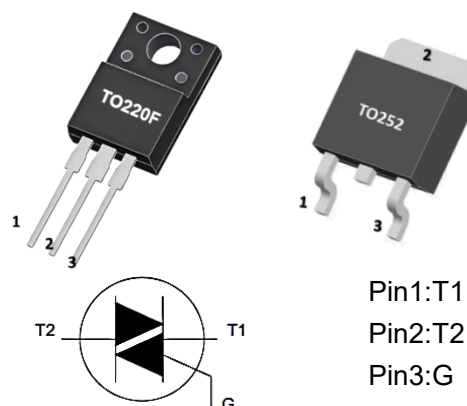


GENERAL DESCRIPTION

Glass passivated , sensitive gate triac in a plastic envelope, intended for use in general purpose bidirectional switching and phase control applications, where high sensitivity is required in all four quadrants.



MARKING



WPM: LOGO
BT138=Device Code
800E:V_{DRM}/V_{RRM}=800V

ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

SYMBOL	PARAMETER		TEST CONDITION	RATINGS	UNIT
V_{DRM}	Repetitive Peak Off-State Voltage	BT138-600E	T _j = 25°C	600	V
		BT138-800E		800	
I_{T(RMS)}	RMS On-State Current(Full sine wave, TMB≤99°C)			12	A
I_{TSM}	Non Repetitive Peak. On-State Current		t=20ms	95	A
			t=16.7ms	105	
I² t	I ² t For Fusing		t=10ms	45	A ² s
di /dt	Repetitive Rate of Rise of On-state Current after Triggering (I _{TM} =20A, I _G =0.2A, di _G /dt=0.2A/μs)		T2+ G-	50	A/μs
			T2+ G-	50	
			T2- G-	50	
			T2- G+	10	
V_{GM}	Peak Gate Voltage			5	V
I_{GM}	Peak Gate Current			2	A
P_{G(AV)}	Average Gate Power			0.5	W
P_{GM}	Peak Gate Power			5	W
T_{stg}	Storage Temperature			-40 to +150	°C
T_j	Operating junction temperature			150	°C

Notes: Although not recommended, off-state voltages up to 800V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 15A/μs.

THERMAL RESISTANCES

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-252/TO-220F	$R\theta_{JA}$	62.5	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220F	$R\theta_{JC}$	3.31	$^{\circ}\text{C}/\text{W}$
	TO-252		2.6	$^{\circ}\text{C}/\text{W}$

STATIC CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Gate trigger current	I_{GT}	T2+ G+	$V_D=12\text{V}, I_T=0.1\text{A}$	2.5	10	mA
		T2+ G-		4.0	10	mA
		T2- G-		5.0	10	mA
		T2- G+		11	25	mA
Latching Current	I_L	T2+ G+	$V_D=12\text{V}, I_T=0.1\text{A}$	3.2	30	mA
		T2+ G-		16	40	mA
		T2- G-		4.0	30	mA
		T2- G+		5.5	40	mA
Holding current	I_H	$V_D=12\text{V}, I_{GT}=0.1\text{A}$		4.0	30	mA
On-State Voltage	V_T	$I_T=15\text{A}$		1.4	1.65	V
Gate Trigger Voltage	V_{GT}	$V_D=12\text{V}, I_T=0.1\text{A}$		0.7	1.5	V
		$V_D=400\text{V}, I_T=0.1\text{A}, T_J=125^{\circ}\text{C}$		0.4		
Off-state leakage current	I_D	$V_D=V_{DRM(max)}, T_J=125^{\circ}\text{C}$			0.5	mA

DYNAMIC CHARACTERISTICS($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Critical Rate Of Rise Of Off-State Voltage	dV_D/dt	$V_{DM}=67\%, V_{DRM(max)}, T_J=125^{\circ}\text{C}$ Exponential waveform, Gate open circuit		50		V/ μs
Gate Controlled Turn-on Time	t_{gt}	$I_{TM}=16\text{A}; V_D=V_{DRM(max)}; I_G=0.1\text{A}$ $dI_G/dt=5\text{A}/\mu\text{s}$		2.0		μs

TYPICAL CHARACTERISTICS (1)

Figure 1. Maximum On-State Dissipation. P_{tot} vs RMS On-state Current, $I_{T(RMS)}$, Where α =Conduction Angle.

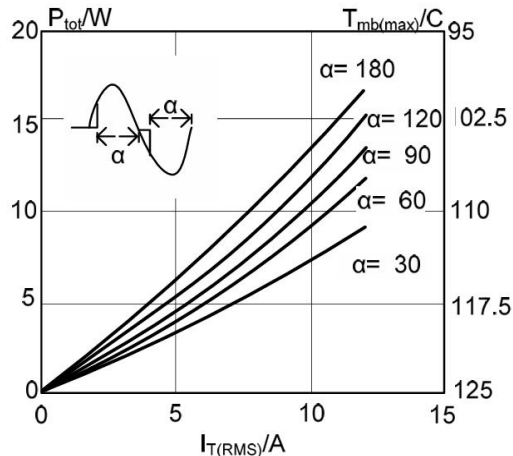


Figure 2. Maximum Permissible Non-Repetitive Peak On-State Current I_{TSM} , vs Pulse Width t_p , for Sinusoidal Currents, $t_p \leq 20ms$.

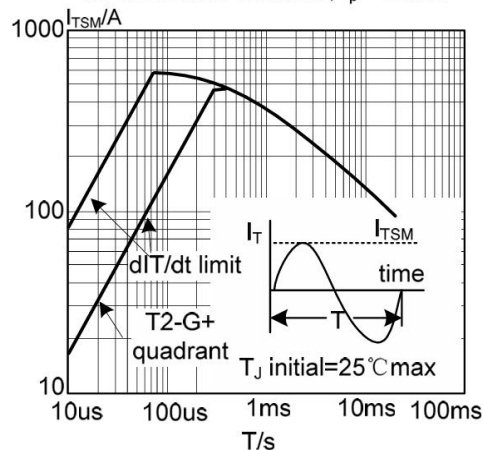


Figure 3. Maximum Permissible Non-Repetitive Peak On-State Current I_{TSM} , vs Number of Cycles, for Sinusoidal Currents, $f=50Hz$.

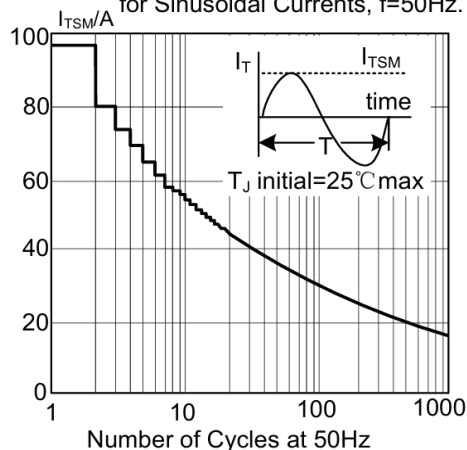


Figure 4. Maximum Permissible RMS Current $I_{T(RMS)}$ vs Mounting Base Temperature T_{mb}

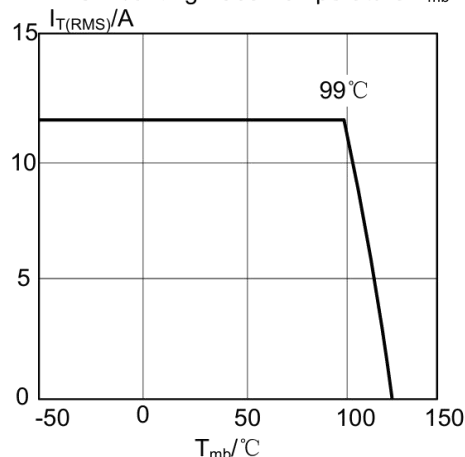


Figure 5. Maximum Permissible Repetitive RMS On-State Current $I_{T(RMS)}$, vs Surge Duration, for Sinusoidal Currents, $f=50Hz$, $T_{mb} \leq 99^\circ C$

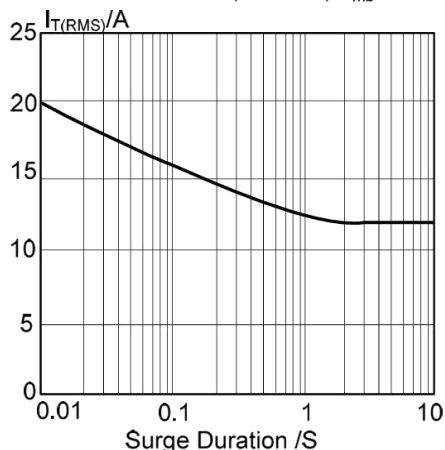
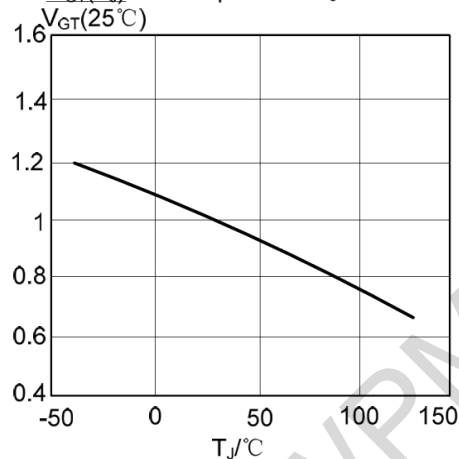


Figure 6. Normalised Gate Trigger Voltage $V_{GT}(T_J)/V_{GT}(25^\circ C)$, vs Junction Temperature T_J



TYPICAL CHARACTERISTICS (2)

Figure 7. Normalised Gate Trigger Current $I_{GT}(T_J)/I_{GT}(25^\circ\text{C})$, vs Junction Temperature T_J .

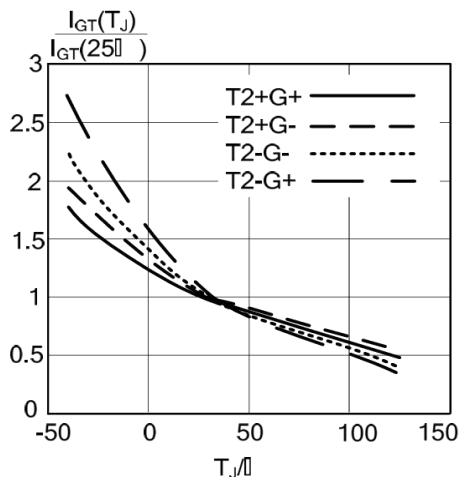


Figure 8. Normalised Latching Current $I_L(T_J)/I_L(25^\circ\text{C})$, vs Junction Temperature T_J .

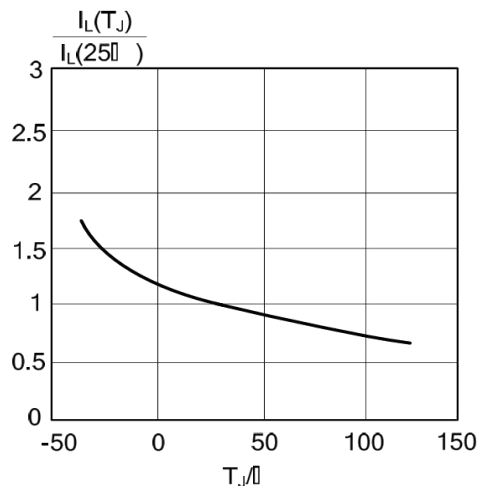


Figure 9. Normalised Holding Current $I_H(T_J)/I_H(25^\circ\text{C})$, vs Junction Temperature T_J .

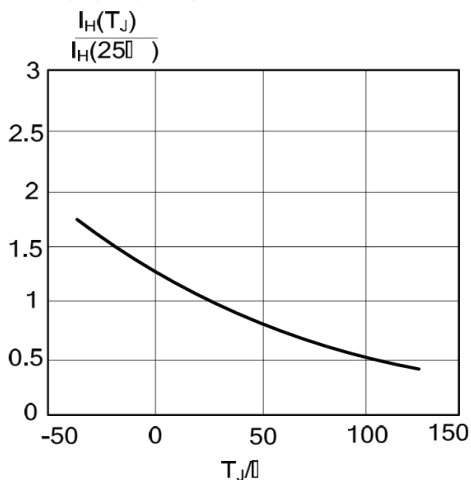


Figure 10. Typical and Maximum On-state Characteristic

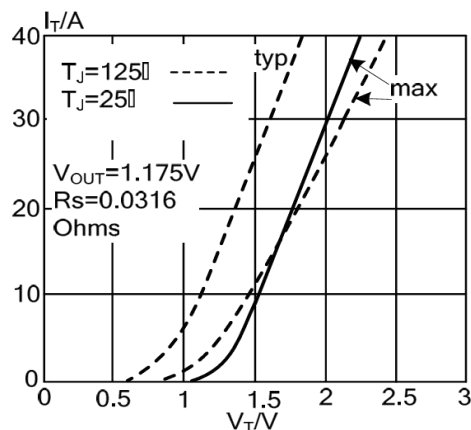


Figure 11. Transient Thermal Impedance $Z_{th j-mb}$, vs Pulse Width t_p

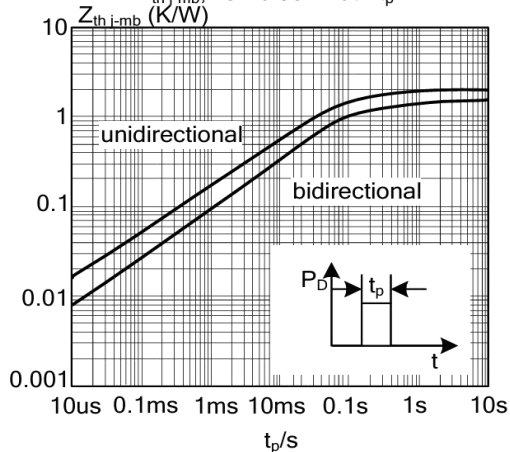
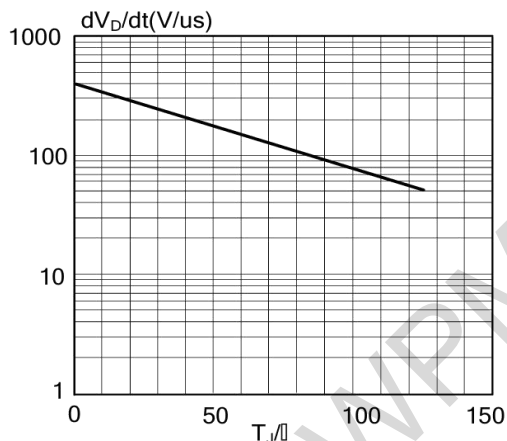
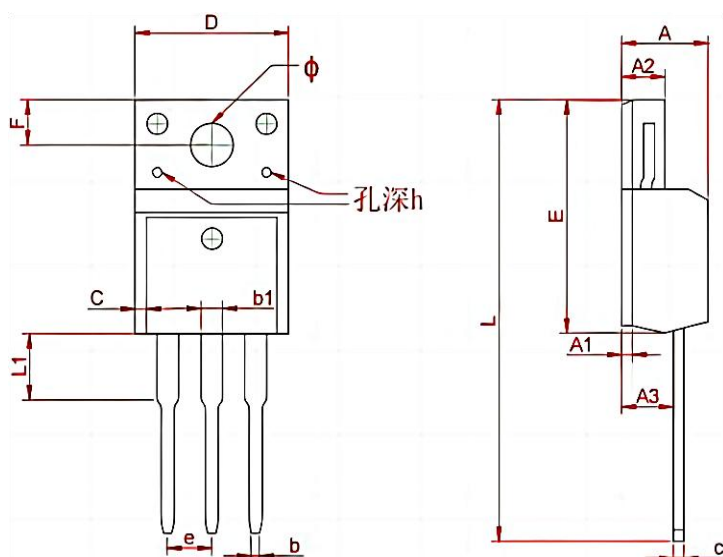


Figure 12. Typical Critical Rate of Rise of Off-State Voltage, dV_D/dt Versus Junction Temperature T_J



TO - 220F Package Outline Dimensions



Symbol	Dimensions In Millimeters	
	Min	Max
A	4.300	4.750
A1	0.7 REF	
A2	2.300	2.850
A3	2.500	2.900
b	0.380	0.420
b1	1.220	1.280
C	1.08	1.200
c	0.480	0.520
D	10.15	10.450
E	15.700	15.950
e	2.574 TYP	
F	3.470 REF	
y	3.200 REF	
h	0.000	0.800
L	28.780	28.900
L1	2.990	3.100

TO - 220F Packing Information



50PCS



20 Tube



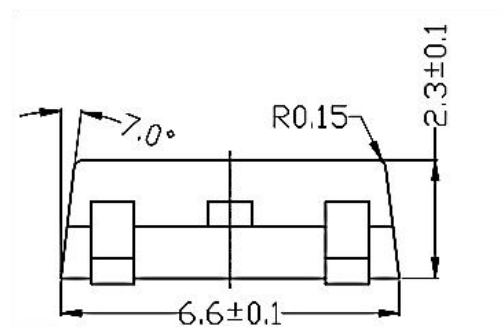
5 Inner
Box



Outer Box

Inner Box

Package version	Tube dimensions LxWxH (mm)	Per Tube (pcs)	Tube per box	Inner box dimensions LxWxH (mm)	PCS/ Inner box	Outer box dimensions LxWxH(mm)	PCS/ Outer box
TO-220F	530*32*7	50	20	580*155*50	1000	602*277*188	5000



Outer box

Inner box

Package version	Reel dimensions $\Phi \times H$ (mm)	Per Reel (pcs)	Reels per box	Inner box dimensions $L \times W \times H$ (mm)	Outer box (pcs)	Outer box dimensions $L \times W \times H$ (mm)
T0-252	$\Phi 330 \times 20$	2500	2	360*340*50	25000	375*375*280

Ver 1.53