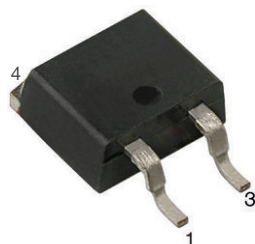
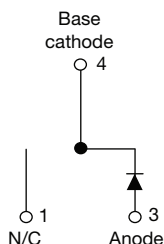


650 V Gen 4 Power Silicon Carbide Schottky Diode, 10 A


D²PAK 2L (TO-263AB 2L)


FEATURES

- 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
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- AEC-Q101 qualified, meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see 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.

Optimized for extreme high speed hard switching across a wide temperature range. This SiC diode is ideal for applications with high dI/dt such as high efficiency PFC and ultra-high frequency output rectifiers in AC/DC and DC/DC converters.

MECHANICAL DATA

Case: D²PAK 2L (TO-263AB 2L)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-HM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

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

LINKS TO ADDITIONAL RESOURCES



3D Models

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	10 A
V_R	650 V
V_F at I_F at 25 °C, typ.	1.3 V
T_J max.	175 °C
I_R at V_R at 175 °C	50 μ A
Q_C ($V_R = 400$ V)	27 nC
Package	D ² PAK 2L (TO-263AB 2L)
Circuit configuration	Single

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	$I_F^{(1)}$	$T_C = 145$ °C (DC)	10	A
	$I_F^{(2)}$	$T_C = 138$ °C (DC)	10	A
DC blocking voltage	V_{DC}		650	V
Repetitive peak forward current	I_{FRM}	$T_C = 25$ °C, $f = 50$ Hz, square wave, DC = 25 %	42	A
Non-repetitive peak forward surge current	I_{FSM}	$T_C = 25$ °C, $t_p = 10$ ms, half sine wave	60	
		$T_C = 110$ °C, $t_p = 10$ ms, half sine wave	48	
Power dissipation	$P_{tot}^{(1)}$	$T_C = 25$ °C	79	W
		$T_C = 110$ °C	34	
	$P_{tot}^{(2)}$	$T_C = 25$ °C	62.5	W
		$T_C = 110$ °C	27	
I^2t value	$\int i^2 dt$	$T_C = 25$ °C	18	A ² s
		$T_C = 110$ °C	11.5	
Operating junction and storage temperatures	$T_J^{(2)}, T_{Stg}$		-55 to +175	°C

Notes

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



ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Forward voltage	V_F	$I_F = 10\text{ A}$	-	1.3	1.5	V
		$I_F = 10\text{ A}, T_J = 150\text{ }^{\circ}\text{C}$	-	1.45	1.75	
		$I_F = 10\text{ A}, T_J = 175\text{ }^{\circ}\text{C}$	-	1.55	-	
Reverse leakage current	I_R	$V_R = V_R\text{ rated}$	-	2	80	μA
		$V_R = V_R\text{ rated}, T_J = 150\text{ }^{\circ}\text{C}$	-	23	160	
		$V_R = V_R\text{ rated}, T_J = 175\text{ }^{\circ}\text{C}$	-	50	-	
Total capacitance	C	$V_R = 1\text{ V}, f = 1\text{ MHz}$	-	440	-	pF
		$V_R = 400\text{ V}, f = 1\text{ MHz}$	-	38	-	
Total capacitive charge	Q_C	$V_R = 400\text{ V}, f = 1\text{ MHz}$	-	27	-	nC

THERMAL AND MECHANICAL SPECIFICATIONS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	R_{thJC}		-	1.9	2.4	$^{\circ}\text{C/W}$
Marking device			4C10ET07S			

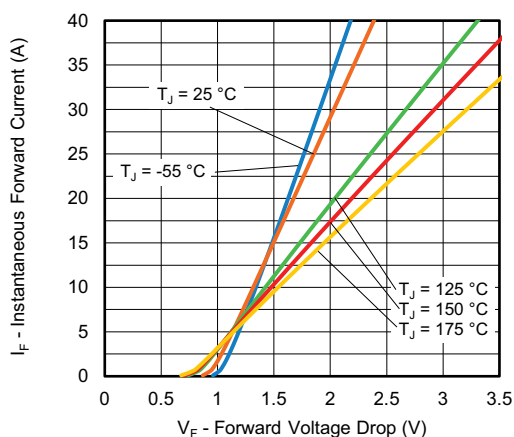


Fig. 1 - Typical Forward Voltage Drop Characteristics

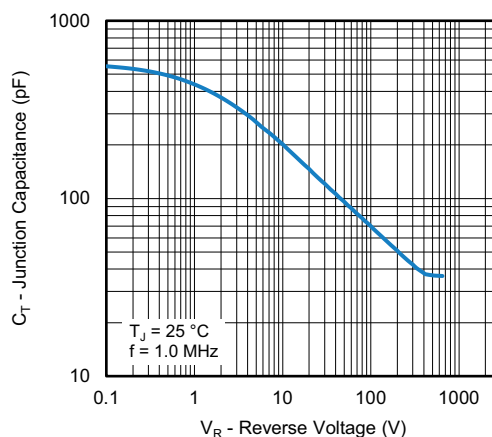


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

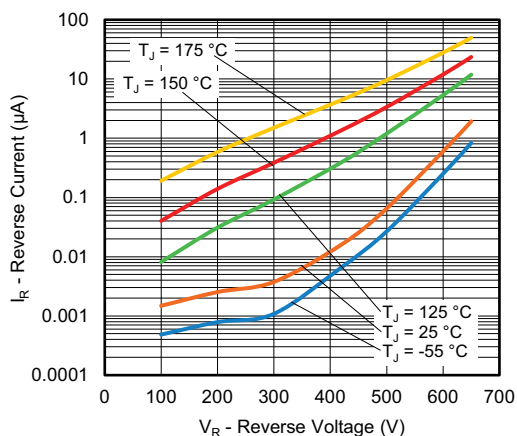


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

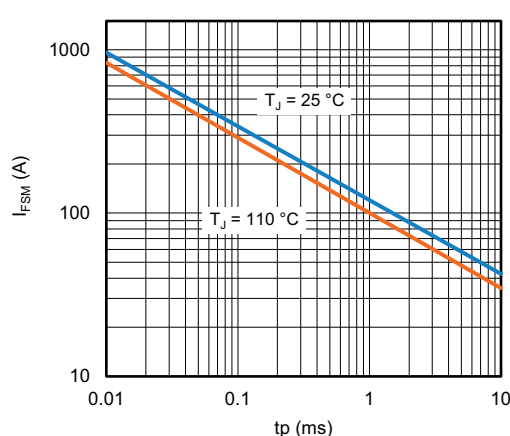


Fig. 4 - Non-Repetitive Peak Forward Surge Current vs. Pulse Duration (Square Wave)

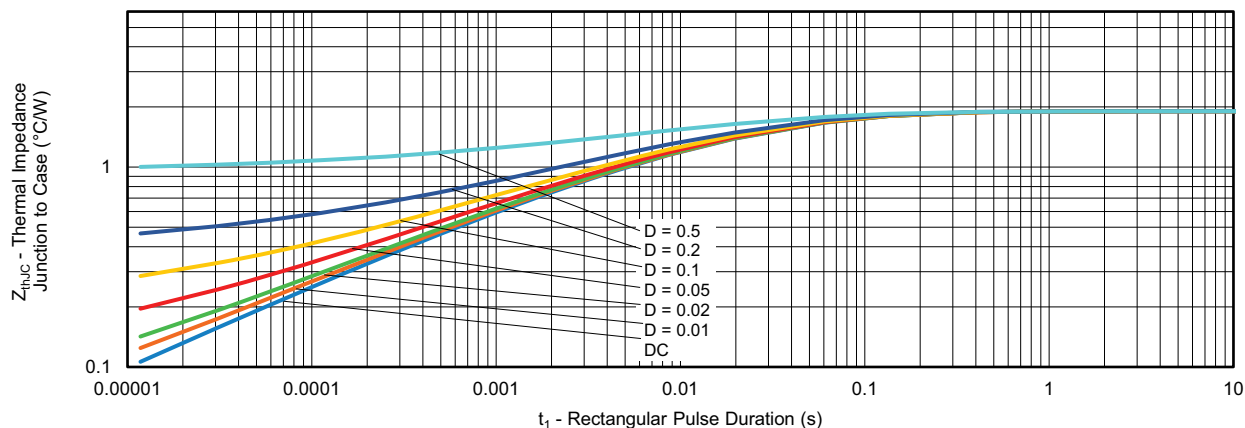
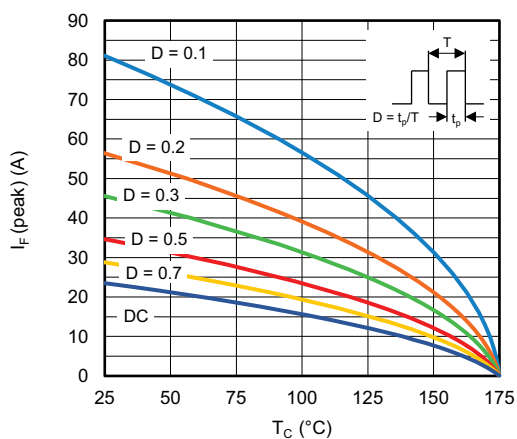

Fig. 5 - Typical Thermal Impedance Z_{thJC} Characteristics


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

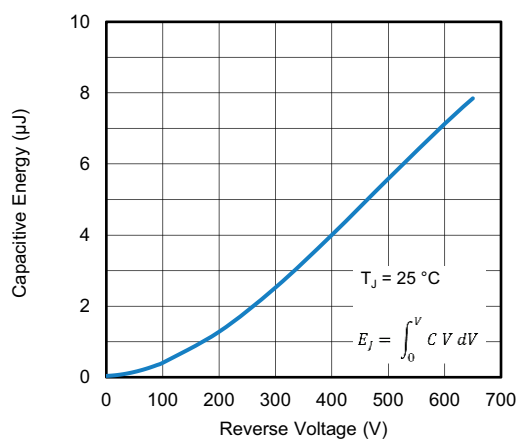


Fig. 8 - Typical Capacitive Energy vs. Reverse Voltage

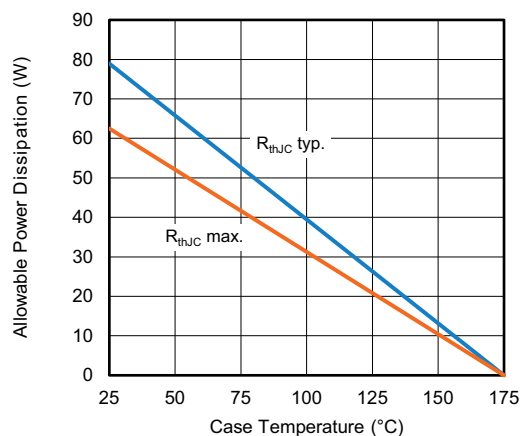


Fig. 7 - Forward Power Loss Characteristics

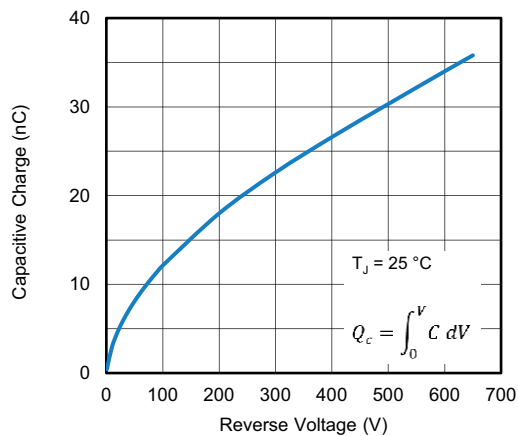


Fig. 9 - Typical Capacitive Charge vs. Reverse Voltage

**ORDERING INFORMATION TABLE**

Device code	VS-	4C	10	E	T	07	S	2	L	H	M3
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪

- | | | |
|-----------|---|---|
| 1 | - | Vishay Semiconductors product |
| 2 | - | 4C = SiC diode, generation 4 |
| 3 | - | Current rating (10 = 10 A) |
| 4 | - | E = single diode |
| 5 | - | T = D ² PAK package |
| 6 | - | Voltage rating: (07 = 650 V) |
| 7 | - | S = surface mountable |
| 8 | - | 2 = true 2 pin D ² PAK |
| 9 | - | L = tape and reel (left oriented) |
| 10 | - | H = AEC-Q101 qualified |
| 11 | - | Environmental digit:
M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free |

ORDERING INFORMATION

PREFERRED P/N	UNIT WEIGHT	BASE QUANTITY	PACKAGING DESCRIPTION
VS-4C10ET07S2LHM3	2 g	800 per reel	13" diameter reel

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?96683
Part marking information	www.vishay.com/doc?96693
Packaging information	www.vishay.com/doc?95032
SPIICE model	www.vishay.com/doc?97484