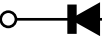


Silicon Carbide Merged PN-Schottky Diode

1200V SiC MPS High Power Rectifier – Cheetah Series



Product Information:

Cathode  Anode



SMAF

Features

- Low Capacitive Charge (Q_C)
- Low Profile & Low Parasitic Inductance Packaging
- Zero Reverse Recovery and zero Forward Recovery
- Ultra-Low Switching Loss
- Optimized for High Speed Applications
- Compact MSL-1 SMT Package
- RoHS Compliant and Halogen Free

Terminal	Packaging Type
	SMAF
Anode	1
Cathode	2

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	1200	V
Nominal Forward Current	$I_{F,NOM}$	2	A
Total Capacitive Charge	Q_C	14.2	nC
Capacitance Stored Energy	E_C	4.2	μ J
Junction & Storage Temperature	T_J, T_{stg}	-55 to 175	$^{\circ}$ C
Continuous Forward Current	$I_{F,max(cont.)}$	3.6	A
I^2t Value	$\int i^2 dt$	0.8	A ² s
Power Dissipation	P_{tot}	10	W

Part Number	Package	Marking
FC12002Y	SMAF	C12
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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	--	--	2 2.8 3.6	A	$T_c \leq 117^\circ\text{C}$, 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	$I_{F,SM}$	--	--	13		$T_c = 25^\circ\text{C}$, $t_p = 10\text{ms}$
Non-Repetitive Peak Forward Surge Current	$I_{F,max}$	--	--	342		$T_c = 25^\circ\text{C}$, $t_p = 10\mu\text{s}$
I^2t Value	$\int i^2 dt$	--	--	0.8	A ² s	$T_c = 25^\circ\text{C}$, $t_p = 10\text{ms}$
Repetitive Peak Reverse Voltage	V_{RRM}	--	--	1200	V	$T_c = 25^\circ\text{C}$
Power Dissipation	P_{tot}	--	--	10	W	$T_c = 25^\circ\text{C}$
		--	--	6.7		$T_c = 75^\circ\text{C}$
Junction Temperature	T_j	-55	--	175	°C	--
Storage Temperature	T_{stg}	-55	--	175		
Soldering Temperature	T_L	--	--	260		

Electrical Characteristics:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
DC Characteristics						
DC Blocking Voltage	V_{DC}	1200	--	--	V	$T_f=25^{\circ}\text{C}$
Forward Voltage	V_F	--	1.32	1.55		$I_F=2\text{A}, T_f=25^{\circ}\text{C}$
			1.81	--		$I_F=2\text{A}, T_f=175^{\circ}\text{C}$
Reverse Current	I_R	--	<0.1 <1	5 --	μA	$V_R=1200\text{V}, T_f=25^{\circ}\text{C}$ $V_R=1200\text{V}, T_f=175^{\circ}\text{C}$
AC Characteristics						
Total Capacitive Charge	Q_C	--	14.2	--	nC	$V_R=800\text{V}, T_f=25^{\circ}\text{C}$
Total Capacitance	C_j	--	139	--	pF	$V_R=1\text{V}, f=1\text{MHz}, T_f=25^{\circ}\text{C}$
			14			$V_R=400\text{V}, f=1\text{MHz}, T_f=25^{\circ}\text{C}$
			11			$V_R=800\text{V}, f=1\text{MHz}, T_f=25^{\circ}\text{C}$
Capacitance Stored Energy	E_C	--	4.2	--	μJ	$V_R=800\text{V}, T_f=25^{\circ}\text{C}$

Thermal Characteristics:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Thermal Impedance, junction – case	R_{th-jc}	--	15	--	K/W	--
Thermal Impedance, junction – ambient	R_{th-ja}	--	40	--		Device on PCB, with 6 cm ² of cooling area

Electrical Characteristics Diagrams

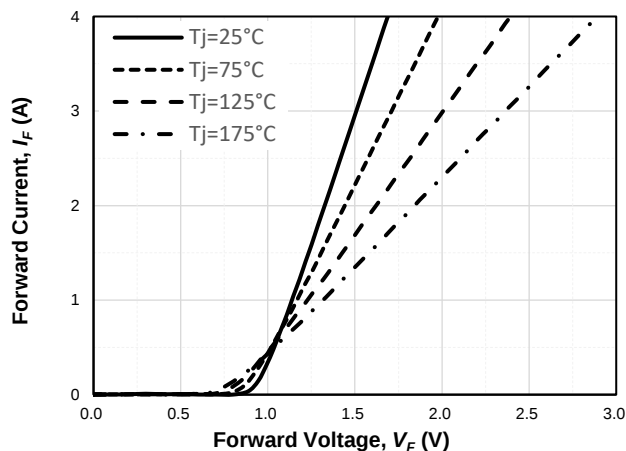


Fig. 1 Forward Characteristics

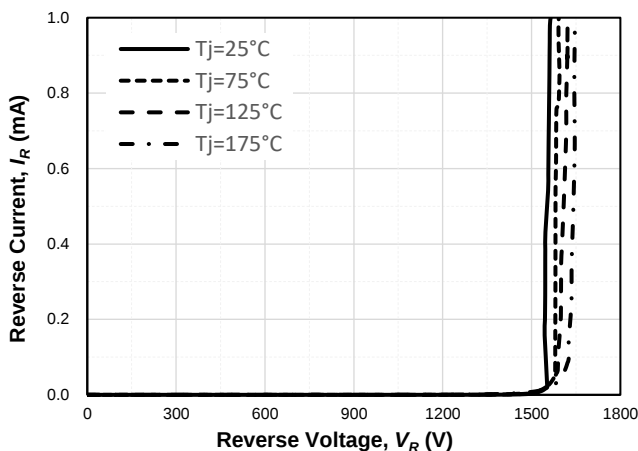


Fig. 2 Reverse Characteristics

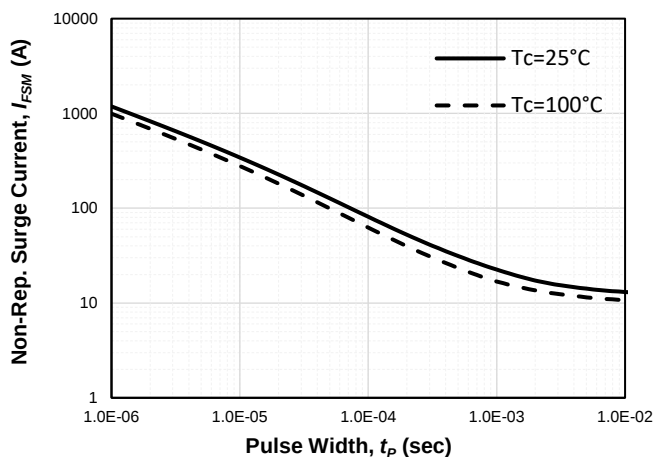


Fig. 3 Non-repetitive Peak Forward Surge Current vs. Pulse Width

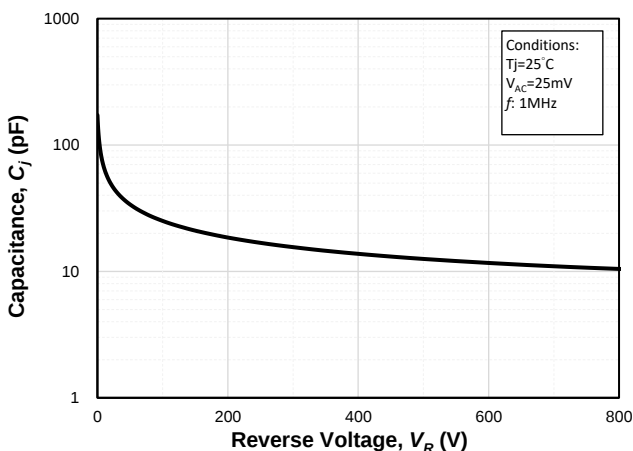


Fig. 4 Capacitance vs. Reverse Voltage

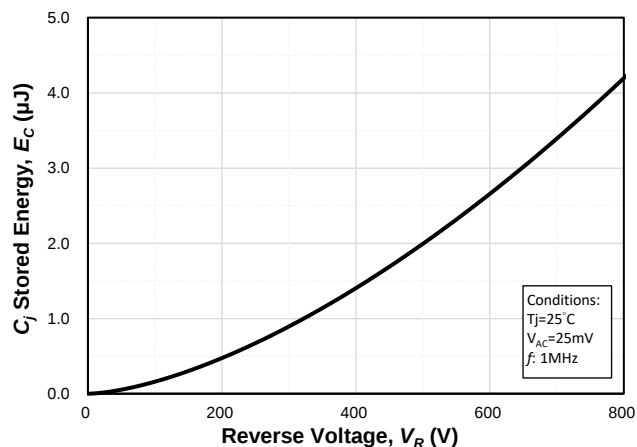


Fig. 5 Capacitance Stored Energy vs. Reverse Voltage

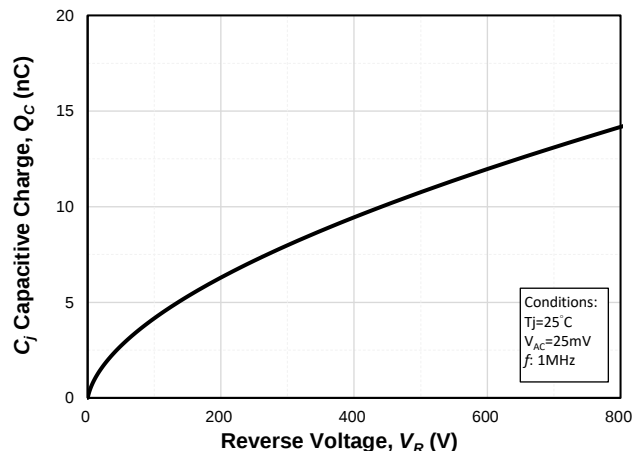


Fig. 6 Capacitive Charge vs. Reverse Voltage

Electrical Characteristics Diagrams

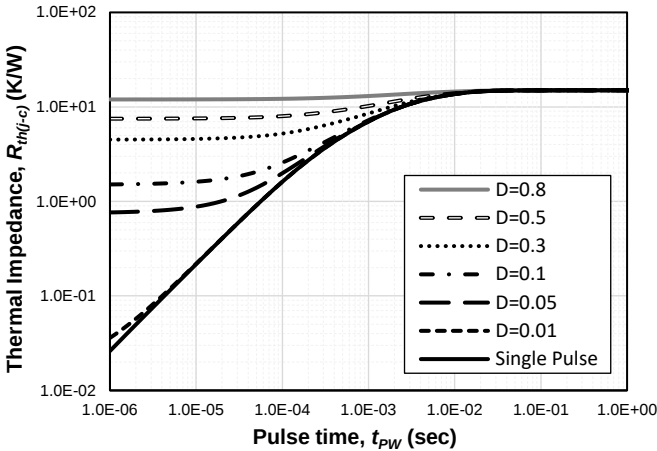


Fig. 7 Typ. Transient Thermal Impedance R_{th-jc}

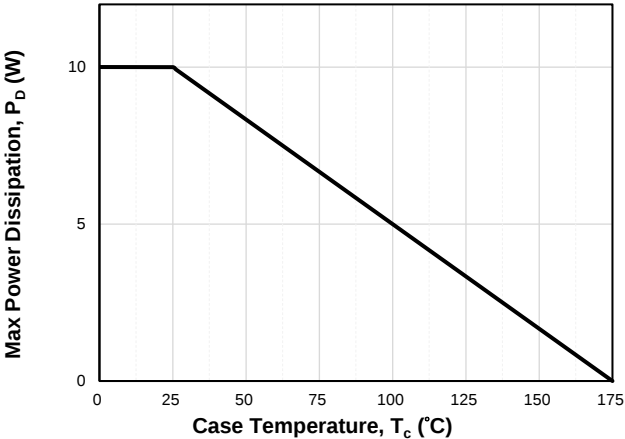


Fig. 8 Power Dissipation

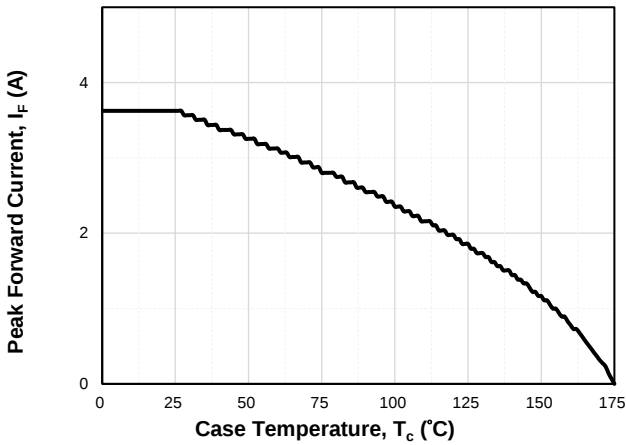
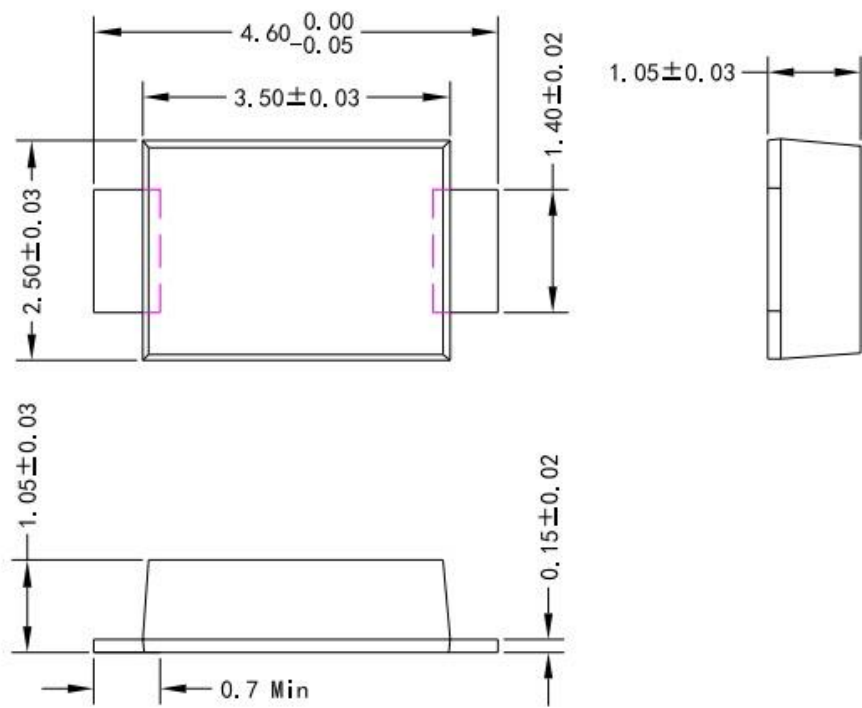


Fig. 9 Continuous I_F De-rating

Package Outline (SMAF)



Revision History

Date	Revision	Changes
24.09	Preliminary	1 st issue

Important Note (Disclaimer)

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Published by:
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Hsinchu, Taiwan
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