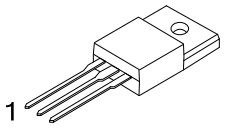
TRIAC

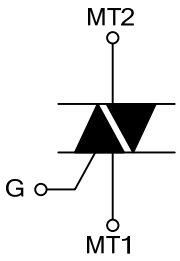


TO-220F

■ DESCRIPTION

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

■ SYMBOL



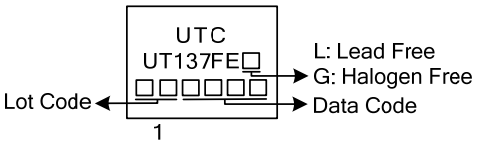
■ ORDERING INFORMATION

Ordering Number		Package	Pin Description			Packing
Lead Free	Halogen Free		1	2	3	
UT13FEL-x-TF3-R	UT137FEG-x-TF3-R	TO-220F	MT1	MT2	G	Tube

Note: Pin Assignment: G: Gate

UT137FEL- x -TF3-T (1)Packing Type (2)Package Type (3)Peak Voltage (4)Green Package	(1) T: Tube (2) TF3: TO-220F (3) 5: 500V, 6: 600V, 8: 800V (4) L: Lead Free, G: Halogen Free and Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Repetitive Peak Off-State Voltages	UT137FE-5	V_{DRM}	500(Note2)	V
	UT137FE-6		600(Note2)	
	UT137FE-8		800	
RMS On-state Current Full sine wave, $T_{HS} \leq 92°C$		$I_{T(RMS)}$	8	A
Non-Repetitive Peak. On-State Current Full sine wave, T_J =125°C prior to surge, with reapplied $V_{DRM(MAX)}$	t =20 ms	I_{TSM}	55	A
	t =16.7 ms		60	
I^2t For Fusing (t =10 ms)		I^2t	15	A^2s
Repetitive Rate of Rise of On-state Current after Triggering I_{TM}=12 A, I_G=0.2 A, dI_G/dt=0.2A/μs	T2 + G+	dI_T/dt	50	A/μs
	T2 + G-		50	
	T2 - G-		50	
	T2 - G+		10	
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		T_J	125	°C
Storage Temperature		T_{STG}	-40 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. 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 6A/μs.

■ THERMAL RESISTANCES

PARAMETER		SYMBOL	MIN	TYP	MAX	UNIT
Thermal resistance Junction to Ambient	In Free Air	θ_{JA}		55		°C/W
Thermal resistance Junction to mounting base	Full cycle	θ_{JC}			4.5	°C/W
	Half cycle				6.5	°C/W

■ ISOLATION LIMITING VALUE & CHARACTERISTIC (T_{HS} =25°C, unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Repetitive peak voltage form all three terminals to external heatsink (R.H.≤ 65%,clean and dustfree)	V_{ISOL}			1500	V
Capacitance from MT2 to external heatsink (f =1MHz)	C_{ISOL}		12		pF

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

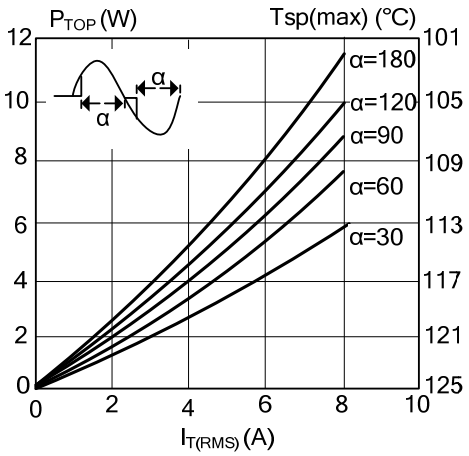
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Gate Trigger Current	I_{GT}	V_D =12 V,I_T =0.1A	T2 + G+		2.5	10	mA
			T2 + G-		4.0	10	mA
			T2 - G-		5.0	10	mA
			T2 - G+		11	25	mA
Latching Current	I_L	V_D =12 V,I_{GT} =0.1A	T2 + G+		3.0	25	mA
			T2 + G-		14	35	mA
			T2 - G-		3.0	25	mA
			T2 - G+		4.0	35	mA
Holding Current	I_H	V_D =12 V,I_{GT} =0.1A			2.5	20	mA
On-State Voltage	V_T	I_T =10 A			1.3	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, T_J=125°C		0.25	0.4		V
Off-State Leakage Current	I_D	V_D=$V_{DRM(MAX)}$, T_J =125°C			0.1	0.5	mA

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

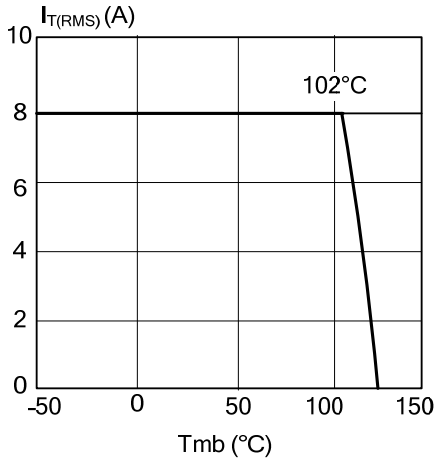
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Critical Rate of Rise of Off-State Voltage	dV_D/dt	V_{DM} = 67% $V_{DRM(MAX)}$,T_J=125°C, Exponential waveform, gate open circuit		50		V/μs
Gate Controlled Turn-On Time	t_{GT}	I_{TM} =12A,V_D= $V_{DRM(MAX)}$, I_G=0.1A, dI_G/dt=5A/μs		2		μs

■ TYPICAL CHARACTERISTICS

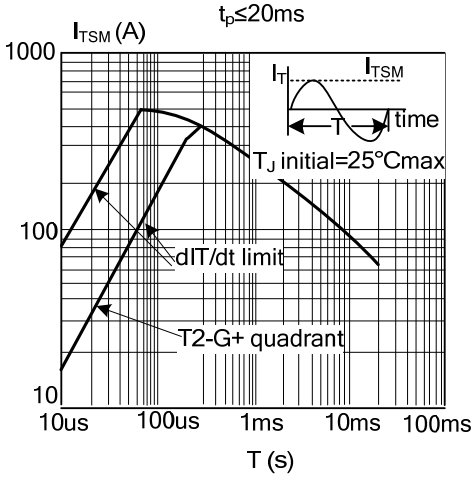
Maximum On -State Dissipation. P_{tot} vs RMS On-State Current, $I_{T(RMS)}$, Where α=conduction Angle



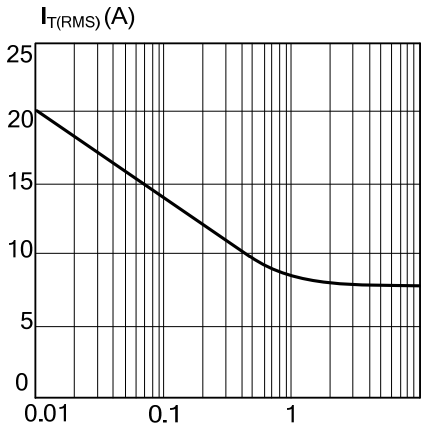
Maximum Permissible RMS Current $I_{T(RMS)}$ vs Mounting Base Temperature T_{mb}



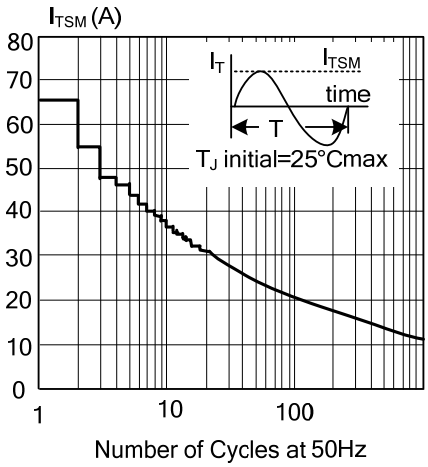
Maximum Permissible Non-Repetitive Peak On-State Current I_{TSM}, vs Pulse Width t_p, for Sinusoidal Currents, $t_p \leq 20ms$



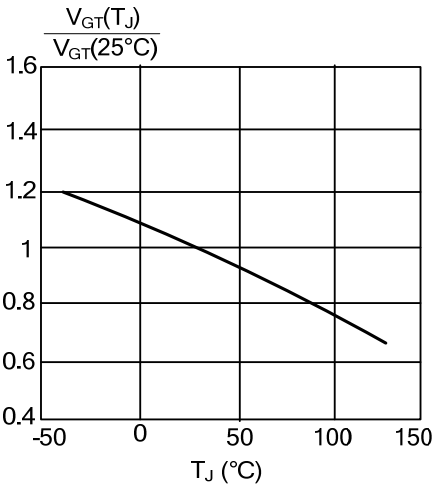
Maximum Permissible Repetitive RMS On-State Current $I_{T(RMS)}$, vs Surge Duration, for Sinusoidal Currents,f =50Hz, $T_{mb} \leq 102°C$



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

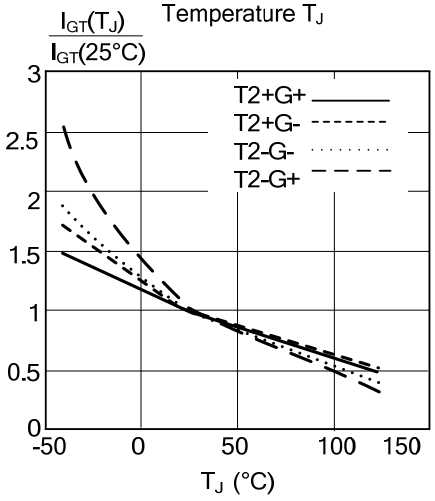


Normalised Gate Trigger Voltage $V_{GT}(T_J)/V_{GT}(25°C)$, vs Junction Temperature T_J

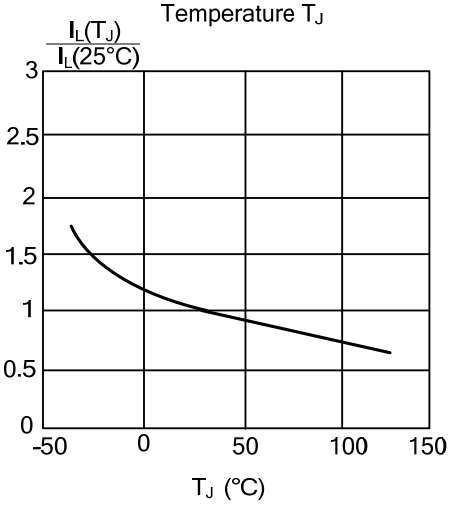


■ TYPICAL CHARACTERISTICS(Cont.)

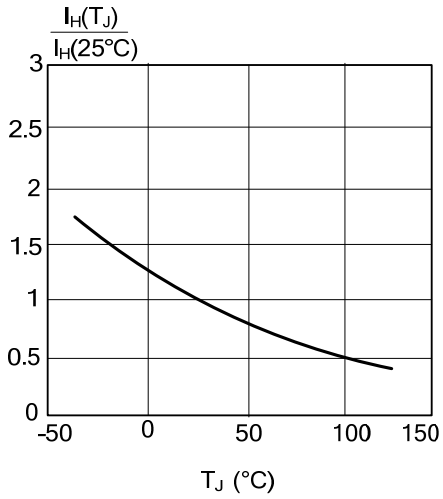
Normalised Gate Trigger Current $I_{GT}(T_J)/I_{GT}(25°C)$, vs Junction Temperature T_J



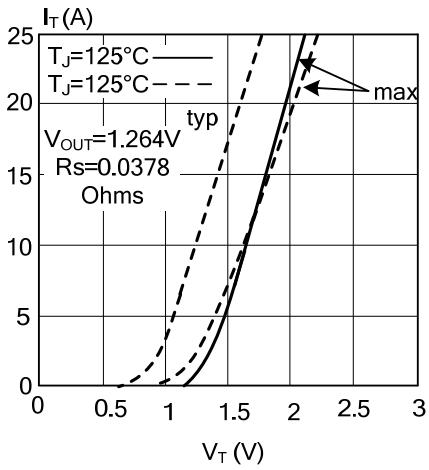
Normalised Latching Current $I_L(T_J)/I_L(25°C)$, vs Junction Temperature T_J



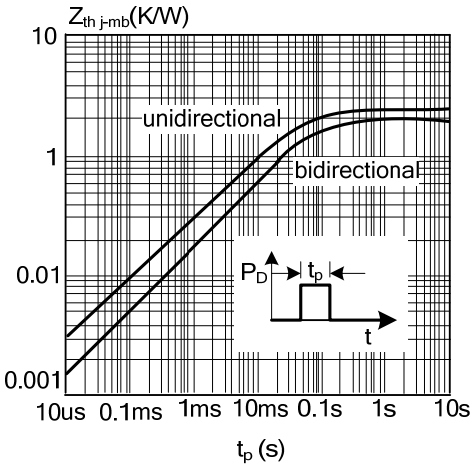
Normalised Holding Current $I_H(T_J)/I_H(25°C)$, vs Junction Temperature T_J



Typical and Maximum On-state Characteristic



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



Typical Critical Rate of Rise of Off-State Voltage, dV_D/dt Versus Junction temperature T_J