

1、Description

Designed primarily for industrial and consumer applications for full wave control of ac loads such as appliance controls, heater controls, motor controls, and other power switching applications.



2、Applications

- Power gate Switching
- appliance control
- heater control
- motor control

3、Features

- Blocking voltage to 800V
- On-state RMS current to 8A
- Ultra low gate trigger current
- Low cost package.

4、Pinning information

PIN	Description	Simplified outline	Symbol
1	main terminal 1 (T1)	 TO-220	
2	main terminal 2 (T2)		
3	gate (G)		
tab	main terminal		

5、Quick reference data

SYMBOL	PARAMETER	MAX	UNIT
V_{DRM} V_{RRM}	Repetitive peak off-state voltages	800	V
$I_{T(RMS)}$	RMS on-state current	8	A
I_{TSM}	Non-repetitive peak on-state current	80	A

6、Thermal characteristics

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Thermal resistance junction to case		-	-	2.0	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		-	-	62.5	°C/W
T_L	Maximum Lead Temperature for Soldering Purposes 1/8" from case for 10 Seconds	in free air		-	260-	°C

7、Limiting value

Limiting values in accordance with the Maximum System(IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
V_{DRM} V_{RRM}	Repetitive peak off-state voltages		-		800	V
$I_{T(RMS)}$	RMS on-state current	Full Cycle Sine Wave 50 to 60 Hz ($T_C = 80^\circ\text{C}$)	-		8	A
I_{Tsm}	Non-repetitive peak Surge Current	One Full Cycle Sine Wave, 60 Hz, $T_J = 110^\circ\text{C}$	-	-	80	A
I^2t	I^2t for fusing	$t = 8.3\text{ ms}$	-	-	26	A^2s
di_T/dt	Repetitive rate of rise of on-state current after triggering	$I_{TM} = 12\text{ A}$; $I_G = 0.2\text{ A}$; $di_G/dt = 0.2\text{ A/s}$				
			-	-	50	$\text{A}/\mu\text{s}$
			-	-	50	$\text{A}/\mu\text{s}$
			-	-	50	$\text{A}/\mu\text{s}$
			-	-	10	$\text{A}/\mu\text{s}$
I_{GM}	Peak gate current	$t \leq 2\text{ s}$, $T_C = 80^\circ\text{C}$	-	-	± 2.0	A
V_{GM}	Peak gate voltage	$t \leq 2\text{ s}$, $T_C = 80^\circ\text{C}$	-	-	± 10	V
P_{GM}	Peak gate power	$t \leq 2\text{ s}$, $T_C = 80^\circ\text{C}$	-	-	20	W
$P_{G(AV)}$	Average gate power	$t \leq 8.3\text{ ms}$, $T_C = 80^\circ\text{C}$	-	-	0.5	W
T_{stg}	Storage temperature		-40	-	150	$^\circ\text{C}$
T_J	Operating junction temperature		-40	-	110	$^\circ\text{C}$

8、Characteristics

$T_J = 25^\circ\text{C}$ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Static characteristics						
I_{GT}	Gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$				
			-	5	10	mA
			-	5	10	mA
			-	5	10	mA
			-	15	25	mA
I_H	Holding current	$V_D = 12\text{ Vdc}$, Initiating Current = $\pm 200\text{ mA}$, Gate Open	-	-	15	mA
V_{TM}	On-state voltage	$I_{TM} = \pm 11\text{ A}$ Peak, Pulse Width $\leq 2\text{ ms}$, Duty Cycle $\leq 2\%$	-	1.3	1.8	V
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$ MT2(+), G(+); MT2(+), G(-); MT2(-), G(-) MT2(-), G(+)	-	-	2.0	V
			-	-	2.5	V
V_{GD}	Gate Non-Trigger Voltage (Continuous dc)	$V_D = 12\text{ V}$, $T_C = 110^\circ\text{C}$, $R_L = 100\text{ }\Omega$) All Four Quadrants	0.2	-	-	V
Dynamic Characteristics						
dv_D/dt	Critical rate of rise of off-state voltage	$V_D = \text{Rated } V_{DRM}$, Exponential Waveform, $T_C = 110^\circ\text{C}$	-	25	-	$\text{V}/\mu\text{s}$
$dv_D/dt(c)$	Critical Rate of Rise of Commutation Voltage	$V_D = \text{Rated } V_{DRM}$, $I_{TM} = 11.3\text{ A}$, Commutating $di/dt = 4.1\text{ A/ms}$, Gate Unenergized, $T_C = 80^\circ\text{C}$		5.0	-	$\text{V}/\mu\text{s}$
t_{gt}	Gate controlled turn-on time	$V_D = \text{Rated } V_{DRM}$, $I_{TM} = 16\text{ A}$ Peak, $I_G = 30\text{ mA}$	-	1.5	-	μs

9. Electrical Characteristics Curve

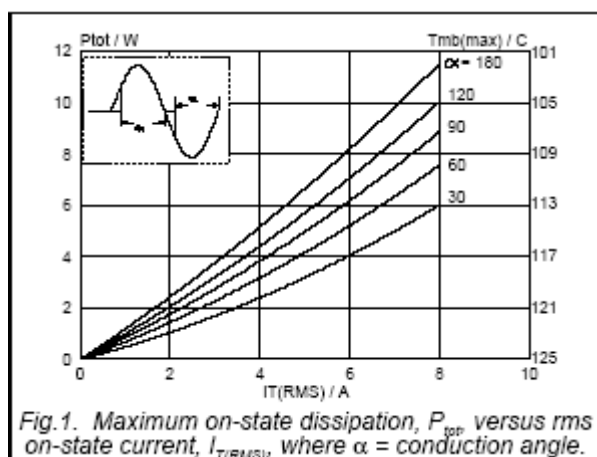


Fig.1. Maximum on-state dissipation, P_{top} , versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

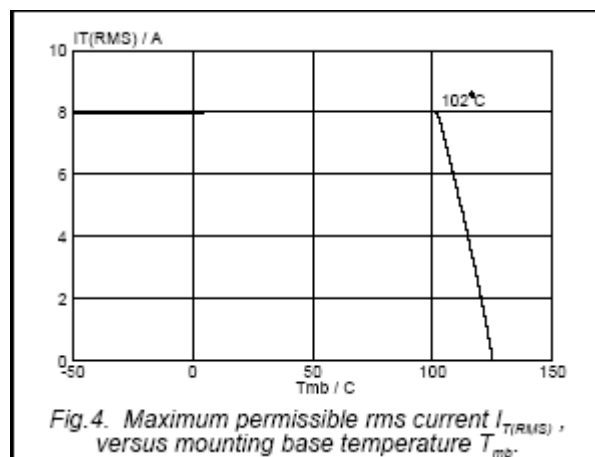


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

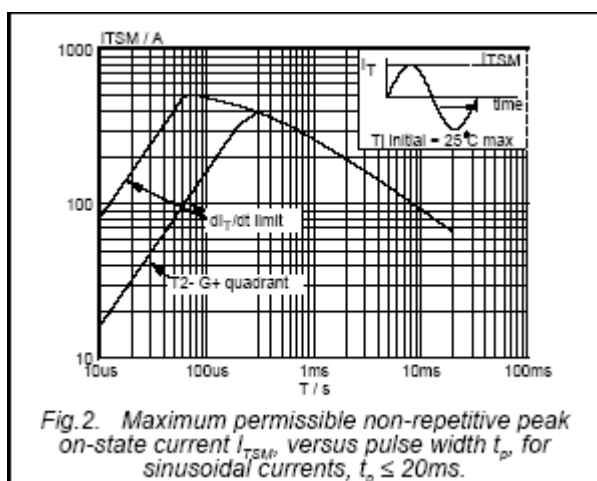


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20\text{ms}$.

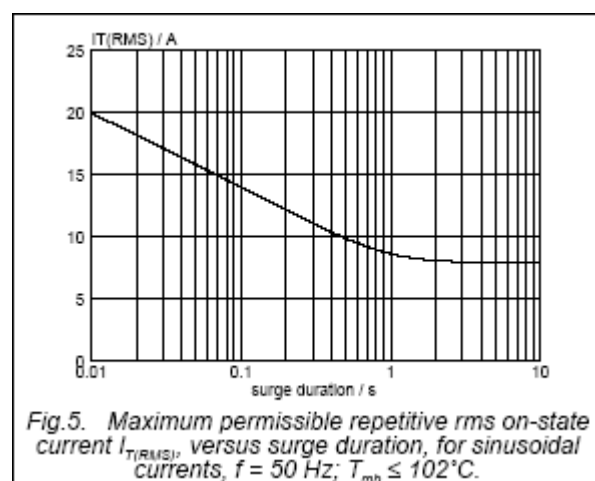


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50\text{ Hz}$; $T_{mb} \leq 102^\circ\text{C}$.

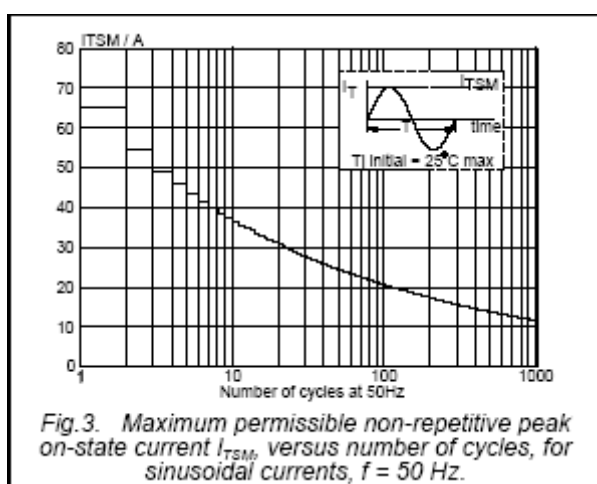


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50\text{ Hz}$.

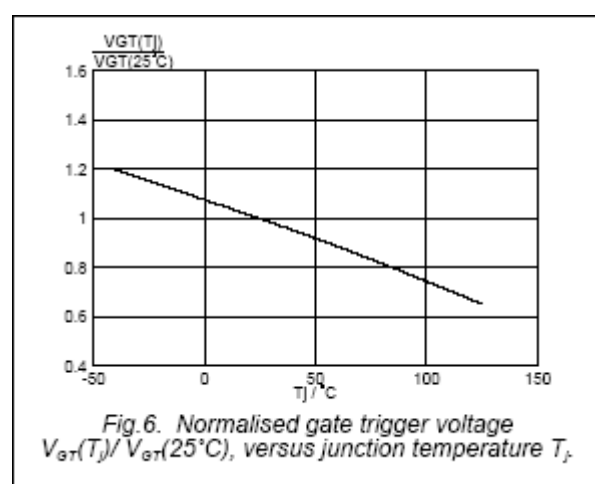
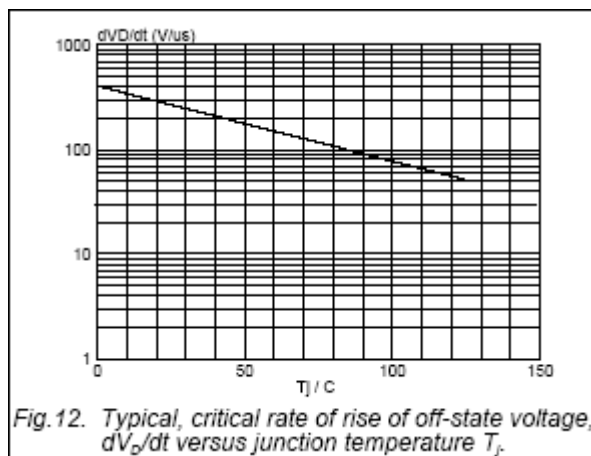
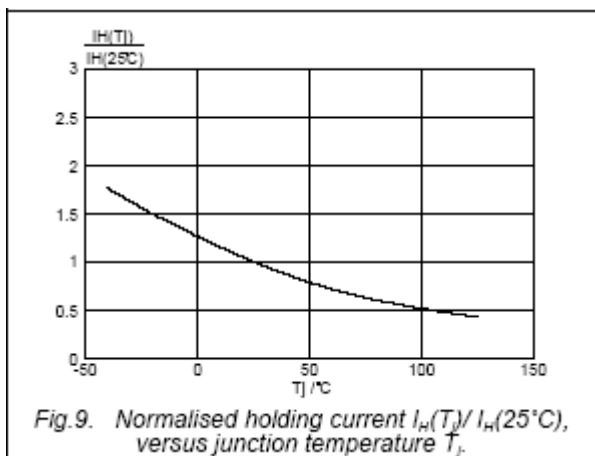
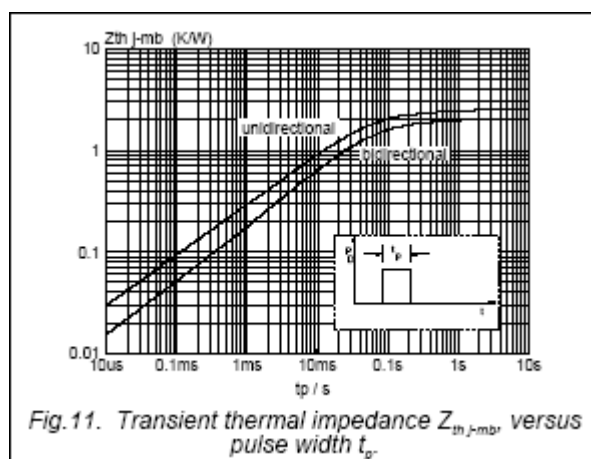
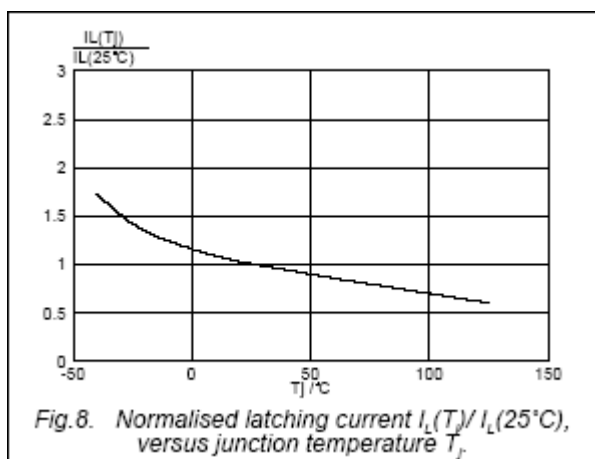
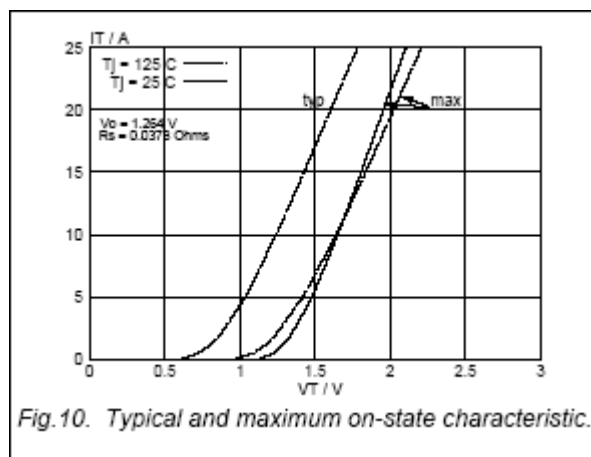
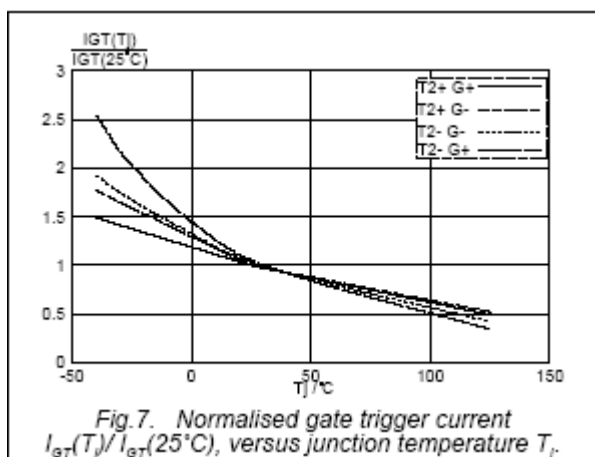
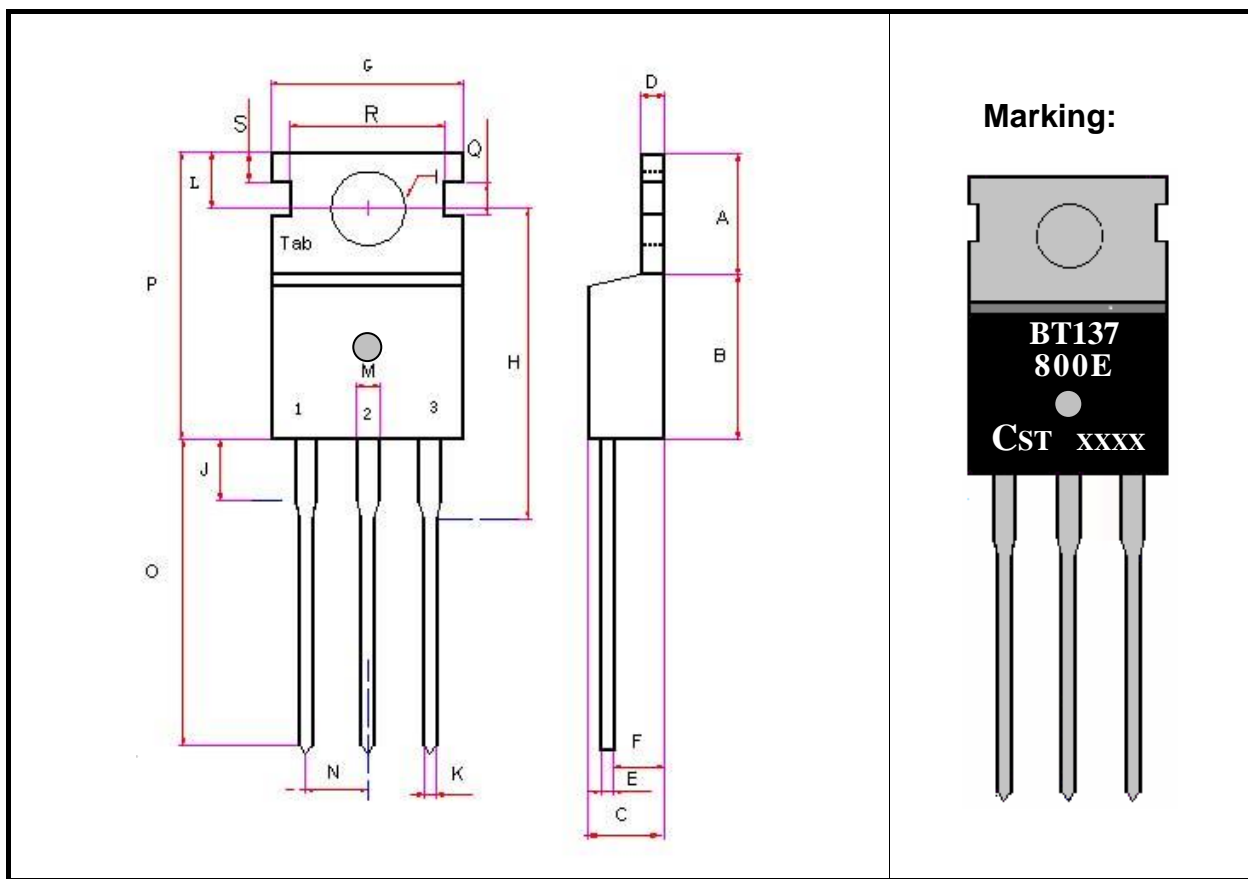


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j) / V_{GT}(25^\circ\text{C})$, versus junction temperature T_j .



10、Package outline(TO-220)



DIM	Inches			Millimeters		
	Min	Type	Max	Min	Type	Max
A	0.226	0.258	0.301	5.75	6.55	7.65
B	0.349	0.362	0.369	8.86	9.20	9.38
C	0.171	0.178	0.183	4.35	4.53	4.65
D	0.046	0.051	0.055	1.16	1.30	1.40
E	0.018	0.020	0.026	0.45	0.51	0.65
F	0.070	0.094	0.105	1.785	2.40	2.675
G	0.367	0.394	0.415	9.31	10.00	10.55
H	-	-	0.640	-	-	16.25
I	-	0.143	0.152	-	3.62	3.85
J	0.087	0.108	0.127	2.22	2.75	3.22
K	0.027	0.031	0.035	0.68	0.8	0.88
L	0.093	-	0.128	2.36	-	3.24
M	0.046	0.048	0.057	1.18	1.22	1.44
N	-	0.100	0.104	-	2.54	2.65
O	0.485	0.514	0.546	12.32	13.05	13.88
P	0.593	0.616	0.648	15.07	15.65	16.47
Q	0.057	0.067	0.073	1.46	1.7	1.86
R	0.320	0.344	0.360	8.14	8.75	9.14
S	0.046	0.051	0.058	1.17	1.3	1.47