

Product Overview

The MSCDR45X160BL3NG device is a three-phase leg rectifier 1600V, 45A diode power module. The following figures show the electrical diagram and pinout location of the device.

Figure 1. Electrical Diagram

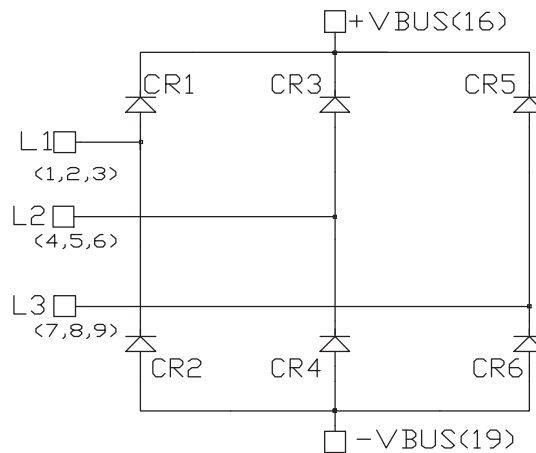
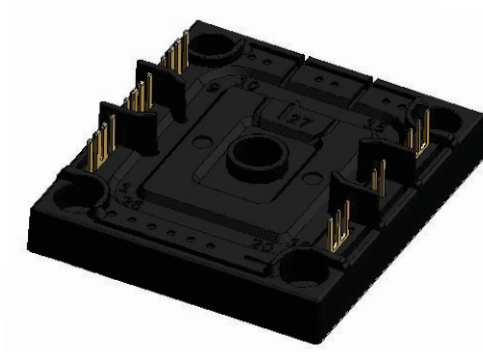
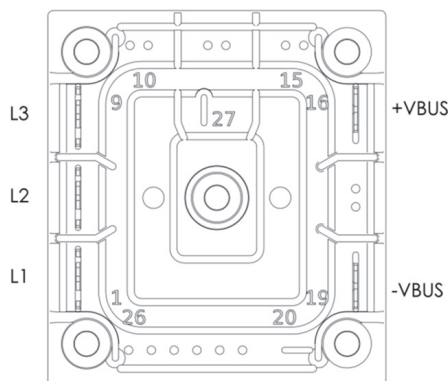


Figure 2. Pinout Location



Note: All ratings are at $T_J = 25\text{ }^\circ\text{C}$, unless otherwise specified.



These devices are sensitive to electrostatic discharge. Proper handling procedures must be followed.

Features

The MSCDR45X160BL3NG device has the following key features:

- High blocking voltage
- High surge current
- Low leakage current
- Very low stray inductance
- Ultra low weight and profile
- Si₃N₄ substrate with thick copper for improved thermal performance
- Extended temperature range

Benefits

The MSCDR45X160BL3NG device has the following benefits:

- High efficiency converter
- Direct mounting to heatsink (isolated package)
- Low junction-to-heatsink thermal resistance
- Solderable terminals for easy PCB mounting
- Very integrated power conversion system
- Low profile
- RoHS Compliant

Application

The MSCDR45X160BL3NG device has the following applications:

- High reliability drive
- Medium and heavy drones
- Aircraft actuation systems

1. Electrical Specification

The following sections describe the electrical specifications of the MSCDR45X160BL3NG device.

1.1 Diode Characteristics (Per Diode)

The following table lists the absolute maximum ratings (per diode) of the MSCDR45X160BL3NG device.

Table 1-1. Absolute Maximum Ratings

| Symbol | Parameter | Maximum Ratings | Unit |
|-----------|--------------------------------------|--|------|
| V_R | DC reverse voltage | 1600 | V |
| V_{RRM} | Peak repetitive reverse voltage | | |
| I_F | DC forward current | $T_H = 100\text{ }^\circ\text{C}$ | 45 |
| I_{FSM} | Non-repetitive forward surge current | $t = 10\text{ ms}$ $T_J = 45\text{ }^\circ\text{C}$ | 520 |

The following table lists the electrical characteristics (per diode) of the MSCDR45X160BL3NG device.

Table 1-2. Electrical Characteristics

| Symbol | Characteristic | Test Conditions | Min. | Typ. | Max. | Unit | |
|------------|---|----------------------|-----------------------------------|-------|------|--------------------|---------------|
| I_R | Reverse current | $V_R = 1600\text{V}$ | $T_J = 25\text{ }^\circ\text{C}$ | — | — | 50 | μA |
| | | | $T_J = 145\text{ }^\circ\text{C}$ | — | — | 1.1 | mA |
| V_F | Forward voltage | $I_F = 18\text{A}$ | $T_J = 25\text{ }^\circ\text{C}$ | — | 1 | 1.21 | V |
| | | | $T_J = 125\text{ }^\circ\text{C}$ | — | 0.9 | — | |
| V_T | On-state voltage | — | — | — | 0.83 | V | |
| r_T | On-state slope resistance | — | — | — | 9.1 | m Ω | |
| R_{thJH} | Junction-to-heatsink thermal resistance | — | — | 0.645 | — | $^\circ\text{C/W}$ | |

1.2 Thermal and Package Characteristics

The following table lists the thermal and package characteristics of the MSCDR45X160BL3NG device.

Table 1-3. Thermal and Package Characteristics

| Symbol | Characteristic | Min. | Typ. | Max. | Unit | | |
|------------|--|-------------|------|-----------------|------------------|-----|-----|
| V_{ISOL} | RMS isolation voltage, any terminal to case, $t = 1\text{ min}$, 50/60 Hz | 2500 | — | — | V | | |
| CTI | Comparative tracking index | 600 | — | — | — | | |
| T_J | Operating junction temperature range | -55 | — | 175 | $^\circ\text{C}$ | | |
| T_{JOP} | Recommended junction temperature under switching conditions | -55 | — | $T_{Jmax} - 25$ | | | |
| T_{STG} | Storage temperature range | -55 | — | 125 | | | |
| T_C | Operating case temperature | -55 | — | 125 | | | |
| Torque | Mounting torque | To heatsink | M3 | 0.7 | — | 0.9 | N.m |
| Wt | Package weight | — | 32.5 | — | — | g | |

1.3 Typical Diode Performance Curves

The following figures show the diode performance curves of the MSCDR45X160BL3NG device.

Figure 1-1. Junction-to-Heatsink Thermal Impedance

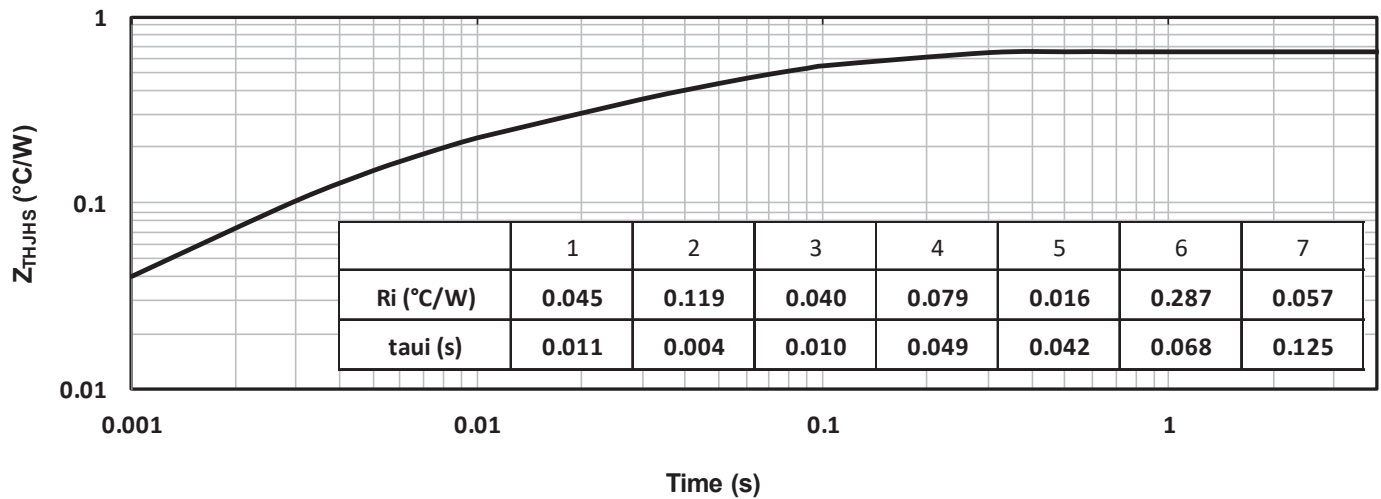
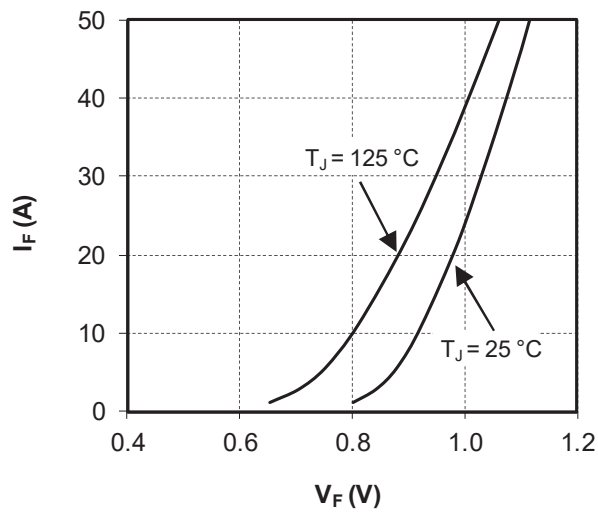


Figure 1-2. Forward Characteristics



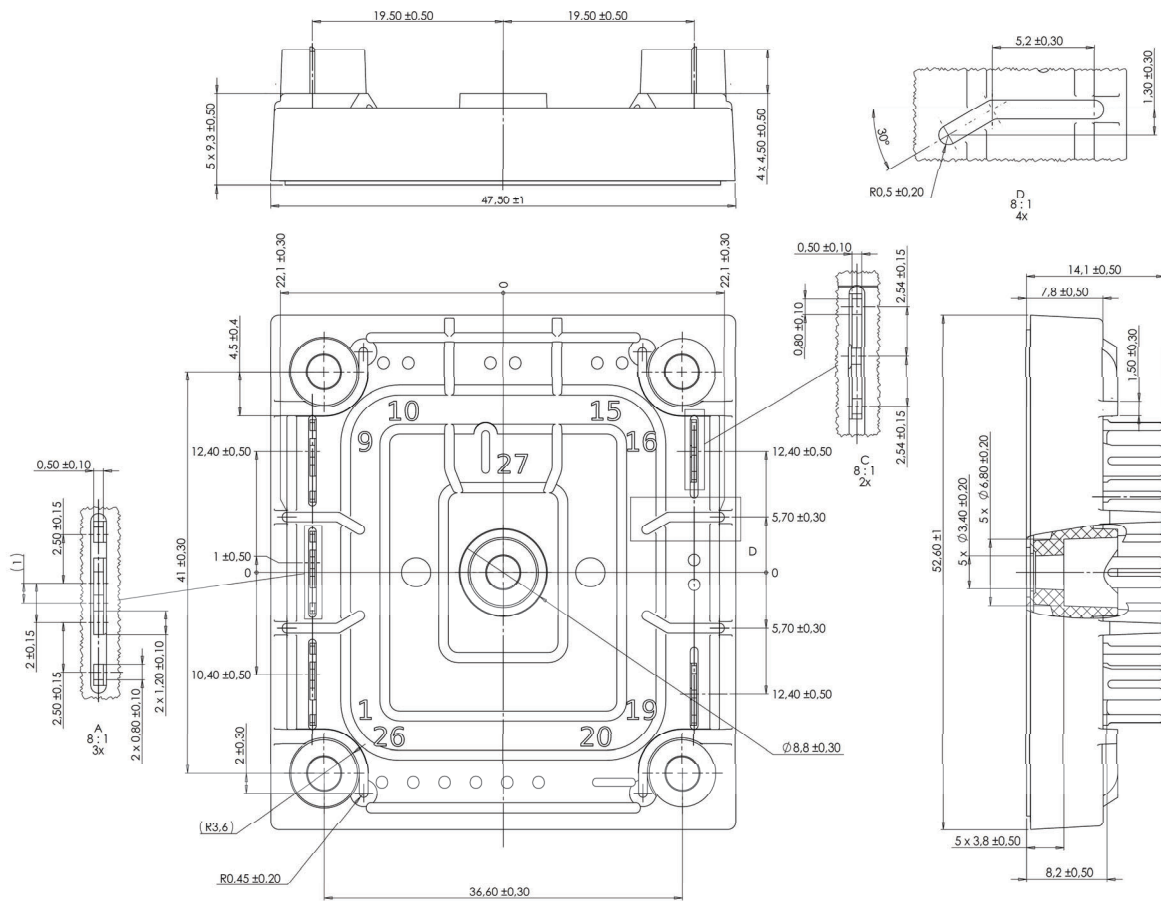
2. Package Specifications

The following section describes the package specification of the MSCDR45X160BL3NG device.

2.1 Package Outline

The following figure shows the package outline drawing of the MSCDR45X160BL3NG device. The dimensions in the following figure are in millimeters.

Figure 2-1. Package Outline Drawing



Note: For more information, see application note [AN4306-Mounting Instruction for Baseless Power Module](#).

3. Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

| Revision | Date | Description |
|----------|---------|------------------|
| A | 09/2023 | Initial revision |

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