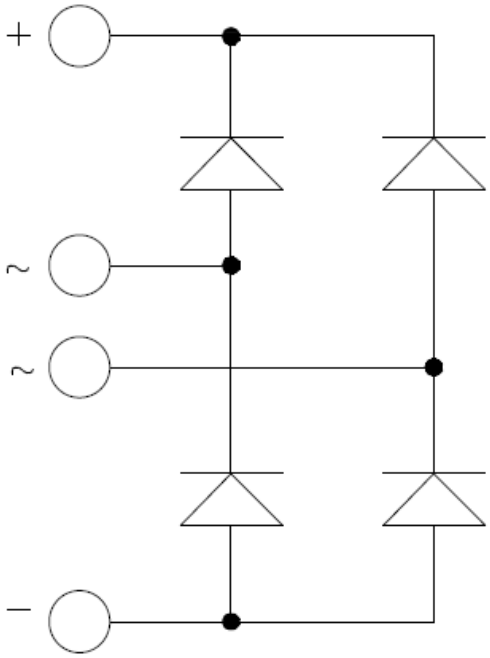
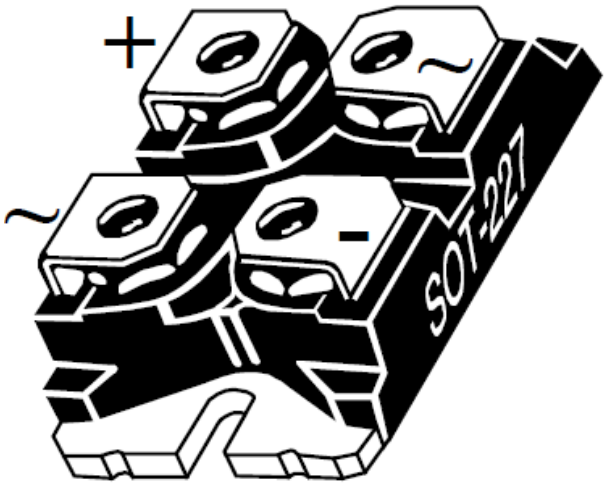
MSC50DC70HJ SiC Diode Full Bridge Power Module

1 Product Overview

This section shows the product overview of the MSC50DC70HJ device.





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

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

1.1 Features

The following are key features of the MSC50DC70HJ device:

- Silicon carbide (SiC) Schottky diode
  - Zero reverse recovery
  - Zero forward recovery
  - Temperature-independent switching behavior
  - Positive temperature coefficient on VF
- Very low stray inductance
- High level of integration

1.2 Benefits

The following are benefits of the MSC50DC70HJ device:

- Outstanding performance at high-frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction-to-case thermal resistance
- RoHS compliant

1.3 Applications

The MSC50DC70HJ device is designed for the following applications:

- Switch-mode power supplies rectifier
- Induction heating
- Welding equipment
- High-speed rectifiers

2 Electrical Specifications

This section shows the electrical specifications of the MSC50DC70HJ device.

2.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings per SiC diode of the MSC50DC70HJ device.

Table 1 • Absolute Maximum Ratings

Symbol	Parameter		Maximum Ratings	Unit
V_{RRM}	Repetitive peak reverse voltage		700	V
I_F	DC forward current	T_C = 25 °C	50	A

The following table shows the thermal and package characteristics of the MSC50DC70HJ.

Table 2 • Thermal and Package Characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
V_{ISOL}	RMS isolation voltage, any terminal to case t =1 minute, 50 Hz/60 Hz	2500			V
T_J, T_{STG}	Storage temperature range	–55		175	°C
T_{JOP}	Recommended junction temperature under switching conditions	–55		T_{Jmax} – 25	
Torque	Terminals and mounting screws			1.1	N.m
Wt	Package weight		29.2		g

2.2 Electrical Performance

The following table shows the electrical characteristics per SiC diode of the MSC50DC70HJ.

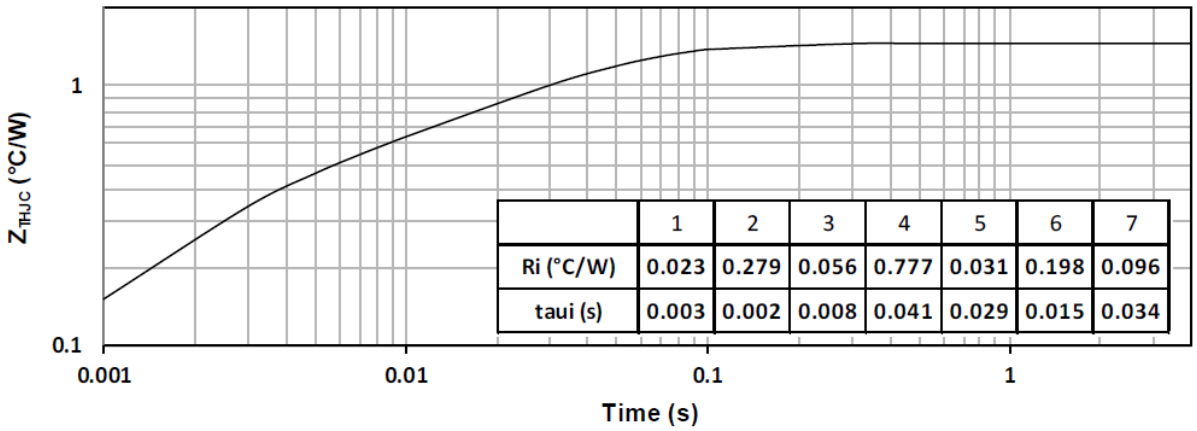
Table 3 • Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_F	Diode forward voltage	I_F = 50 A	T_j = 25 °C		1.5	1.8	V
			T_j = 175 °C		1.9		
I_{RM}	Reverse leakage current	V_R = 700 V	T_j = 25 °C		15	200	µA
			T_j = 175 °C		250		
Q_C	Total capacitive charge	V_R = 400 V			133		nC
C	Total capacitance	f = 1 MHz, V_R = 200 V			248		pF
		f = 1 MHz, V_R = 400 V			216		
R_{thJC}	Junction-to-case thermal resistance					1.46	°C/W

2.3 Performance Curves

This section shows the typical performance curves of the MSC50DC70HJ device.

Figure 1 • Maximum Transient Thermal Impedance



	1	2	3	4	5	6	7
Ri (°C/W)	0.023	0.279	0.056	0.777	0.031	0.198	0.096
taui (s)	0.003	0.002	0.008	0.041	0.029	0.015	0.034

Figure 2 • Forward Current vs. Forward Voltage

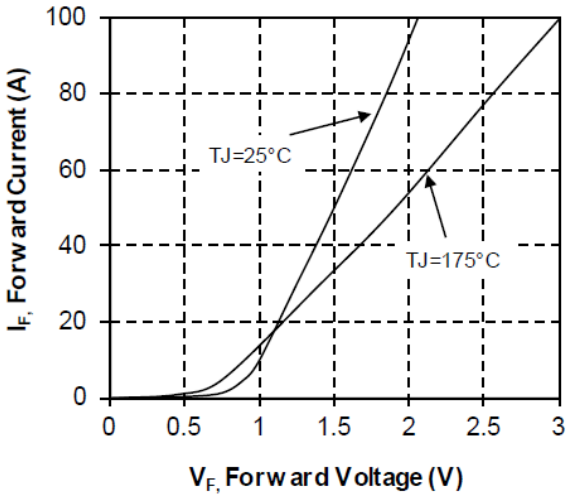
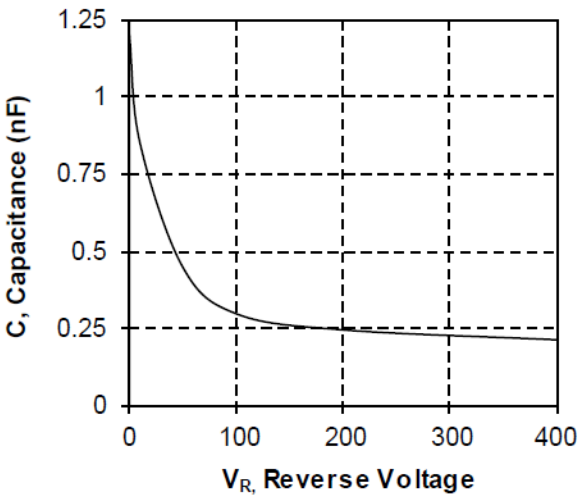


Figure 3 • Capacitance vs. Reverse Voltage



3 Package Specification

This section shows the package specification of the MSC50DC70HJ device.

3.1 Package Outline Drawing

The package outline of the MSC50DC70HJ device is illustrated in this section.

Figure 4 • Package Outline Drawing