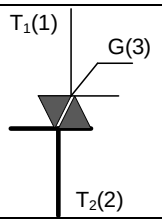
BT12C80X(W)

12A Bidirectional Thyristor

Features

- ◆ Five-layer NPNPN-Structured Silicon Bidirectional Device
- ◆ Single-Side Trenching Technology and Mesa Glass Passivation Process
- ◆ Backside Multilayer Metallized Electrode
- ◆ High Blocking Voltage and Superior Temperature Stability

Symbol



TO-220 Top View

Application

- ◆ Solid State Relay
- ◆ Heating Controller (Temperature Adjustment)
- ◆ Motor Speed Controllers for Vacuum Cleaners, Power Tools, and Similar Applications

Product Summary

Symbol	Value	Unit
$I_{T(RMS)}$	12	A
V_{DRM}	800	V
V_{RRM}	800	

■ Absolute Maximum Ratings

Symbol	Parameter	Test Condition	Value	Unit
$I_{T(RMS)}$	RMS On-State Current	T_C = 90°C	12	A
I_{TSM}	Non-Repetitive Surge Peak On-State Current	F = 50Hz, t = 20ms	120	
I^2t	I^2t Value for Fusing	t_p = 10ms	72	A^2s
d_i/d_t	Critical Rate of Rise of On-State Current	T_J = 125°C	50	A/μs
V_{DRM}	Repetitive Peak Off-State Voltage	T_J = 25°C	800	V
V_{RRM}	Repetitive Peak Reverse Voltage	T_J = 25°C	800	
I_{GM}	Peak Gate Current	t_p = 20μs, T_J = 150°C	4.0	A
$P_{G(AV)}$	Average Gate Power Dissipation	T_J = 150°C	10	W
T_{stg}	Storage Junction Temperature Range	-	-40 to 150	°C
T_J	Operating Junction Temperature Range	-	-40 to 125	

■ Thermal Characteristics

Symbol	Parameter	Test Condition	Value(Max)	Unit
$R_{th(j-c)}$	Junction to Case (AC)	Insulated	2.05	°C/W
		Non-Insulated	1.25	

■ Electrical Characteristics (3 Quadrants)

Symbol	Parameter	Test Condition	Quadrant	Value		Unit
I_{GT}	Gate Trigger Current	V_D = 12V, R_L = 100Ω	I-II-III	Max	50	mA
V_{GT}	Gate Trigger Voltage				1.5	V
V_{GD}	Gate Non-Trigger Voltage	T_J = 150°C		Min	0.2	
I_H	Holding Current	I_T = 0.5A		Max	60	mA
I_L	Latching Current	I_G = 1.2I_{GT}	I-III		60	
			II		100	
dv/dt	Critical Rate-of-Rise of Off-Stage Voltage	V_D = 2/3V_{DRM}, T_J = 150°C		Min	500	V/μs
$(dv/dt)c$	Critical Rate-of-Rise of Commutation Voltage	T_J = 150°C			8.0	

■ Electrical Characteristics (4 Quadrants)

Symbol	Parameter	Test Condition	Quadrant	Value		Unit
I_{GT}	Gate Trigger Current	V_D = 12V, R_L = 100Ω	I-II-III	Max	50	mA
			IV		120	
V_{GT}	Gate Trigger Voltage		I-II-III-IV		1.5	V
V_{GD}	Gate Non-Trigger Voltage	T_J = 125°C		Min	0.2	
I_H	Holding Current	I_T = 0.5A		Max	60	mA
I_L	Latching Current	I_G = 1.2I_{GT}	I-III-IV		60	
			II		100	
dv/dt	Critical Rate-of-Rise of Off-Stage Voltage	V_D = 2/3V_{DRM}, T_J = 150°C		Min	500	V/μs
$(dv/dt)c$	Critical Rate-of-Rise of Commutation Voltage	T_J = 150°C			10	

■ Static Characteristics

Symbol	Parameter	Test Condition	Value(Max)	Unit
V_{TM}	Peak ON-State Voltage	I_{TM} = 24A, T_J = 25°C	1.4	V
V_{TO}	Threshold Voltage	T_J = 150°C	0.88	
R_D	Dynamic Resistance	T_J = 150°C	17.6	mΩ
I_{DRM}	Repetitive Peak Off-State Current	V_D = V_{DRM}, V_R = V_{RRM}, T_J = 25°C	5.0	μA
I_{RRM}	Repetitive Peak Reverse Current	V_D = V_{DRM}, V_R = V_{RRM}, T_J = 150°C	1.0	mA

■ Characteristic Curve

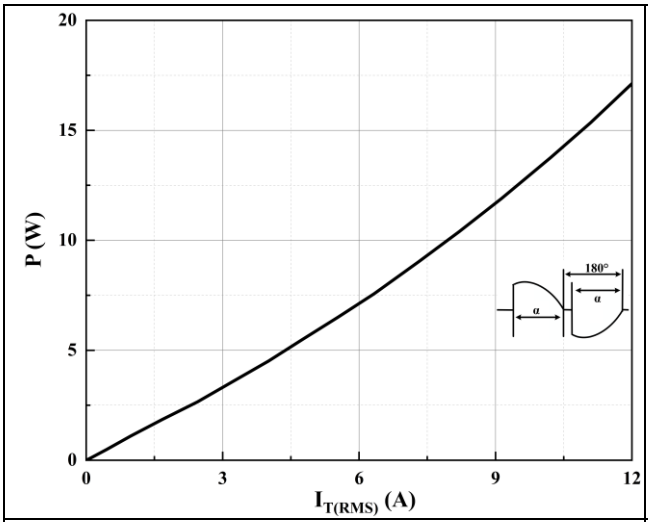


Figure 1. Power Dissipation vs. RMS On-State Current

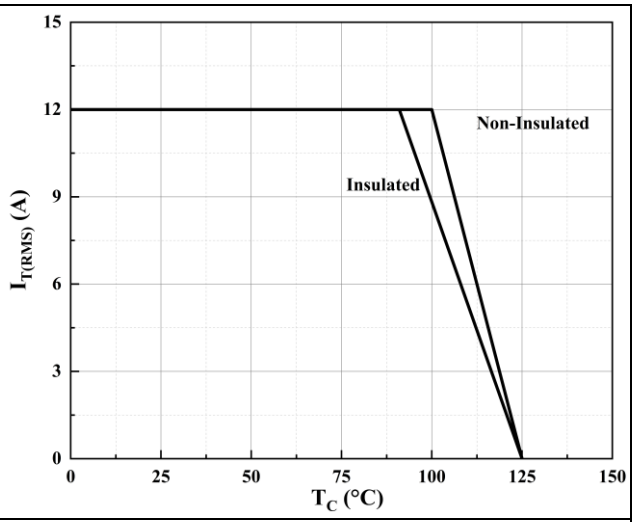


Figure 2. RMS On-State Current vs. Case Temperature

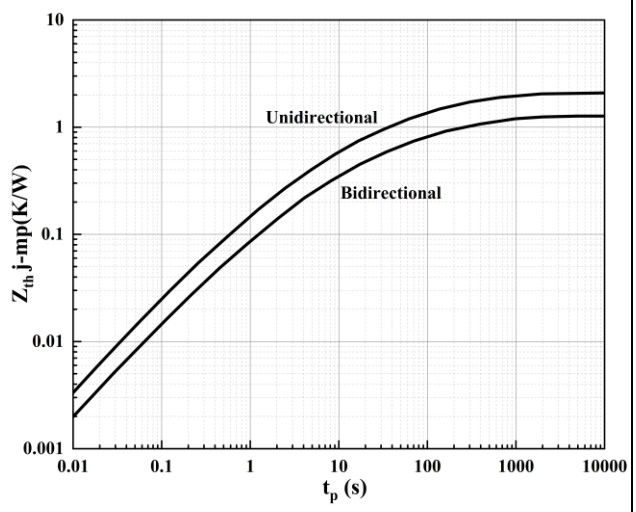


Figure 3. Relative Variation of Thermal Impedance Junction to Case vs. Pulse Duration

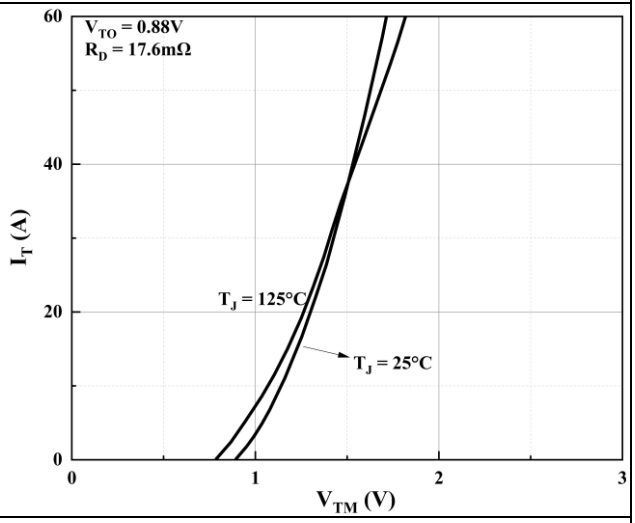


Figure 4. On-State Current vs. Peak ON-State Voltage

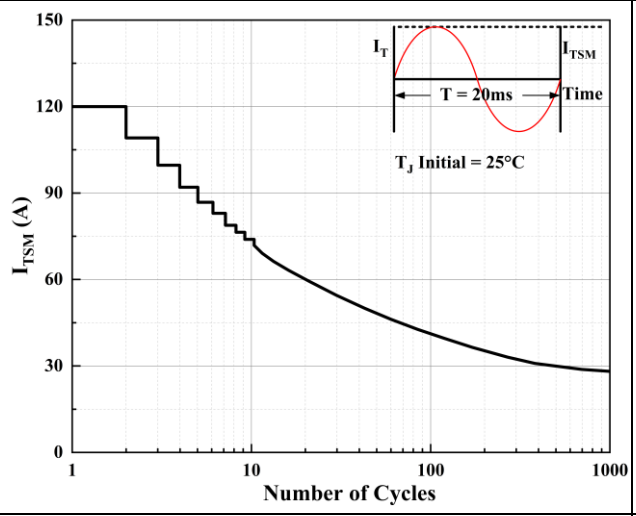


Figure 5. Surge Peak On-State Current vs. Number of Cycles

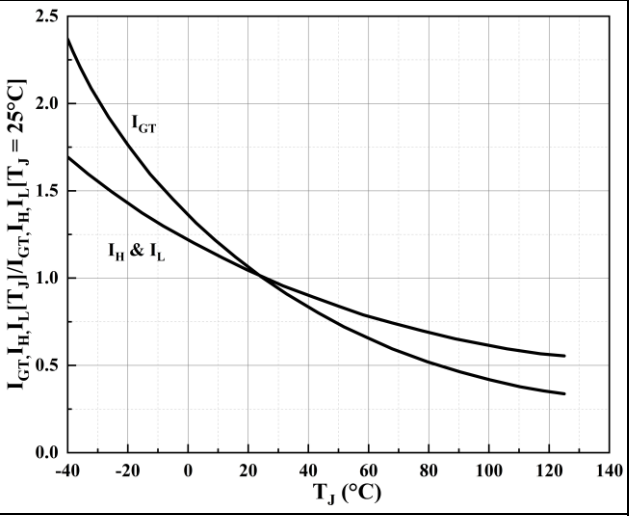


Figure 6. Gate Trigger Current, Holding Current and Latching Current vs. Junction Temperature

■ Characteristic Curve

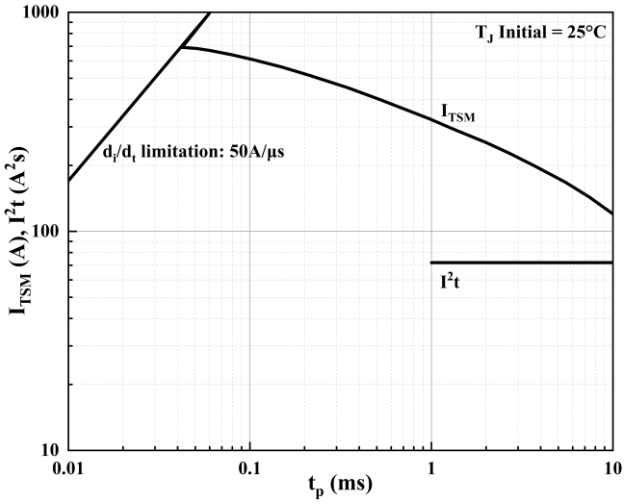


Figure 7. Non-Repetitive Surge Peak On-State Current for a Sinusoidal Pulse with Width t_p < 10ms and Corresponding Value of I^2t (dI/dt< 50A/µs)

■ **Package Information**

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