

650 V Power SiC Gen 3 Merged PIN Schottky Diode, 8 A



RoHS
COMPLIANT
HALOGEN
FREE

FEATURES

- Creepage and clearance distance 2.8 mm minimum
- Very low profile – typical height of 1.3 mm
- Majority carrier diode using Schottky technology on SiC wide band gap material
- Improved V_F and efficiency by thin wafer technology
- Positive V_F temperature coefficient for easy paralleling
- Virtually no recovery tail and no switching losses
- Temperature invariant switching behavior
- 175 °C maximum operating junction temperature
- MPS structure for high ruggedness to forward current surge events
- Meets JESD 201 class 2 whisker test
- Meet MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTION / APPLICATIONS

Wide band gap SiC based 650 V Schottky diode, designed for high performance and ruggedness.

Optimum choice for high speed hard switching and efficient operation over a wide temperature range, it is also recommended for all applications suffering from Silicon ultrafast recovery behavior.

Typical applications include AC/DC PFC and DC/DC ultra high frequency output rectification in FBPS and LLC converters.

MECHANICAL DATA

Case: SlimDPAK 2L

Molding compound meets UL 94 V-0 flammability rating Base P/N-M3 - halogen-free, RoHS-compliant

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	8 A
V_R	650 V
V_F at I_F at 25 °C, typ.	1.30 V
T_J max.	175 °C
I_R at V_R at 175 °C	25 μ A
Q_C ($V_R = 400$ V)	22 nC
Package	SlimDPAK 2L
Circuit configuration	Single

MAXIMUM RATINGS ($T_A = 25$ °C unless otherwise specified)				
PARAMETER	SYMBOL	NOTES / TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous forward current	I_F	$T_M = 151$ °C (DC)	8	A
DC blocking voltage	V_{DC}		650	V
Repetitive peak surge current	I_{FRM}	$T_M = 25$ °C, $f = 50$ Hz, square wave, DC = 25 %	42	A
Non-repetitive peak forward surge current	I_{FSM}	$T_M = 25$ °C, $t_p = 10$ ms, half sine wave	52	A
		$T_M = 110$ °C, $t_p = 10$ ms, half sine wave	51	
		$T_M = 25$ °C	79	W
		$T_M = 110$ °C	34	
Power dissipation	$P_{tot}^{(1)}$	$T_M = 25$ °C	103	W
		$T_M = 110$ °C	45	
	$P_{tot}^{(2)}$	$T_M = 25$ °C	13.5	A ² s
		$T_M = 110$ °C	12.5	
I^2t value	$\int i^2 dt$			
Operating junction and storage temperatures	$T_J^{(3)}, T_{Stg}$		-55 to +175	°C

Notes

(1) Based on maximum R_{th}

(2) Based on typical R_{th}

(3) The heat generated must be less than the thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{\theta JA}$



ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Forward voltage	V_F	$I_F = 8\text{ A}$	-	1.3	1.5	V
		$I_F = 8\text{ A}, T_J = 150\text{ }^{\circ}\text{C}$	-	1.50	1.80	
		$I_F = 8\text{ A}, T_J = 175\text{ }^{\circ}\text{C}$	-	1.58	-	
Reverse leakage current	I_R	$V_R = V_R\text{ rated}$	-	0.35	90	μA
		$V_R = V_R\text{ rated}, T_J = 150\text{ }^{\circ}\text{C}$	-	8	180	
		$V_R = V_R\text{ rated}, T_J = 175\text{ }^{\circ}\text{C}$	-	25	-	
Total capacitance	C	$V_R = 1\text{ V}, f = 1\text{ MHz}$	-	340	-	pF
		$V_R = 400\text{ V}, f = 1\text{ MHz}$	-	34	-	
Total capacitive charge	Q_C	$V_R = 400\text{ V}, f = 1\text{ MHz}$	-	22	-	nC

THERMAL - MECHANICAL SPECIFICATIONS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction-to-mount	R_{thJM}		-	1.45	1.90	$^{\circ}\text{C/W}$
Marking device				3C08EV07T		

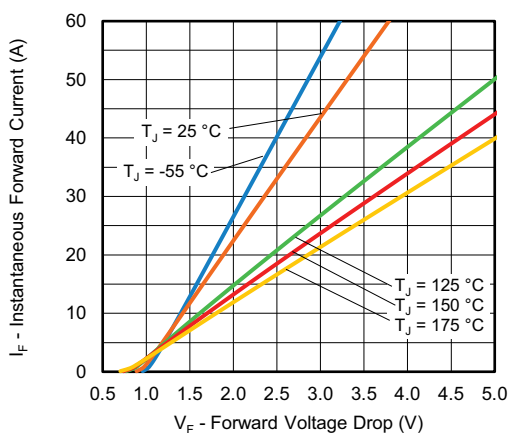


Fig. 1 - Typical Forward Voltage Drop Characteristics

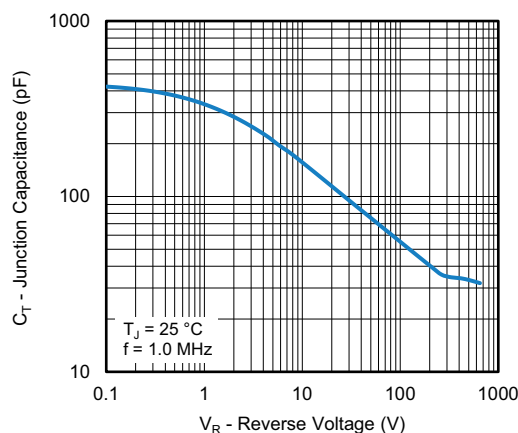


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

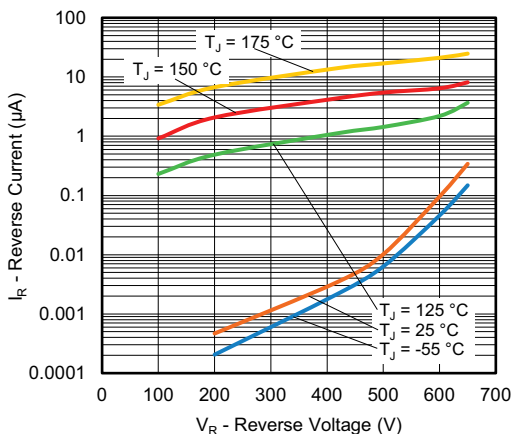


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

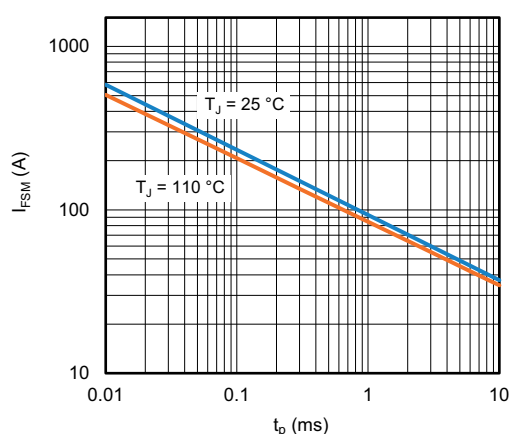


Fig. 4 - Non-Repetitive Peak Forward Surge Current vs. Pulse Duration (Square Wave)

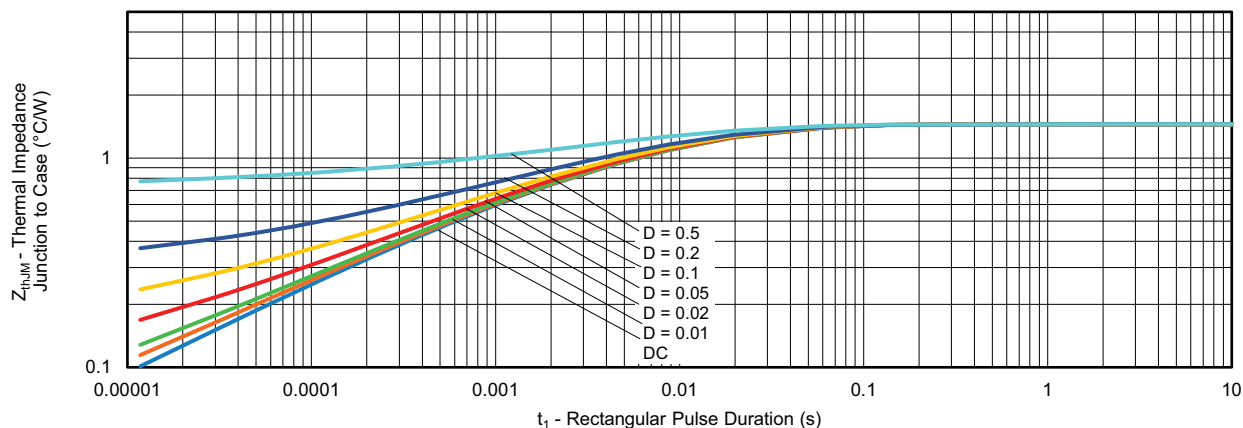
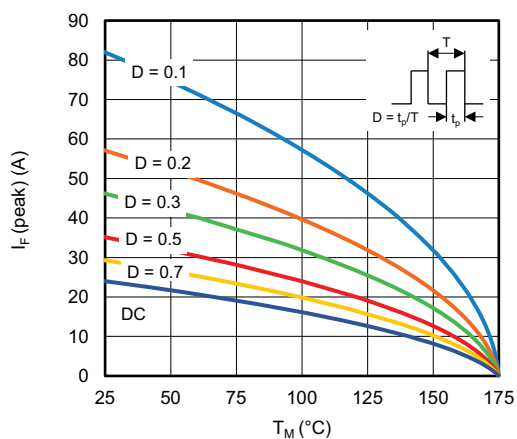

Fig. 5 - Typical Thermal Impedance Z_{thJM} Characteristics


Fig. 6 - Peak Forward Current vs. Maximum Allowable Mount Temperature

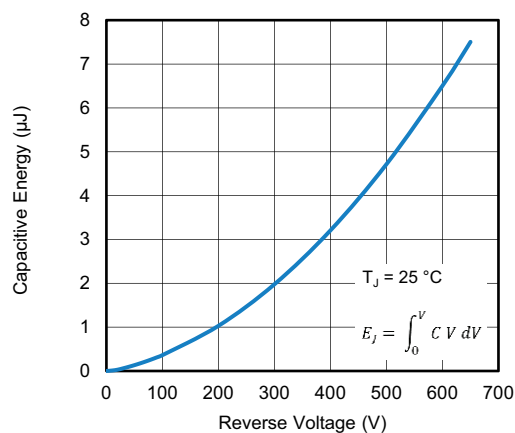


Fig. 8 - Typical Capacitive Energy vs. Reverse Voltage

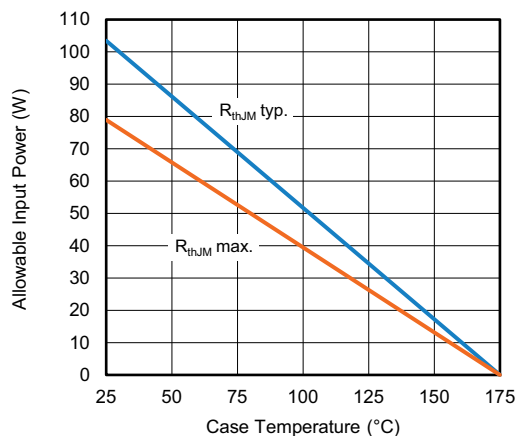


Fig. 7 - Forward Power Loss Characteristics

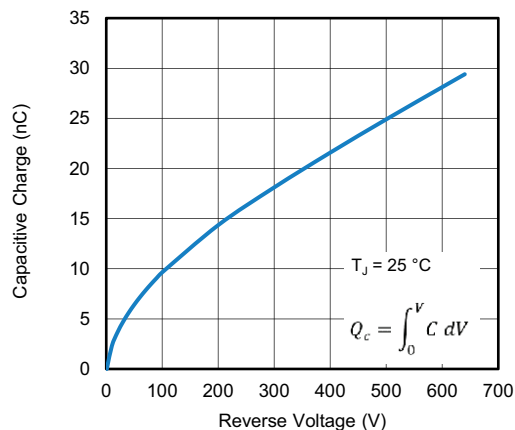


Fig. 9 - Typical Capacitive Charge vs. Reverse Voltage

**ORDERING INFORMATION TABLE**

Device code	VS-	3C	08	E	V	07	T	-M3
	1	2	3	4	5	6	7	8
	1	-	Vishay Semiconductors product					
	2	-	3C = SiC diode, Generation 3					
	3	-	Current rating (08 = 8 A)					
	4	-	E = single diode					
	5	-	Package SlimDPAK					
	6	-	Voltage rating: (07 = 650 V)					
	7	-	T = true 2 pin					
	8	-	Environmental digit:					
			-M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free					

ORDERING INFORMATION (Example)

ORDERING P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	PACKAGING DESCRIPTION
VS-3C08EV07T-M3/I	0.20	I	4500	13" diameter plastic tape and reel

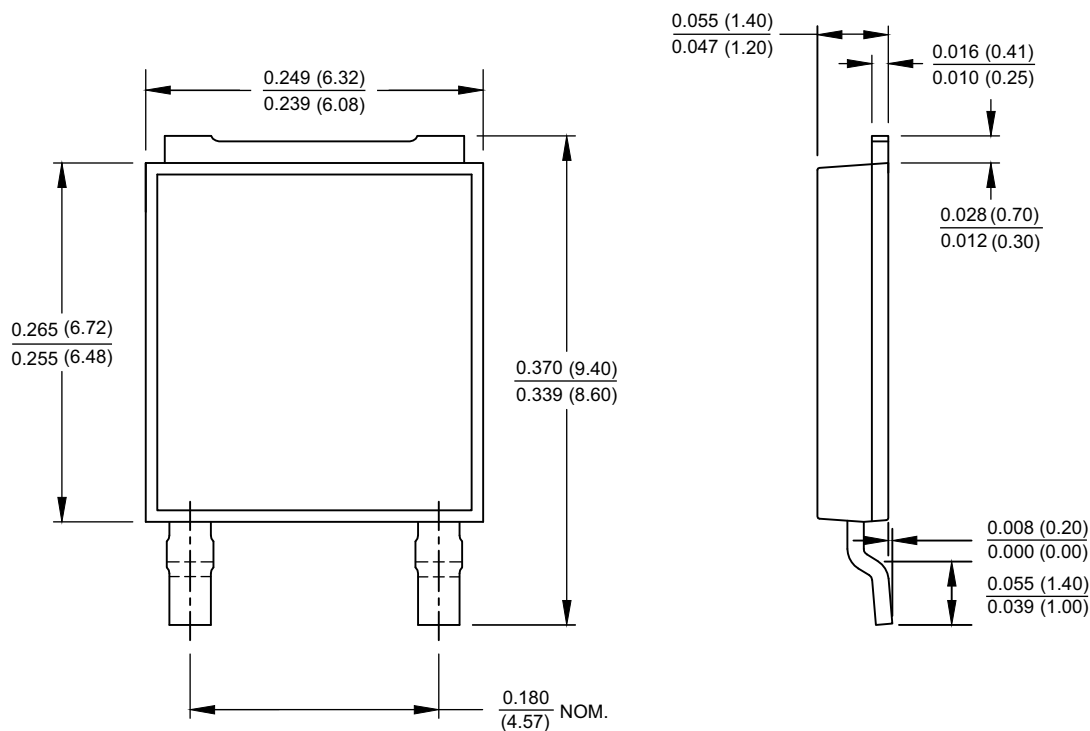
LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?97058
Part marking information	www.vishay.com/doc?97104
Packaging information	www.vishay.com/doc?88869

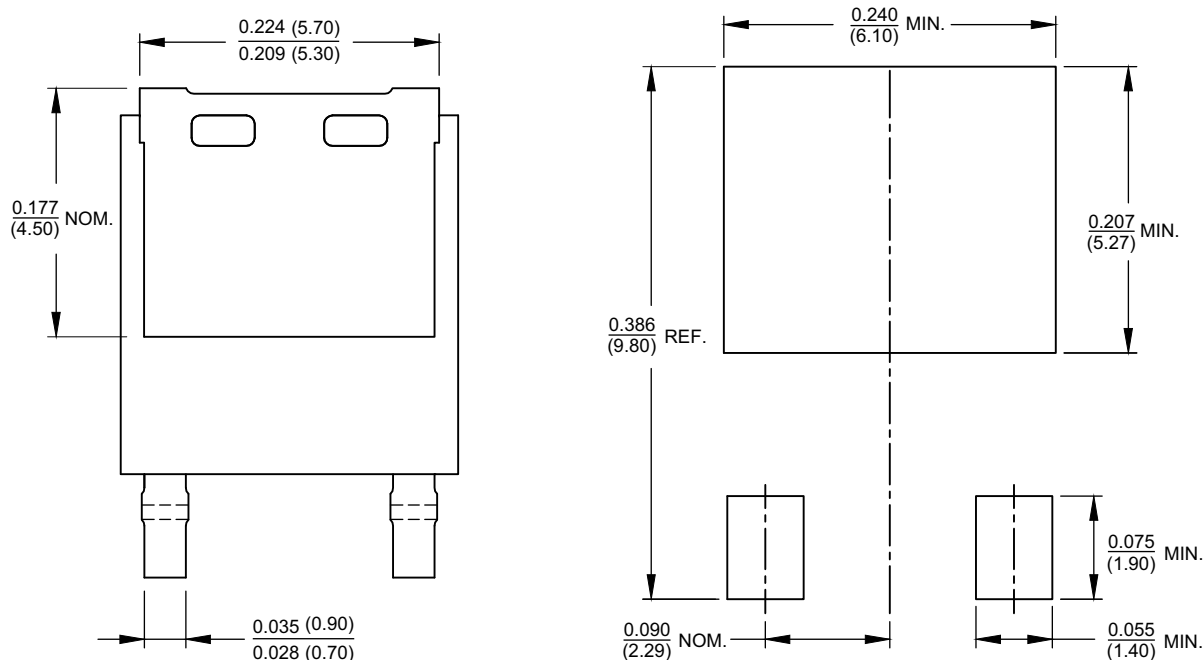


SlimDPAK 2L

DIMENSIONS in millimeters (inches)



Mounting Pad Layout





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