

Silicon Carbide Thyristor

V_{FBM}	=	6500 V
$I_{T(AVM)}$	=	40 A
Q_{rr}	=	1.8 μ C

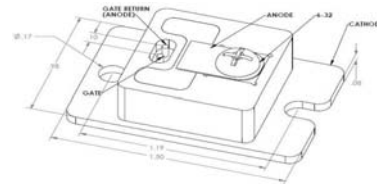
Features

- 6500 V Asymmetric SiC NPNP Thyristor
- 150 °C operating temperature
- Robust compact fully soldered package
- SOT-227 (ISOTOP) base plate form factor
- Fast turn on characteristics
- Lowest in class $Q_{rr}/I_{T(AVM)}$

Applications

- Grid Tied Solar Inverters
- Wind Power Inverters
- HVDC Power Conversion
- Utility Scale Power Conversion
- Trigger Circuits/Ignition Circuits

Package



Maximum Ratings

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak forward voltage	V_{FBM}	$T_J = 25\text{ }^{\circ}\text{C}$	6500	V
Repetitive peak reverse voltage	V_{RBM}	$T_J = 25\text{ }^{\circ}\text{C}$	50	V
Maximum average on-state current	$I_{T(AVM)}$	$T_C \leq 120\text{ }^{\circ}\text{C}$	40	A
RMS on-state current	$I_{T(RMS)}$	$T_C \leq 120\text{ }^{\circ}\text{C}$	69	A
Non-repetitive peak on-state current	$I_{T,max}$	$T_C = 25\text{ }^{\circ}\text{C}$, $t_p = 2\text{ }\mu\text{s}$, $D = 0.1$	tbid	A
Power dissipation	P_{tot}	$T_C = 25\text{ }^{\circ}\text{C}$	595	W
Operating and storage temperature	T_J, T_{stg}		-55 to 150	$^{\circ}\text{C}$

Electrical Characteristics

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Maximum peak on state voltage	$V_{KA(ON)}$	$I_K = -40\text{ A}$, $T_J = 25\text{ }^{\circ}\text{C}$ $I_K = -40\text{ A}$, $T_J = 150\text{ }^{\circ}\text{C}$		-4.30 -3.90		V
Anode-cathode threshold voltage	$V_{KA(TO)}$	$T_J = 25\text{ }^{\circ}\text{C}$ (150 $^{\circ}\text{C}$)		-3.1(-2.8)		V
Anode-cathode slope resistance	R_{AK}	$T_J = 25\text{ }^{\circ}\text{C}$ (150 $^{\circ}\text{C}$), $I_K = -40\text{ A}$		20(21)		m Ω
Leakage current	I_L	$V_{KA} = -6500\text{ V}$, $V_{GA} = 0\text{ V}$, $T_J = 25\text{ }^{\circ}\text{C}$ $V_{KA} = -6500\text{ V}$, $V_{GA} = 0\text{ V}$, $T_J = 150\text{ }^{\circ}\text{C}$		15 30		μ A
Gate trigger current	I_{GT}	$T_J = 25\text{ }^{\circ}\text{C}$, $t_p = 10\text{ }\mu\text{s}$		-30		mA
Holding current	I_H	$T_J = 25\text{ }^{\circ}\text{C}$		780		mA
Rise time	t_R	$I_G = -3\text{ A}$, $V_{KA} = -2500\text{ V}$		200		ns
Delay time	t_D	$I_K = -40\text{ A}$, $T_J = 25\text{ }^{\circ}\text{C}$		40		ns
Reverse recovery charge	Q_{rr}			1.8		μ C
Recovered charge, 50% chord	Q_{ra}	$di/dt = 270\text{ A}/\mu\text{s}$, $I_K = -40\text{ A}$, $V_{KA} = 20\text{ V}$		0.6		μ C
Reverse recovery current	I_{rm}	$dV/dt(\text{re-app}) = -500\text{ V}/\mu\text{s}$, $T_J = 25\text{ }^{\circ}\text{C}$		11		A
Circuit commutated turn-off time	t_q			4.7		μ s

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}	0.21	$^{\circ}\text{C}/\text{W}$
-------------------------------------	------------	------	-----------------------------

Mechanical Properties

Mounting torque for base	M_b	Heat sink surface must be optically flat	1.5	Nm
Mounting torque for top	M_t		1.3	Nm
Weight	W_t		30	g

1. Considering worst case Z_{th} conditions

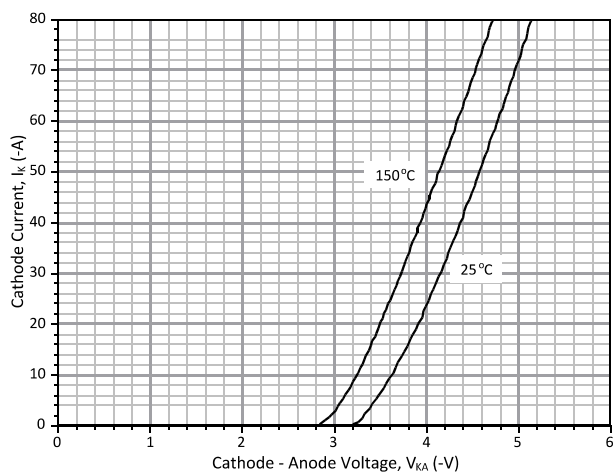


Figure 1: Typical On State Characteristics

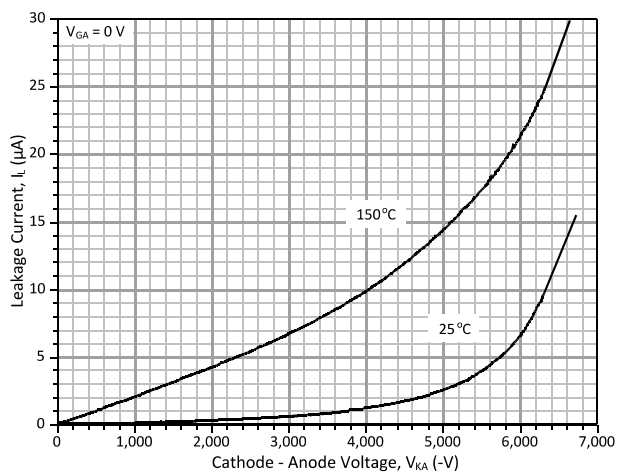


Figure 2: Typical Forward Blocking Characteristics

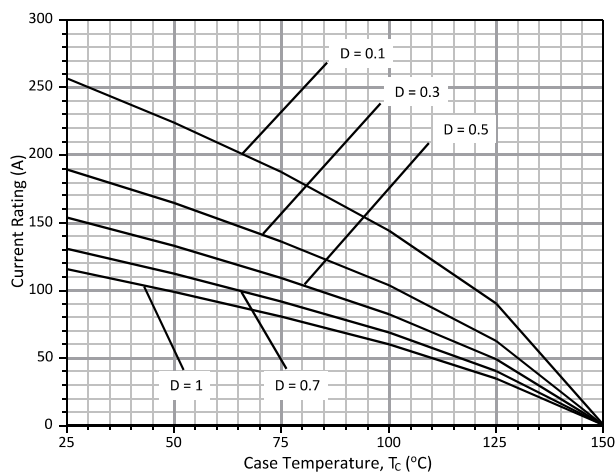


Figure 3: Typical Current Derating Curves ($D = t_p/T$, $t_p = 400 \mu s$)

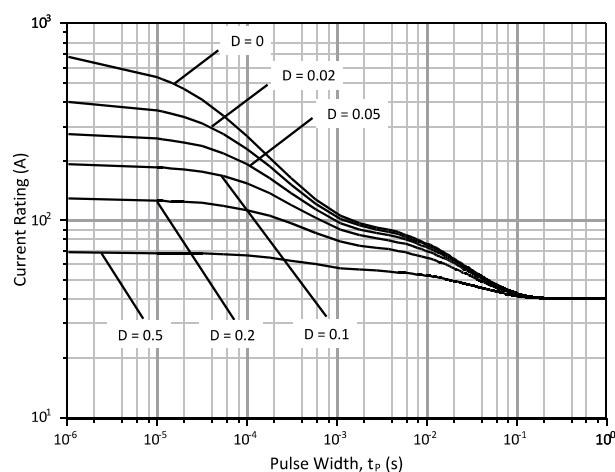


Figure 4: Typical Current Rating versus Pulse Duration Curves at $T_C = 120^\circ C$

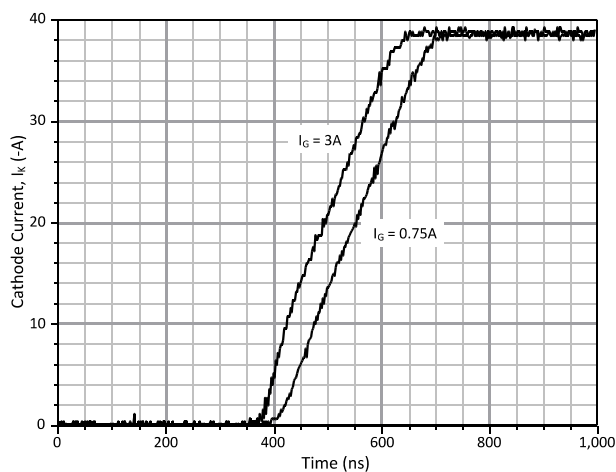


Figure 5: Typical Turn On Characteristics at $25^\circ C$

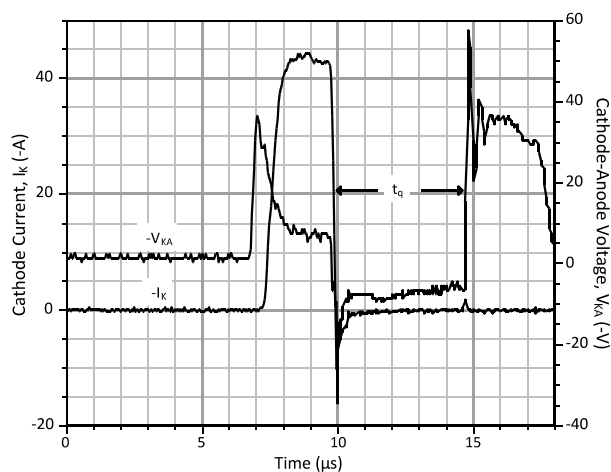


Figure 6: Typical Turn Off Characteristics at $25^\circ C$

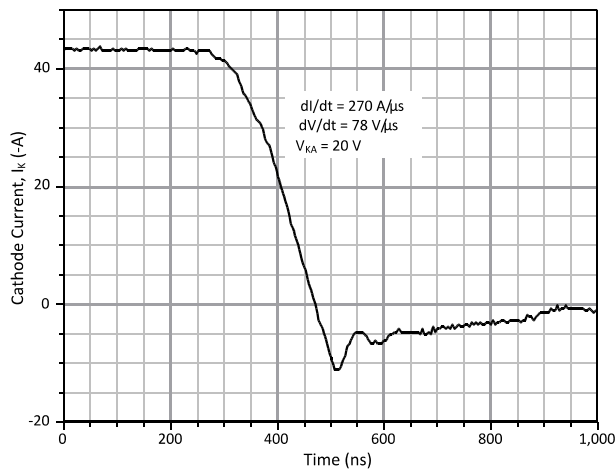


Figure 7: Typical Reverse Recovery Characteristics at 25 °C

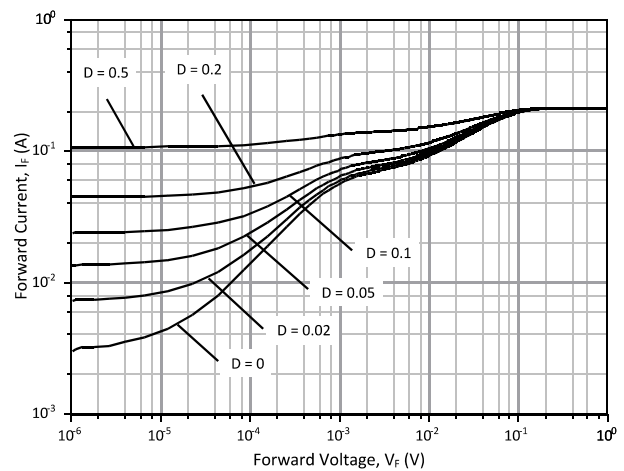


Figure 8: Typical Transient Thermal Impedance

Revision History			
Date	Revision	Comments	Supersedes
2010/11/13	1	First generation release	

Published by
GeneSiC Semiconductor, Inc.
43670 Trade Center Place Suite 155
Dulles, VA 20166

GeneSiC Semiconductor, Inc. reserves right to make changes to the product specifications and data in this document without notice.

GeneSiC disclaims all and any warranty and liability arising out of use or application of any product. No license, express or implied to any intellectual property rights is granted by this document.

Unless otherwise expressly indicated, GeneSiC products are not designed, tested or authorized for use in life-saving, medical, aircraft navigation, communication, air traffic control and weapons systems, nor in applications where their failure may result in death, personal injury and/or property damage.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[GeneSiC Semiconductor:](#)

[GA040TH65](#) [GA040TH65-227SP](#)