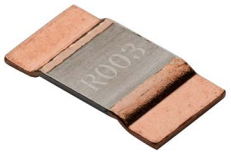
# CSSA

## Automotive grade current sense resistor- metal shunt




### Product features

- AEC-Q200
- Resistance value from 0.2 mΩ to 5.0 mΩ
- Low thermal EMF
- Low TCR
- 2512 (6432 metric) to 5930 (15077 metric) package
- Moisture sensitivity level (MSL): 1

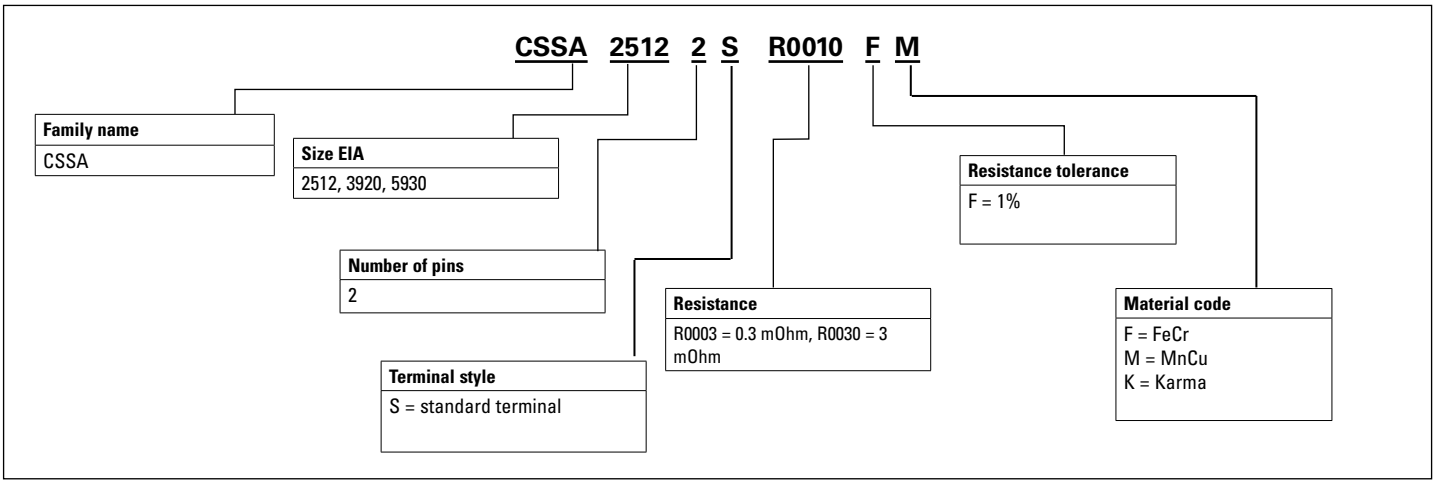
### Applications

- Automotive lighting
- Server
- Battery management
- Hot swap controllers
- Body control modules
- DC/DC converters
- Switched-mode power supplies (SMPS)
- DC Motor control
- IoT devices
- Electric water pump
- Active braking

### Environmental compliance

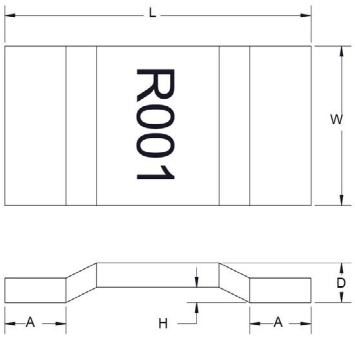
Pb HALOGEN HF FREE RoHS

**Table 1. Part numbering**

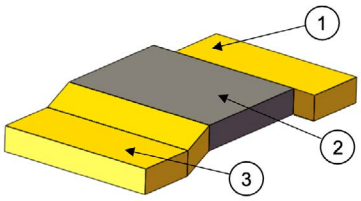



Powering Business Worldwide

### Mechanical parameters- mm



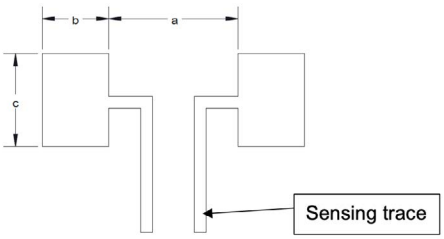

### Construction




| Number | Materials |
|---|---|
| 1 | Copper electrode |
| 2 | FeCr/ MnCu/ Karma |
| 3 | Copper electrode |

| Family | Size code | L | W | R | H | D |
|---|---|---|---|---|---|---|
| CSSA2512 | 2512 (6432 metric) | 6.40 ± 0.20 | 3.20 ± 0.25 | 1.20 ± 0.20 | 0.50 ± 0.10 | 1.50 maximum |
| CSSA3920 | 3920 (10052 metric) | 10.00 ± 0.30 | 5.20 ± 0.30 | 2.00 ± 0.30 | 0.50 ± 0.10 | 2.40 maximum |
| CSSA5930 | 5930 (15077 metric) | 15.00 ± 0.30 | 7.70 ± 0.30 | 4.20 ± 0.30 | 0.50 ± 0.10 | 2.20 maximum |

### Recommended PCB layout




| Family | a | b | c |
|---|---|---|---|
| CSSA2512 | 3.7 | 2.35 | 3.6 |
| CSSA3920 | 5.6 | 2.7 | 6.2 |
| CSSA5930 | 5.6 | 5.2 | 8.75 |

### Part marking

| Part marking | Resistance (mΩ) |
|---|---|
| 0L20 | 0.2 |
| 0L30 | 0.3 |
| 0L50 | 0.5 |
| R001 | 1 |
| R002 | 2 |
| R003 | 3 |
| R004 | 4 |
| R005 | 5 |

## Electrical specifications

| Part number | Size | Power rating @ +125 °C (W) | Resistance[2] (mΩ) | Resistance tolerance | Material | TCR[1] (ppm/°C) | Operating temperature |
|---|---|---|---|---|---|---|---|
| CSSA25122SR0010FM | 2512 (6432 metric) | 5 | 1 | ±1% | MnCu | ± 150 | -55 °C to +170 °C |
| CSSA25122SR0020FF | 2512 (6432 metric) | 5 | 2 | ±1% | FeCr | ± 75 | -55 °C to +170 °C |
| CSSA39202SR0002FM | 3920 (10052 metric) | 12 | 0.2 | ±1% | MnCu | ± 150 | -55 °C to +170 °C |
| CSSA39202SR0003FM | 3920 (10052 metric) | 9 | 0.3 | ±1% | MnCu | ± 150 | -55 °C to +170 °C |
| CSSA39202SR0005FM | 3920 (10052 metric) | 9 | 0.5 | ±1% | MnCu | ± 150 | -55 °C to +170 °C |
| CSSA39202SR0010FM | 3920 (10052 metric) | 9 | 1 | ±1% | MnCu | ± 150 | -55 °C to +170 °C |
| CSSA39202SR0010FK | 3920 (10052 metric) | 9 | 1 | ±1% | Karma | ± 75 | -55 °C to +170 °C |
| CSSA39202SR0010FF | 3920 (10052 metric) | 5 | 1 | ±1% | FeCr | ± 75 | -55 °C to +170 °C |
| CSSA39202SR0020FF | 3920 (10052 metric) | 5 | 2 | ±1% | FeCr | ± 75 | -55 °C to +170 °C |
| CSSA39202SR0030FF | 3920 (10052 metric) | 5 | 3 | ±1% | FeCr | ± 75 | -55 °C to +170 °C |
| CSSA39202SR0040FF | 3920 (10052 metric) | 5 | 4 | ±1% | FeCr | ± 50 | -55 °C to +170 °C |
| CSSA39202SR0050FF | 3920 (10052 metric) | 5 | 5 | ±1% | FeCr | ± 50 | -55 °C to +170 °C |
| CSSA59302SR0002FM | 5930 (15077 metric) | 15 | 0.2 | ±1% | MnCu | ± 150 | -55 °C to +170 °C |
| CSSA59302SR0003FM | 5930 (15077 metric) | 10 | 0.3 | ±1% | MnCu | ± 150 | -55 °C to +170 °C |
| CSSA59302SR0005FM | 5930 (15077 metric) | 10 | 0.5 | ±1% | MnCu | ± 150 | -55 °C to +170 °C |
| CSSA59302SR0010FF | 5930 (15077 metric) | 10 | 1 | ±1% | FeCr | ± 75 | -55 °C to +170 °C |
| CSSA59302SR0020FF | 5930 (15077 metric) | 7 | 2 | ±1% | FeCr | ± 75 | -55 °C to +170 °C |
| CSSA59302SR0030FF | 5930 (15077 metric) | 7 | 3 | ±1% | FeCr | ± 75 | -55 °C to +170 °C |

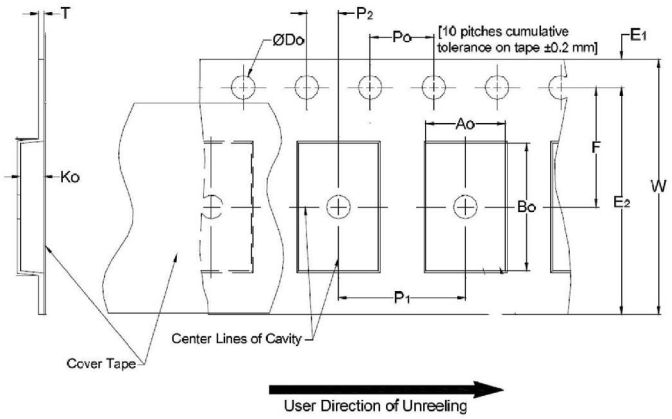
1. Temperature coefficient of resistance (TCR) parameters: +25 °C to +125 °C
2. Resistance should be measured at +23 °C ±5 °C in accordance with the recommended land pattern.

## Packaging information- mm

Supplied in tape and reel on a 13" diameter reel

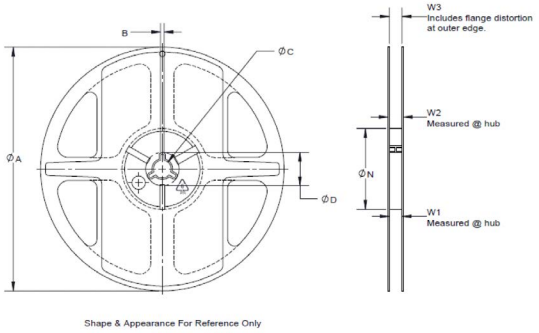
| Part number | Qty/Reel |
|---|---|
| CSSA25122SR0010FM | 4000 |
| CSSA25122SR0020FF | 4000 |
| CSSA39202SR0002FM | 1500 |
| CSSA39202SR0003FM | 1500 |
| CSSA39202SR0005FM | 1500 |
| CSSA39202SR0010FM | 1500 |
| CSSA39202SR0010FK | 1500 |
| CSSA39202SR0010FF | 1500 |
| CSSA39202SR0020FF | 2500 |
| CSSA39202SR0030FF | 2500 |
| CSSA39202SR0040FF | 2500 |
| CSSA39202SR0050FF | 2500 |
| CSSA59302SR0002FM | 1000 |
| CSSA59302SR0003FM | 1000 |
| CSSA59302SR0005FM | 2000 |
| CSSA59302SR0010FF | 1000 |
| CSSA59302SR0020FF | 2000 |
| CSSA59302SR0030FF | 2000 |

## Tape carrier and dimensions




| Dimension | CSSA2512 | CSSA3920 | CSSA5930 |
|---|---|---|---|
| W | 16.00 ± 0.30 | 24.00 ± 0.30 | 24.00 ± 0.30 |
| F | 7.50 ± 0.10 | 11.50 ± 0.10 | 11.50 ± 0.10 |
| E1 | 1.75 ±0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 |
| E2 | NA | NA | NA |
| P0 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 |
| P1 | 8.00 ± 0.10 | 8.00 ± 0.10 | 12.00 ± 0.10 |
| P2 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 |
| ØD0 | 1.50 ± 0.10 | 1.50 ± 0.10 | 1.50 ± 0.10 |
| A0 | 3.50 ± 0.20 | 6.00 ± 0.20 | 8.60 ± 0.20 |
| B0 | 6.80 ± 0.20 | 10.60 ± 0.20 | 15.60 ± 0.20 |
| K0 | 1.40 ± 0.10 | 1.20/2.50 | 1.20/2.35 |
| T | 0.40 ± 0.10 | 0.40 ± 0.10 | 0.40 ± 0.10 |

## Reel dimensions

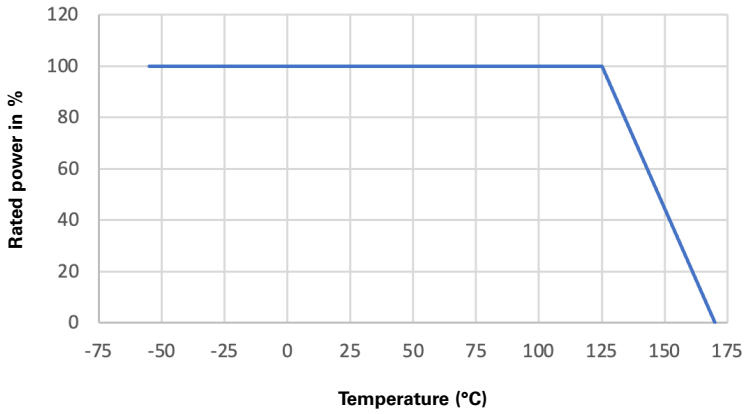



| Size | A | B | C | D | N | W1 | W2 | W3 |
|---|---|---|---|---|---|---|---|---|
| CSSA2512 | 330 ± 2.0 | 2.0 ± 0.5 | 13.5 ± 1.0 | 20.2 minimum | 60 ± 1.0 | 17.0 ± 0.5 | 22.4 maximum | NA |
| CSSA3920 | 330 ± 2.0 | 2.3 ± 0.5 | 13.0 ± 1.0 | 20.2 minimum | 100 ± 1.5 | 24.5 ± 1.5 | 30.4 maximum | NA |
| CSSA5930 | 330 ± 2.0 | 2.3 ± 0.5 | 13.0 ± 1.0 | 20.2 minimum | 100 ± 1.5 | 24.5 ± 1.5 | 30.4 maximum | NA |

## General specifications

| |
|---|
| Temperature coefficient of resistance: MIL-STD-202, Method 304, TCR =(R-R0)/R0(T2-T1)*106. Test temperature: T1=+25 °C, T2=+125 °C |
| Short time overload: IEC60115-1 4.13, 5 X rated power for 5 s |
| High temperature storage: MIL-STD202 Method 108, 1000 hours, +170 °C, unpowered |
| Temperature cycling: JESD22 Method JA-104, 1000 Cycles, -55 °C (15 minutes), +150 °C (15 minutes) |
| Biased humidity: MIL-STD-202 Method 103, 1000 hours, +85 °C/85% RH, 10% bias |
| Operational life: MIL-STD-202 Method 108, 1000 hours, +125 °C ±2 °C at rated power, 1.5 hours on, 0.5 hours off. |
| Resistance to solvents: MIL-STD-202 Method 215, Immersed in three solvents after 3 to 3.5 minutes immersion, brush wipe 10 times, a total of 3 times, washing with washing and cleaning agent, room temperature on the surface of the ventilation drying. |
| Mechanical shock: MIL-STD-202 Method 213, 100 g's. 6 ms, 5 pulses |
| Vibration: MIL-STD-202 Method 204, 10 Hz to 2000 Hz, 5 g's for 20 min., 12 cycles each of 3 orientations |
| Resistance to soldering heat: MIL-STD-202 Method 210, Immerse the specimens in and eutectic solder at +260 ± 5 °C for 10 ± 0.5 s |
| ESD: AEC-Q200-002 or ISO/DIS 10605, 25 kV |
| Solderability: J-STD-002, solder bath at 245 ± 5 °C, Dipping time: 3 ± 0.3 seconds, > 95% area covered with tin |
| Board flex (bending): AEC-Q200-005, Bending amplitude 2 mm for 60 s |
| Terminal strength: AEC-Q200-006, Force of 17.7 N for 60 seconds |

## Temperature derating curve




## Rated current & voltage

The rated Current and Voltage are calculated by the following formula:

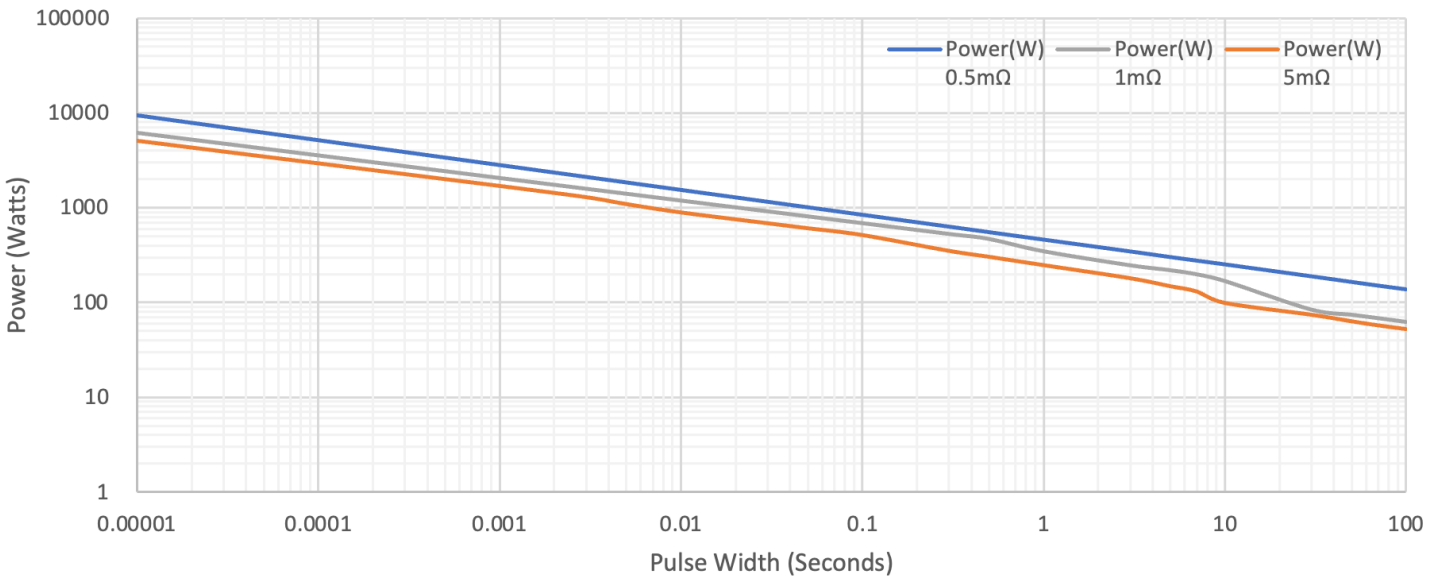
$I=\sqrt{P \div R}$ $V=\sqrt{P \times R}$

I: Rated current (A) V: Rated voltage (V)

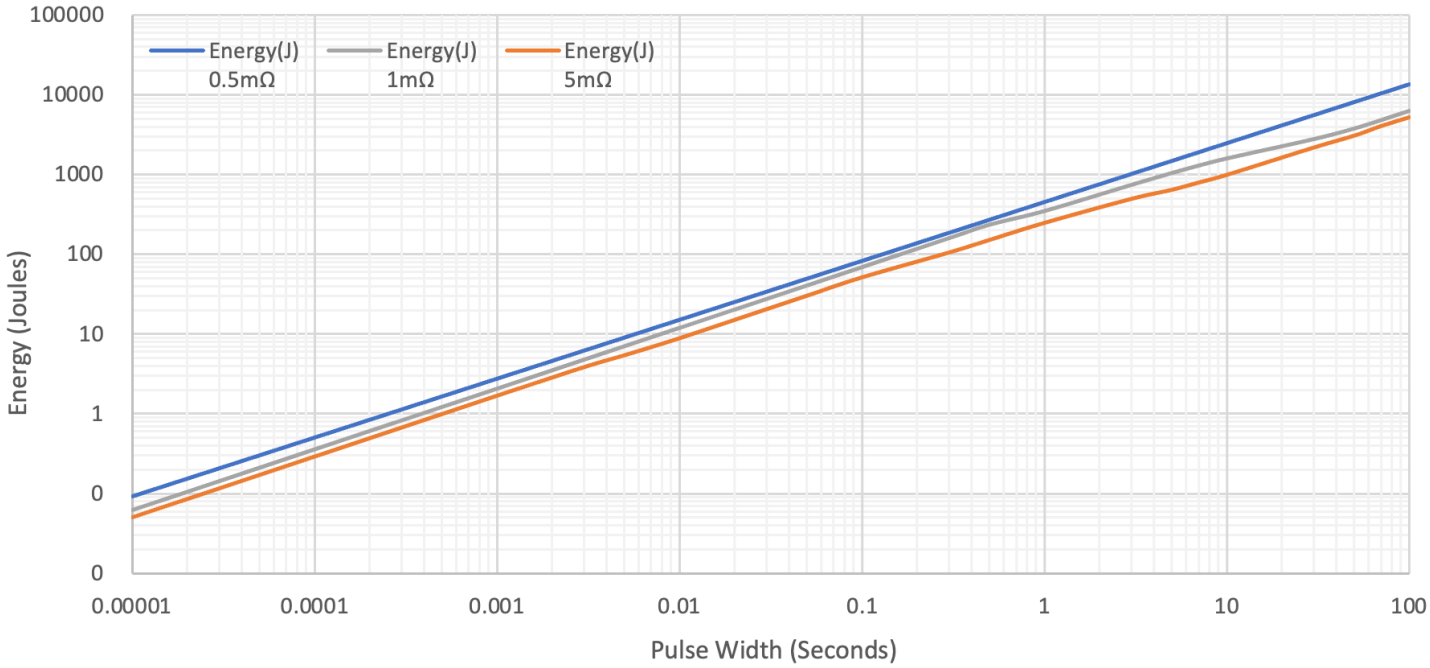
P: Rated power (W) R: Resistance value (Ω)

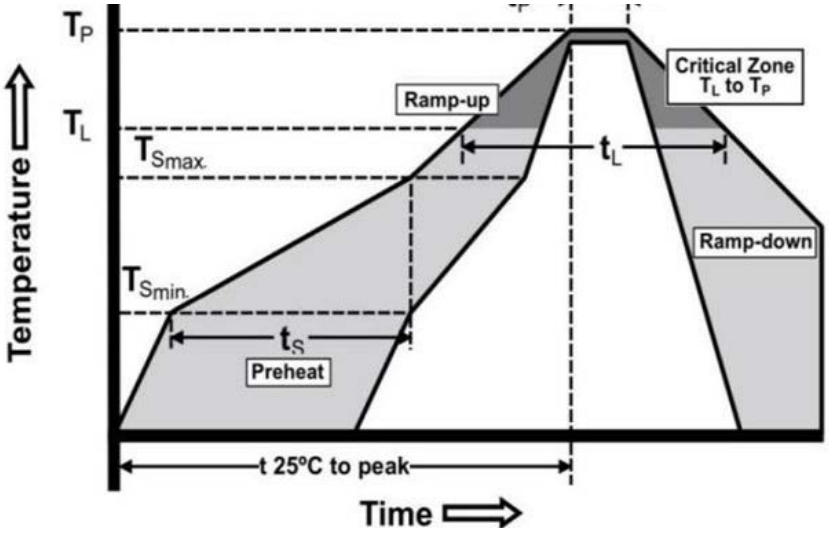
**Curves**

**Maximum pulse power**




**Maximum pulse energy**






| Profile feature | | Lead (Pb) free solder |
|---|---|---|
| Preheat and soak | • Temperature min. ($T_{smin}$) | 150 °C |
| | • Temperature max. ($T_{smax}$) | 200 °C |
| | • Time ($T_{smin}$ to $T_{smax}$) ($t_s$) | 60-120 seconds |
| Ramp up rate $T_{smax}$ to $T_p$ | | 3 °C/ second max. |
| Melting tin time (tL) | | 20 s - 30 s |
| Peak package body temperature ($T_P$)* | | 260 °C |
| Time ($t_p$)* within 5 °C of the specified classification temperature ($T_c$) | | 5 seconds |
| Ramp-down rate ($T_p$ to $T_L$) | | 6 °C/ second max. |
| Time 25 °C to peak temperature | | 8 minutes max. |

### Manual solder

+350 °C ±10 °C , 5 seconds maximum (by soldering iron), generally manual, hand soldering is not recommended

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

**Eaton**
**Electronics Division**
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com/electronics

© 2023 Eaton
All Rights Reserved
Printed in USA
Publication No. ELX1372 BU22240
August 2023

Eaton is a registered trademark.

All other trademarks are property of their respective owners.

Follow us on social media to get the latest product and support information.