

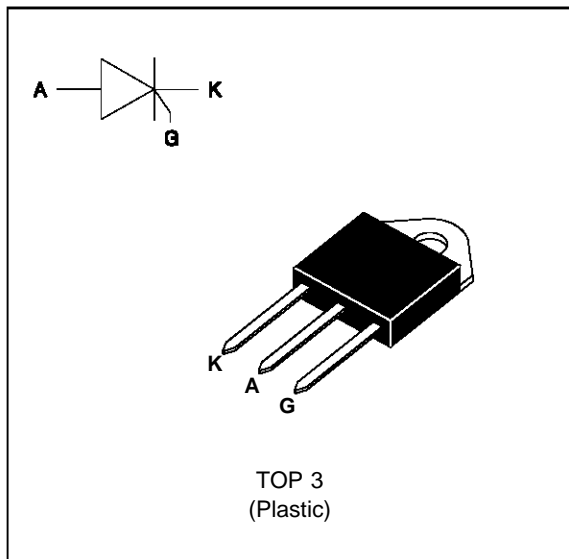
### FEATURES

- HIGH SURGE CAPABILITY
- HIGH ON-STATE CURRENT
- HIGH STABILITY AND RELIABILITY
- BTW 68 Serie :  
INSULATED VOLTAGE = 2500V<sub>(RMS)</sub>  
(UL RECOGNIZED : E81734)

### DESCRIPTION

The BTW 68 (N) Family of Silicon Controlled Rectifiers uses a high performance glass passivated technology.

This general purpose Family of Silicon Controlled Rectifiers is designed for power supplies up to 400Hz on resistive or inductive load.



### ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit	
I <sub>T(RMS)</sub>	RMS on-state current (180° conduction angle)	BTW 68	T <sub>c</sub> =80°C	30	A
		BTW 68 N	T <sub>c</sub> =85°C	35	
I <sub>T(AV)</sub>	Average on-state current (180° conduction angle, single phase circuit)	BTW 68	T <sub>c</sub> =80°C	19	A
		BTW 68 N	T <sub>c</sub> =85°C	22	
I <sub>TSM</sub>	Non repetitive surge peak on-state current ( T <sub>j</sub> initial = 25°C )		tp=8.3 ms	420	A
			tp=10 ms	400	
I <sup>2</sup> t	I <sup>2</sup> t value		tp=10 ms	800	A <sup>2</sup> s
di/dt	Critical rate of rise of on-state current Gate supply : I <sub>G</sub> = 100 mA di <sub>G</sub> /dt = 1 A/μs			100	A/μs
T <sub>stg</sub> T <sub>j</sub>	Storage and operating junction temperature range			- 40 to + 150 - 40 to + 125	°C °C
T <sub>l</sub>	Maximum lead temperature for soldering during 10 s at 4.5 mm from case			230	°C

Symbol	Parameter	BTW 68		BTW 68 / BTW 68 N				Unit
		200	400	600	800	1000	1200	
V <sub>DRM</sub> V <sub>RRM</sub>	Repetitive peak off-state voltage T <sub>j</sub> = 125 °C	200	400	600	800	1000	1200	V

**THERMAL RESISTANCES**

Symbol	Parameter		Value	Unit	
Rth (j-a)	Junction to ambient		50	°C/W	
Rth (j-c) DC	Junction to case for DC		BTW 68	1.1	°C/W
			BTW 68 N	0.8	

**GATE CHARACTERISTICS (maximum values)**

$P_G$  (AV) = 1W     $P_{GM}$  = 40W (tp = 20  $\mu$ s)     $I_{FGM}$  = 8A (tp = 20  $\mu$ s)     $V_{RGM}$  = 5 V.

**ELECTRICAL CHARACTERISTICS**

Symbol	Test Conditions			Value		Unit
				BTW 68	BTW 68 N	
$I_{GT}$	$V_D=12V$ (DC) $R_L=33\Omega$	$T_j=25^\circ C$	MAX	50		mA
$V_{GT}$	$V_D=12V$ (DC) $R_L=33\Omega$	$T_j=25^\circ C$	MAX	1.5		V
$V_{GD}$	$V_D=V_{DRM}$ $R_L=3.3k\Omega$	$T_j=125^\circ C$	MIN	0.2		V
tgt	$V_D=V_{DRM}$ $I_G = 200mA$ $di_G/dt = 1.5A/\mu s$	$T_j=25^\circ C$	TYP	2		$\mu s$
$I_L$	$I_G = 1.2 I_{GT}$	$T_j=25^\circ C$	TYP	40		mA
$I_H$	$I_T = 500mA$ gate open	$T_j=25^\circ C$	MAX	75		mA
$V_{TM}$	BTW 68 $I_{TM} = 60A$ BTW 68 N $I_{TM} = 70A$ $t_p = 380\mu s$	$T_j=25^\circ C$	MAX	2.1	2.2	V
$I_{DRM}$ $I_{RRM}$	$V_{DRM}$ Rated $V_{RRM}$ Rated	$T_j=25^\circ C$	MAX	0.02		mA
		$T_j=125^\circ C$		6		
dV/dt	Linear slope up to $V_D=67\%V_{DRM}$ gate open	$V_{DRM} \leq 800V$ $V_{DRM} \geq 1000V$	$T_j=125^\circ C$	MIN	500 250	V/ $\mu s$
tq	$V_D=67\%V_{DRM}$ $I_{TM}=60A$ $V_R=75V$ $di_{TM}/dt=30 A/\mu s$ $dV_D/dt=20V/\mu s$	$T_j=125^\circ C$	TYP	100		$\mu s$

Package	$I_{T(RMS)}$	$V_{DRM} / V_{RRM}$	Sensitivity Specification
	A	V	BTW
BTW 68 (Insulated)	30	200	X
		400	X
		600	X
		800	X
		1000	X
		1200	X
BTW 68 N (Uninsulated)	35	600	X
		800	X
		1000	X
		1200	X

Fig.1 : Maximum average power dissipation versus average on-state current (BTW 68).

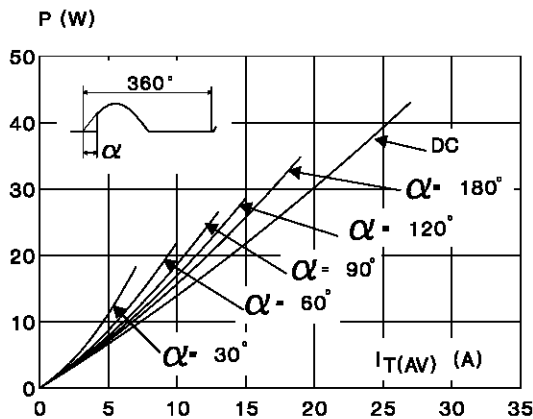


Fig.3 : Maximum average power dissipation versus average on-state current (BTW 68 N).

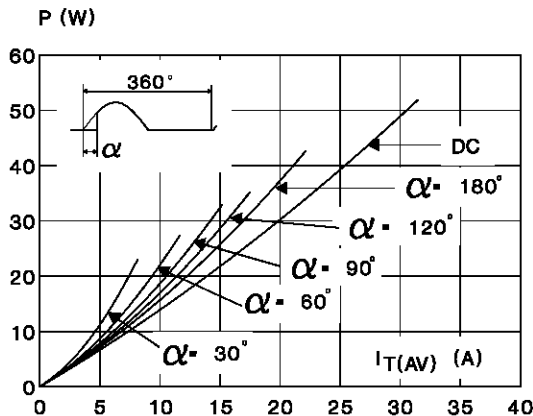


Fig.2 : Correlation between maximum average power dissipation and maximum allowable temperatures ( $T_{amb}$  and  $T_{case}$ ) for different thermal resistances heatsink + contact (BTW 68).

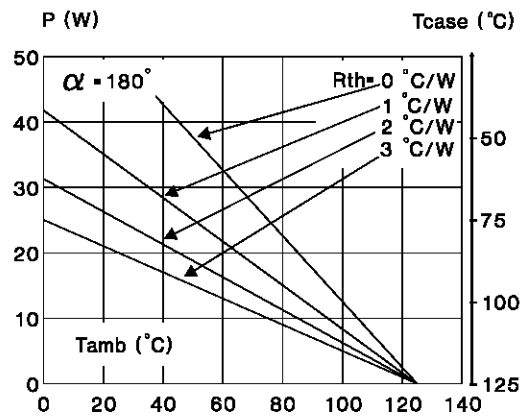


Fig.4 : Correlation between maximum average power dissipation and maximum allowable temperatures ( $T_{amb}$  and  $T_{case}$ ) for different thermal resistances heatsink + contact (BTW 68 N).

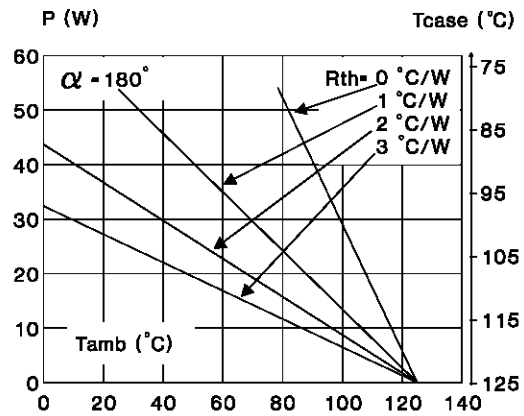


Fig.5 : Average on-state current versus case temperature (BTW 68).

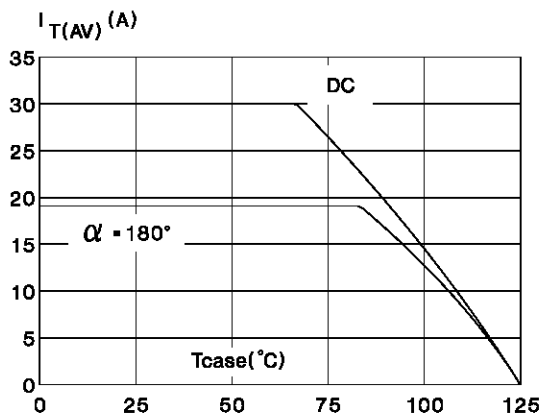


Fig.6 : Average on-state current versus case temperature (BTW 68 N).

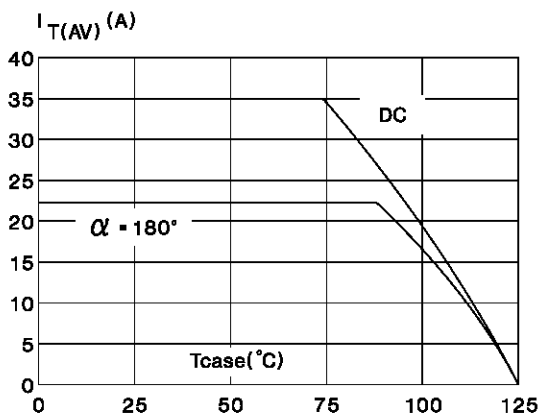


Fig.7 : Relative variation of thermal impedance versus pulse duration.

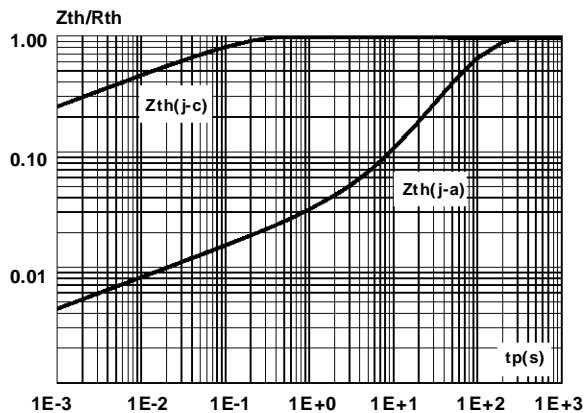


Fig.8 : Relative variation of gate trigger current versus junction temperature.

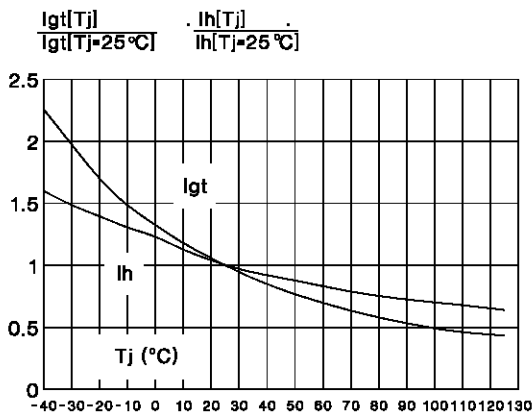


Fig.9 : Non repetitive surge peak on-state current versus number of cycles.

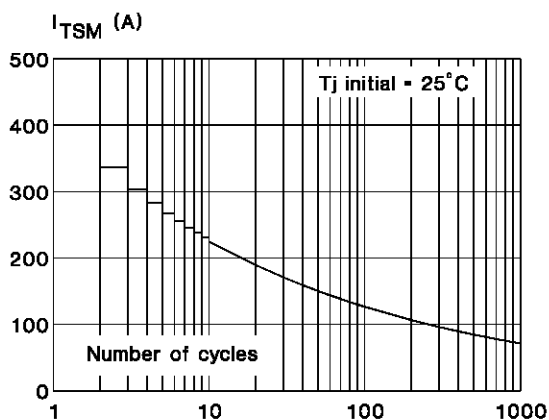


Fig.10 : Non repetitive surge peak on-state current for a sinusoidal pulse with width :  $t \leq 10$  ms, and corresponding value of  $I^2t$ .

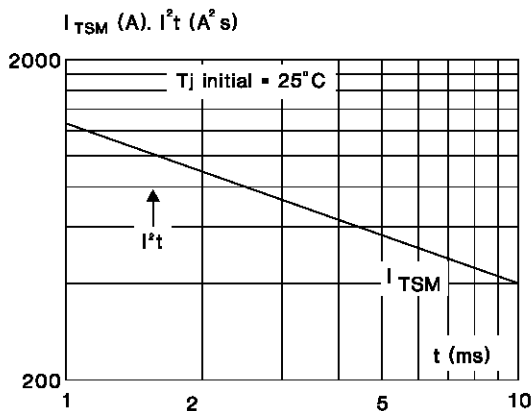
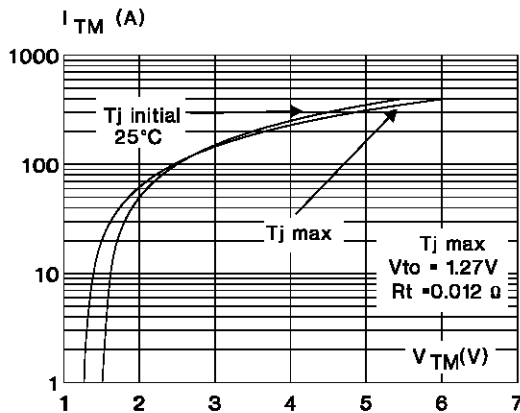
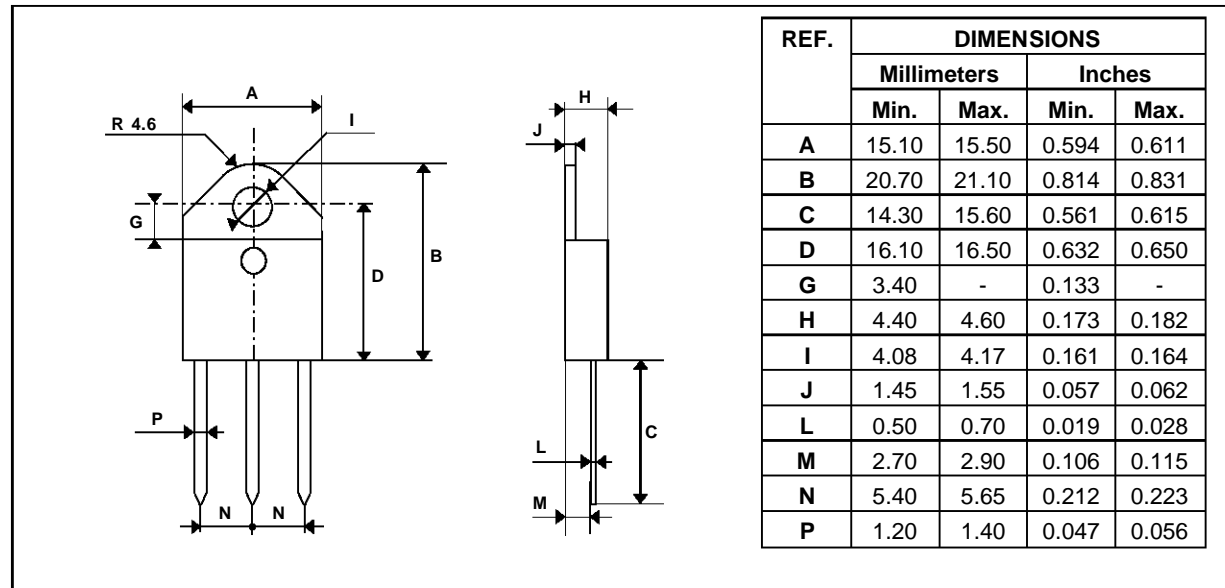


Fig11 : On-state characteristics (maximum values).



PACKAGE MECHANICAL DATA

TOP 3 Plastic



Cooling method : C  
 Marking : type number  
 Weight : 4.7 g

Recommended torque value : 0.8 m.N.  
 Maximum torque value : 1 m.N.

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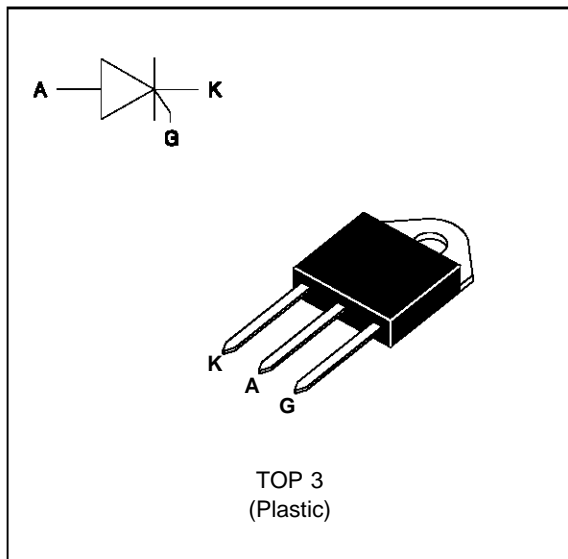
### FEATURES

- HIGH SURGE CAPABILITY
- HIGH ON-STATE CURRENT
- HIGH STABILITY AND RELIABILITY
- BTW 69 Serie :  
INSULATED VOLTAGE = 2500V<sub>(RMS)</sub>  
(UL RECOGNIZED : E81734)

### DESCRIPTION

The BTW 69 (N) Family of Silicon Controlled Rectifiers uses a high performance glass passivated technology.

This general purpose Family of Silicon Controlled Rectifiers is designed for power supplies up to 400Hz on resistive or inductive load.



### ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit	
I <sub>T(RMS)</sub>	RMS on-state current (180° conduction angle)	BTW 69	T <sub>c</sub> =70°C	50	A
		BTW 69 N	T <sub>c</sub> =75°C	55	
I <sub>T(AV)</sub>	Average on-state current (180° conduction angle, single phase circuit)	BTW 69	T <sub>c</sub> =70°C	32	A
		BTW 69 N	T <sub>c</sub> =75°C	35	
I <sub>TSM</sub>	Non repetitive surge peak on-state current ( T <sub>j</sub> initial = 25°C )		tp=8.3 ms	525	A
			tp=10 ms	500	
I <sup>2</sup> t	I <sup>2</sup> t value		tp=10 ms	1250	A <sup>2</sup> s
di/dt	Critical rate of rise of on-state current Gate supply : I <sub>G</sub> = 100 mA di <sub>G</sub> /dt = 1 A/μs			100	A/μs
T <sub>stg</sub> T <sub>j</sub>	Storage and operating junction temperature range			- 40 to + 150 - 40 to + 125	°C °C
T <sub>l</sub>	Maximum lead temperature for soldering during 10 s at 4.5 mm from case			230	°C

Symbol	Parameter	BTW 69		BTW 69 / BTW 69 N				Unit
		200	400	600	800	1000	1200	
V <sub>DRM</sub> V <sub>RRM</sub>	Repetitive peak off-state voltage T <sub>j</sub> = 125 °C	200	400	600	800	1000	1200	V

**THERMAL RESISTANCES**

Symbol	Parameter		Value	Unit
Rth (j-a)	Junction to ambient		50	°C/W
Rth (j-c) DC	Junction to case for DC		BTW 69	°C/W
			BTW 69 N	

**GATE CHARACTERISTICS (maximum values)**

$P_G (AV) = 1W$   $P_{GM} = 40W$  ( $t_p = 20 \mu s$ )  $I_{FGM} = 8A$  ( $t_p = 20 \mu s$ )  $V_{RGM} = 5 V$ .

**ELECTRICAL CHARACTERISTICS**

Symbol	Test Conditions			Value		Unit
				BTW 69	BTW 69 N	
$I_{GT}$	$V_D=12V$ (DC) $R_L=33\Omega$	$T_j=25^\circ C$	MAX	80		mA
$V_{GT}$	$V_D=12V$ (DC) $R_L=33\Omega$	$T_j=25^\circ C$	MAX	1.5		V
$V_{GD}$	$V_D=V_{DRM}$ $R_L=3.3k\Omega$	$T_j=125^\circ C$	MIN	0.2		V
tgt	$V_D=V_{DRM}$ $I_G = 200mA$ $di_G/dt = 1.5A/\mu s$	$T_j=25^\circ C$	TYP	2		$\mu s$
$I_L$	$I_G = 1.2 I_{GT}$	$T_j=25^\circ C$	TYP	50		mA
$I_H$	$I_T = 500mA$ gate open	$T_j=25^\circ C$	MAX	150		mA
$V_{TM}$	BTW 69 $I_{TM} = 100A$ BTW 69 N $I_{TM} = 110A$ $t_p = 380\mu s$	$T_j=25^\circ C$	MAX	1.9	2.0	V
$I_{DRM}$ $I_{RRM}$	$V_{DRM}$ Rated $V_{RRM}$ Rated	$T_j=25^\circ C$	MAX	0.02		mA
		$T_j=125^\circ C$		6		
dV/dt	Linear slope up to $V_D=67\%V_{DRM}$ gate open	$V_{DRM} \leq 800V$ $V_{DRM} \geq 1000V$	$T_j=125^\circ C$	MIN	500 250	V/ $\mu s$
tq	$V_D=67\%V_{DRM}$ $I_{TM}=110A$ $V_R=75V$ $di_{TM}/dt=30 A/\mu s$ $dV_D/dt=20V/\mu s$	$T_j=125^\circ C$	TYP	100		$\mu s$

Package	$I_{T(RMS)}$	$V_{DRM} / V_{RRM}$	Sensitivity Specification
	A	V	BTW
BTW 69 (Insulated)	50	200	X
		400	X
		600	X
		800	X
		1000	X
		1200	X
BTW 69 N (Uninsulated)	55	600	X
		800	X
		1000	X
		1200	X

Fig.1 : Maximum average power dissipation versus average on-state current (BTW 69).

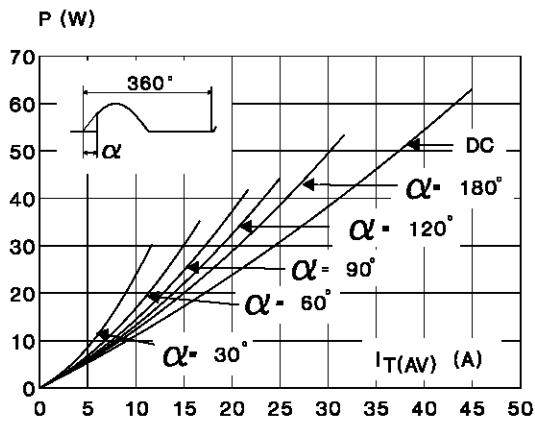


Fig.3 : Maximum average power dissipation versus average on-state current (BTW 69 N).

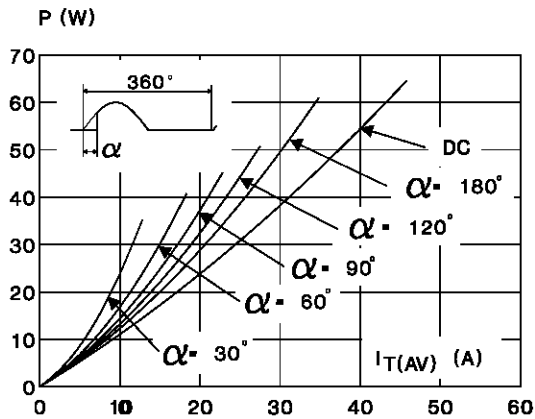


Fig.2 : Correlation between maximum average power dissipation and maximum allowable temperatures ( $T_{amb}$  and  $T_{case}$ ) for different thermal resistances heatsink + contact (BTW 69).

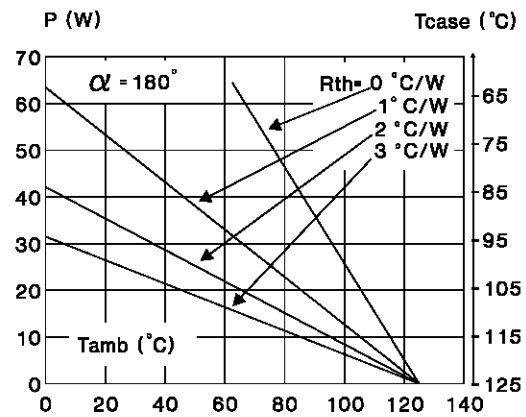


Fig.4 : Correlation between maximum average power dissipation and maximum allowable temperatures ( $T_{amb}$  and  $T_{case}$ ) for different thermal resistances heatsink + contact (BTW 69 N).

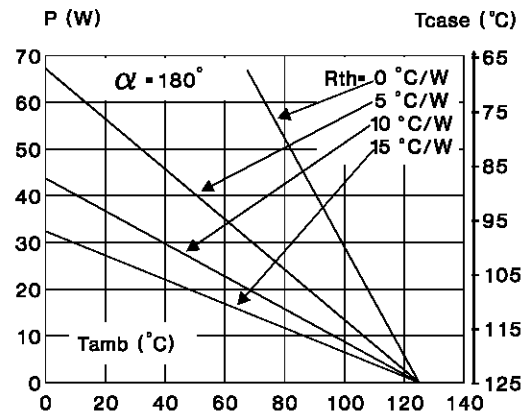




Fig.5 : Average on-state current versus case temperature (BTW 69).

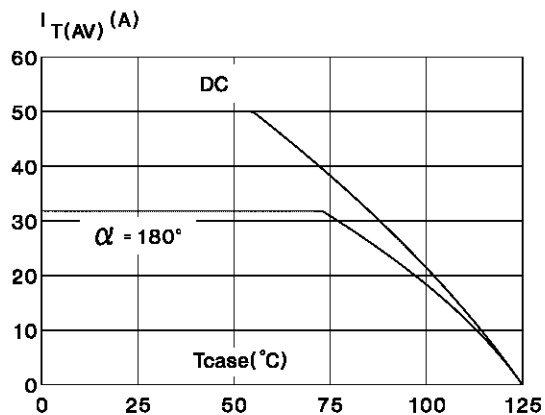


Fig.6 : Average on-state current versus case temperature (BTW 69 N).

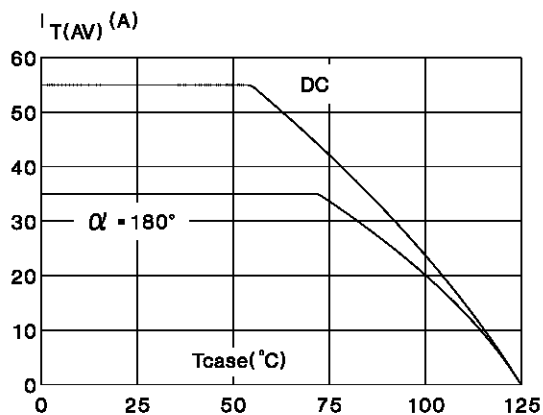


Fig.7 : Relative variation of thermal impedance versus pulse duration.

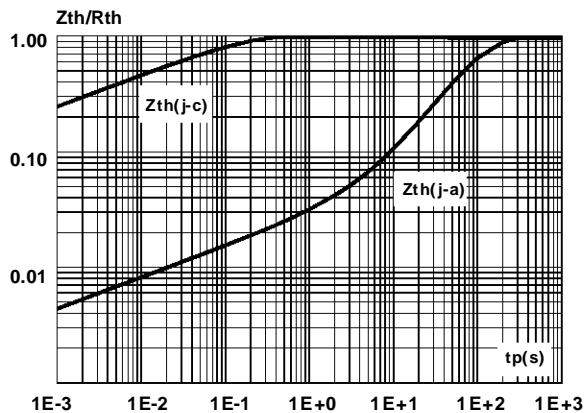


Fig.8 : Relative variation of gate trigger current versus junction temperature.

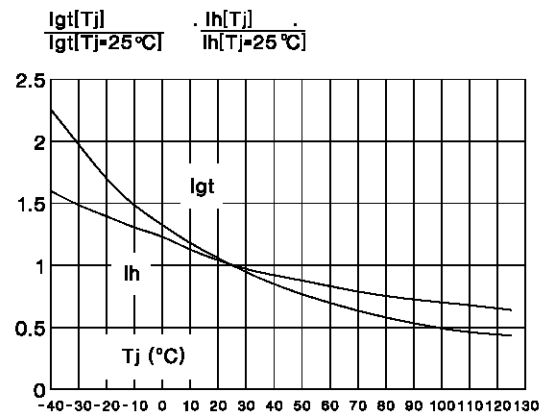


Fig.9 : Non repetitive surge peak on-state current versus number of cycles.

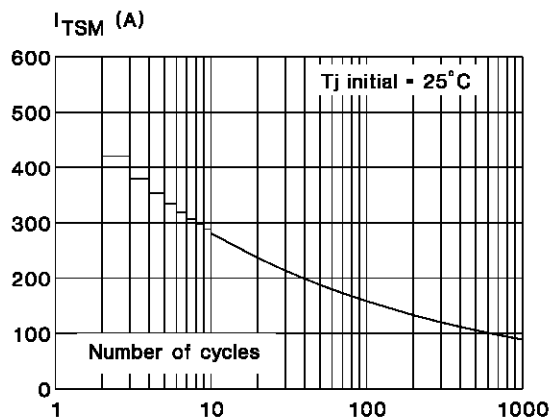


Fig.10 : Non repetitive surge peak on-state current for a sinusoidal pulse with width :  $t \leq 10$  ms, and corresponding value of  $I^2t$ .

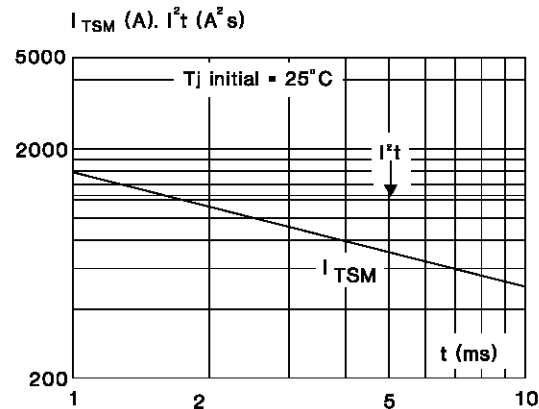
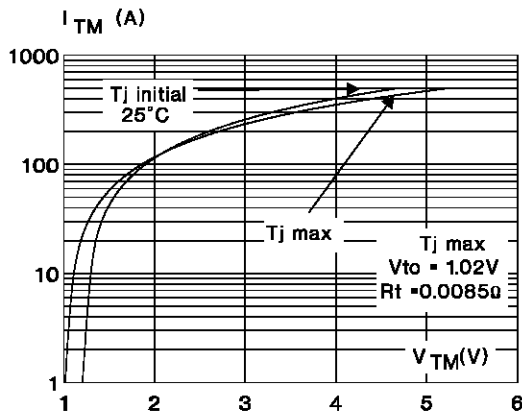
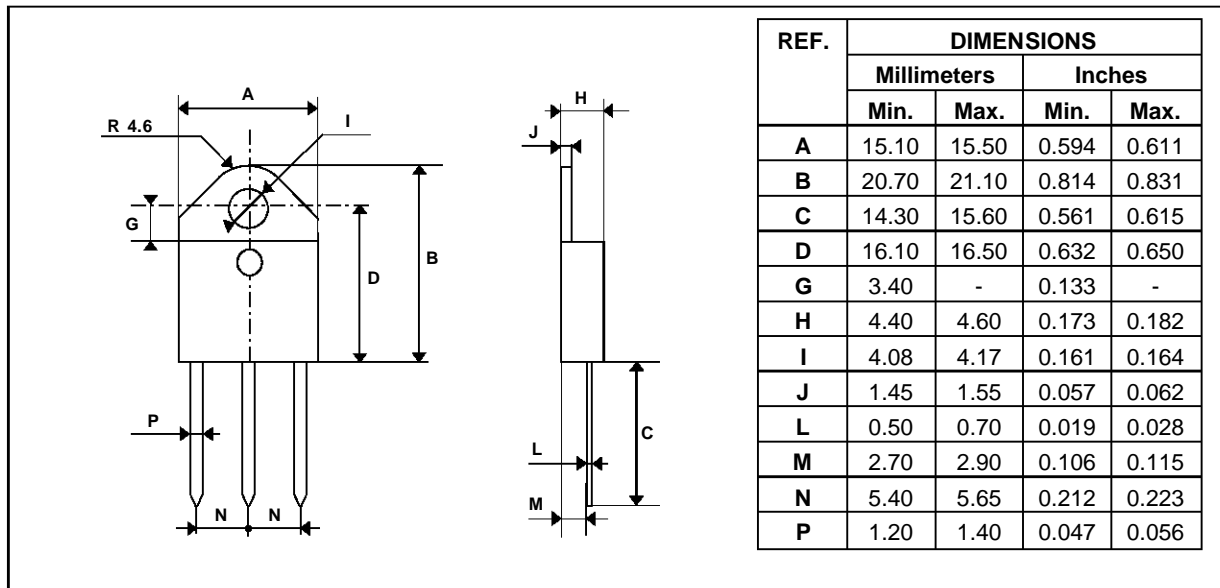


Fig11 : On-state characteristics (maximum values).



PACKAGE MECHANICAL DATA

TOP 3 Plastic



Cooling method : C  
 Marking : type number  
 Weight : 4.7 g

Recommended torque value : 0.8 m.N.  
 Maximum torque value : 1 m.N.

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