Silicon Carbide Merged PN-Schottky Diode

1700V SiC MPS High Power Rectifier – Cheetah Series

Product Information:

TO-247-2L

Features

- Low Capacitive Charge (Q_C)
- Zero Forward Recovery
- Zero Reverse Recovery
- Ultra-Low Switching Loss
- Optimized for High Speed Applications
- RoHS Compliant and Halogen Free

Terminal	Packaging Type
	TO-247-2L
Anode	2
Cathode	1, Tab

Benefits

- Higher System Efficiency
- Increase Parallel Device Convenience
- Enable High Temperature Application
- Allow High Frequency Operation
- Realize Compact and Lightweight Systems
- High Reliability

Potential Applications

- Industrial Switching Mode Power Supply
- Power Factor Correction
- Renewable Energy

Key Performance Parameters

Parameter	Symbol	Value	Unit
DC Blocking Voltage	V_R	1700	V
Nominal Forward Current	$I_{F,\ NOM}$	10	A
Total Capacitive Charge	Q_C	74	nC
Capacitance Stored Energy	E_C	27	µJ
Junction & Storage Temperature	$T_j,\ T_{stg}$	-55 to 175	°C
Continuous Forward Current	$I_{F,\ max\ (cont.)}$	38.1	A
I^2t Value	$\int i^2 dt$	139	A^2s
Power Dissipation	P_{tot}	238.1	W

Part Number	Package	Marking
FC17010E-2	TO-247-2L	FC17010
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For further information about comparable products, please contact (www.fastsic.com).

Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Continuous Forward Current	I_F	--	--	20.0	A	T_c≤124°C, *Duty*=100%
				29.1		T_c≤75°C, *Duty*=100%
				36.6		T_c≤25°C, *Duty*=100%
Non-Repetitive Forward Surge Current, Sinusoidal Halfwave	$I_{F,SM}$	--	--	118		T_c=25°C, t_p=10ms
Non-Repetitive Peak Forward Surge Current	$I_{F,max}$	--	--	1310		T_c=25°C, t_p=10µs
I^2t Value	$\int i^2dt$	--	--	139	A²s	T_c=25°C, t_p=10ms
Repetitive Peak Reverse Voltage	V_{RRM}	--	--	1700	V	T_c=25°C
Power Dissipation	P_{tot}	--	--	238.1	W	T_c=25°C
		--	--	158.7		T_c=75°C
Junction Temperature	T_j	-55	--	175	°C	--
Storage Temperature	T_{stg}	-55	--	175		
Soldering Temperature	T_L	--	--	260		

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
DC Characteristics						
DC Blocking Voltage	V_{DC}	1700	--	--	V	T_j=25°C
Forward Voltage	V_F	--	1.45	1.75		I_F=10A, T_j=25°C
			2.30	--		I_F=10A, T_j=175°C
Reverse Current	I_R	--	36	1000	µA	V_R=1700V, T_j=25°C
			123	--		V_R=1700V, T_j=175°C
AC Characteristics						
Total Capacitive Charge	Q_C	--	74	--	nC	V_R=1000V, T_j=25°C
Total Capacitance	C_j	--	711	--	pF	V_R=1V, *f*=1MHz, T_j=25°C
			56			V_R=500V, *f*=1MHz, T_j=25°C
			42			V_R=1000V, *f*=1MHz, T_j=25°C
Capacitance Stored Energy	E_C	--	27	--	µJ	V_R=1000V, T_j=25°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Thermal Impedance, junction – case	$R_{th\text{-}jc}$	--	0.63	--	K/W	--
Thermal Impedance, junction – ambient	$R_{th\text{-}ja}$	--	40	--		Device on PCB, with 6 cm² of cooling area

Electrical Characteristics Diagrams

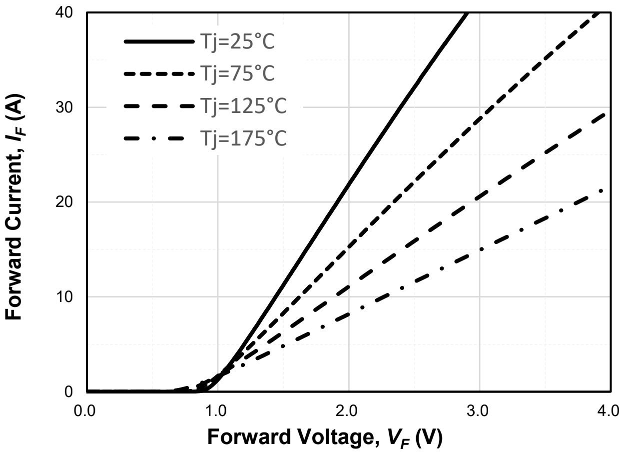


Fig. 1 Forward Characteristics

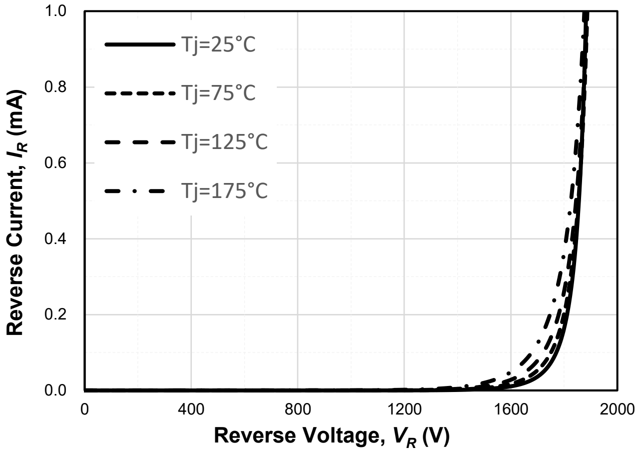


Fig. 2 Reverse Characteristics

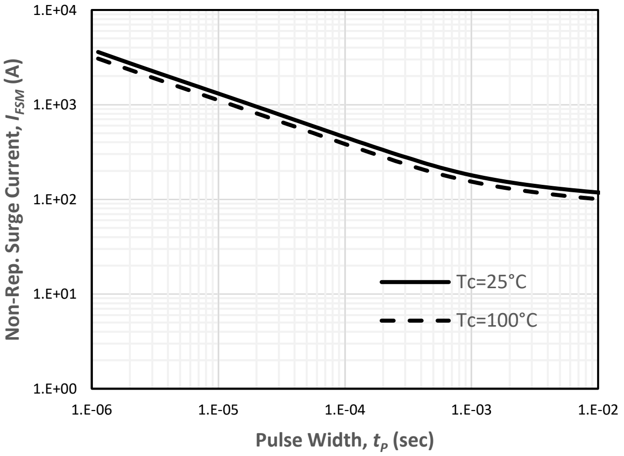


Fig. 3 Non-repetitive Peak Forward Surge Current vs. Pulse Width

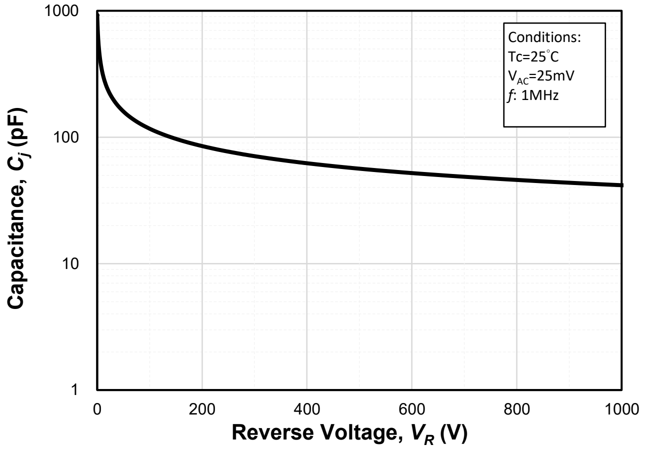


Fig. 4 Capacitance vs. Reverse Voltage

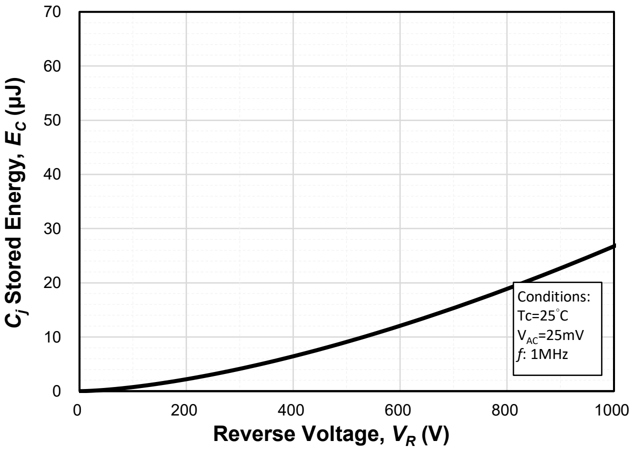


Fig. 5 Capacitance Stored Energy vs. Reverse Voltage

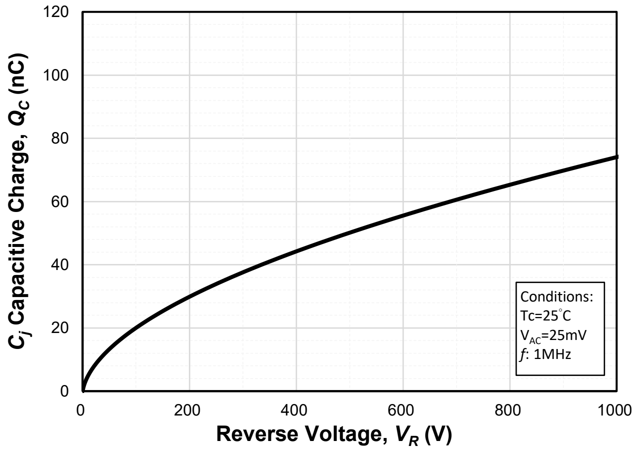


Fig. 6 Capacitive Charge vs. Reverse Voltage

Electrical Characteristics Diagrams

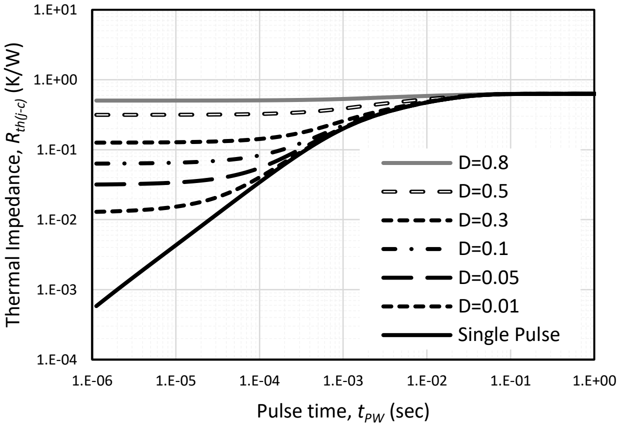


Fig. 7 Typ. Transient Thermal Impedance $R_{th\text{-}jc}$

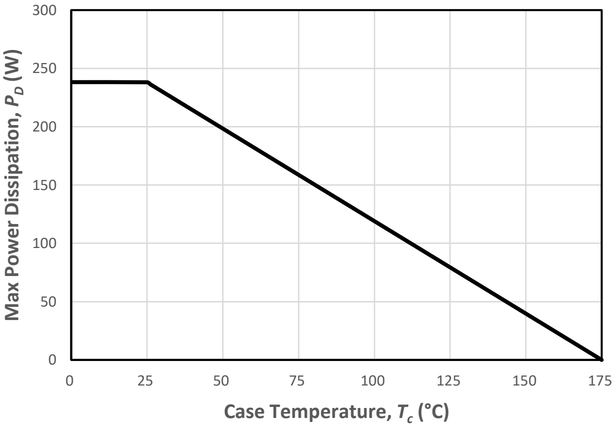


Fig. 8 Power Dissipation

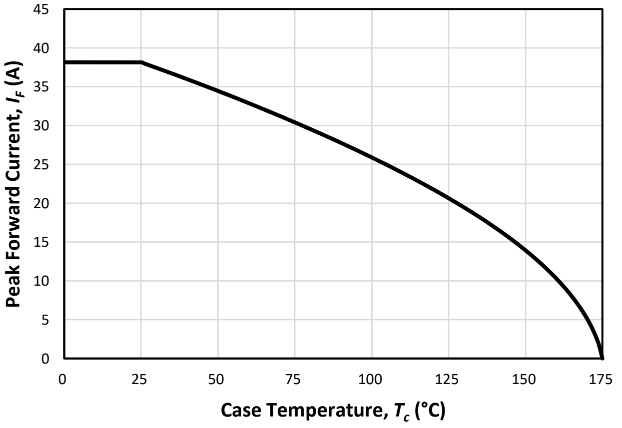
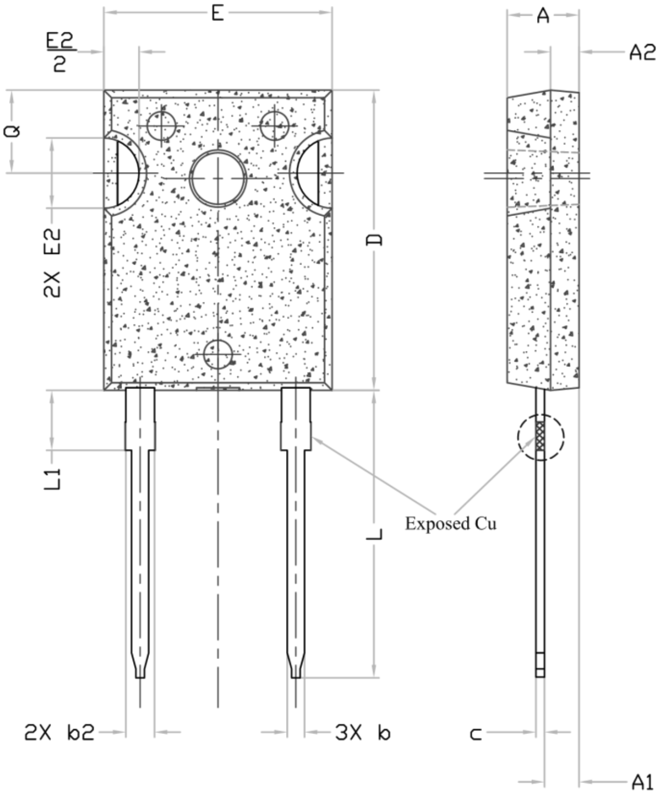
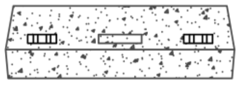
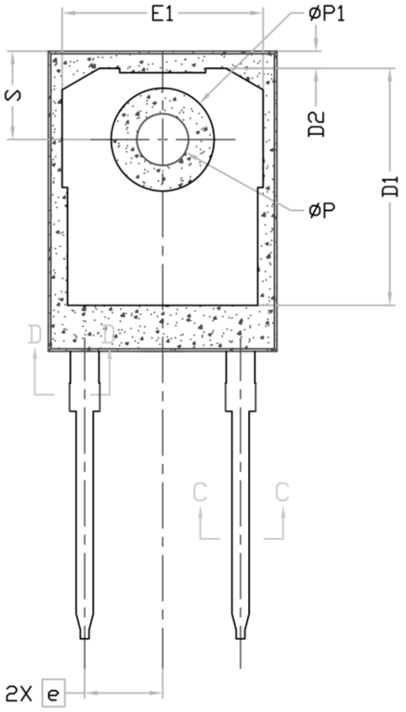


Fig. 9 Continuous I_F De-rating

Package Outline (TO-247-2L)



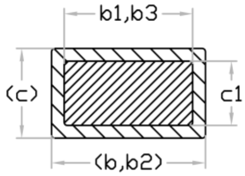




Symbol	Dimension (Millimeters)		
	Min.	Nom.	Max.
A	4.83	5.02	5.21
A1	2.29	2.41	2.55
A2	1.50	2.00	2.49
b	1.12	1.20	1.33
b1	1.12	1.20	1.28
b2(4)	1.91	2.00	2.39
b3	1.91	2.00	2.34
b4(4)(6)	2.87	3.00	3.22
b5	2.87	3.00	3.18
c(4)	0.55	0.60	0.69
c1	0.55	0.60	0.65
D(2)	20.80	20.95	21.10
D1(3)	16.25	16.55	17.65
D2	0.51	1.19	1.35
E(2)	15.75	15.94	16.13
E1(3)	13.46	14.02	14.16
E2(1)	4.32	4.91	5.49
e	5.44 BSC.		
L	19.81	20.07	20.32
L1(4)	4.10	4.19	4.40
ϕP(5)	3.56	3.61	3.65
ϕP1	7.19 REF.		
Q	5.39	5.79	6.20
S	6.04	6.17	6.30

Note:

1. Slot required, notch may be rounded.
2. Dimension D & E do not include mold flash. Mold flash shall not exceed 0.127mm pre side. These dimensions are measured at the outermost extreme of the plastic body.
3. Thermal pad contour optional within dimension D1 & E1.
4. Lead finish uncontrolled in L1.
5. ϕP to have a maximum draft angle of 1.5° to the top of the part with a maximum hole diameter of 3.91mm.
6. Dimension "b2" and "b4" does not include dambar protrusion. Allowable dambar protrusion shall be 0.10mm total in excess of "b2" and "b4" dimension at maximum material condition.



Section C--C,D--D

Revision History

Date	Revision	Changes
25.12	Preliminary	1st issue

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