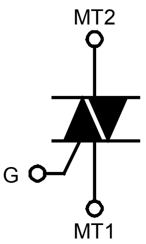
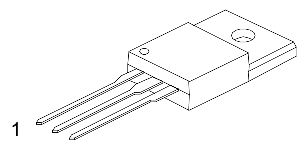
TRIACS

DESCRIPTION

Glass passivated triacs in a full pack plastic envelope, intended for use in applications requiring high bidirectional transient and blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.

SYMBOL





TO-220F

1:MT1 2:MT2 3:GATE

ABSOLUTE MAXIMUM RATINGS (Tj=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltages UT138FF/FG-5 UT138FF/FG-6 UT138FF/FG-8	V_{DRM}	 500* 600* 800	V
RMS On-state Current (Full sine wave, $T_{hs} \leqslant 56°C$)	$I_{T(RMS)}$	12	A
Non-repetitive Peak. On-State Current (Full sine wave, Tj=125°C prior to surge, with reapplied VDRM(max) t=20ms t=16.7ms	I_{TSM}	 90 100	A
I^2t For Fusing (t=10ms)	I^2t	40	A^2s
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+ T2+ G- T2- G- T2- G+	dI_T/dt	 50 50 50 10	A/µs
Peak Gate Voltage	V_{GM}	5	V
Peak Gate Current	I_{GM}	2	A
Peak Gate Power	P_{GM}	5	W
Average Gate Power (over any 20ms period)	$P_{G(AV)}$	0.5	W
Operating Junction Temperature	Tj	125	°C
Storage Temperature	Tstg	-40~150	°C

*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.

ISOLATION LINITING VALUE & CHARACTERISTIC(T_{hs}=25°C,unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
R.M.S. isolation voltage form all three terminals to external heatsink (f=50-60Hz, sinusoidal waveform R.H.≦65%,clean and dustfree)	Visol			1500	V
Capacitance from MT2 to external heatsink (f=1MHz)	Cisol		12		pF

THERMAL RESISTANCES

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Thermal Resistance, Junction to heatsink (full or half cycle) with heatsink compound without heatsink compound	Rthj-hs			 4.0 5.5	K/W
Thermal Resistance, Junction to Ambient In free air	Rthj-a		55		K/W

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

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX		UNIT
					UT138FF	UT138FG	
Gate trigger current	I_{GT}	V_D=12V, I_T=0.1A T2+ G+ T2+ G- T2- G- T2- G+		 5 8 10 22	 25 25 25 70	 50 50 50 100	mA
Latching current	I_L	V_D=12V, I_{GT}=0.1A T2+ G+ T2+ G- T2- G- T2- G+		 7 20 8 10	 40 60 40 60	 60 90 60 90	mA
Holding current	I_H	V_D = 12 V, I_{GT} = 0.1 A		6	30	60	mA
On-state voltage	V_T	I_T=15A		1.4	1.65		V
Gate trigger voltage	V_{GT}	V_D=12V, I_T=0.1A		0.7	1.5		V
		V_D=400V, I_T=0.1A, Tj=125°C	0.25	0.4			V
Off-state leakage current	I_D	V_D=$V_{DRM(max)}$, Tj=125°C		0.1	0.5		mA

DYNAMIC CHARACTERISTICS(T_j=25°C,unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN		TYP	MAX	UNIT
			UT138FF	UT138FG			
Critical rate of change of Off-state voltage	dV_D/dt	V_{DM} = 67% $V_{DRM(max)}$, T_j =125°C; exponential waveform, gate open circuit	100	200	250		V/μs
Critical rate of change of Commutating voltage	dV_{com}/dt	V_{DM}=400V;T_j=95°C,$I_{T(RMS)}$=12A; dI_{com}/dt =5.4A/ms, gate open circuit			20		V/μs
Gate controlled turn-on time	t_{gt}	I_{TM}=16 A, V_D= $V_{DRM(max)}$, I_G=0.1A; dI_G/dt=5A/μs			2		μs

TYPICAL CHARACTERISTICS

Figure 1.Maximum on -state Dissipation.Ptot vs rms On-state Current,$I_{T(RMS)}$,Where α =conduction Angle.

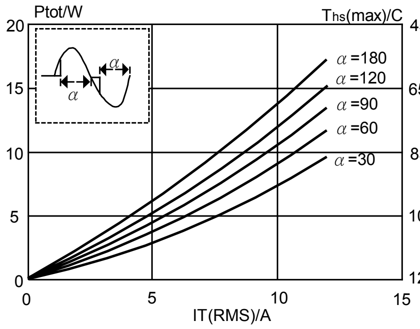


Figure 2. Maximum Permissible Non-repetitive Peak On-state Current I_{TSM},vs Pulse Width t_p,for Sinusoidal Currents,$t_p \leqq 20$ms

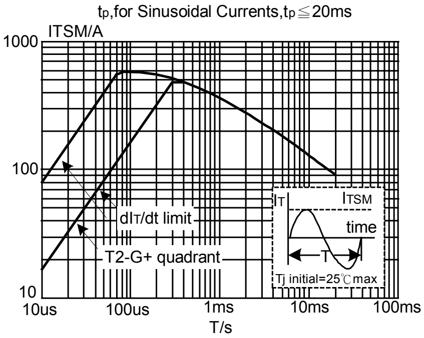


Figure 3 .Maximum Permissible Non-Repetitive peak on-state Current I_{TSM},vs Number of Cycles, for Sinusoidal Currents,f=50Hz

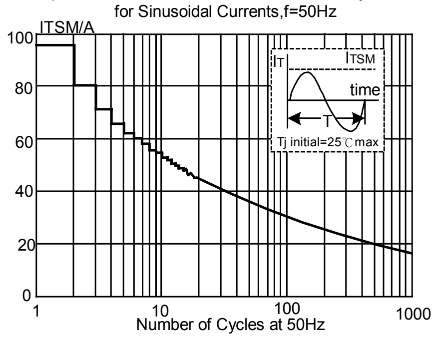


Figure 4.Maximum Permissible RMS Current $I_{T(RMS)}$ vs heatsinkTemperature T_{hs}

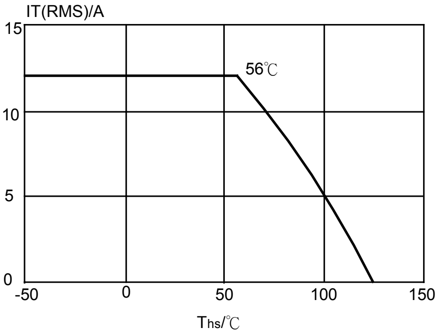


Figure 5.Maximum Permissible Repetitive rms on-state Current IT(RMS),vs Surge Duration,for Sinusoidal Currents,f=50Hz;$T_{hs} \leqq 56$℃

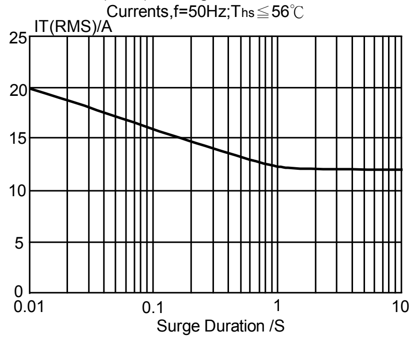


Figure 6.Normalised Gate Trigger Voltage V_{GT}(Tj)/ V_{GT}(25℃),vs Junction Temperature Tj

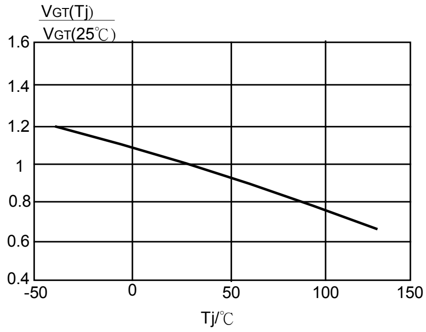


Figure 7.Normalised Gate Trigger Current
IGT(Tj)/IGT(25℃),vs Junction Temperature Tj

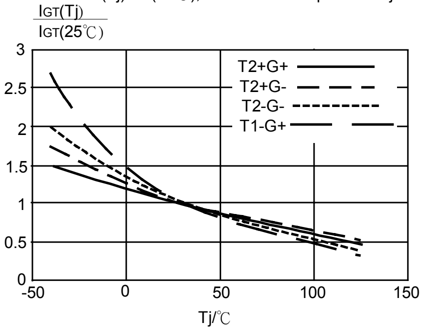


Figure 10.Typical and Maximum
On-state Characteristic

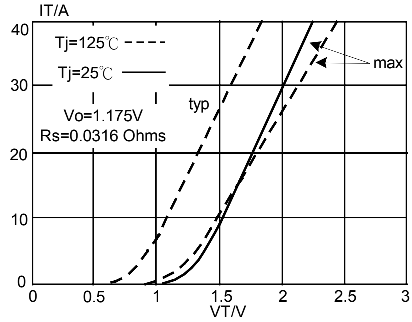


Figure 8.Normalised Latching Current
IL(Tj)/IL(25℃),vs Junction Temperature Tj

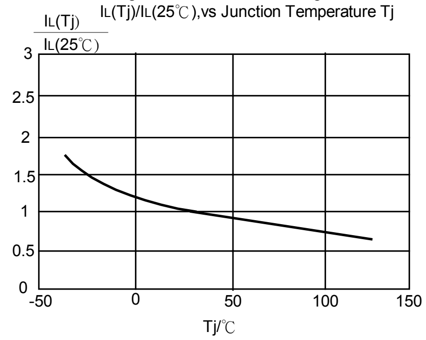


Figure 11.Transient Thermal Impedance
Zth j-hs,vs Pulse Width tp

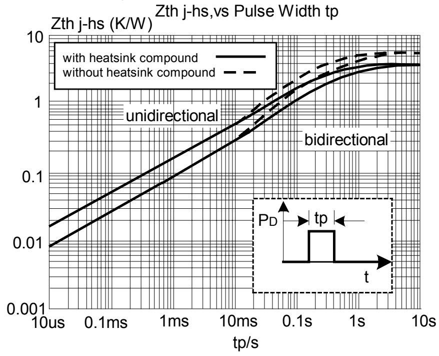


Figure 9.Normalised Holding Current
IH(Tj)/IH(25℃),vs Junction Temperature Tj

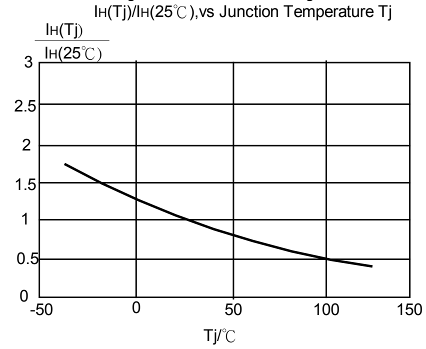


Figure 12.Typical,critical rate of rise of off-state voltage,
dVD/dt versus junction temperature Tj