

HF RoHS MC Series - DO-214



Agency Approvals

| Agency | Agency File Number |
|--------|--------------------|
| | E133083 |

Pinout Designation

NOT APPLICABLE

Schematic Symbol



Description

MC Series DO-214 are low capacitance SIDACTor® devices designed to protect broadband equipment such as VOIP, DSL modems and DSLAMs from damaging overvoltage transients.

The series provides a surface mount solution that enables equipment to comply with global regulatory standards while limiting the impact to broadband signals.

Features and Benefits

- Low voltage overshoot
- Low on-state voltage
- Does not degrade with use
- Fails short circuit when surged in excess of ratings
- 40% lower capacitance than our Baseband Protectors, for applications that demand greater signal integrity

Applicable Global Standards

- TIA-968-A
- TIA-968-B
- ITU K.20/21 Enhanced Level*
- ITU K.20/21 Basic Level*
- GR 1089 Intra-building*
- IEC 61000-4-5
- YD/T 1082
- YD/T 993
- YD/T 950

*A-rated parts require series resistance

Electrical Characteristics

| Part Number | Marking | V_{DRM} @ $I_{DRM}=5\mu A$ | V_S @ 100V/ μs | I_H | I_S | I_T | V_T @ $I_T=2.2$ Amps | Capacitance @ 1MHz, 2V bias | |
|--------------|---------|---------------------------------|--------------------------|--------|--------|-------|---------------------------|--------------------------------|--------|
| | | V min | V max | mA min | mA max | A max | V max | pF min | pF max |
| P0080SAMCLRP | P-8AM | 6 | 25 | 50 | 800 | 2.2 | 4 | 25 | 55 |
| P0220SAMCLRP | P02AM | 15 | 32 | 50 | 800 | 2.2 | 4 | 25 | 50 |
| P0300SAMCLRP | P03AM | 25 | 40 | 50 | 800 | 2.2 | 4 | 15 | 35 |
| P0080SCMCLRP | P-8CM | 6 | 25 | 50 | 800 | 2.2 | 4 | 25 | 75 |
| P0220SCMCLRP | P02CM | 15 | 32 | 50 | 800 | 2.2 | 4 | 30 | 65 |
| P0300SCMCLRP | P03CM | 25 | 40 | 50 | 800 | 2.2 | 4 | 25 | 45 |
| P0640SCMCLRP | P06CM | 58 | 77 | 150 | 800 | 2.2 | 4 | 55 | 85 |
| P0720SCMCLRP | P07CM | 65 | 88 | 150 | 800 | 2.2 | 4 | 50 | 75 |
| P0900SCMCLRP | P09CM | 75 | 98 | 150 | 800 | 2.2 | 4 | 45 | 70 |
| P1100SCMCLRP | P11CM | 90 | 130 | 150 | 800 | 2.2 | 4 | 45 | 70 |
| P1300SCMCLRP | P13CM | 120 | 160 | 150 | 800 | 2.2 | 4 | 40 | 60 |
| P1500SCMCLRP | P15CM | 140 | 180 | 150 | 800 | 2.2 | 4 | 35 | 55 |
| P1800SCMCLRP | P18CM | 170 | 220 | 150 | 800 | 2.2 | 4 | 35 | 50 |
| P2100SCMCLRP | P21CM | 180 | 240 | 150 | 800 | 2.2 | 4 | 30 | 50 |
| P2300SCMCLRP | P23CM | 190 | 260 | 150 | 800 | 2.2 | 4 | 30 | 50 |
| P2600SCMCLRP | P26CM | 220 | 300 | 150 | 800 | 2.2 | 4 | 30 | 45 |
| P3100SCMCLRP | P31CM | 275 | 350 | 150 | 800 | 2.2 | 4 | 30 | 45 |
| P3500SCMCLRP | P35CM | 320 | 400 | 150 | 800 | 2.2 | 4 | 25 | 40 |

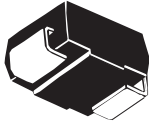
Notes:
- Absolute maximum ratings measured at $T_A = 25^\circ C$ (unless otherwise noted).
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Please refer to www.littelfuse.com for current information.

Surge Ratings

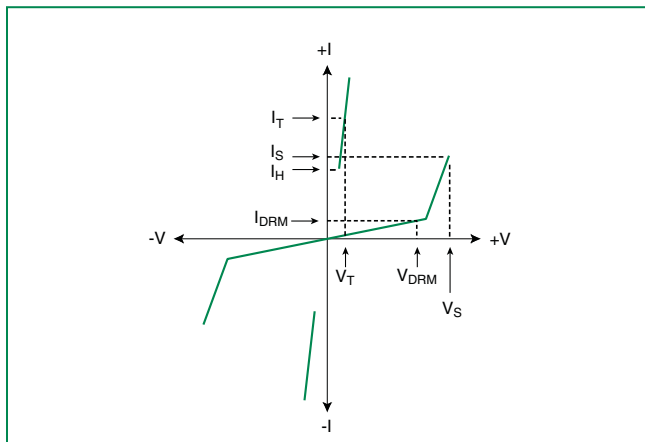
| Series | I_{PP} | | | | | | | | | | I_{TSM} 50/60 Hz | di/dt |
|--------|----------------------|-------------------|---------------------|---------------------|---------------------|--------------------|---------------------|----------------------|---------------------|---------------------|-----------------------|----------|
| | 0.2x310 ¹ | 2x10 ¹ | 8x20 ¹ | 10x160 ¹ | 10x560 ¹ | 5x320 ¹ | 10x360 ¹ | 10x1000 ¹ | 5x310 ¹ | 10x700 ² | | |
| | 0.5x700 ² | 2x10 ² | 1.2x50 ² | 10x160 ² | 10x560 ² | 9x720 ² | 10x360 ² | 10x1000 ² | 10x700 ² | 10x700 ² | | |
| | A min | A min | A min | A min | A min | A min | A min | A min | A min | A min | A min | A/μs max |
| A | 20 | 150 | 150 | 90 | 50 | 75 | 75 | 45 | 75 | 20 | 500 | |
| C | 50 | 500 | 400 | 200 | 150 | 200 | 175 | 100 | 200 | 30 | 500 | |

Notes:
 - Peak pulse current rating (I_{pp}) is repetitive and guaranteed for the life of the product.
 - I_{pp} ratings applicable over temperature range of -40°C to +85°C
 - The device must initially be in thermal equilibrium with -40°C ≤ T_j ≤ +150°C

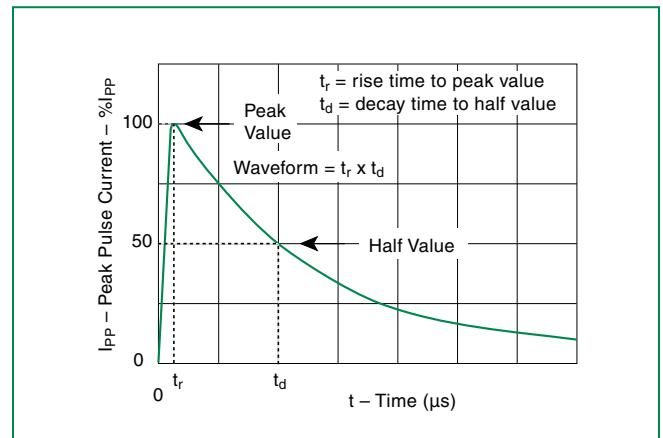
Thermal Considerations

| Package | Symbol | Parameter | Value | Unit |
|---|-----------|---|-------------|------|
|  DO-214AA | T_j | Operating Junction Temperature Range | -40 to +150 | °C |
| | T_s | Storage Temperature Range | -65 to +150 | °C |
| | $R_{θJA}$ | Thermal Resistance: Junction to Ambient | 90 | °C/W |

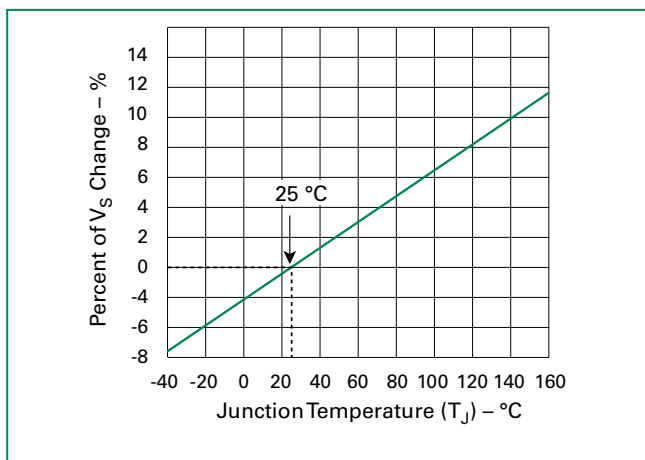
V-I Characteristics



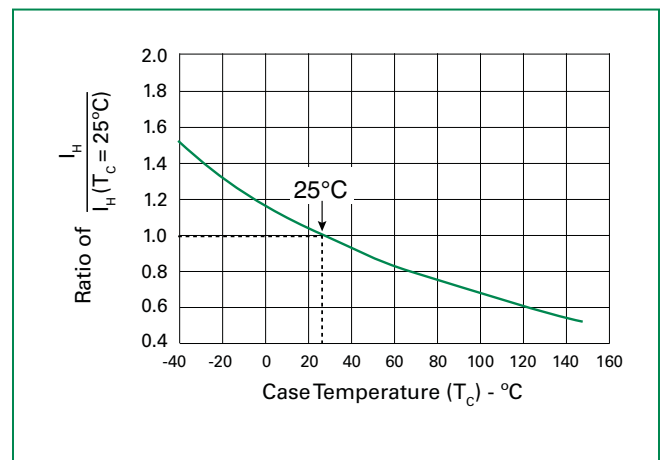
$t_r \times t_d$ Pulse Waveform



Normalized V_s Change vs. Junction Temperature

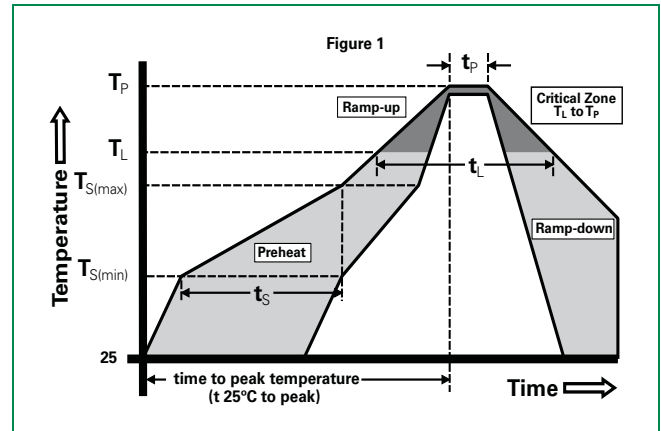


Normalized DC Holding Current vs. Case Temperature



Soldering Parameters

| | | |
|---|------------------------------------|-------------------------------|
| Reflow Condition | | Pb-Free assembly (see Fig. 1) |
| Pre Heat | - Temperature Min ($T_{s(min)}$) | +150°C |
| | - Temperature Max ($T_{s(max)}$) | +200°C |
| | - Time (Min to Max) (t_s) | 60-180 secs. |
| Average ramp up rate (LiquidusTemp (T_L) to peak) | | 3°C/sec. Max. |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/sec. Max. |
| Reflow | - Temperature (T_L) (Liquidus) | +217°C |
| | - Temperature (t_L) | 60-150 secs. |
| Peak Temp (T_p) | | +260(+0/-5)°C |
| Time within 5°C of actual Peak Temp (t_p) | | 30 secs. Max. |
| Ramp-down Rate | | 6°C/sec. Max. |
| Time 25°C to Peak Temp (T_p) | | 8 min. Max. |
| Do not exceed | | +260°C |



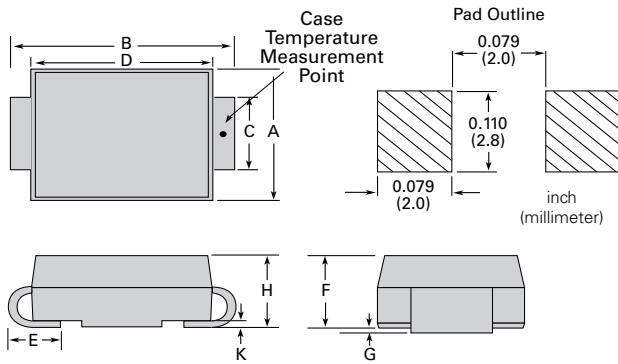
Physical Specifications

| | |
|------------------------|---|
| Lead Material | Copper Alloy |
| Terminal Finish | 100% Matte-Tin Plated |
| Body Material | UL recognized epoxy meeting flammability classification 94V-0 |

Environmental Specifications

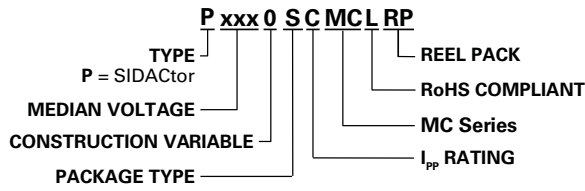
| | |
|---|--|
| High Temp Voltage Blocking | 80% Rated V_{DRM} ($V_{AC Peak}$) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101 |
| Temp Cycling | -65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A-104 |
| Biased Temp & Humidity | 52 V_{DC} (+85°C) 85%RH, 504 up to 1008 hrs. EIA/JEDEC, JESD22-A-101 |
| High Temp Storage | +150°C 1008 hrs. MIL-STD-750 (Method 1031) JEDEC, JESD22-A-101 |
| Low Temp Storage | -65°C, 1008 hrs. |
| Thermal Shock | 0°C to +100°C, 5 min. dwell, 10 sec. transfer, 10 cycles. MIL-STD-750 (Method 1056) JEDEC, JESD22-A-106 |
| Autoclave (Pressure Cooker Test) | +121°C, 100%RH, 2atm, 24 up to 168 hrs. EIA/JEDEC, JESD22-A-102 |
| Resistance to Solder Heat | +260°C, 30 secs. MIL-STD-750 (Method 2031) |
| Moisture Sensitivity Level | 85%RH, +85°C, 168 hrs., 3 reflow cycles (+260°C Peak). JEDEC-J-STD-020, Level 1 |

Dimensions — DO-214AA

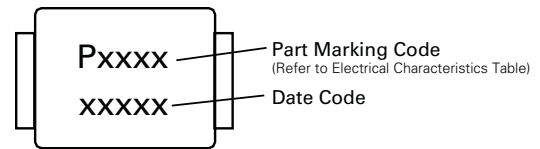


| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|------|
| | Min | Max | Min | Max |
| A | 0.130 | 0.156 | 3.30 | 3.95 |
| B | 0.201 | 0.220 | 5.10 | 5.60 |
| C | 0.077 | 0.087 | 1.95 | 2.20 |
| D | 0.159 | 0.181 | 4.05 | 4.60 |
| E | 0.030 | 0.063 | 0.75 | 1.60 |
| F | 0.075 | 0.096 | 1.90 | 2.45 |
| G | 0.002 | 0.008 | 0.05 | 0.20 |
| H | 0.077 | 0.104 | 1.95 | 2.65 |
| K | 0.006 | 0.016 | 0.15 | 0.41 |

Part Numbering



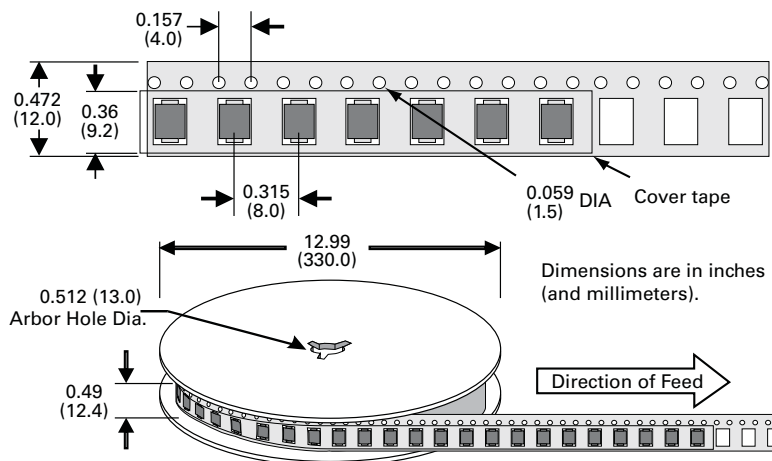
Part Marking



Packing Options

| Package Type | Description | Quantity | Added Suffix | Industry Standard |
|--------------|---------------------------|----------|--------------|-------------------|
| S | DO-214AA Tape & Reel Pack | 2500 | N/A | EIA-481-D |

Tape and Reel Specification — DO-214AA



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