



650V 20A SiC Schottky Diode – SiS650S20AS

Rev 1.0

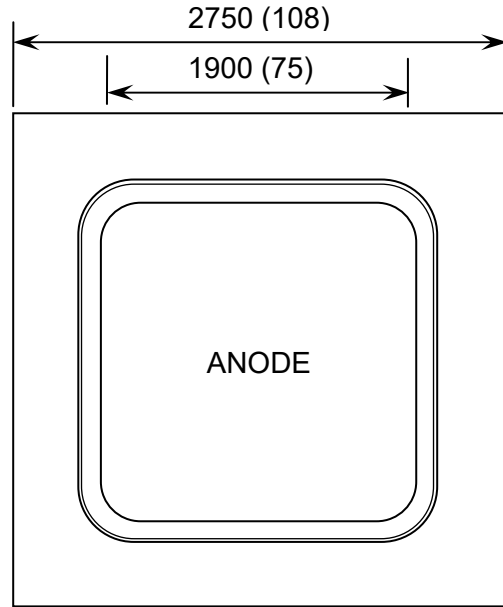
30/10/23

Silicon Carbide Schottky Barrier Rectifier diode in bare die form

Features:

- Capable of high temperature operation $\geq 175^{\circ}\text{C}$
- High Frequency Operation
- High Surge Current Capability
- No Reverse Recovery / No Forward Recovery
- Positive Temperature Coefficient

Die Dimensions in μm (mils)



Ordering Information:

The following part suffixes apply:

- No suffix - MIL-STD-750 /2073 Visual Inspection
- "H" - MIL-STD-750 /2073 Visual Inspection
+ MIL-PRF-38534 Class H LAT
- "K" - MIL-STD-750 /2073 Visual Inspection
+ MIL-PRF-38534 Class K LAT

LAT = Lot Acceptance Test.

For further information on LAT process flows see below.

www.siliconsupplies.com/quality/bare-die-lot-qualification



CHIP BACKSIDE IS CATHODE

Supply Formats:

- Default – Die in Waffle Pack (100 per tray capacity)
- Sawn Wafer on Tape – By specific request
- Unsawn Wafer – By specific request
- With additional electrical selection – By specific request

Mechanical Specification

Die Size (Unsawn)	2750 x 2750 108 x 108	μm mils
Anode Pad Size	1900 x 1900 75 x 75	μm mils
Die Thickness	350 (± 20) 13.78 (0.79)	μm mils
Top Metal Composition	Al 4 μm	
Back Metal Composition	Ag 0.4 μm	





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Absolute Maximum Ratings $T_J = 25^\circ\text{C}$ unless otherwise stated

PARAMETER	SYMBOL	VALUE	UNIT
Repetitive peak reverse voltage	V_{RRM}	650	V
Surge peak reverse voltage	V_{RSM}	650	V
DC Peak Blocking Voltage	V_{BR}	650	V
Average forward rectified current	$I_{F(AV)}$	20	A
Repetitive Peak Forward Surge Current	I_{FRM}	105	A
Peak Single-Cycle Non-Repetitive Surge Current	I_{FSM}	170	A
Operating Junction temperature	T_J	-55 to 175	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 to 175	$^\circ\text{C}$

Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise stated

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Maximum instantaneous forward voltage ¹	V_{F1}	$V_{RRM} = 650\text{V}, I_{FM} = 20\text{A}$	-	1.45	1.70	V
	V_{F2}	$V_{RRM} = 650\text{V}, I_{FM} = 20\text{A}, T_J = 175^\circ\text{C}$	-	1.65	2.00	
Maximum reverse leakage current ¹	$I_{RM} @ V_{RM}$	$V_R = 650\text{V}$	-	1.5	50	μA
		$V_R = 650\text{V}, T_J = 175^\circ\text{C}$	-	15	200	
Junction Capacitance	C_T	$V_R = 0\text{V}, f = 1\text{MHz}$,	-	1550	-	pF
Reverse Recovery Charge	Q_C	$V_R = 400\text{V}, I_F = 20\text{A}, di/dt = 200\text{A}/\mu\text{s}$	-	96.7	-	nC
Capacitance Stored Energy	E_C	$V_R = 400\text{V}$	-	23.69	-	μJ

1. Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$

Typical Characteristics $T_J = 25^\circ\text{C}$

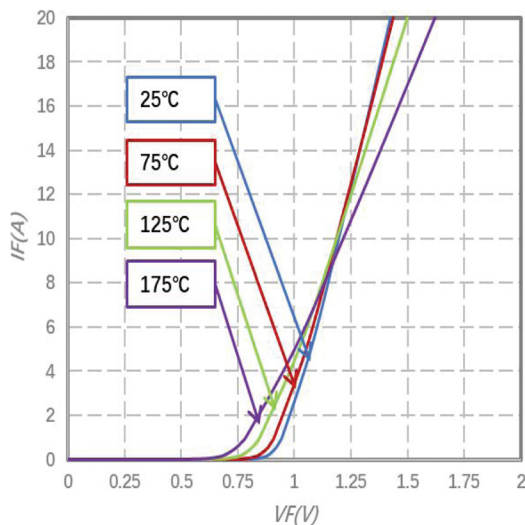


FIGURE 1. Forward Voltage Characteristics

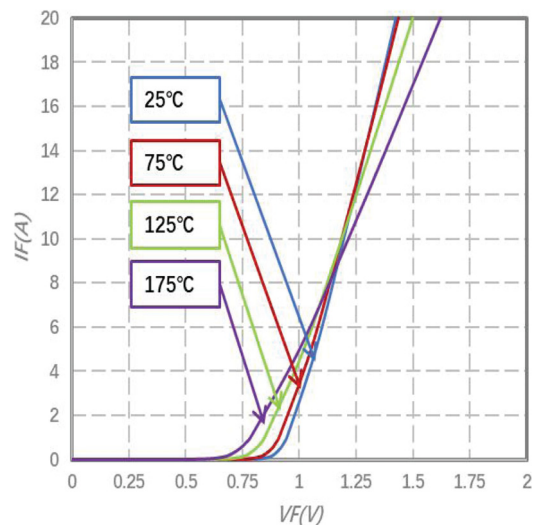


FIGURE 2. Reverse Characteristics





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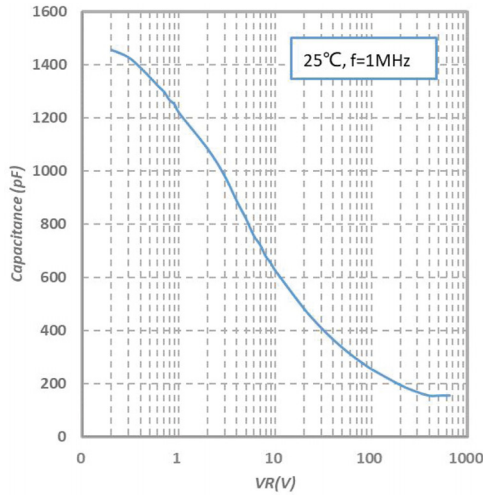


FIGURE 3. Capacitance Versus Reverse Voltage

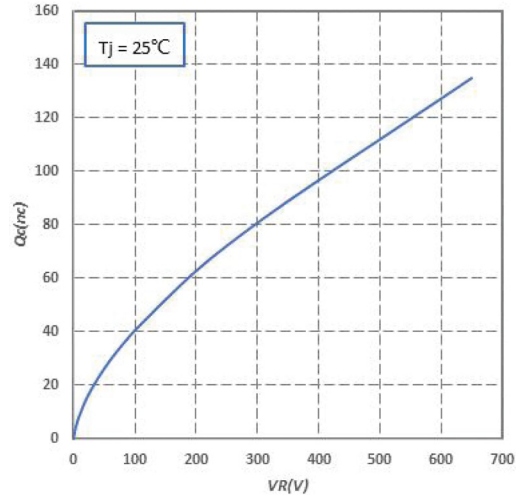


FIGURE 4. Total Capacitance Charge Versus Reverse Voltage

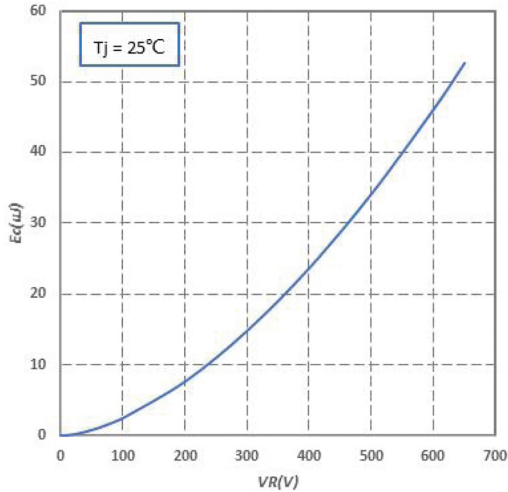


FIGURE 5. Capacitance Stored Energy

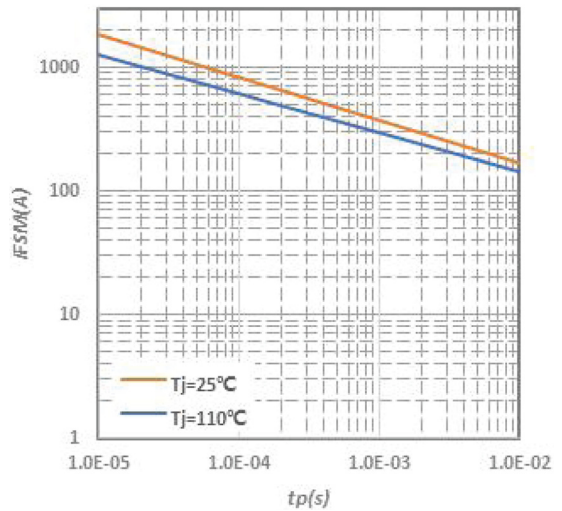


FIGURE 6. Non-repetitive Peak Forward Surge Current Versus Pulse Duration

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