D I G I T R O N S E M I C O N D U C T O R S

2N1842-2N1850A SILICON CONTROLLED RECTIFIER
TR1010-TR9010

Available Non-RoHS (standard) or RoHS compliant (add PBF suffix).
Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.

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	2N 1842(A)	2N 1843(A)	2N 1844(A)	2N 1846(A)	2N 1848(A)	2N 1849(A)	2N 1850(A)	TR 6010	TR 7010	TR 8010	TR 9010	TR 1010	TR 1110	TR 1210
	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

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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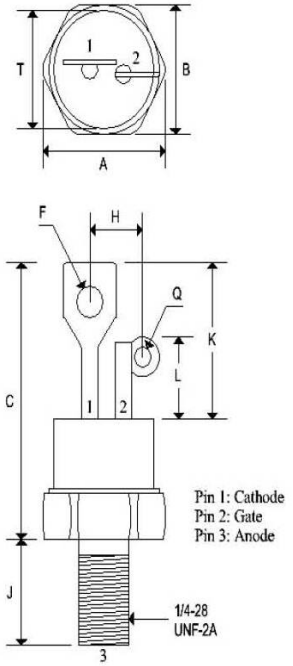
MECHANICAL CHARACTERISTICS

Case	TO-48
Marking	Alpha-numeric
Polarity	Cathode



	TO-48			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.604	0.614	15.340	15.600
B	0.551	0.559	14.000	14.200
C	1.050	1.190	2.670	30.230
F	0.135	0.160	3.430	4.060
H	-	0.265	-	6.730
J	0.420	0.455	10.670	11.560
K	0.620	0.670	15.750	17.020
L	0.300	0.350	7.620	8.890
Q	0.055	0.085	1.400	2.160
T	0.501	0.505	12.730	12.830

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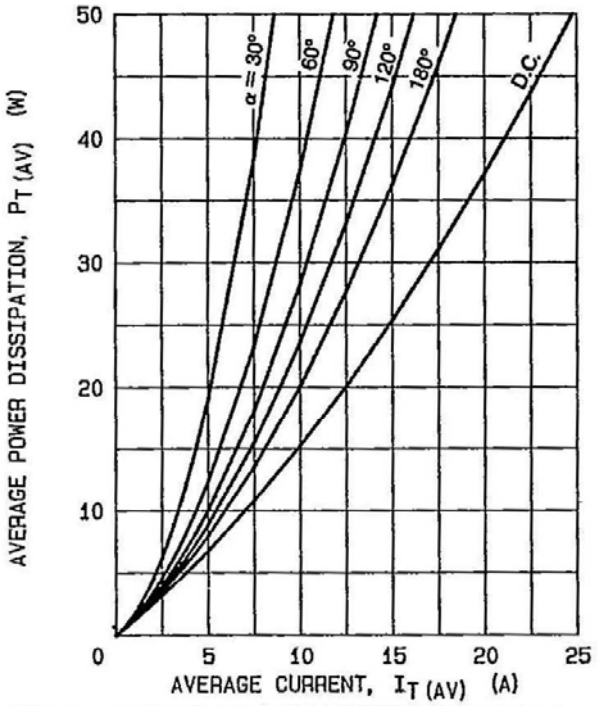


FIG.1 – MAXIMUM ON-STATE POWER DISSIPATION FOR SINUSOIDAL CURRENT WAVEFORM

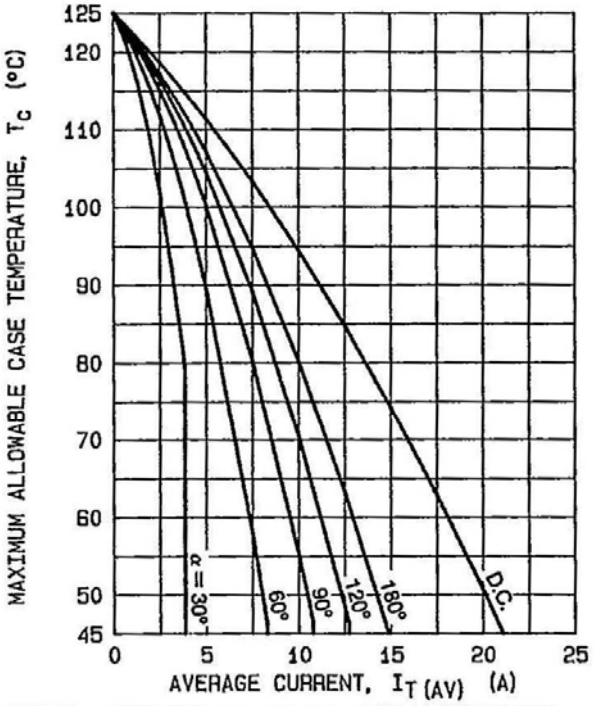
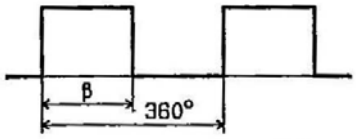


FIG.2 – MAXIMUM ALLOWABLE CASE TEMPERATURE FOR SINUSOIDAL CURRENT WAVEFORM



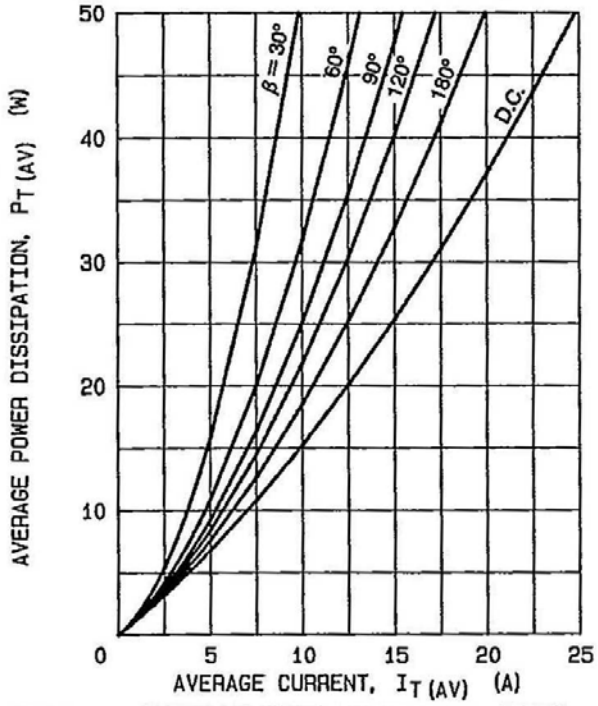


FIG.3 – MAXIMUM ON-STATE POWER DISSIPATION FOR RECTANGULAR CURRENT WAVEFORM

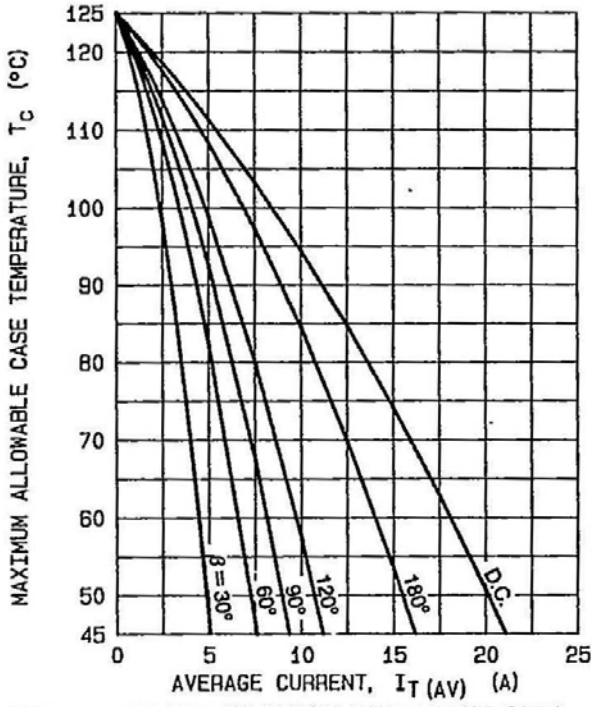


FIG.4 – MAXIMUM ALLOWABLE CASE TEMPERATURE FOR RECTANGULAR CURRENT WAVEFORM

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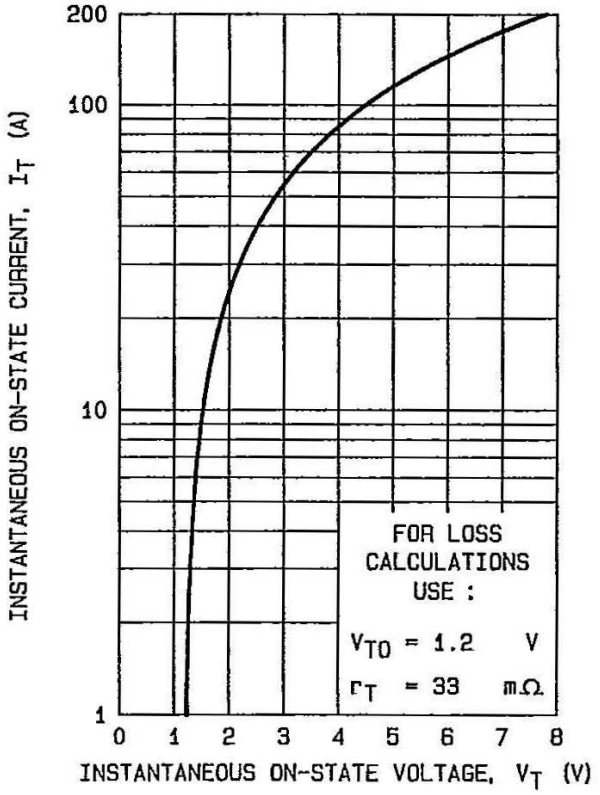

FIG.5 - MAXIMUM ON-STATE CONDUCTION CHARACTERISTIC (T_J = 125 °C).

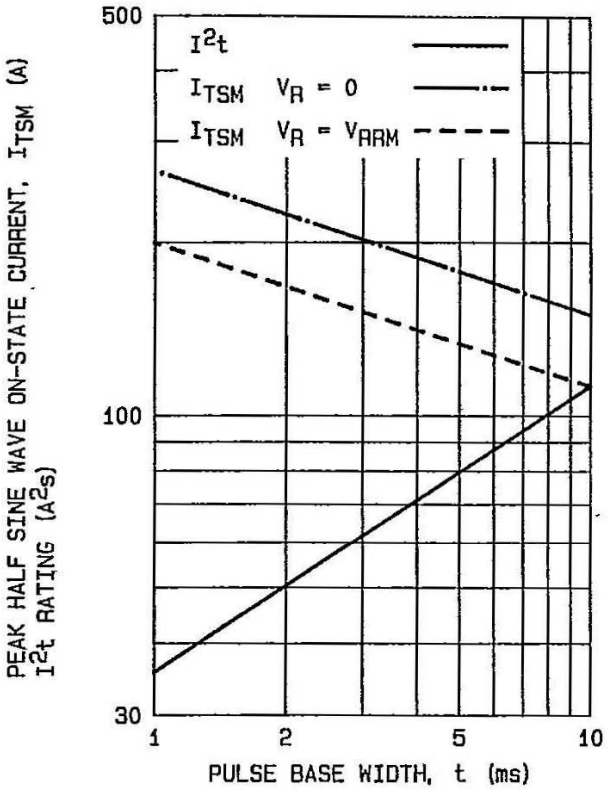

FIG.6 - NON REPETITIVE SUB-CYCLE SURGE ON-STATE CURRENT AND I^2t RATING (INITIAL T_J = 125 °C).

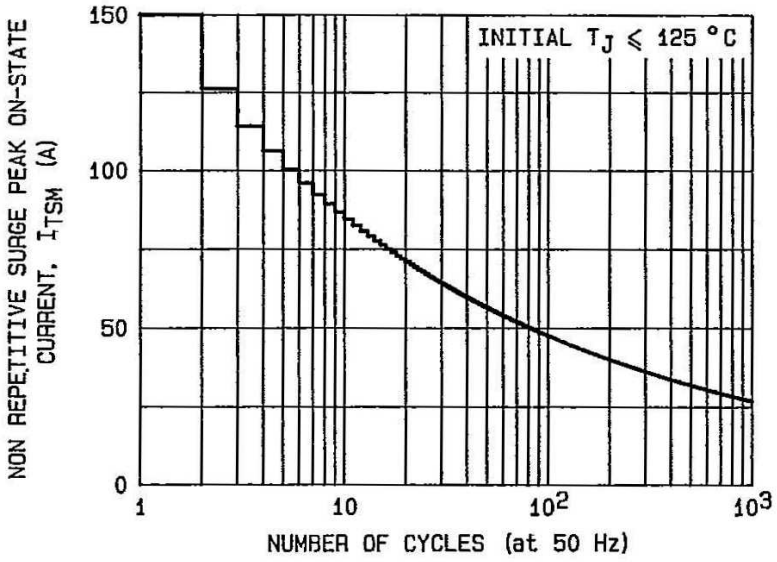

FIG.7 - NON REPETITIVE SURGE PEAK ON-STATE CURRENT VERSUS NUMBER OF CYCLES.

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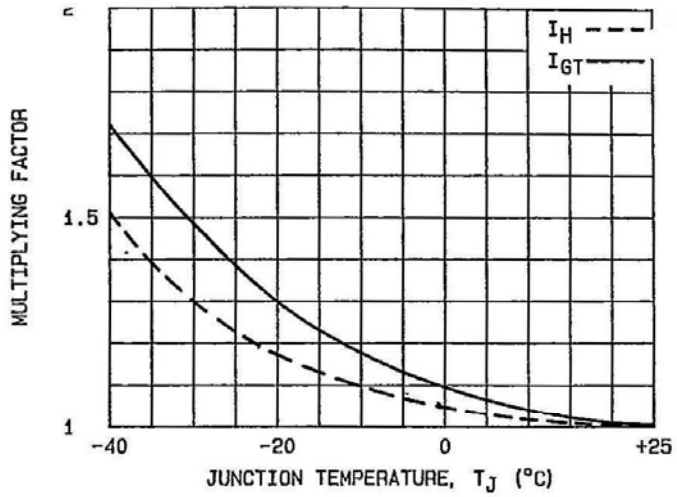


FIG.8 - RELATIVE VARIATION OF GATE TRIGGER CURRENT AND HOLDING CURRENT VERSUS JUNCTION TEMPERATURE.

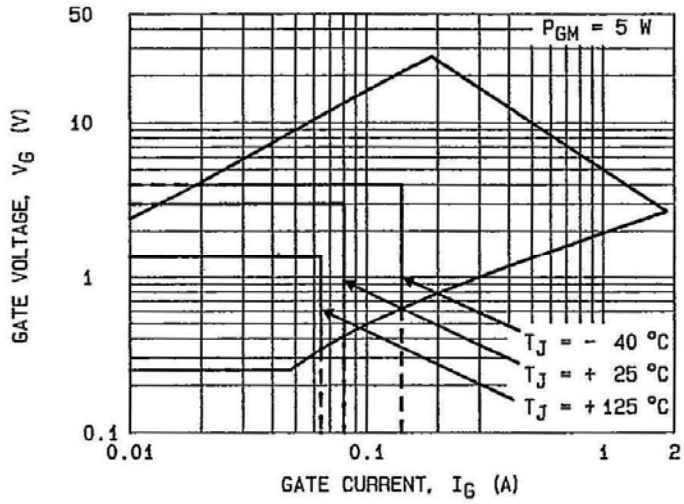
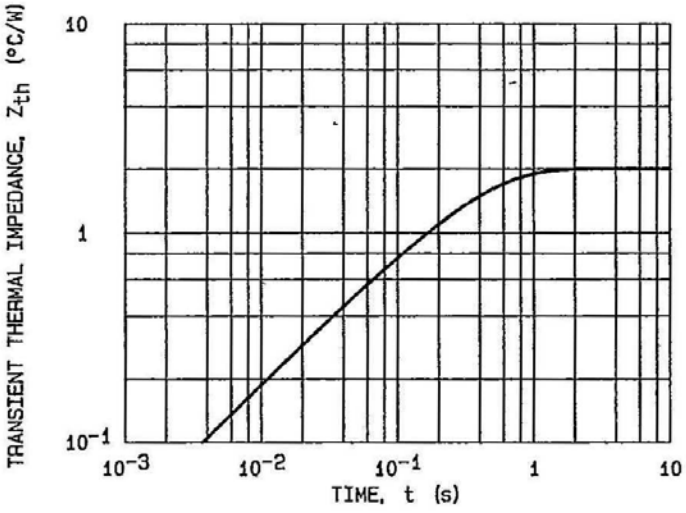


FIG.9 - GATE TRIGGER CHARACTERISTICS.



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

FIG.10 - TRANSIENT THERMAL IMPEDANCE JUNCTION TO CASE.

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