

# UNISONIC TECHNOLOGIES CO., LTD

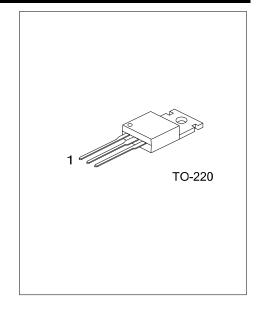
UT137F/G

# **TRIAC**

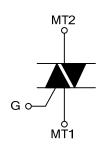
#### DESCRIPTION

Passivated triacs in a 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.



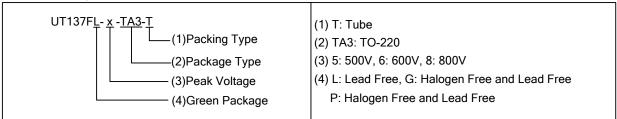
#### ■ SYMBOL



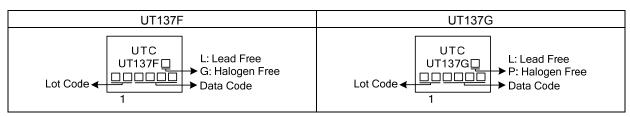
#### ORDERING INFORMATION

Order Number		Dookogo	Pin Assignment			Doolsing	
Lead Free	Halogen Free	Package	1	2	3	Packing	
UT137FL-x-TA3-T	UT137FG-x-TA3-T	TO-220	MT1	MT2	G	Tube	
UT137GL-x-TA3-T	UT137GP-x-TA3-T	TO-220	MT1	MT2	G	Tube	

Note: Pin Assignment: G: Gate



### ■ MARKING



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## ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT	
	UT137F_G-5		500 (Note 2)	V
Repetitive peak off-state voltages	UT137F_G-6	$V_{DRM}$	600 (Note 2)	V
	UT137F_G-8		800	V
RMS on-state current full sine wave; T <sub>mb</sub> ≤10	$I_{T(RMS)}$	8	Α	
Non-repetitive peak on-state current t = 20m			65	A
(Full sine wave; T <sub>J</sub> = 25°C prior to surge)	t = 16.7 ms	I <sub>TSM</sub>	71	A
I <sup>2</sup> t for fusing	t = 10 ms	I <sup>2</sup> t	21	A <sup>2</sup> s
Repetitive rate of rise of on-state current after triggering I <sub>TM</sub> =12A; I <sub>G</sub> =0.2A; d <sub>IG</sub> /dt=0.2A/µs	T2+ G+		50	A/µs
	T2+ G-	dl⊤/dt	50	A/µs
	T2- G-		50	A/µs
	T2- G+		10	A/µs
Peak gate voltage		$V_{GM}$	5	V
Peak gate current	$I_{GM}$	2	Α	
Peak gate power	$P_GM$	5	W	
Average gate power (over any 20 ms period	$P_{G(AV)}$	0.5	W	
Junction Temperature	$T_J$	125	°C	
Storage Temperature	$T_{STG}$	-40 ~ +150	°C	

Note: 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.

### ■ THERMAL RESISTANCES

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	
Thermal resistance Junction to Ambient	In Free Air	$\theta_{JA}$		60		°C/W
Thermal resistance Junction to mounting	Full cycle	0			2.0	°C/W
base	Half cycle	$\theta_{JC}$			2.4	°C/W

## ■ STATIC CHARACTERISTICS (T<sub>J</sub> =25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS MIN		MINI	TYP	MAX		UNIT
PARAMETER	STIVIBUL			ITP	UT137F	JT137F UT137G		
	I <sub>GT</sub>		T2+G+		5	25	50	mA
		V <sub>D</sub> =12V, I <sub>T</sub> =0.1A	T2+G-		8	25	50	
Gate Trigger Current			T2-G-		11	25	50	
			T2-G+		30	70	100	
Latching Current	IL	V <sub>D</sub> =12V, I <sub>GT</sub> =0.1A	T2+G+		7	30	45	mA
			T2+G-		16	45	60	
			T2-G-		5	30	45	
			T2-G+		7	45	60	
Holding Current	$I_H$	V <sub>D</sub> =12V, I <sub>GT</sub> =0.1A			5	20	40	mA
On-State Voltage	$V_{T}$	I <sub>T</sub> =10A			1.3	1.65		V
Gate Trigger Voltage	$V_{GT}$	V <sub>D</sub> =12V, I <sub>T</sub> =0.1A			0.7	1.5		V
		V <sub>D</sub> =400V, I <sub>T</sub> =0.1A, T <sub>J</sub> =125°C		0.25	0.4			V
Off-State Leakage Current	$I_{D}$	V <sub>D</sub> =V <sub>DRM(max)</sub> , T <sub>J</sub> =125°C			0.1	0.5		mA

<sup>2.</sup> 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.

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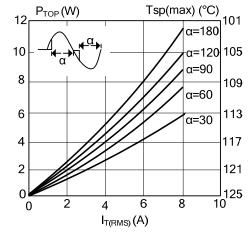
## ■ **DYNAMIC CHARACTERISTICS** (T<sub>J</sub> =25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN		TYP	MAY	UNIT
PARAMETER	STIVIBOL	TEST CONDITIONS	UT137F	UT137G	IIF	IVIAA	UNIT
Critical Rate Of Rise Of Off-State Voltage		V <sub>DM</sub> =67% V <sub>DRM(max)</sub> , T <sub>J</sub> =125°C, Exponential waveform, gate open circuit	50	200	250		V/µs
Critical Rate Of Change Of Commutating Voltage	dV <sub>com</sub> /dt	V <sub>DM</sub> =400V, T <sub>J</sub> =95°C, I <sub>T(RMS)</sub> =8A, dI <sub>com</sub> /dt=3.6A/ms, gate open circuit		10	20		V/µs
Gate Controlled Turn-On Time	T <sub>m4</sub>	$I_{TM}$ =12A, $V_D$ = $V_{DRM(max)}$ , $I_G$ =0.1A, $dI_G/dt$ =5A/ $\mu$ s			2		μs

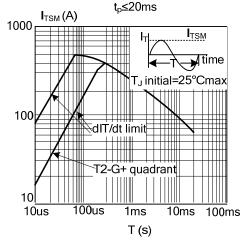
UT137F/G **TRIAC** 

## TYPICAL CHARACTERISTICS

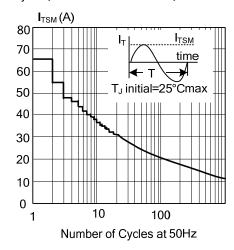
Maximum On -State Dissipation. Ptot vs RMS On-State Current,  $I_{T(RMS)}$ , Where  $\alpha$ =conduction Angle



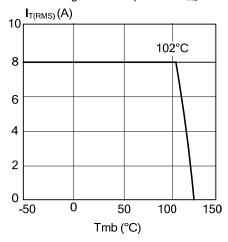
Maximum Permissible Non-Repetitive Peak On-State Current ITSM, vs Pulse Width to, for Sinusoidal Currents,



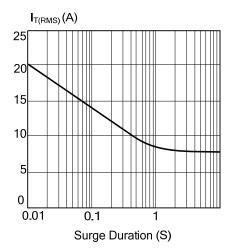
Maximum Permissible Non-Repetitive Peak On-State Current ITSM, vs Number of Cycles, for Sinusoidal Currents, f=50Hz



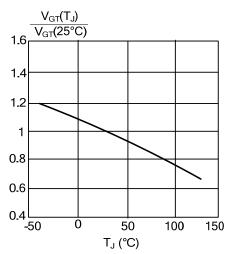
Maximum Permissible RMS Current I<sub>T(RMS)</sub> vs Mounting Base Temperature T<sub>mb</sub>



Maximum Permissible Repetitive RMS On-State Current  $I_{T(RMS)}$ , vs Surge Duration, for Sinusoidal Currents,f =50Hz, T<sub>mb</sub>≤102°C



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

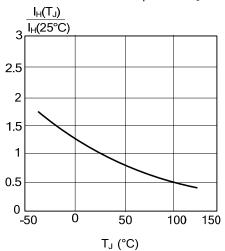


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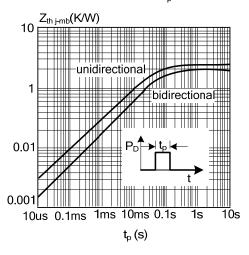
## **■ TYPICAL CHARACTERISTICS(Cont.)**

Normalised Gate Trigger Current  $I_{GT}(T_J)/I_{GT}(25^{\circ}C)$ , vs Junction Temperature T<sub>J</sub> I<sub>GT</sub>(25°C) T2+G+ T2+G- -----2.5 T2-G-T2-G+ 2 1.5 1 0.5 o<u>└</u> 0 50 100 150 T<sub>J</sub> (°C)

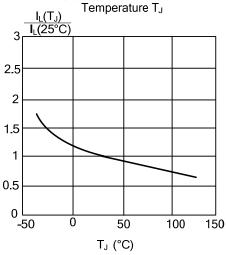
Normalised Holding Current  $I_H(T_J)/I_H(25^{\circ}C)$ , vs Junction Temperature  $T_J$ 



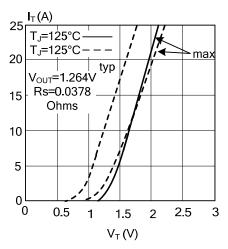
Transient Thermal Impedance  $Z_{th j-mb}$ , vs Pulse Width  $t_{\text{p}}$ 



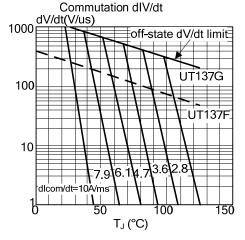
Normalised Latching Current I<sub>L</sub>(T<sub>J</sub>)/I<sub>L</sub>(25°C), vs Junction



Typical and Maximum On-state Characteristic



Typical Commutation dV/dt Vs Junction Temperature, Parameter Commutation dI<sub>T</sub>/dt. The Triac Should Commutate When The dV/dt Is Below The Value On The Appropriate Curve For Pre-



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