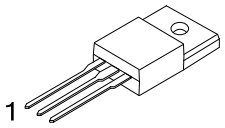
UT138FF/FG

TRIAC

TRIAC

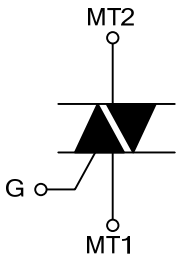


TO-220F

■ DESCRIPTION

Glass passivated triac 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.

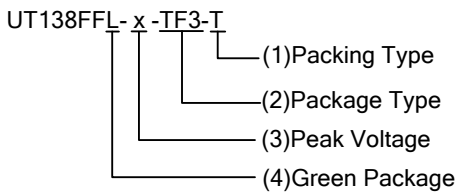
■ SYMBOL



■ ORDERING INFORMATION

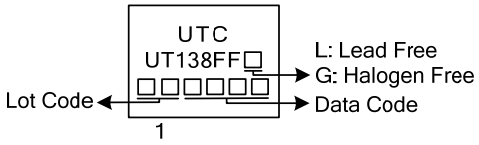
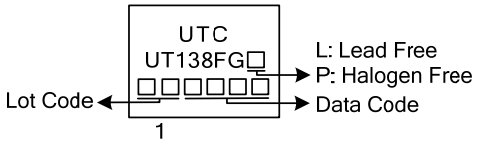
Ordering Number		Package	Pin Description			Packing
Lead Free	Halogen Free		1	2	3	
UT138FFL-x-TF3-R	UT138FFG-x-TF3-R	TO-220F	MT1	MT2	G	Tube
UT138FGL-x-TF3-R	UT138FGP-x-TF3-R	TO-220F	MT1	MT2	G	Tube

Note: Pin Assignment: G: Gate



(1) T: Tube
(2) TF3: TO-220F
(3) 5: 500V, 6: 600V, 8: 800V
(4) L: Lead Free, G: Halogen Free and Lead Free
P: Halogen Free and Lead Free

■ MARKING

UT138FF	UT138FG
	

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■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Repetitive Peak Off-State Voltages	UT138FF/FG-5	V_{DRM}	500(Note2)	V
	UT138FF/FG-6		600(Note2)	
	UT138FF/FG-8		800	
RMS On-state Current Full sine wave, T_{HS} ≤92°C		$I_{T(RMS)}$	12	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}	90	A
	t =16.7 ms		100	
I^2t For Fusing (t =10 ms)		I^2t	40	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 15A/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}			4.0	°C/W
	Half cycle				5.5	°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)

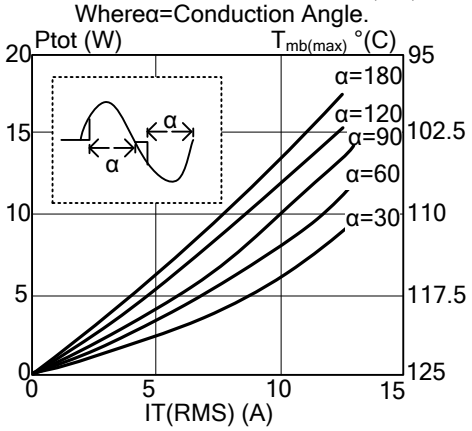
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX		UNIT
						UT138FF	UT138FG	
Gate Trigger Current	I_{GT}	V_D =12 V,I_T =0.1A	T2 + G+		5	25	50	mA
			T2 + G-		8	25	50	mA
			T2 - G-		10	25	50	mA
			T2 - G+		22	70	100	mA
Latching Current	I_L	V_D =12 V,I_{GT} =0.1A	T2 + G+		7	40	60	mA
			T2 + G-		20	60	90	mA
			T2 - G-		8	40	60	mA
			T2 - G+		10	60	90	mA
Holding Current	I_H	V_D =12 V,I_{GT} =0.1A			6	30	60	mA
On-State Voltage	V_T	I_T =15 A			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, 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)

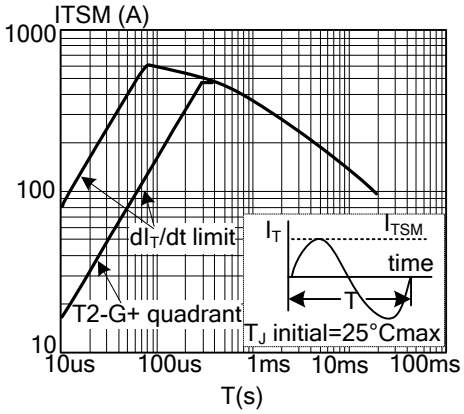
PARAMETER	SYMBOL	TEST CONDITIONS	MIN		TYP	MAX	UNIT
			UT138FF	UT138FG			
Critical Rate of Rise of Off-State Voltage	dV_D/dt	V_{DM} = 67% $V_{DRM(MAX)}$,T_J=125°C, exponential waveform, gate open circuit	100	200	250		V/μs
Critical Rate of Change of Commutating Voltage	dV_{COM}/dt	V_{DM}=400V, T_J=95°C, $I_{T(RMS)}$=12A, dI_{COM}/dt=5.4A/ms, gate open circuit			20		V/μs
Gate Controlled Turn-On Time	t_{GT}	I_{TM} =16A,V_D= $V_{DRM(MAX)}$, I_G=0.1A, dI_G/dt=5A/μs			2		μs

■ TYPICAL CHARACTERISTICS

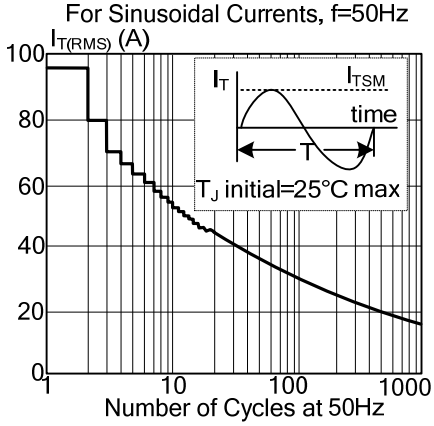
Maximum On-State Dissipation, Ptot Vs RMS On-state Current, $I_{T(RMS)}$, Whereα=Conduction Angle.



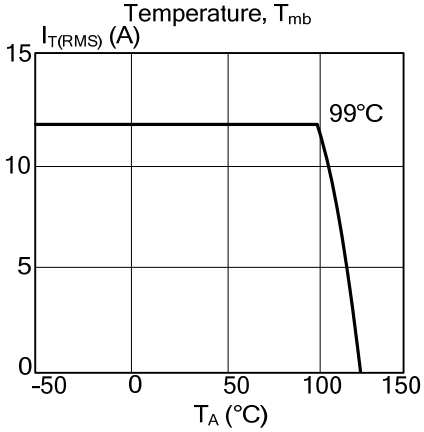
Maximum Permissible Non-Repetitive Peak On-state Current I_{TSM}, Vs Pulse Width t_p, for Sinusoidal Currents ,t_p≤20ms.



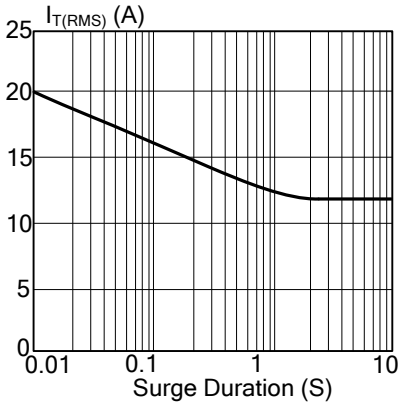
Maximum Permissible Non-Repetitive Peak On-state Current I_{TSM}, Vs Number Of Cycles, For Sinusoidal Currents, f=50Hz



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

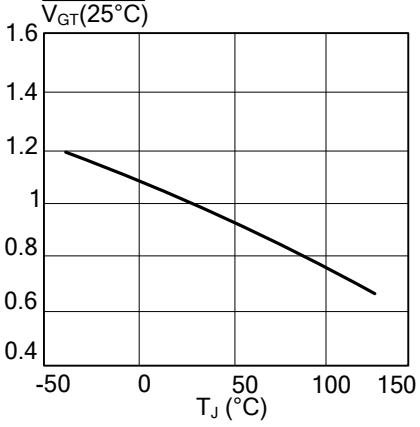


Maximum Permissible Repetitive RMS On-state Current $I_{T(RMS)}$, Vs Surge Duration, For Sinusoidal Currents, f=50Hz, T_{MP}≤99°C



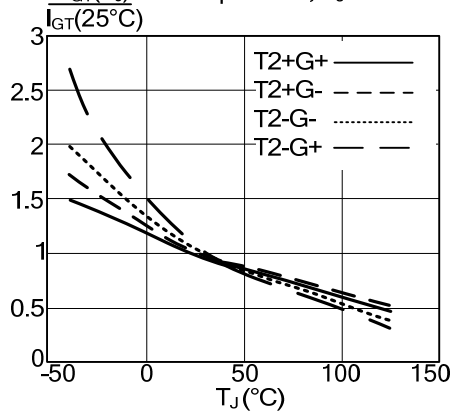
Normalised Gate Trigger Voltage $V_{GT}(T_J)/V_{GT}(25°C)$, Vs Junction Temperature, T_J

$\frac{V_{GT}(T_J)}{V_{GT}(25°C)}$

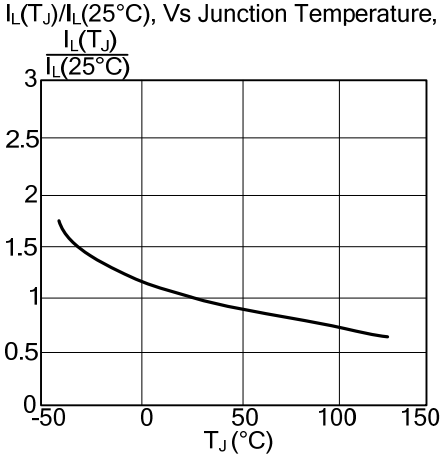


■ TYPICAL CHARACTERISTICS(Cont.)

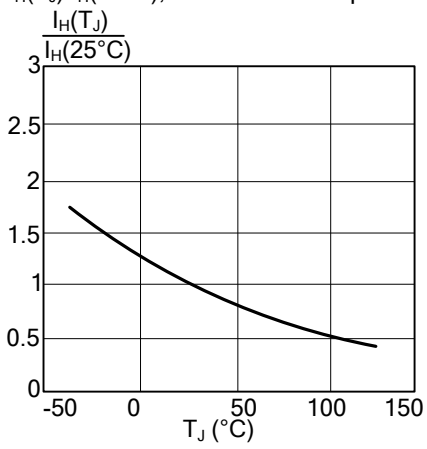
Normalised Gate Trigger Current
$I_{GT}(T_J)/I_GT(25°C)$, Vs Junction Temperature, T_J



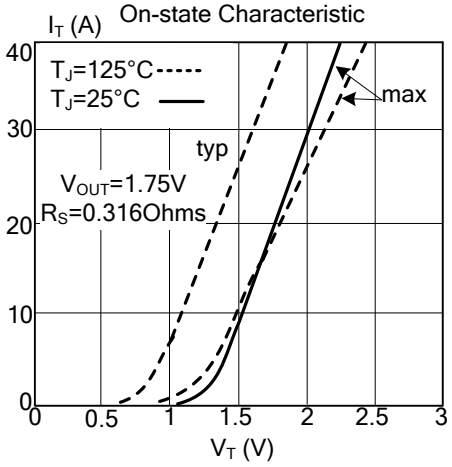
Normalised Latching Current
$I_L(T_J)/I_L(25°C)$, Vs Junction Temperature, T_J



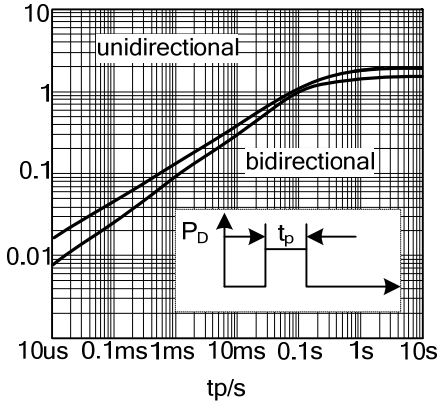
Normalised Holding Current
$I_H(T_J)/I_H(25°C)$, Vs Junction Temperature, T_J



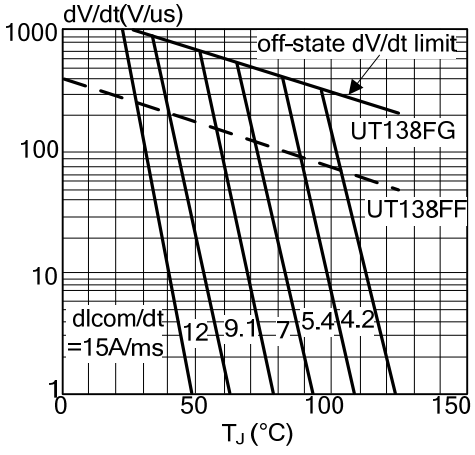
Typical And Maximum On-state Characteristic



Transient Thermal Impedance
Zth j-mb, Vs Pulse Width, t_p



Typical Commutation dV/dt Vs Junction Temperature, Parameter Commutation dI_T/dt.
The Triac Should Commutate When The dV/dt Is Below The Value On The Appropriate Curve For Pre-Commutation dIV/dt



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