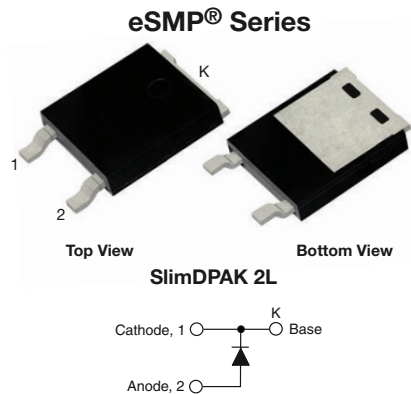


# 650 V Power SiC Gen 3 Merged PIN Schottky Diode, 4 A



## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	4 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	12 $\mu$ A
$Q_C$ ( $V_R = 400$ V)	12 nC
Package	SlimDPAK 2L
Circuit configuration	Single

## 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
FREE

## 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

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	$I_F$	$T_M = 158$ °C (DC)	4	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 %	26	A
Non-repetitive peak forward surge current	$I_{FSM}$	$T_M = 25$ °C, $t_p = 10$ ms, half sine wave	29	A
		$T_M = 110$ °C, $t_p = 10$ ms, half sine wave	26	
Power dissipation	$P_{tot}^{(1)}$	$T_M = 25$ °C	57	W
		$T_M = 110$ °C	25	
	$P_{tot}^{(2)}$	$T_M = 25$ °C	71	W
		$T_M = 110$ °C	31	
$I^2t$ value	$\int i^2 dt$	$T_M = 25$ °C	4.1	A <sup>2</sup> s
		$T_M = 110$ °C	3.3	
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 <sub>J</sub> = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Forward voltage	V <sub>F</sub>	I <sub>F</sub> = 4 A	-	1.3	1.5	V
		I <sub>F</sub> = 4 A, T <sub>J</sub> = 150 °C	-	1.50	1.85	
		I <sub>F</sub> = 4 A, T <sub>J</sub> = 175 °C	-	1.58	-	
Reverse leakage current	I <sub>R</sub>	V <sub>R</sub> = V <sub>R</sub> rated	-	0.2	25	μA
		V <sub>R</sub> = V <sub>R</sub> rated, T <sub>J</sub> = 150 °C	-	4.0	50	
		V <sub>R</sub> = V <sub>R</sub> rated, T <sub>J</sub> = 175 °C	-	12	-	
Total capacitance	C	V <sub>R</sub> = 1 V, f = 1 MHz	-	175	-	pF
		V <sub>R</sub> = 400 V, f = 1 MHz	-	21	-	
Total capacitive charge	Q <sub>C</sub>	V <sub>R</sub> = 400 V, f = 1 MHz	-	12	-	nC

THERMAL - MECHANICAL SPECIFICATIONS (T <sub>A</sub> = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction-to-mount	R <sub>thJM</sub>		-	2.1	2.7	°C/W
Marking device			3C04EV07T			

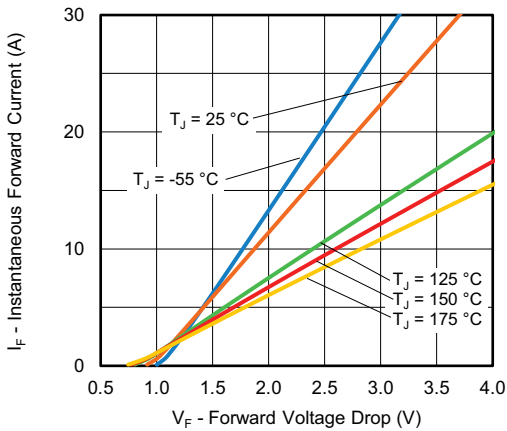


Fig. 1 - Typical Forward Voltage Drop Characteristics

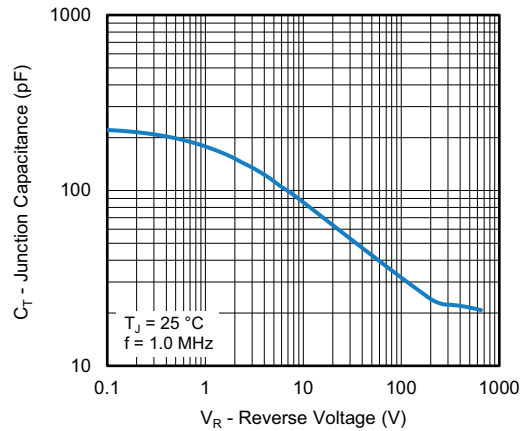


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

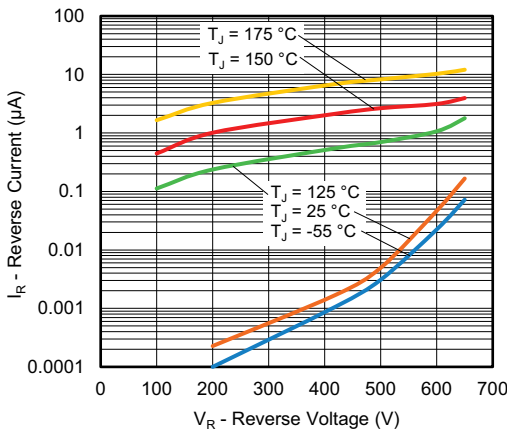


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

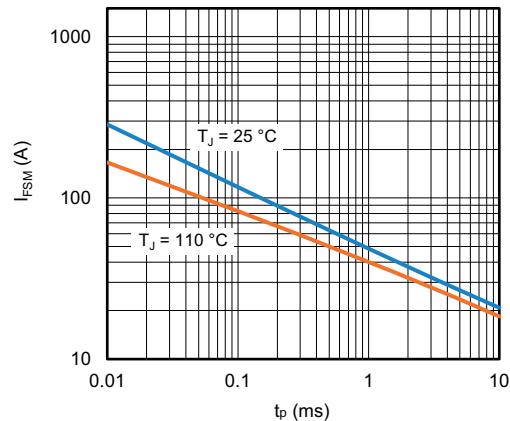


Fig. 4 - Non-Repetitive Peak Forward Surge Current vs. Pulse Duration (Square Wave)

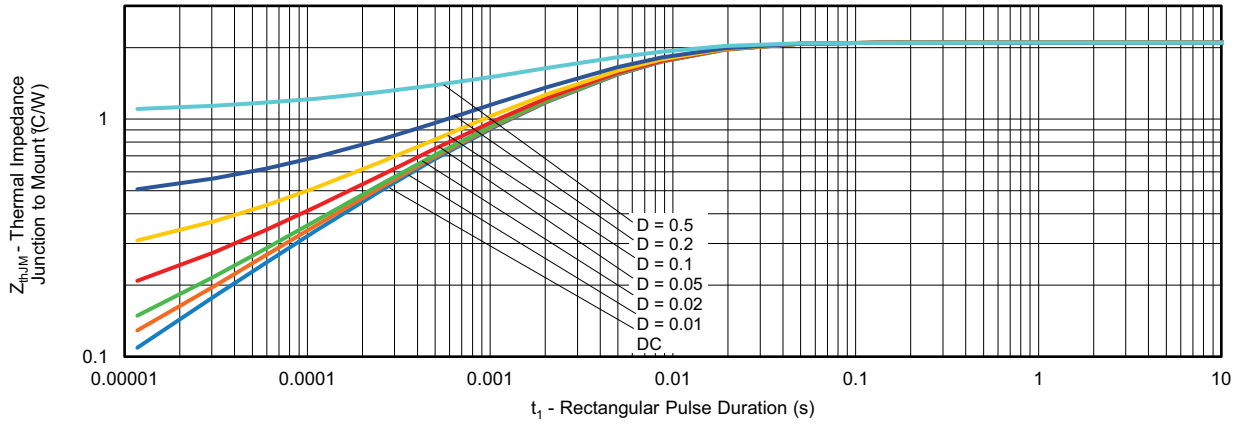


Fig. 5 - Typical Thermal Impedance  $Z_{thJM}$  Characteristics

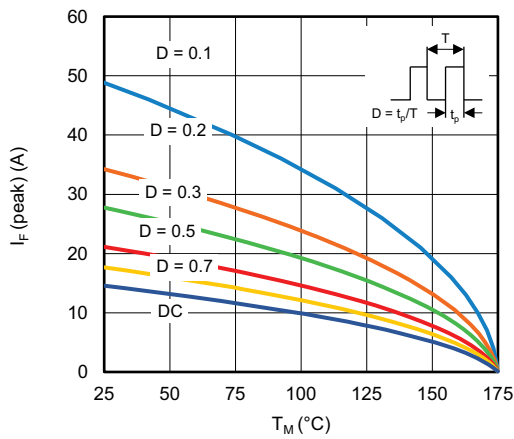


Fig. 6 - Peak Forward Current vs. Maximum Allowable Mount Temperature

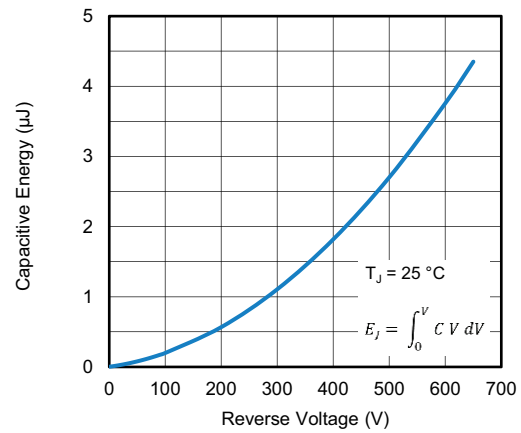


Fig. 8 - Typical Capacitive Energy vs. Reverse Voltage

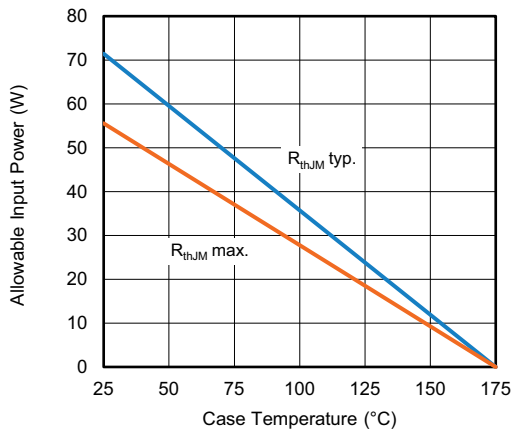


Fig. 7 - Forward Power Loss Characteristics

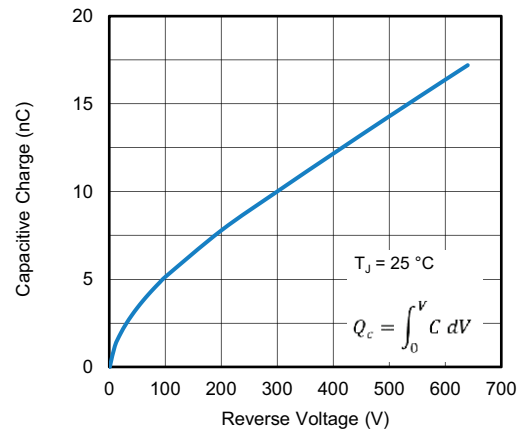
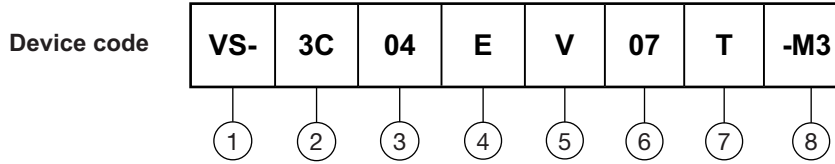


Fig. 9 - Typical Capacitive Charge vs. Reverse Voltage



ORDERING INFORMATION TABLE



- 1 - Vishay Semiconductors product
- 2 - 3C = SiC diode, Generation 3
- 3 - Current rating (04 = 4 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

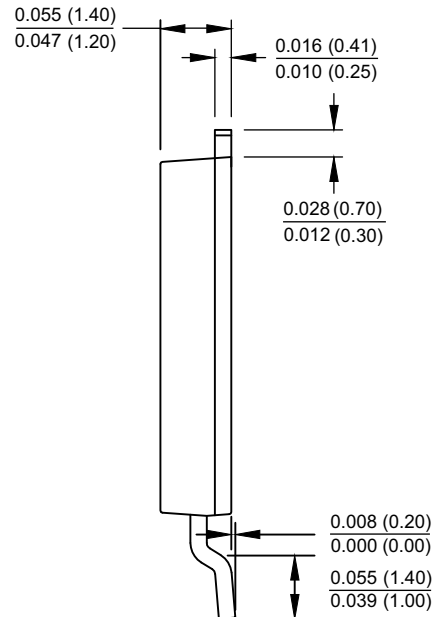
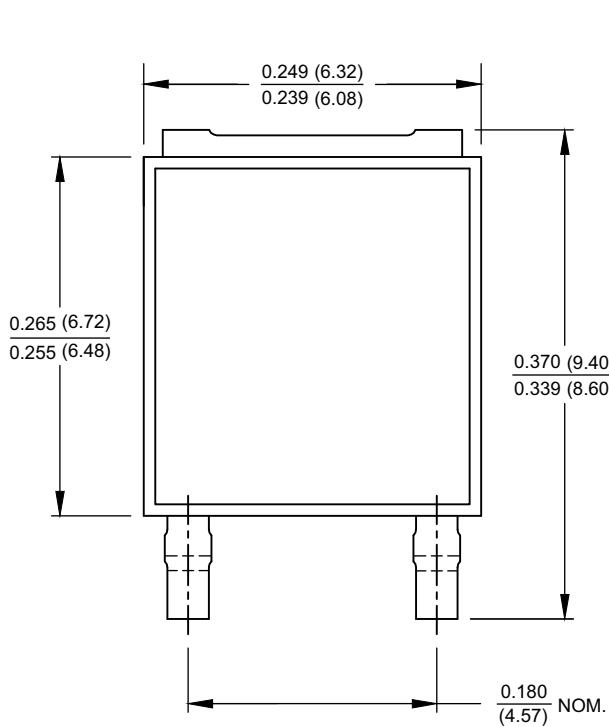
ORDERING INFORMATION (Example)				
ORDERING P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	PACKAGING DESCRIPTION
VS-3C04EV07T-M3/I	0.20	I	4500	13" diameter plastic tape and reel

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?97058">www.vishay.com/doc?97058</a>
Part marking information	<a href="http://www.vishay.com/doc?97104">www.vishay.com/doc?97104</a>
Packaging information	<a href="http://www.vishay.com/doc?88869">www.vishay.com/doc?88869</a>

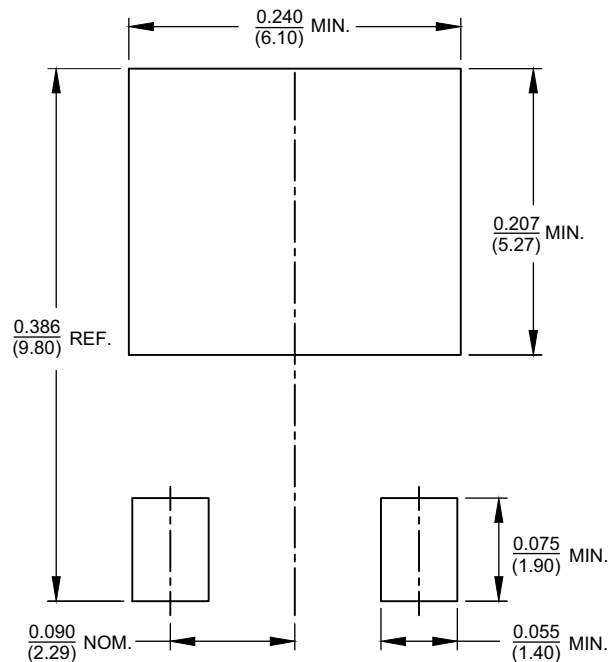
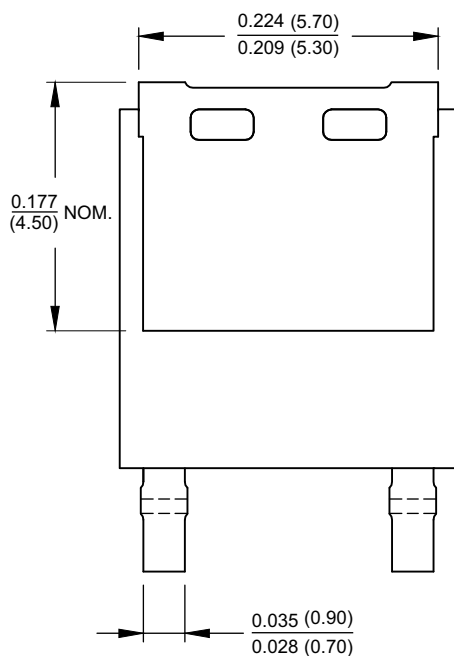


## SlimDPAK 2L

**DIMENSIONS** in millimeters (inches)



### Mounting Pad Layout





## Disclaimer

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