

### Features

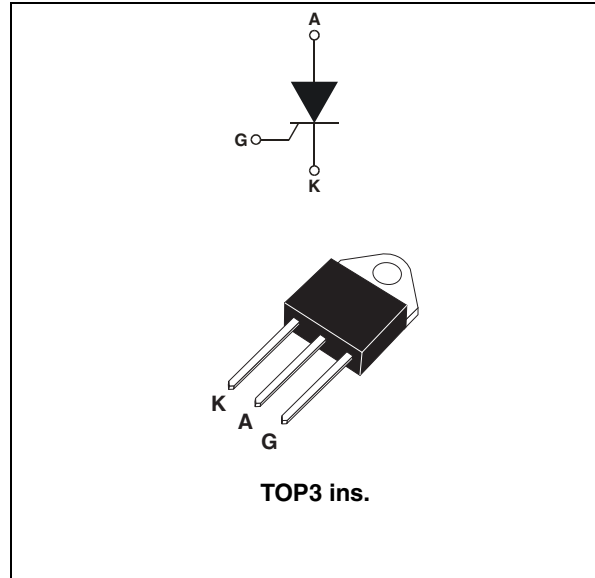
- On-state rms current: 30 A
- Blocking voltage: up to 1200 V
- Gate current: 50 mA
- UL 2500 V insulation (file ref E81734)

### 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<sub>RMS</sub>) and complies with UL standards (file ref: E81734).



**Table 1. Device summary**

Symbol	Value
$I_{T(RMS)}$	30 A
$V_{DRM}/V_{RRM}$	600 to 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)	$T_c = 80\text{ °C}$	30	A
$I_{T(AV)}$	Average on-state current (180° conduction angle)	$T_c = 80\text{ °C}$	19	A
$I_{TSM}$	Non repetitive surge peak on-state current	$t_p = 8.3\text{ ms}$	420	A
		$t_p = 10\text{ ms}$	400	
$I^2t$	$I^2t$ Value for fusing	$T_j = 25\text{ °C}$	800	$A^2s$
$di/dt$	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ , $t_r \leq 100\text{ ns}$	$F = 60\text{ Hz}$ $T_j = 125\text{ °C}$	100	$A/\mu s$
$I_{GM}$	Peak gate current	$t_p = 20\text{ }\mu s$ $T_j = 125\text{ °C}$	8	A
$P_{G(AV)}$	Average gate power dissipation	$T_j = 125\text{ °C}$	1	W
$T_{stg}$ $T_j$	Storage junction temperature range Operating junction temperature range		- 40 to + 150 - 40 to + 125	$^{\circ}C$
$V_{RGM}$	Maximum peak reverse gate voltage		5	V

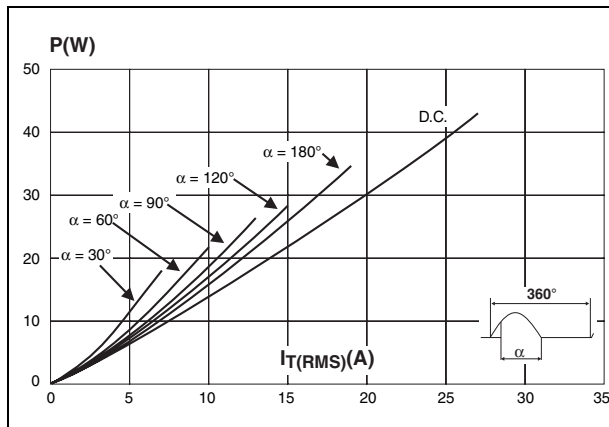
**Table 3. Electrical characteristics ( $T_j = 25\text{ °C}$ , unless otherwise specified)**

Symbol	Test conditions			Value	Unit	
I <sub>GT</sub>	V <sub>D</sub> = 12 V, R <sub>L</sub> = 33 Ω		MIN.	50	mA	
V <sub>GT</sub>			MAX.	1.5	V	
V <sub>GD</sub>	V <sub>D</sub> = V <sub>DRM</sub> , R <sub>L</sub> = 3.3 kΩ	T <sub>j</sub> = 125 °C	MIN.	0.2	V	
t <sub>gt</sub>	V <sub>D</sub> = V <sub>DRM</sub> , I <sub>G</sub> = 200 mA, dI <sub>G</sub> /dt = 1.5 A/μs		TYP.	2	μs	
I <sub>H</sub>	I <sub>T</sub> = 500 mA, gate open		MAX.	75	mA	
I <sub>L</sub>	I <sub>G</sub> = 1.2 × I <sub>GT</sub>		TYP.	40	mA	
dV/dt	V <sub>D</sub> = 67 % V <sub>DRM</sub> gate open	V <sub>DRM</sub> = 800 V	T <sub>j</sub> = 125 °C	MIN.	500	V/μs
		V <sub>DRM</sub> = 1000 V			250	
V <sub>TM</sub>	I <sub>TM</sub> = 60 A, t <sub>p</sub> = 380 μs		MAX.	2.1	V	
I <sub>DRM</sub> I <sub>RRM</sub>	V <sub>DRM</sub> = V <sub>RRM</sub>	T <sub>j</sub> = 25 °C	MAX.	20	μA	
		T <sub>j</sub> = 125 °C		6	mA	
t <sub>q</sub>	V <sub>D</sub> = 67% V <sub>DRM</sub> , I <sub>TM</sub> = 60 A, V <sub>R</sub> = 75 V dI <sub>TM</sub> /dt = 30 A/μs, dV <sub>D</sub> /dt = 20 V/μs		T <sub>j</sub> = 125 °C	TYP.	100	μs

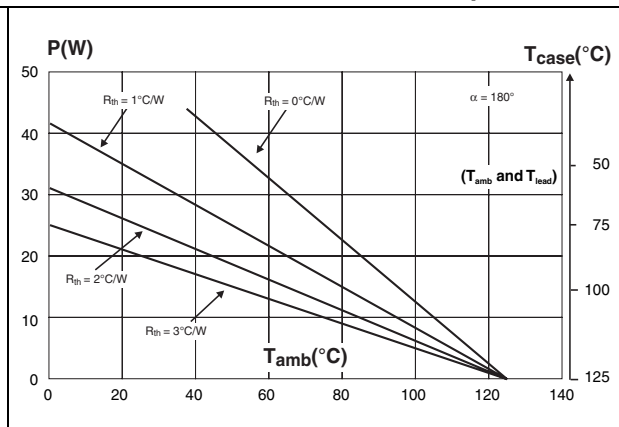
**Table 4. Thermal resistance**

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case (D.C.)	1.1	$^{\circ}C/W$
$R_{th(j-a)}$	Junction to ambient	50	$^{\circ}C/W$

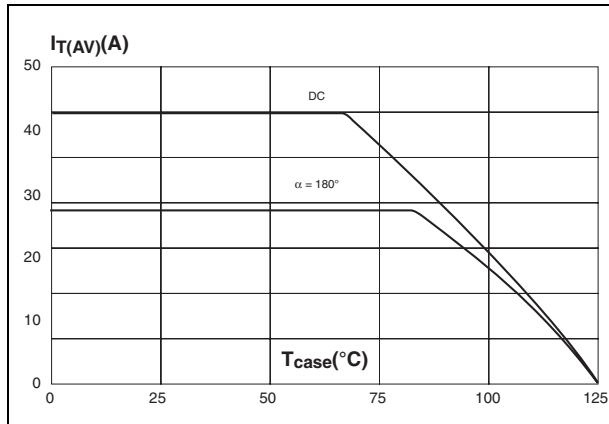
**Figure 1. Maximum average power dissipation versus average on-state current**



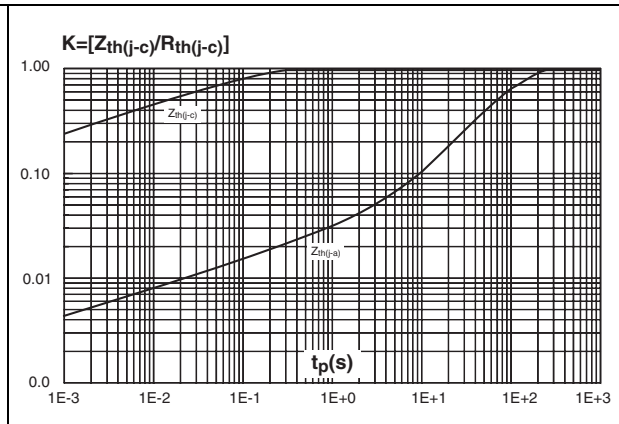
**Figure 2. Correlation between maximum average power dissipation and maximum allowable temperature**



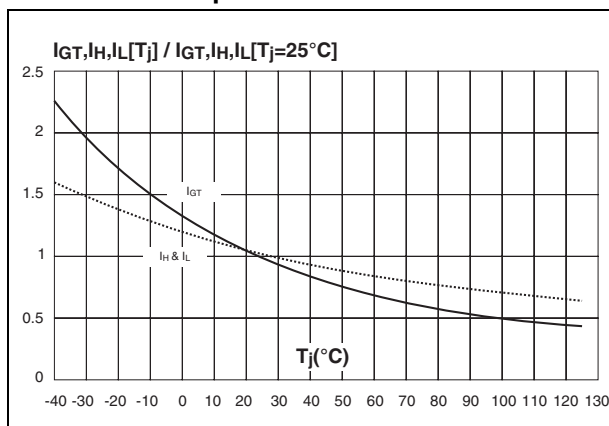
**Figure 3. Average on-state current versus case temperature**



**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**

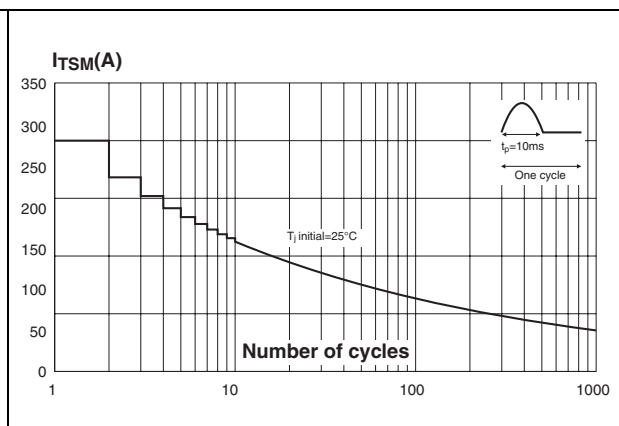


Figure 7. Non repetitive surge peak on-state current and corresponding value of  $I^2t$  versus sinusoidal pulse width

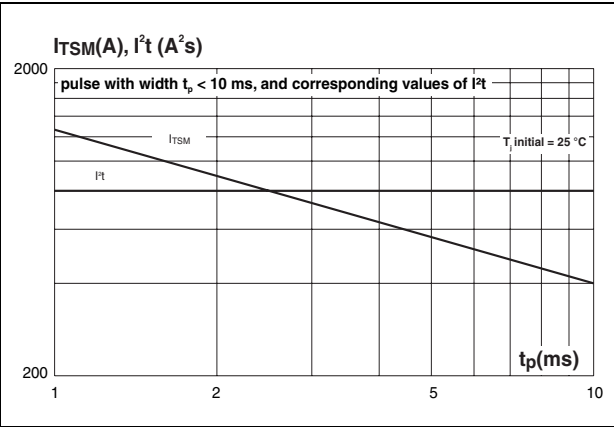
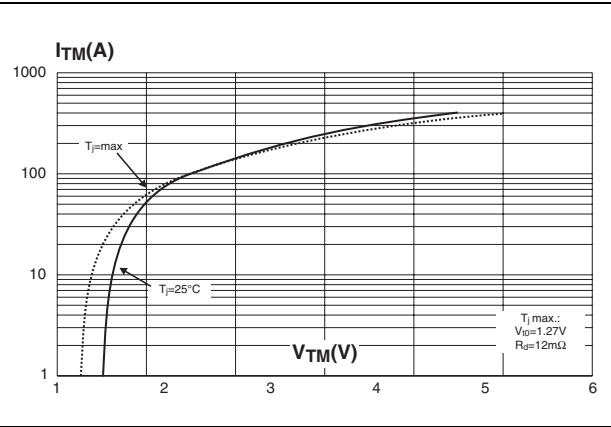


Figure 8. On-state characteristics (maximum values)



## 2 Ordering information scheme

Figure 9. Ordering information scheme

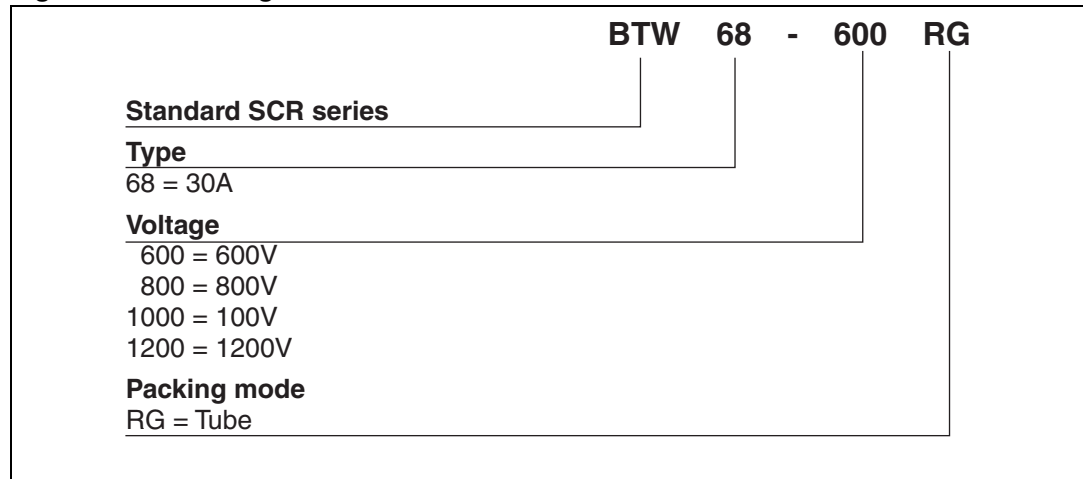


Table 5. Product Selector

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		

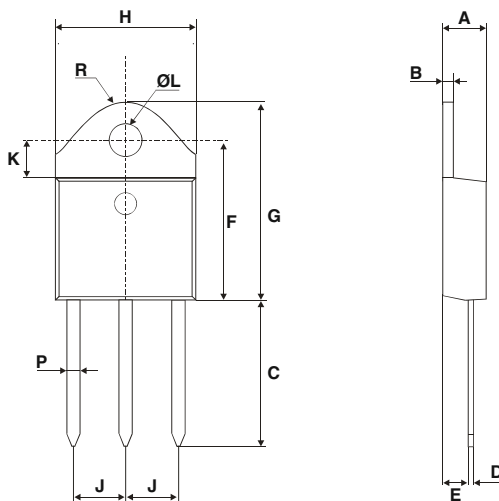
### 3 Package information

- Epoxy meets UL94,V0
- Lead-free packages

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](http://www.st.com). ECOPACK® is an ST trademark.

**Table 6. TOP3 ins. dimensions**

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.	



## 4 Ordering information

**Table 7. 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				

## 5 Revision history

**Table 8. 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 <a href="#">Table 2</a> , <a href="#">Figure 7</a> and alpha angle in <a href="#">Figure 1</a> .

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