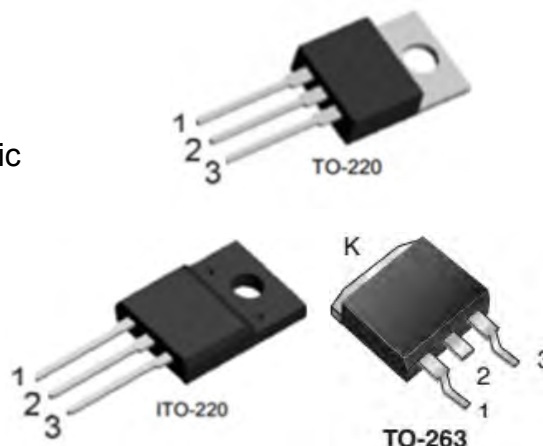


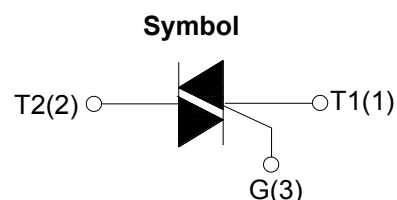
DESCRIPTION:

BT139 Triacs is fabricated using separation diffusion processes, the junction termination areas are passivated with glass. Thanks to highly dv/dt and reliability, the Triacs series is suitable for domestic lighting, heating and motor speed controllers.



MAIN FEATURES

Symbol	Value	Unit
V_{DRM}/V_{RRM}	600 / 800	V
$I_{T(RMS)}$	16	A



ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Storage junction temperature range		T_{stg}	-40 - 150	°C
Operating junction temperature range		T_j	-40 - 125	°C
Repetitive peak off-state voltage ($T_j=25^{\circ}\text{C}$)		V_{DRM}	600 / 800	V
Repetitive peak reverse voltage ($T_j=25^{\circ}\text{C}$)		V_{RRM}	600 / 800	V
Non repetitive surge peak Off-state voltage		V_{DSM}	$V_{DRM} + 100$	V
Non repetitive peak reverse voltage		V_{RSM}	$V_{RRM} + 100$	V
RMS on-state current	$T_C=105^{\circ}\text{C}$	$I_{T(RMS)}$	16	A
Non repetitive surge peak on-state current (full cycle, $F=50\text{Hz}$)		I_{TSM}	160	A
I^2t value for fusing ($t_p=10\text{ms}$)		I^2t	144	A^2s



Electrical characteristics ($T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) Snubberless and logic level (3 quadrants)

Symbol	Test Condition	Quadrant		Value				Unit
				TW	SW	CW	BW	
I_{GT}	$V_D=12\text{V}$ $R_L=33\Omega$	I - II - III	MAX	5	10	35	50	mA
V_{GT}		I - II - III	MAX	1.3				V
V_{GD}	$V_D=V_{DRM}$ $T_j=125^{\circ}\text{C}$ $R_L=3.3\text{K}\Omega$	I - II - III	MIN	0.2				V
I_L	$I_G=1.2I_{GT}$	I - III	MAX	10	25	50	70	mA
		II		15	30	60	80	
I_H	$I_{TM}=100\text{mA}$			20	25	35	50	mA
dV/dt	$V_D=2/3V_{DRM}$ Gate Open $T_j=125^{\circ}\text{C}$		MIN	20	40	400	1000	V/ μs

4 Quadrants

Symbol	Test Conditions	Quadrant		Value				Unit
				B	C	D	E	
I_{GT} (1)	$V_D = 12\text{ V}$ $R_L = 30\ \Omega$	I - II - III IV	MAX.	50 100	25 50	5 10	10 25	mA
V_{GT}		ALL	MAX.	1.3				V
V_{GD}	$V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$ $T_j = 125^{\circ}\text{C}$	ALL	MIN.	0.2				V
I_H (2)	$I_T = 500\text{ mA}$		MAX.	50	25	10	15	mA
I_L	$I_G = 1.2 I_{GT}$	I - III - IV	MAX.	50	40	10	25	mA
		II		100	80	15	30	
dV/dt (2)	$V_D = 67\% V_{DRM}$ gate open $T_j = 125^{\circ}\text{C}$		MIN.	400	200	10	20	V/ μs

Static characteristics

Symbol	Test conditions			Value	Unit
V_T (2)	$I_{TM} = 22.5\text{ A}$	$t_p = 380\ \mu\text{s}$	$T_j = 25\text{ }^{\circ}\text{C}$	Max.	1.55 V
V_{to} (2)	Threshold voltage		$T_j = 125\text{ }^{\circ}\text{C}$	Max.	0.85 V
R_d (2)	Dynamic resistance		$T_j = 125\text{ }^{\circ}\text{C}$	Max.	25 m Ω
I_{DRM} I_{RRM}	$V_{DRM} = V_{RRM}$		$T_j = 25\text{ }^{\circ}\text{C}$	Max.	5 μA
			$T_j = 125\text{ }^{\circ}\text{C}$		2 mA



Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case (AC)	D ² PAK / TO-220AB	1.2	°C/W
		ITO-220AB insulated	3.9	
$R_{th(j-a)}$	Junction to ambient	$S^{(1)} = 1 \text{ cm}^2$ D ² PAK	45	°C/W
		TO-220AB	60	

1. S = Copper surface under tab

CHARACTERISTICS

Figure 1. Maximum power dissipation versus on-state rms current (full cycle)

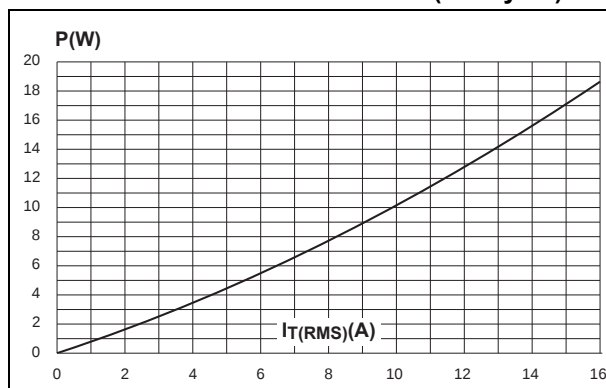


Figure 2. On-state rms current versus case temperature (full cycle)

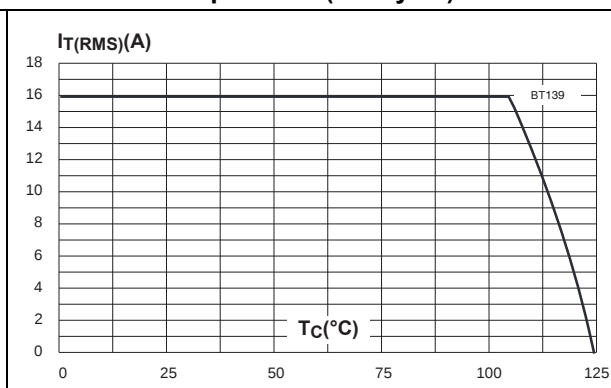


Figure 3. On-state rms current versus ambient temperature (full cycle)

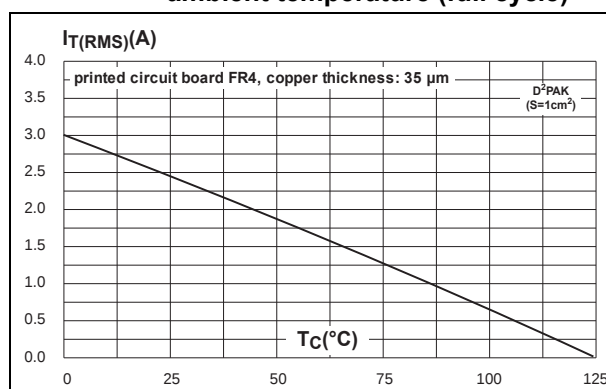


Figure 4. Relative variation of thermal impedance versus pulse duration

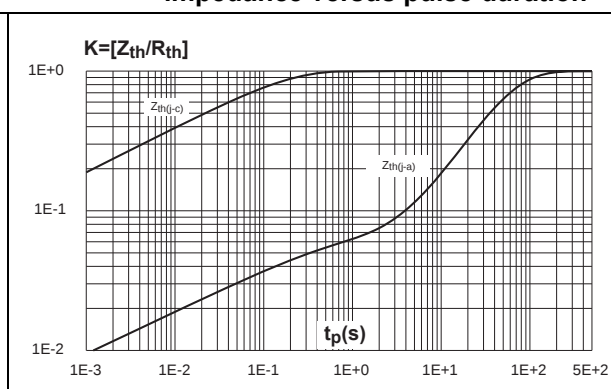


Figure 5. On-state characteristics (maximum values)

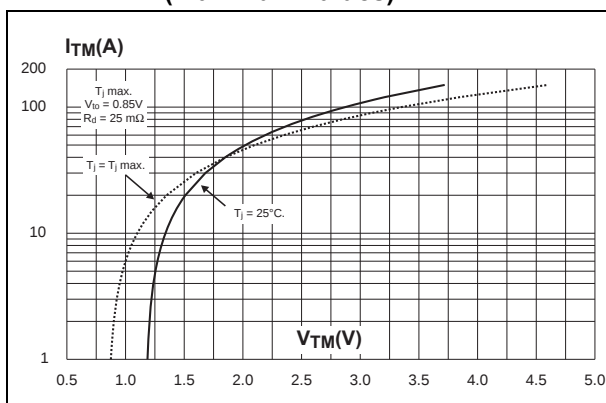
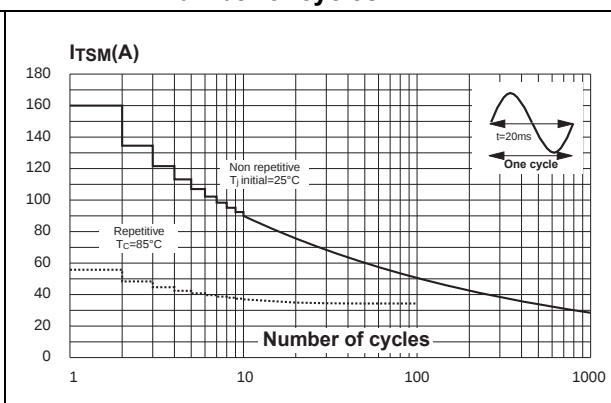


Figure 6. Surge peak on-state current versus number of cycles



CHARACTERISTICS

Figure 7. Non-repetitive surge peak on-state current for a sinusoidal

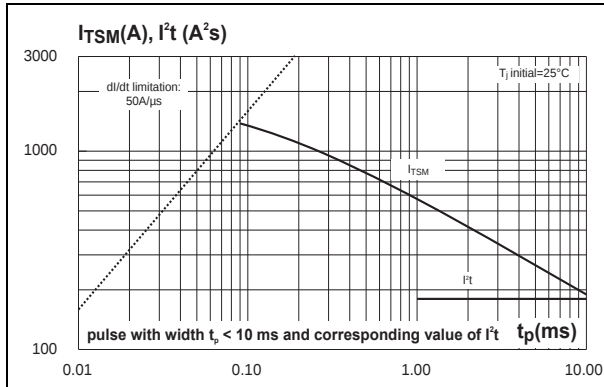


Figure 8. Relative variation of gate trigger current

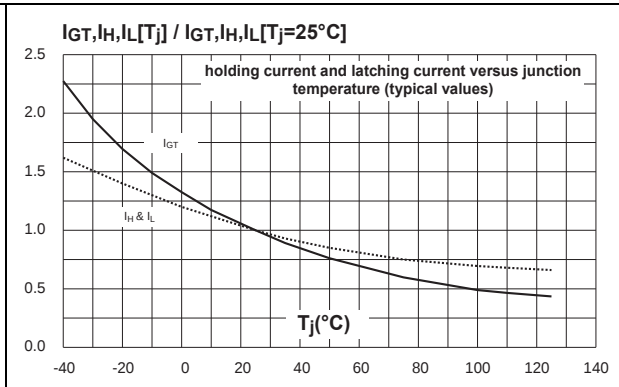


Figure 9. Relative variation of critical rate of decrease of main current versus (dV/dt)_c (typical values)

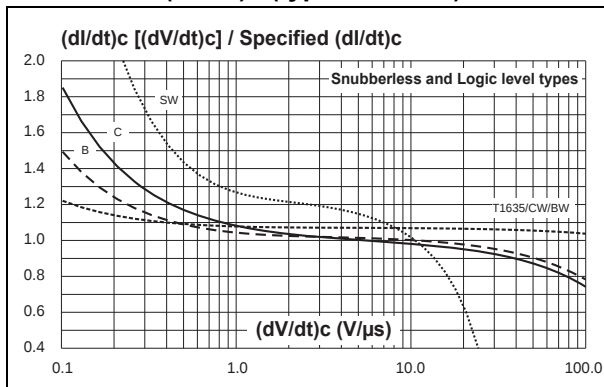


Figure 10. Relative variation of critical rate of decrease of main current versus (dV/dt)_c (typical values)

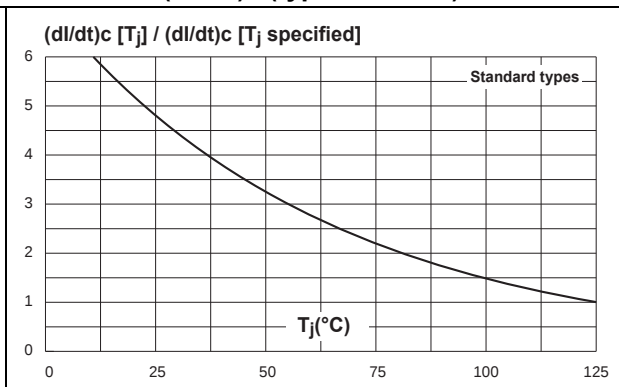
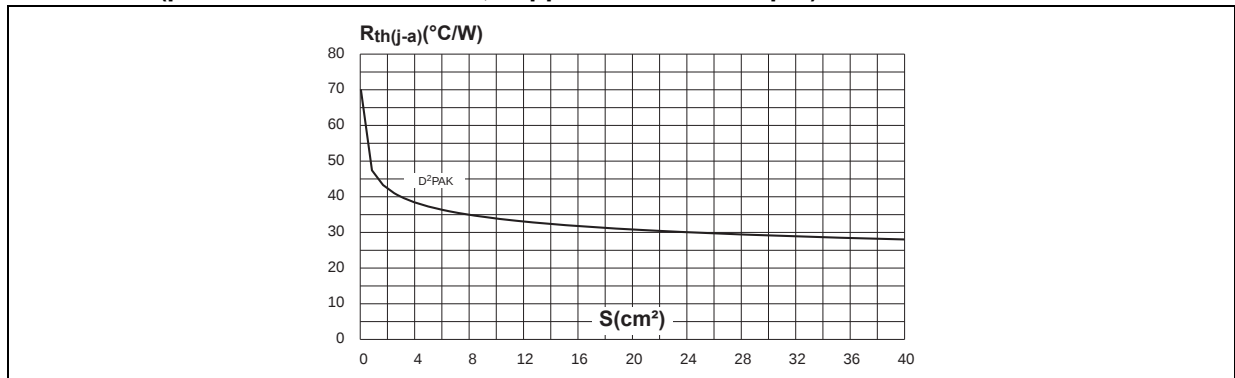
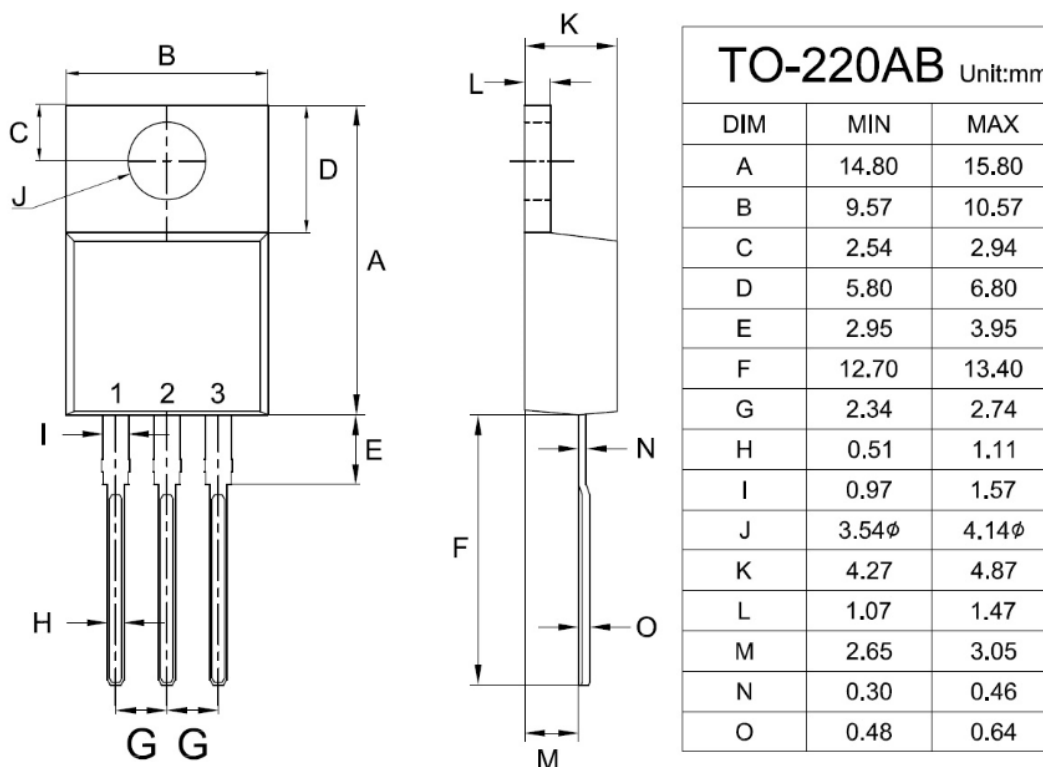


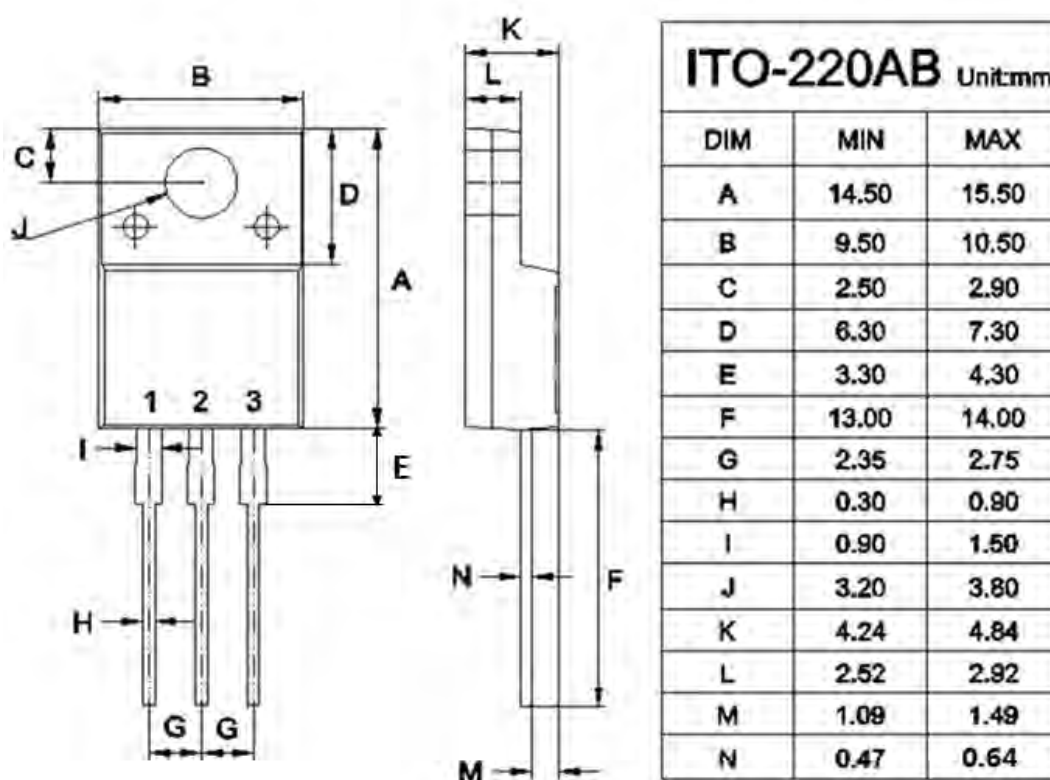
Figure 11. TO-263 thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness: 35 μm)



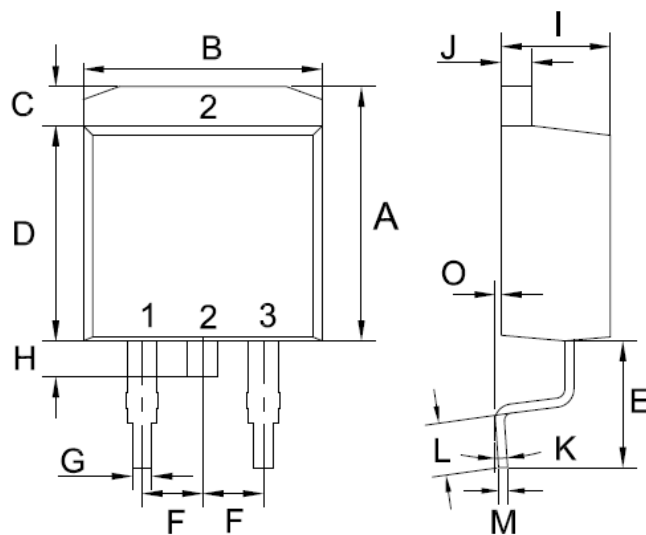
TO-220AB Mechanical Drawing



ITO-220AB Mechanical Drawing



TO-263 Mechanical Drawing



TO-263 (D ² PAK)		
Unit:mm		
DIM	MIN	MAX
A	10.44	10.84
B	9.81	10.21
C	1.44	1.84
D	8.80	9.20
E	4.46	4.66
F	2.44	2.64
G	0.61	1.01
H	0.70	1.30
I	4.27	4.87
J	1.07	1.47
K	0°	8°
L	2.10	2.50
M	0.30	0.46
O	0	0.25