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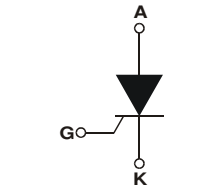
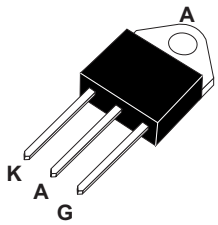
BTW69-1200N

50 A – 1200 V non insulated SCR thyristor

Datasheet - production data





TOP3 non insulated

Features

- On-state rms current: 50 A
- Blocking voltage: 1200 V
- Gate current: 50 mA

Applications

- Solid state relay
- Battery charging system
- Uninterruptible power supply
- Variable speed motor drive
- Industrial welding systems
- By pass AC switch

Description

Available in non insulated TOP3 high power package, the BTW69-1200N is suitable for applications where power switching and power dissipation are critical, such as by-pass switch, controlled AC rectifier bridge, in solid state relay, battery charger, uninterruptible power supply, welding equipment and motor driver applications.

Based on a clip assembly technology, the BTW69-1200N offers a superior performance in surge current handling and thermal cooling capabilities.

Table 1. Device summary

Symbol	Value
$I_{T(RMS)}$	50 A
V_{DRM}/V_{RRM}	1200 V
I_{GT}	50 mA

1 Characteristics

Table 2. Absolute maximum ratings (limiting values)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state current rms (180° conduction angle)		T_c = 102 °C	50	A
$IT_{(AV)}$	Average on-state current (180° conduction angle)		T_c = 102 °C	31	A
I_{TSM}	Non repetitive surge peak on-state current	t_p = 8.3 ms	T_j = 25 °C	763	A
		t_p = 10 ms		700	
I^2t	I^2t Value	t_p = 10 ms	T_j = 25 °C	2450	A^2s
dI/dt	Critical rate of rise of on-state current Gate supply: I_G = 100 mA, dI_G/dt = 1 A/µs			100	A/µs
I_{GM}	Peak gate current	t_p = 20 µs	T_j = 125 °C	8	A
$P_{G(AV)}$	Average gate power dissipation		T_j = 125 °C	1	W
T_{stg} T_j	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	°C
V_{GM}	Maximum peak reverse gate voltage			5	V

Table 3. Electrical characteristics (T_j = 25 °C, unless otherwise specified)

Symbol	Test conditions			Value	Unit
I_{GT}	V_D = 12 V, R_L = 33 Ω		MIN.	8	mA
			MAX.	50	
V_{GT}			MAX.	1.3	V
V_{GD}	$V_D = V_{DRM}$, R_L = 3.3 kΩ	T_j = 125 °C	MIN.	0.2	V
I_H	I_T = 500 mA, gate open		MAX.	100	mA
I_L	I_G = 1.2 x I_{GT}		TYP.	125	mA
t_{gt}	I_T = 50 A, $V_D = V_{DRM}$, I_G = 200 mA, dI_G/dt = 0.2 A/µs		TYP.	2	µs
dV/dt	V_D = 67% V_{DRM}, gate open	T_j = 125 °C	MIN.	1000	V/µs
t_q	V_D = 800 V, I_{TM} = 50 A, V_R = 75 V, t_p = 100 µs, dI_{TM}/dt = 30 A/µs, dV_D/dt = 20 V/µs	T_j = 125 °C	TYP.	100	µs
V_{TM}	I_{TM} = 100 A, t_p = 380 µs	T_j = 25 °C	MAX.	1.6	V
V_{t0}	Threshold voltage	T_j = 125 °C	MAX.	0.9	V
R_D	Dynamic resistance	T_j = 125 °C	MAX.	8.5	mΩ
I_{DRM} I_{RRM}	$V_D = V_{DRM}$ $V_R = V_{RRM}$	T_j = 25 °C	MAX.	10	µA
		T_j = 125 °C		5	mA

Table 4. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case (DC, typ.)	0.45	°C/W
$R_{th(j-a)}$	Junction to ambient (DC)	50	°C/W

Figure 1. Maximum average power dissipation versus average on-state current

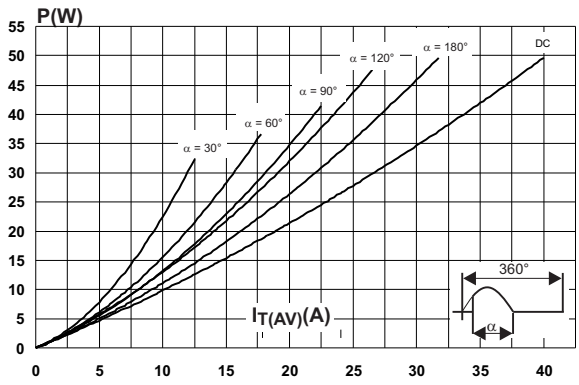


Figure 2. Correlation between maximum average power dissipation and maximum allowable temperatures

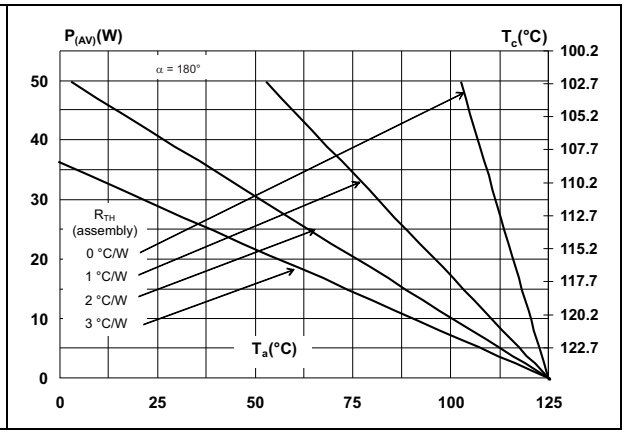


Figure 3. Average and DC on-state current versus case temperature

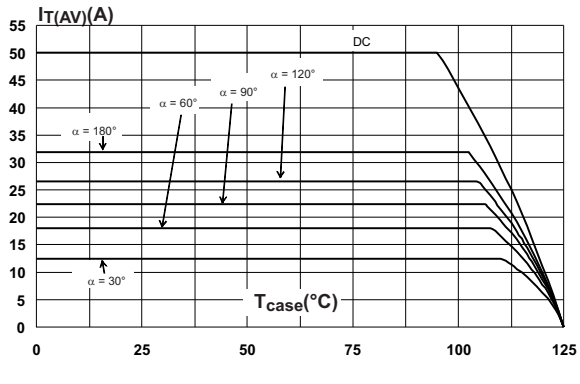


Figure 4. Average and DC on-state current versus ambient temperature

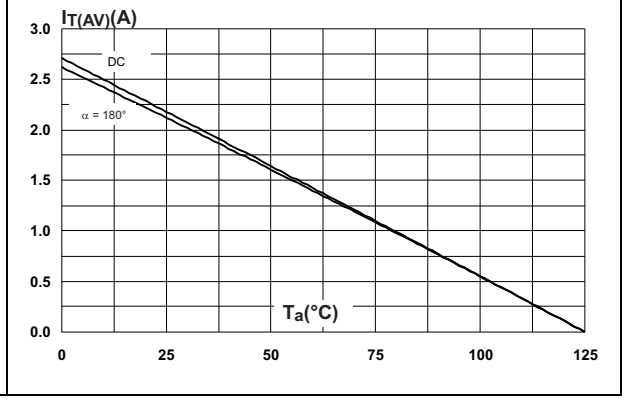


Figure 5. Relative variation of thermal impedance versus pulse duration

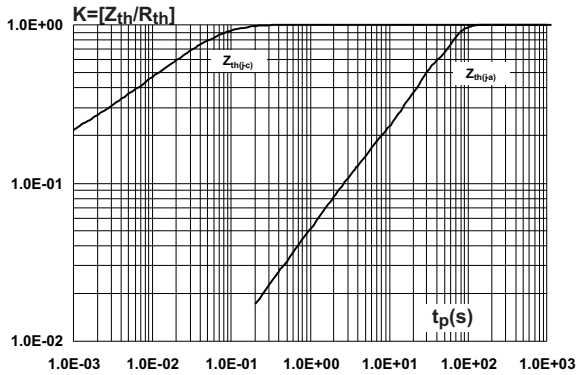


Figure 6. Relative variation of gate trigger current and gate trigger voltage versus junction temperature (typical value)

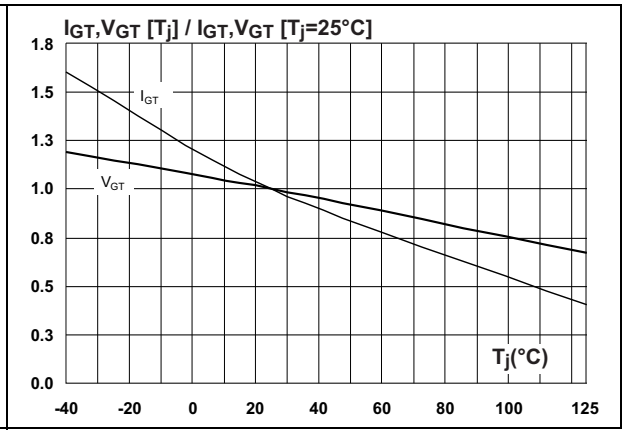


Figure 7. Relative variation of holding, and latching currents versus junction temperature (typical values)

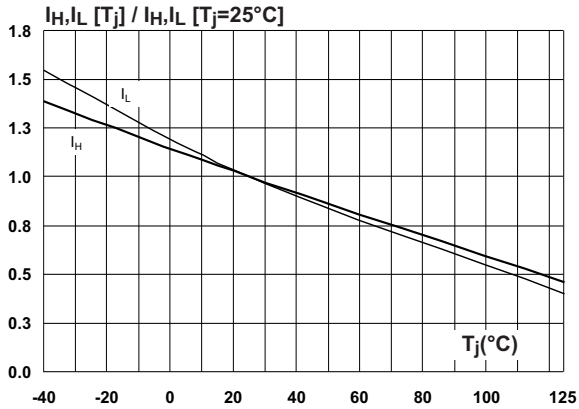


Figure 8. Surge peak on-state current versus number of cycles

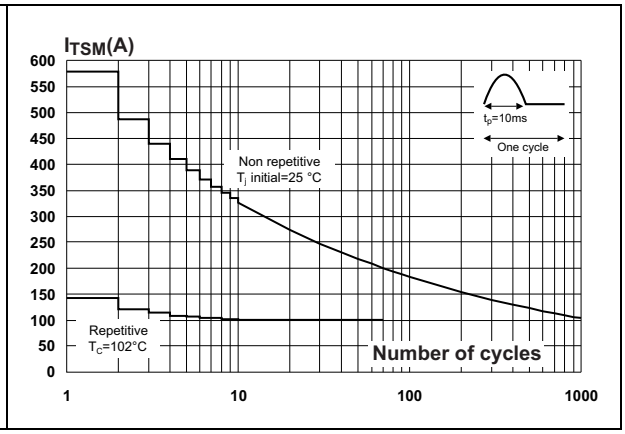


Figure 9. Non repetitive surge peak on-state current and corresponding value of I^2t versus sinusoidal pulse

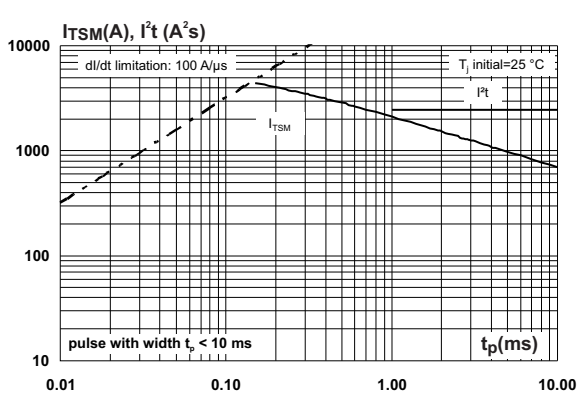


Figure 10. On-state characteristics (maximum values)

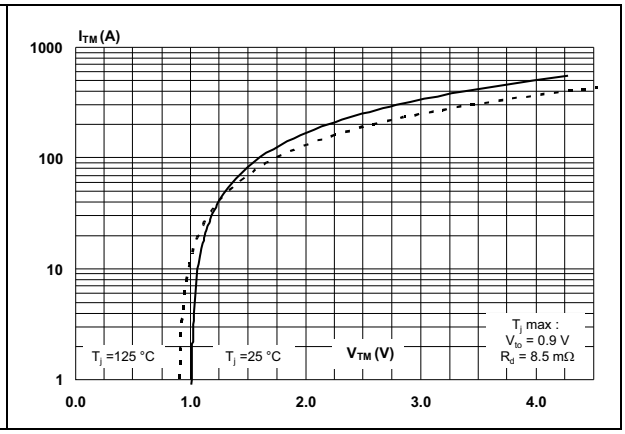


Figure 11. Relative variation of leakage current versus junction temperature for different values of blocking voltage (600 and 800 V)

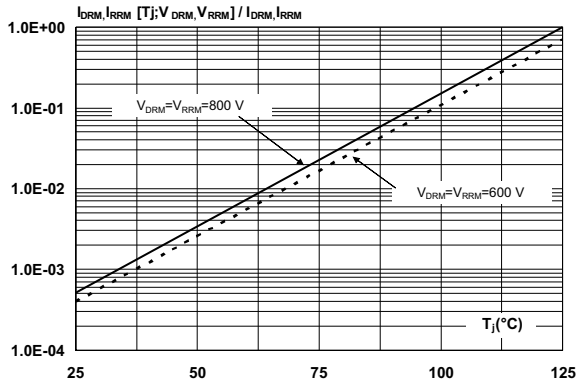
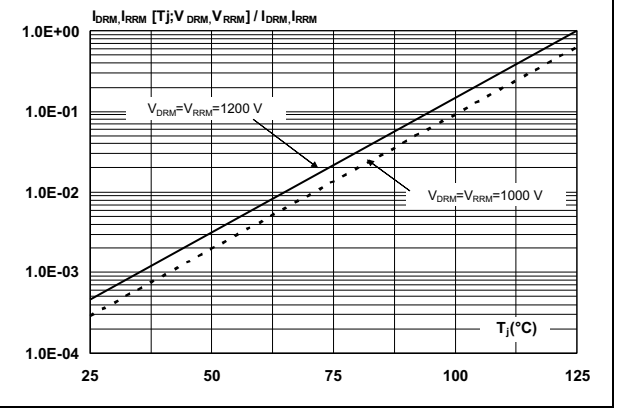


Figure 12. Relative variation of leakage current versus junction temperature for different values of blocking voltage (1000 and 1200 V)



2 Package information

- Epoxy meets UL94,V0
- Lead-free packages
- Cooling method: by conduction (C)
- Recommended torque value: 0.9 to 1.2 N·m

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Figure 13. TOP3 dimension definitions

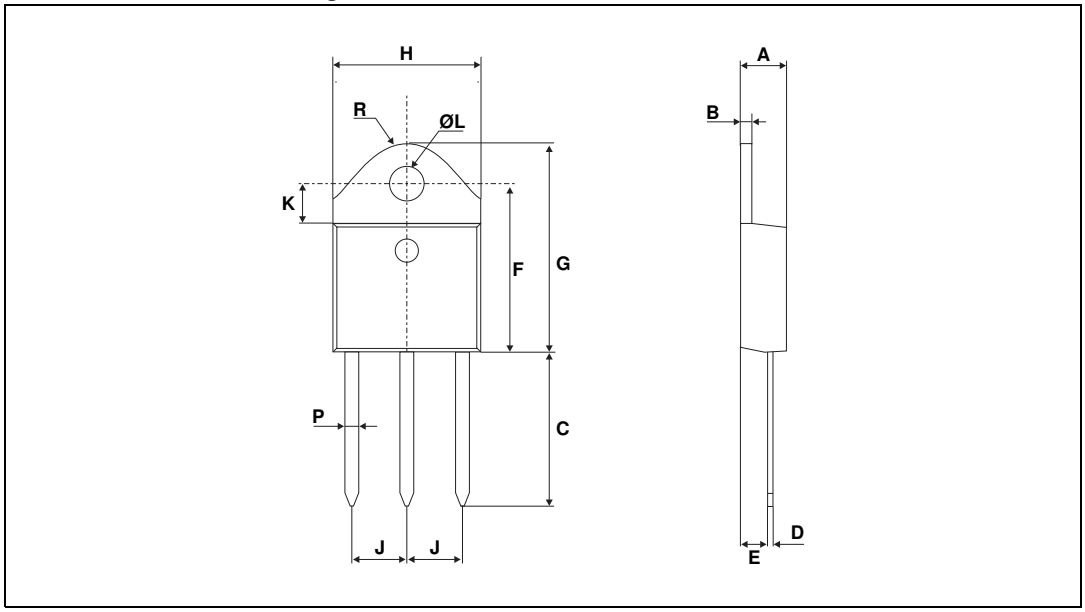

Table 5. TOP3 dimension values

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	1.45	1.55	0.057	0.061
C	14.35	15.60	0.565	0.614
D	0.5	0.7	0.020	0.028
E	2.7	2.9	0.106	0.114
F	15.8	16.5	0.622	0.650
G	20.4	21.1	0.815	0.831
H	15.1	15.5	0.594	0.610
J	5.4	5.65	0.213	0.222
K	3.4	3.65	0.134	0.144
ØL	4.08	4.17	0.161	0.164
P	1.20	1.40	0.047	0.055
R	4.60 typ.		0.181 typ.	

3 Ordering information

Figure 14. Ordering information scheme

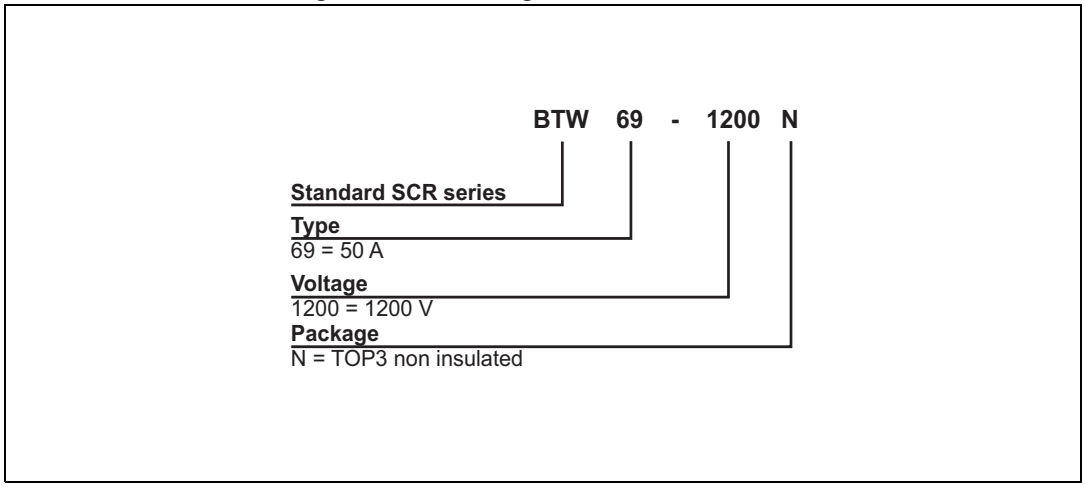

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
BTW69-1200N	BTW691200N	TOP3	4.55 g	30	Tube

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
14-Jun-2013	1	Initial release.

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