

## Silicon Carbide Thyristor

$V_{\text{FBM}}$	=	6500 V
$I_{\text{T(AVM)}}$	=	60 A
$Q_{\text{rr}}$	=	2.95 $\mu\text{C}$

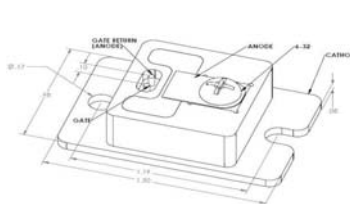
## Features

- 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	$I_{T(AVM)}$	$T_C \leq 120\text{ }^{\circ}\text{C}$	60	A
RMS on-state current	$I_{T(RMS)}$	$T_C \leq 120\text{ }^{\circ}\text{C}$	104	A
Non-repetitive peak on-state current	$I_{T,max}$	$T_C = 25\text{ }^{\circ}\text{C}$ , $t_p = 2\text{ }\mu\text{s}$ , $D = 0.1$	tbd	A
Power dissipation	$P_{tot}$	$T_C = 25\text{ }^{\circ}\text{C}$	919	W
Operating and storage temperature	$T_J, T_{sto}$		-55 to 150	$^{\circ}\text{C}$

## Electrical Characteristics

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Maximum peak on state voltage	$V_{KA(ON)}$	$I_K = -60\text{ A}, T_J = 25\text{ }^{\circ}\text{C}$ $I_K = -60\text{ A}, T_J = 150\text{ }^{\circ}\text{C}$		-3.90 -3.70		V
Anode-cathode threshold voltage	$V_{KA(TO)}$	$T_J = 25\text{ }^{\circ}\text{C} (150\text{ }^{\circ}\text{C})$		-3.1 (-2.8)		V
Anode-cathode slope resistance	$R_{AK}$	$T_J = 25\text{ }^{\circ}\text{C} (150\text{ }^{\circ}\text{C}), I_K = -60\text{ A}$		9.4 (9.5)		mΩ
Leakage current	$I_L$	$V_{KA} = -6500\text{ V}, V_{GA} = 0\text{ V}, T_J = 25\text{ }^{\circ}\text{C}$ $V_{KA} = -6500\text{ V}, V_{GA} = 0\text{ V}, T_J = 150\text{ }^{\circ}\text{C}$		20 50		μA
Gate trigger current	$I_{GT}$	$T_J = 25\text{ }^{\circ}\text{C}, t_p = 10\text{ }μ\text{s}$		-100		mA
Holding current	$I_H$	$T_J = 25\text{ }^{\circ}\text{C}$		tbd		mA
Rise time	$t_R$	$I_G = -3\text{ A}, V_{KA} = -2200\text{ V}$		170		ns
Delay time	$t_D$	$I_K = -60\text{ A}, T_J = 25\text{ }^{\circ}\text{C}$		45		ns
Reverse recovery charge	$Q_{rr}$			2.95		μC
Recovered charge, 50% chord	$Q_{ra}$	$dI/dt = 360\text{ A/}μ\text{s}, I_K = -60\text{ A}, V_{KA} = 20\text{ V}$		1.6		μC
Reverse recovery current	$I_{rm}$	$dV/dt(\text{re-app}) = -362\text{ V/}μ\text{s}, T_J = 25\text{ }^{\circ}\text{C}$		15		A
Circuit commutated turn-off time	$t_a$			6.7		μs

### Thermal Characteristics

Thermal resistance, junction - case	$R_{thJG}$	0.136	$^{\circ}\text{C/W}$
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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

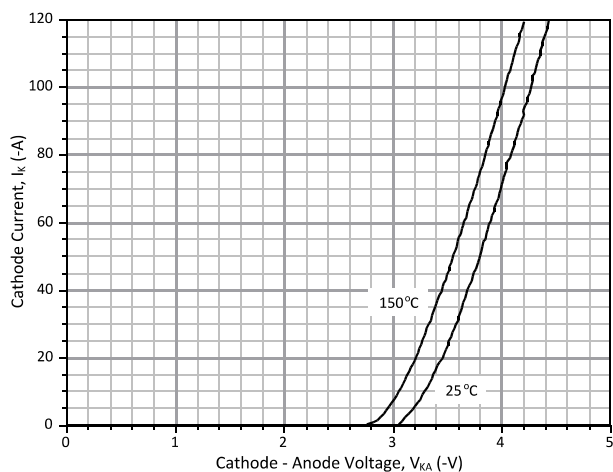


Figure 1: Typical On State Characteristics

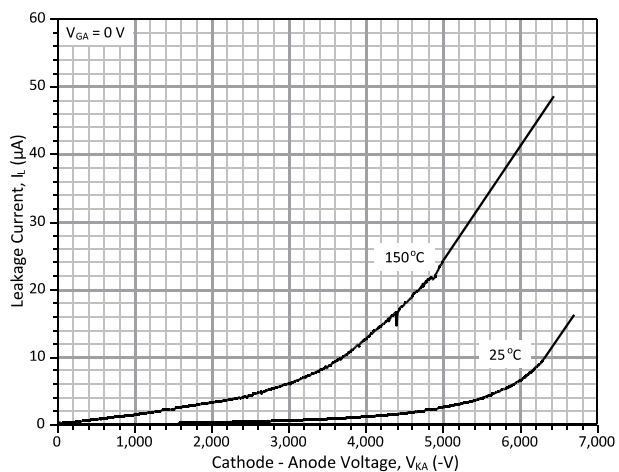


Figure 2: Typical Forward Blocking Characteristics

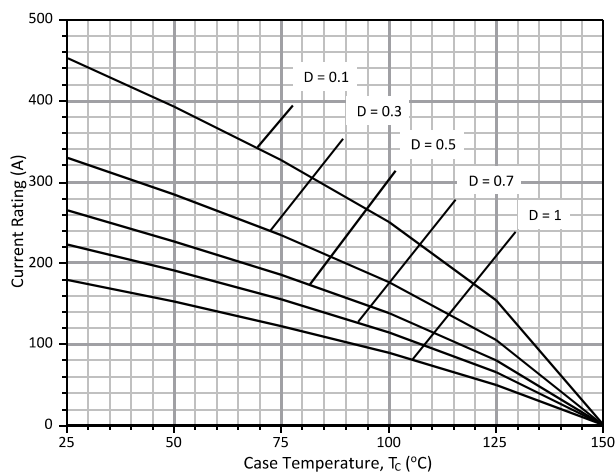


Figure 3: Typical Current Derating Curves ( $D = t_p/T$ ,  $t_p = 400 \mu s$ )

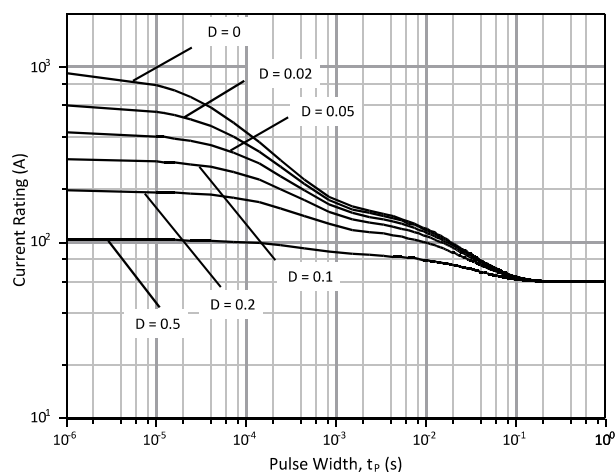


Figure 4: Typical Current Rating versus Pulse Duration Curves at  $T_c = 120^\circ C$

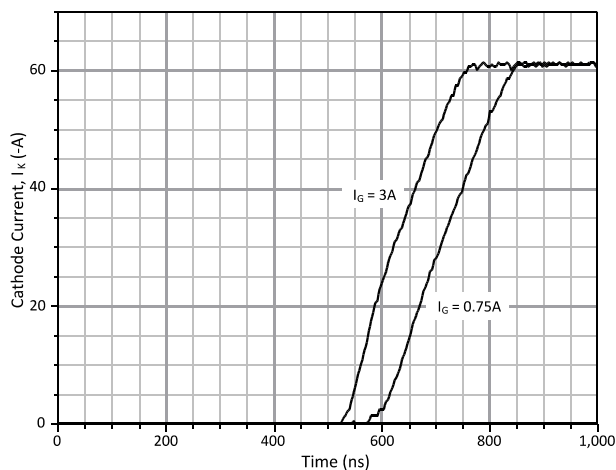


Figure 5: Typical Turn On Characteristics at  $25^\circ C$

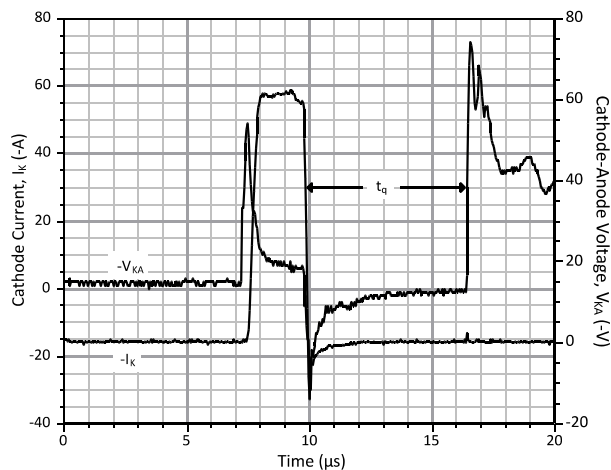


Figure 6: Typical Turn Off Characteristics at  $25^\circ C$

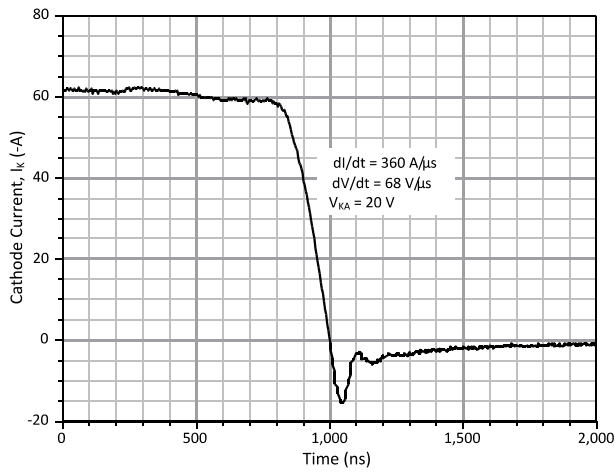


Figure 7: Typical Reverse Recovery Characteristics at 25 °C

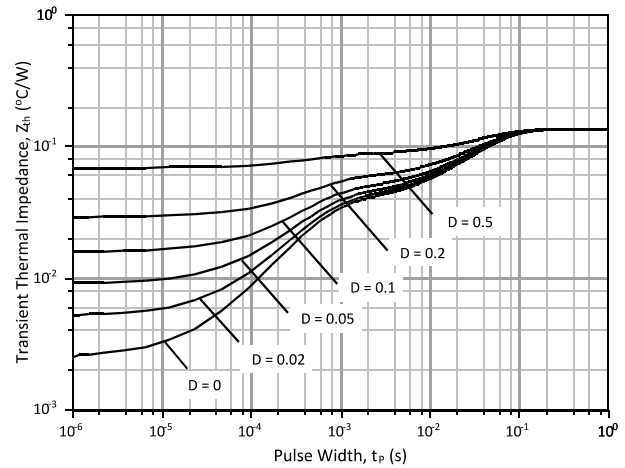


Figure 8: Typical Transient Thermal Impedance

#### Revision History

Date	Revision	Comments	Supersedes
2010/11/10	1	First generation release	

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