



# Pulse

Electronics  
NETWORKING



## Ethernet Magnetics Selector Guide

# About Our Ethernet Magnetics

100Base-TX | 1000Base-T | 2.5GBase-T | 5GBase-T | 10GBase-T

Pulse's Ethernet transformers are RoHS compliant and qualified at major PHY suppliers. 100/1000/2.5G/5G/10GBASE-T Ethernet transformer modules are optimized for all major LAN transceivers. All modules provide electrical circuit isolation that meets IEEE 802.3, while maintaining signal integrity needed for the most demanding applications.

## Features and Benefits:

- IEEE 802.3 Compliant to 10G
- High Isolation up to 6kV
- Higher Reliability (Carrier Class & AEC-Q200)
- Single, Dual, Quad Packages
- SMT & BGA Options
- Extended Temperature -40°C to +85°C
- 4P PoE++ Capable up to 140W max.



## 100Base-TX

| MATERIAL  | NUMBER OF PORTS | PACKAGE | PACKAGE HEIGHT (MM) | PACKAGE LENGTH (MM) | PACKAGE WIDTH (MM) | SPEED      | TEMPERATURE | PoE RATING |
|-----------|-----------------|---------|---------------------|---------------------|--------------------|------------|-------------|------------|
| H0068ANL  | SINGLE          | PCMCIA  | 2.08                | 12.70               | 9.65               | 100BASE-TX | 0 TO 70     | NON-PoE    |
| H1102NL   | SINGLE          | SMT     | 5.97                | 12.70               | 9.40               | 100BASE-TX | 0 TO 70     | NON-PoE    |
| H1112NL   | SINGLE          | SMT     | 4.88                | 14.81               | 14.73              | 100BASE-TX | 0 TO 70     | NON-PoE    |
| H1164NL   | QUAD            | SMT     | 5.84                | 28.58               | 16.00              | 100BASE-TX | 0 TO 70     | NON-PoE    |
| H1197NL   | SINGLE          | SMT     | 5.97                | 12.70               | 9.40               | 100BASE-TX | 0 TO 70     | NON-PoE    |
| H12 60NL  | SINGLE          | SMT     | 5.97                | 12.70               | 9.40               | 100BASE-TX | 0 TO 70     | NON-PoE    |
| H1270NL   | DUAL            | SMT     | 3.68                | 13.08               | 14.99              | 100BASE-TX | 0 TO 70     | NON-PoE    |
| H1302NL   | SINGLE          | SMT     | 5.97                | 12.70               | 9.40               | 100BASE-TX | 0 TO 70     | NON-PoE    |
| H2009NL   | DUAL            | SMT     | 6.12                | 13.16               | 18.67              | 100BASE-TX | 0 TO 70     | PoE 15W    |
| H2017NL   | QUAD            | SMT     | 7.24                | 28.45               | 16.00              | 100BASE-TX | 0 TO 70     | PoE 15W    |
| H2019NL   | SINGLE          | SMT     | 5.97                | 12.70               | 9.40               | 100BASE-TX | 0 TO 70     | PoE 15W    |
| H2260NL   | SINGLE          | SMT     | 5.97                | 12.70               | 9.40               | 100BASE-TX | 0 TO 70     | PoE 15W    |
| HX0068ANL | SINGLE          | PCMCIA  | 2.08                | 12.70               | 9.65               | 100BASE-TX | -40 TO +85  | NON-PoE    |
| HX1098NL  | SINGLE          | SMT     | 4.01                | 12.70               | 9.65               | 100BASE-TX | -40 TO +85  | PoE 15W    |
| HX1112QNL | SINGLE          | SMT     | 4.88                | 14.73               | 14.73              | 100BASE-TX | -40 TO +85  | NON-PoE    |
| HX1148NL  | SINGLE          | SMT     | 5.84                | 25.45               | 12.70              | 100BASE-TX | -40 TO +85  | NON-PoE    |
| HX1188NL  | SINGLE          | SMT     | 5.97                | 12.70               | 7.11               | 100BASE-TX | -40 TO +85  | NON-PoE    |
| HX1198NL  | SINGLE          | SMT     | 5.97                | 12.70               | 9.40               | 100BASE-TX | -40 TO +85  | NON-PoE    |
| HX1224CNL | SINGLE          | SMT     | 6.22                | 13.64               | 14.99              | 100BASE-TX | -40 TO +85  | PoE 15W    |
| HX1234NL  | QUAD            | SMT     | 5.84                | 28.58               | 16.00              | 100BASE-TX | -40 TO +85  | NON-PoE    |
| HX1260NL  | SINGLE          | SMT     | 5.97                | 12.70               | 9.40               | 100BASE-TX | -40 TO +85  | NON-PoE    |
| HX1294NL  | DUAL            | SMT     | 5.87                | 13.67               | 18.87              | 100BASE-TX | -40 TO +85  | NON-PoE    |
| HX1305NL  | DUAL            | SMT     | 6.12                | 13.16               | 18.67              | 100BASE-TX | -40 TO +85  | NON-PoE    |
| HX1344NL  | QUAD            | SMT     | 5.72                | 28.45               | 16.00              | 100BASE-TX | -40 TO +85  | NON-PoE    |
| HX2019NL  | SINGLE          | SMT     | 5.97                | 12.70               | 9.40               | 100BASE-TX | -40 TO +85  | PoE 15W    |
| HX2260NL  | SINGLE          | SMT     | 5.97                | 12.70               | 9.40               | 100BASE-TX | -40 TO +85  | PoE 15W    |
| HX2305NL  | DUAL            | SMT     | 6.12                | 13.16               | 18.67              | 100BASE-TX | -40 TO +85  | PoE 15W    |
| HX2326NL  | SINGLE          | SMT     | 5.99                | 12.70               | 9.65               | 100BASE-TX | -40 TO +85  | PoE+ 30W   |

# 1000Base-TX

| MATERIAL  | NUMBER OF PORTS | PACKAGE            | PACKAGE HEIGHT (MM) | PACKAGE LENGTH (MM) | PACKAGE WIDTH (MM) | SPEED      | TEMPERATURE | PoE RATING     |
|-----------|-----------------|--------------------|---------------------|---------------------|--------------------|------------|-------------|----------------|
| H5004ENL  | SINGLE          | SMT                | 5.72                | 17.53               | 16.00              | 1000BASE-T | 0 TO 70     | NON-PoE        |
| H5007ENL  | SINGLE          | SMT                | 5.72                | 17.53               | 16.00              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| H5008NL   | SINGLE          | SMT                | 5.87                | 13.67               | 18.87              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| H5014NL   | DUAL            | SMT                | 7.24                | 27.81               | 15.37              | 1000BASE-T | 0 TO 70     | NON-PoE        |
| H5015NL   | SINGLE          | SMT                | 4.57                | 17.65               | 15.75              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| H5020NL   | DUAL            | SMT                | 8.33                | 27.94               | 10.92              | 1000BASE-T | 0 TO 70     | NON-PoE        |
| H5062NL   | SINGLE          | SMT                | 5.72                | 17.53               | 16.00              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| H5077NL   | SINGLE          | SMT                | 4.83                | 14.22               | 12.95              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| H5079NL   | SINGLE          | PCMCIA             | 2.54                | 19.94               | 14.73              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| H5084NL   | SINGLE          | SMT                | 4.14                | 15.24               | 10.29              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| H5120NL   | SINGLE          | PCMCIA             | 2.08                | 16.51               | 9.65               | 1000BASE-T | 0 TO 70     | NON-PoE        |
| H5149NL   | SINGLE          | PCMCIA             | 3.20                | 17.78               | 10.41              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| H5200NL   | DUAL            | BGA BUMP GRID ARRA | 11.18               | 14.73               | 17.27              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| H5400NL   | QUAD            | BGA BUMP GRID ARRA | 11.18               | 28.45               | 17.27              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| H6062NL   | SINGLE          | SMT                | 5.72                | 17.53               | 15.99              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| H6080NL   | DUAL            | SMT                | 7.24                | 27.81               | 15.37              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| H6096NL   | SINGLE          | SMT                | 6.60                | 18.16               | 16.00              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 75W  |
| H6101NL   | DUAL            | SMT                | 7.24                | 27.81               | 15.24              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 60W  |
| H6200NL   | DUAL            | BGA BUMP GRID ARRA | 11.18               | 14.73               | 17.27              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 60W  |
| H6400NL   | QUAD            | BGA BUMP GRID ARRA | 11.18               | 28.45               | 17.27              | 1000BASE-T | 0 TO 70     | 4PAIR PoE 60W  |
| HX5004ENL | SINGLE          | SMT                | 5.72                | 17.53               | 16.00              | 1000BASE-T | -40 TO +85  | NON-PoE        |
| HX5008NL  | SINGLE          | SMT                | 6.12                | 13.16               | 18.67              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 30W  |
| HX5014NL  | DUAL            | SMT                | 7.24                | 27.81               | 15.37              | 1000BASE-T | -40 TO +85  | NON-PoE        |
| HX5020NL  | DUAL            | SMT                | 8.33                | 27.94               | 10.92              | 1000BASE-T | -40 TO +85  | NON-PoE        |
| HX5062NL  | SINGLE          | SMT                | 5.72                | 17.53               | 16.00              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 30W  |
| HX5084NL  | SINGLE          | SMT                | 4.14                | 15.24               | 10.29              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 30W  |
| HX5120NL  | SINGLE          | PCMCIA             | 2.08                | 16.51               | 9.65               | 1000BASE-T | -40 TO +85  | NON-PoE        |
| HX5149NL  | SINGLE          | PCMCIA             | 3.20                | 17.78               | 10.41              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 30W  |
| HX5181NL  | SINGLE          | SMT                | 6.35                | 13.84               | 15.37              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 30W  |
| HX5200NL  | DUAL            | BGA BUMP GRID ARRA | 11.18               | 14.73               | 17.27              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 30W  |
| HX5224CNL | SINGLE          | SMT                | 9.77                | 18.50               | 15.94              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 30W  |
| HX5400NL  | QUAD            | BGA BUMP GRID ARRA | 11.18               | 28.45               | 17.27              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 30W  |
| HX5610NL  | SINGLE          | BGA BUMP GRID ARRA | 11.18               | 7.87                | 17.27              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 30W  |
| HX6062NL  | SINGLE          | SMT                | 5.72                | 17.53               | 16.00              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 30W  |
| HX6080NL  | DUAL            | SMT                | 7.24                | 27.81               | 15.37              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 30W  |
| HX6096NL  | SINGLE          | SMT                | 6.60                | 18.16               | 16.00              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 75W  |
| HX6098NL  | SINGLE          | SMT                | 6.60                | 18.16               | 16.00              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 120W |
| HX6101NL  | DUAL            | SMT                | 7.24                | 27.81               | 15.37              | 1000BASE-T | -40 TO +85  | 4PAIR PoE 60W  |

## 2.5GBase-T

| MATERIAL | NUMBER OF PORTS | PACKAGE | PACKAGE HEIGHT (MM) | PACKAGE LENGTH (MM) | PACKAGE WIDTH (MM) | SPEED      | TEMPERATURE | PoE RATING    |
|----------|-----------------|---------|---------------------|---------------------|--------------------|------------|-------------|---------------|
| HU4006NL | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | 2.5GBASE-T | 0 TO 70     | 4PAIR PoE 60W |
| HU4009NL | SINGLE          | SMT     | 6.60                | 18.16               | 16.01              | 2.5GBASE-T | 0 TO 70     | 4PAIR PoE 60W |
| HU4102NL | DUAL            | SMT     | 8.33                | 27.94               | 10.92              | 2.5GBASE-T | 0 TO 70     | NON-PoE       |
| HU4103NL | DUAL            | SMT     | 8.33                | 27.94               | 10.92              | 2.5GBASE-T | 0 TO 70     | 4PAIR PoE 60W |
| HU4108NL | SINGLE          | SMT     | 8.63                | 15.24               | 10.93              | 2.5GBASE-T | 0 TO 70     | 4PAIR PoE 60W |

## 5GBase-T

| MATERIAL  | NUMBER OF PORTS | PACKAGE | PACKAGE HEIGHT (MM) | PACKAGE LENGTH (MM) | PACKAGE WIDTH (MM) | SPEED    | TEMPERATURE | PoE RATING    |
|-----------|-----------------|---------|---------------------|---------------------|--------------------|----------|-------------|---------------|
| H5G1002NL | SINGLE          | SMT     | 6.60                | 18.16               | 16.01              | 5GBASE-T | 0 TO 70     | 4PAIR PoE 60W |

## 10GBase-T

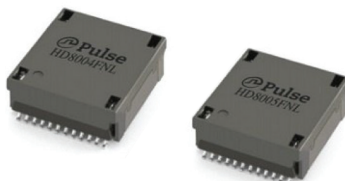
| MATERIAL | NUMBER OF PORTS | PACKAGE | PACKAGE HEIGHT (MM) | PACKAGE LENGTH (MM) | PACKAGE WIDTH (MM) | SPEED     | TEMPERATURE | PoE RATING |
|----------|-----------------|---------|---------------------|---------------------|--------------------|-----------|-------------|------------|
| H7008FNL | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | 10GBASE-T | 0 TO 70     | NON-PoE    |
| H7008NL  | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | 10GBASE-T | 0 TO 70     | NON-PoE    |
| H7018FNL | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | 10GBASE-T | 0 TO 70     | NON-PoE    |
| H7019FNL | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | 10GBASE-T | 0 TO 70     | NON-PoE    |
| H7028FNL | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | 10GBASE-T | 0 TO 70     | NON-PoE    |
| H7029FNL | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | 10GBASE-T | 0 TO 70     | NON-PoE    |
| H7137FNL | SINGLE          | SMT     | 7.24                | 17.73               | 14.86              | 10GBASE-T | 0 TO 70     | NON-PoE    |
| H7800NL  | SINGLE          | SMT     | 2.54                | 19.40               | 14.73              | 10GBASE-T | 0 TO 70     | NON-PoE    |
| HX7028NL | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | 10GBASE-T | -40 TO +85  | NON-PoE    |
| HX7137NL | SINGLE          | SMT     | 7.24                | 17.73               | 15.24              | 10GBASE-T | -40 TO +85  | NON-PoE    |

# HDBaseT Transformers

Pulse HDBaseT transformers are designed to provide common mode noise reduction for improved EMI performance and support power over HDBaseT (PoH) applications of up to 140W. The HDBaseT technology enables 5Play feature set, which includes ultra high definition 4K video, audio, 100BASE-TX Ethernet, various control signals, and up to 100W of power, on a single 100m/328ft CAT5e/6 cable.

## Features and Benefits:

- Qualified for Valens chipsets
- Supports Power Over HDBaseT up to 140W
- Suitable for a variety of HDBaseT applications
- High volume production
- Industry standard footprint



## HDBaseT Applications

- Blu-ray, DVD, Recorders
- Displays
- Digital Set Top Box
- PC's Projectors
- A/V Recievers
- Game Consoles
- HDMI repeaters, Splitters, Switches

| HDBase-T  |                 |         |                     |                     |                    |          |             |                |
|-----------|-----------------|---------|---------------------|---------------------|--------------------|----------|-------------|----------------|
| MATERIAL  | NUMBER OF PORTS | PACKAGE | PACKAGE HEIGHT (MM) | PACKAGE LENGTH (MM) | PACKAGE WIDTH (MM) | SPEED    | TEMPERATURE | PoE RATING     |
| HD8004FNL | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | HDBASE-T | 0 TO 70     | 4PAIR PoE 60W  |
| HD8005FNL | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | HDBASE-T | 0 TO 70     | 4PAIRPoE 100W  |
| HD8006FNL | SINGLE          | SMT     | 7.87                | 17.73               | 15.88              | HDBASE-T | 0 TO 70     | 4PAIR PoE 140W |
| HD8008NL  | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | HDBASE-T | 0 TO 70     | 4PAIR PoE 30W  |
| HDX8004NL | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | HDBASE-T | -40 TO +85  | 4PAIR PoE 60W  |
| HDX8005NL | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | HDBASE-T | -40 TO +85  | 4PAIR PoE 100W |
| HDX8006NL | SINGLE          | SMT     | 6.60                | 18.16               | 16.00              | HDBASE-T | -40 TO +85  | 4PAIR PoE 140W |
| HXD8008NL | SINGLE          | SMT     | 5.72                | 13.72               | 15.24              | HDBASE-T | -40 TO +85  | 4PAIR PoE 30W  |

# About Our BMS Transformers

In large battery pack applications with daisy chain connections, the number of cells connected in series is very high, and the large voltage differences demand component-to-component isolation. The serial communication links between boards need to be isolated by transformer coupling circuits instead of capacitor coupling.

Pulse Electronics Networking BU offers a full line of isolation transformers, and common mode chokes for small to large battery pack systems for serial port safety isolation and EMI noise suppression.

We help designers create battery management systems for higher energy-efficiency modern cars such as EVs, HEVs, and PHEVs. All our battery management parts meet AEC-Q200 requirements for automotive applications.

Our team created the BMS transformers to meet the standards of sophisticated BMS systems. We designed isolation transformers, and common mode chokes to isolate multiple high-energy cells to increase safety and function.



BMS Isolation transformers and common mode chokes

## Key Features and Benefits:

- Supports BMS safety isolation and EMI noise suppression
- Supports serial Daisy Chain isoSPI, SPI and other signal isolation
- Meets AEC-Q200 requirements for automotive application
- Operating temperature: -40C up to +125C
- Multiple options for working voltages and voltage isolation
- Functional, Basic, and reinforced insulation available.

## Applications:

- Electric Vehicle
- Energy Storage Systems
- Data Center UPS
- Solar energy storage
- Green – Renewable
- Marine

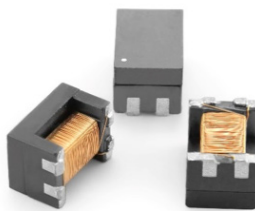
## BMS Parts

| MATERIAL  | NUMBER OF CHANNELS | ISOLATION VOLTAGE | PACKAGE | PACKAGE HEIGHT (MM) | PACKAGE LENGTH (MM) | PACKAGE WIDTH (MM) | TEMPERATURE | WORKING VOLTAGE | INSULATION |
|-----------|--------------------|-------------------|---------|---------------------|---------------------|--------------------|-------------|-----------------|------------|
| HM1236NL  | 1                  | 3200 VDC          | SMT     | 4.06                | 8.64                | 10.92              | -40 TO +125 | 600             | FUNCTIONAL |
| HM1237NL  | 2                  | 2500 VRMS         | SMT     | 5.72                | 11.56               | 9.53               | -40 TO +125 | 600             | FUNCTIONAL |
| HM1238NL  | 1                  | 4300 VDC          | SMT     | 4.25                | 8.38                | 10.50              | -40 TO +150 | 1000            | FUNCTIONAL |
| HM2100NL  | 2                  | 4300 VDC          | SMT     | 3.45                | 14.70               | 11.65              | -40 TO +125 | 1000            | FUNCTIONAL |
| HM2101NL  | 1                  | 4300 VDC          | SMT     | 5.72                | 7.62                | 9.40               | -40 TO +125 | 1000            | FUNCTIONAL |
| HM2102NL  | 2                  | 4300 VDC          | SMT     | 5.00                | 14.81               | 14.73              | -40 TO +125 | 1600            | FUNCTIONAL |
| HM2103NL  | 1                  | 4300 VDC          | SMT     | 5.72                | 7.62                | 9.40               | -40 TO +125 | 1000            | FUNCTIONAL |
| HM2106NL  | 1                  | 4300 VDC          | SMT     | 5.75                | 8.50                | 16.84              | -40 TO +125 | 1000            | FUNCTIONAL |
| HM2108NL  | 1                  | 4300 VDC          | SMT     | 5.75                | 8.50                | 16.84              | -40 TO +125 | 1000            | FUNCTIONAL |
| HM2112ZNL | 2                  | 4300 VDC          | SMT     | 3.45                | 14.70               | 15.43              | -40 TO +125 | 1000            | FUNCTIONAL |
| HM2113ZNL | 1                  | 4300 VDC          | SMT     | 3.45                | 0.90                | 14.53              | -40 TO +125 | 1000            | FUNCTIONAL |
| HMU2128NL | 1                  | 4300 VDC          | SMT     | 6.85                | 8.89                | 10.03              | -40 TO +125 | 1000            | REINFORCED |
| HMU2102NL | 2                  | 4300 VDC          | SMT     | 4.88                | 14.81               | 14.70              | -40 TO +125 | 1000            | FUNCTIONAL |
| HMU2103NL | 1                  | 4300 VDC          | SMT     | 5.72                | 7.62                | 9.27               | -40 TO +125 | 1000            | FUNCTIONAL |

# Automotive Communications

## Pulse Electronics 100Base-T1 Automotive | Ethernet Common Mode Choke

Pulse releases the AE2002 100Base-T1 common mode choke for automotive Ethernet applications. In addition to the 100Base-T1 Pulse is in process of releasing the 1000Base-T1 AE5002 and the 100Base-T1 Power over Data Lines (PoDL) AE3003/AE3005/AE3006. Pulse's parts are designed to operate from -40C up to +125C, have high reliability, high volume manufacturing, long term manufacturing support, and meet AEC-Q200 requirements.



AE-Series CMC



HM-Series Ethernet Transformers

### Features and Benefits:

- Designed to meet IEEE 802.3bw
- Qualified at Marvell, Broadcom, Intel
- Meets AEC-Q200 requirements
- IATF 16949:2016 certification for 100Base-T1, 1000Base-T1, and PoDL parts in-process
- Operating Temp. from -40C up to +125C
- PPAP Capable

### Applications:

- Infotainment
- Advanced Driver Assist Systems (ADAS)
- Body Control
- Camera/Radar
- Gateways
- Backbone Diagnostics

### AE Auto Chokes

| MATERIAL | NUMBER OF PORTS | PACKAGE | PACKAGE HEIGHT (MM) | PACKAGE LENGTH (MM) | PACKAGE WIDTH (MM) | SPEED       | TEMPERATURE | CHOKE OCL MH | PoDL RATING |
|----------|-----------------|---------|---------------------|---------------------|--------------------|-------------|-------------|--------------|-------------|
| AE2002   | SINGLE          | SMT     | 2.8                 | 4.5                 | 3.2                | 100BASE-T1  | -40 TO +125 | 0.16         | NON-PoDL    |
| AE5002   | SINGLE          | SMT     | 2.8                 | 4.5                 | 3.2                | 1000BASE-T1 | -40 TO +125 | 0.12         | NON-PoDL    |

### HM Series Auto

| MATERIAL  | NUMBER OF PORTS | PACKAGE | PACKAGE HEIGHT (MM) | PACKAGE LENGTH (MM) | PACKAGE WIDTH (MM) | SPEED      | TEMPERATURE | PoE RATING    |
|-----------|-----------------|---------|---------------------|---------------------|--------------------|------------|-------------|---------------|
| HM0068ANL | SINGLE          | PCMCIA  | 2.083               | 12.7                | 9.652              | 100BASE-TX | -40 TO +105 | NON-PoE       |
| HM1188NL  | SINGLE          | SMT     | 5.969               | 12.7                | 7.11               | 100BASE-TX | -40 TO +105 | NON-PoE       |
| HM1190NL  | SINGLE          | SMT     | 5.99                | 12.7                | 9.09               | 100BASE-TX | -40 TO +125 | NON-PoE       |
| HM1225NL  | SINGLE          | SMT     | 5.969               | 12.7                | 9.398              | 100BASE-TX | -40 TO +85  | NON-PoE       |
| HM1331NL  | SINGLE          | SMT     | 7.62                | 15.24               | 12.7               | 100BASE-TX | -40 TO +85  | NON-PoE       |
| HM5149NL  | SINGLE          | PCMCIA  | 3.2                 | 17.78               | 10.414             | 1000BASE-T | -40 TO +125 | 4PAIR PoE 30W |



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