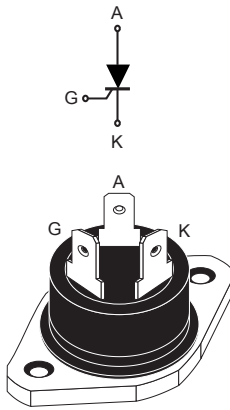


## 50 A, 1000 V SCR thyristor in RD91



RD91

## Features

- High current SCR
- High commutation capability
- Low thermal resistance with clip bonding
- Insulated package RD91 high power:
  - Low thermal resistance with clip bonding
  - Insulated voltage: 2500 V<sub>RMS</sub>
  - Complies with UL 1557 (File ref : E81734)
- RoHS (2002/95/EC) compliant

## Applications

- Solid state relays
- Welding equipment
- High power motor control

## Description

Available in 2500 V insulated high power package, the 50 A and 1000 V SCR BTW67 is suitable in 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, they offer a superior performance in surge current handling capabilities.

## Product status link

[BTW67](#)

## Product summary

$I_{T(RMS)}$	50 A
$V_{DRM}/V_{RRM}$	1000 V
$I_{GT}$	80 mA

# 1 Characteristics

**Table 1. Absolute maximum ratings**

Symbol	Parameters		Value	Unit	
$I_{T(RMS)}$	RMS on-state current (full sine wave)		$T_C = 70\text{ °C}$	50	A
$I_{T(AV)}$	Average on-state current (180° conduction angle)		$T_C = 70\text{ °C}$	32	A
$I_{TSM}$	Non repetitive surge peak on-state current (full cycle, $T_j$ initial = 25 °C)		$t_p = 8.3\text{ ms}$	610	A
$I^2t$	$I^2t$ value for fusing	$t_p = 10\text{ ms}$		1680	A <sup>2</sup> s
$di/dt$	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ , $t_r \leq 100\text{ ns}$	$F = 60\text{ Hz}$	$T_j = 125\text{ °C}$	50	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
$T_{stg}$	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
$V_{ins}$	Insulation RMS voltage, 1 minute			2500	V

**Table 2. Electrical characteristics ( $T_j = 25\text{ °C}$ , unless otherwise specified)**

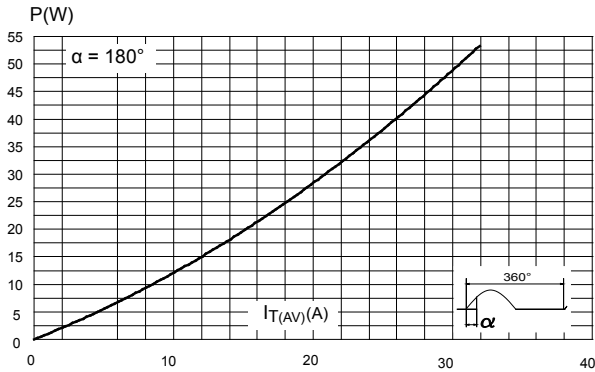
Symbol	Test conditions	$T_j$		Value	Unit
$I_{GT}$	$V_D = 12\text{ V}$ , $R_L = 33\text{ }\Omega$	25 °C	Min.	8	mA
			Max	80	
$V_{GT}$			Max	1.3	V
$V_{GD}$	$V_D = V_{DRM}$ , $R_L = 3.3\text{ k}\Omega$	125 °C	Min.	0.2	V
$I_H$	$I_T = 500\text{ mA}$ , gate open		Max.	150	mA
$I_L$	$I_G = 1.2 \times I_{GT}$		Max.	200	mA
$dV/dt$	$V_D = 67\%$ , $V_{DRM}$ gate open	125 °C	Min.	1000	V/ $\mu$ s
$V_{TM}$	$I_{TM} = 100\text{ A}$ , $t_p = 380\text{ }\mu$ s	25 °C	Max.	1.9	V
$V_{TO}$	threshold on-state voltage	125 °C	Max.	1.0	V
$R_D$	Dynamic resistance	125 °C	Max.	8.5	m $\Omega$
$I_{DRM}/I_{RRM}$	$V_D = V_{DRM}$ , $V_R = V_{RRM}$	25 °C	Max.	10	$\mu$ A
		125 °C		5	mA

**Table 3. Thermal resistance**

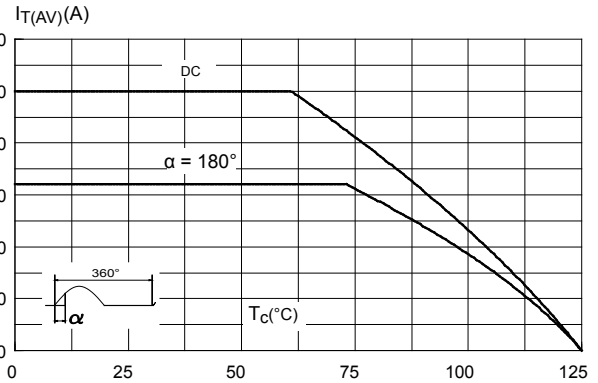
Symbol	Parameters	Value	Unit
$R_{th(j-c)}$	Junction to case (D.C)	1.0	°C/W

## 1.1 Characteristics curves

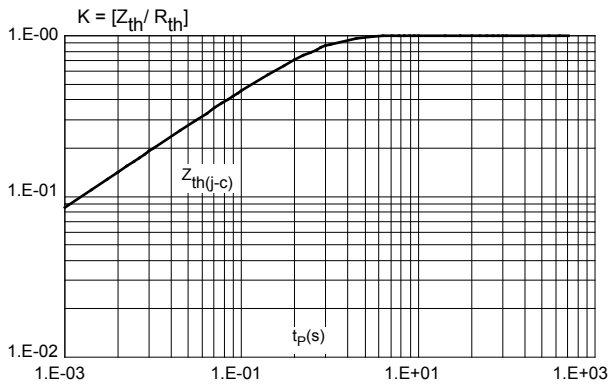
**Figure 1. Maximum average power dissipation versus average on-state current**



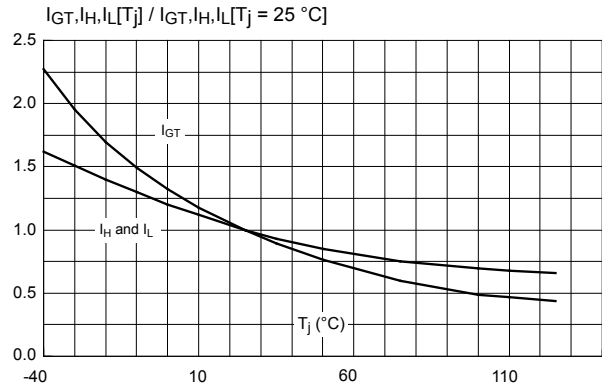
**Figure 2. Average on-state current versus case temperature**



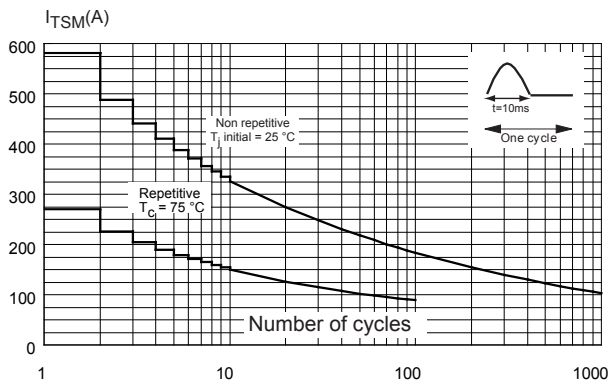
**Figure 3. Relative variation of thermal impedance versus pulse duration**



**Figure 4. Relative variation of gate trigger current, holding current and latching current versus junction temperature**



**Figure 5. Surge peak on-state current versus number of cycles**



**Figure 6. Non repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10\text{ms}$ , and corresponding value of  $I^2t$**

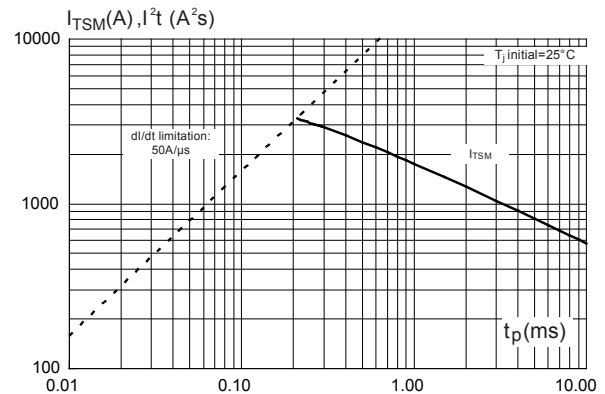
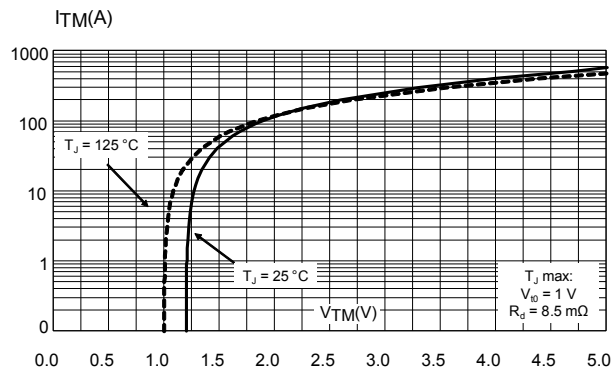


Figure 7. On-state characteristics (maximum values)



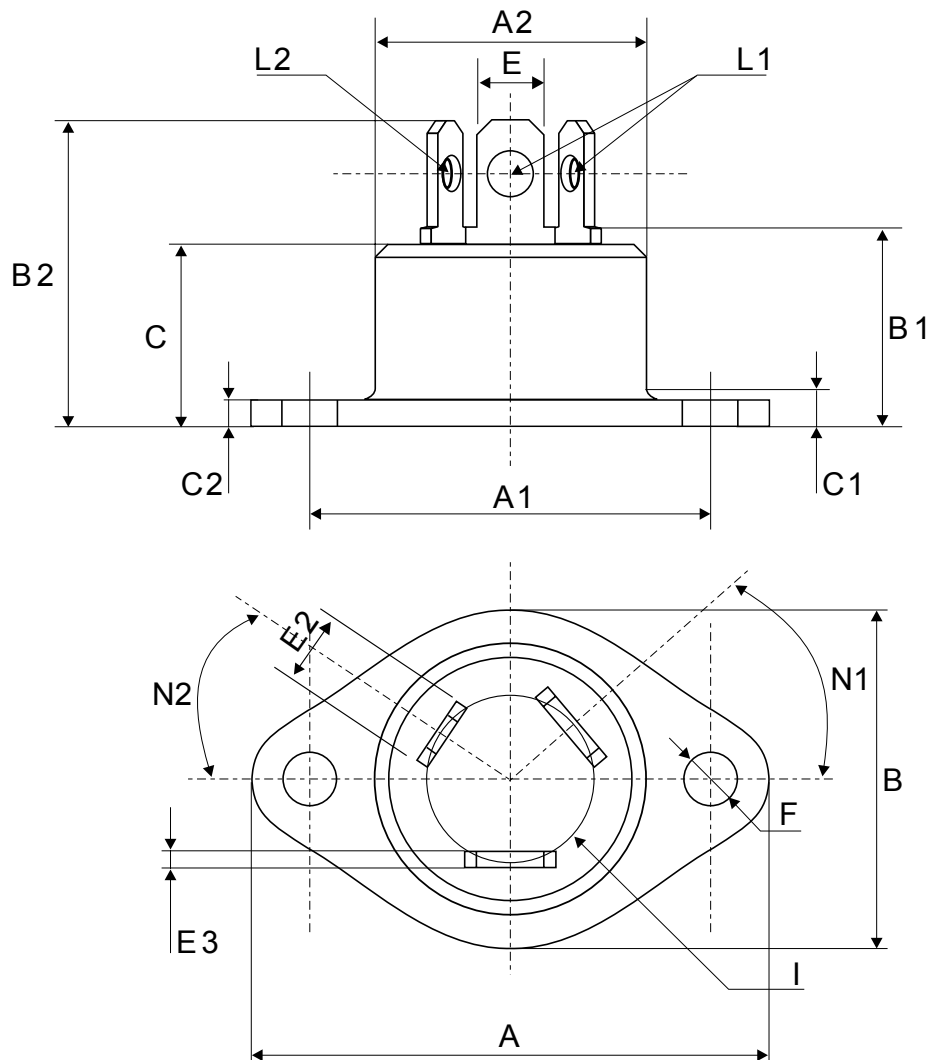
## 2 Package information

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

### 2.1 RD91 package information

- Epoxy meets UL94, V0
- Cooling method: Conduction
- Recommended torque: 0.9 to 1.2 N·m

**Figure 8. RD91 package outline**



**Table 4. RD91 mechanical data**

Ref.	Dimensions					
	mm			Inches <sup>(1)</sup>		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			40.00			1.575
A1	30.10		30.30	1.185		1.193
A2			22.00			0.867
B			27.00			1.063
B1	13.50		16.50	0.531		0.650
B2			24.00			0.945
C			14.00			0.552
C1			3.50			0.138
C2	1.90		2.10	0.074		0.083
E	6.10		6.50	0.240		0.256
E2	4.80		5.20	0.188		0.205
E3	0.70		0.90	0.027		0.036
F	4.00		4.30	0.157		0.170
I	11.20		11.60	0.440		0.536
L1	3.10		3.50	0.122		0.138
L2	1.70		1.90	0.066		0.075
N1	33°		43°	33°		43°
N2	28°		38°	28°		38°

1. Inches given for reference only

### 3 Ordering information

Figure 9. Ordering information scheme

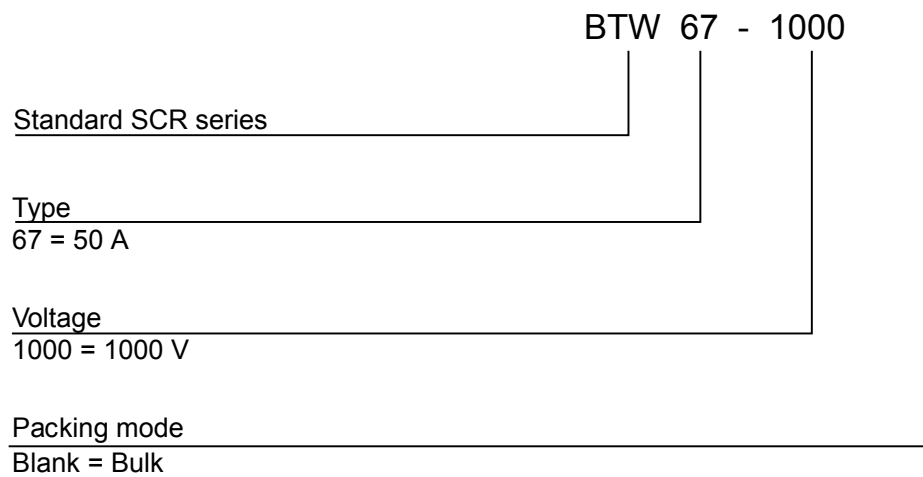


Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
BTW67-1000	BTW671000	RD91	20 g	25	Bulk

## Revision history

**Table 6. Document revision history**

Date	Revision	Changes
Apr-2001	4A	Last update.
13-Feb-2006	5	TOP3 Insulated delivery mode changed from bulk to tube. ECOPACK statement added.
26-Jun-2019	6	Removed TOP3 Ins. package information. Minor text changed.
27-Feb-2023	7	Updated package pinout.



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