



# UT137E

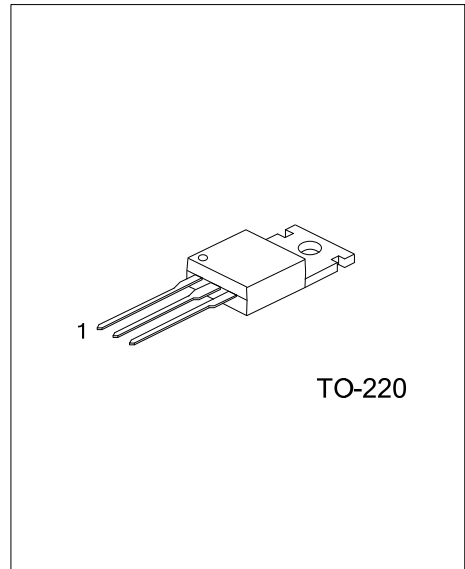
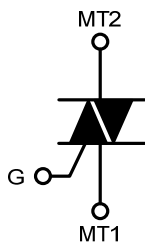
TRIAC

## TRIAC

### DESCRIPTION

Passivated, sensitive gate triacs 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.

### SYMBOL



### ORDERING INFORMATION

Order Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
UT137EL-x-TA3-T	UT137EG-x-TA3-T	TO-220	MT1	MT2	GATE	Tube

<p>UT137EL-x-TA3-T</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Peak Voltage</li> <li>(4) Lead Free</li> </ul>	<ul style="list-style-type: none"> <li>(1) T: Tube</li> <li>(2) TA3: TO-220</li> <li>(3) 5: 500V, 6: 600V, 8: 800V</li> <li>(4) L: Lead Free, G: Halogen Free</li> </ul>
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## ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Repetitive peak off-state voltages	$V_{DRM}$	500 (Note 2)	V
		600 (Note 2)	V
		800	V
RMS on-state current full sine wave; $T_{mb} \leq 102^{\circ}C$	$I_{T(RMS)}$	8	A
Non-repetitive peak on-state current (Full sine wave; $T_J = 25^{\circ}C$ prior to surge)	$I_{TSM}$	$t = 20ms$	65
		$t = 16.7 ms$	71
$I^2t$ for fusing	$I^2t$	21	$A^2s$
Repetitive rate of rise of on-state current after triggering $I_{TM}=12A; I_G=0.2A; d_{IG}/dt=0.2A/\mu s$	$di_T/dt$	T2+ G+	50
		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 20 ms period)	$P_{G(AV)}$	0.5	W
Junction Temperature	$T_J$	125	$^{\circ}C$
Storage Temperature	$T_{STG}$	-40 ~ +150	$^{\circ}C$

- 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.
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  $6A/\mu s$ .

## ■ THERMAL RESISTANCES

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

## ■ STATIC CHARACTERISTICS ( $T_J=25^{\circ}C$ , unless otherwise stated)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Gate trigger current	$I_{GT}$	$V_D = 12 V; I_T = 0.1 A$	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	$I_L$	$V_D = 12 V; I_{GT} = 0.1 A$	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	$I_H$	$V_D = 12 V; I_{GT} = 0.1 A$		2.5	20	mA
On-state voltage	$V_T$	$I_T = 10 A$		1.3	1.65	V
Gate trigger voltage	$V_{GT}$	$V_D = 12 V; I_T = 0.1 A$		0.7	1.5	V
		$V_D = 400V; I_T = 0.1 A; T_J = 125^{\circ}C$	0.25	0.4		V
Off-state leakage current	$I_D$	$V_D = V_{DRM(max)}; T_J = 125^{\circ}C$		0.1	0.5	mA

■ **DYNAMIC CHARACTERISTICS** ( $T_J=25^\circ\text{C}$ , unless otherwise stated)

parameter	symbol	conditions	min	typ	max	unit
Critical rate of rise of Off-state voltage	$d_{VD}/dt$	$V_{DM} = 67\% V_{DRMMAX}$ ; $T_J=125^\circ\text{C}$ ; Exponential waveform; gate open circuit		50		V/ $\mu\text{s}$
Gate controlled turn-on time	$t_{GT}$	$I_{TM} = 12\text{A}$ ; $V_D = V_{DRMMAX}$ ; $I_G = 0.1\text{A}$ ; $d_{IG}/dt = 5\text{A}/\mu\text{s}$		2		$\mu\text{s}$

■ TYPICAL CHARACTERISTICS

Figure 1. Maximum On-State Dissipation.  $P_{tot}$  vs RMS On-State Current,  $I_{T(RMS)}$ , Where  $\alpha$ =conduction Angle

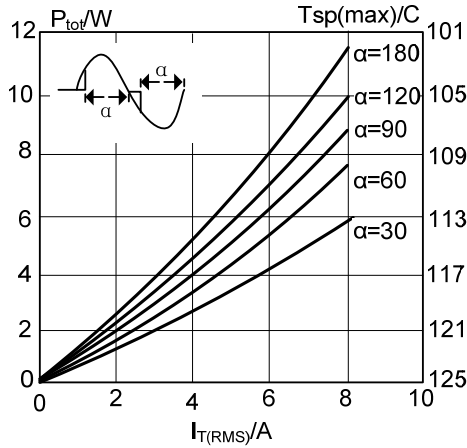


Figure 2. Maximum Permissible Non-Repetitive Peak On-State Current  $I_{TSM}$ , vs Pulse Width  $t_p$ , for Sinusoidal Currents,  $t_p \leq 20ms$

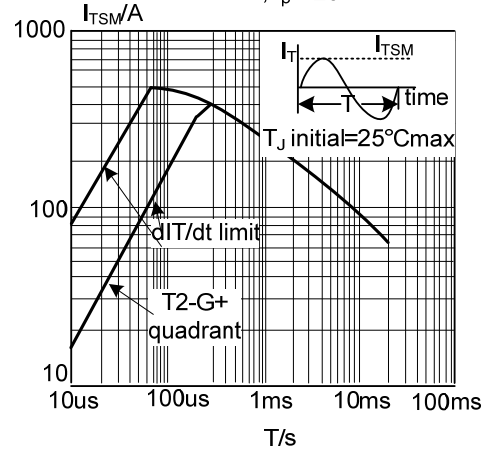


Figure 3. Maximum Permissible Non-Repetitive Peak On-State Current  $I_{TSM}$ , vs Number of Cycles, for Sinusoidal Currents,  $f=50Hz$

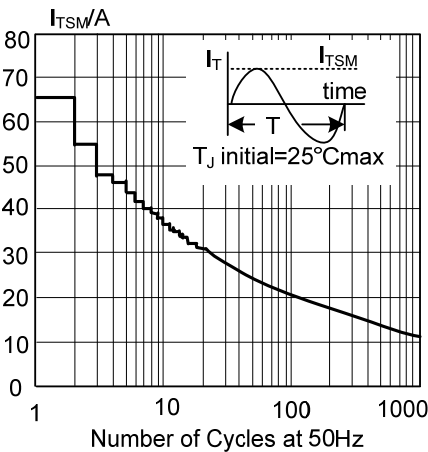


Figure 4. Maximum Permissible RMS Current  $I_{T(RMS)}$  vs Mounting Base Temperature  $T_{mb}$

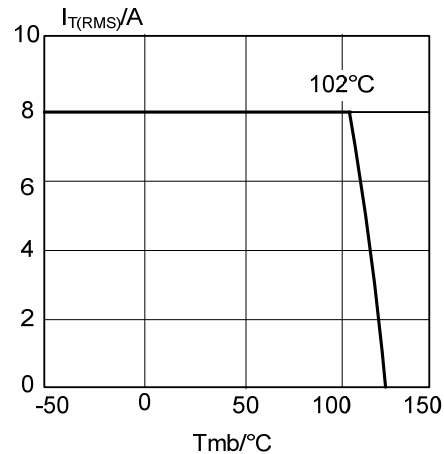


Figure 5. Maximum Permissible Repetitive RMS On-State Current  $I_{T(RMS)}$ , vs Surge Duration, for Sinusoidal Currents,  $f=50Hz$ ,  $T_{mb} \leq 102^\circ C$

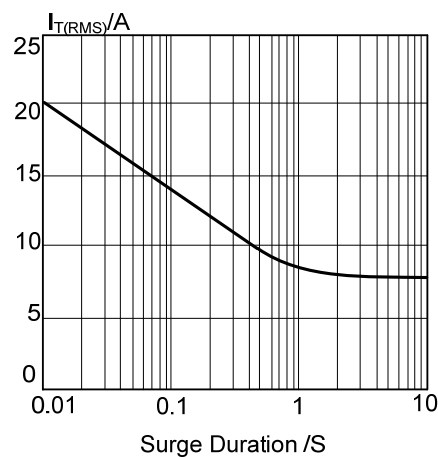
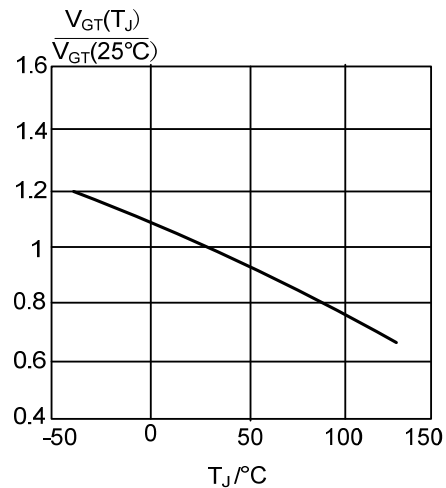


Figure 6. Normalised Gate Trigger Voltage  $V_{GT}(T_J)/V_{GT}(25^\circ C)$ , vs Junction Temperature  $T_J$



■ TYPICAL CHARACTERISTICS(Cont.)

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

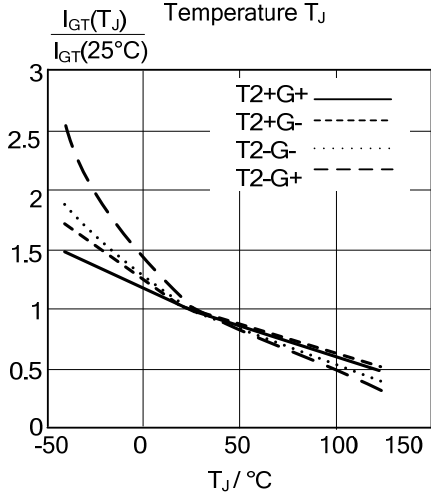


Figure 8. Normalised Latching Current  $I_L(T_J)/I_L(25^\circ\text{C})$ , vs Junction Temperature  $T_J$

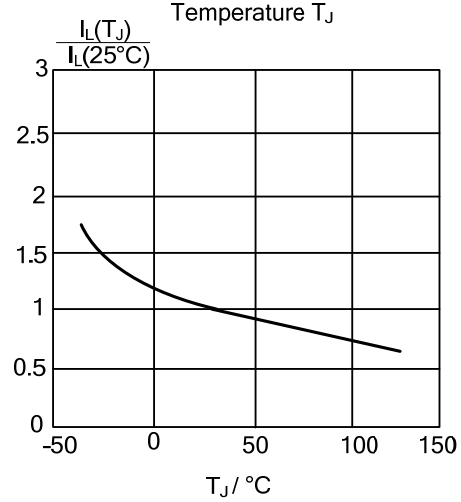


Figure 9. Normalised Holding Current  $I_H(T_J)/I_H(25^\circ\text{C})$ , vs Junction Temperature  $T_J$

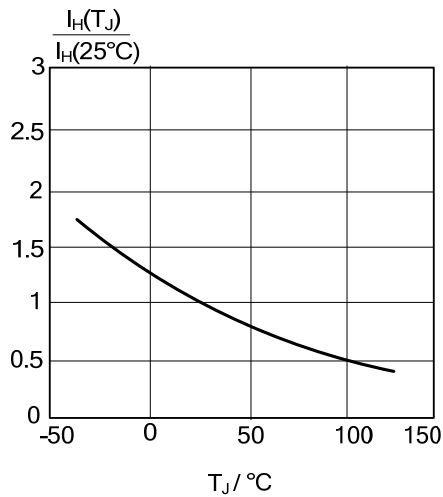


Figure 10. Typical and Maximum On-state Characteristic

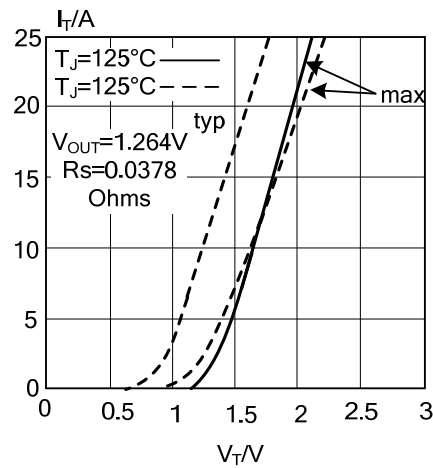


Figure 11. Transient Thermal Impedance  $Z_{th\ j-mb}$ , vs Pulse Width  $t_p$

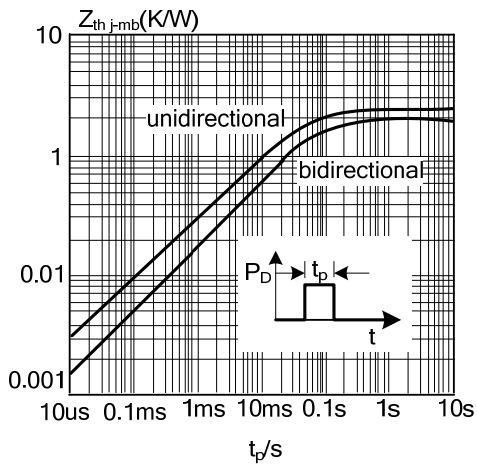
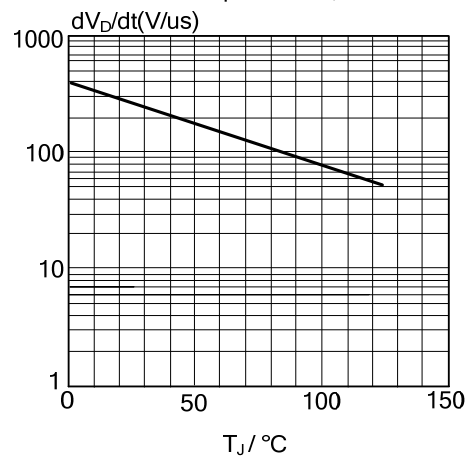


Figure 12. Typical Critical Rate of Rise of Off-State Voltage,  $dV_D/dt$  Versus Junction temperature  $T_J$



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