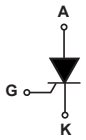
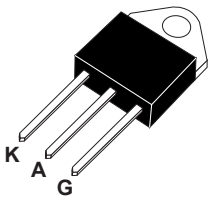
BTW68

Datasheet

30 A SCRs





TOP3 Isolated

Product status link
BTW68

Product summary	
$I_{T(RMS)}$	30 A
V_{DRM}/V_{RRM}	600 to 1200 V
I_{GT}	50 mA

Features

- On-state rms current: 30 A
- Blocking voltage: up to 1200 V
- Gate current: 50 mA
- UL 2500 V insulation (file ref E81734)

Applications

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

Description

Available in a high power insulated package, the BTW68 series is suitable for applications where power handling and power dissipation are critical such as solid state relays, welding equipment and high power motor control.

Based on a clip assembly technology, this device offers a superior performance in surge current handling capabilities.

Thanks to the internal ceramic pad, the device provides high voltage insulation (2500 V_{RMS}) and complies with UL standards (file ref: E81734).

1 Characteristics

Table 1. Absolute maximum ratings

Symbol	Parameters			Value	Unit
$I_{T(RMS)}$	RMS on-state current (180° conduction angle)		T_c = 80 °C	30	A
$I_{T(AV)}$	Average on-state current (180° conduction angle)		T_c = 80 °C	19	A
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C, V_R = 0 V)	t_p = 8.3 ms	t_j = 25 °C	420	A
		t_p = 10 ms		400	
I^2t	I^2t value for fusing		T_j = 25 °C	800	A^2s
dI/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT} , $t_r \leq$ 100 ns	F = 60 Hz	T_j = 125 °C	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}	Storage junction temperature range			-40 to +150	°C
T_j	Operating junction temperature range			-40 to +125	°C
V_{GRM}	Maximum peak reverse gate voltage			5	V

Table 2. 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.	50	mA
V_{GT}				Max	1.5	V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ		T_j = 125 °C	Min.	0.2	V
t_{gt}	V_D = V_{DRM}, I_G = 200 mA, dI_G/dt = 1.5 A/µs			Typ.	2	µs
I_H	I_T = 500 mA, gate open			Max.	75	mA
I_L	I_G = 1.2 x I_{GT}			Typ.	40	mA
dV/dt	V_D = 67 %, V_{DRM} gate open	V_{DRM} = 800 V	T_j = 125 °C	Min.	500	V/µs
		V_{DRM} = 1000 V			250	
t_q	V_D = 67% V_{DRM}, I_{TM} = 60 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} = 60 A, t_p = 380 µs			Max.	2.1	V
I_{DRM}	V_{DRM} = V_{RRM}		T_j = 25 °C	Max.	20	µA
I_{RRM}			T_j = 125 °C		6	mA

Table 3. Thermal resistance

Symbol	Parameters	Value	Unit
$R_{th(j-c)}$	Junction to case (D.C.)	1.1	°C/W
$R_{th(j-a)}$	Junction to ambiant	50	

1.1 Characteristics (curves)

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

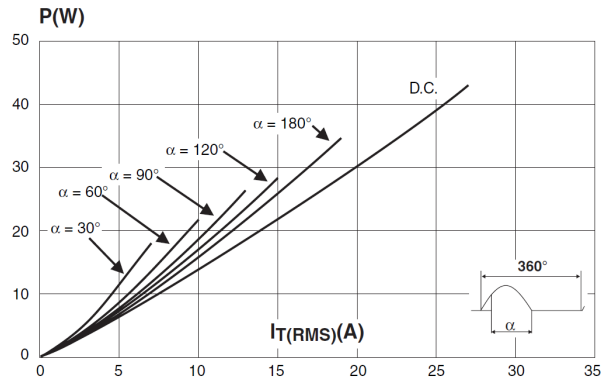


Figure 2. Correlation between maximum average power dissipation and maximum allowable temperatures

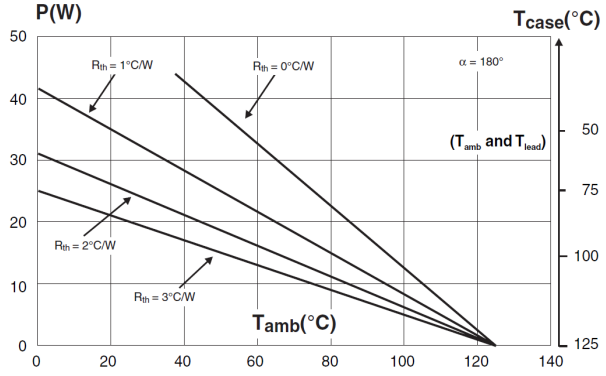


Figure 3. Average on-state current versus case temperature

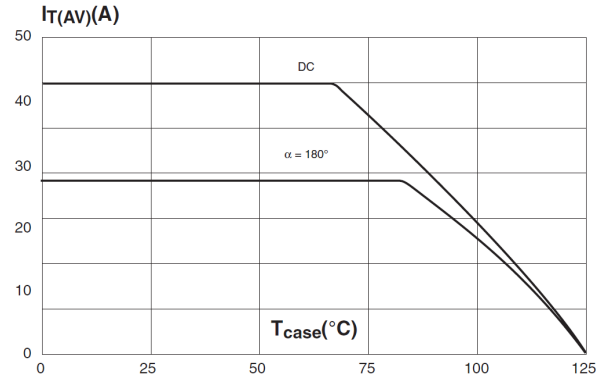


Figure 4. Relative variation of thermal impedance versus pulse duration

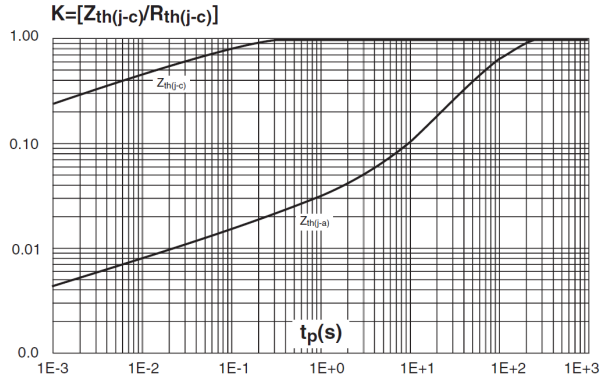


Figure 5. Relative variation of gate trigger current versus junction temperature

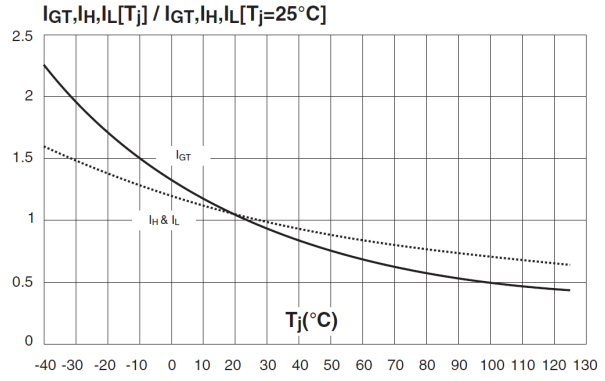


Figure 6. Surge peak on-state current versus number of cycles

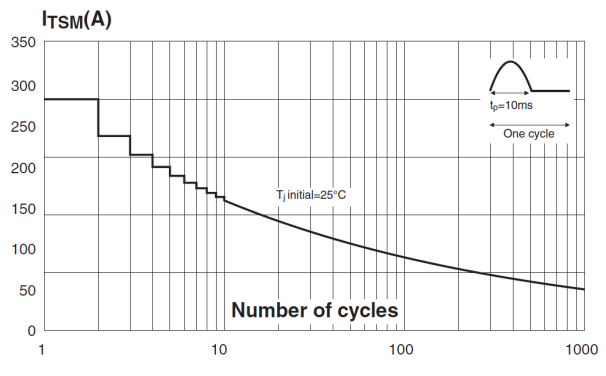


Figure 7. Non repetitive surge peak on-state current and corresponding value of I²t versus sinusoidal pulse width

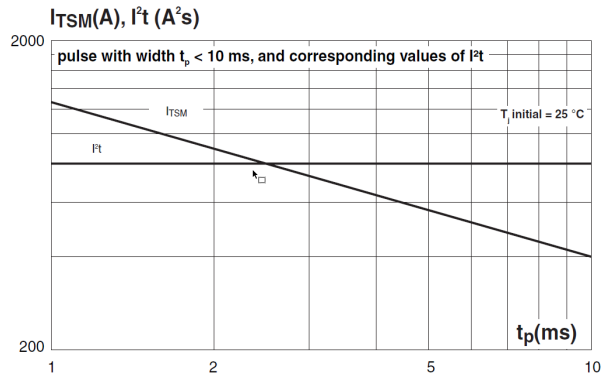
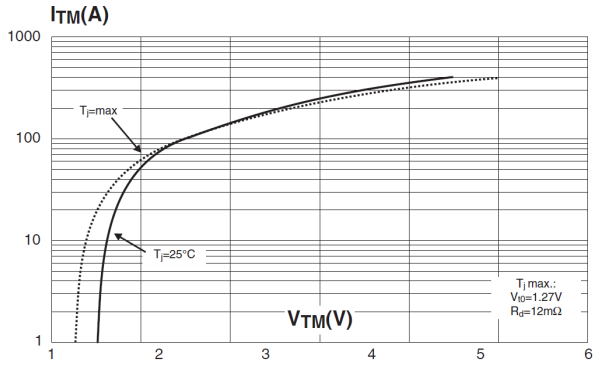


Figure 8. On-state characteristics (maximum values)



2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

2.1 TOP3 Ins. package information

- Epoxy meets UL94, V0
- Lead-free packages
- Recommended torque: 1.05 N·m (max. torque: 1.2 N·m)

Figure 9. TOP3 insulated and non-insulated package outline

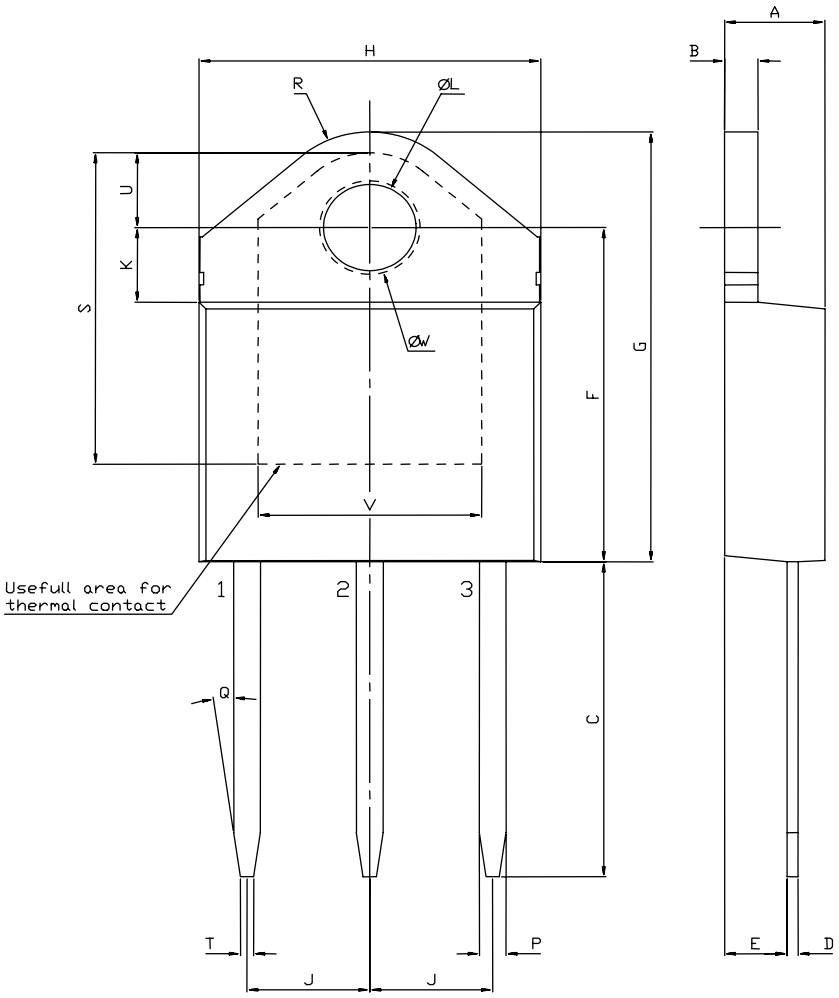


Table 4. TOP3 insulated and non-insulated mechanical data

Ref.	Dimensions					
	mm			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.1732		0.1812
B	1.45		1.55	0.0570		0.0611
C	14.35		15.60	0.5649		0.6142
D	0.50		0.70	0.0196		0.0276
E	2.70		2.90	0.1062		0.1142
F	15.80		16.50	0.6220		0.6497
G	20.40		21.10	0.8031		0.8308
H	15.10		15.50	0.5944		0.6103
J	5.40		5.65	0.2125		0.2225
K	3.40		3.65	0.1338		0.1438
L	4.08		4.17	0.1606		0.1642
P	1.10		1.30	0.0430		0.0510
R		4.60			0.1811	

1. *Inches given for reference only*

3 Ordering information

Figure 10. **Ordering information scheme**

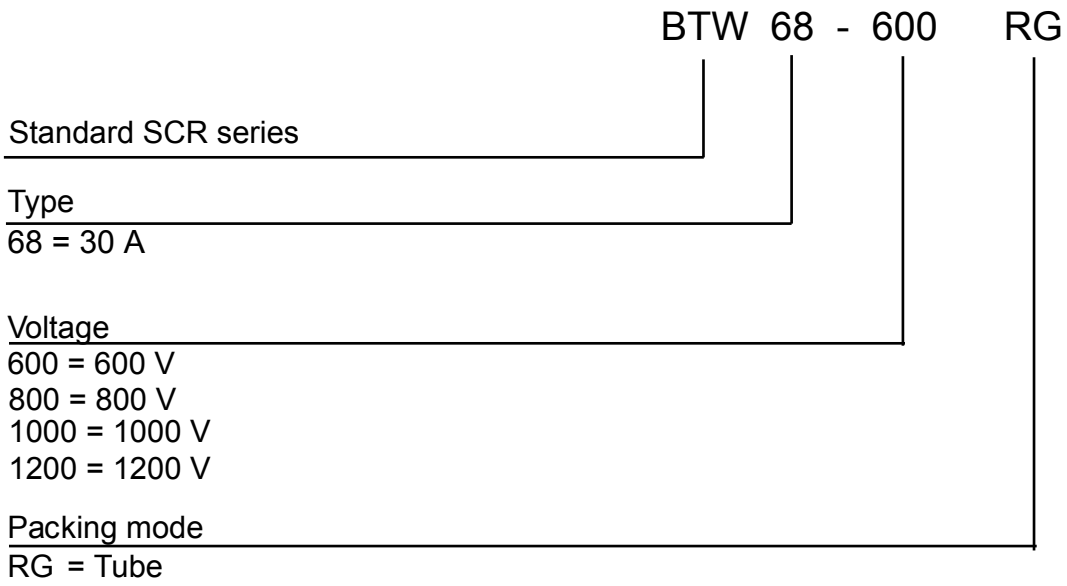


Table 5. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
BTW68-600RG	BTW68-600	TOP3 Ins.	4.5 g	30	Tube
BTW68-800RG	BTW68-800				
BTW68-1000RG	BTW68-1000				
BTW68-1200RG	BTW68-1200				

Table 6. **Product Selector**

Part numbers	Voltage (xxx)				Sensitivity	Package
	600 V	800 V	1000 V	1200 V		
BTW68-600RG	X				50 mA	TOP3 Ins.
BTW68-800RG		X				
BTW68-1000RG			X			
BTW68-1200RG				X		

Revision history

Table 7. **Document revision history**

Date	Revision	Changes
Mar-1995	1	Initial release.
13-Feb-2006	2	TOP3 Insulated delivery mode changed from bulk to tube.ECOPACK statement added.
29-Jul-2010	3	Deleted part number BTW68-200RG. Updated *Table 2*, *Figure 7* and alpha angle *in Figure 1*.
06-Oct-2023	4	Updated Table 4.

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