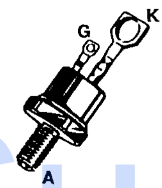
SGS-THOMSON MICROELECTRONICS 2N 3654 → 2N 3658

FAST SWITCHING THYRISTORS

- GLASS PASSIVATED CHIP
- HIGH STABILITY AND RELIABILITY
- HIGH di/dt AND dv/dt RATINGS
- $t_q \leq 10\ \mu s$

Thread : 1/4" -28 UNF : type N°
M6 on request : type N° + suffix M



TO 48
(Metal)

DESCRIPTION

SCR designed for high frequency power switching applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state Current (1)	$T_C = 40\ °C$	35	A
$I_{T(AV)}$	Mean on-state Current (1)	$T_C = 40\ °C$	22.5	A
I_{TSM}	Non Repetitive Surge Peak on-state Current (T_j initial ≤ 120 °C) (2)	t = 8.3 ms	210	A
		t = 10 ms	200	
I^2t	I^2t Value for Fusing	t = 10 ms	200	A^2s
di/dt	Critical Rate of Rise of on-state Current (3)		400	A/µs
T_{stg} T_j	Storage and Operating Junction Temperature Range		– 65 to 150 – 65 to 120	°C °C

Symbol	Parameter	2N 36..					Unit
		54	55	56	57	58	
V_{DRM} V_{RRM}	Repetitive Peak off-state Voltage (4)	50	100	200	300	400	V

(1) Single phase circuit, 180° conduction angle.
(2) Half sine wave.
(3) $I_G = 1$ A $dI_G/dt = 1$ A/µs.
(4) $T_j = 120$ °C .

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$ $R_{th\ (c-h)}$	Junction-case for D.C. Contact (case to heatsink)	1.45 0.40	°C/W °C/W

GATE CHARACTERISTICS (maximum values)

P_{GM} = 60 W (t_p = 500 µs) I_{FGM} = 10 A (t_p = 500 µs) V_{RGM} = 5 V
$P_{G(AV)}$ = 1 W V_{FGM} = 15 V (t_p = 500 µs)

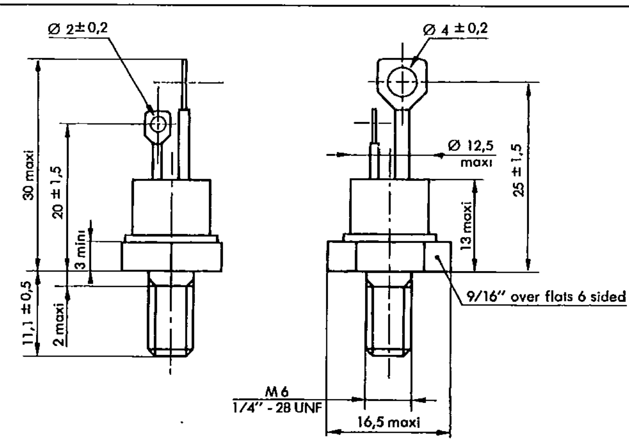
ELECTRICAL CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
I_{GT}	T_j = 25 °C Pulse Duration > 20 µs	V_D = 12 V	R_L = 33 Ω			180	mA
V_{GT}	T_j = 25 °C Pulse Duration > 20 µs	V_D = 12 V	R_L = 33 Ω			1.5	V
V_{GD}	T_j = 120 °C	V_D = V_{DRM}	R_L = 3.3 kΩ	0.2			V
I_H	T_j = 25 °C	I_T = 500 mA	Gate Open		70		mA
I_L	T_j = 25 °C Pulse Duration > 20 µs	V_D = 12 V	I_G = 360 mA		140		mA
V_{TM}	T_j = 25 °C	I_{TM} = 25 A	t_p = 10 ms			2.05	V
I_{DRM}	T_j = 120 °C	V_{DRM} Specified				6	mA
I_{RRM}	T_j = 120 °C	V_{RRM} Specified				6	mA
t_{gt}	T_j = 25 °C I_G = 500 mA	V_D = V_{DRM} di_G/dt = 5 A/µs	I_T = 25 A		1		µs
t_q	T_j = 120 °C V_D = 67 % V_{DRM} dv/dt = 200 V/µs	I_T = 25 A di/dt = 5 A/µs Gate Open	V_R = 15 V			10	µs
dv/dt*	T_j = 120 °C Linear Slope up to V_D = 67 % V_{DRM}	Gate Open		200			V/µs

* For higher guaranteed values, please consult us.

PACKAGE MECHANICAL DATA

TO 48 Metal



Cooling method : by conduction (method C)
Marking : type number
Weight : 13.5 ± 1 g
Polarity : anode to case
Stud torque : 3.5 m∆N min - 3.8 m∆N max.

SINUSOIDAL CURRENT PULSE DATA

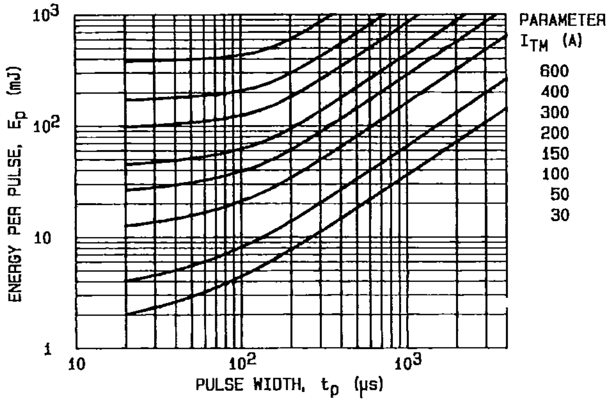
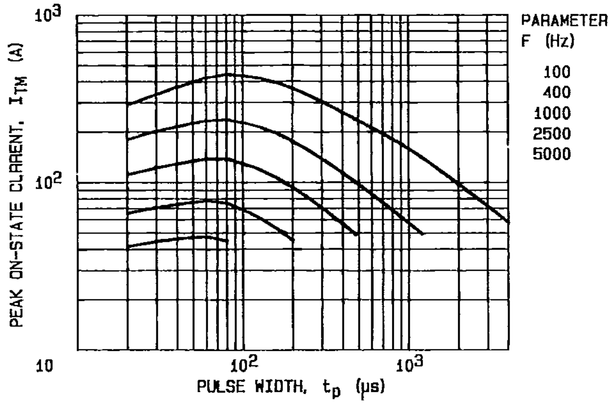


FIG.1 - ENERGY PER PULSE FOR SINUSOIDAL PULSES.



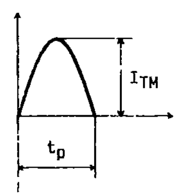
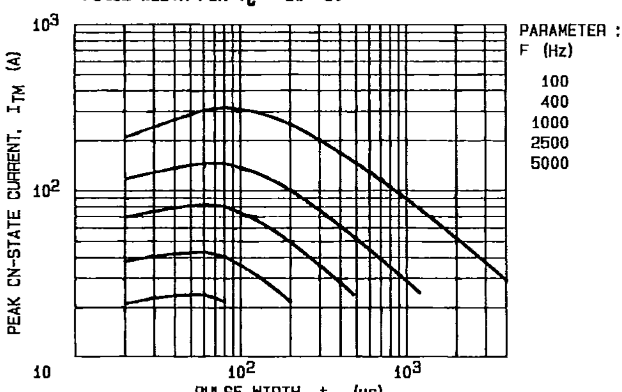


FIG.2 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR T_c = 85 °C.



NOTES :

1. $V_D = V_R$ = 200 Volts.
2. R.C Snubber, C = 0.1 μF, R = 33 Ω .

FIG.3 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR T_c = 90 °C.

TRAPEZOIDAL CURRENT PULSE DATA

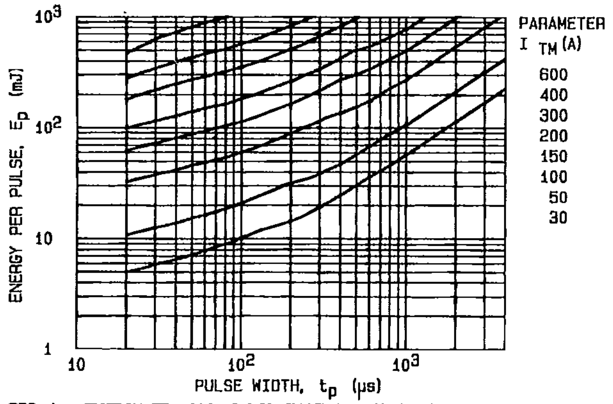
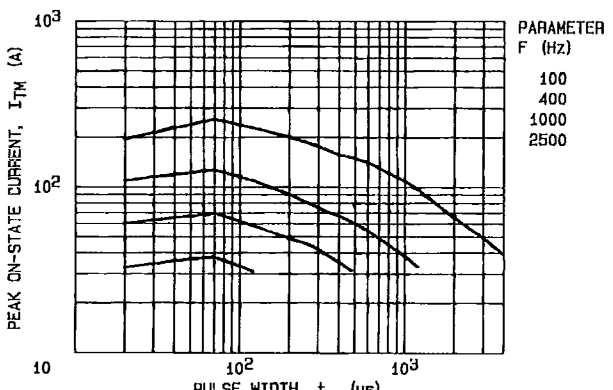


FIG.4 - ENERGY PER PULSE FOR TRAPEZOIDAL PULSES.



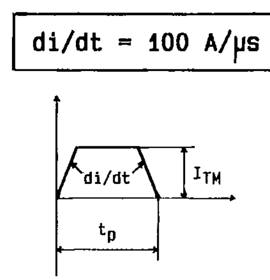
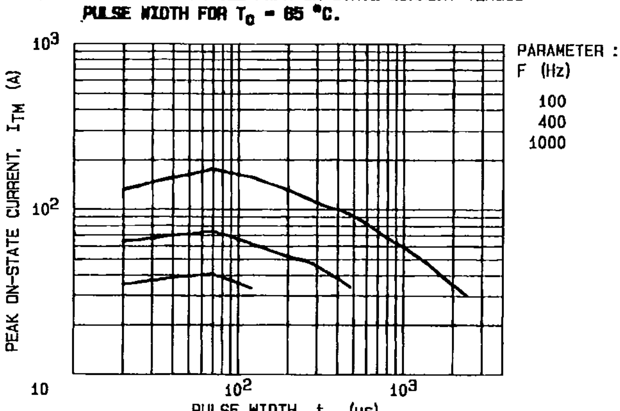


FIG.5 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR T_c = 85 °C.



NOTES :

1. $V_D = V_R$ = 200 Volts.
2. R.C Snubber, C = 0.1 μF,
   R = 33 Ω .

FIG.6 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR T_c = 90 °C.

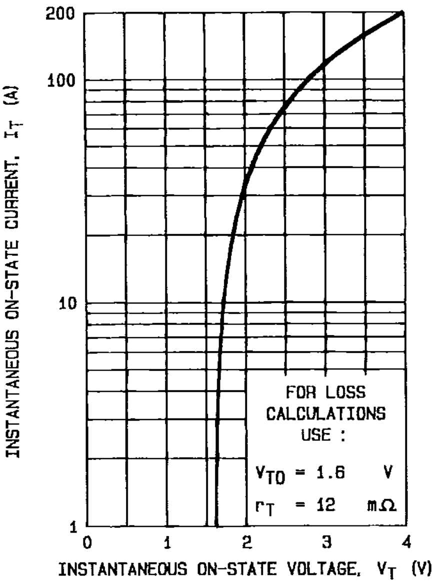


FIG.7 - MAXIMUM ON-STATE CONDUCTION CHARACTERISTIC (T_J = 120 °C).

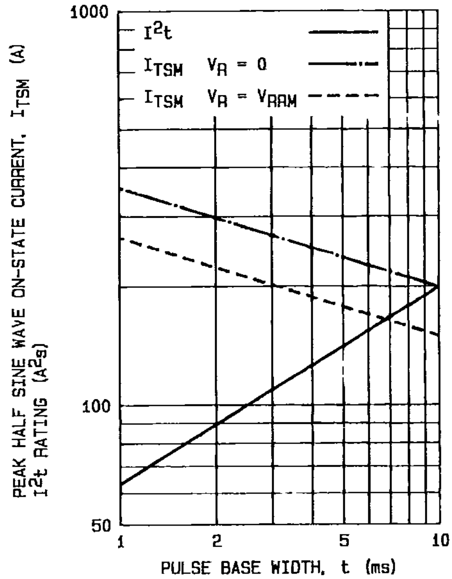


FIG.8 - NON REPETITIVE SUB-CYCLE SURGE ON-STATE CURRENT AND I^2t RATING (INITIAL T_J = 120 °C).

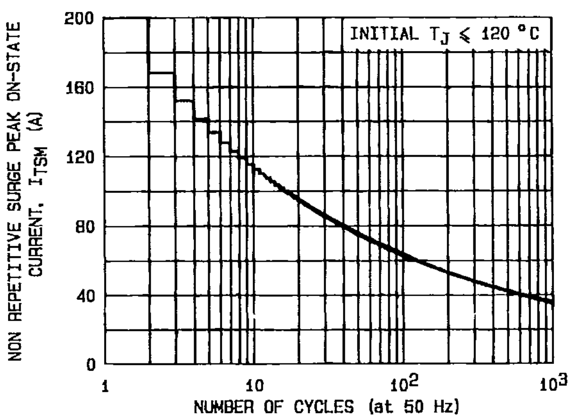


FIG.9 - NON REPETITIVE SURGE PEAK ON-STATE CURRENT VERSUS NUMBER OF CYCLES.

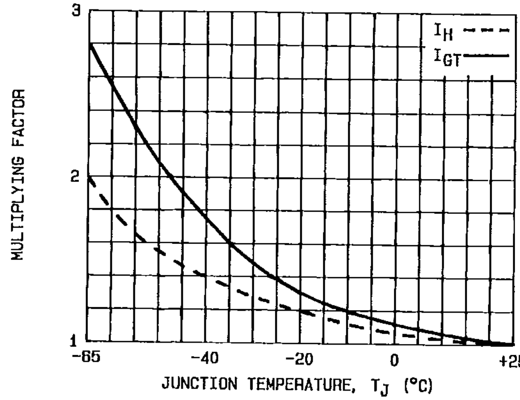


FIG.10 – RELATIVE VARIATION OF GATE TRIGGER CURRENT AND HOLDING CURRENT VERSUS JUNCTION TEMPERATURE.

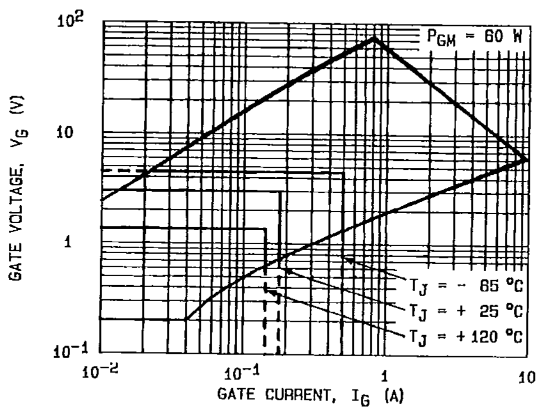


FIG.11 – GATE TRIGGER CHARACTERISTICS.

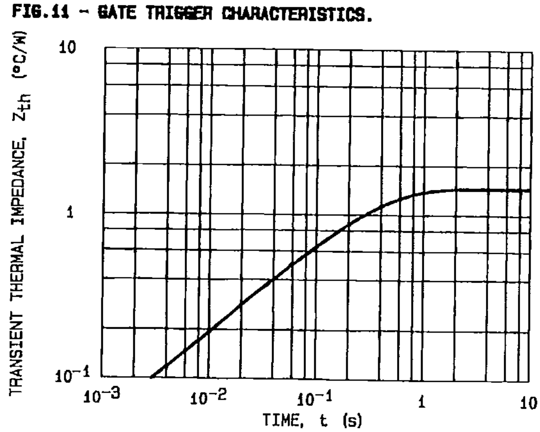


FIG.12 – TRANSIENT THERMAL IMPEDANCE JUNCTION TO CASE.