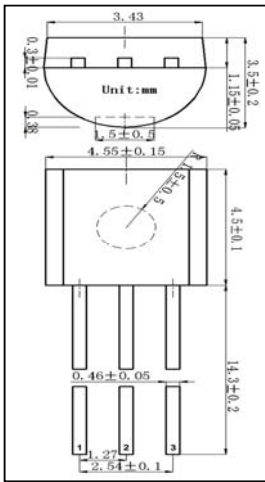
TO-92 Plastic-Encapsulate Transistors

FEATURES

- Blocking voltage to 600 V
- RMS on-state current to 0.6 A
- Sensitive gate in all four quadrants
- Low cost package
- General purpose bidirectional switching

MECHANICAL DATA

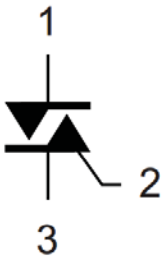
- Case style:TO-92 molded plastic
- Mounting position:any



1 .ANODE

2. GATE

3. ANODE



MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

Parameter	Symbol	Conditions		Value	Unit
repetitive peak off-state voltage	V_{DRM}	T_j =25 to125°C		600	V
on-state current (RMS value)	$I_{T(RMS)}$	full sine wave; T_{lead}≤51℃		0.8	A
non-repetitive peak on-state current	I_{TSM}	full sine wave; T_j=25℃ prior to surge	t=20ms	8.0	A
			t = 16.7ms	8.8	A
I^2t for fusing	I^2t	t=10 ms		1.28	A^2s
repetitive rate of rise of on-state current after triggering	dI_T/dt	I_{TM}= 1.0 A; I_G= 0.2 A; dI_G/dt = 0.2 A/μs	T2+ G+	50	A/μs
			T2+ G-	50	
			T2- G-	50	
			T2- G+	10	
gate current (peak value)	I_{GM}	t = 2μs max		2	A
gate voltage (peak value)	V_{GM}	t = 2μs max		5	V
gate power (peak value)	P_{GM}	t = 2μs max		5	W
average gate power	$P_{G(AV)}$	T_{case}=80°C; t = 2μs max		0.5	W
storage temperature	T_{stg}			-40~ +150	C
operating junction temperature	T_j			-40~ +110	C
thermal resistance from junction to lead	$R_{th(j-lead)}$	full cycle		60	K/W
		half cycle		80	K/W
thermal resistance from junction to ambient	$R_{th(j-a)}$	mounted on a printed circuit board; lead length = 4 mm		150	K/W

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Parameter	Symbol	Test conditions		Min	Max	Unit
Static characteristics						
gate trigger current	I_{GT}	V_D= 12V; I_T= 0.1A	T2+ G+		3	mA
			T2+ G-		3	
			T2- G-		3	
			T2- G+		7	
latching current	I_L	V_D= 12V; I_{GT}= 0.1A	T2+ G+		5	mA
			T2+ G-		8	
			T2- G-		5	
			T2- G+		8	
holding current	I_H	V_D= 12 V; I_{GT}= 0.1 A			5	mA
on-state voltage	V_{TM}	I_T= 1.0 A			1.65	V
gate trigger voltage	V_{GT}	V_D= 12 V; I_T= 0.1 A			1.5	V
		V_D=400V; I_T= 0.1 A; T_j = 110°C		0.2		
off-state leakage current	I_D	V_D=$V_{DRM\ (max)}$; T_j = 125°C			0.5	mA

Dynamic characteristics

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
critical rate of rise of off-state voltage	dV_D/dt	V_D= 67% of $V_{DM(max)}$; T_{case}= 110°C; exponential waveform; gate open circuit	5	15		V/µs
critical rate of rise of commutation voltage	dV_{com}/dt	V_D= rated V_{DRM};T_{case}=50°C I_{TM}= 0.84 A Commutating dI/dt=0.3 A/ms		5		V/µs
gate controlled turn-on time	t_{gt}	I_{TM}= 1.5 A; V_D=$V_{DRM(max)}$ I_G= 100mA; dI_G/dt=5A/µs		2		µs

RATINGS AND CHARACTERISTIC CURVES

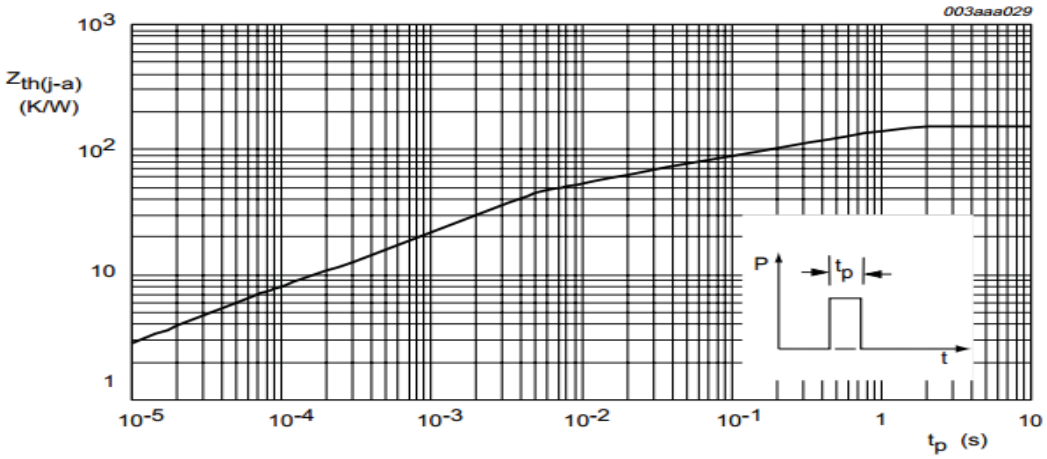
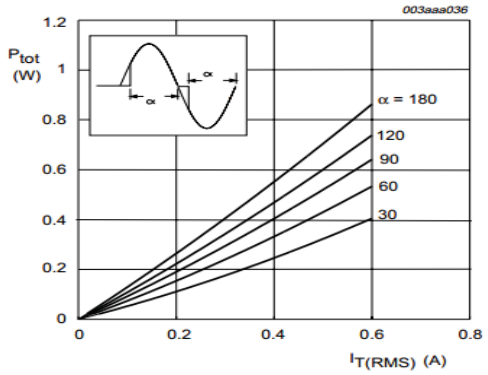
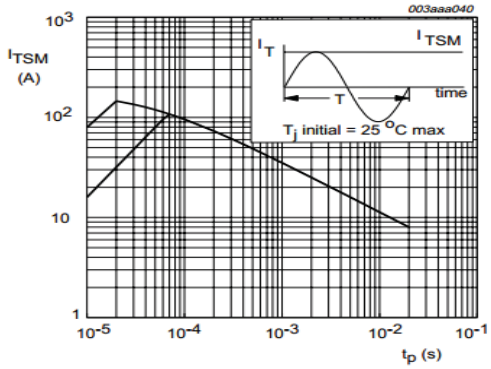


Fig 1. Transient thermal impedance from junction to ambient as a function of pulse duration.



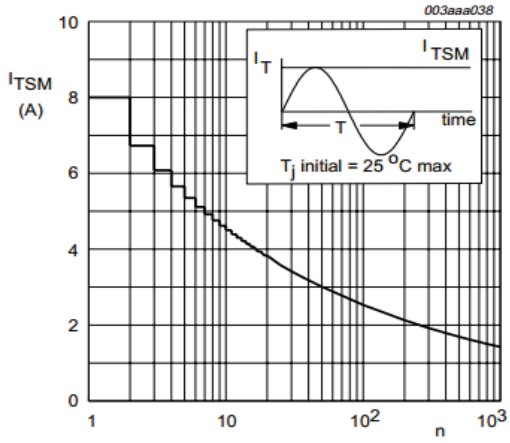
α = conduction angle

Fig 2. Maximum on-state dissipation as a function of RMS on-state current; typical values.



$t_p \leq 20$ ms

Fig 3. Maximum permissible non-repetitive peak on-state current as a function of pulse width for sinusoidal currents; typical values.



n = number of cycles at f = 50 Hz

Fig 4. Maximum permissible non-repetitive peak on-state current as a function of number of cycles for sinusoidal currents; typical values.

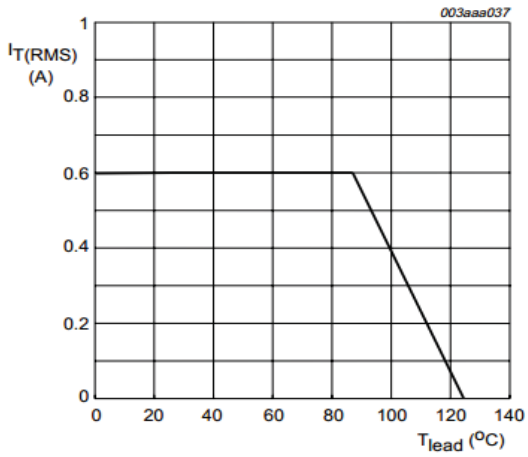
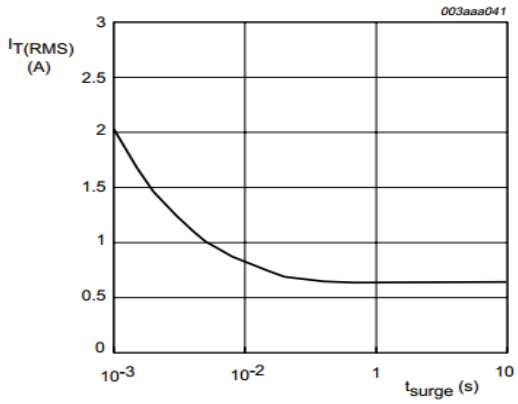


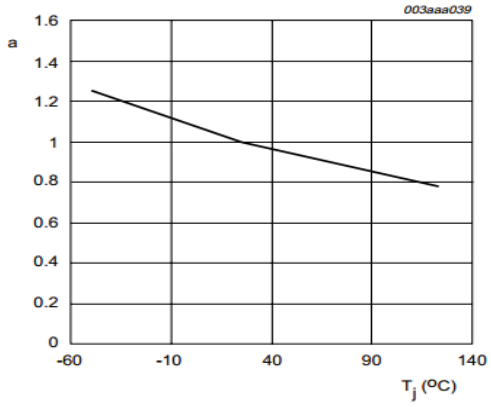
Fig 5. Maximum permissible RMS current as a function of lead temperature; typical values.

RATINGS AND CHARACTERISTIC CURVES



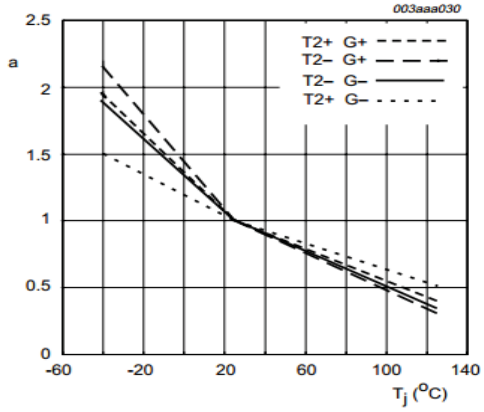
f = 50 Hz; $T_{lead} \leq 50$ °C

Fig 6. Maximum permissible repetitive RMS on-state current as a function of surge duration for sinusoidal currents; typical values.



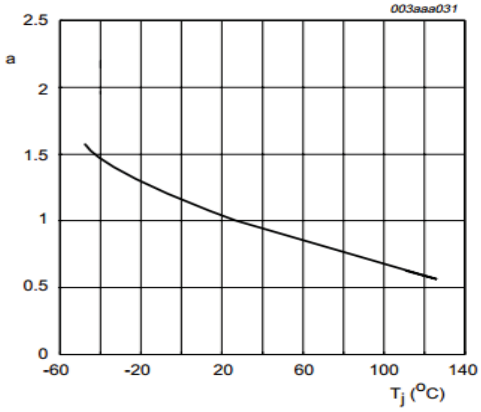
$$a = \frac{V_{GT(Tj)}}{V_{GT(25°C)}}$$

Fig 7. Normalized gate trigger voltage as a function of junction temperature; typical values.



$$a = \frac{I_{GT(Tj)}}{I_{GT(25°C)}}$$

Fig 8. Normalized gate trigger current as a function of junction temperature; typical values.



$$a = \frac{I_{L(Tj)}}{I_{L(25°C)}}$$

Fig 9. Normalized latching current as a function of junction temperature; typical values.

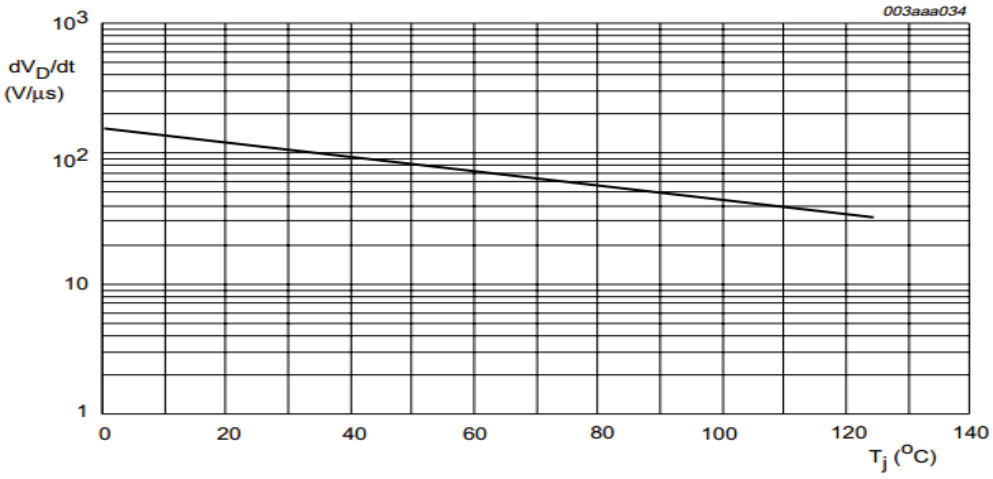


Fig 12. Critical rate of rise of off-state voltage as a function of junction temperature; typical values.