Littelfuse
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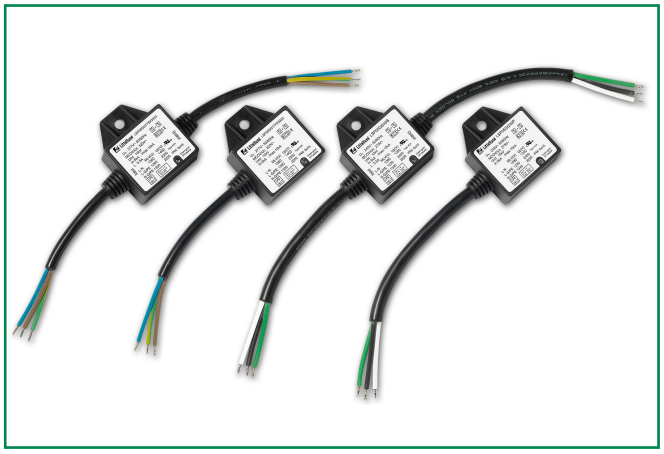
# Surge Protection Module

## LED Lighting Surge Protection Module > LSP05GI

### LSP05GI Module Series



## Agency Approvals

| Agency | Standard | Agency File Number |
|---|---|---|
| c UL us | UL 1449+ | E320116 |
| IECEE | IEC 61643-11++ | NL-40819 |
| KEMA KEUR | EN 61643-11++ | 3177948.01 |

+ = For 120V, 240V and 277V
++ = For 240V and 277V

## Additional Information

**Datasheet** | **Resources** | **Samples**

## Description

Littelfuse's LSP05GI thermally protected Surge Protective Device is a self-protected device specially designed to be used in outdoor and commercial LED lighting fixtures for transient overvoltage protection. It has been developed with Littelfuse's thermally protected varistor technology. Its built-in thermal disconnect function provides additional protection to prevent catastrophic failure and fire hazard even under extreme circumstances of varistor end-of-life or sustaining over voltage conditions.

The LSP05GI features a built-in LED indicator that notifies when replacement of the module is needed.

## Features

- Build-in LED Indication, saves maintenance time by identifying replacement need
- Thermally Protected
- Suitable for use in luminaire with Class I or Class II insulation*
- 10kA Maximum Discharge Current ($I_{max}$), 8/20µs
- Meets ANSI C82.77-5-2015: Location C Medium
- Meets ANSI C136.2-2015: Enhanced Level
- Meets IEEE C62.41.2: Location Category C Low
- Meets US Dept. of Energy MSSSLC Model Spec.
- High line-to-earth/ground resistance
- IP66: Dust-tight and water resistant
- Parallel or Series connected options
- UL 1449 and IEC 61643-11/EN 61643-11 recognized*

* See 'Part Numbering System' for exact details of voltages available for Class I and Class II installations, and 'Device Ratings and Specifications' table for voltage specific approvals.

## Applications

- Outdoor and Commercial LED Lighting
- Roadway lighting
- Traffic lighting
- Digital signage
- Wall wash lighting
- Parking garage lighting
- Flood lighting
- Tunnel lighting
- Street lighting

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## Absolute Maximum Ratings

• For ratings of individual members of a series, see Device Ratings and Specifications chart

| | LSP05GI Series | Units |
|---|---|---|
| Continuous: | | |
| Steady State Applied Voltage: | | |
| Max AC Voltage Range ($V_{M(AC)RMS}$) | 150 to 510 | V |
| Continuous Current | 3.5 | A |
| Transient: | | |
| Maximum Discharge Current, 8/20µs Waveform ($I_{max}$) | 10,000 | A |
| Nominal Discharge Current, 8/20µs Waveform ($I_n$) | 5,000 | A |
| Operating Ambient Temperature Range ($T_A$) | -40 to +85 | °C |
| Storage Temperature Range ($T_{STG}$) | -40 to +85 | °C |
| Isolation Voltage Capability (When the thermal disconnect opens) | 600 | V |
| Insulation Resistance | >1,000 | MΩ |

*CAUTION: Stresses above those listed in 'Absolute Maximum Ratings' may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.*

## LSP05GI Series Device Ratings and Specifications

| Part Number | Operating Voltage (VAC) | MCOV/$U_C$ [1] (VAC) | Maximum Discharge Current [2] $I_{max}$ (A) | Nominal Discharge Current [3] $I_n$ (A) | MLV [4] (V) | $U_p$ [5] (V) | Safety Compliance | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | IEC/EN 61643-11 | UL1449 |
| LSP05GI120* | 120 | 150 | 10,000 | 5,000 | L-N:650<br>L-G:1280<br>N-G:1230 | – | – | X |
| LSP05GI240* | 240 | 275 | 10,000 | 5,000 | L-N:1080<br>L-G:1230<br>N-G:1340 | L-N: 1300<br>L-G/PE: 2400<br>N-G/PE: 2200 | X | X |
| LSP05GI277* | 277 | 320 | 10,000 | 5,000 | L-N: 1260<br>L-G: 1260<br>N-G:1300 | L-N: 1400<br>L-G/PE: 2400<br>N-G/PE: 2200 | X | X |
| LSP05GI347* | 347 | 420 | 10,000 | 5,000 | L-N: 1530<br>L-G: 1550<br>N-G: 1410 | – | – | – |
| LSP05GI480* | 480 | 510 | 10,000 | 5,000 | L-N: 1800<br>L-G: 1900<br>N-G: 1410 | – | – | – |
| LSP05GI120*H† | 120 | 150 | 10,000 | 5,000 | L-N: 650<br>L-G: 3150<br>N-G: 3210 | – | – | X |
| LSP05GI240*H† | 240 | 275 | 10,000 | 5,000 | L-N: 1080<br>L-G: 3170<br>N-G: 3430 | – | – | X |
| LSP05GI277*H† | 277 | 320 | 10,000 | 5,000 | L-N: 1260<br>L-G: 3160<br>N-G: 3310 | – | – | X |
| LSP05GI480*H† | 480 | 510 | 10,000 | 5,000 | L-N: 1800<br>L-G: 3090<br>N-G: 3090 | – | – | – |

* = S or P

† = Module with 'H' designation features 1500Vac Hi-Pot withstand capability in common mode (L-G and N-G).

**Glossary:**

1. MCOV/$U_C$: Maximum Continuous Operating Voltage - maximum r.m.s. voltage that could be continuously applied to the SPD.
2. Maximum Discharge Current $I_{max}$ (A): The maximum discharge current is a measure of the SPDs maximum capability; single impulse of discharge current uses the 8/20µs current waveform. All Devices pass maximum discharge current with possible, safe opening of thermal disconnect.
3. Nominal Discharge Current $I_n$ (A): The nominal discharge current is a measure of the SPDs endurance capability; 15 impulses of discharge current uses the 8/20µs current waveform.
4. MLV: UL1449 Measured limiting voltage; the highest value of residual voltage measurements during the application of impulses of 8/20µs nominal discharge current ($I_n$); an average voltage value of 15 impulses.
5. $U_p$: IEC 61643-11 Voltage protection level; the highest value of residual voltage measurements during the application of impulses of 8/20µs nominal discharge current ($I_n$); a rounding voltage value of maximum measurement.

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# Surge Protection Module

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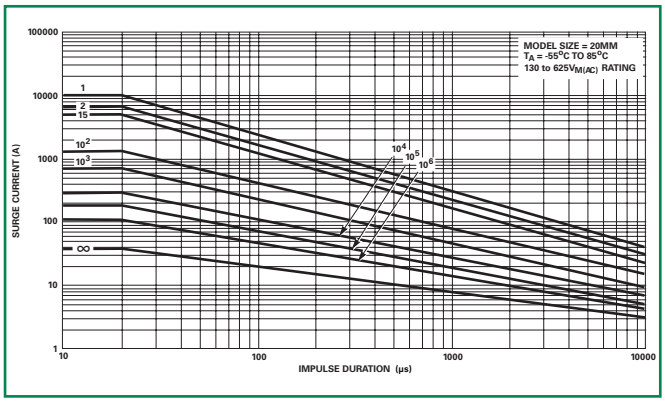
| Specification | Value | | Condition |
|---|---|---|---|
| | 240V | 277V | |
| Temporary Overvoltage (V) TOV UT @ $t_T$ = 5 s | 337 | 403 | LV System Fault for TN Power Grid |
| Temporary Overvoltage (V) TOV UT @ $t_T$ = 120 min | 442 | 529 | LV System Fault for TN Power Grid |
| Power grids | TN | TN | |
| Backup fuse (A) | 16 | 20 | Maximum gG Fuse |
| End of life indication | Yes | Yes | Optical<br>Light ON: SPD is functional<br>Light OFF: SPD has reached end-of-life |
| Max earth leakage current at Uc (µA) | 50 | 50 | |
| IEC 61643-11 Test Classification | Test Class II and III | Test Class II and III | |
| EN 61643-11 Type Classification | Type 2 and 3 | Type 2 and 3 | |
| UL 1449 Type | 4CA | 4CA | |

## Repetitive Surge Capability




| Pulse Rating (8x20µSec) | |
|---|---|
| Strikes | Surge |
| 1 | 10,000A |
| 2 | 7,000A |
| 15 | 5,000A |
| 100 | 1,500A |
| 1,000 | 700A |

## LSP05GI Series Wire Specification

| Part Number Extension | Length | Diameter | Double Insulation | Installation Class | Color |
|---|---|---|---|---|---|
| X3333 | 250mm ± 20mm | 1mm² | Yes | I | L - Brown<br>N - Blue<br>G/PE - Green with Yellow stripe |
| X3316 | 250mm ± 20mm | 1mm² | Yes | II | L - Brown<br>N - Blue |
| None | 250mm ± 20mm | 16AWG | Yes | -- | L - Black<br>N- White<br>G- Green |

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# Surge Protection Module

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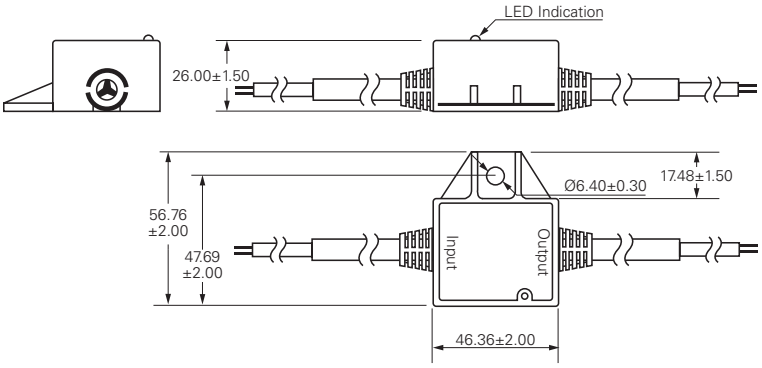
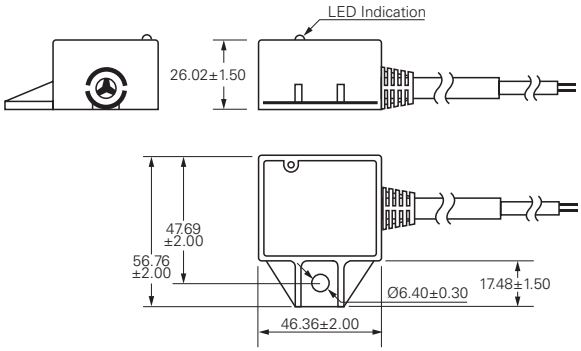
## Dimensions

### Series Version

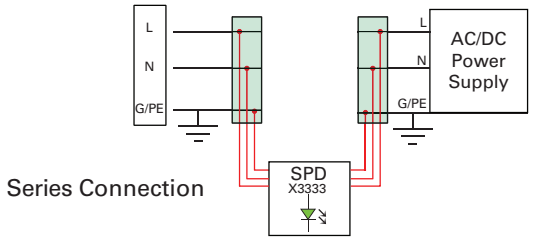



### Parallel Version

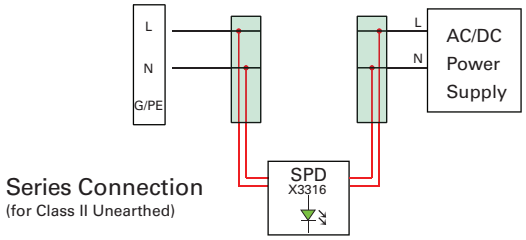



Note: Dimensions are in millimeters (mm)

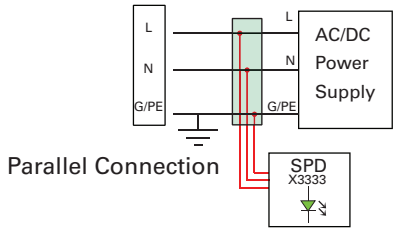
## Application/Installation Schematic



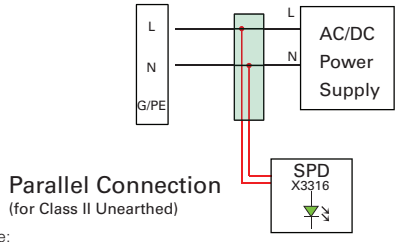

Series Connection




Series Connection
(for Class II Unearthed)




Parallel Connection




Parallel Connection
(for Class II Unearthed)

Note:
Green LED light on: SPD is good
Green LED light off: SPD needs replacement

## Part Numbering System

**LSP 05G I 120 P H Xxxxx**

- Littelfuse Surge Protection Module
- 5kA (Nominal Discharge Current)
- Built-in LED indication
- Operating Voltage
- P: Parallel connection
  S: Series connection
- Blank: Normal mode
  H: With 1500Vac Hi-Pot withstand capability in common mode (L-G and N-G)
- Other Options:
  **X3333**: with GND wire connection, available for 240Vac and 277Vac rating with CE Marking for Class I earthed luminaire installation
  Wire Color: Line: Brown, Neutral: Blue, Ground/PE: Green with yellow stripe
  **X3316**: without GND wire connection, available for 240Vac and 277Vac rating with CE Marking for Class II unearthed luminaire installation
  Wire Color: Line: Brown, Neutral: Blue

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