

## Silicon Carbide Thyristor

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

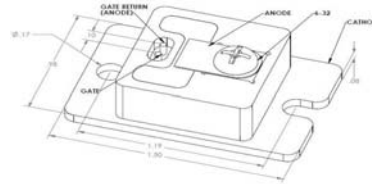
### Features

- 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 °C)		-3.1(-2.8)		V
Anode-cathode slope resistance	$R_{AK}$	$T_j = 25\text{ }^\circ\text{C}$ (150 °C), $I_K = -40\text{ A}$		20(21)		m $\Omega$
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		$\mu$ 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		$\mu$ 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		$\mu$ 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		$\mu\text{s}$

### Thermal Characteristics

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

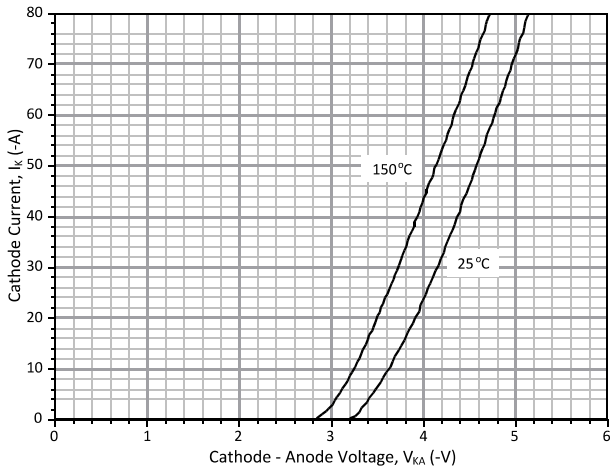


Figure 1: Typical On State Characteristics

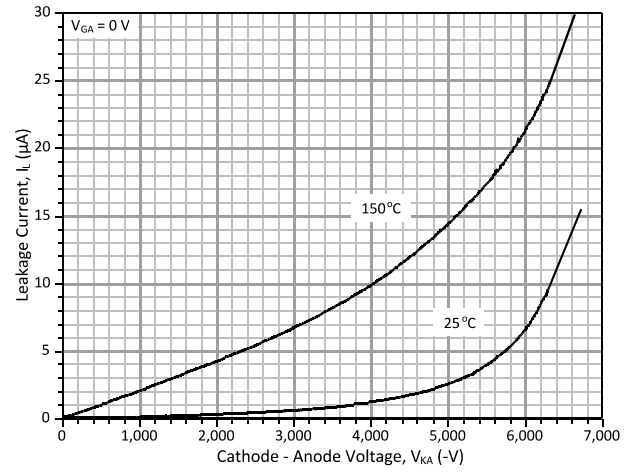


Figure 2: Typical Forward Blocking Characteristics

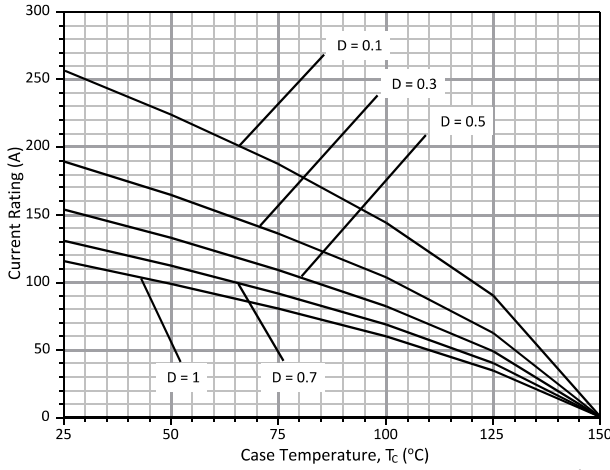


Figure 3: Typical Current Derating Curves ( $D = t_p/T, t_p = 400 \mu s^1$ )

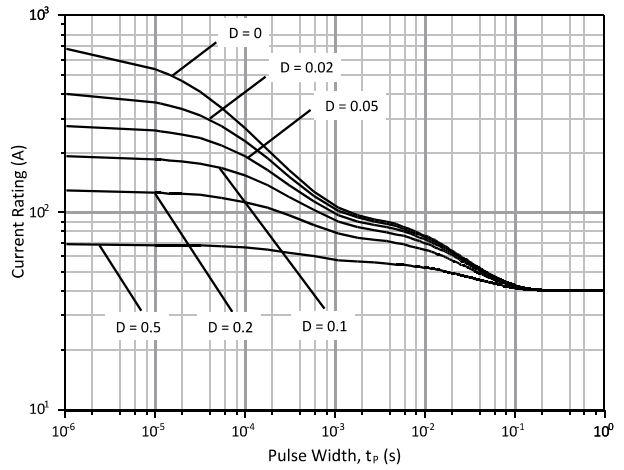


Figure 4: Typical Current Rating versus Pulse Duration Curves at  $T_c = 120 \text{ }^\circ\text{C}$

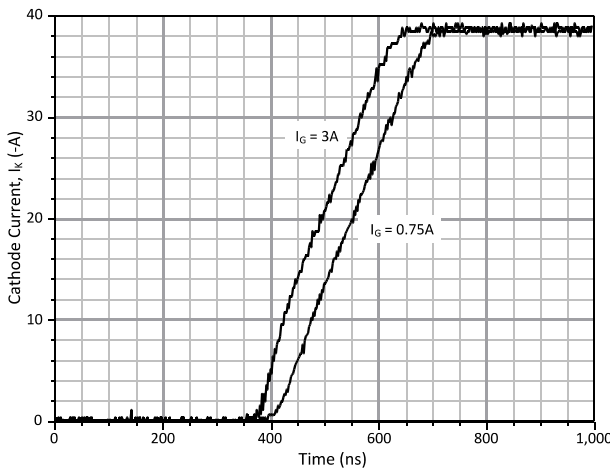


Figure 5: Typical Turn On Characteristics at 25 °C

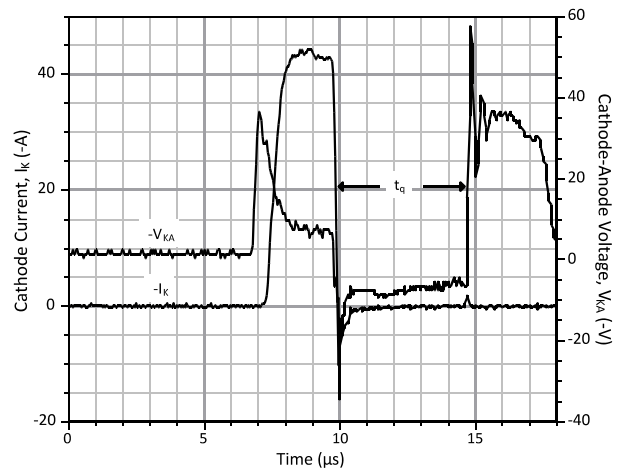


Figure 6: Typical Turn Off Characteristics at 25 °C

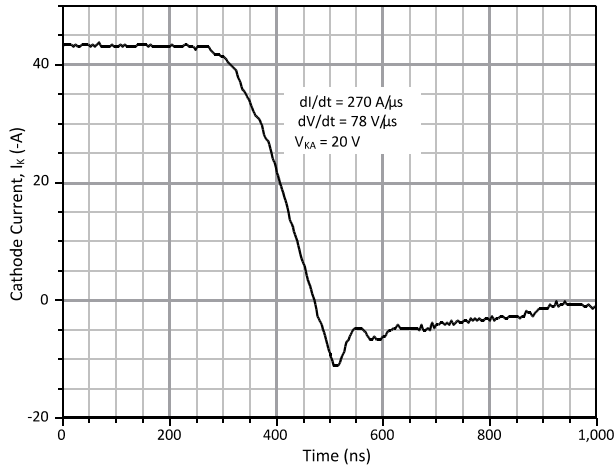


Figure 7: Typical Reverse Recovery Characteristics at 25 °C

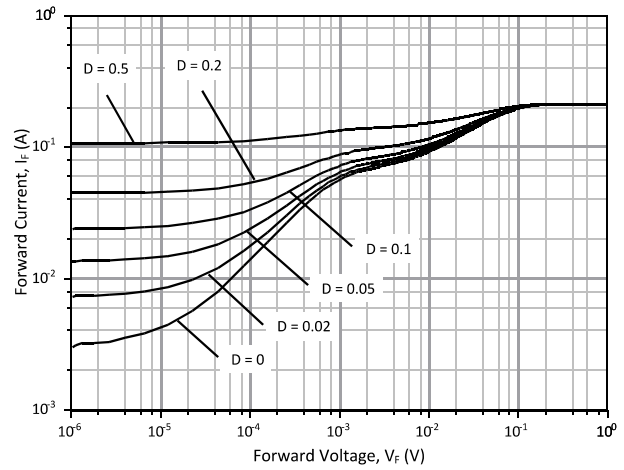


Figure 8: Typical Transient Thermal Impedance

**Revision History**

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

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