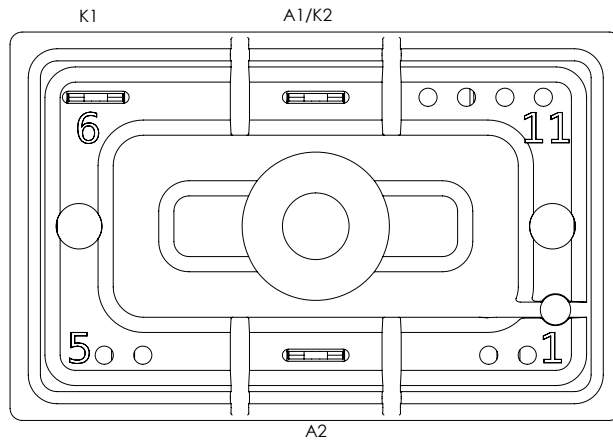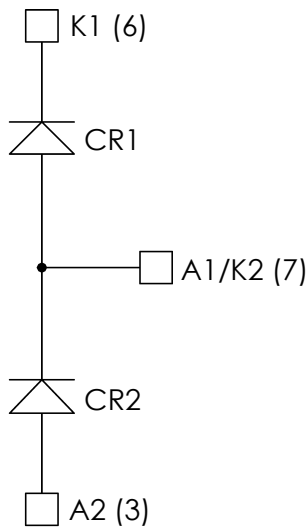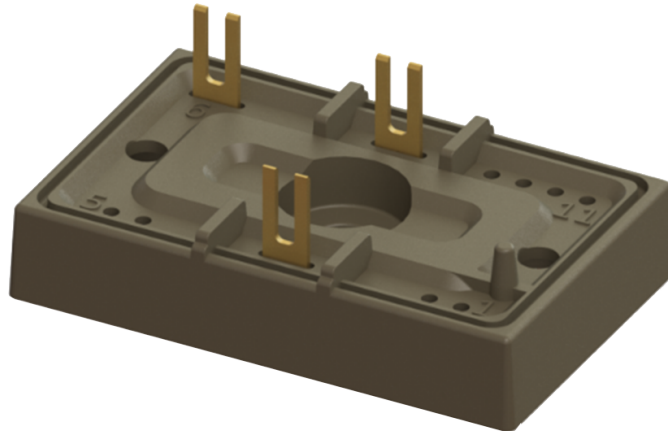# MSCDR90A160BL1NG

Phase Leg Rectifier Diode Power Module

Product Overview

The MSCDR90A160BL1NG device is a 1600 V, 90 A phase leg rectifier diode power module.

All ratings at T_J = 25°C, unless otherwise specified.

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

Features

The following are the key features of MSCDR90A160BL1NG device:

- High blocking voltage
- High surge current
- Low leakage current
- Very low stray inductance
- Ultra-low weight and profile
- Si_3N_4 substrate with thick copper for improved thermal performance
- Extended temperature range

Benefits

The following are the benefits of MSCDR90A160BL1NG device:

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

Application

The following are the applications of MSCDR90A160BL1NG device:

- High reliability power systems
- High efficiency AC/DC and DC/AC converters
- Motor control

1.   Electrical Specifications

This section provides the electrical specifications of MSCDR90A160BL1NG device.

1.1   Electrical Characteristics

The following table lists the absolute maximum ratings of MSCDR90A160BL1NG 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	$T_H = 100°C$	90	A
I_{FSM}	Non-repetitive forward surge current	t = 10 ms $T_J = 45°C$	850	

The following table lists the electrical characteristics of MSCDR90A160BL1NG device.

Table 1-2. Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_R	Reverse current	$V_R = 1600$ V	$T_J = 25°C$	—	—	50	µA
			$T_J = 140°C$	—	—	1.1	mA
V_F	Forward voltage	$I_F = 33$ A	$T_J = 25°C$	—	1	1.21	V
			$T_J = 125°C$	—	0.9	—	
V_T	On-state voltage	—	$T_J = 125°C$	—	—	0.83	V
r_T	On-state slope resistance			—	—	4.9	mΩ
R_{thJH}	Junction-to-Heatsink thermal resistance			—	0.468	—	°C/W

1.2   Thermal and Package Characteristics

The following table lists the thermal and package characteristics of MSCDR90A160BL1NG 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 min, 50 Hz/60 Hz			2500	—	—	V
T_J	Operating junction temperature range			–55	—	150	°C
T_{JOP}	Recommended junction temperature under switching conditions			–55	—	T_{Jmax}–25	
T_{STG}	Storage case temperature			–55	—	125	
T_C	Operating case temperature			–55	—	125	
Torque	Mounting torque	To heatsink	M4	1.5	—	2	N.m
Wt	Package weight			—	13.5	—	g

Datasheet

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1.3 Typical SiC Diode Performance Curve (Per SiC Diode)

This section shows the typical SiC diode performance curves of MSCDR90A160BL1NG device.
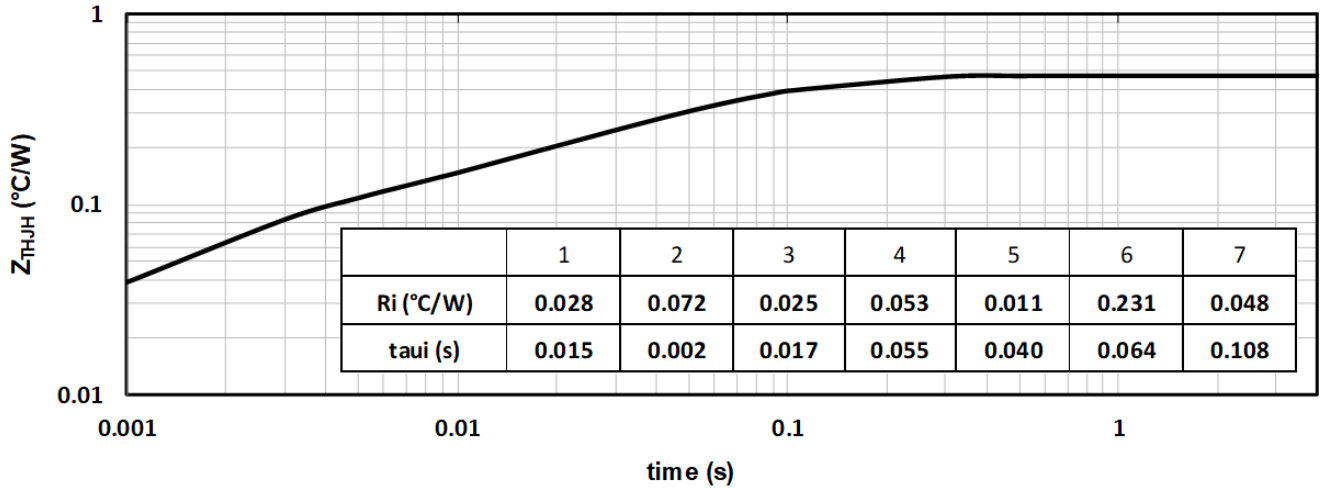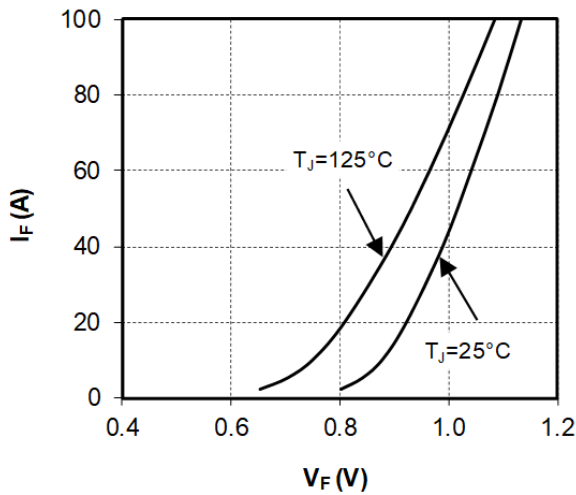
Figure 1-1. Junction-to-Heatsink Thermal Impedance

	1	2	3	4	5	6	7
Ri (°C/W)	0.028	0.072	0.025	0.053	0.011	0.231	0.048
taui (s)	0.015	0.002	0.017	0.055	0.040	0.064	0.108

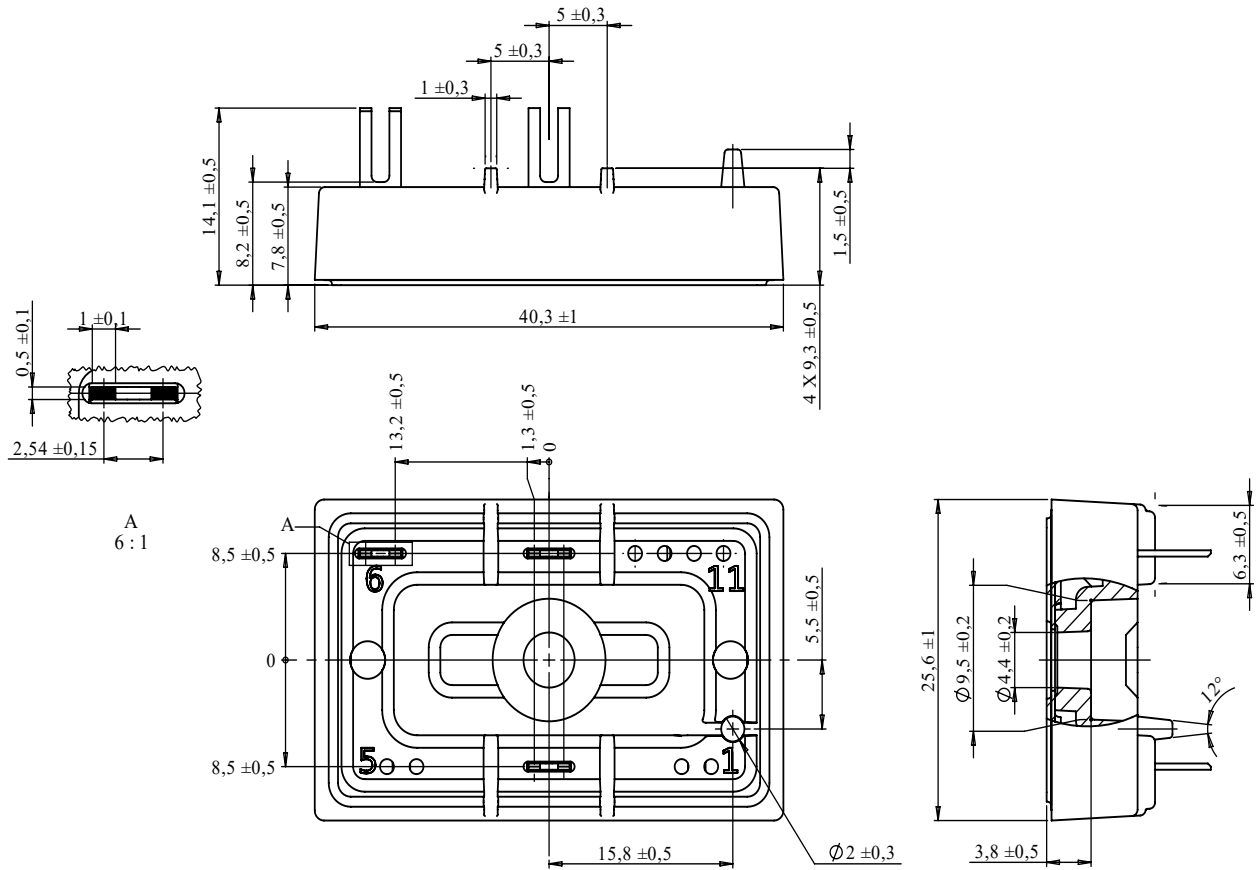**Figure 1-2. Forward Characteristics**

2.   Package Specifications

The following section shows the package specification of MSCDR90A160BL1NG device.

2.1   Package Outline

The following figure shows the package outline drawing of MSCDR90A160BL1NG device. The dimensions in the following figure are in millimeters.

Figure 2-1. Package Outline Drawing

3.   Revision History

Revision	Date	Description
A	07/2021	Initial revision

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