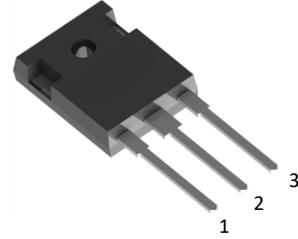
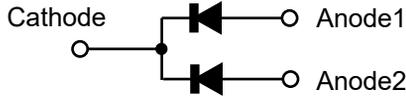


**Silicon Carbide Merged PN-Schottky Diode**  
1700V SiC MPS High Power Rectifier – Cheetah Series



**Product Information:**



**TO-247-3L**

**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-247-3L
Anode1	1
Anode2	3
Cathode	2, 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 (per leg)**

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	$\mu$ J
Junction & Storage Temperature	$T_J, T_{stg}$	-55 to 175	$^{\circ}$ C
Continuous Forward Current	$I_{F,max(cont.)}$	36.6	A
$I^2t$ Value	$\int i^2 dt$	132	A <sup>2</sup> s
Power Dissipation	$P_{tot}$	220.6	W

Part Number	Package	Marking
FC17020E-3	TO-247-3L	FC17020
--	--	--
--	--	--

For further information about comparable products, please contact ([www.fastsic.com](http://www.fastsic.com)).

**Maximum Ratings (per leg) :**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Continuous Forward Current	$I_F$	--	--	20.0 29.1 36.6	A	$T_c \leq 124^\circ\text{C}$ , Duty=100% $T_c \leq 75^\circ\text{C}$ , Duty=100% $T_c \leq 25^\circ\text{C}$ , Duty=100%
Non-Repetitive Forward Surge Current, Sinusoidal Halfwave	$I_{F,SM}$	--	--	115		$T_c = 25^\circ\text{C}$ , $t_p = 10\text{ms}$
Non-Repetitive Peak Forward Surge Current	$I_{F,max}$	--	--	1300		$T_c = 25^\circ\text{C}$ , $t_p = 10\mu\text{s}$
$I^2t$ Value	$\int i^2 dt$	--	--	132	A <sup>2</sup> s	$T_c = 25^\circ\text{C}$ , $t_p = 10\text{ms}$
Repetitive Peak Reverse Voltage	$V_{RRM}$	--	--	1700	V	$T_c = 25^\circ\text{C}$
Power Dissipation	$P_{tot}$	--	--	220.6	W	$T_c = 25^\circ\text{C}$
		--	--	147.1		$T_c = 75^\circ\text{C}$
Junction Temperature	$T_j$	-55	--	175	°C	--
Storage Temperature	$T_{stg}$	-55	--	175		
Soldering Temperature	$T_L$	--	--	260		

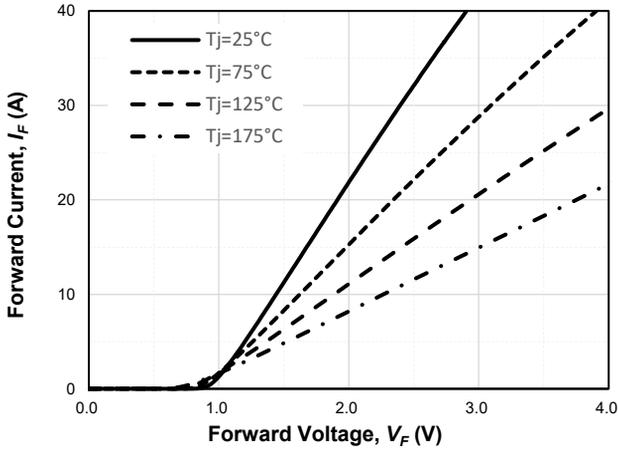
**Electrical Characteristics (per leg) :**

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

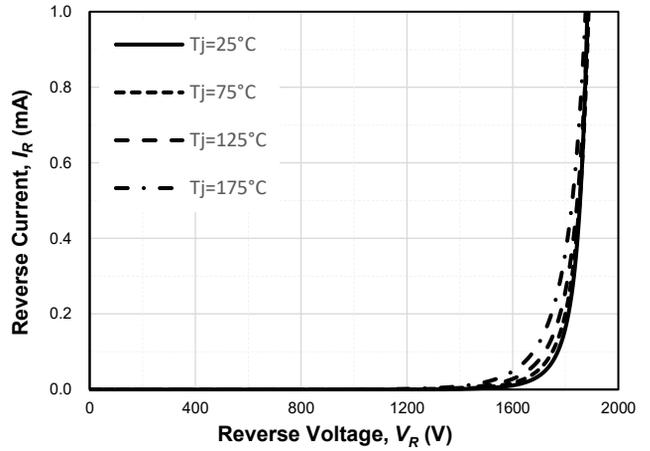
**Thermal Characteristics (per leg) :**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Thermal Impedance, junction – case	$R_{th-jc}$	--	0.68	--	K/W	--
Thermal Impedance, junction – ambient	$R_{th-ja}$	--	40	--		Device on PCB, with 6 cm <sup>2</sup> of cooling area

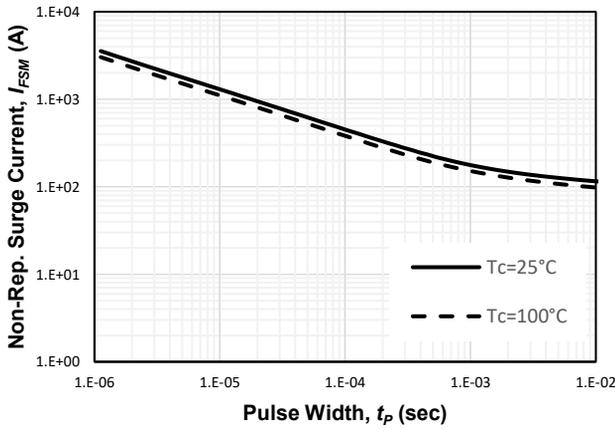
**Electrical Characteristics Diagrams (per leg)**



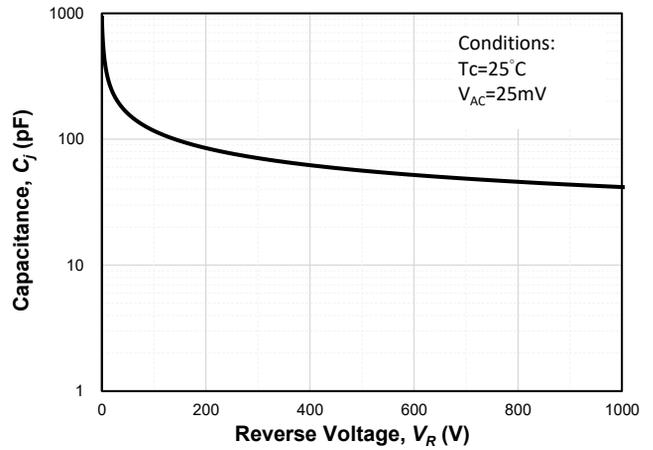
**Fig. 1 Forward Characteristics**



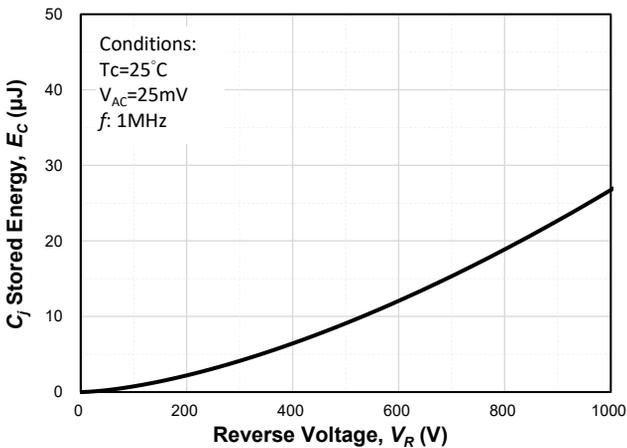
**Fig. 2 Reverse Characteristics**



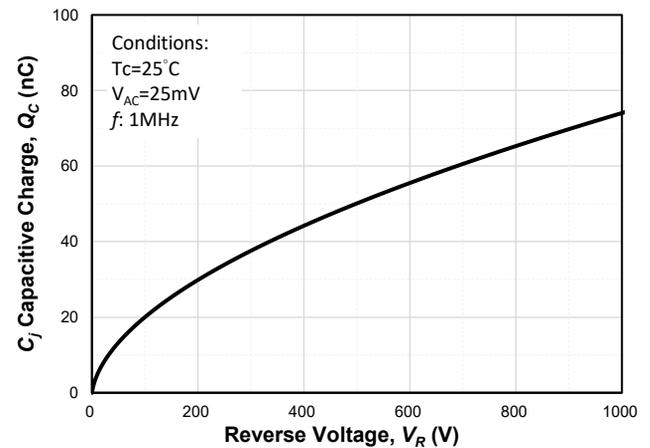
**Fig. 3 Non-repetitive Peak Forward Surge Current vs. Pulse Width**



**Fig. 4 Capacitance vs. Reverse Voltage**

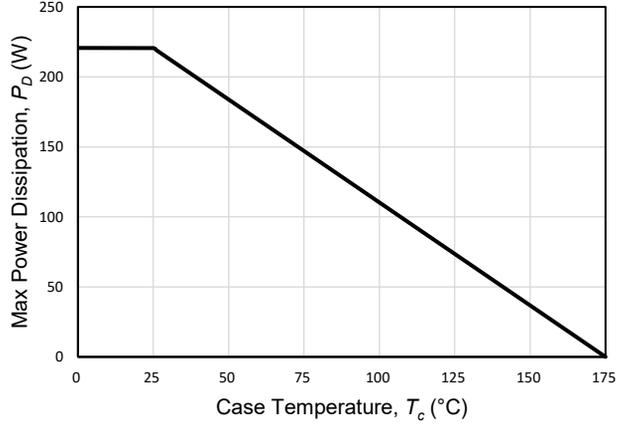
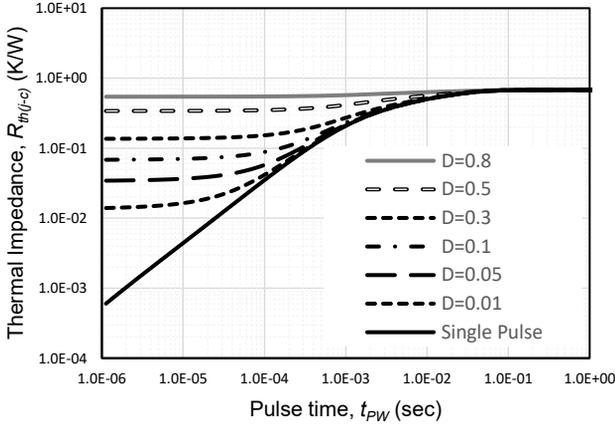


**Fig. 5 Capacitance Stored Energy vs. Reverse Voltage**



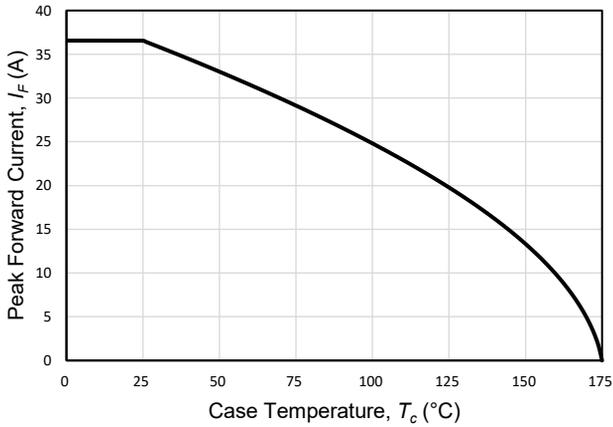
**Fig. 6 Capacitive Charge vs. Reverse Voltage**

**Electrical Characteristics Diagrams (per leg)**



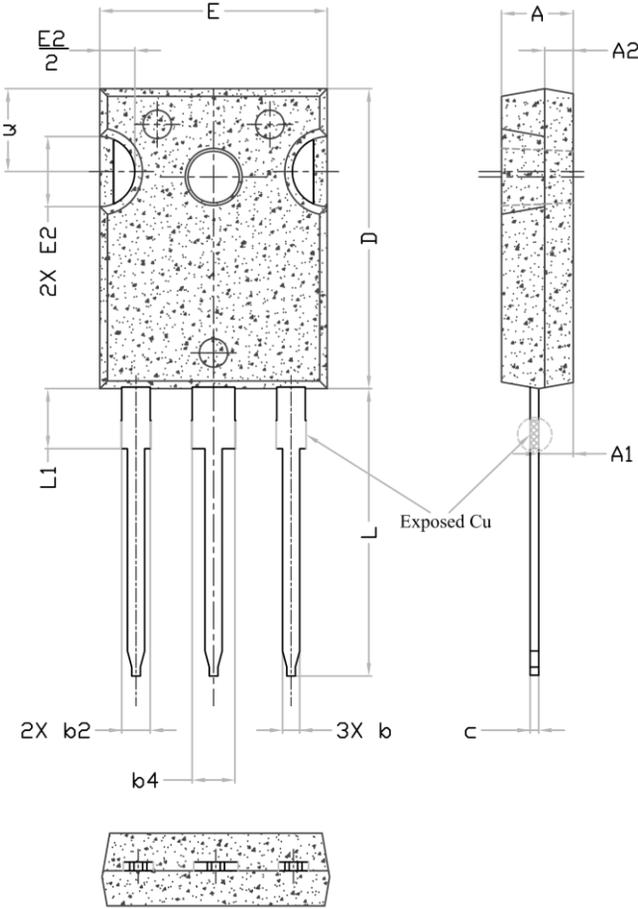
**Fig. 7** Typ. Transient Thermal Impedance  $R_{th-jc}$

**Fig. 8** Power Dissipation



**Fig. 9** Continuous  $I_F$  De-rating

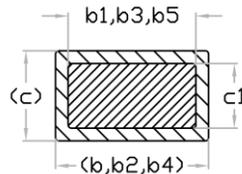
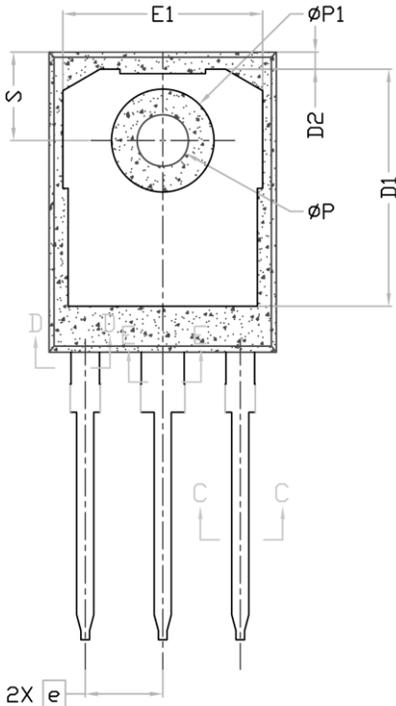
**Package Outline (TO-247-3L)**



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 <sup>(4)</sup>	1.91	2.00	2.39
b3	1.91	2.00	2.34
b4 <sup>(4)(6)</sup>	2.87	3.00	3.22
b5	2.87	3.00	3.18
c <sup>(4)</sup>	0.55	0.60	0.69
c1	0.55	0.60	0.65
D <sup>(2)</sup>	20.80	20.95	21.10
D1 <sup>(3)</sup>	16.25	16.55	17.65
D2	0.51	1.19	1.35
E <sup>(2)</sup>	15.75	15.94	16.13
E1 <sup>(3)</sup>	13.46	14.02	14.16
E2 <sup>(1)</sup>	4.32	4.91	5.49
e	5.44 BSC.		
L	19.81	20.07	20.32
L1 <sup>(4)</sup>	4.10	4.19	4.40
φP <sup>(5)</sup>	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, E--E**

## Revision History

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Date	Revision	Changes
25.08	Preliminary	1 <sup>st</sup> issue

## Important Note (Disclaimer)

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