GeneSiC
SEMICONDUCTOR

Silicon Carbide Thyristor

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

Applications

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

Package
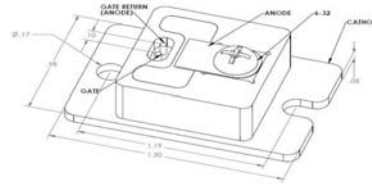
Maximum Ratings

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak forward voltage	V_{FBM}	$T_j = 25 °C$	6500	V
Repetitive peak reverse voltage	V_{RBM}	$T_j = 25 °C$	50	V
Maximum average on-state current	$I_{T(AVM)}$	$T_C \leq 120 °C$	40	A
RMS on-state current	$I_{T(RMS)}$	$T_C \leq 120 °C$	69	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}	$T_C = 25 °C$	595	W
Operating and storage temperature	T_j, T_{stg}		-55 to 150	°C

Electrical Characteristics

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

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}				0.21	°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

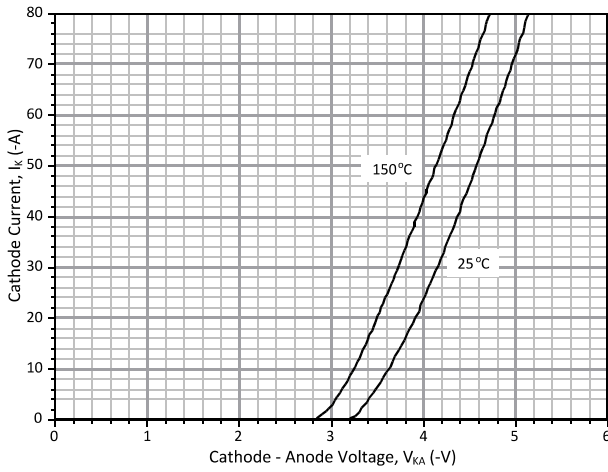http://www.genesicsemi.com/index.php/sic-products/thyristors

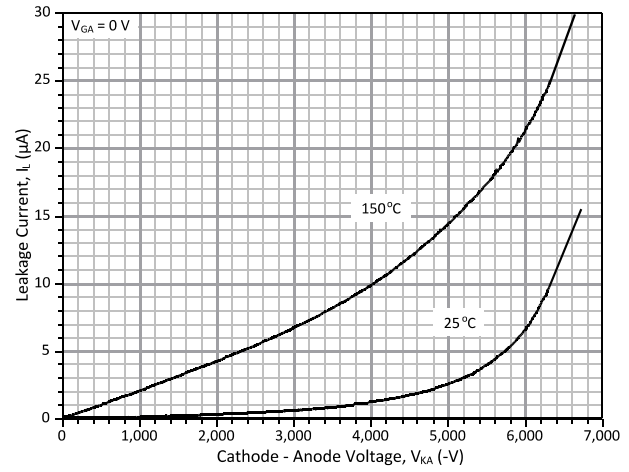Figure 1: Typical On State Characteristics

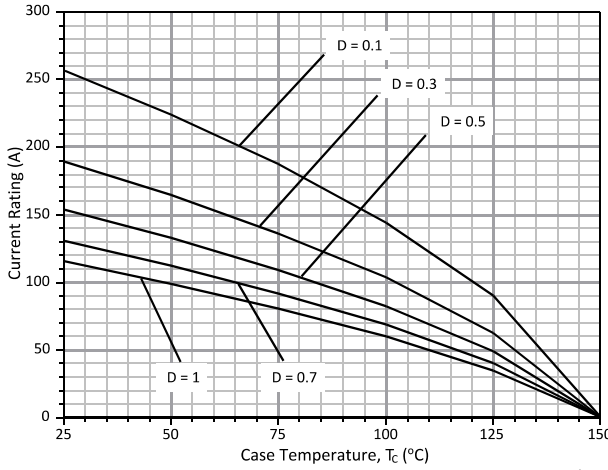
Figure 2: Typical Forward Blocking Characteristics

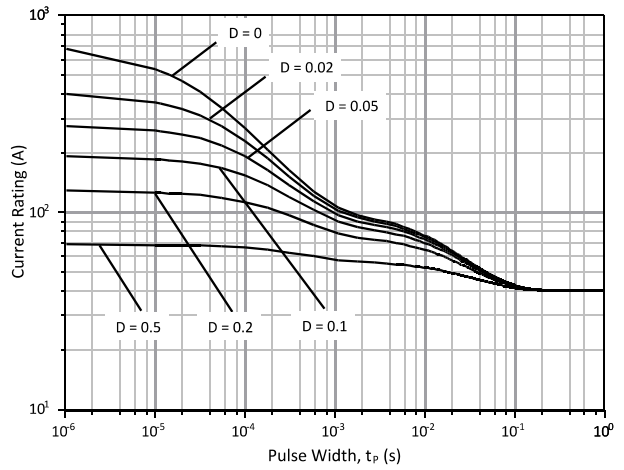Figure 3: Typical Current Derating Curves (D = t_P/T, t_P = 400 μs[1])

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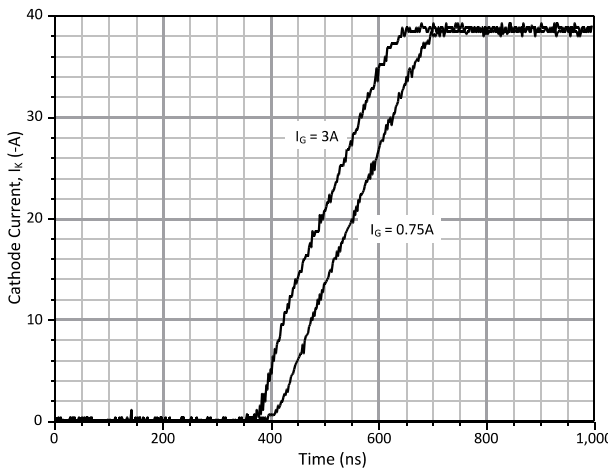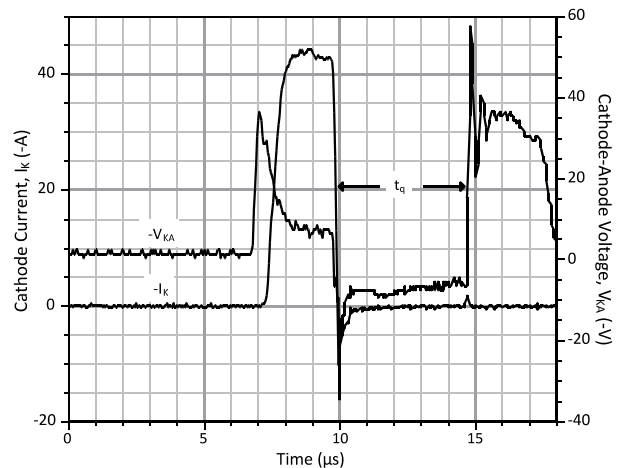

Figure 5: Typical Turn On Characteristics at 25 °C

Figure 6: Typical Turn Off Characteristics at 25 °C

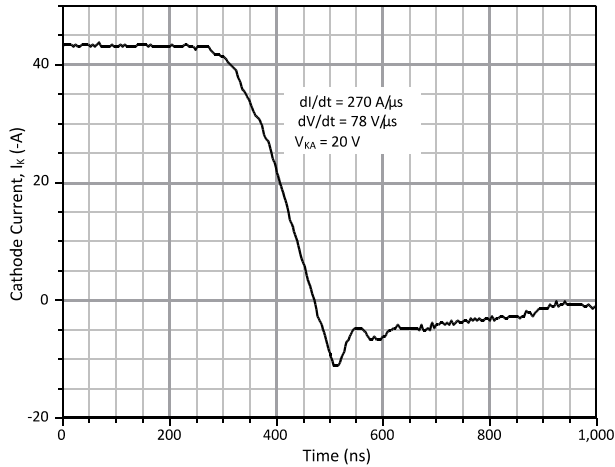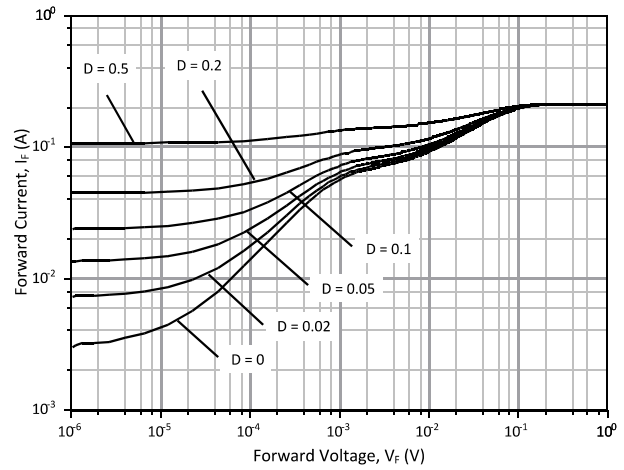Figure 7: Typical Reverse Recovery Characteristics at 25 °C

dI/dt = 270 A/µs
dV/dt = 78 V/µs
V_{KA} = 20 V

Figure 8: Typical Transient Thermal Impedance

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