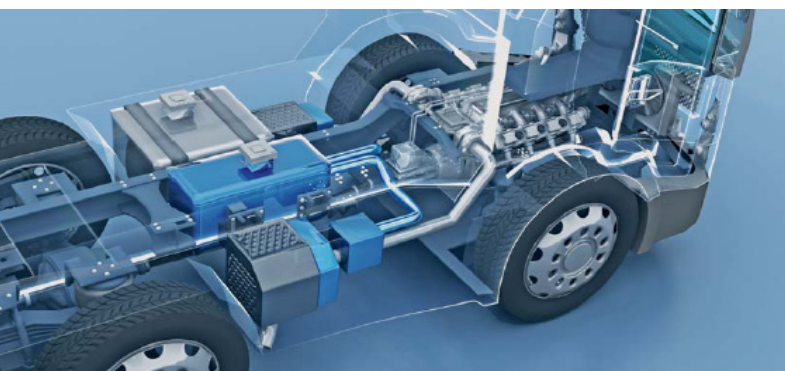


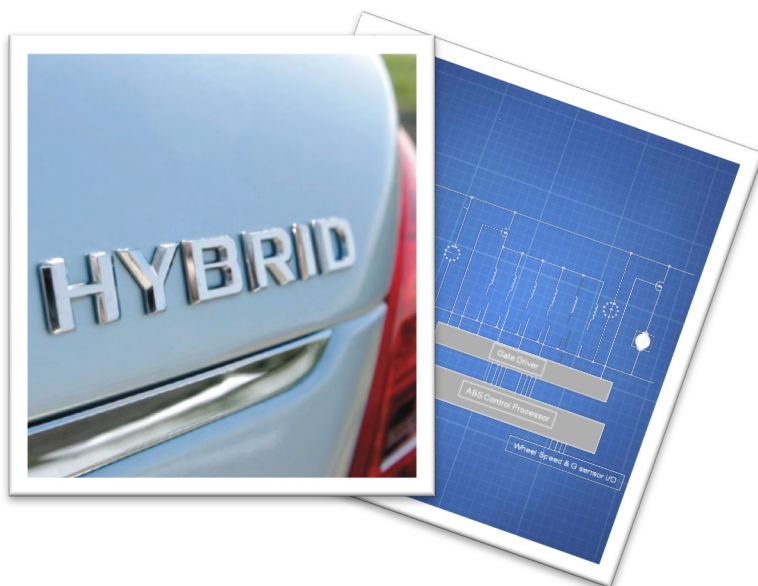


# EV/HEV/PHEV

## MLCC Application Spotlight

Version A12

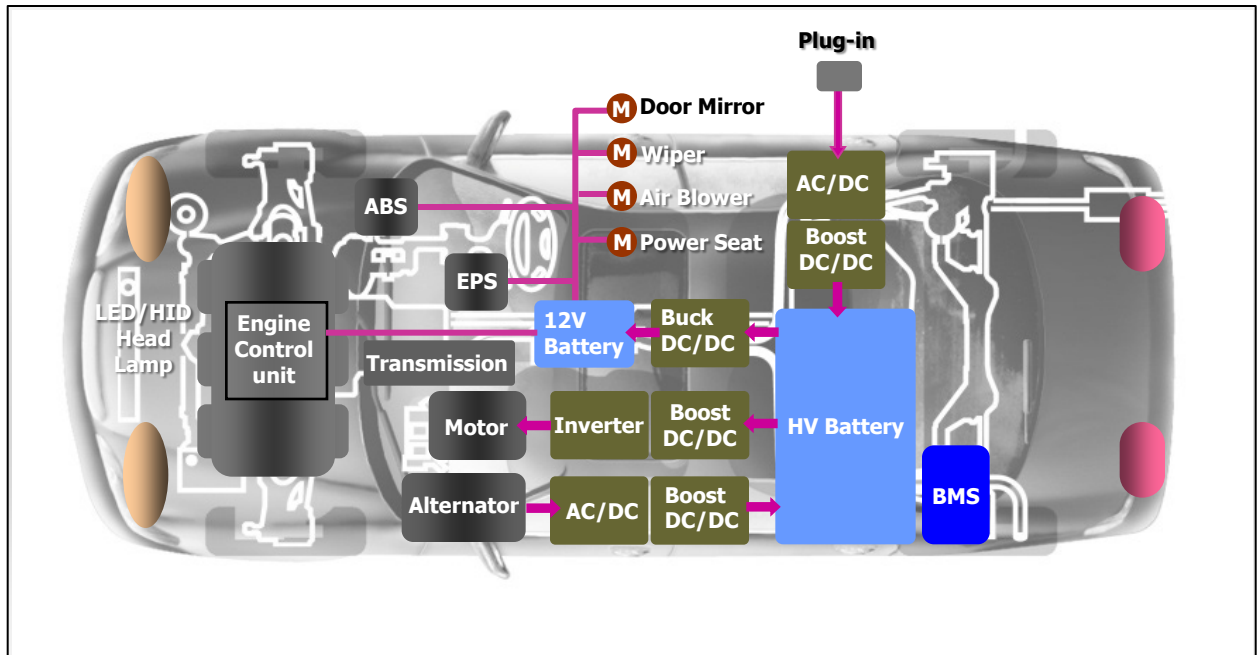
**DC/DC Converter**  
**Power Inverter**  
**Electric Power Steering**  
**AC/DC Battery Charger**  
**Battery Management**  
**Regenerative Charging**  
**Automotive Lighting**



## Introduction

DC/DC  
Converter  
Power  
Inverter  
Electric Power  
Steering  
AC/DC Battery  
Charger  
Battery  
Management  
Regenerative  
Charging  
Automotive  
Lighting

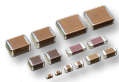
General  
Capacitor  
Mid Voltage  
Capacitor  
High Voltage  
Capacitor  
High Temp.  
Capacitor  
Open Mode  
Capacitor  
Soft Term.  
Capacitor  
2in1 Array  
Capacitor  
Serial Design  
Capacitor  
Mega Cap  
Capacitor



## TDK MLCC Solution for EV/HEV/PHEV Application



### General Capacitor (C/CGA)



- Up to 47 $\mu$ F
- High performance applications
- Electrolytic replacement
- 6.3V to 50V

### Mid & High Voltage (C/CGA)



- Mid Voltage: 100V, 250V, 450V, 630V
- High Voltage: 1000V, 2000V, 3000V
- Lower ESR than Ta
- Up to 15 $\mu$ F

### High Temperature (C/CGA)



- Stable temperature characteristics up to 150°C
- Available 16V~100V
- Up to 10 $\mu$ F
- Safe for automotive underhood application

### Array Type (CKC)



- 2-in-1 construction
- Multiple independent caps
- Available in Soft Termination
- Reduce mounting area

### Open Mode (C/CGA)



- Same material and manufacturing
- Increased internal gap
- Reduces risk of short
- Available in X7R & X8R up to 22 $\mu$ F

### Soft Termination (C/CGA)



- Additional conductive resin layer
- Absorb thermal & mechanical stress
- Reduce solder crack
- Higher bending strength

### Mega Cap Type (CKG)



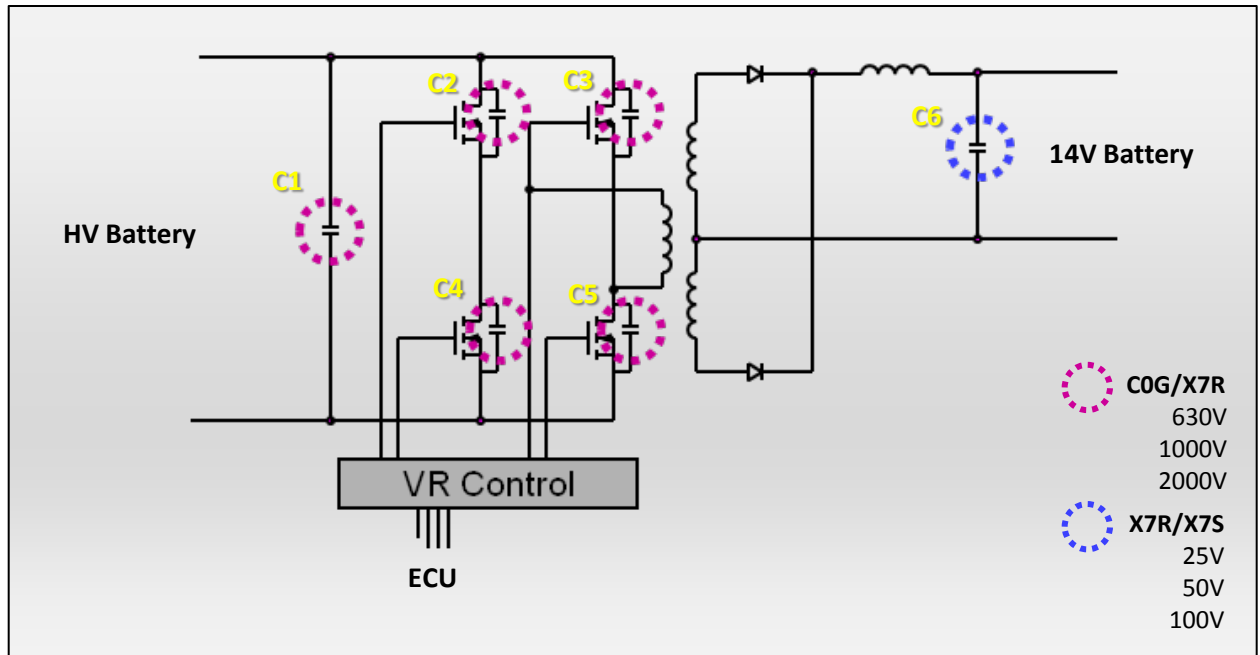
- Single and double stacked
- Absorb thermal & mechanical stress
- Absorb piezoelectric
- Electrolytic replacement

### Serial Construction Type (CEU)



- Internal serial construction
- Soft termination reduce solder crack
- Improved bending strength
- Design for automotive battery line

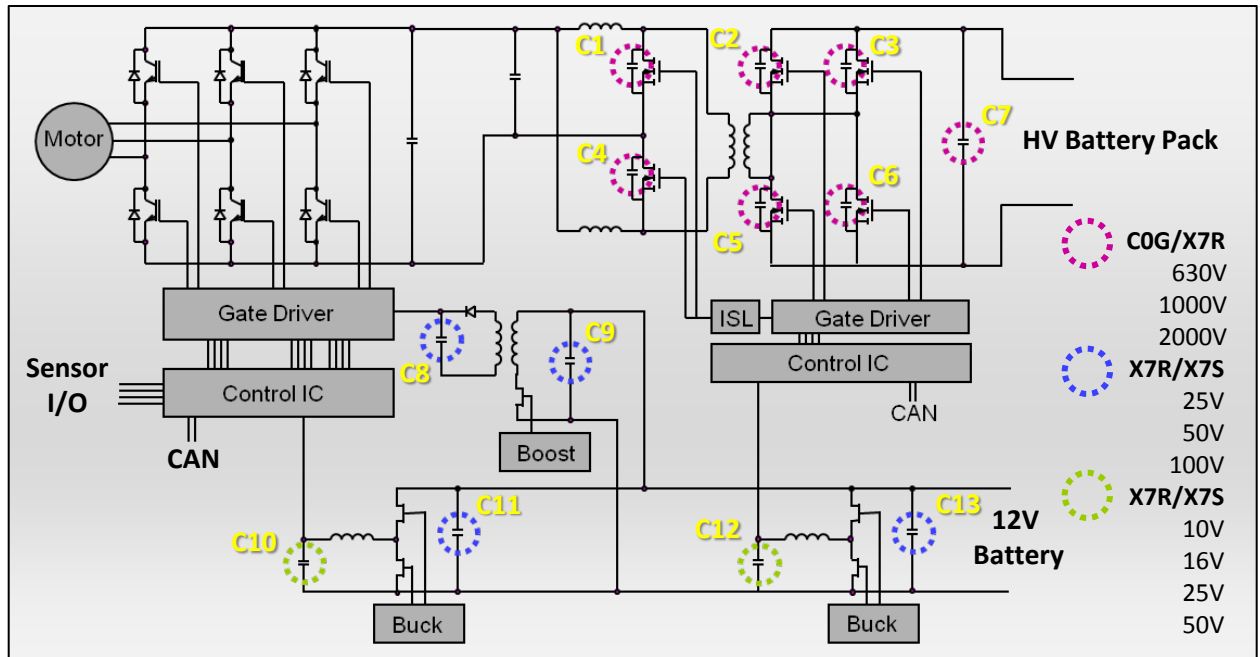




## DC/DC Converter



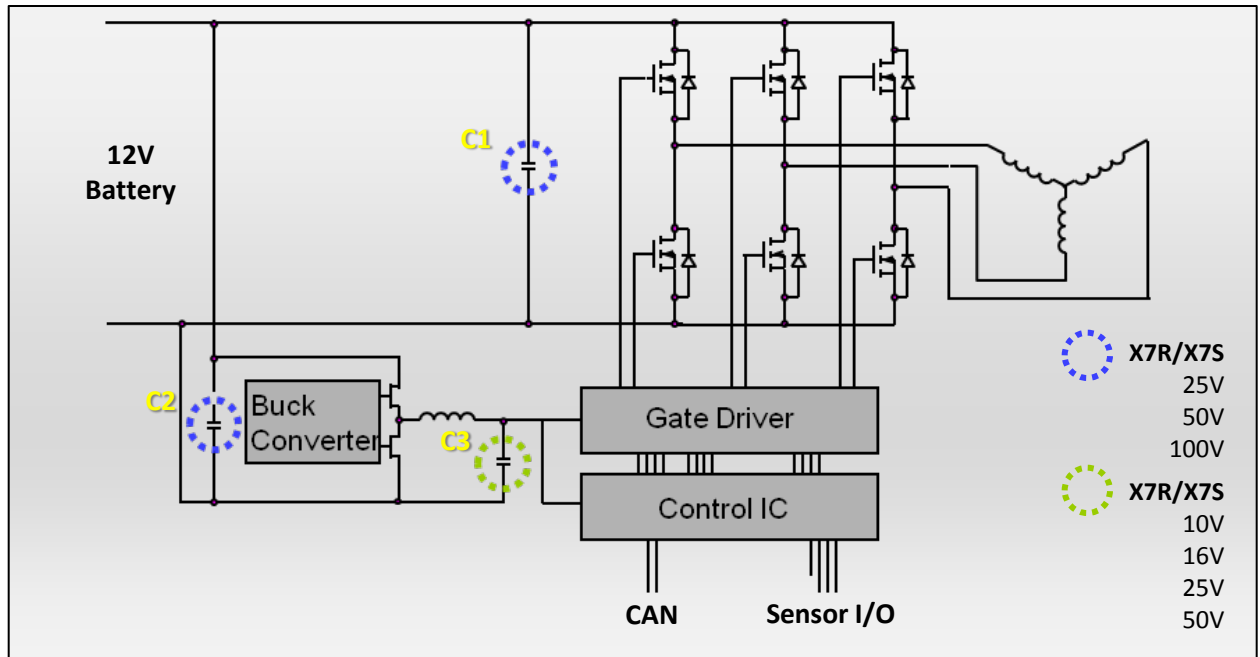
| Designation            | Series       | Description                    | Product Guide | Item List |
|------------------------|--------------|--------------------------------|---------------|-----------|
| C1, C2, C3, C4, C5, C6 | Mid Volt     | 100V - 630V; C0G               |               |           |
|                        |              | 100V - 630V; X7R/X7S/X7T       |               |           |
|                        |              | 100V - 630V; Mega Cap          |               |           |
| C6                     | General      | 50V; C0G                       |               |           |
|                        |              | 6.3V - 50V; X7R/X7S            |               |           |
|                        |              | 6.3V - 50V; X5R                |               |           |
| Option                 | High Voltage | 1000V - 3000V; X7R/X7S/C0G     |               |           |
| Option                 | High Temp    | 16V - 100V; X8R (150C)         |               |           |
|                        |              | 25V - 50V; C0G (150C)          |               |           |
| Option                 | Open Mode    | 16V - 100V; X7R                |               |           |
|                        |              | 50V; X8R (150C)                |               |           |
| Option                 | Soft Term    | 16V - 630V; X7R/X7S/X7T        |               |           |
|                        |              | 50V - 100V; C0G; 2:1 Array     |               |           |
|                        |              | 50V - 100V; X7R; 2:1 Array     |               |           |
|                        |              | 50V; X8R; 2:1 Array            |               |           |
|                        |              | 50V - 100V; X7R; Serial Design |               |           |
| Option                 | CEU          | 50V - 100V; X7R; Serial Design |               |           |
| Option                 | Mega Cap     | 16V - 630V; X7R/X7S/X7T        |               |           |



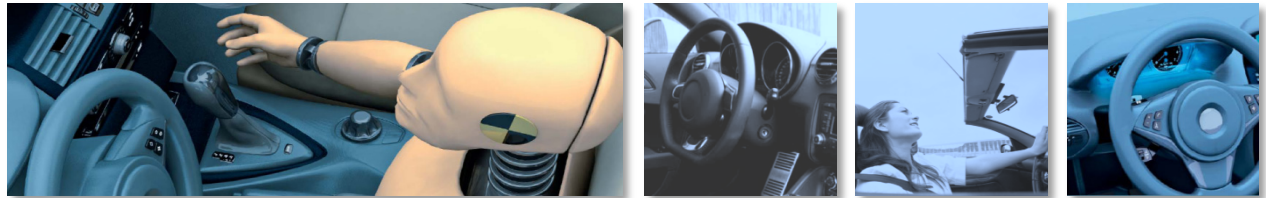
## Power Inverter



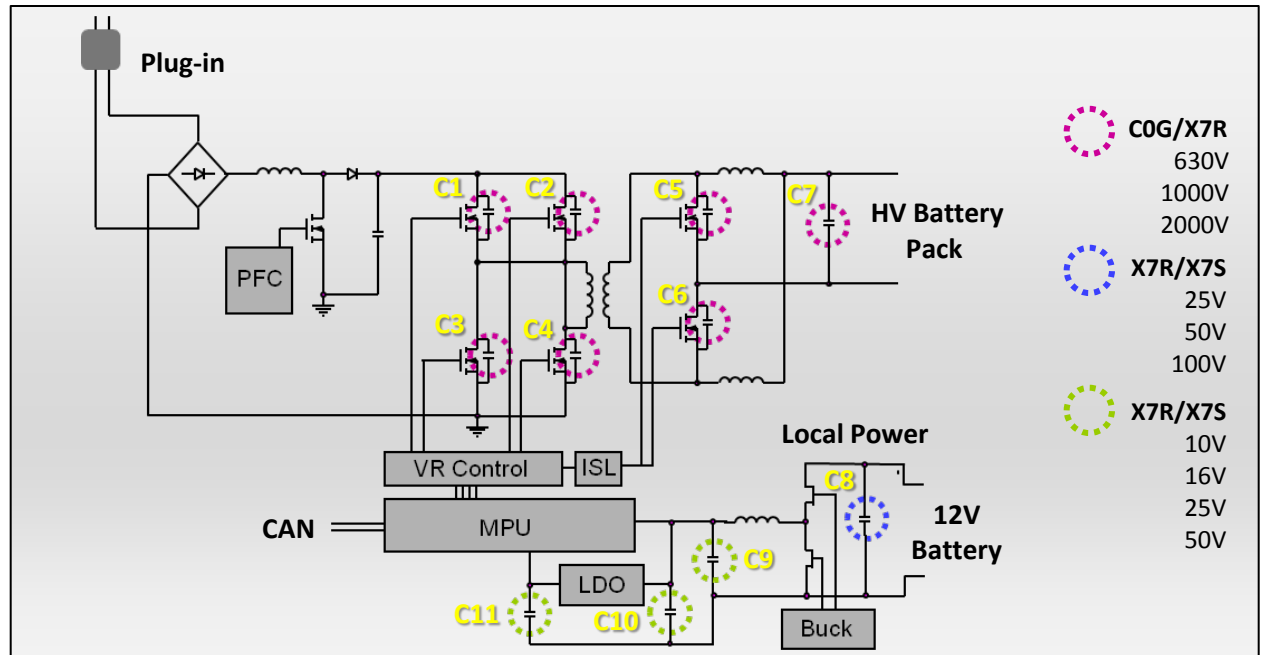
| Designation                             | Series       | Description                    | Product Guide | Item List |
|-----------------------------------------|--------------|--------------------------------|---------------|-----------|
| C1, C2, C3, C4, C5, C6, C7, C8, C9, C11 | Mid Volt     | 100V - 630V; C0G               |               |           |
|                                         |              | 100V - 630V; X7R/X7S/X7T       |               |           |
|                                         |              | 100V - 630V; Mega Cap          |               |           |
| C8, C9, C10, C11, C12, C13              | General      | 50V; C0G                       |               |           |
|                                         |              | 6.3V - 50V; X7R/X7S            |               |           |
|                                         |              | 6.3V - 50V; X5R                |               |           |
| Option                                  | High Voltage | 1000V - 3000V; X7R/X7S/C0G     |               |           |
| Option                                  | Mega Cap     | 16V - 630V; X7R/X7S/X7T        |               |           |
| Option                                  | Open Mode    | 16V - 100V; X7R                |               |           |
|                                         |              | 50V; X8R (150C)                |               |           |
| Option                                  | Soft Term    | 16V - 630V; X7R/X7S/X7T        |               |           |
|                                         |              | 50V - 100V; C0G; 2:1 Array     |               |           |
|                                         |              | 50V - 100V; X7R; 2:1 Array     |               |           |
|                                         |              | 50V; X8R; 2:1 Array            |               |           |
|                                         |              | 50V - 100V; X7R; Serial Design |               |           |
| Option                                  | 2:1 Array    | 50V - 100V; C0G; 2:1 Array     |               |           |
|                                         |              | 10V - 100V; X7R; 2:1 Array     |               |           |
|                                         |              | 50V; X8R; 2:1 Array            |               |           |
| Option                                  | CEU          | 50V - 100V; X7R; Serial Design |               |           |



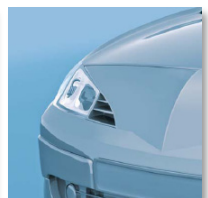
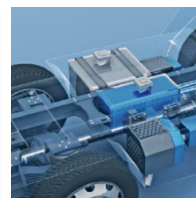
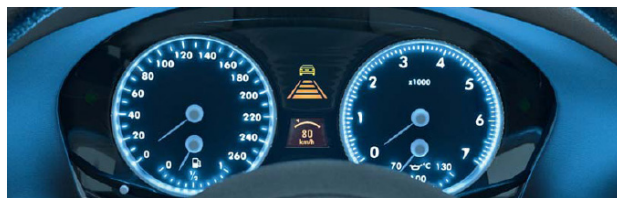
## Electric Power Steering



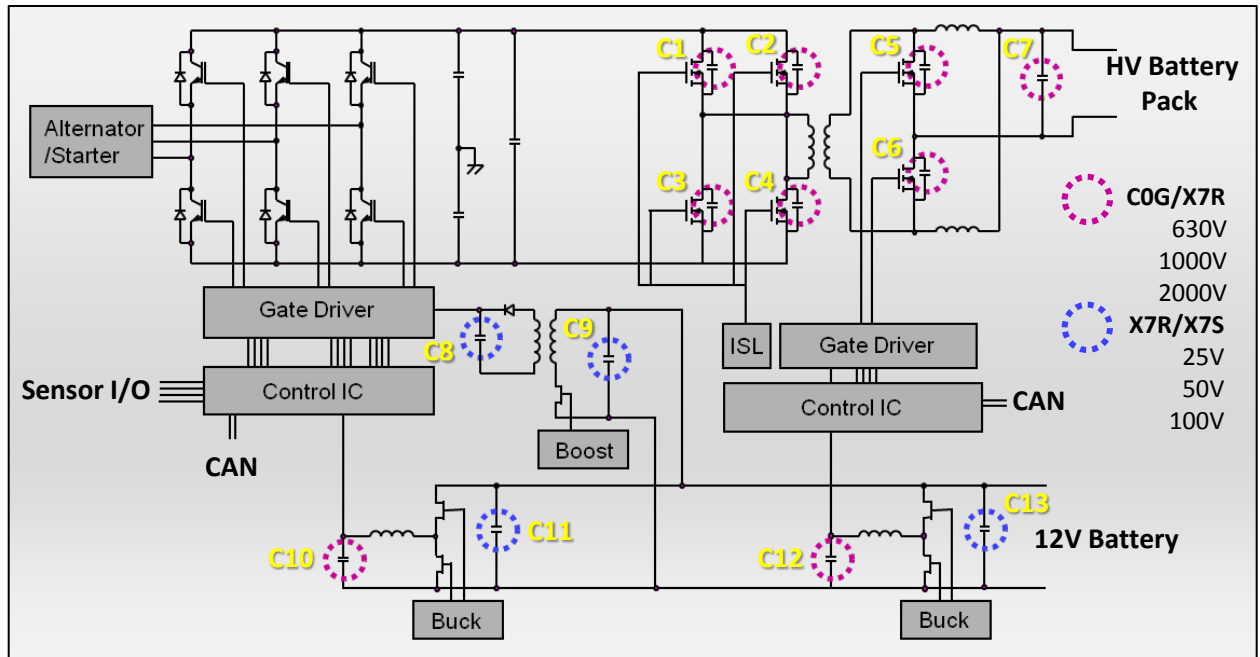
| Designation | Series    | Description                    | Product Guide | Item List |
|-------------|-----------|--------------------------------|---------------|-----------|
| C1, C2, C3  | General   | 50V; C0G                       |               |           |
|             |           | 6.3V - 50V; X7R/X7S            |               |           |
|             |           | 6.3V - 50V; X5R                |               |           |
| C1, C2      | Mid Volt  | 100V - 630V; C0G               |               |           |
|             |           | 100V - 630V; X7R/X7S/X7T       |               |           |
|             |           | 100V - 630V; Mega Cap          |               |           |
| Option      | Open Mode | 16V - 100V; X7R                |               |           |
| Option      | Mega Cap  | 50V; X8R (150C)                |               |           |
| Option      | Soft Term | 16V - 630V; X7R/X7S/X7T        |               |           |
|             |           | 16V - 630V; X7R/X7S/X7T        |               |           |
|             |           | 50V - 100V; C0G; 2:1 Array     |               |           |
|             |           | 50V - 100V; X7R; 2:1 Array     |               |           |
|             |           | 50V; X8R; 2:1 Array            |               |           |
| Option      | 2:1 Array | 50V - 100V; X7R; Serial Design |               |           |
|             |           | 50V - 100V; C0G; 2:1 Array     |               |           |
|             |           | 10V - 100V; X7R; 2:1 Array     |               |           |
| Option      | CEU       | 50V; X8R; 2:1 Array            |               |           |
|             |           | 50V - 100V; X7R; Serial Design |               |           |



## AC/DC Battery Charger



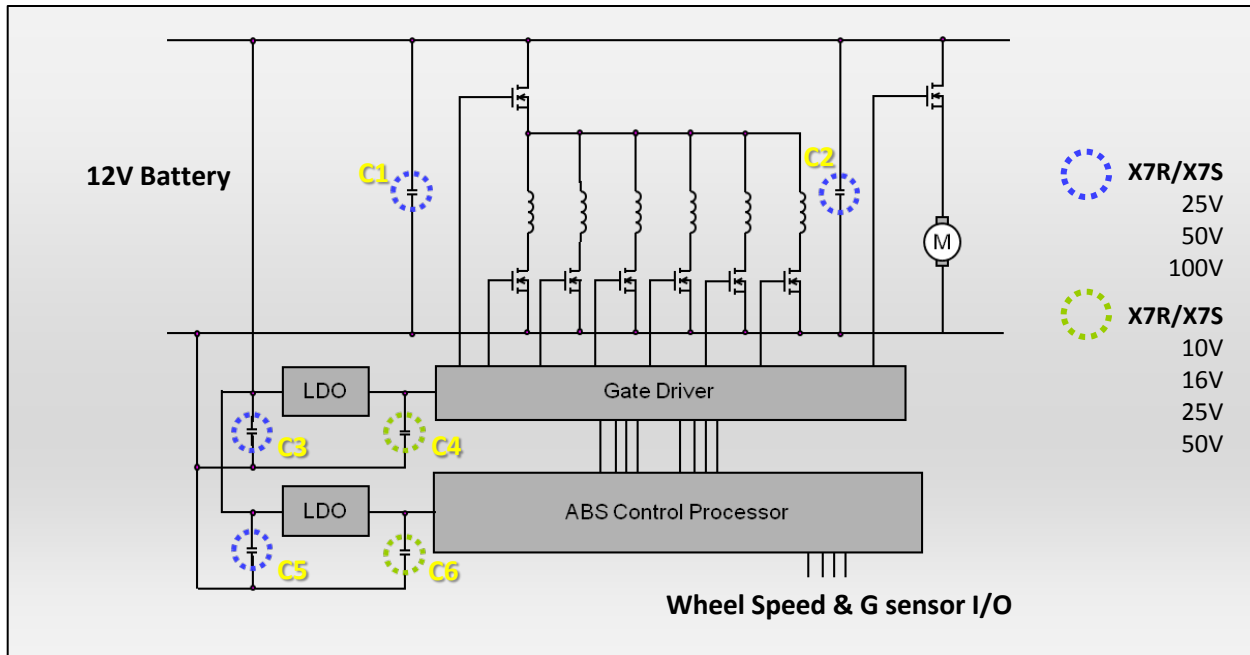
| Designation                    | Series       | Description                    | Product Guide | Item List |
|--------------------------------|--------------|--------------------------------|---------------|-----------|
| C1, C2, C3, C4, C5, C6, C7, C8 | Mid Volt     | 100V - 630V; C0G               |               |           |
|                                |              | 100V - 630V; X7R/X7S/X7T       |               |           |
|                                |              | 100V - 630V; Mega Cap          |               |           |
| C8, C9, C10, C11               | General      | 50V; C0G                       |               |           |
|                                |              | 6.3V - 50V; X7R/X7S            |               |           |
|                                |              | 6.3V - 50V; X5R                |               |           |
| Option                         | High Voltage | 1000V - 3000V; X7R/X7S/C0G     |               |           |
| Option                         | High Temp    | 16V - 100V; X8R (150C)         |               |           |
|                                |              | 25V - 50V; C0G (150C)          |               |           |
| Option                         | Open Mode    | 16V - 100V; X7R                |               |           |
|                                |              | 50V; X8R (150C)                |               |           |
| Option                         | Mega Cap     | 16V - 630V; X7R/X7S/X7T        |               |           |
|                                |              | 16V - 630V; X7R/X7S/X7T        |               |           |
|                                |              | 50V - 100V; C0G; 2:1 Array     |               |           |
|                                |              | 50V - 100V; X7R; 2:1 Array     |               |           |
|                                |              | 50V; X8R; 2:1 Array            |               |           |
| Option                         | Soft Term    | 50V - 100V; X7R; Serial Design |               |           |
|                                |              | 50V - 100V; C0G; 2:1 Array     |               |           |
|                                |              | 10V - 100V; X7R; 2:1 Array     |               |           |
|                                |              | 50V; X8R; 2:1 Array            |               |           |
| Option                         | 2:1 Array    | 50V - 100V; X7R; Serial Design |               |           |
| Option                         | CEU          | 50V - 100V; X7R; Serial Design |               |           |



## Battery Management System



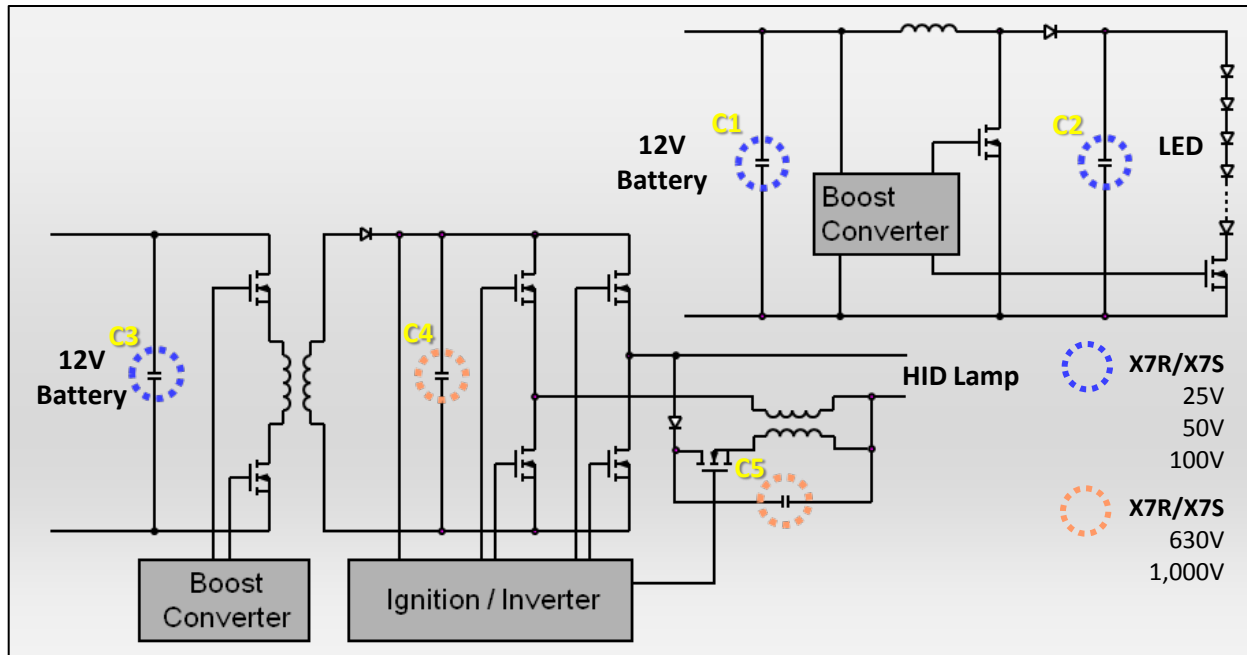
| Designation                                   | Series       | Description                    | Product Guide | Item List |
|-----------------------------------------------|--------------|--------------------------------|---------------|-----------|
| C1, C2, C3, C4,<br>C5, C6, C7, C8,<br>C9, C11 | Mid Volt     | 100V - 630V; C0G               |               |           |
|                                               |              | 100V - 630V; X7R/X7S/X7T       |               |           |
|                                               |              | 100V - 630V; Mega Cap          |               |           |
| C8, C9, C10,<br>C11, C12, C13                 | General      | 50V; C0G                       |               |           |
|                                               |              | 6.3V - 50V; X7R/X7S            |               |           |
|                                               |              | 6.3V - 50V; X5R                |               |           |
| Option                                        | High Voltage | 1000V - 3000V; X7R/X7S/C0G     |               |           |
| Option                                        | High Temp    | 16V - 100V; X8R (150C)         |               |           |
|                                               |              | 25V - 50V; C0G (150C)          |               |           |
| Option                                        | Open Mode    | 16V - 100V; X7R                |               |           |
|                                               |              | 50V; X8R (150C)                |               |           |
| Option                                        | Mega Cap     | 16V - 630V; X7R/X7S/X7T        |               |           |
|                                               |              | 16V - 630V; X7R/X7S/X7T        |               |           |
|                                               |              | 50V - 100V; C0G; 2:1 Array     |               |           |
|                                               |              | 50V - 100V; X7R; 2:1 Array     |               |           |
|                                               |              | 50V; X8R; 2:1 Array            |               |           |
| Option                                        | Soft Term    | 50V - 100V; X7R; Serial Design |               |           |
|                                               |              | 50V - 100V; C0G; 2:1 Array     |               |           |
|                                               |              | 10V - 100V; X7R; 2:1 Array     |               |           |
|                                               |              | 50V; X8R; 2:1 Array            |               |           |
| Option                                        | 2:1 Array    | 50V - 100V; X7R; Serial Design |               |           |
| Option                                        | CEU          | 50V - 100V; X7R; Serial Design |               |           |



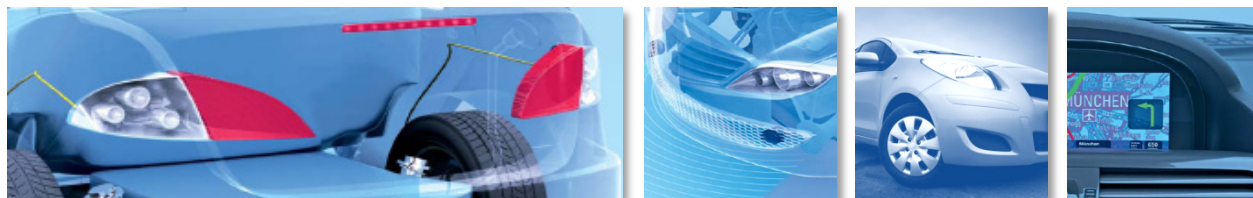
## Regenerative Charging



| Designation            | Series    | Description                    | Product Guide | Item List |
|------------------------|-----------|--------------------------------|---------------|-----------|
| C1, C2, C3, C4, C5, C6 | General   | 50V; C0G                       |               |           |
|                        |           | 6.3V - 50V; X7R/X7S            |               |           |
|                        |           | 6.3V - 50V; X5R                |               |           |
| C1, C2, C3, C5         | Mid Volt  | 100V - 630V; C0G               |               |           |
|                        |           | 100V - 630V; X7R/X7S/X7T       |               |           |
|                        |           | 100V - 630V; Mega Cap          |               |           |
| Option                 | High Temp | 16V - 100V; X8R (150C)         |               |           |
|                        |           | 25V - 50V; C0G (150C)          |               |           |
| Option                 | Open Mode | 16V - 100V; X7R                |               |           |
|                        |           | 50V; X8R (150C)                |               |           |
| Option                 | Mega Cap  | 16V - 630V; X7R/X7S/X7T        |               |           |
| Option                 | Soft Term | 16V - 630V; X7R/X7S/X7T        |               |           |
|                        |           | 50V - 100V; C0G; 2:1 Array     |               |           |
|                        |           | 50V - 100V; X7R; 2:1 Array     |               |           |
|                        |           | 50V; X8R; 2:1 Array            |               |           |
|                        |           | 50V - 100V; X7R; Serial Design |               |           |
| Option                 | 2:1 Array | 50V - 100V; C0G; 2:1 Array     |               |           |
|                        |           | 10V - 100V; X7R; 2:1 Array     |               |           |
|                        |           | 50V; X8R; 2:1 Array            |               |           |
| Option                 | CEU       | 50V - 100V; X7R; Serial Design |               |           |



## Automotive Lighting



| Designation        | Series    | Description                    | Product Guide | Item List |
|--------------------|-----------|--------------------------------|---------------|-----------|
| C1, C2             | High Temp | 16V - 100V; X8R (150C)         |               |           |
|                    |           | 25V - 50V; C0G (150C)          |               |           |
|                    |           | 50V; C0G                       |               |           |
| C3                 | General   | 6.3V - 50V; X7R/X7S            |               |           |
|                    |           | 6.3V - 50V; X5R                |               |           |
| C1, C2, C3, C4, C5 | Mid Volt  | 100V - 630V; C0G               |               |           |
|                    |           | 100V - 630V; X7R/X7S/X7T       |               |           |
| C4, C5             | High Volt | 3000V; C0G                     |               |           |
|                    |           | 1000V - 2000V; X7R/X7S         |               |           |
| Option             | Open Mode | 16V - 100V; X7R                |               |           |
|                    |           | 50V; X8R (150C)                |               |           |
| Option             | Mega Cap  | 16V - 630V; X7R/X7S/X7T        |               |           |
|                    |           | 16V - 630V; X7R/X7S/X7T        |               |           |
|                    |           | 50V - 100V; C0G; 2:1 Array     |               |           |
|                    |           | 50V - 100V; X7R; 2:1 Array     |               |           |
|                    |           | 50V; X8R; 2:1 Array            |               |           |
| Option             | Soft Term | 50V - 100V; X7R; Serial Design |               |           |
|                    |           | 50V - 100V; C0G; 2:1 Array     |               |           |
|                    |           | 10V - 100V; X7R; 2:1 Array     |               |           |
| Option             | 2:1 Array | 50V; X8R; 2:1 Array            |               |           |
|                    |           | 50V - 100V; X7R; Serial Design |               |           |
| Option             | CEU       | 50V - 100V; X7R; Serial Design |               |           |

# General (50V and lower) Capacitor

## Introduction

DC/DC  
Converter

Power  
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Electric Power  
Steering

AC/DC Battery  
Charger

Battery  
Management

Regenerative  
Charging

Automotive  
Lighting

## General Capacitor

Mid Voltage  
Capacitor

High Voltage  
Capacitor

High Temp.  
Capacitor

Open Mode  
Capacitor

Soft Term.  
Capacitor

2in1 Array  
Capacitor

Serial Design  
Capacitor

Mega Cap  
Capacitor

## • DIMENSIONS

|             | Body<br>Length<br>(mm) | Body<br>Width<br>(mm) |
|-------------|------------------------|-----------------------|
| CGA2 (0402) | 1.00                   | 0.50                  |
| CGA3 (0603) | 1.60                   | 0.80                  |
| CGA4 (0805) | 2.00                   | 1.25                  |
| CGA5 (1206) | 3.20                   | 1.60                  |
| CGA6 (1210) | 3.20                   | 2.50                  |
| CGA8 (1812) | 4.50                   | 3.20                  |
| CGA9 (2220) | 5.70                   | 5.00                  |

## • PART NUMBER DESCRIPTIONS

**CGA9 N 3 X7R 1H 106 K I 0000**  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- 1) Series Name & Dimensions
- 2) Thickness Dimensions
- 3) Life Test Condition
- 4) Temperature Characteristics
- 5) Rated Voltage (DC)
- 6) Nominal Capacitance (pF)
- 7) Capacitance Tolerance
- 8) Packaging Style
- 9) Internal Codes

## • FEATURES

- ❖ Wide range of case size and superior dimension precision
- ❖ Voltage rating up to 50V
- ❖ High mechanical strength
- ❖ Capacitance range up to 46μF
- ❖ No polarity
- ❖ Low ESR

## Capacitor Range // C0G

| Capacitance<br>(pF) | Cap<br>Code | CGA2<br>(0402) | CGA3<br>(0603) |             | CGA4<br>(0805) |             | CGJ5<br>(1206) | CGJ6<br>(1210) | CGJ8<br>(1812) |
|---------------------|-------------|----------------|----------------|-------------|----------------|-------------|----------------|----------------|----------------|
|                     |             | 1H<br>(50V)    | 1H<br>(50V)    | 1E<br>(25V) | 1H<br>(50V)    | 1E<br>(25V) | 1H<br>(50V)    | 1H<br>(50V)    | 1H<br>(50V)    |
| 100                 | 101         |                |                |             |                |             |                |                |                |
| 120                 | 121         |                |                |             |                |             |                |                |                |
| 150                 | 151         |                |                |             |                |             |                |                |                |
| 180                 | 181         |                |                |             |                |             |                |                |                |
| 220                 | 221         |                |                |             |                |             |                |                |                |
| 270                 | 271         |                |                |             |                |             |                |                |                |
| 330                 | 331         |                |                |             |                |             |                |                |                |
| 390                 | 391         |                |                |             |                |             |                |                |                |
| 470                 | 471         |                |                |             |                |             |                |                |                |
| 560                 | 561         |                |                |             |                |             |                |                |                |
| 680                 | 681         |                |                |             |                |             |                |                |                |
| 820                 | 821         |                |                |             |                |             |                |                |                |
| 1,000               | 102         |                |                |             |                |             |                |                |                |
| 1,200               | 122         |                |                |             |                |             |                |                |                |
| 1,500               | 152         |                |                |             |                |             |                |                |                |
| 1,800               | 182         |                |                |             |                |             |                |                |                |
| 2,200               | 222         |                |                |             |                |             |                |                |                |
| 2,700               | 272         |                |                |             |                |             |                |                |                |
| 3,300               | 332         |                |                |             |                |             |                |                |                |
| 3,900               | 392         |                |                |             |                |             |                |                |                |
| 4,700               | 472         |                |                |             |                |             |                |                |                |
| 5,600               | 562         |                |                |             |                |             |                |                |                |
| 6,800               | 682         |                |                |             |                |             |                |                |                |
| 8,200               | 822         |                |                |             |                |             |                |                |                |
| 10,000              | 103         |                |                |             |                |             |                |                |                |
| 15,000              | 153         |                |                |             |                |             |                |                |                |
| 22,000              | 223         |                |                |             |                |             |                |                |                |
| 33,000              | 333         |                |                |             |                |             |                |                |                |
| 47,000              | 473         |                |                |             |                |             |                |                |                |
| 68,000              | 683         |                |                |             |                |             |                |                |                |
| 100,000             | 104         |                |                |             |                |             |                |                |                |
| 150,000             | 154         |                |                |             |                |             |                |                |                |
| 220,000             | 224         |                |                |             |                |             |                |                |                |

C0G Under Development

Introduction

DC/DC

Converter

Power

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AC/DC Battery

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Battery

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Regenerative

Charging

Automotive

Lighting

General

Capacitor

Mid Voltage

Capacitor

High Voltage

Capacitor

High Temp.

Capacitor

Open Mode

Capacitor

Soft Term.

Capacitor

2in1 Array

Capacitor

Serial Design

Capacitor

Mega Cap

Capacitor

| Capacitance (pF) | Cap Code | CGA2 (0402) |          |          |          |          | CGA3 (0603) |          |          |          |           |
|------------------|----------|-------------|----------|----------|----------|----------|-------------|----------|----------|----------|-----------|
|                  |          | 1H (50V)    | 1V (35V) | 1E (25V) | 1C (16V) | 1A (10V) | 1H (50V)    | 1V (35V) | 1E (25V) | 1C (16V) | 0J (6.3V) |
| 1,000            | 102      |             |          |          |          |          |             |          |          |          |           |
| 1,500            | 152      |             |          |          |          |          |             |          |          |          |           |
| 2,200            | 222      |             |          |          |          |          |             |          |          |          |           |
| 3,300            | 332      |             |          |          |          |          |             |          |          |          |           |
| 4,700            | 472      |             |          |          |          |          |             |          |          |          |           |
| 6,800            | 682      |             |          |          |          |          |             |          |          |          |           |
| 10,000           | 103      |             |          |          |          |          |             |          |          |          |           |
| 15,000           | 153      |             |          |          |          |          |             |          |          |          |           |
| 22,000           | 223      |             |          |          |          |          |             |          |          |          |           |
| 33,000           | 333      |             |          |          |          |          |             |          |          |          |           |
| 47,000           | 473      |             |          |          |          |          |             |          |          |          |           |
| 68,000           | 683      |             |          |          |          |          |             |          |          |          |           |
| 100,000          | 104      |             |          |          |          |          |             |          |          |          |           |
| 150,000          | 154      |             |          |          |          |          |             |          |          |          |           |
| 220,000          | 224      |             |          |          |          |          |             |          |          |          |           |
| 330,000          | 334      |             |          |          |          |          |             |          |          |          |           |
| 470,000          | 474      |             |          |          |          |          |             |          |          |          |           |
| 680,000          | 684      |             |          |          |          |          |             |          |          |          |           |
| 1,000,000        | 105      |             |          |          |          |          |             |          |          |          |           |
| 1,500,000        | 155      |             |          |          |          |          |             |          |          |          |           |
| 2,200,000        | 225      |             |          |          |          |          |             |          |          |          |           |

| Capacitance (pF) | Cap Code | CGA4 (0805) |          |          |          |          | CGA5 (1206) |          |          |          |           |
|------------------|----------|-------------|----------|----------|----------|----------|-------------|----------|----------|----------|-----------|
|                  |          | 1H (50V)    | 1V (35V) | 1E (25V) | 1C (16V) | 1A (10V) | 1H (50V)    | 1V (35V) | 1E (25V) | 1C (16V) | 0J (6.3V) |
| 150,000          | 154      |             |          |          |          |          |             |          |          |          |           |
| 220,000          | 224      |             |          |          |          |          |             |          |          |          |           |
| 330,000          | 334      |             |          |          |          |          |             |          |          |          |           |
| 470,000          | 474      |             |          |          |          |          |             |          |          |          |           |
| 680,000          | 684      |             |          |          |          |          |             |          |          |          |           |
| 1,000,000        | 105      |             |          |          |          |          |             |          |          |          |           |
| 1,500,000        | 155      |             |          |          |          |          |             |          |          |          |           |
| 2,200,000        | 225      |             |          |          |          |          |             |          |          |          |           |
| 3,300,000        | 335      |             |          |          |          |          |             |          |          |          |           |
| 4,700,000        | 475      |             |          |          |          |          |             |          |          |          |           |
| 6,800,000        | 685      |             |          |          |          |          |             |          |          |          |           |
| 10,000,000       | 106      |             |          |          |          |          |             |          |          |          |           |
| 15,000,000       | 156      |             |          |          |          |          |             |          |          |          |           |
| 22,000,000       | 226      |             |          |          |          |          |             |          |          |          |           |

| Capacitance (pF) | Cap Code | CGA6 (1210) |          |          |           | CGA8 (1812) |          |          | CGA9 (2220) |          |          |
|------------------|----------|-------------|----------|----------|-----------|-------------|----------|----------|-------------|----------|----------|
|                  |          | 1H (50V)    | 1E (25V) | 1C (16V) | 0J (6.3V) | 1H (50V)    | 1E (25V) | 1C (16V) | 1H (50V)    | 1E (25V) | 1C (16V) |
| 1,000,000        | 105      |             |          |          |           |             |          |          |             |          |          |
| 1,500,000        | 155      |             |          |          |           |             |          |          |             |          |          |
| 2,200,000        | 225      |             |          |          |           |             |          |          |             |          |          |
| 3,300,000        | 335      |             |          |          |           |             |          |          |             |          |          |
| 4,700,000        | 475      |             |          |          |           |             |          |          |             |          |          |
| 6,800,000        | 685      |             |          |          |           |             |          |          |             |          |          |
| 10,000,000       | 106      |             |          |          |           |             |          |          |             |          |          |
| 15,000,000       | 156      |             |          |          |           |             |          |          |             |          |          |
| 22,000,000       | 226      |             |          |          |           |             |          |          |             |          |          |
| 33,000,000       | 336      |             |          |          |           |             |          |          |             |          |          |
| 47,000,000       | 476      |             |          |          |           |             |          |          |             |          |          |

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Capacitor

Open Mode  
Capacitor

Soft Term.  
Capacitor

2in1 Array  
Capacitor

Serial Design  
Capacitor

Mega Cap  
Capacitor

| Capacitance<br>(pF) | Cap<br>Code | CGA2<br>(0402) |             |             |             |             | CGA3<br>(0603) |             |             |             |             |              |
|---------------------|-------------|----------------|-------------|-------------|-------------|-------------|----------------|-------------|-------------|-------------|-------------|--------------|
|                     |             | 1H<br>(50V)    | 1V<br>(35V) | 1E<br>(25V) | 1C<br>(16V) | 1A<br>(10V) | 1H<br>(50V)    | 1V<br>(35V) | 1E<br>(25V) | 1C<br>(16V) | 1A<br>(10V) | 0J<br>(6.3V) |
| 1,000               | 102         |                |             |             |             |             |                |             |             |             |             |              |
| 1,500               | 152         |                |             |             |             |             |                |             |             |             |             |              |
| 2,200               | 222         |                |             |             |             |             |                |             |             |             |             |              |
| 3,300               | 332         |                |             |             |             |             |                |             |             |             |             |              |
| 4,700               | 472         |                |             |             |             |             |                |             |             |             |             |              |
| 6,800               | 682         |                |             |             |             |             |                |             |             |             |             |              |
| 10,000              | 103         |                |             |             |             |             |                |             |             |             |             |              |
| 15,000              | 153         |                |             |             |             |             |                |             |             |             |             |              |
| 22,000              | 223         |                |             |             |             |             |                |             |             |             |             |              |
| 33,000              | 333         |                |             |             |             |             |                |             |             |             |             |              |
| 47,000              | 473         |                |             |             |             |             |                |             |             |             |             |              |
| 68,000              | 683         |                |             |             |             |             |                |             |             |             |             |              |
| 100,000             | 104         |                |             |             |             |             |                |             |             |             |             |              |
| 150,000             | 154         |                |             |             |             |             |                |             |             |             |             |              |
| 220,000             | 224         |                |             |             |             |             |                |             |             |             |             |              |
| 330,000             | 334         |                |             |             |             |             |                |             |             |             |             |              |
| 470,000             | 474         |                |             |             |             |             |                |             |             |             |             |              |
| 680,000             | 684         |                |             |             |             |             |                |             |             |             |             |              |
| 1,000,000           | 105         |                |             |             |             |             |                |             |             |             |             |              |
| 1,500,000           | 155         |                |             |             |             |             |                |             |             |             |             |              |
| 2,200,000           | 225         |                |             |             |             |             |                |             |             |             |             |              |
| 3,300,000           | 335         |                |             |             |             |             |                |             |             |             |             |              |
| 4,700,000           | 475         |                |             |             |             |             |                |             |             |             |             |              |

| Capacitance<br>(pF) | Cap<br>Code | CGA4<br>(0805) |             |             |             |             | CGA5<br>(1206) |             |             |             | CGA6<br>(1210) |              |
|---------------------|-------------|----------------|-------------|-------------|-------------|-------------|----------------|-------------|-------------|-------------|----------------|--------------|
|                     |             | 1H<br>(50V)    | 1V<br>(35V) | 1E<br>(25V) | 1C<br>(16V) | 1A<br>(10V) | 1H<br>(50V)    | 1V<br>(35V) | 1E<br>(25V) | 1C<br>(16V) | 1A<br>(10V)    | 0J<br>(6.3V) |
| 150,000             | 154         |                |             |             |             |             |                |             |             |             |                |              |
| 220,000             | 224         |                |             |             |             |             |                |             |             |             |                |              |
| 330,000             | 334         |                |             |             |             |             |                |             |             |             |                |              |
| 470,000             | 474         |                |             |             |             |             |                |             |             |             |                |              |
| 680,000             | 684         |                |             |             |             |             |                |             |             |             |                |              |
| 1,000,000           | 105         |                |             |             |             |             |                |             |             |             |                |              |
| 1,500,000           | 155         |                |             |             |             |             |                |             |             |             |                |              |
| 2,200,000           | 225         |                |             |             |             |             |                |             |             |             |                |              |
| 3,300,000           | 335         |                |             |             |             |             |                |             |             |             |                |              |
| 4,700,000           | 475         |                |             |             |             |             |                |             |             |             |                |              |
| 6,800,000           | 685         |                |             |             |             |             |                |             |             |             |                |              |
| 10,000,000          | 106         |                |             |             |             |             |                |             |             |             |                |              |
| 15,000,000          | 156         |                |             |             |             |             |                |             |             |             |                |              |
| 22,000,000          | 226         |                |             |             |             |             |                |             |             |             |                |              |
| 33,000,000          | 336         |                |             |             |             |             |                |             |             |             |                |              |
| 47,000,000          | 476         |                |             |             |             |             |                |             |             |             |                |              |

X5R Under Development

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Capacitor

2in1 Array  
Capacitor

Serial Design  
Capacitor

Mega Cap  
Capacitor

## • DIMENSIONS

|             | Body Length (mm) | Body Width (mm) |
|-------------|------------------|-----------------|
| CGA2 (0402) | 1.00             | 0.50            |
| CGA3 (0603) | 1.60             | 0.80            |
| CGA4 (0805) | 2.00             | 1.25            |
| CGA5 (1206) | 3.20             | 1.60            |
| CGA6 (1210) | 3.20             | 2.50            |
| CGA8 (1812) | 4.50             | 3.20            |
| CGA9 (2220) | 5.70             | 5.00            |

## • PART NUMBER DESCRIPTIONS

**CGA9 N 3 X75 2A 106 K I 0000**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- 1) Series Name & Dimensions
- 2) Thickness Dimensions
- 3) Life Test Condition
- 4) Temperature Characteristics
- 5) Rated Voltage (DC)
- 6) Nominal Capacitance (pF)
- 7) Capacitance Tolerance
- 8) Packaging Style
- 9) Internal Codes

## • FEATURES

- ❖ Unique electrode design allows higher voltage application in smaller case size
- ❖ Voltage rating of 100V, 250V, 450V, and 630V
- ❖ High mechanical strength
- ❖ No polarity
- ❖ Low ESR

## Capacitor Range // C0G

| Capacitance (pF) | Cap Code | CGA3 (0603) |           | CGA4 (0805) |           | CGA5 (1206) |           |           |
|------------------|----------|-------------|-----------|-------------|-----------|-------------|-----------|-----------|
|                  |          | 2E (250V)   | 2A (100V) | 2E (250V)   | 2A (100V) | 2J (630V)   | 2E (250V) | 2A (100V) |
| 100              | 101      |             |           |             |           |             |           |           |
| 120              | 121      |             |           |             |           |             |           |           |
| 150              | 151      |             |           |             |           |             |           |           |
| 180              | 181      |             |           |             |           |             |           |           |
| 220              | 221      |             |           |             |           |             |           |           |
| 270              | 271      |             |           |             |           |             |           |           |
| 330              | 331      |             |           |             |           |             |           |           |
| 390              | 391      |             |           |             |           |             |           |           |
| 470              | 471      |             |           |             |           |             |           |           |
| 560              | 561      |             |           |             |           |             |           |           |
| 680              | 681      |             |           |             |           |             |           |           |
| 820              | 821      |             |           |             |           |             |           |           |
| 1,000            | 102      |             |           |             |           |             |           |           |
| 1,200            | 122      |             |           |             |           |             |           |           |
| 1,500            | 152      |             |           |             |           |             |           |           |
| 1,800            | 182      |             |           |             |           |             |           |           |
| 2,200            | 222      |             |           |             |           |             |           |           |
| 2,700            | 272      |             |           |             |           |             |           |           |
| 3,300            | 332      |             |           |             |           |             |           |           |
| 3,900            | 392      |             |           |             |           |             |           |           |
| 4,700            | 472      |             |           |             |           |             |           |           |
| 5,600            | 562      |             |           |             |           |             |           |           |
| 6,800            | 682      |             |           |             |           |             |           |           |
| 8,200            | 822      |             |           |             |           |             |           |           |
| 10,000           | 103      |             |           |             |           |             |           |           |
| 15,000           | 153      |             |           |             |           |             |           |           |
| 22,000           | 223      |             |           |             |           |             |           |           |
| 33,000           | 333      |             |           |             |           |             |           |           |
| 47,000           | 473      |             |           |             |           |             |           |           |
| 68,000           | 683      |             |           |             |           |             |           |           |

C0G  
 Under Development

| Capacitance (pF) | Cap Code | CGA6 (1210) |           |           | CGA8 (1812) |           |           | CGA9 (2220) |           |           |
|------------------|----------|-------------|-----------|-----------|-------------|-----------|-----------|-------------|-----------|-----------|
|                  |          | 2J (630V)   | 2E (250V) | 2A (100V) | 2J (630V)   | 2E (250V) | 2A (100V) | 2J (630V)   | 2E (250V) | 2A (100V) |
| 3,900            | 392      |             |           |           |             |           |           |             |           |           |
| 4,700            | 472      |             |           |           |             |           |           |             |           |           |
| 5,600            | 562      |             |           |           |             |           |           |             |           |           |
| 6,800            | 682      |             |           |           |             |           |           |             |           |           |
| 8,200            | 822      |             |           |           |             |           |           |             |           |           |
| 10,000           | 103      |             |           |           |             |           |           |             |           |           |
| 15,000           | 153      |             |           |           |             |           |           |             |           |           |
| 22,000           | 223      |             |           |           |             |           |           |             |           |           |
| 33,000           | 333      |             |           |           |             |           |           |             |           |           |
| 47,000           | 473      |             |           |           |             |           |           |             |           |           |
| 68,000           | 683      |             |           |           |             |           |           |             |           |           |
| 100,000          | 104      |             |           |           |             |           |           |             |           |           |
| 150,000          | 154      |             |           |           |             |           |           |             |           |           |

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Capacitor

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Capacitor

Soft Term.

Capacitor

2in1 Array

Capacitor

Serial Design

Capacitor

Mega Cap

Capacitor

| Capacitance<br>(pF) | Cap<br>Code | CGA2<br>(0402) | CGA3<br>(0603) | CGA4<br>(0805) |              |              | CGA5<br>(1206) |              |              |              |
|---------------------|-------------|----------------|----------------|----------------|--------------|--------------|----------------|--------------|--------------|--------------|
|                     |             | 2A<br>(100V)   | 2A<br>(100V)   | 2W<br>(450V)   | 2E<br>(250V) | 2A<br>(100V) | 2J<br>(630V)   | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) |
| 1,000               | 102         |                |                |                |              |              |                |              |              |              |
| 1,500               | 152         |                |                |                |              |              |                |              |              |              |
| 2,200               | 222         |                |                |                |              |              |                |              |              |              |
| 3,300               | 332         |                |                |                |              |              |                |              |              |              |
| 4,700               | 472         |                |                |                |              |              |                |              |              |              |
| 6,800               | 682         |                |                |                |              |              |                |              |              |              |
| 10,000              | 103         |                |                |                |              |              |                |              |              |              |
| 15,000              | 153         |                |                |                |              |              |                |              |              |              |
| 22,000              | 223         |                |                |                |              |              |                |              |              |              |
| 33,000              | 333         |                |                |                |              |              |                |              |              |              |
| 47,000              | 473         |                |                |                |              |              |                |              |              |              |
| 68,000              | 683         |                |                |                |              |              |                |              |              |              |
| 100,000             | 104         |                |                |                |              |              |                |              |              |              |
| 150,000             | 154         |                |                |                |              |              |                |              |              |              |
| 220,000             | 224         |                |                |                |              |              |                |              |              |              |
| 330,000             | 334         |                |                |                |              |              |                |              |              |              |
| 470,000             | 474         |                |                |                |              |              |                |              |              |              |
| 680,000             | 684         |                |                |                |              |              |                |              |              |              |
| 1,000,000           | 105         |                |                |                |              |              |                |              |              |              |
| 1,500,000           | 155         |                |                |                |              |              |                |              |              |              |
| 2,200,000           | 225         |                |                |                |              |              |                |              |              |              |
| 3,300,000           | 335         |                |                |                |              |              |                |              |              |              |
| 4,700,000           | 475         |                |                |                |              |              |                |              |              |              |

| Capacitance<br>(pF) | Cap<br>Code | CGA6<br>(1210) |              |              | CGA8<br>(1812) |              |              |              | CGA9<br>(2220) |              |              |              |
|---------------------|-------------|----------------|--------------|--------------|----------------|--------------|--------------|--------------|----------------|--------------|--------------|--------------|
|                     |             | 2J<br>(630V)   | 2E<br>(250V) | 2A<br>(100V) | 2J<br>(630V)   | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) | 2J<br>(630V)   | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) |
| 47,000              | 473         |                |              |              |                |              |              |              |                |              |              |              |
| 68,000              | 683         |                |              |              |                |              |              |              |                |              |              |              |
| 100,000             | 104         |                |              |              |                |              |              |              |                |              |              |              |
| 150,000             | 154         |                |              |              |                |              |              |              |                |              |              |              |
| 220,000             | 224         |                |              |              |                |              |              |              |                |              |              |              |
| 330,000             | 334         |                |              |              |                |              |              |              |                |              |              |              |
| 470,000             | 474         |                |              |              |                |              |              |              |                |              |              |              |
| 680,000             | 684         |                |              |              |                |              |              |              |                |              |              |              |
| 1,000,000           | 105         |                |              |              |                |              |              |              |                |              |              |              |
| 1,500,000           | 155         |                |              |              |                |              |              |              |                |              |              |              |
| 2,200,000           | 225         |                |              |              |                |              |              |              |                |              |              |              |
| 3,300,000           | 335         |                |              |              |                |              |              |              |                |              |              |              |
| 4,700,000           | 475         |                |              |              |                |              |              |              |                |              |              |              |
| 6,800,000           | 685         |                |              |              |                |              |              |              |                |              |              |              |
| 10,000,000          | 106         |                |              |              |                |              |              |              |                |              |              |              |
| 15,000,000          | 156         |                |              |              |                |              |              |              |                |              |              |              |

X7R 
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General  
Capacitor

Mid Voltage  
Capacitor

High Voltage  
Capacitor

High Temp.  
Capacitor

Open Mode  
Capacitor

Soft Term.  
Capacitor

2in1 Array  
Capacitor

Serial Design  
Capacitor

Mega Cap  
Capacitor

## • DIMENSIONS

|             | Body Length (mm) | Body Width (mm) |
|-------------|------------------|-----------------|
| CGA5 (1206) | 3.20             | 1.60            |
| CGA6 (1210) | 3.20             | 2.50            |
| CGA7 (1808) | 4.50             | 2.00            |
| CGA8 (1812) | 4.50             | 3.20            |
| CGA9 (2220) | 5.70             | 5.00            |

## • PART NUMBER DESCRIPTIONS

CGA9 N 3 X7S 3A 473 K I 0000

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- 1) Series Name & Dimensions
- 2) Thickness Dimensions
- 3) Life Test Condition
- 4) Temperature Characteristics
- 5) Rated Voltage (DC)
- 6) Nominal Capacitance (pF)
- 7) Capacitance Tolerance
- 8) Packaging Style
- 9) Internal Codes

## • FEATURES

- ❖ Up to 3000V rated voltage
- ❖ Advanced design provides improved withstanding voltage characteristics
- ❖ TDK's proprietary internal electrode structure
- ❖ Low-dielectric-strength material

## Capacitor Range // C0G, X7R, X7S

| Capacitance (pF) | Cap Code | C4520 (1808)<br>3F (3KV) | C4532 (1812)<br>3F (3KV) |
|------------------|----------|--------------------------|--------------------------|
| 10               | 100      |                          |                          |
| 12               | 120      |                          |                          |
| 15               | 150      |                          |                          |
| 18               | 180      |                          |                          |
| 22               | 220      |                          |                          |
| 27               | 270      |                          |                          |
| 33               | 330      |                          |                          |
| 39               | 390      |                          |                          |
| 47               | 470      |                          |                          |
| 56               | 560      |                          |                          |
| 68               | 680      |                          |                          |
| 82               | 820      |                          |                          |
| 100              | 101      |                          |                          |
| 120              | 121      |                          |                          |
| 150              | 151      |                          |                          |
| 180              | 181      |                          |                          |
| 220              | 221      |                          |                          |
| 270              | 271      |                          |                          |
| 330              | 331      |                          |                          |

| Capacitance (pF) | Cap Code | C3216 (1206) |          | C3225 (1210) |          | C4520 (1808) |          | C4532 (1812) |          | C5750 (2220) |          |
|------------------|----------|--------------|----------|--------------|----------|--------------|----------|--------------|----------|--------------|----------|
|                  |          | 3D (2KV)     | 2A (1KV) | 3D (2KV)     | 2A (1KV) | 3D (2KV)     | 2A (1KV) | 3D (2KV)     | 2A (1KV) | 3D (2KV)     | 2A (1KV) |
| 100              | 101      |              |          |              |          |              |          |              |          |              |          |
| 220              | 221      |              |          |              |          |              |          |              |          |              |          |
| 470              | 471      |              |          |              |          |              |          |              |          |              |          |
| 1,000            | 102      |              |          |              |          |              |          |              |          |              |          |
| 2,200            | 222      |              |          |              |          |              |          |              |          |              |          |
| 4,700            | 472      |              |          |              |          |              |          |              |          |              |          |
| 10,000           | 103      |              |          |              |          |              |          |              |          |              |          |
| 22,000           | 223      |              |          |              |          |              |          |              |          |              |          |
| 47,000           | 473      |              |          |              |          |              |          |              |          |              |          |

C0G X7R X7S

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Open Mode  
Capacitor

Soft Term.  
Capacitor

2in1 Array  
Capacitor

Serial Design  
Capacitor

Mega Cap  
Capacitor

## • DIMENSIONS

|             | Body Length (mm) | Body Width (mm) |
|-------------|------------------|-----------------|
| CGA2 (0402) | 1.00             | 0.50            |
| CGA3 (0603) | 1.60             | 0.80            |
| CGA4 (0805) | 2.00             | 1.25            |
| CGA5 (1206) | 3.20             | 1.60            |
| CGA6 (1210) | 3.20             | 2.50            |
| CGA8 (1812) | 4.50             | 3.20            |

## • PART NUMBER DESCRIPTIONS

**CGA6 P 2 X8R 1E 335 K I 0000**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- 1) Series Name & Dimensions
- 2) Thickness Dimensions
- 3) Life Test Condition
- 4) Temperature Characteristics
- 5) Rated Voltage (DC)
- 6) Nominal Capacitance (pF)
- 7) Capacitance Tolerance
- 8) Packaging Style
- 9) Internal Codes

## • FEATURES

- ❖ These products have no polarity
- ❖ Stable temperature characteristics (15%) up to 150°C
- ❖ Highly precise temperature characteristics (±7.5%) up to 125°C

## Capacitor Range // X8R

| Capacitance<br>(pF) | Cap<br>Code | CGA2<br>(0402) |             |             | CGA3<br>(0603) |             |             |             | CGA4<br>(0805) |             |             |             |
|---------------------|-------------|----------------|-------------|-------------|----------------|-------------|-------------|-------------|----------------|-------------|-------------|-------------|
|                     |             | 1H<br>(50V)    | 1E<br>(25V) | 1C<br>(16V) | 2A<br>(100V)   | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) | 2A<br>(100V)   | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) |
| 150                 | 151         |                |             |             |                |             |             |             |                |             |             |             |
| 220                 | 221         |                |             |             |                |             |             |             |                |             |             |             |
| 330                 | 331         |                |             |             |                |             |             |             |                |             |             |             |
| 470                 | 471         |                |             |             |                |             |             |             |                |             |             |             |
| 680                 | 681         |                |             |             |                |             |             |             |                |             |             |             |
| 1,000               | 102         |                |             |             |                |             |             |             |                |             |             |             |
| 1,500               | 152         |                |             |             |                |             |             |             |                |             |             |             |
| 2,200               | 222         |                |             |             |                |             |             |             |                |             |             |             |
| 3,300               | 332         |                |             |             |                |             |             |             |                |             |             |             |
| 4,700               | 472         |                |             |             |                |             |             |             |                |             |             |             |
| 6,800               | 682         |                |             |             |                |             |             |             |                |             |             |             |
| 10,000              | 103         |                |             |             |                |             |             |             |                |             |             |             |
| 15,000              | 153         |                |             |             |                |             |             |             |                |             |             |             |
| 22,000              | 223         |                |             |             |                |             |             |             |                |             |             |             |
| 33,000              | 333         |                |             |             |                |             |             |             |                |             |             |             |
| 47,000              | 473         |                |             |             |                |             |             |             |                |             |             |             |
| 68,000              | 683         |                |             |             |                |             |             |             |                |             |             |             |
| 100,000             | 104         |                |             |             |                |             |             |             |                |             |             |             |
| 150,000             | 154         |                |             |             |                |             |             |             |                |             |             |             |
| 220,000             | 224         |                |             |             |                |             |             |             |                |             |             |             |
| 330,000             | 334         |                |             |             |                |             |             |             |                |             |             |             |
| 470,000             | 474         |                |             |             |                |             |             |             |                |             |             |             |
| 680,000             | 684         |                |             |             |                |             |             |             |                |             |             |             |
| 1,000,000           | 105         |                |             |             |                |             |             |             |                |             |             |             |

| Capacitance (pF) | Cap Code | CGA5 (1206) |          |          |          | CGA6 (1210) |          |          |          |
|------------------|----------|-------------|----------|----------|----------|-------------|----------|----------|----------|
|                  |          | 2A (100V)   | 1H (50V) | 1E (25V) | 1C (16V) | 2A (100V)   | 1H (50V) | 1E (25V) | 1C (16V) |
| 33,000           | 333      |             |          |          |          |             |          |          |          |
| 47,000           | 473      |             |          |          |          |             |          |          |          |
| 68,000           | 683      |             |          |          |          |             |          |          |          |
| 100,000          | 104      |             |          |          |          |             |          |          |          |
| 150,000          | 154      |             |          |          |          |             |          |          |          |
| 220,000          | 224      |             |          |          |          |             |          |          |          |
| 330,000          | 334      |             |          |          |          |             |          |          |          |
| 470,000          | 474      |             |          |          |          |             |          |          |          |
| 680,000          | 684      |             |          |          |          |             |          |          |          |
| 1,000,000        | 105      |             |          |          |          |             |          |          |          |
| 1,500,000        | 155      |             |          |          |          |             |          |          |          |
| 2,200,000        | 225      |             |          |          |          |             |          |          |          |
| 3,300,000        | 335      |             |          |          |          |             |          |          |          |
| 4,700,000        | 475      |             |          |          |          |             |          |          |          |
| 6,800,000        | 685      |             |          |          |          |             |          |          |          |
| 10,000,000       | 106      |             |          |          |          |             |          |          |          |

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Capacitor

High Voltage

Capacitor

High Temp.

Capacitor

Open Mode

Capacitor

Soft Term.

Capacitor

2in1 Array

Capacitor

Serial Design

Capacitor

Mega Cap

Capacitor

| Capacitance<br>(pF) | Cap<br>Code | C1005<br>(0402) | C1608<br>(0603) |             | C2012<br>(0805) |             | C3216<br>(1206) |             | C3225<br>(1210) |             | C4532<br>(1812) |             |
|---------------------|-------------|-----------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|
|                     |             | 1H<br>(50V)     | 2A<br>(100V)    | 1H<br>(50V) | 2A<br>(100V)    | 1H<br>(50V) | 2A<br>(100V)    | 1H<br>(50V) | 2A<br>(100V)    | 1H<br>(50V) | 2A<br>(100V)    | 1H<br>(50V) |
| 100                 | 101         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 120                 | 121         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 150                 | 151         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 220                 | 221         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 270                 | 271         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 330                 | 331         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 390                 | 391         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 470                 | 471         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 560                 | 561         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 680                 | 681         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 820                 | 821         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 1,000               | 102         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 1,200               | 122         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 1,500               | 152         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 1,800               | 182         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 2,200               | 222         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 2,700               | 272         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 3,300               | 332         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 3,900               | 392         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 4,700               | 472         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 5,600               | 562         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 6,800               | 682         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 8,200               | 822         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 10,000              | 103         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 15,000              | 153         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 22,000              | 223         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 33,000              | 333         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 47,000              | 473         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 68,000              | 683         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 100,000             | 104         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 150,000             | 154         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |
| 220,000             | 224         |                 |                 |             |                 |             |                 |             |                 |             |                 |             |

C0G Under Development

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High Voltage  
Capacitor

High Temp.  
Capacitor

Open Mode  
Capacitor

Soft Term.  
Capacitor

2in1 Array  
Capacitor

Serial Design  
Capacitor

Mega Cap  
Capacitor

## • DIMENSIONS

|             | Body Length (mm) | Body Width (mm) |
|-------------|------------------|-----------------|
| CGA4 (0805) | 2.00             | 1.25            |
| CGA5 (1206) | 3.20             | 1.60            |
| CGA6 (1210) | 3.20             | 2.50            |
| CGA8 (1812) | 4.50             | 3.20            |
| CGA9 (2220) | 5.70             | 5.00            |

## • PART NUMBER DESCRIPTIONS

**CGA6 P 2 X7R 1H 335 K I 5000**  
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- 1) Series Name & Dimensions
- 2) Thickness Dimensions
- 3) Life Test Condition
- 4) Temperature Characteristics
- 5) Rated Voltage (DC)
- 6) Nominal Capacitance (pF)
- 7) Capacitance Tolerance
- 8) Packaging Style
- 9) Internal Codes

## • FEATURES

- ❖ Increase resistance to mechanical bending, temperature cycle, vibration, and electrical stresses
- ❖ Wider distance between the end of the opposite electrode and the termination
- ❖ Reduces the risk of short circuit failures
- ❖ X7R and X8R temperature ranges

## Capacitor Range // X7R, X8R

| Capacitance (pF) | Cap Code | C2012 (0805) |           |          | C3216 (1206) |           |           | C3225 (1210) |           |
|------------------|----------|--------------|-----------|----------|--------------|-----------|-----------|--------------|-----------|
|                  |          | 2E (250V)    | 2A (100V) | 1H (50V) | 2J (630V)    | 2E (250V) | 2A (100V) | 1C (16V)     | 2J (630V) |
| 1,000            | 102      |              |           |          |              |           |           |              |           |
| 1,500            | 152      |              |           |          |              |           |           |              |           |
| 2,200            | 222      |              |           |          |              |           |           |              |           |
| 3,300            | 332      |              |           |          |              |           |           |              |           |
| 4,700            | 472      |              |           |          |              |           |           |              |           |
| 6,800            | 682      |              |           |          |              |           |           |              |           |
| 10,000           | 103      |              |           |          |              |           |           |              |           |
| 15,000           | 153      |              |           |          |              |           |           |              |           |
| 22,000           | 223      |              |           |          |              |           |           |              |           |
| 33,000           | 333      |              |           |          |              |           |           |              |           |
| 47,000           | 473      |              |           |          |              |           |           |              |           |
| 68,000           | 683      |              |           |          |              |           |           |              |           |
| 100,000          | 104      |              |           |          |              |           |           |              |           |
| 150,000          | 154      |              |           |          |              |           |           |              |           |
| 220,000          | 224      |              |           |          |              |           |           |              |           |
| 330,000          | 334      |              |           |          |              |           |           |              |           |
| 470,000          | 474      |              |           |          |              |           |           |              |           |
| 680,000          | 684      |              |           |          |              |           |           |              |           |
| 1,000,000        | 105      |              |           |          |              |           |           |              |           |
| 1,500,000        | 155      |              |           |          |              |           |           |              |           |
| 2,200,000        | 225      |              |           |          |              |           |           |              |           |
| 3,300,000        | 335      |              |           |          |              |           |           |              |           |
| 4,700,000        | 475      |              |           |          |              |           |           |              |           |

| Capacitance (pF) | Cap Code | C3225 (1210) |          |          |          | C4532 (1812) |           |           |          |          |          |
|------------------|----------|--------------|----------|----------|----------|--------------|-----------|-----------|----------|----------|----------|
|                  |          | 2A (100V)    | 1H (50V) | 1E (25V) | 1C (16V) | 2J (630V)    | 2E (250V) | 2A (100V) | 1H (50V) | 1E (25V) | 1C (16V) |
| 68,000           | 683      |              |          |          |          |              |           |           |          |          |          |
| 100,000          | 104      |              |          |          |          |              |           |           |          |          |          |
| 150,000          | 154      |              |          |          |          |              |           |           |          |          |          |
| 220,000          | 224      |              |          |          |          |              |           |           |          |          |          |
| 330,000          | 334      |              |          |          |          |              |           |           |          |          |          |
| 470,000          | 474      |              |          |          |          |              |           |           |          |          |          |
| 680,000          | 684      |              |          |          |          |              |           |           |          |          |          |
| 1,000,000        | 105      |              |          |          |          |              |           |           |          |          |          |
| 1,500,000        | 155      |              |          |          |          |              |           |           |          |          |          |
| 2,200,000        | 225      |              |          |          |          |              |           |           |          |          |          |
| 3,300,000        | 335      |              |          |          |          |              |           |           |          |          |          |
| 4,700,000        | 475      |              |          |          |          |              |           |           |          |          |          |
| 6,800,000        | 685      |              |          |          |          |              |           |           |          |          |          |
| 10,000,000       | 106      |              |          |          |          |              |           |           |          |          |          |



X7R



X8R

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High Voltage

Capacitor

High Temp.

Capacitor

Open Mode

Capacitor

Soft Term.

Capacitor

2in1 Array

Capacitor

Serial Design

Capacitor

Mega Cap

Capacitor

| Capacitance<br>(pF) | Cap<br>Code | C5750<br>(2220) |              |              |             |             |             |
|---------------------|-------------|-----------------|--------------|--------------|-------------|-------------|-------------|
|                     |             | 2J<br>(630V)    | 2E<br>(250V) | 2A<br>(100V) | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) |
| 150,000             | 154         |                 |              |              |             |             |             |
| 220,000             | 224         |                 |              |              |             |             |             |
| 330,000             | 334         |                 |              |              |             |             |             |
| 470,000             | 474         |                 |              |              |             |             |             |
| 680,000             | 684         |                 |              |              |             |             |             |
| 1,000,000           | 105         |                 |              |              |             |             |             |
| 1,500,000           | 155         |                 |              |              |             |             |             |
| 2,200,000           | 225         |                 |              |              |             |             |             |
| 3,300,000           | 335         |                 |              |              |             |             |             |
| 4,700,000           | 475         |                 |              |              |             |             |             |
| 6,800,000           | 685         |                 |              |              |             |             |             |
| 10,000,000          | 106         |                 |              |              |             |             |             |
| 15,000,000          | 156         |                 |              |              |             |             |             |
| 22,000,000          | 226         |                 |              |              |             |             |             |

 X7R

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Capacitor

High Voltage  
Capacitor

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Capacitor

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Capacitor

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Capacitor

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Capacitor

Mega Cap  
Capacitor

## • DIMENSIONS

|             | Body Length (mm) | Body Width (mm) |
|-------------|------------------|-----------------|
| CGA4 (0805) | 2.00             | 1.25            |
| CGA5 (1206) | 3.20             | 1.60            |
| CGA6 (1210) | 3.20             | 2.50            |
| CGA8 (1812) | 4.50             | 3.20            |
| CGA9 (2220) | 5.70             | 5.00            |

## • PART NUMBER DESCRIPTIONS

**CGA6 N 3 X7S 1H 106 K I 000S**  
 (1) (2) (3) (4) (5) (6) (7) (8) (9)

- 1) Series Name & Dimensions
- 2) Thickness Dimensions
- 3) Life Test Condition
- 4) Temperature Characteristics
- 5) Rated Voltage (DC)
- 6) Nominal Capacitance (pF)
- 7) Capacitance Tolerance
- 8) Packaging Style
- 9) Internal Codes

## • FEATURES

- ❖ Improved bending resistance (Board Flex Resistance)
- ❖ Improved temperature cycle performance
- ❖ RoHS, WEE, and REACH compliant

## Capacitor Range // X7R, X7S, X7T

| Capacitance (pF) | Cap Code | CGA4 (0805) |           |           |          |          |          | CGA5 (1206) |           |           |           |
|------------------|----------|-------------|-----------|-----------|----------|----------|----------|-------------|-----------|-----------|-----------|
|                  |          | 2W (450V)   | 2E (250V) | 2A (100V) | 1H (50V) | 1V (35V) | 1C (16V) | 2J (630V)   | 2W (450V) | 2E (250V) | 2A (100V) |
| 10,000           | 103      |             |           |           |          |          |          |             |           |           |           |
| 22,000           | 223      |             |           |           |          |          |          |             |           |           |           |
| 47,000           | 473      |             |           |           |          |          |          |             |           |           |           |
| 100,000          | 104      |             |           |           |          |          |          |             |           |           |           |
| 220,000          | 224      |             |           |           |          |          |          |             |           |           |           |
| 470,000          | 474      |             |           |           |          |          |          |             |           |           |           |
| 1,000,000        | 105      |             |           |           |          |          |          |             |           |           |           |
| 2,200,000        | 225      |             |           |           |          |          |          |             |           |           |           |
| 4,700,000        | 475      |             |           |           |          |          |          |             |           |           |           |

| Capacitance (pF) | Cap Code | CGA5 (1206) |          |          | CGA6 (1210) |           |           |           |          |
|------------------|----------|-------------|----------|----------|-------------|-----------|-----------|-----------|----------|
|                  |          | 1H (50V)    | 1V (35V) | 1E (25V) | 2J (630V)   | 2W (450V) | 2E (250V) | 2A (100V) | 1H (50V) |
| 47,000           | 473      |             |          |          |             |           |           |           |          |
| 100,000          | 104      |             |          |          |             |           |           |           |          |
| 220,000          | 224      |             |          |          |             |           |           |           |          |
| 470,000          | 474      |             |          |          |             |           |           |           |          |
| 1,000,000        | 105      |             |          |          |             |           |           |           |          |
| 2,200,000        | 225      |             |          |          |             |           |           |           |          |
| 4,700,000        | 475      |             |          |          |             |           |           |           |          |
| 10,000,000       | 106      |             |          |          |             |           |           |           |          |

| Capacitance (pF) | Cap Code | CGA7 (1812) |           |           | CGA9 (2220) |           |           |           |
|------------------|----------|-------------|-----------|-----------|-------------|-----------|-----------|-----------|
|                  |          | 2J (630V)   | 2W (450V) | 2E (250V) | 2J (630V)   | 2W (450V) | 2E (250V) | 2A (100V) |
| 220,000          | 224      |             |           |           |             |           |           |           |
| 470,000          | 474      |             |           |           |             |           |           |           |
| 1,000,000        | 105      |             |           |           |             |           |           |           |
| 2,200,000        | 225      |             |           |           |             |           |           |           |
| 4,700,000        | 475      |             |           |           |             |           |           |           |
| 10,000,000       | 106      |             |           |           |             |           |           |           |

\* This is standard product line up. Please contact TDK for additional capacitance value.

X7R X7T X7S

# 2-in-1 Array Capacitor

## Introduction

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Capacitor

High Voltage  
Capacitor

High Temp.  
Capacitor

Open Mode  
Capacitor

Soft Term.  
Capacitor

2in1 Array  
Capacitor

Serial Design  
Capacitor

Mega Cap  
Capacitor

## • DIMENSIONS

|                        | Body Length<br>(mm) | Body Width<br>(mm) | Terminal<br>Spacing<br>(mm) | Terminal<br>Width (mm) | Max. Height<br>(mm) |
|------------------------|---------------------|--------------------|-----------------------------|------------------------|---------------------|
| CKCM25<br>(C1312/0504) | 1.37                | 1.00               | 0.64                        | 0.36                   | 0.66                |
| CKCL22<br>(C2012/0805) | 2.00                | 1.25               | 1.00                        | 0.45                   | 1.00                |

## • PART NUMBER DESCRIPTIONS

**CKCM25 X7R 1E 103 M I 0000**  
① ② ③ ④ ⑤ ⑥ ⑦

- 1) Series Name & Dimensions
- 2) Temperature Characteristics
- 3) Rated Voltage (DC)
- 4) Nominal Capacitance (pF)
- 5) Capacitance Tolerance
- 6) Packaging Style
- 7) Internal Codes

## • FEATURES

- ❖ 2 capacitors in one package
- ❖ Reduced PCB space and mounting time
- ❖ Unique electrode construction reduces crosstalk
- ❖ Also available in soft termination

## Capacitor Range // C0G, X7R, X5R, X8R

| Capacitance<br>(pF) | Cap<br>Code | CKCM25<br>(0504) |             |             | CKCL22<br>(0805) |             |             |             |
|---------------------|-------------|------------------|-------------|-------------|------------------|-------------|-------------|-------------|
|                     |             | 2A<br>(100V)     | 1H<br>(50V) | 1E<br>(25V) | 2A<br>(100V)     | 1H<br>(50V) | 1E<br>(25V) | 1A<br>(10V) |
| 10                  | 100         |                  |             |             |                  |             |             |             |
| 15                  | 150         |                  |             |             |                  |             |             |             |
| 22                  | 220         |                  |             |             |                  |             |             |             |
| 33                  | 330         |                  |             |             |                  |             |             |             |
| 47                  | 470         |                  |             |             |                  |             |             |             |
| 68                  | 680         |                  |             |             |                  |             |             |             |
| 100                 | 101         |                  |             |             |                  |             |             |             |
| 150                 | 151         |                  |             |             |                  |             |             |             |
| 220                 | 221         |                  |             |             |                  |             |             |             |
| 330                 | 331         |                  |             |             |                  |             |             |             |
| 470                 | 471         |                  |             |             |                  |             |             |             |
| 680                 | 681         |                  |             |             |                  |             |             |             |
| 1,000               | 102         |                  |             |             |                  |             |             |             |
| 1,500               | 152         |                  |             |             |                  |             |             |             |
| 2,200               | 222         |                  |             |             |                  |             |             |             |
| 3,300               | 332         |                  |             |             |                  |             |             |             |
| 4,700               | 472         |                  |             |             |                  |             |             |             |
| 6,800               | 682         |                  |             |             |                  |             |             |             |
| 10,000              | 103         |                  |             |             |                  |             |             |             |
| 15,000              | 153         |                  |             |             |                  |             |             |             |
| 22,000              | 223         |                  |             |             |                  |             |             |             |
| 33,000              | 333         |                  |             |             |                  |             |             |             |
| 47,000              | 473         |                  |             |             |                  |             |             |             |
| 68,000              | 683         |                  |             |             |                  |             |             |             |
| 100,000             | 104         |                  |             |             |                  |             |             |             |
| 150,000             | 154         |                  |             |             |                  |             |             |             |
| 220,000             | 224         |                  |             |             |                  |             |             |             |

C0G X7R X5R X8R

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Capacitor

High Temp.  
Capacitor

Open Mode  
Capacitor

Soft Term.  
Capacitor

2in1 Array  
Capacitor

Serial Design  
Capacitor

Mega Cap  
Capacitor

## • DIMENSIONS

|               | Body Length<br>(mm) | Body Width<br>(mm) | Max. Height<br>(mm) | Life Test<br>Conditions* |
|---------------|---------------------|--------------------|---------------------|--------------------------|
| CEU3E2 (0603) | 1.60                | 0.80               | 0.95                | WV x 2                   |
| CEU4J2 (0805) | 2.00                | 1.25               | 1.45                | WV x 2                   |

## • PART NUMBER DESCRIPTIONS

**CEU3 E 2 X7R 1H 103 K T 0000**  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- 1) Series Name & Dimensions
- 2) Thickness Dimensions
- 3) Life Test Condition
- 4) Temperature Characteristics
- 5) Rated Voltage (DC)
- 6) Nominal Capacitance (pF)
- 7) Capacitance Tolerance
- 8) Packaging Style
- 9) Internal Codes

## • FEATURES

- ❖ Improved bending resistance (Board Flex Resistance)
- ❖ Improved temperature cycle performance
- ❖ Allow space reduction on PCB
- ❖ Ultra high reliability
- ❖ RoHS, WEE, and REACH compliant

## Capacitor Range // X7R

| Capacitance<br>(pF) | Cap<br>Code | CEU3E<br>(0603) |             | CEU4J<br>(0805) |             |
|---------------------|-------------|-----------------|-------------|-----------------|-------------|
|                     |             | 2A<br>(100V)    | 1H<br>(50V) | 2A<br>(100V)    | 1H<br>(50V) |
| 1,000               | 102         |                 |             |                 |             |
| 1,500               | 152         |                 |             |                 |             |
| 2,200               | 222         |                 |             |                 |             |
| 3,300               | 332         |                 |             |                 |             |
| 4,700               | 472         |                 |             |                 |             |
| 6,800               | 682         |                 |             |                 |             |
| 10,000              | 103         |                 |             |                 |             |
| 15,000              | 153         |                 |             |                 |             |
| 22,000              | 223         |                 |             |                 |             |
| 33,000              | 333         |                 |             |                 |             |
| 47,000              | 473         |                 |             |                 |             |
| 68,000              | 683         |                 |             |                 |             |
| 100,000             | 104         |                 |             |                 |             |

X7R

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High Temp.

Capacitor

Open Mode

Capacitor

Soft Term.

Capacitor

2in1 Array

Capacitor

Serial Design

Capacitor

Mega Cap

Capacitor

## • DIMENSIONS

|        | Body Length<br>(mm) | Body Width<br>(mm) | Body Height<br>(mm) |
|--------|---------------------|--------------------|---------------------|
| CKG32K | 3.8                 | 2.0                | 4.3                 |
| CKG45K | 5.5                 | 4.0                | 2.4                 |
| CKG57K | 6.5                 | 5.5                | 4.5                 |
| CKG45N | 5.5                 | 4.0                | 3.4                 |
| CKG57N | 6.5                 | 5.5                | 3.4                 |

## • PART NUMBER DESCRIPTIONS

**CKG57N X7R 1H 106 M I 0000**  
 ① ② ③ ④ ⑤ ⑥ ⑦

- 1) Series Name & Dimensions
- 2) Temperature Characteristics
- 3) Rated Voltage (DC)
- 4) Nominal Capacitance (pF)
- 5) Capacitance Tolerance
- 6) Packaging Style
- 7) Internal Codes

## • FEATURES

- ❖ Twice the capacitance on single capacitor foot print
- ❖ Lower ESR and ESL than Al caps
- ❖ Capable of absorbing thermal and mechanical stress
- ❖ Improved heat generation by ripple current
- ❖ Improved vibration performance

## Capacitor Range // X7R, X7S, X7T

| Capacitance<br>(pF) | Cap<br>Code | CKG32K<br>(1210 - Single) |              |              |              |             |             | CKG45K<br>(1812 - Single) |              |              |              |
|---------------------|-------------|---------------------------|--------------|--------------|--------------|-------------|-------------|---------------------------|--------------|--------------|--------------|
|                     |             | 2J<br>(630V)              | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) | 1H<br>(50V) | 1E<br>(25V) | 2J<br>(630V)              | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) |
| 47,000              | 473         |                           |              |              |              |             |             |                           |              |              |              |
| 100,000             | 104         |                           |              |              |              |             |             |                           |              |              |              |
| 150,000             | 154         |                           |              |              |              |             |             |                           |              |              |              |
| 220,000             | 224         |                           |              |              |              |             |             |                           |              |              |              |
| 330,000             | 334         |                           |              |              |              |             |             |                           |              |              |              |
| 470,000             | 474         |                           |              |              |              |             |             |                           |              |              |              |
| 680,000             | 684         |                           |              |              |              |             |             |                           |              |              |              |
| 1,000,000           | 105         |                           |              |              |              |             |             |                           |              |              |              |
| 1,500,000           | 155         |                           |              |              |              |             |             |                           |              |              |              |
| 2,200,000           | 225         |                           |              |              |              |             |             |                           |              |              |              |
| 3,300,000           | 335         |                           |              |              |              |             |             |                           |              |              |              |
| 4,700,000           | 475         |                           |              |              |              |             |             |                           |              |              |              |
| 6,800,000           | 685         |                           |              |              |              |             |             |                           |              |              |              |
| 10,000,000          | 106         |                           |              |              |              |             |             |                           |              |              |              |

| Capacitance<br>(pF) | Cap<br>Code | CKG45K<br>(1812 - Single) |             |             | CKG57K<br>(2220 - Single) |              |              |              |             |             |             |
|---------------------|-------------|---------------------------|-------------|-------------|---------------------------|--------------|--------------|--------------|-------------|-------------|-------------|
|                     |             | 1H<br>(50V)               | 1E<br>(25V) | 1C<br>(16V) | 2J<br>(630V)              | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) |
| 220,000             | 224         |                           |             |             |                           |              |              |              |             |             |             |
| 330,000             | 334         |                           |             |             |                           |              |              |              |             |             |             |
| 470,000             | 474         |                           |             |             |                           |              |              |              |             |             |             |
| 680,000             | 684         |                           |             |             |                           |              |              |              |             |             |             |
| 1,000,000           | 105         |                           |             |             |                           |              |              |              |             |             |             |
| 1,500,000           | 155         |                           |             |             |                           |              |              |              |             |             |             |
| 2,200,000           | 225         |                           |             |             |                           |              |              |              |             |             |             |
| 3,300,000           | 335         |                           |             |             |                           |              |              |              |             |             |             |
| 4,700,000           | 475         |                           |             |             |                           |              |              |              |             |             |             |
| 6,800,000           | 685         |                           |             |             |                           |              |              |              |             |             |             |
| 10,000,000          | 106         |                           |             |             |                           |              |              |              |             |             |             |
| 15,000,000          | 156         |                           |             |             |                           |              |              |              |             |             |             |
| 22,000,000          | 226         |                           |             |             |                           |              |              |              |             |             |             |
| 33,000,000          | 336         |                           |             |             |                           |              |              |              |             |             |             |
| 47,000,000          | 476         |                           |             |             |                           |              |              |              |             |             |             |



X7R



X7T



X7S

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Mid Voltage

Capacitor

High Voltage

Capacitor

High Temp.

Capacitor

Open Mode

Capacitor

Soft Term.

Capacitor

2in1 Array

Capacitor

Serial Design

Capacitor

Mega Cap

Capacitor

| Capacitance (pF) | Cap Code | CKG45N<br>(1812 - Double) |              |              |              |             |             |             |
|------------------|----------|---------------------------|--------------|--------------|--------------|-------------|-------------|-------------|
|                  |          | 2J<br>(630V)              | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) |
| 220,000          | 224      | X7R                       |              |              |              |             |             |             |
| 330,000          | 334      | X7R                       |              |              |              |             |             |             |
| 470,000          | 474      | X7R                       |              | X7R          |              |             |             |             |
| 680,000          | 684      |                           | X7T          |              |              |             |             |             |
| 1,000,000        | 105      |                           | X7T          | X7R          |              |             |             |             |
| 1,500,000        | 155      |                           |              | X7R          |              |             |             |             |
| 2,200,000        | 225      |                           |              | X7R          | X7R          |             |             |             |
| 3,300,000        | 335      |                           |              |              |              | X7R         |             |             |
| 4,700,000        | 475      |                           |              |              | X7R          |             |             |             |
| 6,800,000        | 685      |                           |              |              | X7S          | X7R         |             |             |
| 10,000,000       | 106      |                           |              |              | X7S          | X7S         | X7R         |             |
| 15,000,000       | 156      |                           |              |              |              |             |             |             |
| 22,000,000       | 226      |                           |              |              |              |             |             | X7R         |
| 33,000,000       | 336      |                           |              |              |              |             |             |             |
| 47,000,000       | 476      |                           |              |              |              |             |             | X7S         |

| Capacitance (pF) | Cap Code | CKG57N<br>(2220 - Double) |              |              |              |             |             |             |
|------------------|----------|---------------------------|--------------|--------------|--------------|-------------|-------------|-------------|
|                  |          | 2J<br>(630V)              | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) |
| 470,000          | 474      | X7R                       |              |              |              |             |             |             |
| 680,000          | 684      | X7R                       |              |              |              |             |             |             |
| 1,000,000        | 105      | X7R                       |              | X7R          |              |             |             |             |
| 1,500,000        | 155      |                           |              |              |              |             |             |             |
| 2,200,000        | 225      |                           | X7T          | X7R          | X7R          |             |             |             |
| 3,300,000        | 335      |                           |              | X7R          |              |             |             |             |
| 4,700,000        | 475      |                           |              |              | X7R          |             |             |             |
| 6,800,000        | 685      |                           |              |              |              |             |             |             |
| 10,000,000       | 106      |                           |              |              | X7R          | X7R         |             |             |
| 15,000,000       | 156      |                           |              |              |              |             |             |             |
| 22,000,000       | 226      |                           |              |              | X7S          | X7S         | X7R         |             |
| 33,000,000       | 336      |                           |              |              |              |             |             | X7R         |
| 47,000,000       | 476      |                           |              |              |              |             | X7S         |             |
| 68,000,000       | 686      |                           |              |              |              |             |             |             |
| 100,000,000      | 107      |                           |              |              |              |             |             | X7S         |

X7R 
 X7T 
 X7S



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