BT139 Series

Plastic-Encapsulate Thyristors

Features

- NPNPN 5-layer Structure TRIACs
- Mesa Glass Passivated Technology
- Multi Layers Metal Electrodes
- High Junction Temperature
- Good Commutation Performance
- High dV/dt and dI/dt
- Insulating Voltage=2500V(RMS)

Product Summary

Symbol	PartNumber	Rating	Unit
$I_{T(RMS)}$		16	A
V_{DRM}/V_{RRM}	BT139-600D/E/F	600	V
	BT139-800D/E/F	800	
V_{TM}		1.55	V

Applications

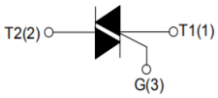
- Heater Control
- Mixer
- Motor Speed Controller

TO-263

TO-220

TO-220F

Pb-Free RoHS Halogen-Free



Maximum Ratings(Ta=25℃ unless otherwise noted)

Symbol	Parameter	Test condition		Rating		Unit
V_{DRM}/V_{RRM}	Repetitive peak off-state voltages	T_j=25℃	BT139-600D/E/F	600		V
			BT139-800D/E/F	800		
$I_{T(RMS)}$	RMS on-state current	T_C≤100℃		16		A
I_{TSM}	Non repetitive surge peak on-state current	Full sine wave,tp=20ms,Tj(init)=25℃		140		A
I^2t	I^2t value for fusing	tp=10ms		98		A^2s
dI_T/dt	Critical rate of rise of on-state current	I_G=2*I_{GT},tr≤10ns, F=120HZ,T_j=125℃		Ⅰ-Ⅱ-Ⅲ	50	A/μs
				Ⅳ	10	
I_{GM}	Peak gate current	tp=20us,T_j=125℃		2		A
$P_{G(AV)}$	Average gate power	T_j=125℃		0.5		W
P_{GM}	Peak gate Power	tp=20us,T_j=125℃		5		W
T_j	Junction Temperature			-40~+125		℃
T_{stg}	Storage Temperature			-40~+150		℃
Mounted on Large Heat Sink						
Rth(j-c)	Junction to case (AC)			1.2		℃/W

Electrical Characteristics(Ta=25℃ unless otherwise noted)

Symbol	Parameter	Test conditions		Value			Unit
				D	E	F	
I_{GT}	Gate trigger current	V_D=12V,I_T=0.1A ,T_j=25℃	Ⅰ-Ⅱ-Ⅲ	≤5	≤10	≤25	mA
			Ⅳ	≤10	≤25	≤70	
V_{GT}	Gate trigger voltage		ALL	≤1.3			V
V_{GD}	Non-triggering gate voltage	V_D=V_{DRM},Tj=125℃		≥0.2			V
I_H	Holding current	V_D=12V,I_{GT}=0.1A ,Tj=25℃	ALL	≤10	≤25	≤30	mA
I_L	Latching current		Ⅰ-Ⅲ-Ⅳ	≤30	≤30	≤40	mA
			Ⅱ	≤20	≤40	≤70	mA
dV/dt	Critical rate of rise of off-state	V_D=2/3V_{DRM} Gate Open Tj=125℃		≥50	≥100	≥500	V/μs
V_{TM}	On-state	I_{TM}=20A,tp=380μs		≤1.55			V
I_{DRM}/I_{RRM}	Repetitive peak off-state current	V_D=V_{DRM}/V_{RRM},Tj=25℃		≤10			μA
		V_D=V_{DRM}/V_{RRM},Tj=125℃		≤1			mA

Ordering Information (Example)

Part Number	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)
BT139-600/800	TO-220	See the table below	50	1,000	5,000
BT139-600/800	TO-220F		50	1,000	5,000
BT139-600/800	TO-263		800	800	4,000

PART NUMBER

BT — TRIACS

139 — 4 Quadrant $I_{T(RMS)}$=16A

-600 — Repetitive peak off-state voltages
600：≥600V
800：≥800V

E
D：I_{GT1-3}≤5mA,I_{GT4}≤10mA
E：I_{GT1-3}≤10mA,I_{GT4}≤25mA
F：I_{GT1-3}≤25mA,I_{GT4}≤70mA

Typical Operating Characteristics

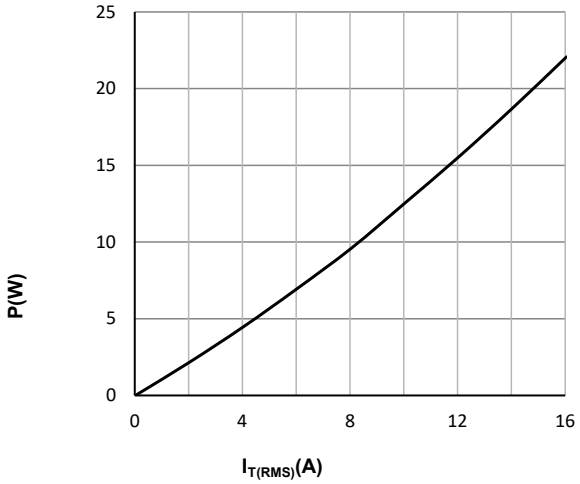


Fig1. Maximum power dissipation versus RMS on-state current

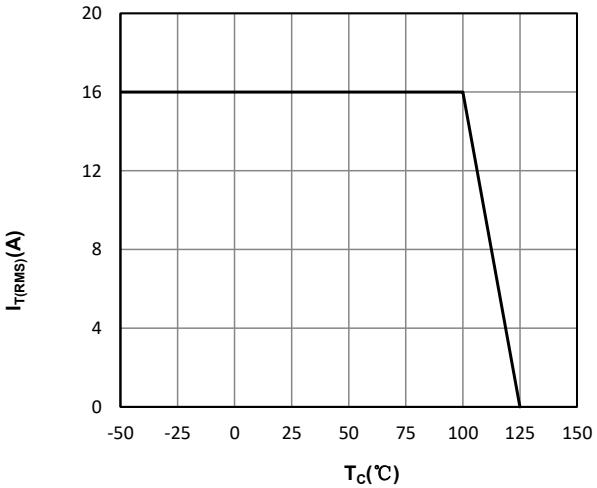


Fig2. RMS on-state current versus case temperature

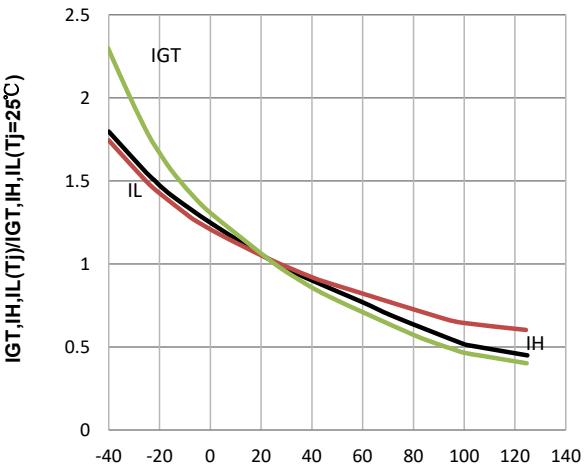


Fig3. Relative variations of gate trigger current, holding current and latching current versus junction temperature

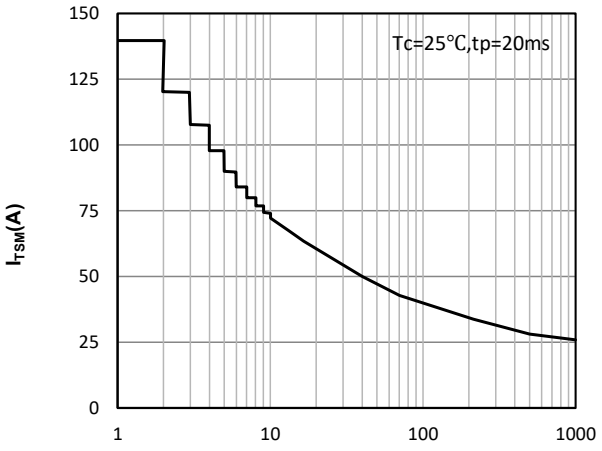


Fig4. Surge peak on-state current versus number of cycles

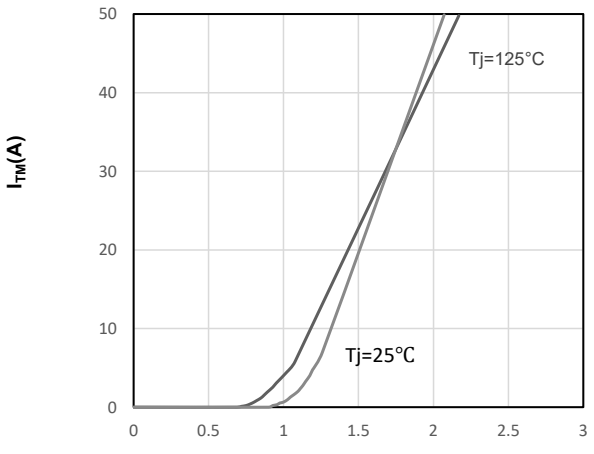


Fig5. On-state characteristics

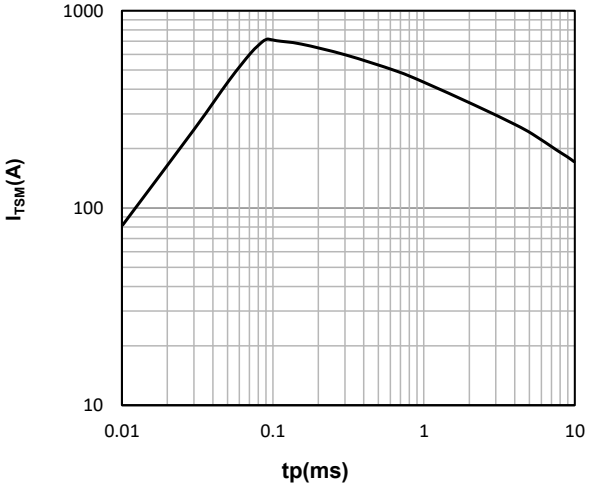
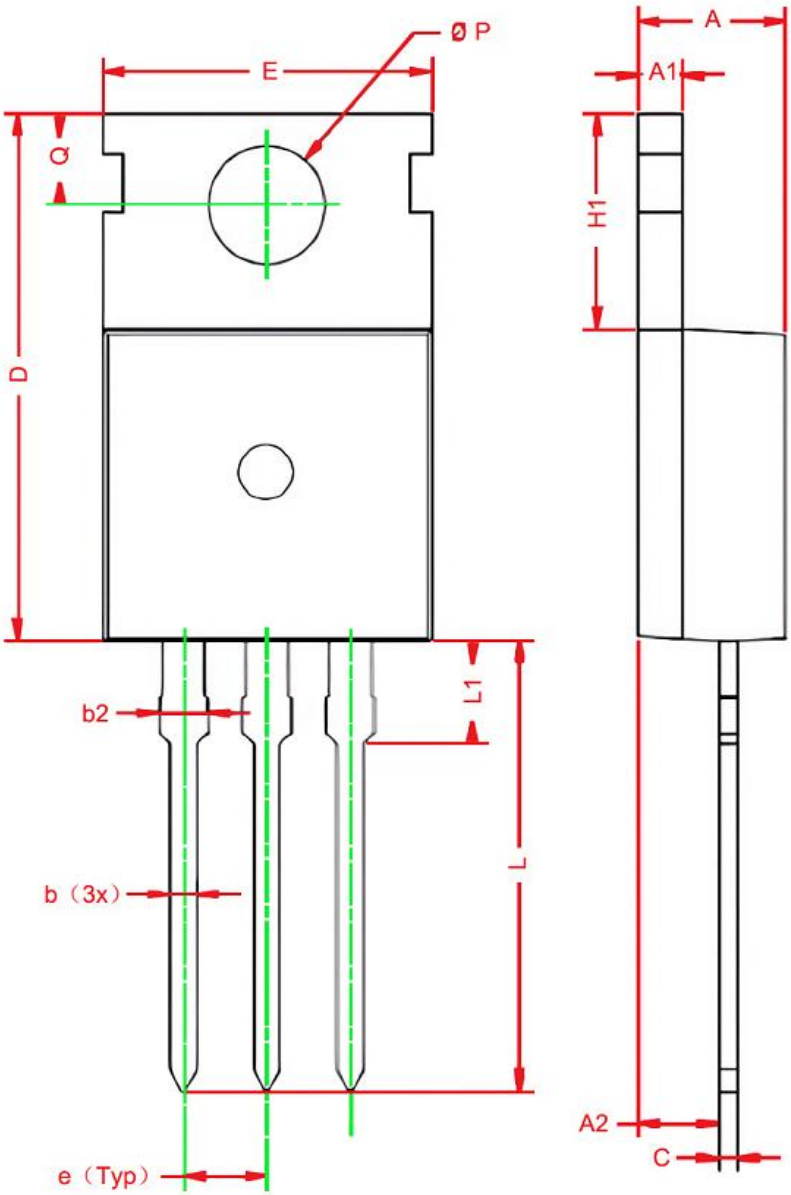


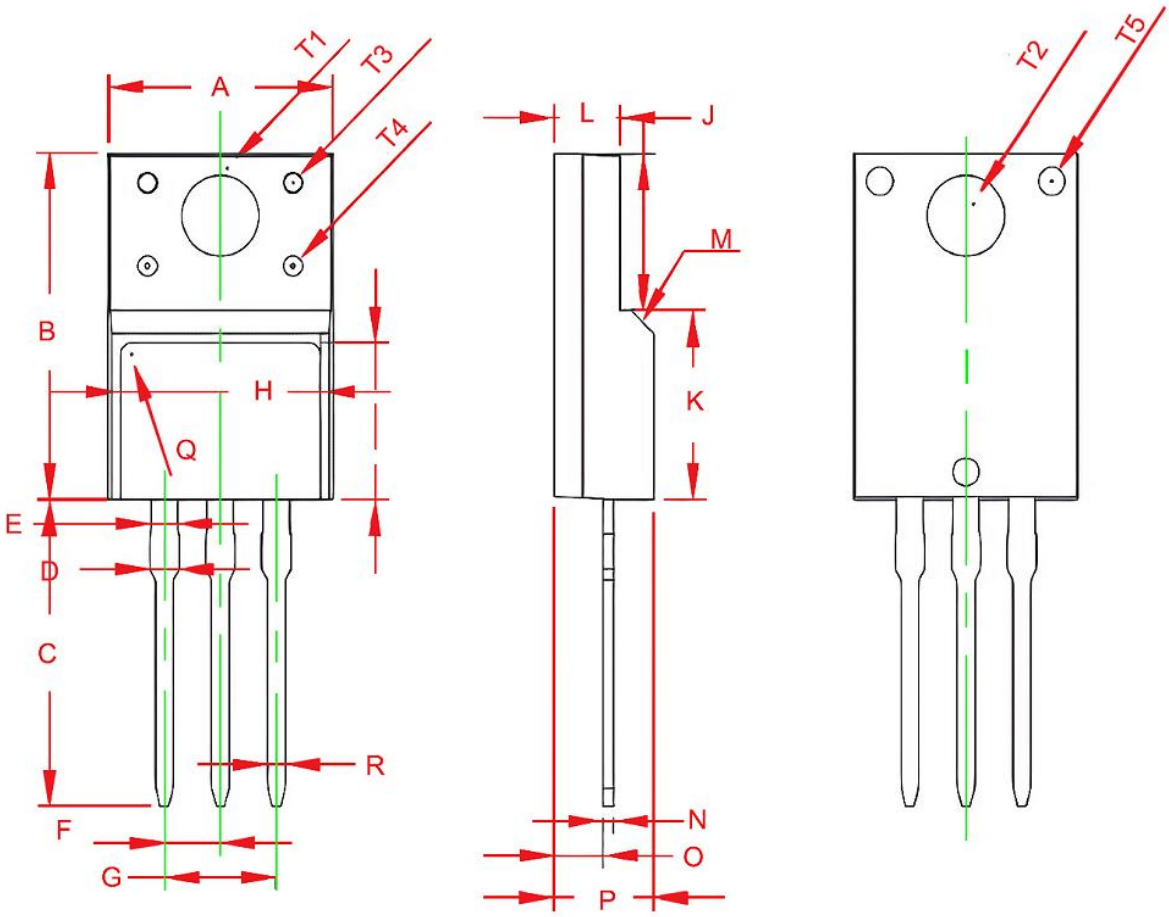
Fig6. Non-repetitive surge peak on-state current for a sinusoidal currents pulse with width tp<20ms

TO-220 Package information



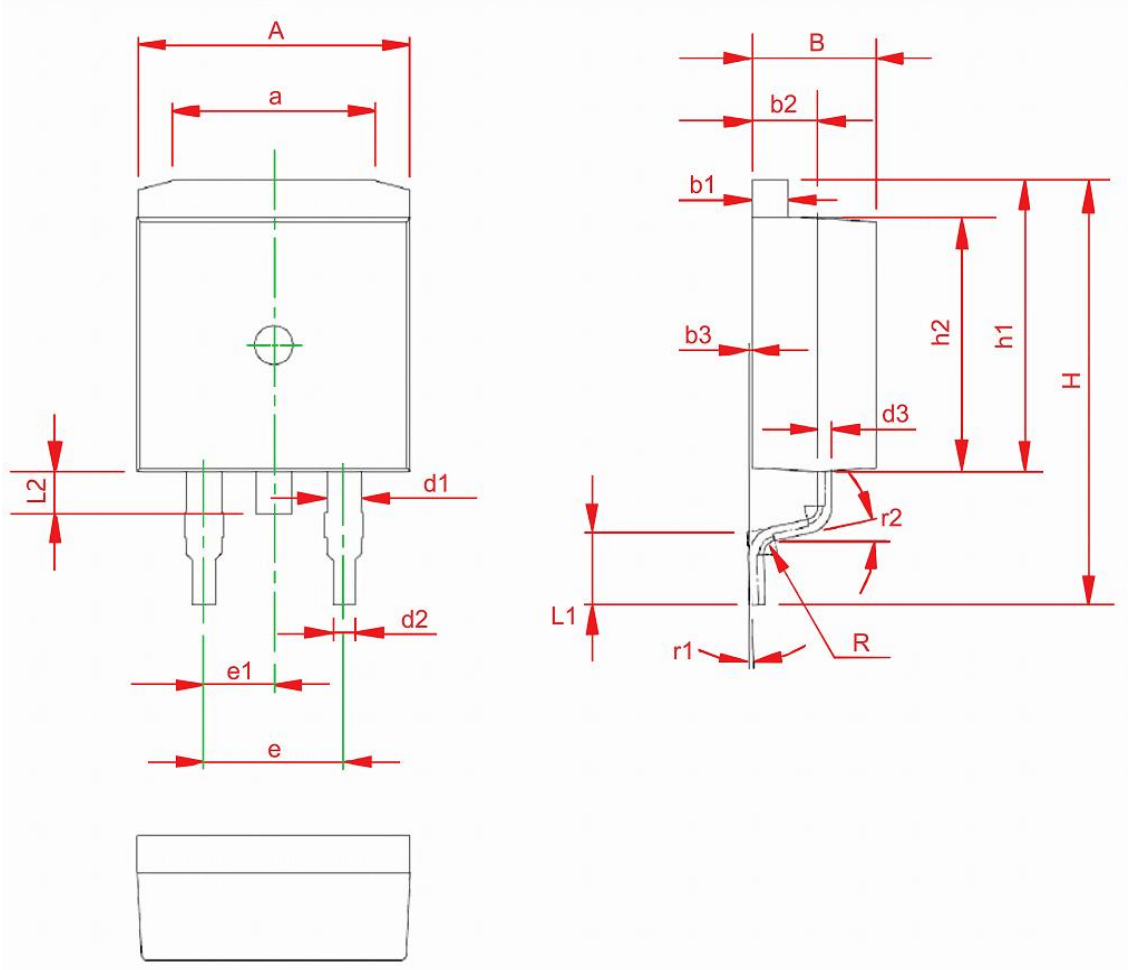
Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	3.600	4.800	0.142	0.189
A1	1.200	1.400	0.047	0.055
A2	2.030	2.900	0.080	0.114
b	0.400	1.000	0.016	0.039
b2	1.200	1.780	0.047	0.070
c	0.360	0.600	0.014	0.024
D	14.220	16.500	0.561	0.651
e	2.340	2.740	0.092	0.108
E	9.700	10.600	0.383	0.418
H1	5.840	6.850	0.230	0.270
L	12.700	14.700	0.501	0.580
L1	2.700	3.300	0.106	0.130
ØP	3.500	4.000	0.138	0.158
Q	2.540	3.400	0.100	0.134

TO-220F Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	9.960	10.360	0.392	0.407
B	15.670	16.070	0.616	0.632
C	13.140	13.540	0.517	0.533
D	1.200	1.400	0.047	0.055
E	1.200TYP		0.047TYP	
F	2.540TYP		0.100TYP	
G	5.080TYP		0.200TYP	
H	7.600	8.000	0.299	0.314
I	7.100	7.500	0.279	0.295
J	6.480	6.880	0.255	0.270
K	8.990	9.390	0.353	0.369
L	2.340	2.740	0.092	0.107
M	45°TYP		45°TYP	
N	0.490	0.520	0.019	0.020
O	2.150	2.550	0.084	0.100
P	4.500	4.900	0.177	0.192
Q	0.500TYP		0.019TYP	
S	4.5°TYP		4.5°TYP	
T1	3.450TYP		0.135TYP	
T2	3.180TYP		0.125TYP	
T3	1.500TYP		0.059TYP	
T4	1.200TYP		0.047TYP	
T5	1.500TYP		0.059TYP	
R	0.770	0.830	0.030	0.032

TO-263 Package information



Symbol	Dimensions in Millimeters(mm)		Symbol	Dimensions in Millimeters(mm)	
	Min	Max		Min	Max
A	9.700	10.300	e1	2.54TYP	
a	7.000	7.800	H	14.800	15.600
B	4.300	4.700	h1	10.200	10.700
b1	1.250	1.350	h2	8.900	9.400
b2	2.200	2.600	L1	2.400	2.900
b3	0.000	0.200	L2	1.300	1.800
d1	1.200	1.400	R	0.5TYP	
d2	0.700	0.900	r1	0°	8°
d3	0.400	0.600	r2	12°TYP	
e	5.08TYP				