

T-25-17

**TENTATIVE DATA**

**FEATURES**  
Low loss asymmetrical diffusion structure.  
Interdigitated gate structure.  
Very low TQ with gate assisted turn-off.  
Fully characterised for operation up to 40 kHz.  
Directly compatible with 220-415 V a.c. mains.

**APPLICATIONS**  
High frequency, high power choppers and inverters :  
Welding, Induction Heating, 400 Hz UPS,  
PWM inverters, Ultrasonic generators.

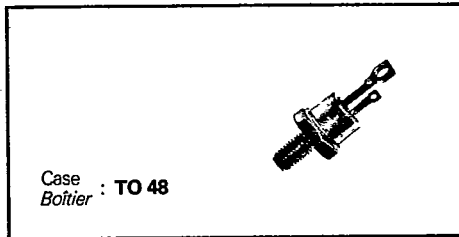
**CARACTERISTIQUES GENERALES**  
*Structure de diffusion asymétrique à faibles pertes.  
Structure de gâchette amplificatrice.  
Très faible TQ avec l'extinction assistée par gâchette.  
Caractérisé pour fonctionnement jusqu'à 40 kHz.  
Compatible avec tensions secteur 220-415 V.*

**APPLICATIONS**  
*Hacheurs et onduleurs haute fréquence, forte puissance :  
Soudure, Chauffage par induction,  
Onduleurs MLI, Générateurs ultrason, Alimentations de secours 400 Hz.*

**IT(PEAK)@ 20 KHz**      **40 Amps**

**VDRM up to**              **1200 Volts**

**tq'**                              **5 µs**



ORDERING INFORMATION APPELLATION				
Type	Voltage		Turn - off	
Code	V <sub>DRM</sub> (V)	Code	t <sub>q'</sub> (µs)	Code
TSD	50	035	5	No code
	200	235		
	400	435		
	600	635		
	800	835		
	1000	1035		
	1200	1235	For V <sub>DRM</sub> ≥ 1000 V, please consult us. Pour V <sub>DRM</sub> ≥ 1000 V, nous consulter.	

<b>Example</b> Type TSD with V <sub>DRM</sub> = 600 V, and tq' = 5 µs, order as:	Type	V <sub>DRM</sub>
	TSD	635

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**BLOCKING STATE CHARACTERISTICS**

Repetitive peak reverse voltage (for all voltage classes)	$V_{RRM}$	10	V	
Max. forward leakage current	$I_{DRM}$	5	mA	$T_J = 125\text{ }^\circ\text{C}$ @ $V_{DRM}$
Max. reverse leakage current	$I_{RRM}$	100	mA	$T_J = 125\text{ }^\circ\text{C}$ @ $V_{RRM}$

**CONDUCTING STATE CHARACTERISTICS**

Peak forward current at 20 kHz	$I_{T(PEAK)}$	40	A	} $T_J = 125\text{ }^\circ\text{C}$ $T_{case} = 80\text{ }^\circ\text{C}$ Half sine Duty cycle 50 Hz
Peak one cycle surge current (non repetitive)	$I_{TSM}$	400	A	
$I^2t$ (for fusing)	$I^2t$	800	A <sup>2</sup> s	$T_J = 125\text{ }^\circ\text{C}$ $t_p = 10\text{ ms}$ $V_R = 0$
Max. forward voltage drop	$V_{TM}$	2.4	V	$T_p \geq 10\text{ ms}$ $T_J = 25\text{ }^\circ\text{C}$ $I_{TM} = 100\text{ A}$

**SWITCHING CHARACTERISTICS**

Gate assisted turn-off time (with feedback diode)	$t_q$ Max Typ	5 3	$\mu\text{s}$	} $T_J = 125\text{ }^\circ\text{C}$ $I_{TM} = 40\text{ A}$ $t_p = 25\text{ }\mu\text{s}$ $di_R/dt = 10\text{ A}/\mu\text{s}$ $V_R = -1\text{ V}$ $dv/dt = 200\text{ V}/\mu\text{s}$ (Linear to $0.6 V_{DRM}$ ) $V_{GK} = -5\text{ V}$
Typ. turn-off time (with feedback diode)	$t_q$	7	$\mu\text{s}$	
Min. critical on-state $di/dt$ - Non repetitive - Repetitive	$di/dt$	1000 500	A/ $\mu\text{s}$	$T_J = 125\text{ }^\circ\text{C}$ $I_{TM} = 40\text{ A}$ $t_p = 100\text{ }\mu\text{s}$ $di_R/dt = 10\text{ A}/\mu\text{s}$ $V_R = 1\text{ V}$ $dv/dt = 200\text{ V}/\mu\text{s}$ (Linear to $0.6 V_{DRM}$ ) Gate open
Min. critical off-state $dv/dt$	$dv/dt$	1000	V/ $\mu\text{s}$	Gate supply $20\text{ V}/20\text{ }\Omega$ $t_r \leq 0.5\text{ }\mu\text{s}$ $T_J = 125\text{ }^\circ\text{C}$ Linear to $0.6 V_{DRM}$ $V_{GK} = -5\text{ V}$

**GATE CHARACTERISTICS**

Max. DC trigger current	$I_{GT}$	200	mA	} $T_J = 25\text{ }^\circ\text{C}$ $V_D = 12\text{ V}$ $R_L = 3\text{ }\Omega$
Max. DC trigger voltage	$V_{GT}$	2	V	
Min. non trigger voltage	$V_{GD}$	0.2	V	$T_J = 125\text{ }^\circ\text{C}$ $V_D = V_{DRM}$ $R_L = 1\text{ k}\Omega$
Peak forward current	$I_{FGM}$	20	A	$T_p = 10\text{ }\mu\text{s}$
Peak reverse voltage	$V_{RGM}$	10	V	
Peak power	$P_{GM}$	60	W	$T_p = 10\text{ }\mu\text{s}$
Average power	$P_{G(AV)}$	2	W	

**THERMAL AND MECHANICAL CHARACTERISTICS**

Junction operating temperature range	$T_J$	- 40 to + 125	$^\circ\text{C}$	
Storage temperature range	$T_{stg}$	- 40 to + 150	$^\circ\text{C}$	
Max. thermal resistance junction to case (DC)	$R_{thJC}$	1.0	$^\circ\text{C}/\text{W}$	Stud torque Min : 3.5 Nm Max : 3.8 Nm
Max. thermal resistance case to heatsink	$R_{thCS}$	0.4		

SINUSOIDAL CURRENT PULSE DATA

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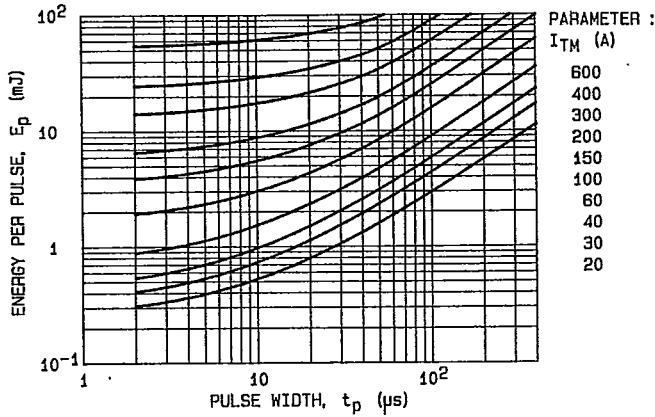


FIG.1 - ENERGY PER PULSE FOR SINUSOIDAL PULSES.

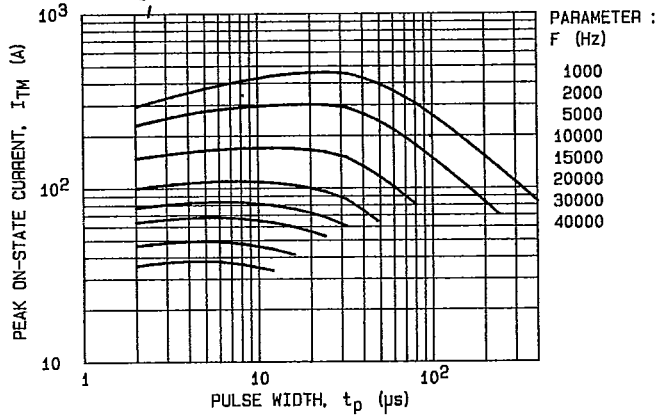


FIG.2 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR  $T_c = 85^\circ\text{C}$ .

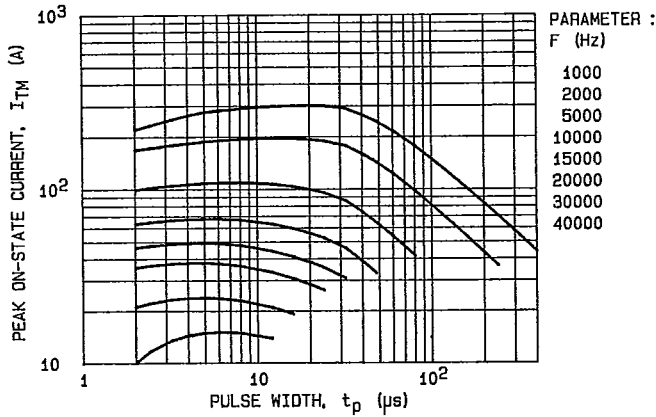
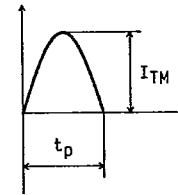


FIG.3 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR  $T_c = 80^\circ\text{C}$ .



NOTES :

1.  $V_D \leq 600$  Volts.
2.  $V_R \leq 1$  Volt.
3. R.C Snubber,  $C = 22$  nF,  
 $R = 33 \Omega$

## TRAPEZOIDAL CURRENT PULSE DATA

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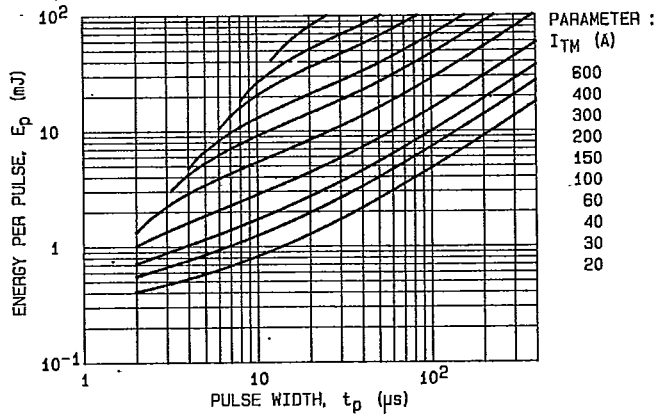


FIG.4 - ENERGY PER PULSE FOR TRAPEZOIDAL PULSES.

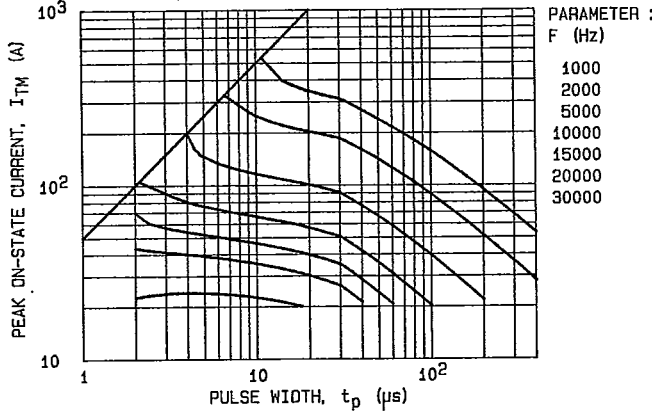


FIG.5 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR  $T_C = 85^\circ C$ .

$di/dt = 100 \text{ A}/\mu\text{s}$

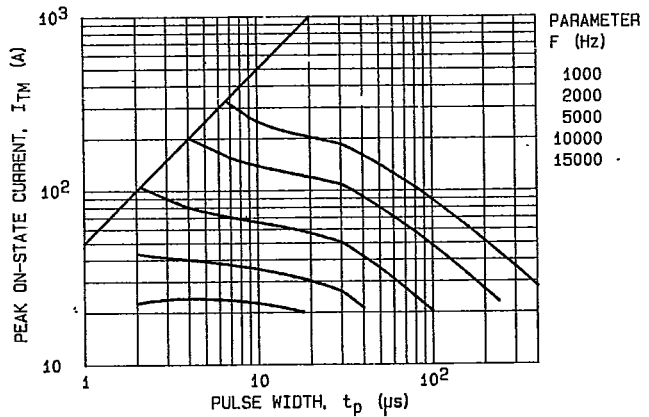
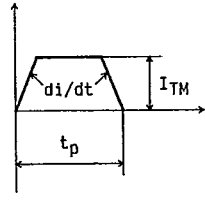


FIG.6 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR  $T_C = 80^\circ C$ .

- NOTES :
1.  $V_D \leq 600$  Volts.
  2.  $V_R \leq 1$  Volt.
  3. R.C Snubber,  $C = 22 \text{ nF}$ ,  
 $R = 33 \Omega$ .

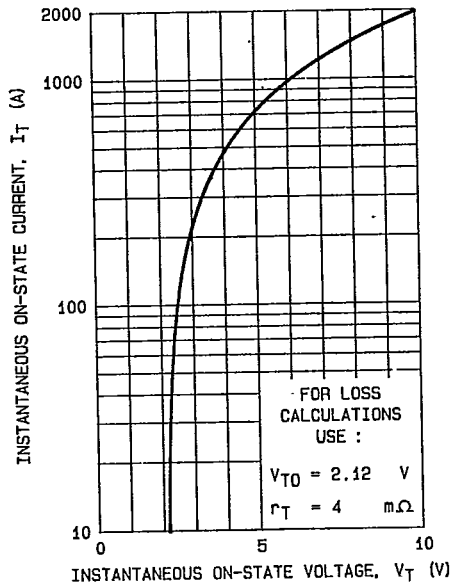


FIG.7 - MAXIMUM ON-STATE CONDUCTION CHARACTERISTIC ( $T_J = 125^\circ\text{C}$ ).

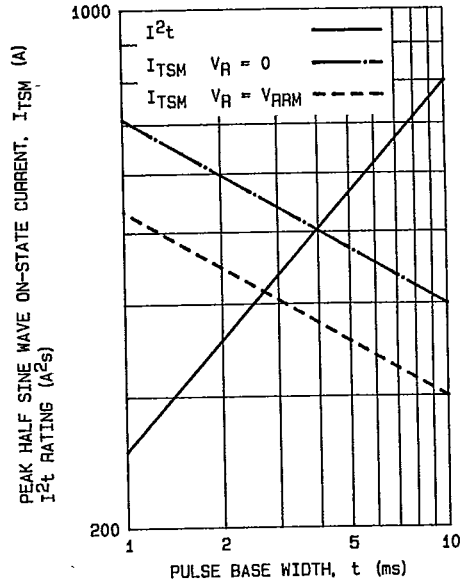


FIG.8 - NON REPETITIVE SUB-CYCLE SURGE ON-STATE CURRENT AND  $I^2t$  RATING (INITIAL  $T_J = 125^\circ\text{C}$ ).

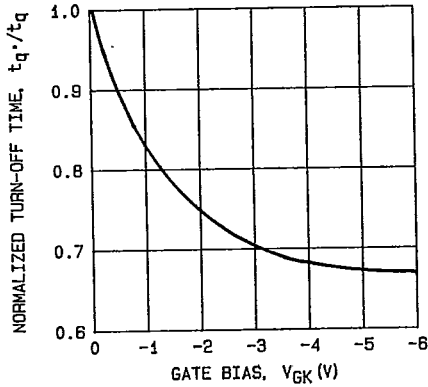


FIG.9 - TYPICAL VARIATION OF EFFECTIVE TURN-OFF TIME  $t_{q^*}$  WITH NEGATIVE GATE BIAS.

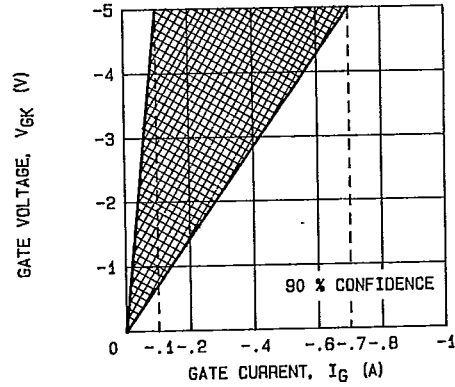


FIG.10 - REVERSE GATE CHARACTERISTICS.

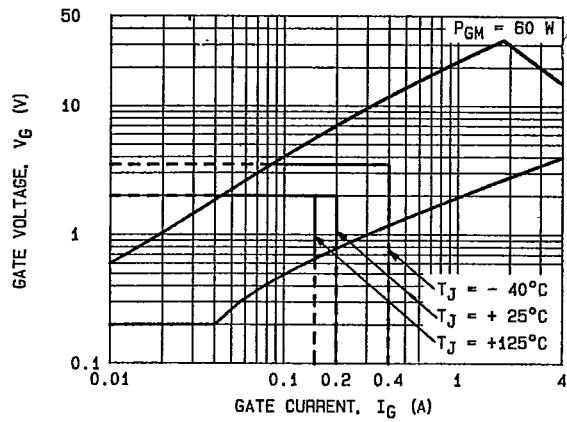


FIG.11 - GATE TRIGGER CHARACTERISTICS.

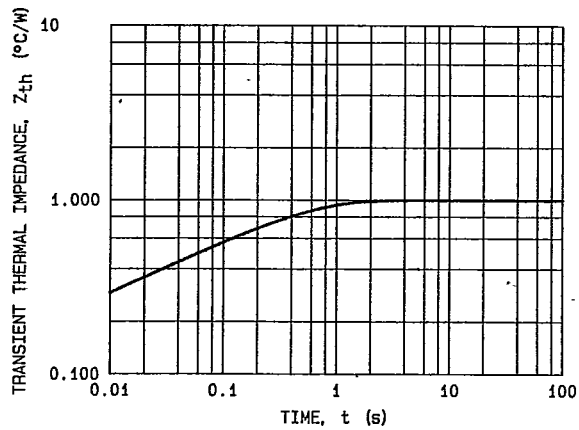
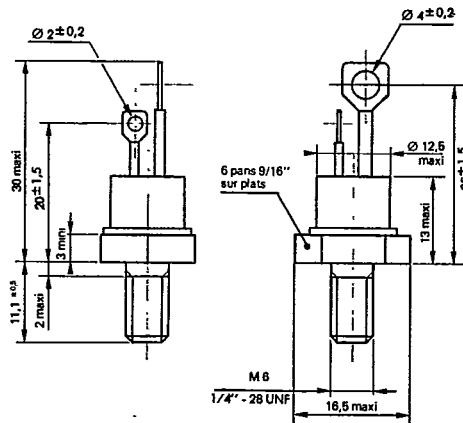


FIG.12 - TRANSIENT THERMAL IMPEDANCE JUNCTION TO CASE.



TO 48 CASE OUTLINE