



Vishay Intertechnology, Inc.

AMS *(Avionics, Military, and Space)*





**AMS (Avionics,
Military, and
Space)**

AMS (Avionics, Military,
and Space)

Satellites/GPS	4
Cockpit Panels	5
Airborne Systems	6
Flight control computers	7
Braking systems	8

The Engineer's Toolbox highlights, by market application, some innovative components Vishay manufactures that help design engineers develop superior end products. We recognize that offering unique component solutions helps improve the performance of next-generation devices, overcome technical barriers, and create new markets.

More information on the Engineer's Toolbox, including product datasheet links, can be found at www.vishay.com/ref/et2. For inquiries, please contact your local sales representative.



Key components for
AMS (AVIONICS, MILITARY,
AND SPACE)



SATELLITES/GPS



COCKPIT PANELS



AIRBORNE SYSTEMS



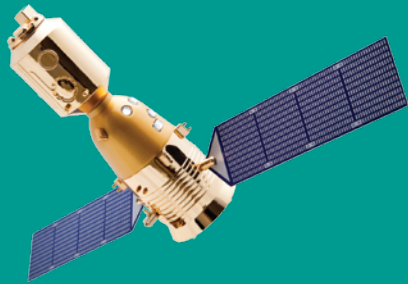
FLIGHT CONTROL COMPUTERS



BRAKING SYSTEMS

THE VISHAY ADVANTAGE:

- High Reliability
- MIL-PRF Qualifications
- CECC A approvals
- ESA Approvals
- S-Level Failure Rates
- Hermetic Sealing
- and more...*

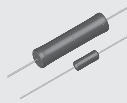


SATELLITES / GPS

RESISTORS

RWR

Wirewound, Military Qualified Resistor



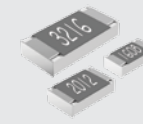
Features

- Axial leads, silicone coated
- Military/established reliability, MIL-PRF-39007 qualified
- S-level failure rate available
- Available in non-inductive styles (type N) with Ayrton-Perry winding

RESISTORS

TNPS ESCC Series

Hi-Rel Thin Film Chip Resistors



Features

- High-reliability product
- ESA approved to ESCC 4001/029
- TCR/tolerance down to $\pm 15 \text{ ppm/K} \pm 0.1 \%$
- Case sizes: 0603 to 1206

RESISTORS

PHR/PRAHR/CHPHR/PFRR



ESCC Wraparound Resistor Chips and Networks

Features

- ESA qualified, space level or R failure rate level
- Chips: 0402 to 2010, 0.01 % tolerance, 5 ppm/°C (- 55 °C; + 155 °C)
- Networks: 3 sizes, tolerance matching: 0.05 % (0.01 % on request), TCR tracking: 3 ppm/°C
- Screening tests: 100 % overload, 100 % burn in

CAPACITORS

CWR06

Solid Tantalum Chip Capacitor



Features

- MIL-PRF-55365/4 qualified, - 55 °C to + 125 °C operation
- Weibull failure rates B and C; exponential M, P, R, S; three surge current options
- 0.10 μF to 100 μF , 4 V to 50 V, 8 miniature case sizes
- Solder plate, solder dipped, and gold termination options; bulk and reel packaging

INDUCTORS

IHLP-2525CZ

Low-Profile, High-Current IHLP® Inductor



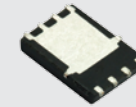
Features

- Shielded construction
- Handles high transient current spikes without saturation
- Ultra-low buzz noise due to composite construction
- 100 % lead (Pb)-free and RoHS-compliant

MOSFETs

SiR880ADP

Single, 80 V N-Channel Power MOSFET



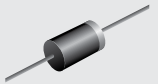
Features

- Highly optimized medium-voltage ThunderFET® technology
- Thermally enhanced PowerPAK® SO-8 packaging
- Maximum on-resistance down to 0.0063 Ω
- On-resistance ratings down to $V_{GS} = 4.5 \text{ V}$

RECTIFIERS

1N5406

3 A, 600 V Standard Rectifier in DO-201AD



Features

- Low forward voltage drop
- Low leakage current
- High forward surge capability
- RoHS-compliant

DIODES

1N5235B

Hermetically Sealed, 5 % Zener Diode



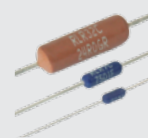
Features

- Junction temperature rating at 175 °C
- AEC-Q101 qualified
- 2.4 V to 75 V Zener voltage

RESISTORS

RLR

Military-Qualified Metal Film Resistor



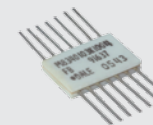
Features

- Qualified to and compliant with MIL-PRF-39017
- Established reliability failure rates with ongoing qual maintenance programs
- 100 ppm/°C temperature coefficient, non-precision tolerance of 1 % or 2 %
- Extended value range up to 22 M Ω available from various DSCC drawings

RESISTORS

DFM

Military Thick Film Flatpack Resistor Network



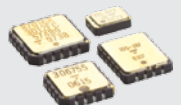
Features

- Qualified to and compliant with, MIL-PRF-83401
- Isolated, bussed, and dual termination schematics available
- Epoxy filled ceramic sandwich with hot solder dipped leads
- Full material and process traceability with data retention

RESISTORS

LCC/TLCC

Leadless Chip Carrier Hermetic Resistor Network



Features

- 16-, 20-, 24-terminal gold plated wraparound true hermetic packaging
- Resistance range: 10 Ω to 100 k Ω
- Isolated/bussed circuits
- TCR tracking of 5 ppm/°C

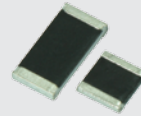


COCKPIT PANELS

RESISTORS

RCWPM (M/D55342)

Military Thick Film Chip Resistor



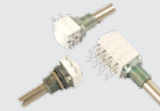
Features

- Qualified to and compliant with MIL-PRF-55342 specification
- Established reliability with verified failure rates (M, P, R, U, S, V, and T levels)
- Offered in all 13 MIL case sizes, and in resistance values from 1 Ω to 22 M Ω
- For designs and applications requiring higher reliability resistors

RESISTORS, VARIABLE

P11L

Long-Life Cermet Potentiometer



Features

- 2 million cycles
- 12.5 mm square, single-turn panel control
- 4, 6, and 6.35 shaft diameters and 29 terminal styles
- Tested according to CECC 41000 or IEC 60393-1

INDUCTORS

IHLP-6767GZ

Low-Profile, High-Current IHLP[®] Inductor



Features

- Shielded construction
- Handles high transient current spikes without saturation
- Ultra-low buzz noise due to composite construction
- 100 % lead (Pb)-free and RoHS-compliant

MOSFETS

SiHF740AS/IRF740AS

Single, 400 V P-Channel Power MOSFET



Features

- Maximum current of 10 A
- D²PAK packaging
- Maximum on-resistance of 0.55 Ω at $V_{GS} = 10 V$
- Typical gate charge of 24 nC at $V_{GS} = 10 V$

RECTIFIERS

VS-8TQ100SPBF

8 A Schottky Rectifier in D²PAK



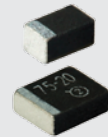
Features

- 175 °C T_J operation
- Low forward voltage drop
- High-frequency operation
- Guard ring for enhanced ruggedness and long-term reliability

CAPACITORS

TM8 Series High-Reliability MICROTAN[®]

High-Reliability Tantalum Capacitors



Features

- Robust designs for maximum reliability
- Industry's best volumetric efficiency; ideal for space-constrained applications
- Small sizes including 0603 footprint
- DLA (DSCC) approved under DLA 11020 drawing

MOSFETS

SiS892ADN

Single 100 V N-Channel Power MOSFET



Features

- Highly optimized medium-voltage ThunderFET[®] technology
- Thermally enhanced PowerPAK[®] 1212-8 is 1/3 the size of an SO-8
- Maximum on-resistance down to 0.033 Ω
- On-resistance rating down to $V_{GS} = 4.5 V$

THE VISHAY ADVANTAGE

- High Reliability
- MIL-PRF Qualifications
- CECC Approvals
- ESA Approvals
- S-Level Failure Rates
- Hermetic Sealing
- and more...

Vishay Intertechnology's reputation for innovation, reliability, and quality is complemented by a decades-long record of service to and improvements for the AMS industry.

Important Literature

Military and Aerospace Passive Components Selector Guide
www.vishay.com/doc?49605

Military Resistors 101 Instructional Guide
www.vishay.com/doc?49851

Design Support Tools

Thermal Simulation Tools, Performance Calculators, and SPICE and 3D Models
www.vishay.com/how/design-support-tools/

Technical Library
www.vishay.com/how/onlineliterature/technical-library/

Video Library
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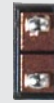


AIRBORNE SYSTEMS

CAPACITORS

RFCS

Thin Film Surface-Mount RF Capacitor



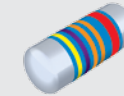
Features

- Highest SRF (self-resonance frequency) in the industry
- 0402 case size
- Ultra-thin form factors
- S parameter files available

RESISTORS

MS1

Hi-Rel Thin Film MiniMELF Resistor



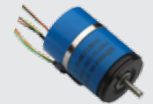
Features

- High-reliability product
- ESCC type available, ESA approved to ESCC 4001/022
- EN803 type available with established reliability according to EN 140401-803, version E
- TCR/tolerance down to ± 15 ppm/K/ ± 0.1 %

RESISTORS, VARIABLE

ROT SF

Precision Rotative Position Sensor



Features

- 8 sizes available from 19 mm to 76 mm diameters, up to 6 redundant signals
- Tight linearity: ± 1 % down to ± 0.015 %, interlinearity if multigang assemblies
- Excellent repeatability, not sensible to T° changes and magnetic environments
- Lifespan up to 50 M cycles, low current consumption, many optional mechanical features

CAPACITORS

Vishay Vitramon Hi-Rel Series

MLCCs for High-Reliability Applications



Features

- C0G (NP0), and X7R dielectrics, sizes: 0402 to 3640, up to 600 V, capacitance up to 6.8 μ F
- Available with several screening options
- Available with several termination options including tin/lead
- Reliable Noble Metal Electrode (NME) system build with wet process

CAPACITORS

STE, T16

Wet Tantalum, Axial Leaded Capacitors



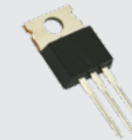
Features

- Hermetically glass-to-seal, all-tantalum case
- High capacitance, low ESR
- Low DC leakage
- - 55 $^\circ$ C to + 125 $^\circ$ C operation

MOSFETs

SiHFZ44/IRFZ44

Single, 60 V N-Channel Power MOSFET



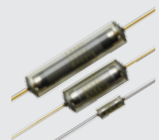
Features

- Maximum current of 50 A
- TO-220 packaging
- Maximum on-resistance of 0.028 Ω at $V_{GS} = 10$ V

RESISTORS

RNR

Military-Qualified Metal Film Resistor



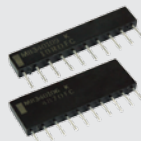
Features

- Qualified to and compliant with MIL-PRF-55182 (type RNR/RNN)
- Hermetic glass enclosure, impervious to corrosive environments and atmospheres
- Established reliability failure rates with ongoing qual maintenance programs
- Precision tolerances down to 0.1 %; tight TC down to 25 ppm/ $^\circ$ C

RESISTORS

MSM

Military Thick Film SIP Network



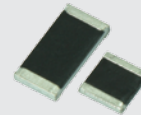
Features

- Qualified to and compliant with MIL-PRF-83401
- Isolated, bussed, and dual terminator schematics available
- Full material and process traceability with data retention
- Rugged molded case construction to withstand harsh environments

RESISTORS

RCWPM (M/D55342)

Military Thick Film Chip Resistor



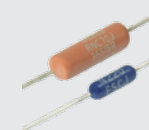
Features

- Qualified to and compliant with MIL-PRF-55342
- Established reliability with verified failure rates (M, P, R, U, S, V, and T)
- Offered in all 13 MIL case sizes, and in resistance values from 1 Ω to 22 M Ω
- For designs and applications that require higher reliability resistors

RESISTORS

RNC

Military-Qualified Metal Film Resistor



Features

- Qualified to and compliant with MIL-PRF-55182 specification (type RNC/RNR)
- Established reliability failure rates with on-going quality maintenance programs
- Precision tolerances down to 0.1 %; tight temperature coefficient down to 25 ppm/ $^\circ$ C
- Epoxy coating provides superior moisture protection

CAPACITORS

T97 Series Hi-Rel COTS Ultra Low ESR TANTAMOUNT[®]

High-Reliability Tantalum Capacitors



Features

- Robust designs for maximum reliability
- Highest capacitance and voltage ratings in industry
- Voltage ratings up to 75 V
- Lowest ESR available



FLIGHT CONTROL COMPUTERS

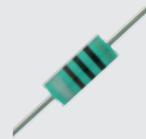
RESISTORS

MS21426, MS7508X

Axial Leaded Inductors

Features

- Military, MIL-PRF-15305 qualified
- Flame-retardant coating
- Electromagnetic shield
- Small package



RESISTORS

RV/P

High-Precision Wraparound

Features

- CECC qualified
- Load life stability: 0.02 % typical at 8000 h at 70 °C under Pd (0.033 % maximum)
- Tolerance down to 0.01 %, TCR down to 5 ppm/°C (- 55 °C; + 155 °C)
- Wide resistance range: 10 Ω to 76 MΩ depending on size



RESISTORS

MDM (M8340101../M8340102..)

Military Thick Film DIP Networks

Features

- Qualified to, and comply with, existing MIL-PRF-83401 specifications
- Isolated, bussed, and dual terminator schematics available
- Full material and process traceability with data retention
- Rugged molded case construction to withstand harsh environments



DIODES

VESD05A6-HAF

6-Line Protection Diode Array in LLP75

Features

- Ultra compact LLP75-7L package
- 6-line ESD protection
- Low leakage current: $I_R < 1 \mu A$
- Low load capacitance: $C_D = 40 \text{ pF}$



RECTIFIERS

SS32HE3

3 A, 20 V Schottky in SMC

Features

- Guard ring for overvoltage protection
- Low forward voltage drop
- High surge capability
- RoHS-compliant



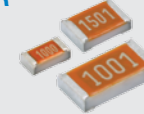
RESISTORS, NON-LINEAR

TFPT

SMD, PTC Ni Thin Film Linear Thermistor

Features

- Wide temperature range up to 150 °C
- High stability over the entire temperature range, < 0.25 % drift



CAPACITORS

T97 Series Hi-Rel COTS Ultra Low ESR TANTAMOUNT®

High-Reliability Tantalum Capacitors

Features

- Robust designs for maximum reliability
- Highest capacitance and voltage ratings in industry
- Voltage ratings up to 75 V
- Lowest ESR available



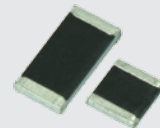
RESISTORS

M/D55342

Military Thick Film/Thin Film Chip Resistors

Features

- Qualified to, and comply with, existing MIL-PRF-55342 specifications
- Established reliability with verified failure rates (M, P, R, U, S, V, and T levels)
- Offered in all 13 MIL case sizes, and in resistance values from 1 Ω to 22 MΩ
- Fulfill a need in designs and applications that require higher reliability resistors



CAPACITORS

Super Tan® ST

Axial-Leaded Wet Tantalum Capacitor

Features

- Tantalum case, hermetically sealed
- Low ESR, high ripple current rating
- High reliability, DSCC 93026 approved
- Highest capacitance per unit volume



Vishay Intertechnology's reputation for innovation, reliability, and quality is complemented by a decades-long record of service to and improvements for the AMS industry.

Important Literature

Military and Aerospace Passive Components Selector Guide
www.vishay.com/doc?49605

Military Resistors 101 Instructional Guide
www.vishay.com/doc?49851

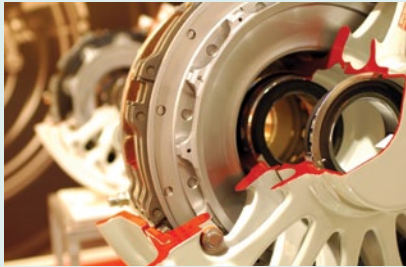
Design Support Tools

Thermal Simulation Tools, Performance Calculators, and SPICE and 3D Models
www.vishay.com/how/design-support-tools/

Technical Library
www.vishay.com/how/onlineliterature/technical-library/

Video Library
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View datasheets for these products at
www.vishay.com/ref/et2as



BRAKING SYSTEMS

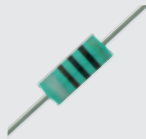
INDUCTORS

MS21426, MS7508X

Axial Leaded Inductors

Features

- Military, MIL-PRF-15305 qualified
- Flame-retardant coating
- Electromagnetic shield
- Small package



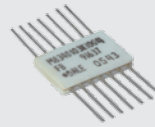
RESISTORS

DFM

Military Thick Film Flatpack Network

Features

- Qualified to and compliant with, MIL-PRF-83401
- Isolated, bussed, and dual termination schematics available
- Epoxy filled ceramic sandwich with hot solder dipped leads
- Full material and process traceability with data retention



RESISTORS

RER

Wirewound, Military-Qualified Resistor

Features

- Aluminum housed, molded construction for total environmental protection
- MIL-PRF-39009 military/established reliability, qualified to "R" failure rate level
- Mounts on chassis to utilize heat-sink effect
- Available in non-inductive styles with Aryton-Perry winding



RESISTORS

PHT

High-Stability, High-Temperature (230 °C)

Features

- Operating temperature range: - 55 °C; + 215 °C
- Storage temperature range: - 55 °C; + 230 °C
- Gold terminations (< 1 µm thick)
- Temperature coefficient down to 15 ppm (- 55 °C; + 215 °C)



THE VISHAY ADVANTAGE

High Reliability

MIL-PRF Qualifications

CECC Approvals

ESA Approvals

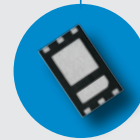
S-Level Failure Rates

Hermetic Sealing

and more...

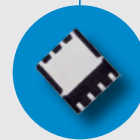
TECHNOLOGY AWARDS

Vishay's R&D, design, and manufacturing programs generate a steady stream of innovative components to help designers create new generations of end products. Vishay has received a number of awards for its industry-leading components.



China Annual Creativity in Electronics (ACE) Award

- SiZ710DT PowerPAIR® Power MOSFET



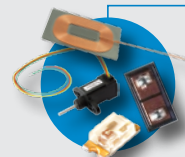
Electronic Products China Top-10 DC/DC Power Product Award

- SiR662DP TrenchFET® Power MOSFET



EN-Genius Network Product of the Year Awards

- CNY64ST and CNY65ST Cat IV Optocouplers
- Dual-Chip 45 V TMBS® Rectifiers



Electronic Design Top 101 Components

- IWAS-4832FF-50 Wireless Charging Receiving Coil
- RFCS Series Thin Film RF Capacitors
- 20 LHE Hall Effect Linear Position Sensor
- VLMx1300 Series Chip LEDs

Find out more at www.vishay.com/landingpage/newsletters/awards/



Vishay Intertechnology, Inc.

BUILD VISHAY

into your **DESIGN**

