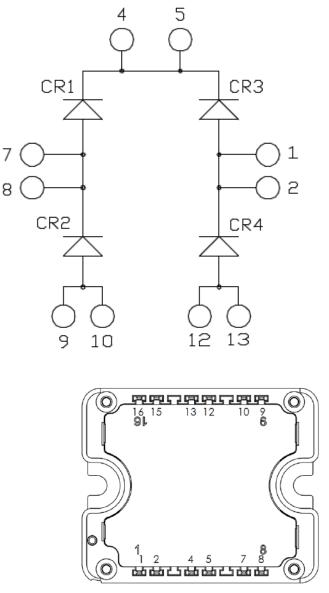# MSCDC50H701AG SiC Diode Full Bridge Power Module

1   Product Overview

This section shows the product overview of the MSCDC50H701AG device.

All multiple inputs and outputs must be shorted together
1/2 ; 7/8 ; 9/10 ; 12/13

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 MSCDC50H701AG device:

- Silicon carbide (SiC) Schottky diode
  - Zero reverse recovery
  - Zero forward recovery
  - Temperature-independent switching behavior
  - Positive temperature coefficient on VF
- High blocking voltage
- Very low stray inductance
- Aluminum nitrate (AlN) substrate for improved thermal performance

1.2 Benefits

The following are benefits of the MSCDC50H701AG device:

- Outstanding performance at high-frequency operation
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low profile
- RoHS compliant

1.3 Applications

The MSCDC50H701AG device is designed for the following applications:

- Uninterruptible power supplies
- Induction heating
- Welding equipment
- High-speed rectifiers

2 Electrical Specifications

This section shows the electrical specifications of the MSCDC50H701AG device.

2.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings per SiC diode of the MSCDC50H701AG device.

Table 1 • Absolute Maximum Ratings

Symbol	Parameter		Maximum Ratings	Unit
V_{RRM}	Repetitive peak reverse voltage		700	V
I_F	DC forward current	$T_C = 80\ °C$	50	A

The following table shows the thermal and package characteristics of the MSCDC50H701AG.

Table 2 • Thermal and Package Characteristics

Symbol	Characteristic			Min	Max	Unit
V_{ISOL}	RMS isolation voltage, any terminal to case t =1 minute, 50 Hz/60 Hz			4000		V
T_J	Operating junction temperature range			−40	175	°C
T_{JOP}	Recommended junction temperature under switching conditions			−40	$T_{Jmax} - 25$	
T_{STG}	Storage temperature range			−40	125	
T_C	Operating case temperature			−40	125	
Torque	Terminals and mounting screws	To heatsink	M4	2	3	N.m
Wt	Package weight				80	g

2.2 Electrical Performance

The following table shows the electrical characteristics per SiC diode of the MSCDC50H701AG.

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					0.86	°C/W

2.3 Performance Curves

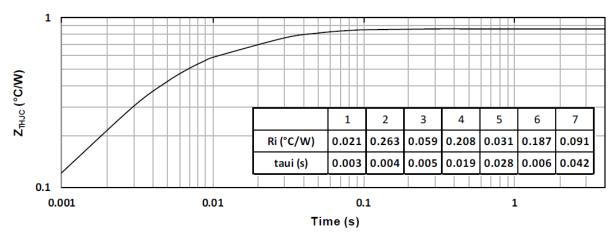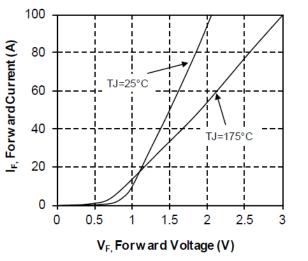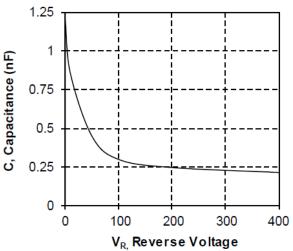This section shows the typical performance curves of the MSCDC50H701AG device.

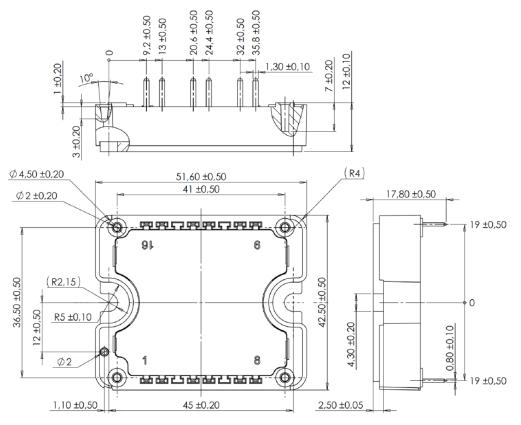**Figure 1 • Maximum Transient Thermal Impedance**

	1	2	3	4	5	6	7
Ri (°C/W)	0.021	0.263	0.059	0.208	0.031	0.187	0.091
taui (s)	0.003	0.004	0.005	0.019	0.028	0.006	0.042

Figure 2 • Forward Current vs. Forward Voltage

Figure 3 • Capacitance vs. Reverse Voltage

3 Package Specification

This section shows the package specification of the MSCDC50H701AG device.

3.1 Package Outline Drawing

The package outline of the MSCDC50H701AG device is illustrated in this section. The dimensions are in millimeters.

Figure 4 • Package Outline Drawing

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