

PLED Open LED Protectors PLEDxSW Series

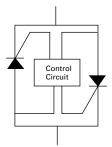
PLEDxSW Series - White Body

OBSOLETE DATE: <u>03/26/2020</u> PCN/ECN# <u>41325</u> REPLACED BY: PLED series



| Agency Approvals | | | | |
|------------------|--------------------|--|--|--|
| Agency | Agency File Number | | | |
| LR _® | E133083 | | | |

Schematic Symbol



Description

PLEDxSW Series open LED protectors provide a switching electronic shunt path when an LED in an LED string fails as an open circuit. This ensures that the remaining string of LEDs will continue to function if a single LED does not.

PLEDxSW Series devices were designed to enable higher reliability in indoor LED lighting applications such as advertisement lighting and other applications. Additionally, they are molded from white material to make them less visible in the LED fixture and the white molding also reflects more light to improve overall light engine efficiency.

Compatible with one, two and three watt LEDs that have a nominal 3V forward characteristic, PLEDxSW Series devices are available in SMB surface mount package. The DO-214AA (SMB) low profile package is ideal for dense board applications.

Features & Benefits

- Fast switching
- Automatically resets after power cycle
- Low profile, small foot print standard DO-214AA package
- Compatible with industrial lighting environments

F RoHS

- Compatible with PWM frequencies up to 30 kHz
- RoHS compliant and halogen-free

Electrical Characteristics (All parameters are measured at T=25°C unless otherwise noted)

| Part Number | Marking | V _{BR} breakdown Volts | | V _{DRM} breakdown | I _H | I _s | I _T @V _T | V _T @ I _T = 1 Amp | Critical rate of rise dV/dt |
|-------------|---------|---------------------------------------|-----|-------------------------------|----------------|----------------|--------------------------------|--|-----------------------------|
| | | | | Volts | mAmps | mAmps | Amps | Volts | Volts |
| | | Min | Max | Min | Min | Max | Max | Max | Max |
| PLED6SW | PL6 | 6 | 16 | 6 | 5 | 100 | 1.0 | 1.2 | 250V/µs |
| PLED9SW | PL9 | 9 | 18 | 9 | | | | | |
| PLED13SW | PL13 | 13 | 26 | 13 | | | | | |
| PLED18SW | PL18 | 18 | 33 | 18 | | | | | |



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Thermal Considerations

| Package Symbol | | Parameter | Value | Unit |
|-------------------|------------------|--|--|------|
| DO-214AA in White | TJ | Operating Junction Temperature Range | -40 to +150 | °C |
| | Τ _s | T _s Storage Temperature Range | | °C |
| | R _{eja} | Thermal Resistance: Junction to Ambient | DO-214AA: 90 ¹ DO-214AA: 40 ² | °C/W |

Notes:

.__

1.4

1.2

1.0

0.8 0.6

0.4

-40 -20

0

1) Standard FR-4 PCB with Copper Pads (Recommended Size)

2) Aluminum PCB

Thickness: 1.6mm

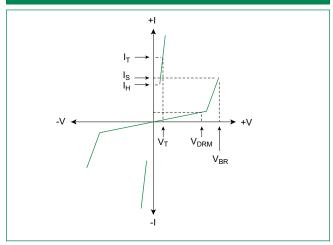
Grade: 1-2 W/mK Thermal Conductivity

Trace thickness: 2 oz

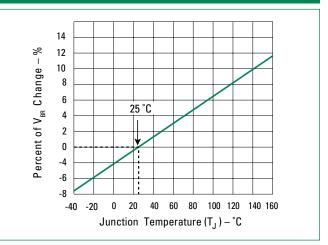
Insulation layer thickness: 215 um

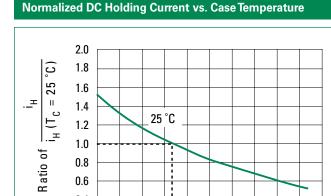
Solder Pad Dimensions: 2.0mm x 2.8mm (Recommended Size)

V-I Characteristics



V_{BR} vs. Junction Temperature



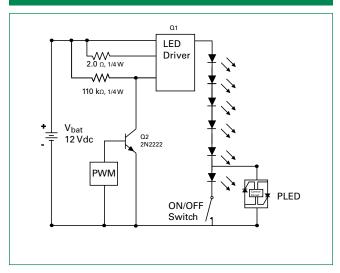


25 °C

20 40 60 80 100 120 140 160

Case Temperature (T $_{\rm C}$) – °C

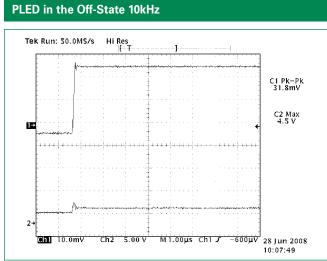
LED Interference Test Circuit

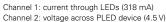


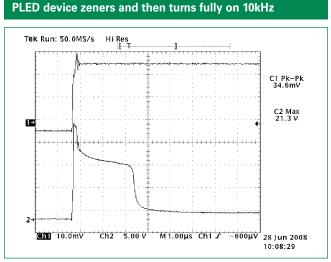


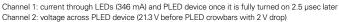
6 LEDs in Series 50% Duty Cycle 10kHz 5 LEDs and 1 PLED in Series 50% Duty Cycle 10kHz Tek Run: 2.50MS/s Hi Res Tek Run: 2.50MS/s Hi Res C1 Pk-Pk 8.9mV C2 Pk-Pk 9.1mV 2→ 1⇒ Chi 5.00m M 20.0µs Ch1 J 6mV 25 Jun 2008 Ch2 5.00mV M 20.0µs Ch2 J 2.4mV 1 Jul 2008 13:18:23 15:31:15

Note: These two graphs show the current magnitude through the LED string with and without the PLED included. There is no noticeable effect on the LED current magnitude when the PLED is included in the circuit as compared to the LED current magnitude when the PLED is not in the circuit. (The conversion factor for the test measurement in the graphs above is 10mA/mV for the Pearson coil measurement, therefore, the current magnitude in the first figure is 10mA*8.9 = 89mA, while the second figure is 91mA.)











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PLEDxSW Series

Soldering Parameters

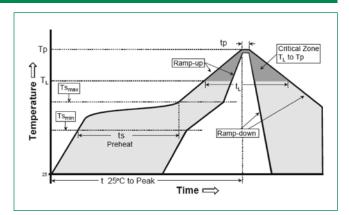
| Reflow Condition | | Pb – Free assembly | |
|---|---|-------------------------|--|
| | -Temperature Min (T _{s(min)}) | 150°C | |
| Pre Heat | -Temperature Max (T _{s(max)}) | 200°C | |
| | -Time (min to max) (t _s) | 60 – 180 secs | |
| Average ra (T _L) to pea | amp up rate (Liquidus Temp k | 3°C/second max | |
| $T_{S(max)}$ to T_{L} | - Ramp-up Rate | 3°C/second max | |
| Reflow | -Temperature (T _L) (Liquidus) | 217°C | |
| | -Temperature (t _L) | 60 – 150 seconds | |
| PeakTemperature (T _p) 260 ^{+0/-5} °C | | 260 ^{+0/-5} °C | |
| Time within 5°C of actual peak Temperature (t _p) | | 30 seconds | |
| Ramp-dov | vn Rate | 6°C/second max | |
| Time 25°C | to peak Temperature (T _P) | 8 minutes max | |
| Do not exc | ceed | 260°C | |

Copper Alloy

100% Matte Tin Plated

classification 94V-0

UL recognized epoxy meeting flammability



Environmental Specifications

| High Temperature Voltage Blocking | MIL-STD-750: Method 1040, Condition A 80% min V _{DRM} (VAC-peak), 150°C, 504 hours | | |
|--------------------------------------|---|--|--|
| Temperature Cycling | MIL-STD-750: Method 1051 -65°C to 150°C, 15-minute dwell, 100 cycles | | |
| Biased Temperature & Humidity | EIA/JEDEC: JESD22-A101 80%V _{DRM} , 85°C, 85%RH, 1008 hours | | |
| High Temperature Storage | MIL-STD-750: Method 1031 150°C, 1008 hours | | |
| Low Temperature Storage | -65°C, 1008 hours | | |
| Thermal Shock | MIL-STD-750: Method 1056 0°C to 100°C, 5-minute dwell, 10-second transfer, 10 cycles | | |
| Resistance to Solder Heat | MIL-STD-750: Method 2031 260°C, 10 seconds | | |

Part Marking System



| Packaging | | | | | | |
|-----------|-----------------|--------------------|-------------------|--|--|--|
| Package | Description | Packaging Quantity | Industry Standard | | | |
| S | D O - 2 1 4 A A | 2500 | EIA-481-1 | | | |

Part Numbering System

LED Protector

Physical Specifications

Terminal Material

Terminal Finish

Body Material

PLED X S W

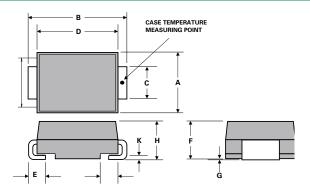
V_{DRM}

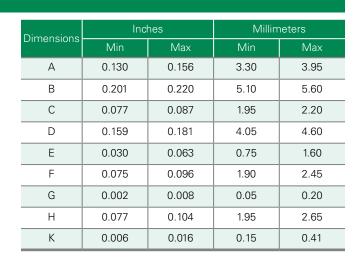
6 Volts 9 Volts 13 Volts 18 Volts -PACKAGE TYPE S: DO-214AA

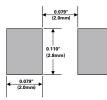


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Dimensions - DO-214 AA Package







Recommended solder pad layout (Reference Only)

DO-214AA Embossed Carrier Reel Pack (RP)

Meets all EIA-481-1 Standards

