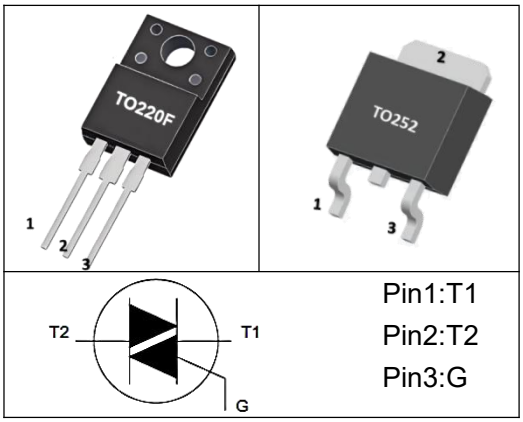
BT138

TRIAC

■ 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

: HY LOGO
BT138=Device Code
800E:V_{DRM}/V_{RRM}=800V
XXXX=Date Code
Solid Dot=Green molding compound

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

SYMBOL	PARAMETER		TEST CONDITION	RATINGS	UNIT
V_{DRM}	Repetitive Peak Off-State Voltage	BT138-600	T_j = 25°C	600	V
		BT138-800		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	
I^2t	I^2t For Fusing		t=10ms	45	A^2s
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
Tstg	Storage Temperature			-40 to +150	℃
Tj	Operating junction temperature			150	℃

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.

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■ THERMAL RESISTANCES

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

■ STATIC CHARACTERISTICS (TJ=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Gate trigger current	I_{GT}	T2+ G+	V_D=12V, I_T=0.1A		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=12V, I_T=0.1A		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	VD=12V, IGT=0.1A			4.0	30	mA
On-State Voltage	V_T	I_T=15A			1.4	1.65	V
Gate Trigger Voltage	V_{GT}	VD=12V, IT=0.1A			0.7	1.5	V
		VD=400V, IT=0.1A, TJ=125°C			0.4		
Off-state leakage current	I_D	V_D=$V_{DRM(max)}$, Tj=125°C				0.5	mA

■ DYNAMIC CHARACTERISTICS(TJ=25°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°C Exponential waveform,Gate open circuit		50		V/μs
Gate Controlled Turn-on Time	t_{gt}	I_{TM}=16A ;VD=VDRM(max); IG=0.1A dIg/dt=5A/μs		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.

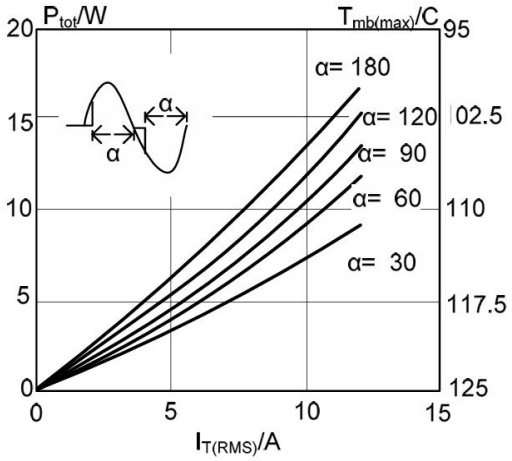


Figure 2. Maximum Permissible Non-Repetitive Peak On-State Current I_{TSM}, vs Pulse Width t_p, for Sinusoidal Currents, $t_p \leqq 20ms$.

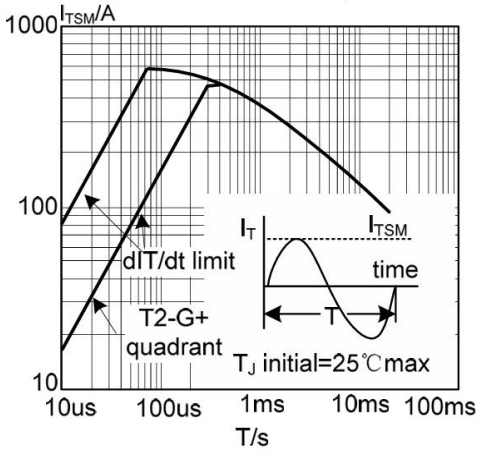


Figure 3 .Maximum Permissible Non-Repetitive Peak On-State Current I_{TSM}, vs Number of Cycles, for Sinusoidal Currents, f=50Hz.

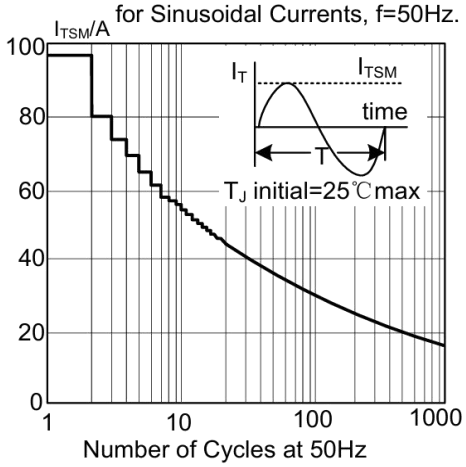


Figure 4. Maximum Permissible RMS Current $I_{T(RMS)}$ vs Mounting Base Temperature T_{mb}

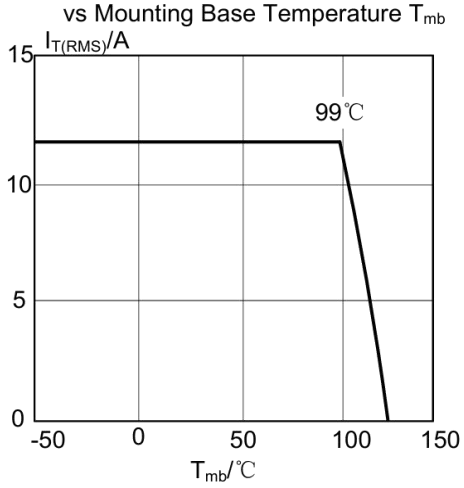


Figure 5. Maximum Permissible Repetitive RMS On-State Current $I_{T(RMS)}$, vs Surge Duration, for Sinusoidal Currents,f =50Hz, $T_{mb} \leqq 99℃$

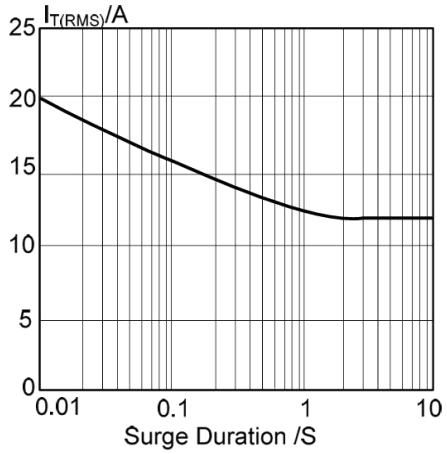
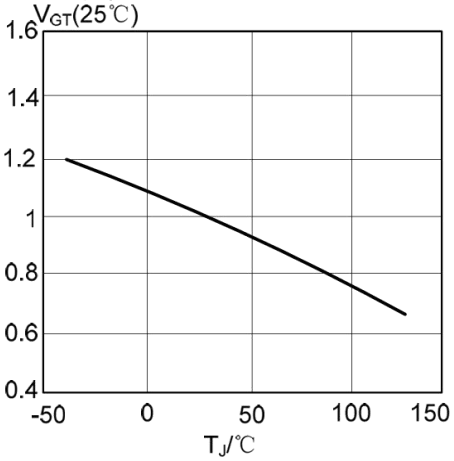


Figure 6. Normalised Gate Trigger Voltage $V_{GT}(T_J)/V_{GT}(25℃)$, vs Junction Temperature T_J

$\frac{V_{GT}(T_J)}{V_{GT}(25℃)}$



■ TYPICAL CHARACTERISTICS（2）

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

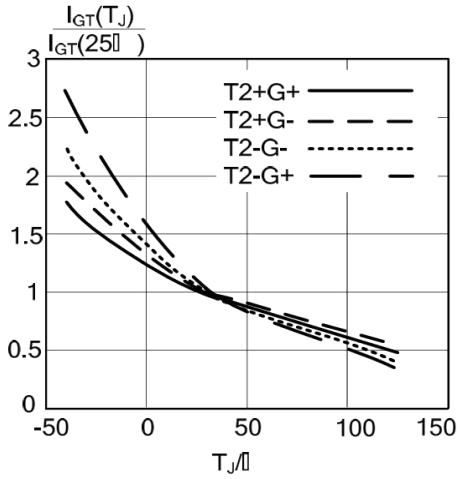


Figure 8. Normalised Latching Current $I_L(T_J)/I_L(25°C)$, vs Junction Temperature T_J

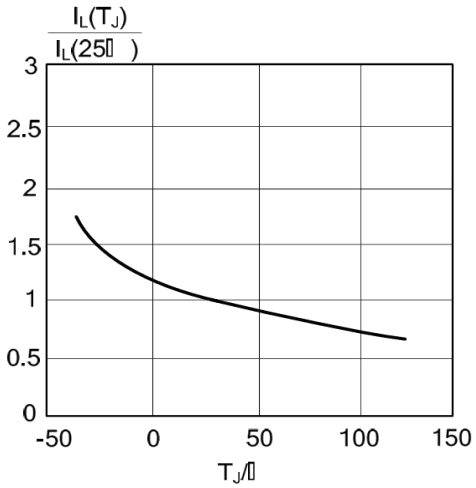


Figure 9. Normalised Holding Current $I_H(T_J)/I_H(25°C)$, vs Junction Temperature T_J

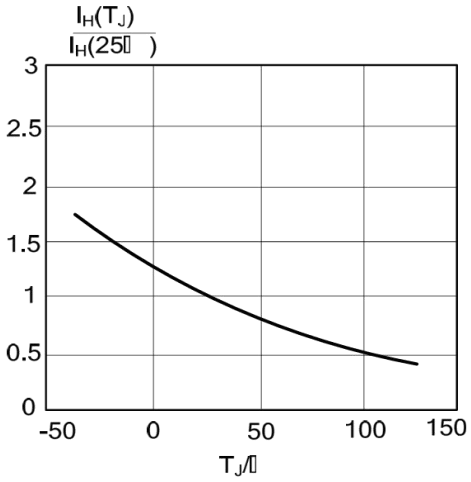


Figure 10. Typical and Maximum On-state Characteristic

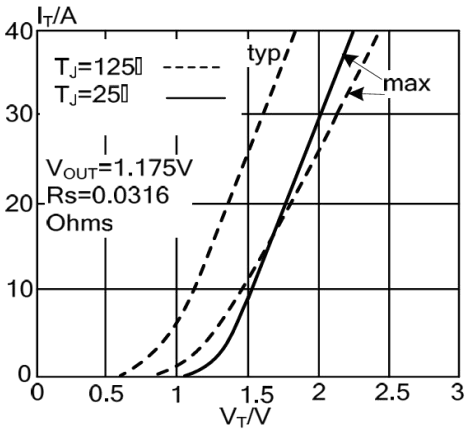


Figure 11. Transient Thermal Impedance $Z_{th\ j\text{-}mb}$, vs Pulse Width t_p

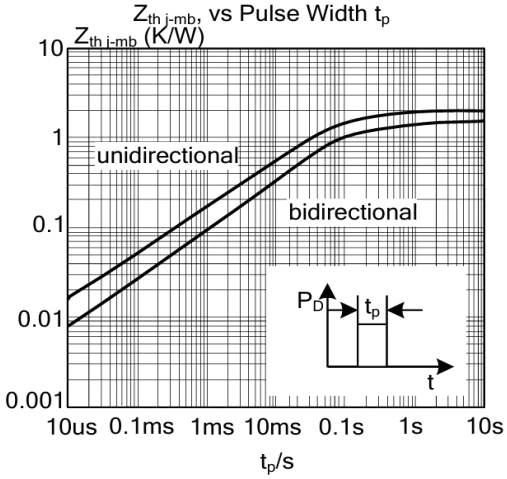
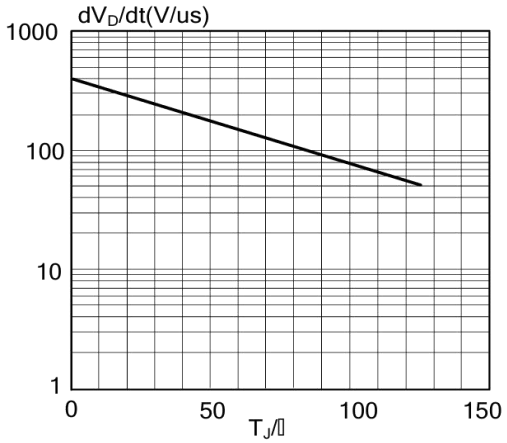


Figure 12. Typical Critical Rate of Rise of Off-State Voltage, dV_D/dt Versus Junction Temperature T_J



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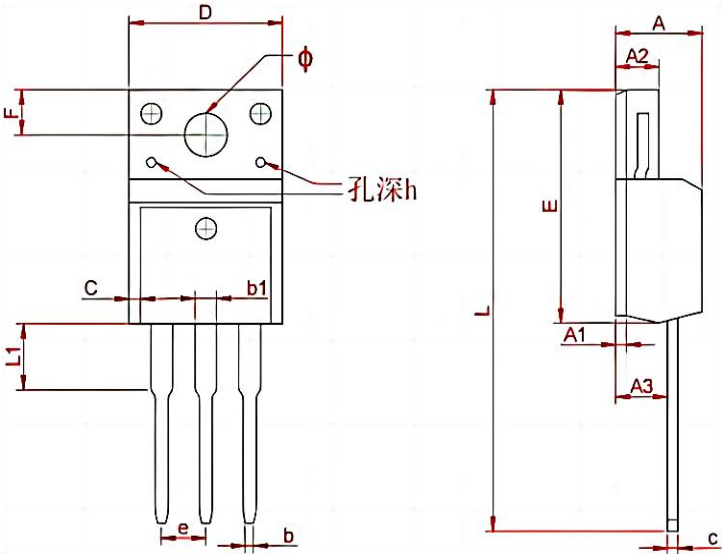
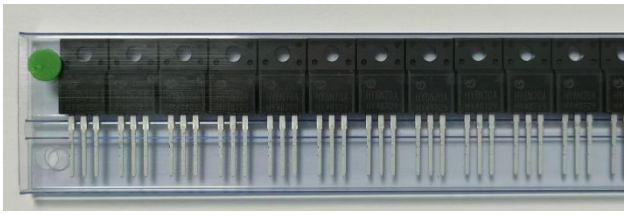
■ TO - 220F Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max	Min	Max
A	4.300	4.750	0.169	0.185
A1	1.830 REF		0.072 REF	
A2	2.300	2.850	0.090	0.112
A3	2.500	2.900	0.098	0.114
b	0.400	0.420	0.016	0.016
b1	1.220	1.280	0.048	0.050
C	0.690	0.720	0.027	0.028
c	0.490	0.510	0.019	0.020
D	9.960	10.200	0.392	0.400
E	15.000	15.950	0.588	0.625
e	2.574 TYP		0.101TYP	
F	3.470 REF		0.136 REF	
y	3.200 REF		0.125 REF	
h	0.000	0.300	0.000	0.012
L	28.780	28.900	1.128	1.133
L1	2.990	3.100	0.117	0.122

■ TO - 220F Packing Information

50PCS



20 Tube

Inner Box

5 Inner Box

Outer Box

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

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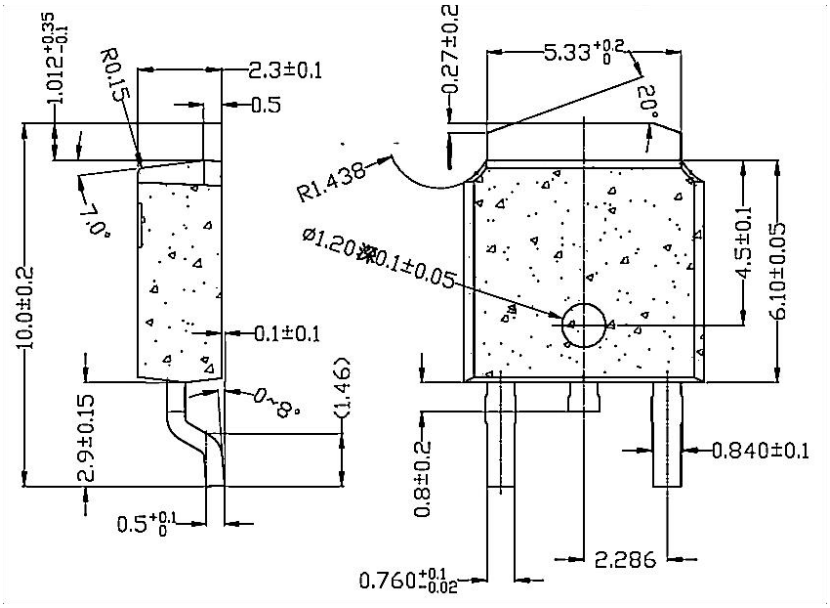
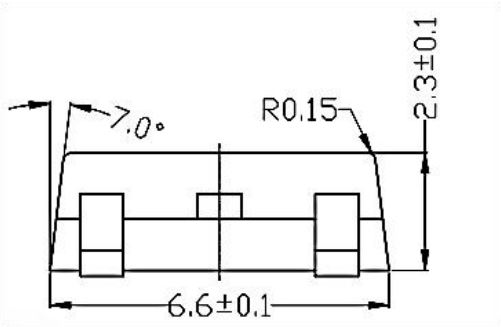
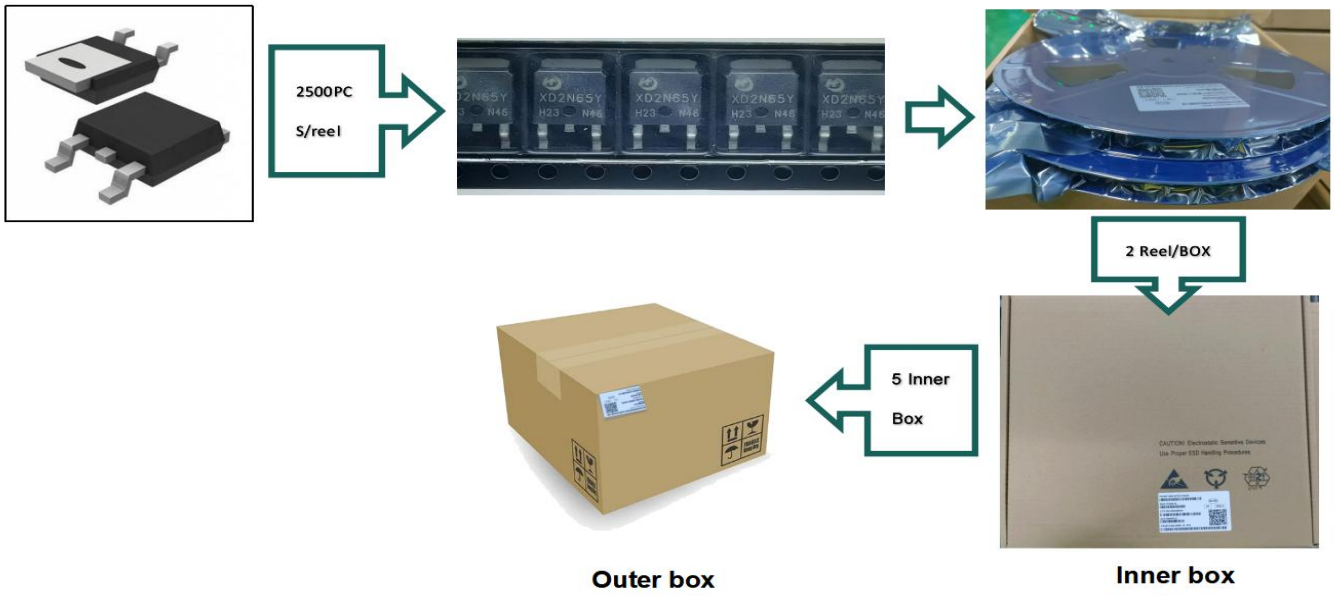
TRIAC

■ TO - 252 Package Outline Dimensions





■ TO - 252 Packing Information



Package version	Reel dimensions Φ×H (mm)	Per Reel (pcs)	Reels per box	Inner box dimensions L×W×H(mm)	Outer box (pcs)	Outer box dimensions L×W×H (mm)
TO-252	Φ330*20	2500	2	360*340*50	25000	375*375*280