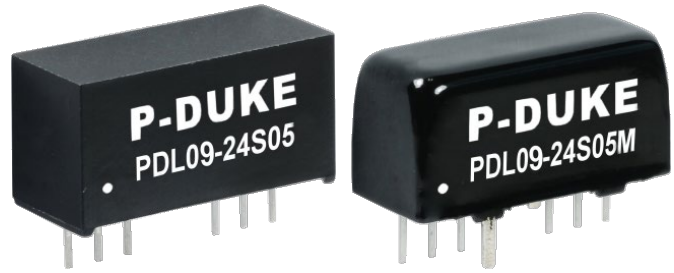


## Features

- 2:1 Wide input 4.5~75V DC
- Isolation Voltage: 1600V DC & 3000V DC  
Depending on model
- Operating Temperature Range: -40~90°C
- Approved to cURus, UKCA, CE, RoHS, REACH
- Safety standards to IEC/EN/UL 62368-1
- Efficiency up to 86%
- EMC Class A & B Certified



Ideal Power's 43PDL06-xyz 6W Series Pin Connection DC/DC Converters are certified to cURus, UKCA, CE, RoHS, REACH & IEC/UL/EN 62368-1 Standards and comply with Efficiency Regulations. These are primarily used in ITE, Video & Audio Industries and customised solutions are available upon request.

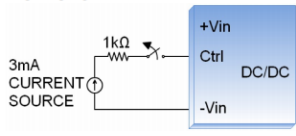
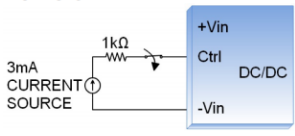
### Part Number Structure

| PDL06       | - | 48  | S                                      | 05   | H   |
|-------------|---|---|--|--|---|
| Series Name |   | Input Voltage(VDC)  | Output Quantity                        | Output Voltage (VDC)   | Case & Isolation Options  |
|             |   | <b>05:</b> 4.5~9<br><b>12:</b> 9~18<br><b>24:</b> 18~36<br><b>48:</b> 36~75 | <b>S:</b> Single<br><br><b>D:</b> Dual | <b>3P3:</b> 3.3<br><b>05:</b> 5<br><b>09:</b> 9<br><b>12:</b> 12<br><b>15:</b> 15<br><b>24:</b> 24<br><b>05:</b> <u>+5</u><br><b>12:</b> <u>+12</u><br><b>15:</b> <u>+15</u> | <b>□:</b> Standard type<br>Plastic case<br>1600V DC Isolation<br><b>H:</b> Plastic case<br>3000V DC Isolation<br><b>M:</b> Metal case<br>1600V DC Isolation |

**Models**

| Model Number   | Input Range | Output Voltage | Output current @Full Load | Input Current @ No Load | Efficiency % | Maximum Capacitor Load |
|----------------|-------------|----------------|---------------------------|-------------------------|--------------|------------------------|
|                | V DC        | V DC           | mA                        | A                       |              | μF                     |
| 43PDL06-05S3P3 | 4.5~9       | 3.3            | 1300                      | 65                      | 77           | 6600                   |
| 43PDL06-05S05  | 4.5~9       | 5              | 1200                      | 105                     | 81           | 3300                   |
| 43PDL06-05S09  | 4.5~9       | 9              | 666                       | 105                     | 83           | 2000                   |
| 43PDL06-05S12  | 4.5~9       | 12             | 500                       | 105                     | 84           | 1600                   |
| 43PDL06-05S15  | 4.5~9       | 15             | 400                       | 105                     | 84           | 1400                   |
| 43PDL06-05S24  | 4.5~9       | 24             | 250                       | 105                     | 84           | 680                    |
| 43PDL06-05D05  | 4.5~9       | ±5             | ±600                      | 105                     | 81           | ±2000                  |
| 43PDL06-05D12  | 4.5~9       | ±12            | ±250                      | 105                     | 84           | ±900                   |
| 43PDL06-05D15  | 4.5~9       | ±15            | ±200                      | 105                     | 84           | ±660                   |
| 43PDL06-12S3P3 | 9~18        | 3.3            | 1300                      | 40                      | 78           | 6600                   |
| 43PDL06-12S05  | 9~18        | 5              | 1200                      | 55                      | 83           | 3300                   |
| 43PDL06-12S09  | 9~18        | 9              | 666                       | 55                      | 85           | 2000                   |
| 43PDL06-12S12  | 9~18        | 12             | 500                       | 55                      | 85           | 1600                   |
| 43PDL06-12S15  | 9~18        | 15             | 400                       | 55                      | 85           | 1400                   |
| 43PDL06-12S24  | 9~18        | 24             | 250                       | 55                      | 84           | 680                    |
| 43PDL06-12D05  | 9~18        | ±5             | ±600                      | 55                      | 82           | ±2000                  |
| 43PDL06-12D12  | 9~18        | ±12            | ±250                      | 55                      | 84           | ±900                   |
| 43PDL06-12D15  | 9~18        | ±15            | ±200                      | 55                      | 85           | ±660                   |
| 43PDL06-24S3P3 | 18~36       | 3.3            | 1300                      | 20                      | 78           | 6600                   |
| 43PDL06-24S05  | 18~36       | 5              | 1200                      | 28                      | 83           | 3300                   |
| 43PDL06-24S09  | 18~36       | 9              | 666                       | 28                      | 85           | 2000                   |
| 43PDL06-24S12  | 18~36       | 12             | 500                       | 28                      | 86           | 1600                   |
| 43PDL06-24S15  | 18~36       | 15             | 400                       | 28                      | 86           | 1400                   |
| 43PDL06-24S24  | 18~36       | 24             | 250                       | 28                      | 85           | 680                    |
| 43PDL06-24D05  | 18~36       | ±5             | ±600                      | 28                      | 82           | ±2000                  |
| 43PDL06-24D12  | 18~36       | ±12            | ±250                      | 28                      | 85           | ±900                   |
| 43PDL06-24D15  | 18~36       | ±15            | ±200                      | 28                      | 85           | ±660                   |
| 43PDL06-48S3P3 | 36~75       | 3.3            | 1300                      | 14                      | 78           | 6600                   |
| 43PDL06-48S05  | 36~75       | 5              | 1200                      | 14                      | 82           | 3300                   |
| 43PDL06-48S09  | 36~75       | 9              | 666                       | 14                      | 84           | 2000                   |
| 43PDL06-48S12  | 36~75       | 12             | 500                       | 14                      | 85           | 1600                   |
| 43PDL06-48S15  | 36~75       | 15             | 400                       | 14                      | 86           | 1400                   |
| 43PDL06-48S24  | 36~75       | 24             | 250                       | 14                      | 84           | 680                    |
| 43PDL06-48D05  | 36~75       | ±5             | ±600                      | 14                      | 82           | ±2000                  |
| 43PDL06-48D12  | 36~75       | ±12            | ±250                      | 14                      | 84           | ±900                   |
| 43PDL06-48D15  | 36~75       | ±15            | ±200                      | 14                      | 85           | ±660                   |

**Input Specifications**

| Parameter  | Conditions                       |                          | Min                    | Typ | Max | Unit |
|--|----------------------------------|--------------------------|------------------------|-----|-----|------|
| Operating input voltage range  | 05Vin(nom)                       |                          | 4.5                    | 5   | 9   |      |
|  | 12Vin(nom)                       |                          | 9                      | 12  | 18  |      |
|  | 24Vin(nom)                       |                          | 18                     | 24  | 36  |      |
|  | 48Vin(nom)                       |                          | 36                     | 48  | 75  |      |
| Start-up voltage   | 05Vin(nom)                       |                          | --                     | --  | 4.5 | V DC |
|  | 12Vin(nom)                       |                          | --                     | --  | 9   |      |
|  | 24Vin(nom)                       |                          | --                     | --  | 18  |      |
|  | 48Vin(nom)                       |                          | --                     | --  | 36  |      |
| Shutdown voltage   | 05Vin(nom)                       |                          | 2                      | 3.5 | 4   |      |
|  | 12Vin(nom)                       |                          | 5                      | 7   | 8   |      |
|  | 24Vin(nom)                       |                          | 12                     | 15  | 17  |      |
|  | 48Vin(nom)                       |                          | 26                     | 33  | 35  |      |
| Start-up time  | Constant resistive load          | Power up                 | --                     | 5   | 10  | ms   |
|  |                                  | Remote ON/OFF            | --                     | 5   | 10  |      |
| Input surge voltage  | 100 Second, max.                 | 05Vin(nom)               | --                     | --  | 15  | V DC |
|  |                                  | 12Vin(nom)               | --                     | --  | 36  |      |
|  |                                  | 24Vin(nom)               | --                     | --  | 50  |      |
|  |                                  | 48Vin(nom)               | --                     | --  | 100 |      |
| Input filter   | Capacitor Type                   |                          |                        |     |     |      |
| Remote ON/OFF  | Ctrl pin applied current via 1kΩ | DC_DC ON                 | Open or high impedance |     |     |      |
|  |                                  | DC_DC OFF                | 2                      | 3   | 4   | mA   |
|  |                                  | Remote off input current | 2.5                    |     |     |      |
| Application circuit<br>DC-DC ON  |                                  |                          |                        |     |     |      |
| DC-DC OFF                       |                                  |                          |                        |     |     |      |

**Output Specifications**

| Parameter                        | Conditions                         |        | Min   | Typ | Max   | Unit  |
|----------------------------------|------------------------------------|--------|-------|-----|-------|-------|
| Voltage accuracy                 |                                    |        | -1.0  | --  | +1.0  |       |
| Line regulation                  | Low Line to High Line at Full Load |        | -0.2  | --  | +0.2  |       |
| Load regulation                  | No Load to Full Load               | Single | -1.0  | --  | +1.0  | %     |
|                                  |                                    | Dual   | -1.0  | --  | +1.0  |       |
| Cross regulation                 | Asymmetrical load 25%/100% FL      |        | -5.0  | --  | +5.0  |       |
| Ripple and Noise                 | 20MHz bandwidth                    |        | --    | 50  | --    | mVp-p |
| Temperature coefficient          |                                    |        | -0.02 | --  | +0.02 | %/°C  |
| Transient response recovery time | 25% Load step change               |        | --    | 500 | --    | µs    |
| Short circuit protection         | Continuous, automatic recovery     |        |       |     |       |       |

**General Specifications**

| Parameter             | Conditions                |                 | Min           | Typ                          | Max | Unit                       |        |
|-----------------------|---------------------------|-----------------|---------------|------------------------------|-----|----------------------------|--------|
| Isolation voltage     | 1 minute                  | Input to Output | Standard Type | 1600                         | --  | --                         | V DC   |
|                       |                           |                 | Suffix "H"    | 3000                         | --  | --                         |        |
|                       |                           |                 | Suffix "M"    | 1600                         | --  | --                         |        |
|                       |                           |                 | Suffix "M"    | 1000                         | --  | --                         |        |
| Isolation resistance  | 500VDC                    |                 | 1             | --                           |     | GΩ                         |        |
| Isolation capacitance |                           |                 | Standard Type | --                           | --  | 50                         | pF     |
|                       |                           |                 | Suffix "H"    | --                           | --  | 50                         |        |
|                       |                           |                 | Suffix "M"    | --                           | --  | 50                         |        |
| Switching frequency   | Full load to minimum load |                 | 100           | --                           | --  | kHz                        |        |
| Safety approvals      | IEC/ EN/ UL62368-1        |                 |               |                              |     | UL:E193009<br>CB:UL(Demko) |        |
| Case material         |                           |                 | Standard Type | Non-conductive black plastic |     |                            | Copper |
|                       |                           |                 | Suffix "H"    | Non-conductive black plastic |     |                            |        |
|                       |                           |                 | Suffix "M"    |                              |     |                            |        |
| Base material         |                           |                 |               |                              |     | None                       |        |
| Potting material      |                           |                 |               |                              |     | Silicone (UL94 V-0)        |        |
| Weight                |                           |                 | Standard Type | 4.8g (0.17oz)                |     |                            |        |
|                       |                           |                 | Suffix "H"    | 4.8g (0.17oz)                |     |                            |        |
|                       |                           |                 | Suffix "M"    | 5.9g (0.21oz)                |     |                            |        |
| MTBF                  | MIL-HDBK-217F, Full load  |                 | Standard Type | 2.135 x 10 <sup>6</sup> hrs  |     |                            |        |
|                       |                           |                 | Suffix "H"    | 2.135 x 10 <sup>6</sup> hrs  |     |                            |        |
|                       |                           |                 | Suffix "M"    | 2.360 x 10 <sup>6</sup> hrs  |     |                            |        |

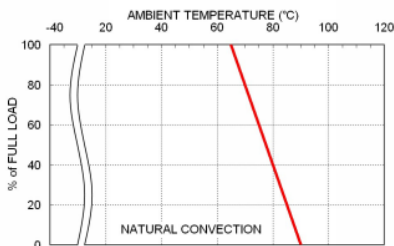
**Environmental Specifications**

| Parameter                     | Conditions                                |               | Min | Typ | Max  | Unit         |
|-------------------------------|---|---------------|-----|-----|------|--------------|
| Operating ambient temperature | Standard Type<br>Suffix "H"<br>Suffix "M" | With derating | -40 | --  | +90  | °C           |
|                               |   | With derating | -40 | --  | +90  |              |
|                               |   | With derating | -40 | --  | +95  |              |
| Maximin case temperature      |   |               | --  | --  | 105  |              |
| Storage temperature range     |   |               | -55 | --  | +125 |              |
| Thermal Shock                 |   |               |     |     |      | MIL-STD-810F |
| Vibration                     |   |               |     |     |      | MIL-STD-810F |
| Relative humidity             |   |               |     |     |      | 5% to 95% RH |

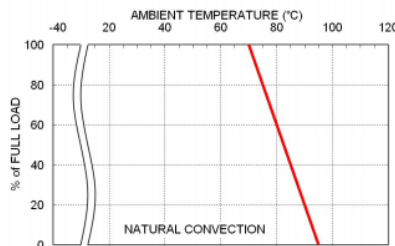
**EMC Specifications**

| Parameter                      | Conditions   |   | Level            |
|--------------------------------|--------------|---|------------------|
| EMI                            | EN55032      | With external components  | Class A, Class B |
| EMS                            | EN55024      |   |                  |
| ESD                            | EN61000-4-2  | Air $\pm 8$ kV and Contact $\pm 6$ kV   | Perf. Criteria A |
| Radiated immunity              | EN61000-4-3  | 10 V/m  | Perf. Criteria A |
| Fast transient                 | EN61000-4-4  | $\pm 2$ kV  | Perf. Criteria A |
|                                | 5 V DC input | With an external input filter capacitor (Nippon chemi-con KY series, 330 $\mu$ F/50V)   |                  |
|                                | Others       | With an external input filter capacitor (Nippon chemi-con KY series, 220 $\mu$ F/100V.) |                  |
| Surge                          | EN61000-4-5  | $\pm 1$ kV  | Perf. Criteria A |
|                                | 5 V DC input | With an external input filter capacitor (Nippon chemi-con KY series, 330 $\mu$ F/50V)   |                  |
|                                | Others       | With an external input filter capacitor (Nippon chemi-con KY series, 220 $\mu$ F/100V.) |                  |
| Conducted immunity             | EN61000-4-6  | 10 Vr.m.s   | Perf. Criteria A |
| Power frequency magnetic field | EN61000-4-8  | 100A/m continuous; 1000A/m 1 second   | Perf. Criteria A |

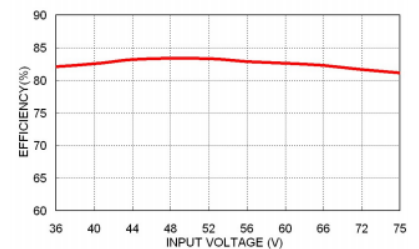
**CAUTION:** This power module is not internally fused. An input line fuse must always be used.

**Characteristic Curve**


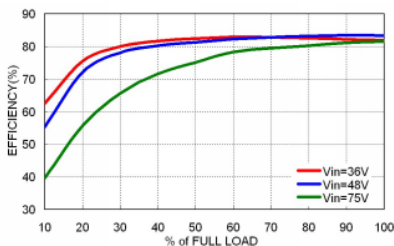
43PDL06-48S05 Derating Curve



43PDL06-48S05M Derating Curve



PDL06-48S05 Efficiency vs. Input Voltage



43PDL06-48S05 Efficiency vs. Output Load

### Fuse Considerations

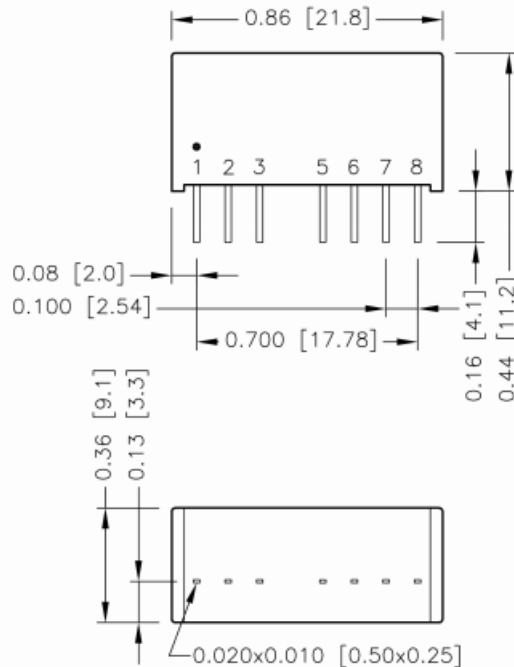
This power module is not internally fused. An input line fuse must always be used. This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture. To maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse. The input line fuse suggest as below :

| Model                        | Fuse Rating (A) | Fuse Type |
|------------------------------|-----------------|-----------|
| 43PDL06-05S□□, 43PDL06-05D□□ | 3               | Slow-Blow |
| 43PDL06-12S□□, 43PDL06-12D□□ | 1.6             | Slow-Blow |
| 43PDL06-24S□□, 43PDL06-24D□□ | 1               | Slow-Blow |
| 43PDL06-48S□□, 43PDL06-48D□□ | 0.5             | Slow-Blow |

The table based on the information provided in this data sheet on inrush energy and maximum DC input current at low Vin.

### Mechanical Drawing

Standard type, Suffix "H"



1. All dimensions in inch [mm]
2. Tolerance :x.xx±0.02 [x.x±0.5]  
x.xxx±0.01 [x.xx±0.25]
3. Pin dimension tolerance ±0.004 [0.10]

BOTTOM VIEW

### Pin Connection

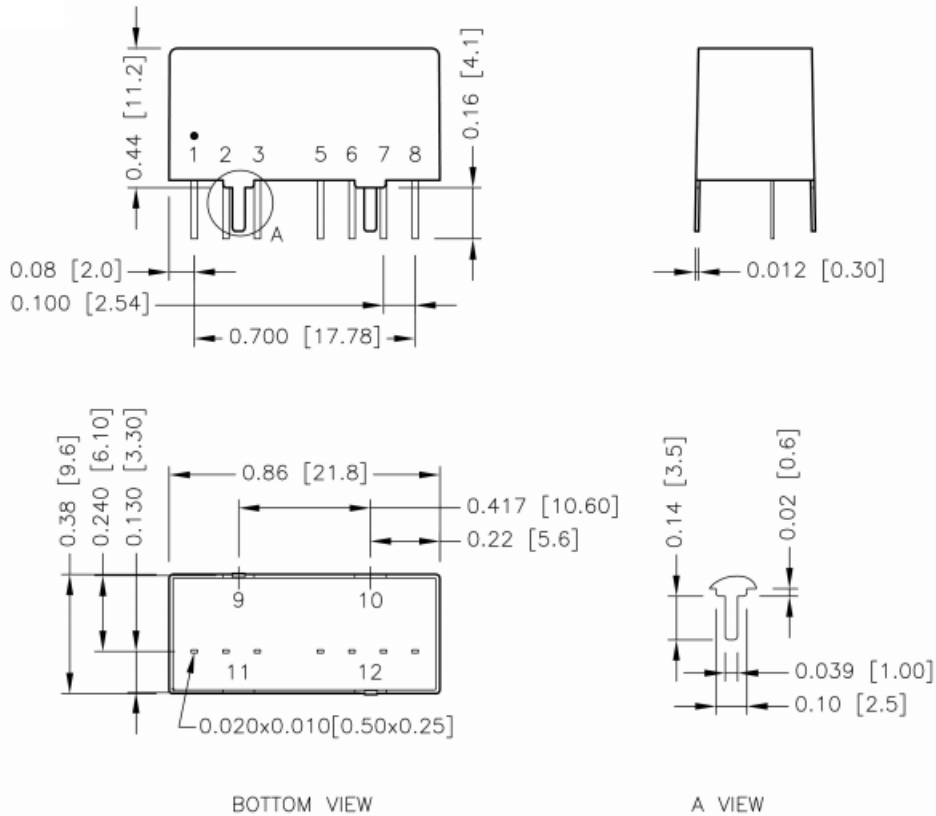
| Pin | Single       | Dual         |
|-----|--------------|--------------|
| 1   | -Vin         | -Vin         |
| 2   | +Vin         | +Vin         |
| 3   | Ctrl         | Ctrl         |
| 5   | NC*/No pin** | NC*/No pin** |
| 6   | +Vout        | +Vout        |
| 7   | -Vout        | Common       |
| 8   | NC           | -Vout        |

\*NC pin for standard type model. \*

\*\*No pin for 3kVDC isolation model (suffix "H").

Mechanical Drawing (Continued)

Suffix "M"



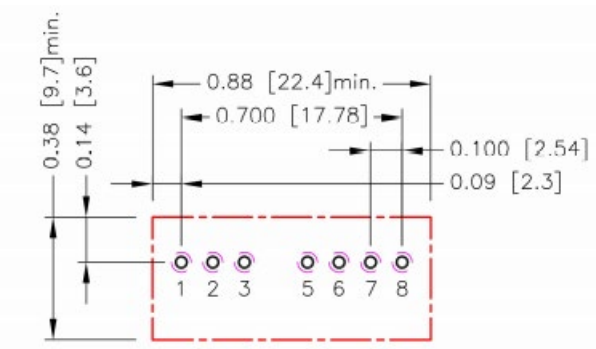
1. All dimensions in inch [mm]
2. Tolerance :x.xx±0.02 [x.x±0.5]  
x.xxx±0.01 [x.xx±0.25]
3. Pin dimension tolerance ±0.004 [0.10]

Pin Connection

| Pin | Single    | Dual      |
|-----|-----------|-----------|
| 1   | -Vin      | -Vin      |
| 2   | +Vin      | +Vin      |
| 3   | Ctrl      | Ctrl      |
| 5   | NC        | NC        |
| 6   | +Vout     | +Vout     |
| 7   | -Vout     | Common    |
| 8   | NC        | -Vout     |
| 9   | Case      | Case      |
| 10  | Stand off | Stand off |
| 11  | Stand off | Stand off |
| 12  | Case      | Case      |

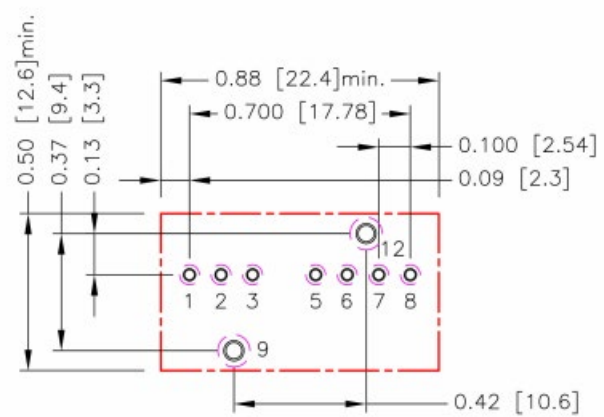
## Recommended Pad Layout

Standard Type  
Suffix "H"



All dimensions in inch[mm]  
 Pad size(lead free recommended)  
 Through hole 1.2.3.6.7.8:  $\Phi 0.031[0.80]$   
 Top view pad 1.2.3.6.7.8:  $\Phi 0.039[1.00]$   
 Bottom view pad 1.2.3.6.7.8:  $\Phi 0.063[1.60]$

Suffix "M"



All dimensions in inch[mm]  
 Pad size(lead free recommended)  
 Through hole 1.2.3.5.6.7.8:  $\Phi 0.031[0.80]$   
 Through hole 9.12:  $\Phi 0.051[1.30]$   
 Top view pad 1.2.3.5.6.7.8:  $\Phi 0.039[1.00]$   
 Top view pad 9.12:  $\Phi 0.064[1.63]$   
 Bottom view pad 1.2.3.5.6.7.8:  $\Phi 0.063[1.60]$   
 Bottom view pad 9.12:  $\Phi 0.102[2.60]$

## Thermal Considerations

The power module operates in a variety of thermal environments. However, sufficient cooling should be provided to help ensure reliable operation of the unit. Heat is removed by conduction, convection, and radiation to the surrounding Environment. Proper cooling can be verified by measuring the point as the figure below. The temperature at this location should not exceed "Maximum case temperature". When operating, adequate cooling must be provided to maintain the test point temperature at or below "Maximum case temperature". You can limit this Temperature to a lower value for extremely high reliability.

- Thermal test condition with vertical direction by natural convection (20LFM).

