

DIGITRON SEMICONDUCTORS

2N1842-2N1850A
TR1010-TR9010

SILICON CONTROLLED RECTIFIER

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

VOLTAGE RATINGS

$T_j = 125^\circ\text{C}$	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	$^\circ\text{C}/\text{W}$
Case to heatsink	$R_{th(c-h)}$	0.4	$^\circ\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS

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

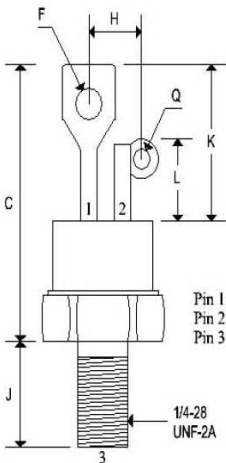
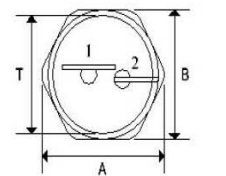
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MECHANICAL CHARACTERISTICS

Case	TO-48
Marking	Alpha-numeric
Polarity	Cathode



Pin 1: Cathode
Pin 2: Gate
Pin 3: Anode

1/4-28
UNF-2A

	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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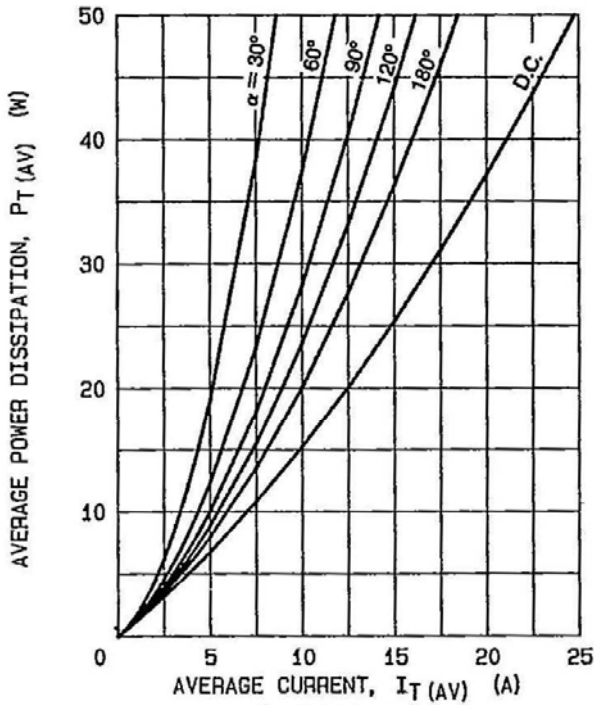


FIG.1 - MAXIMUM ON-STATE POWER DISSIPATION FOR SINUSOIDAL CURRENT WAVEFORM

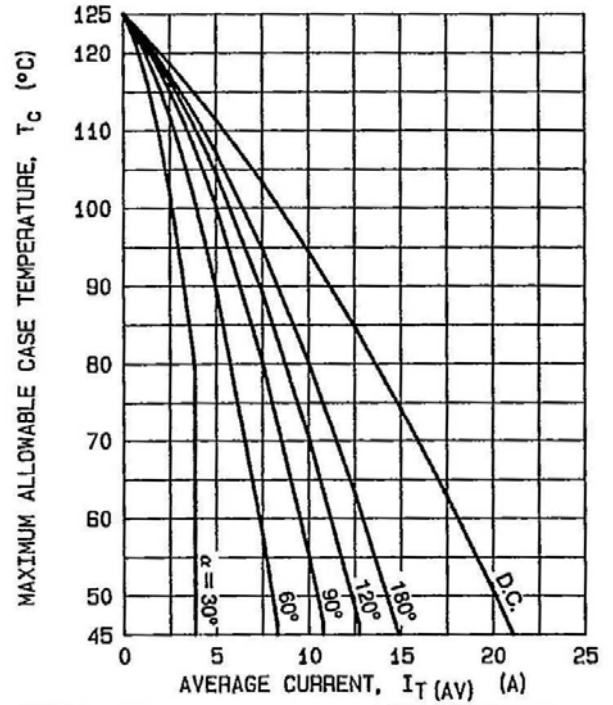


FIG.2 - MAXIMUM ALLOWABLE CASE TEMPERATURE FOR SINUSOIDAL CURRENT WAVEFORM

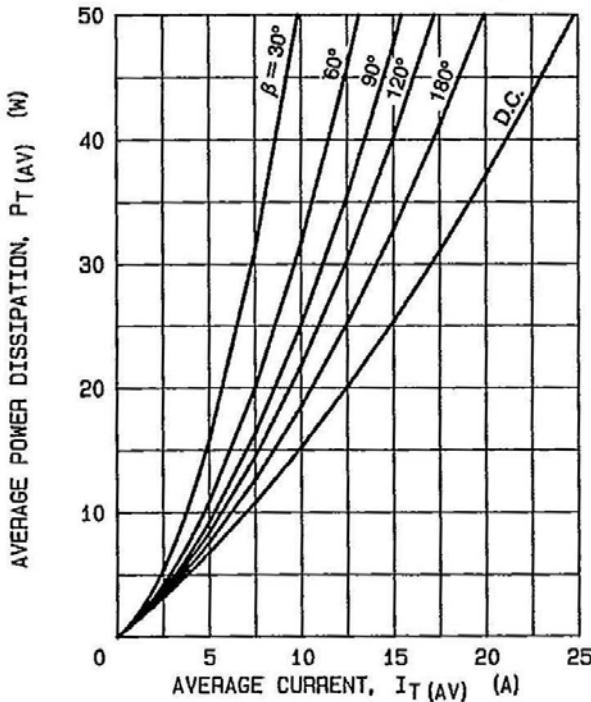
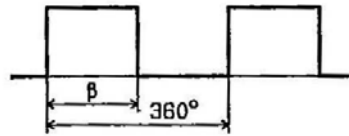


FIG.3 - MAXIMUM ON-STATE POWER DISSIPATION FOR RECTANGULAR CURRENT WAVEFORM

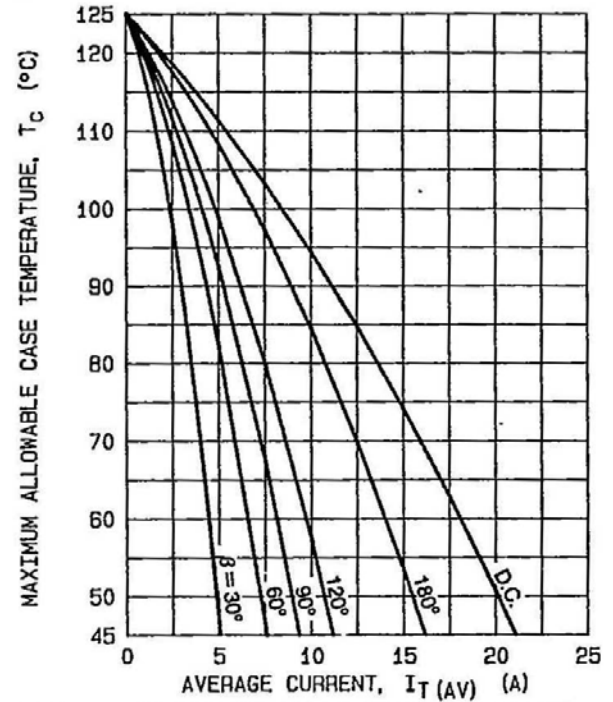


FIG.4 - MAXIMUM ALLOWABLE CASE TEMPERATURE FOR RECTANGULAR CURRENT WAVEFORM

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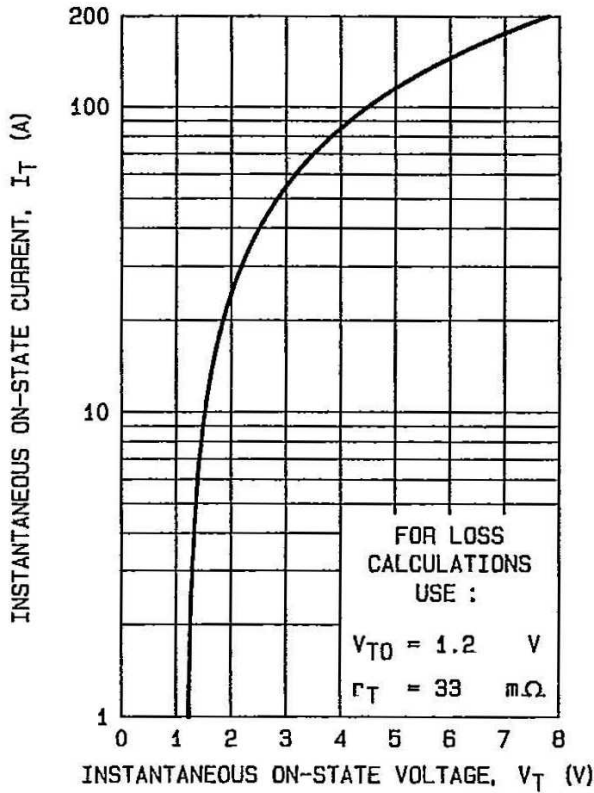


FIG.5 - MAXIMUM ON-STATE CONDUCTION CHARACTERISTIC ($T_J = 125^\circ\text{C}$).

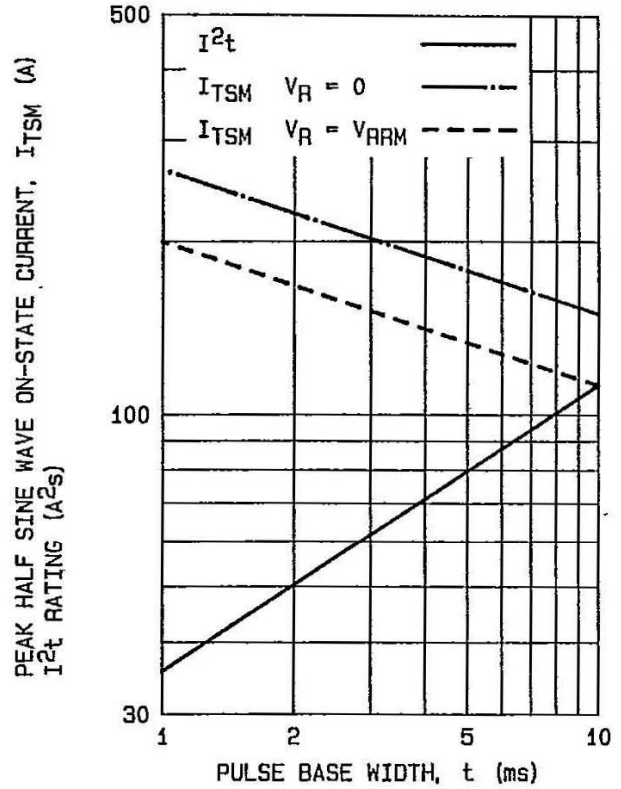


FIG.6 - NON REPETITIVE SUB-CYCLE SURGE ON-STATE CURRENT AND I^2t RATING (INITIAL $T_J = 125^\circ\text{C}$).

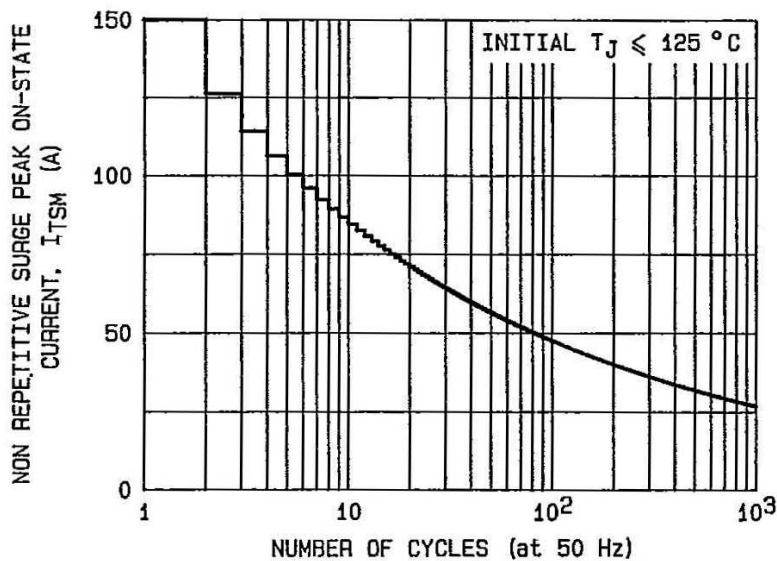


FIG.7 - NON REPETITIVE SURGE PEAK ON-STATE CURRENT VERSUS NUMBER OF CYCLES.

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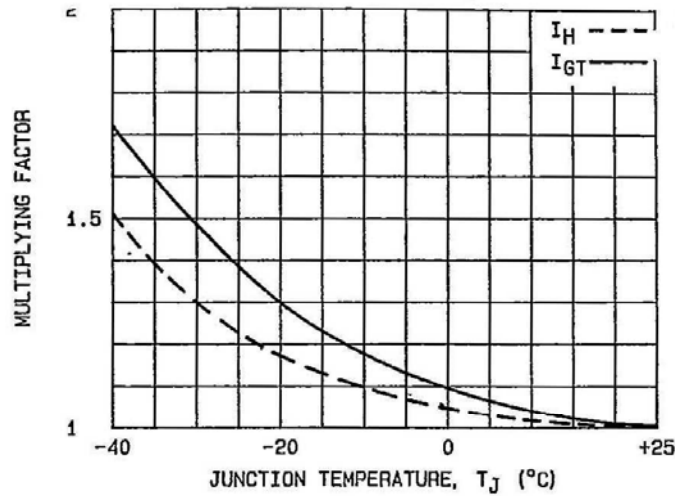


FIG.8 - RELATIVE VARIATION OF GATE TRIGGER CURRENT AND HOLDING CURRENT VERSUS JUNCTION TEMPERATURE.

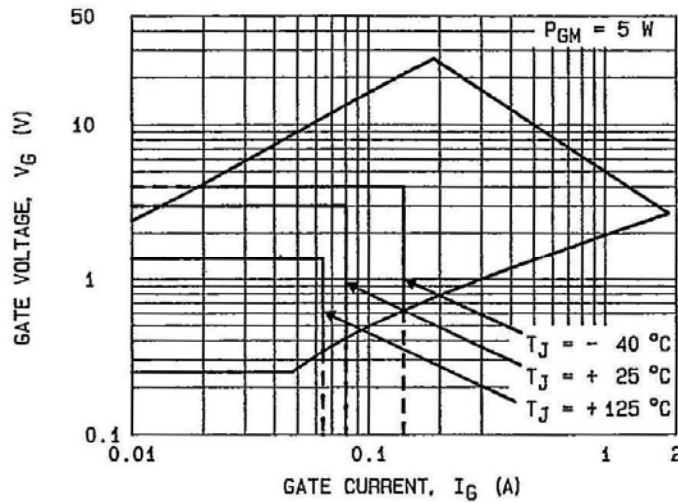


FIG.9 - GATE TRIGGER CHARACTERISTICS.

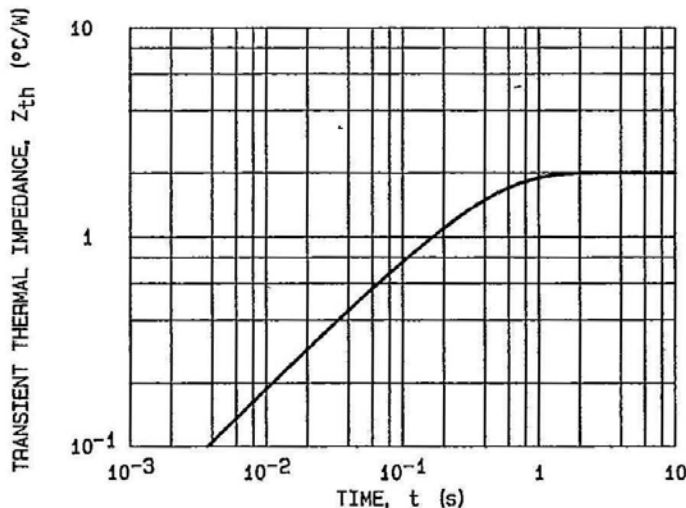


FIG.10 - TRANSIENT THERMAL IMPEDANCE JUNCTION TO CASE.

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