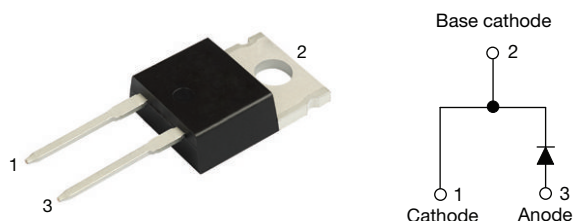


650 V Gen 4 Power Silicon Carbide Schottky Diode, 10 A



LINKS TO ADDITIONAL RESOURCES



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	TO-220AC 2L
Circuit configuration	Single

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
- AEC-Q101 qualified, meets JESD 201 class 2 whisker test
- Solder bath temperature 275 °C maximum, 10 s per JESD 22-B106
- 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: TO-220AC 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

Mounting torque: 10 in-lbs maximum

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: $dP_D/dT_J < 1/R_{\theta JA}$



ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Forward voltage	V_F	$I_F = 10\text{ A}$	-	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			4C10ET07T			

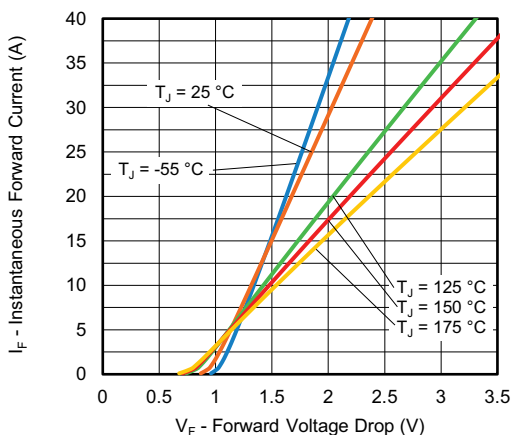


Fig. 1 - Typical Forward Voltage Drop Characteristics

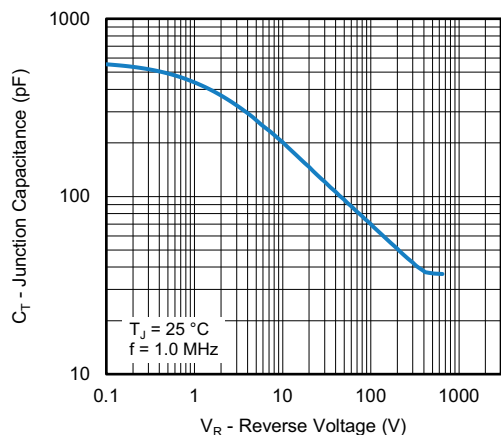


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

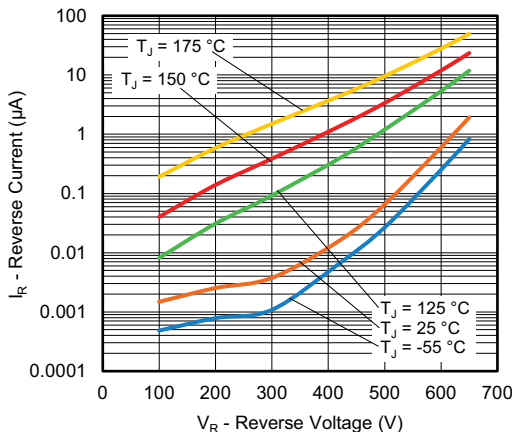


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

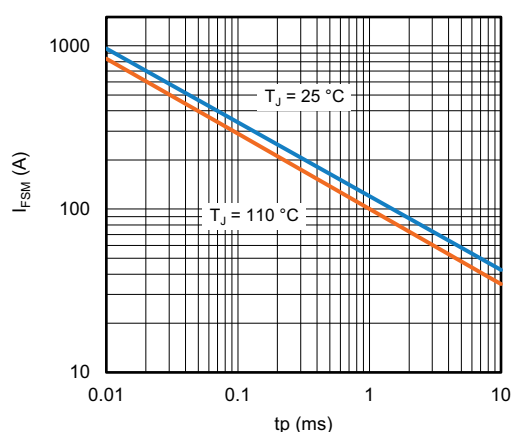


Fig. 4 - Non-Repetitive Peak Forward Surge Current vs. Pulse Duration (Square Wave)

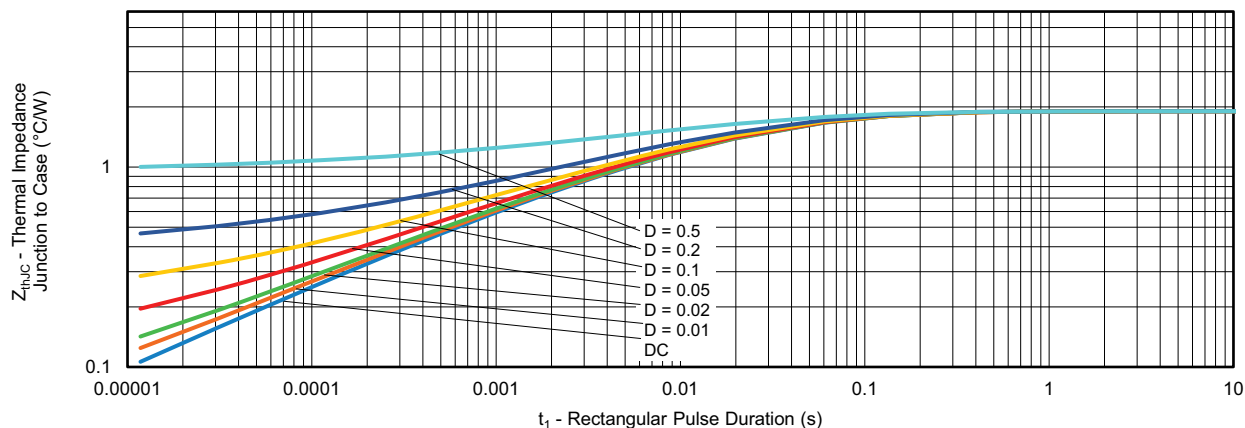
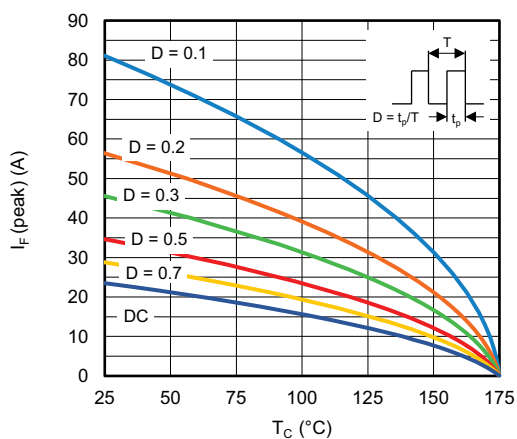

Fig. 5 - Typical Thermal Impedance Z_{thJC} Characteristics


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

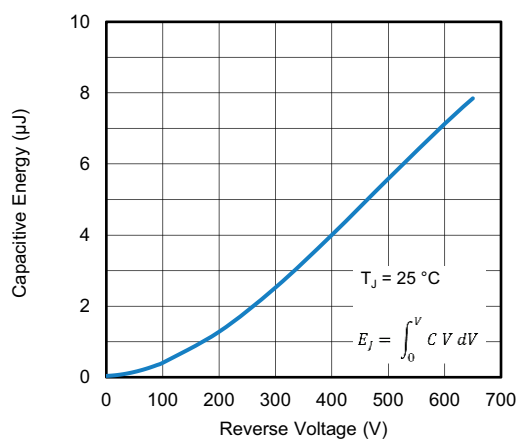


Fig. 8 - Typical Capacitive Energy vs. Reverse Voltage

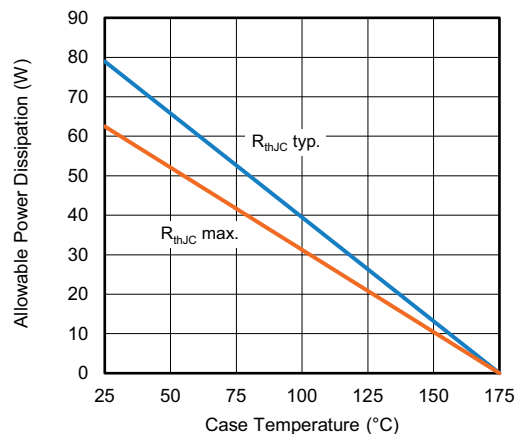


Fig. 7 - Forward Power Loss Characteristics

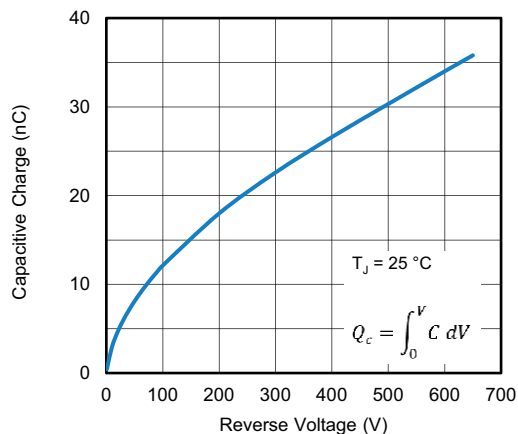


Fig. 9 - Typical Capacitive Charge vs. Reverse Voltage



ORDERING INFORMATION TABLE

Device code	VS-	4C	10	E	T	07	T	H	M3
	1	2	3	4	5	6	7	8	9
1	Vishay Semiconductors product								
2	4C = SiC diode, generation 4								
3	Current rating (10 = 10 A)								
4	E = single diode								
5	T = TO-220 package								
6	Voltage rating: (07 = 650 V)								
7	T = true 2 pin								
8	H = AEC-Q101 qualified								
9	Environmental digit: M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free								

ORDERING INFORMATION			
PREFERRED P/N	UNIT WEIGHT	BASE QUANTITY	PACKAGING DESCRIPTION
VS-4C10ET07THM3	2 g	50 per tube	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96069
Part marking information	www.vishay.com/doc?95391
SPIICE model	www.vishay.com/doc?97484