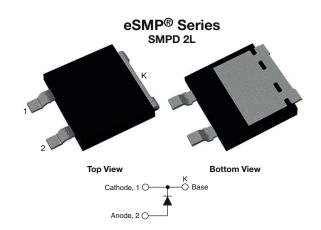


Vishay Semiconductors

RoHS

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



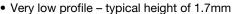
LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS				
I _F	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 µA			
$Q_{C} (V_{R} = 400 V)$	12 nC			
Package	SMPD 2L			
Circuit configuration	Single			

FEATURES

 Creepage and clearance distance 3.6 mm minimum



• Majority carrier diode using Schottky technology on SiC wide band gap material

COMPLIANT HALOGEN FREE 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
- Meets 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: SMPD 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	TEST CONDITIONS	VALUES	UNITS	
Peak repetitive reverse voltage	V_{RRM}		650	V	
Continuous forward current	I _F	T _M = 158°C (DC)	4	Α	
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	Α	
Non-repetitive peak forward surge current	I _{FSM}	$T_M = 25$ °C, $t_p = 10$ ms, half sine wave	29	А	
		T _M = 110 °C, t _p = 10 ms, half sine wave	26		
	P _{tot} (1)	T _M = 25 °C	57	- w - w	
Dower discinction		T _M = 110 °C	25		
Power dissipation	P _{tot} (2)	T _M == 25 °C	71		
		T _M = 110 °C	31		
I ² t value	∫i ² dt	T _M = 25 °C	4.1	A ² s	
i-t value		T _M = 110 °C	3.3	A-2	
Operating junction and storage temperatures	T _J ⁽³⁾ , T _{Stg}		-55 to +175	°C	

Notes

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



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ELECTRICAL SPECIFICATIONS (T _J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
		I _F = 4 A	-	1.3	1.5	
Forward voltage	V _F	I _F = 4 A, T _J = 150 °C	-	1.50	1.85	V
		I _F = 4 A, T _J = 175 °C	-	1.58	-	
Reverse leakage current	I _R	$V_R = V_R$ rated	-	0.2	25	μΑ
		$V_R = V_R$ rated, $T_J = 150$ °C	-	4.0	50	
		V _R = V _R rated, T _J = 175 °C	-	12	-	
Total capacitance	С	V _R = 1 V, f = 1 MHz	-	175	-	nE.
		V _R = 400 V, f = 1 MHz	-	21	-	pF
Total capacitive charge	Q_C	V _R = 400 V, f = 1 MHz	-	12	-	nC

THERMAL - MECHANICAL SPECIFICATIONS (T _A = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction-to-mount	R_{thJm}		-	2.1	2.7	°C/W
Marking device				3C04F	ED07T	

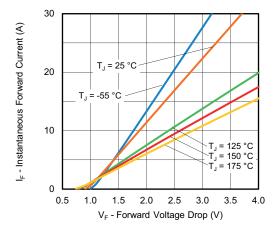


Fig. 1 - Typical Forward Voltage Drop Characteristics

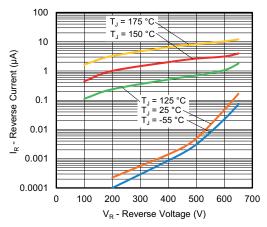


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

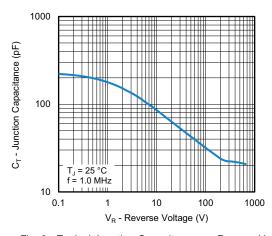


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

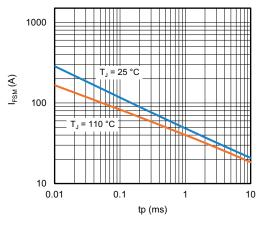


Fig. 4 - Non-Repetitive Peak Forward Surge Current vs. Pulse Duration (Square Wave)



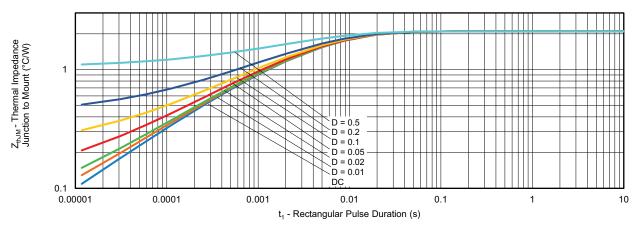


Fig. 5 - Typical Thermal Impedance Z_{thJM} Characteristics

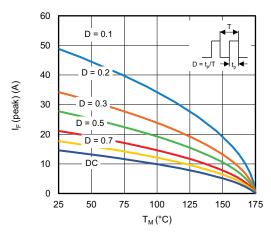


Fig. 6 - Peak Forward Current vs. Maximum Allowable Mount Temperature

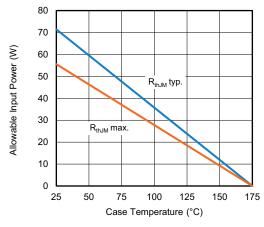


Fig. 7 - Forward Power Loss Characteristics

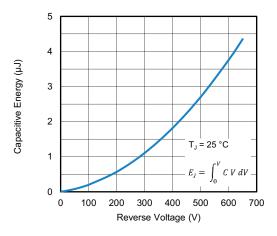


Fig. 8 - Typical Capacitive Energy vs. Reverse Voltage

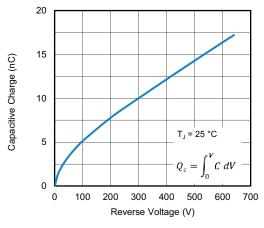


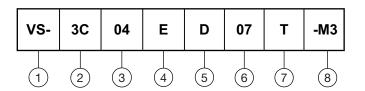
Fig. 9 - Typical Capacitive Charge vs. Reverse Voltage



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ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - 3C = SiC diode, Generation 3

3 - Current rating (04 = 4 A)

- E = single diode

5 - D = Package SMPD 2L

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	DELIVERY MODE	
VS-3C04ED07T-M3/I	0.52	[2000 / reel	13" diameter plastic tape and reel	

LINKS TO RELATED DOCUMENTS				
Dimensions <u>www.vishay.com/doc?97059</u>				
Part marking information	www.vishay.com/doc?97105			
Packaging information	www.vishay.com/doc?88869			



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