File Number **1051**

S5800

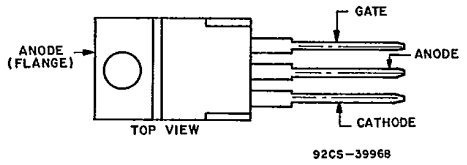
5-A Silicon Controlled Rectifiers

For Inverter/Regulator Applications

Features:

- *800V, 125 deg. C T_J Operating*
- *High dv/dt and di/dt Capability*
- *Low Switching Losses*
- *High Pulse Current Capability*
- *Low Forward and Reverse Leakage*
- *Sipos Oxide Glass Multilayer Passivation System*
- *Advanced Unisurface Construction*
- *Precise Ion Implanted Diffusion Source*

TERMINAL DESIGNATIONS



92CS-39968

JEDEC TO-220AB

The RCA-S5800 series are all-diffused silicon controlled rectifiers (reverse-blocking triode thyristors) intended for high-speed switching applications such as power inverters, switching regulators, and high-current pulse applications. They feature fast turn-off, high dv/dt, and high di/dt characteristics and may be used at frequencies up to 25 kHz.

All types in the series utilize the JEDEC TO-220AB (VERSAWATT) plastic package.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

	S5800B	S5800C	S5800D	S5800E	S5800M	S5800S	S5800N	
V_{RROM}▲	200	300	400	500	600	700	800	V
V_{DROM}▲	200	300	400	500	600	700	800	V
$I_{T(RMS)}$ (T_C = 85°C, t_1/t_2 = 0.5)	5							A
$I_{T(AV)}$ (T_C = 85°C, t_1/t_2 = 0.5)	3.2							A
I_{TSM}: (For one full cycle of applied principal voltage)								
60-Hz (sinusoidal)	80							A
50-Hz (sinusoidal)	75							A
For more than one cycle of applied principal voltage	See Fig. 3							
di/dt: (See Fig. 8) $V_{DM} = V_{DROM}$, I_{GT} = 500 mA,	200							A/μs
I^2T [At T_C shown for I_T(RMS)]:								
t = 10 ms	28							A^2s
8.3 ms	26							A^2s
1 ms	13							A^2s
For other time values	See Fig. 4							
P_{GM}: Peak forward for 10 μs max.	13							W
P_{RGM}: Peak reverse for 10 μs max.	13							W
$P_{G(AV)}$: Averaging time = 10 ms max.	0.5							W
T_{stg}	-40 to 150							°C
T_C	-40 to 125							°C
T_T (During soldering for 10 s maximum, terminals and case).	225							°C

▲These values do not apply if there is a positive gate signal. Gate must be open or negatively biased.

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ELECTRICAL CHARACTERISTICS
As Maximum Ratings Unless Otherwise Specified and at Indicated Case Temperature (T_C)

CHARACTERISTIC	LIMITS FOR ALL TYPES			UNITS
	Min.	Typ.	Max.	
I_{DROM}: $V_D = V_{DROM}$, T_C = 125°C	–	0.5	3	mA
I_{RROM}: $V_R = V_{RROM}$, T_C = 125°C	–	0.3	1.5	
V_T: I_{TM} = 30 A (peak), T_C = 25°C: (See Fig. 5)	–	2.3	4	V
i_{HQ}: T_C = 25°C	–	20	—	mA
dv/dt: (Linear) (See Fig. 9) $V_D = V_{DROM}$, T_C = 80°C	—	250	–	V/μs
I_{GT}: V_D = 12 V dc, R_L = 30 Ω, T_C = 25°C	–	–	40	mA
V_{GT}: V_D = 12 V dc, R_L = 30 Ω, T_C = 25°C	–	1.2	2.5	V
t_{gt}: (See Fig. 10) $V_D = V_{DROM}$, i_T = 8 A (peak), I_{GT} = 300 mA, t_r = 0.1 μs, T_C = 25°C	–	0.7	–	μs
t_q: (See Figs. 7, 11, 12) ½ Sine Wave $V_D = V_{DROM}$, pulse duration = 50 μs, dv/dt = 100 V/μs, −di/dt = −10 A/μs, I_{GT} = 100 mA at turn on, V_{GK} = 0 V at turn off, T_C = 100°C:				
i_T = 4A	–	4.4	–	μs
i_T = 8A	–	4.7	6	
$R_{\theta JC}$	–	–	2.2	°C/W

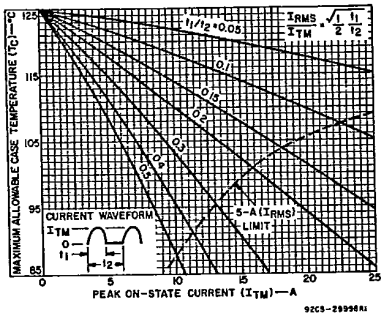

Fig. 1 — Maximum allowable case temperature as a function of peak on-state current.

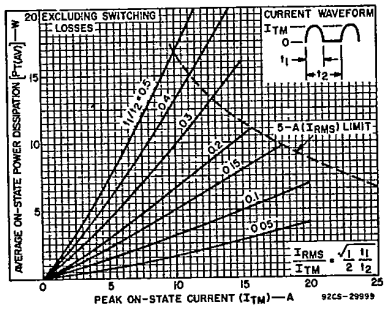

Fig. 2 — Average on-state power dissipation as a function of peak on-state current.

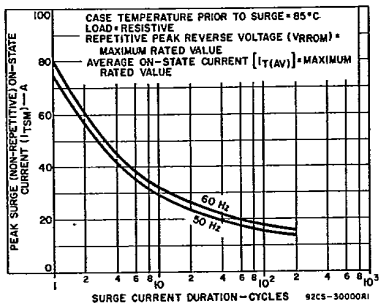

Fig. 3 — Peak surge on-state current as a function of surge duration.

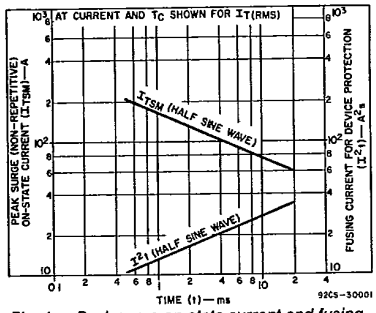

Fig. 4 — Peak surge on-state current and fusing current as a function of time.

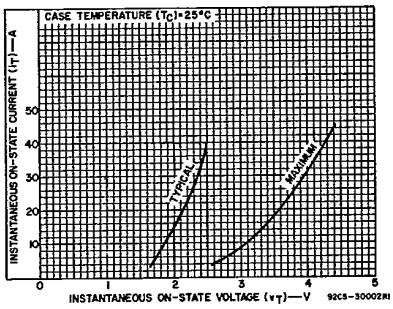

Fig. 5 — Instantaneous on-state current as a function of instantaneous on-state voltage.

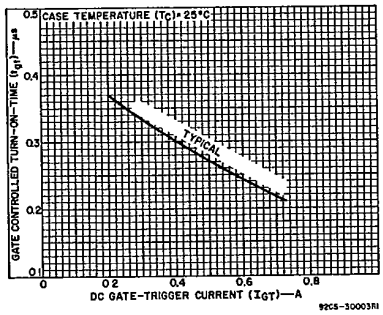

Fig. 6 — Gate-controlled turn-on-time as a function of gate current.

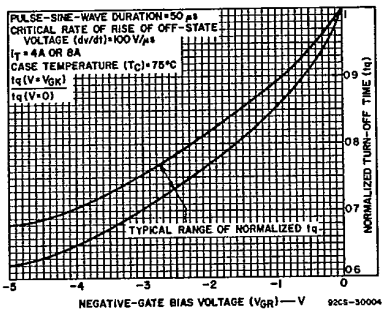

Fig. 7 — Normalized turn-off time as a function of negative-gate bias voltage.

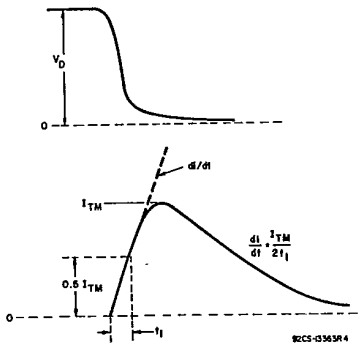

Fig. 8 — Rate of change on-state current with time (defining di/dt).

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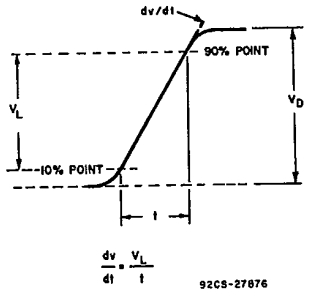

Fig. 9 — Linear rate of rise of off-state voltage with time (defining dv/dt).

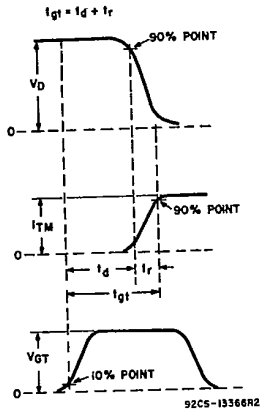

Fig. 10 — Relationship between off-state voltage, on-state current, and gate-trigger voltage showing reference points for definition of turn-on time (t_{gt}).

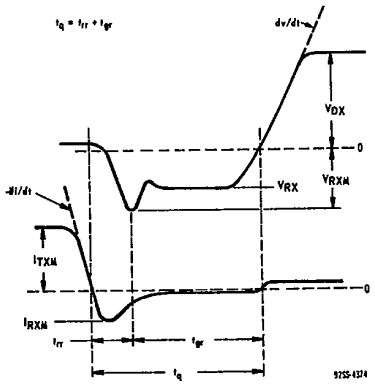

Fig. 11 — Relationship between off-state voltage, reverse voltage, on-state current, and reverse current showing reference points defining turn-off time (t_q).

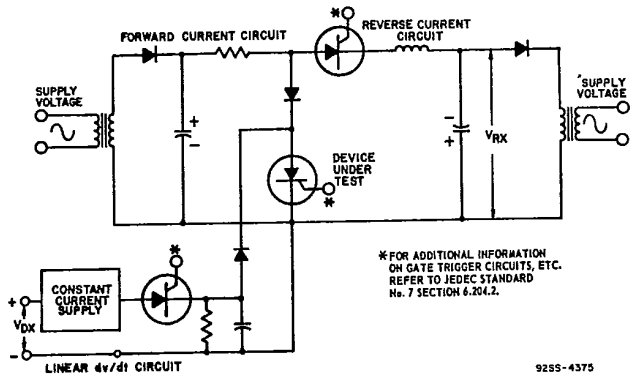

Fig. 12 — Circuit used to measure turn-off time (t_q).