THOMSON SEMICONDUCTORS

TSD.35

ASYMMETRICAL THYRISTOR
THYRISTOR ASYMÉTRIQUE

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.

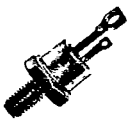
CARACTERISTIQUES GENERALES

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.

$I_{T(PEAK)}$ @ 20 KHz	40 Amps
V_{DRM} up to	1200 Volts
t_q'	5 µs



Case
Boîtier : **TO 48**

ORDERING INFORMATION
APPELLATION

Type	Voltage		Turn - off	
Code	V_{DRM} (V)	Code	t_q'(µs)	Code
TSD	50	035	5	No code
	200	235		
	400	435		
	600	635		
	800	835		
	1000	1035	For $V_{DRM} \geq$ 1000 V, please consult us. Pour $V_{DRM} \geq$ 1000 V, nous consulter.	
	1200	1235		

Example

Type TSD with V_{DRM} = 600 V, and t_q' = 5 µs, order as:

Type	V_{DRM}
TSD	**635**

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THOMSON COMPONENTS

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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 °C @ V_{DRM}
Max. reverse leakage current	I_{RRM}	100	mA	T_J = 125 °C @ V_{RRM}

CONDUCTING STATE CHARACTERISTICS

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

SWITCHING CHARACTERISTICS

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

GATE CHARACTERISTICS

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

THERMAL AND MECHANICAL CHARACTERISTICS

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

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SINUSOIDAL CURRENT PULSE DATA

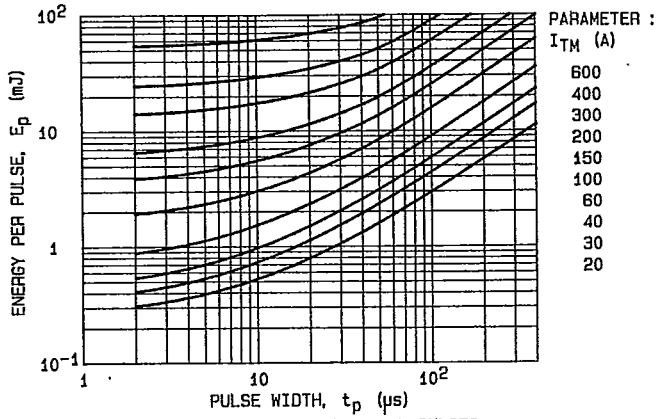
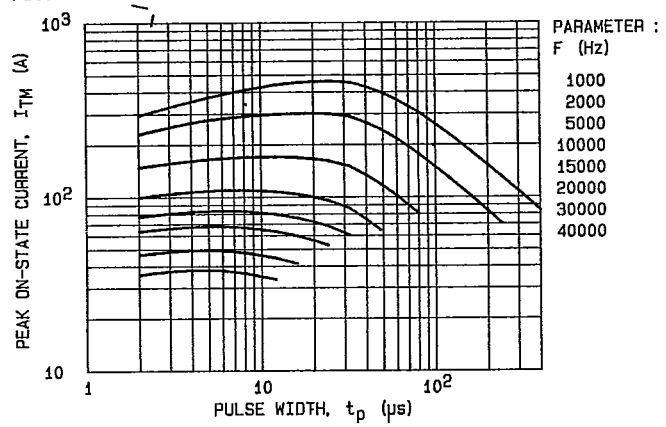


FIG.1 - ENERGY PER PULSE FOR SINUSOIDAL PULSES.



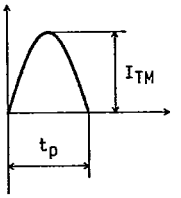
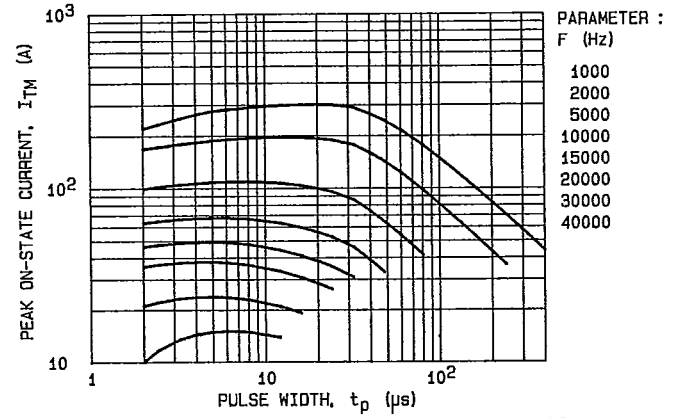


FIG.2 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR T_C = 85 °C.



NOTES :

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

FIG.3 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR T_C = 80 °C.

TRAPEZOIDAL CURRENT PULSE DATA

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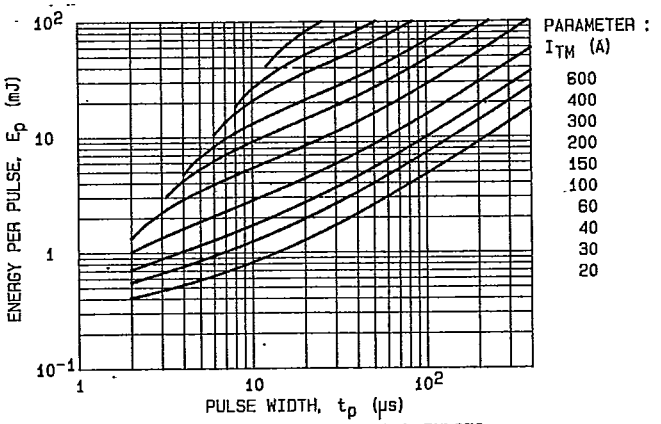


FIG.4 - ENERGY PER PULSE FOR TRAPEZOIDAL PULSES.

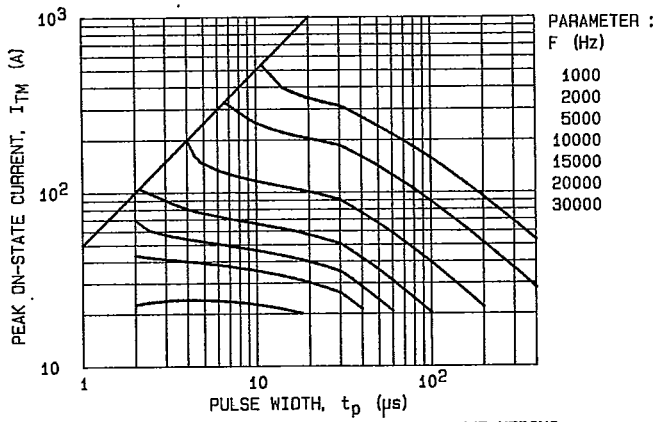
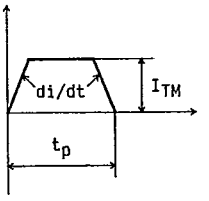


FIG.5 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR T_c = 65 °C.

di/dt = 100 A/µs



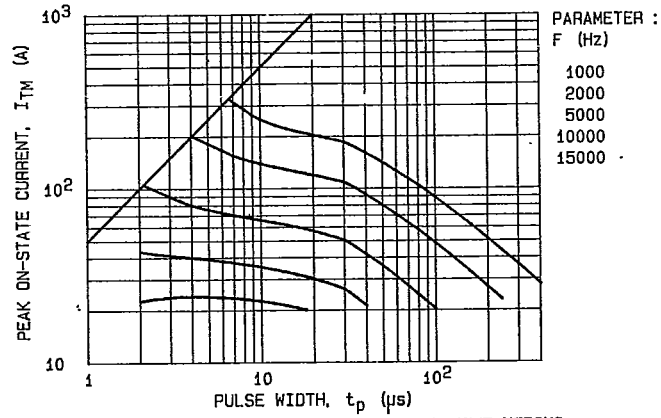


FIG.6 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR T_c = 80 °C.

NOTES :

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

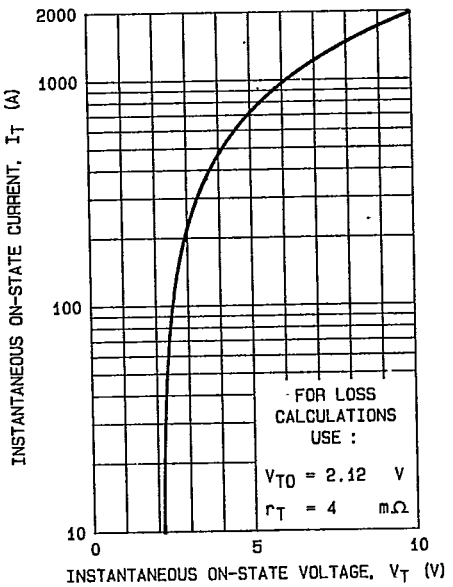


FIG.7 - MAXIMUM ON-STATE CONDUCTION CHARACTERISTIC (T_J = 125 °C).

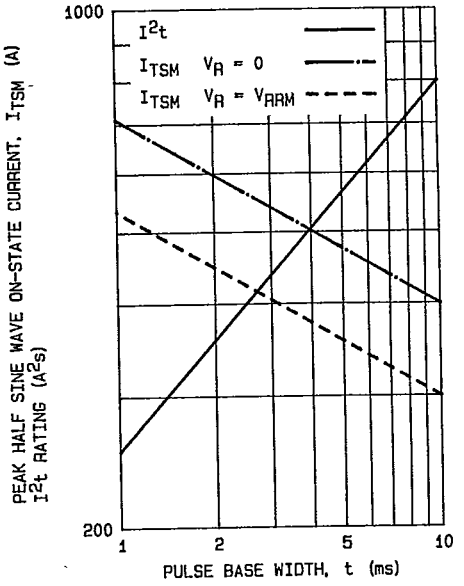


FIG.8 - NON REPETITIVE SUB-CYCLE SURGE ON-STATE CURRENT AND I^2t RATING (INITIAL T_J = 125 °C).

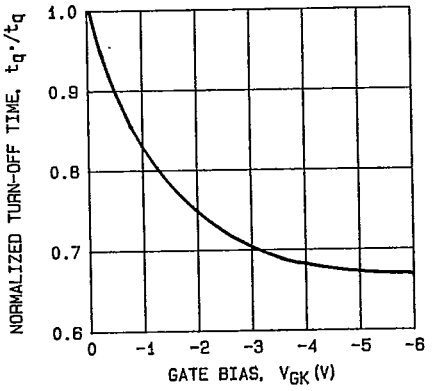


FIG.9 - TYPICAL VARIATION OF EFFECTIVE TURN-OFF TIME t_q WITH NEGATIVE GATE BIAS.

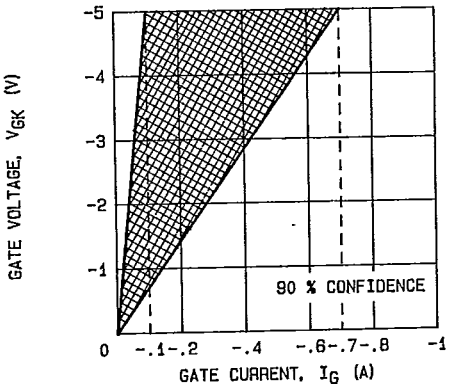


FIG.10 - REVERSE GATE CHARACTERISTICS.

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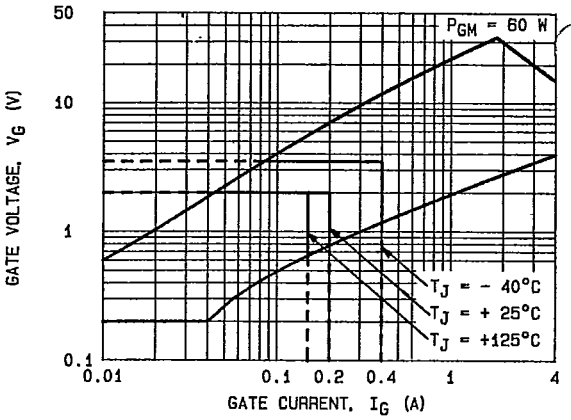


FIG.11 - GATE TRIGGER CHARACTERISTICS.

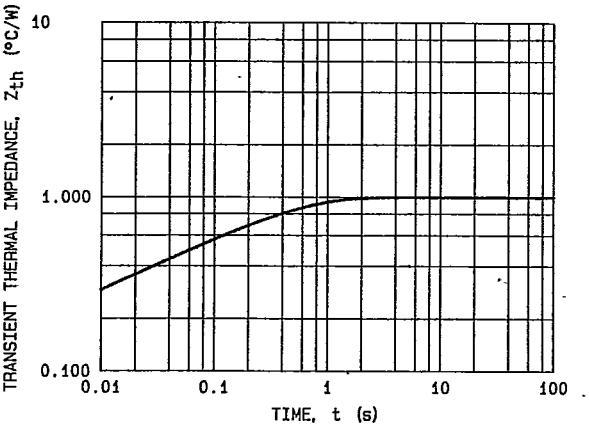
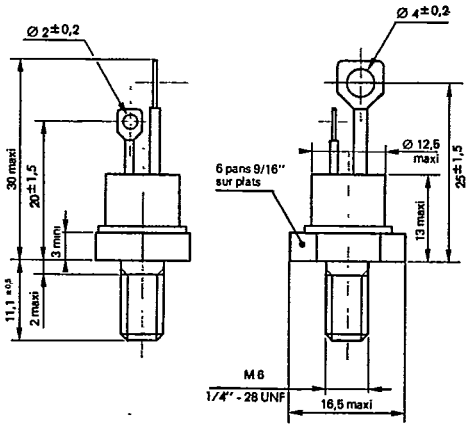


FIG.12 - TRANSIENT THERMAL IMPEDANCE JUNCTION TO CASE.



TO 48 CASE OUTLINE