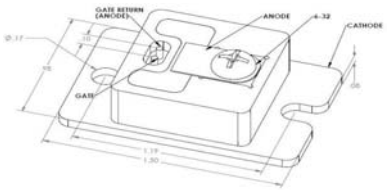
Silicon Carbide Thyristor

V_{FBM}	=	6500 V
$I_{T(AVM)}$	=	80 A
Q_{rr}	=	4.2 µC

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 $Q_{rr}/I_{T(AVM)}$

Package



Applications

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

Maximum Ratings

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak forward voltage	V_{FBM}	T_j = 25 °C	6500	V
Repetitive peak reverse voltage	V_{RBM}	T_j = 25 °C	50	V
Maximum average on-state current	$I_{T(AVM)}$	$T_C \leq$ 125 °C	80	A
RMS on-state current	$I_{T(RMS)}$	$T_C \leq$ 125 °C	139	A
Non-repetitive peak on-state current	$I_{T,max}$	T_C= 25 °C, t_p = 2 us, D = 0.1	tbd	A
Power dissipation	P_{tot}	T_C= 25 °C	1563	W
Operating and storage temperature	T_j, T_{stg}		-55 to 150	°C

Electrical Characteristics

Parameter	Symbol	Conditions	Values min.	Values typ.	Values max.	Unit
Maximum peak on state voltage	$V_{KA(ON)}$	I_K = -80 A, T_j = 25 °C I_K = -80 A, T_j = 150 °C		-3.70 -3.45		V
Anode-cathode threshold voltage	$V_{KA(TO)}$	T_j = 25 °C (150 °C)		-3.0(-2.7)		V
Anode-cathode slope resistance	R_{AK}	T_j = 25 °C (150 °C), I_K = -80 A		6.0(6.3)		mΩ
Leakage current	I_L	V_{KA} = -6500 V, V_{GA} = 0 V, T_j = 25 °C V_{KA} = -6500 V, V_{GA} = 0 V, T_j = 150 °C		15 50		µA
Gate trigger current	I_{GT}	T_j = 25 °C, t_P = 10 µs		-100		mA
Holding current	I_H	T_j = 25 °C		tbd		mA
Rise time	t_R	I_G = -3 A, V_{KA} = -2200 V		190		ns
Delay time	t_D	I_K = -80 A, T_j = 25 °C		50		ns
Reverse recovery charge	Q_{rr}			4.2		µC
Recovered charge, 50% chord	Q_{ra}	dI/dt = 430 A/us, I_K = -70 A, V_{KA} = 20 V		2.3		µC
Reverse recovery current	I_{rm}	dV/dt(re-app) = -460 V/us, T_j = 25 °C		20		A
Circuit commutated turn-off time	t_q			10.1		µs

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}		0.08	°C/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

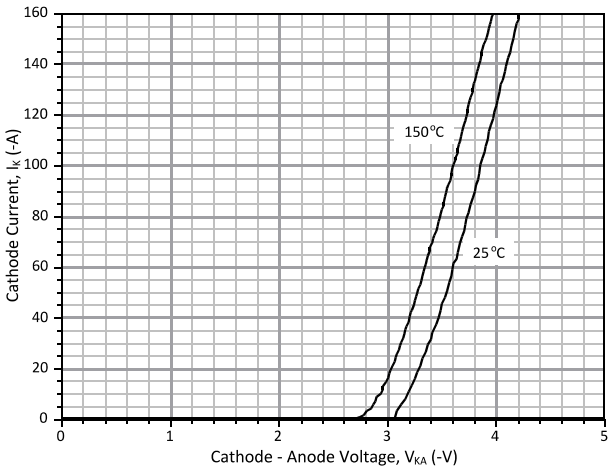


Figure 1: Typical On State Characteristics

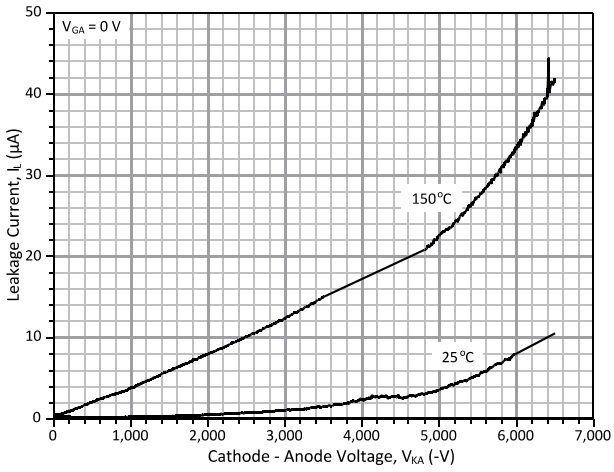


Figure 2: Typical Forward Blocking Characteristics

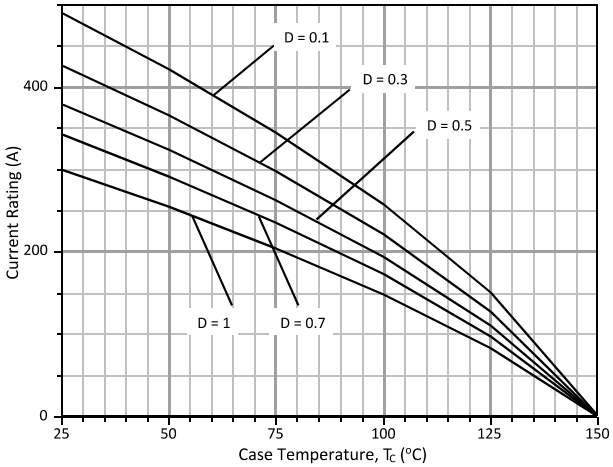


Figure 3: Typical Current Derating Curves (D = t_P/T, t_P = 400 µs[1])

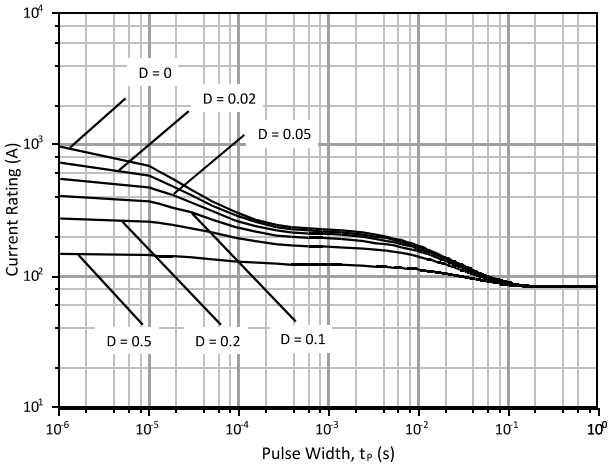


Figure 4: Typical Current Rating versus Pulse Duration Curves at T_C = 120 °C

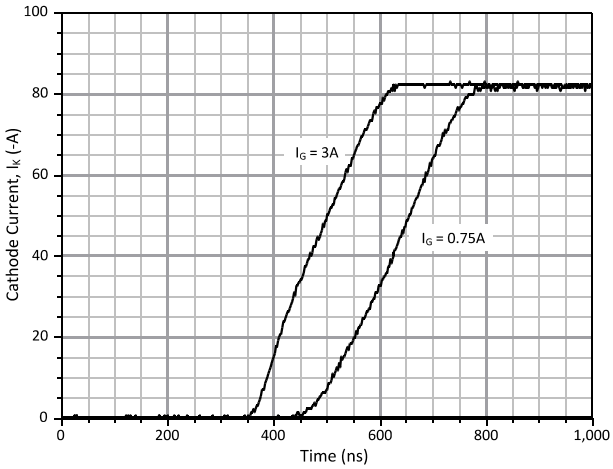


Figure 5: Typical Turn On Characteristics at 25 °C

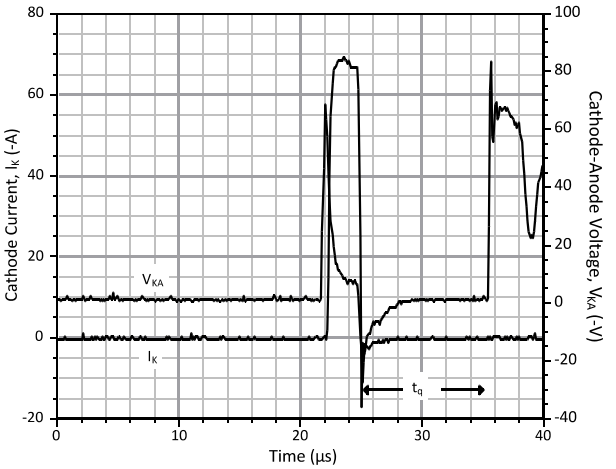


Figure 6: Typical Turn Off Characteristics at 25 °C

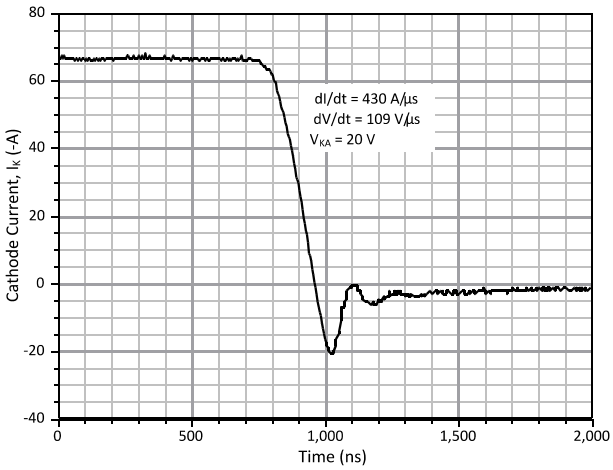


Figure 7: Typical Reverse Recovery Characteristics at 25 °C

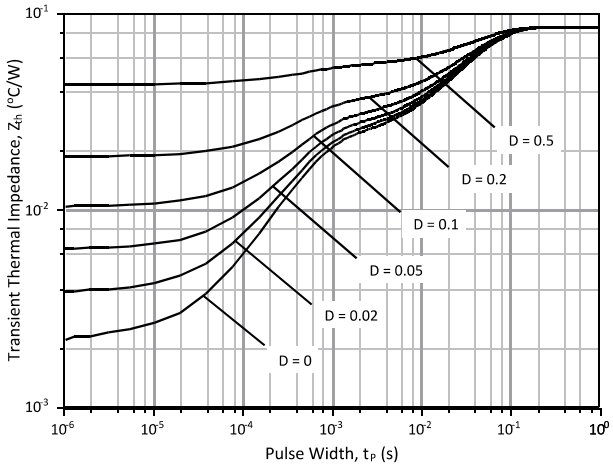


Figure 8: Typical Transient Thermal Impedance

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

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