DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

2N1842-2N1850A
TR1010-TR9010

SILICON CONTROLLED RECTIFIER

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RMS on-state current @ T_C = 80°C	$I_{T(RMS)}$	16	A
Mean on-state current @ T_C = 80°C	$I_{T(AV)}$	10	A
Non-repetitive surge peak on-state current @ $T_J \leq 125°C$ **t = 8.3ms** **t = 10ms**	I_{TSM}	 157 150	A
I2t for fusing @ $T_J \leq 125°C$, t = 10ms	I^2t	112.5	A^2s
Critical rate of rise of on-state current	di/dt	100	A/µs
Operating junction temperature range	T_J	-40 to +150	°C
Storage temperature range	T_{stg}	-40 to +125	°C

VOLTAGE RATINGS

T_J = 125°C	2N1842(A)	2N1843(A)	2N1844(A)	2N1846(A)	2N1848(A)	2N1849(A)	2N1850(A)	TR6010	TR7010	TR8010	TR9010	TR1010	TR1110	TR1210
	VOLTS													
V_{DRM} = V_{RRM}	25	50	100	200	300	400	500	600	700	800	900	1000	1100	1200

THERMAL RESISTANCE

Thermal resistance	Symbol	Value	Unit
Junction to case for DC	$R_{th(j-c)}$	2	°C/W
Case to heatsink	$R_{th(c-h)}$	0.4	°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

Characteristic	Symbol	Value			Unit	Test conditions			
		Min	Typ	Max					
Gate trigger current	I_{GT}	-	-	80	mA	T_J = 25°C	V_D = 12V	R_L = 33Ω	$t_p \geq 20µs$
Gate trigger voltage	V_{GT}	-	-	3	V	T_J = 25°C	V_D = 12V	R_L = 33Ω	$t_p \geq 20µs$
Peak gate voltage	V_{GD}	0.25	-	-		T_J = 125°C	$V_D = V_{DRM}$	R_L = 3.3Ω	
Holding current	I_H	-	20	-	mA	T_J = 25°C	I_T = 0.5A	Gate open	
Peak on-state voltage	V_{TM}	-	-	2.2	V	T_J = 25°C	I_{TM} = 30A	t_p = 10ms	
Maximum off-state current	I_{DRM}	-	-	5	mA	T_J = 125°C	V_{DRM} specified		
Maximum off-state current	I_{RRM}	-	-	5	mA	T_J = 125°C	V_{RRM} specified		
Turn on time	t_{gt}	-	2	-	µs	T_J = 25°C I_G = 200mA	I_T = 30A di_G/dt = 2A/µs	$V_D = V_{DRM}$	
Turn off time	t_q	-	100	-	µs	T_J = 125°C di_R/dt = 30A/µs	I_T = 10A dv/dt = 20V/µs	V_R = 30V	V_D = 0.67 V_{DRM} Gate open
Critical rise of off-state voltage	dv/dt	100	-	-	V/µs	T_J = 125°C	Linear slope up to 0.67 V_{DRM} specified		

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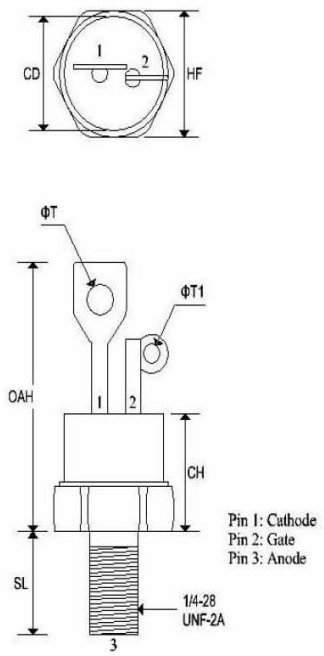
MECHANICAL CHARACTERISTICS

Case	TO-48
Marking	Alpha-numeric
Polarity	Cathode



	TO-48			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	-	0.543	-	13.793
CH	-	0.550	-	13.970
HF	0.544	0.563	13.817	14.301
OAH	-	1.193	-	30.303
SL	0.422	0.453	10.718	11.507
ΦT	0.125	0.165	3.175	4.191
ΦT_1	0.060	0.075	1.524	1.905

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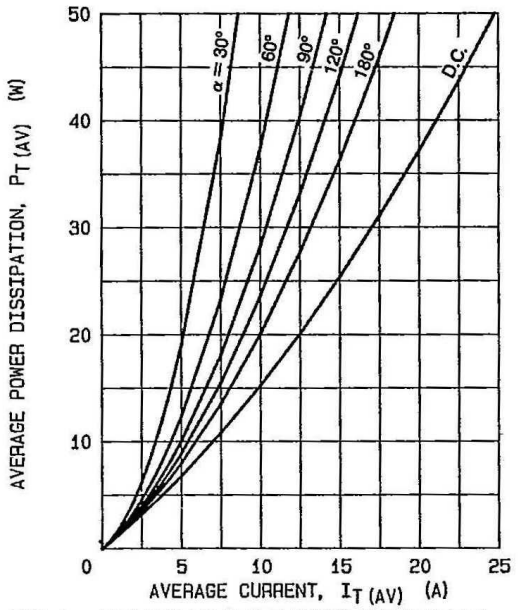


FIG.1 – MAXIMUM ON-STATE POWER DISSIPATION FOR SINUSOIDAL CURRENT WAVEFORM

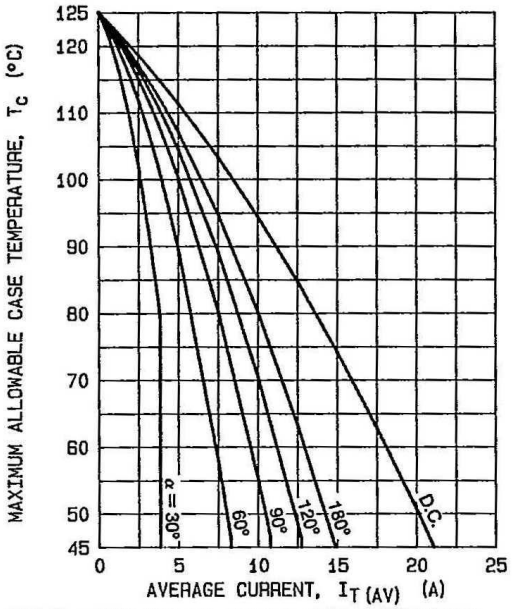
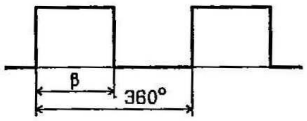


FIG.2 – MAXIMUM ALLOWABLE CASE TEMPERATURE FOR SINUSOIDAL CURRENT WAVEFORM



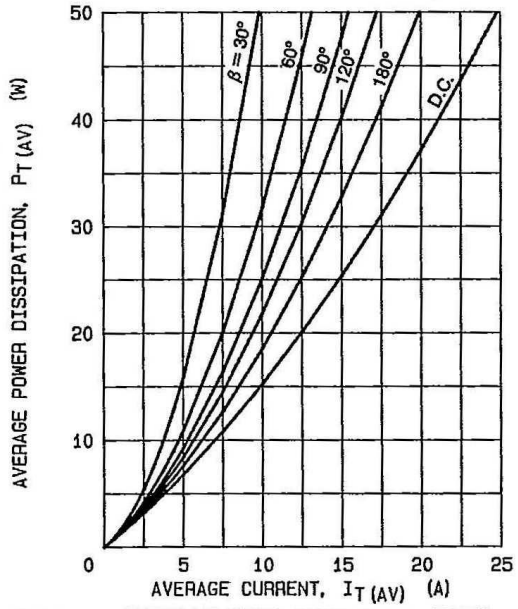


FIG.3 – MAXIMUM ON-STATE POWER DISSIPATION FOR RECTANGULAR CURRENT WAVEFORM

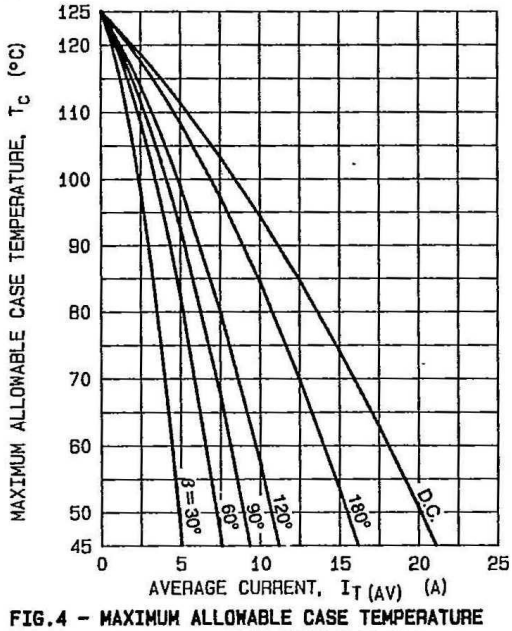


FIG.4 – MAXIMUM ALLOWABLE CASE TEMPERATURE FOR RECTANGULAR CURRENT WAVEFORM

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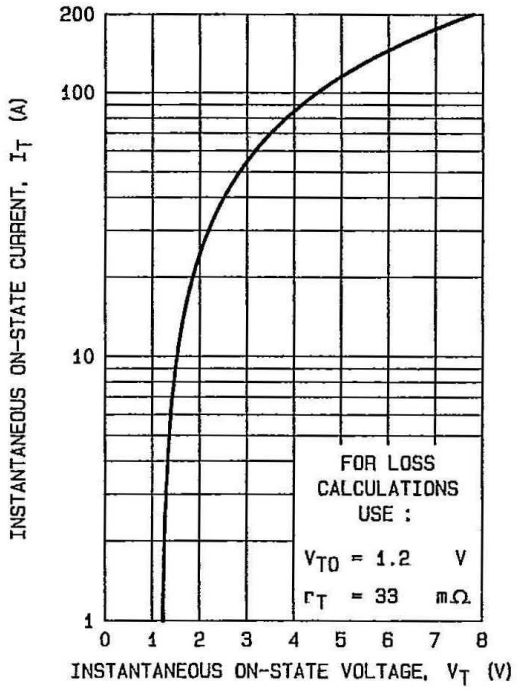

FIG.5 - MAXIMUM ON-STATE CONDUCTION CHARACTERISTIC (T_J = 125 °C).

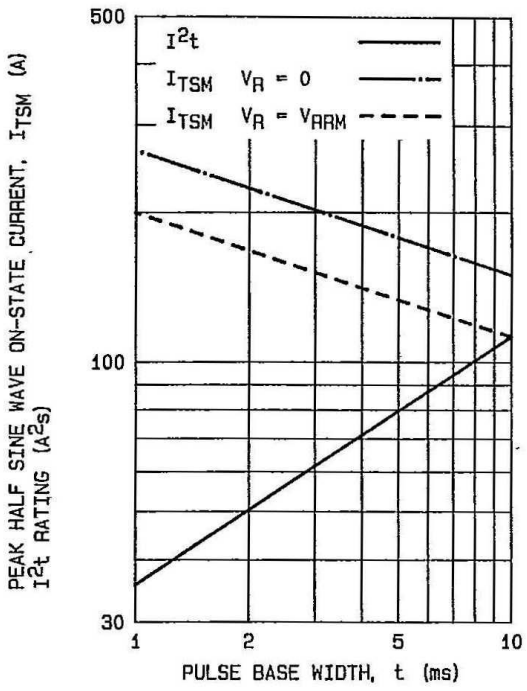

FIG.6 - NON REPETITIVE SUB-CYCLE SURGE ON-STATE CURRENT AND I^2t RATING (INITIAL T_J = 125 °C).

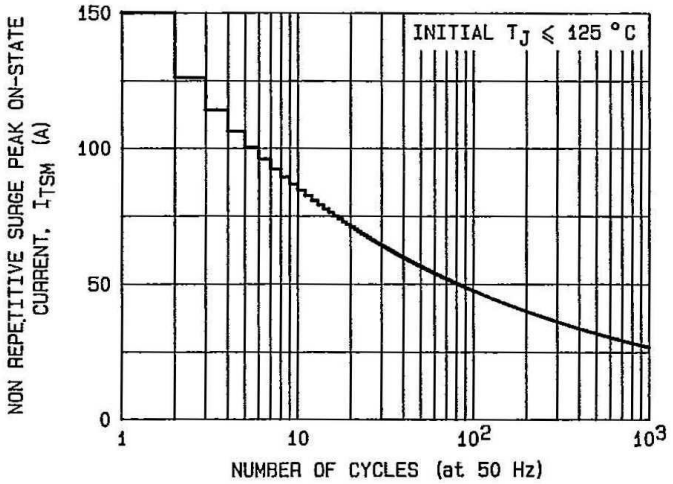

FIG.7 - NON REPETITIVE SURGE PEAK ON-STATE CURRENT VERSUS NUMBER OF CYCLES.

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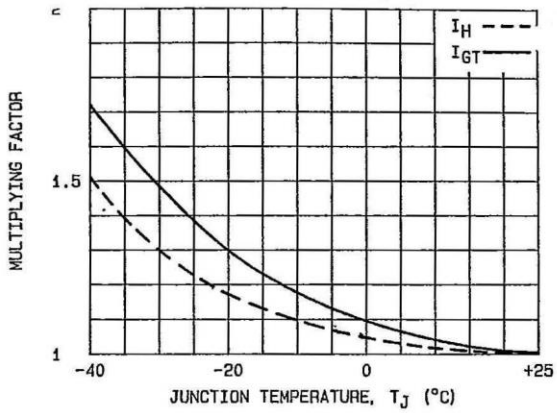

FIG.8 - RELATIVE VARIATION OF GATE TRIGGER CURRENT AND HOLDING CURRENT VERSUS JUNCTION TEMPERATURE.

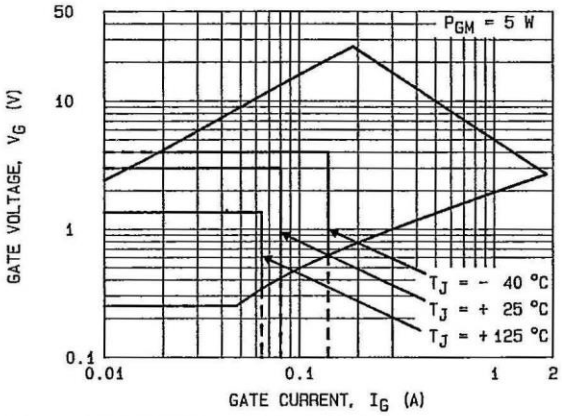

FIG.9 - GATE TRIGGER CHARACTERISTICS.

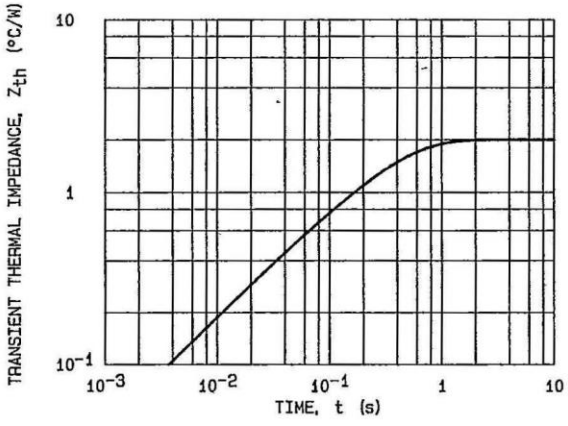

FIG.10 - TRANSIENT THERMAL IMPEDANCE JUNCTION TO CASE.

Conduction angle (α,β)	Effective thermal resistance (°C/W) junction to case	
	Sinusoidal	Rectangular
180°	2.23	2.18
120°	2.31	3.09
90°	2.47	3.50
60°	2.88	3.91
30°	3.71	4.94