

3875081 G E SOLID STATE

01E 17731 D T-25-15
Silicon Controlled Rectifiers

File Number 1306

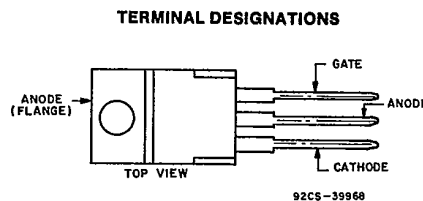
S4060 Series

**10-Ampere Sensitive-Gate
Silicon Controlled Rectifiers**

For Power Switching and Control Applications

Features:

- Microampere gate sensitivity
- 800-V capability
- 10-A (rms) on-state current ratings
- 120-A peak surge capability
- Low thermal resistances
- Surge capability curve



JEDEC TO-220AB

The S4060 series* are sensitive-gate silicon controlled rectifiers designed for switching ac and dc currents. The types within the series differ in their voltage ratings; the voltage ratings are identified by suffix letters in the type designations.

All types utilize the JEDEC TO-220AB package.

These thyristors have microampere gate-current requirements which permit operation with low-level logic circuits. They can be used for lighting, power-switching, and motor-speed controls, and for gate-current amplification for driving larger SCR's.

*Formerly the RCA Dev. No. TAS4060 series.

MAXIMUM RATINGS, Absolute-Maximum Values:

	S4060U	S4060F	S4060A	S4060B	S4060C	S4060D	S4060E	S4060M	S4060S	S4060N	
V_{RRM}											
$R_{GK} = 1000 \Omega$, $T_C = -40$ to 125°C ..	25	50	100	200	300	400	500	600	700	800	V
V_{DRM}											
$R_{GK} = 1000 \Omega$, $T_C = -40$ to 125°C ..											
$I_{T(RMS)}$											
Conduction angle = 180° , $T_C = 103^\circ\text{C}$						10					A
I_{TSM}											
For one cycle of applied principal voltage 60 Hz (sinusoidal)						120					A
For more than one cycle of applied principal voltage						See Figs. 5, 6					
I_{GFM}											
($t = 10 \mu\text{sec}$)						0.2					A
V_{GKM}						6					V
di/dt											
$V_{DM} = V_{DRM}$, $I_{GT} = 1 \text{ mA}$, $t_r = 0.5 \mu$, $T_C = 110^\circ\text{C}$						100					μs
P_{GM}											
(for $10 \mu\text{s}$ max.)						0.5					W
$P_{G(AV)}$											
(averaging time = 10 ms max.)						0.1					W
T_{stg}						-40 to +150					$^\circ\text{C}$
T_C						-40 to +125					$^\circ\text{C}$
T_J											
For 10 s max.						250					$^\circ\text{C}$

737

3875081 G E SOLID STATE

01E 17732

D T-25-15

Silicon Controlled Rectifiers

S4060 Series

ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	LIMITS FOR ALL TYPES UNLESS OTHERWISE SPECIFIED			UNITS
	MIN.	TYP.	MAX.	
I_{DRXM} , $V_D = V_{DRXM}$, $R_{GK} = 1000 \Omega$ $T_C = 25^\circ C$ $T_C = 125^\circ C$	—	0.4 50	50 500	μA
I_{RRXM} , $V_R = V_{RRXM}$, $R_{GK} = 1000 \Omega$ $T_C = 25^\circ C$ $T_C = 125^\circ C$	—	0.4 50	50 500	
V_T For $I_T = 30 A$ and $T_C = 25^\circ C$ (See Fig. 4)	—	1.55	2.3	V
I_{GT} $V_D = 12 V$ (dc), $R_L = 30 \Omega$, $T_C = 25^\circ C$: For other case temperatures	—	—	200 See Fig. 8	μA
V_{GT} $V_D = 12 V$ (dc), $R_L = 30 \Omega$, $T_C = 25^\circ C$ For other case temperatures	—	0.58 See Fig. 7	1.5	V
I_H $R_{GK} = 1000 \Omega$, $V_D = 12 V$, I_T (INITIAL) = 150 mA, $T_C = 25^\circ C$: (See Fig. 9)	—	3.5	—	mA
I_L $R_{GK} = 1000 \Omega$, $V_D = 12 V$, $T_C = 25^\circ C$: ($I_{GT} = 200 \mu A$)	—	1.8	—	mA
dv/dt $V_D = V_{DRXM}$, $R_{GK} = 1000 \Omega$, Exponential rise, $T_C = 125^\circ C$ (See Fig. 10)	—	4.0	—	V/ μs
t_{gt} $V_D = V_{DRXM}$, $I_T = 1 A$, $R_{GK} = 1000 \Omega$, $I_{GT} = 1 mA$, rise time = 0.1 μs , $T_C = 25^\circ C$	—	1.7	—	μs
t_d $V_D = V_{DRXM}$, $I_T = 1 A$, $R_{GK} = 1000 \Omega$, Pulse Duration = 50 μs , $dv/dt = 2 V/\mu s$, $di/dt = -10 A/\mu s$, $I_{GT} = 1 mA$ at turn on, $T_C = 125^\circ C$	—	50	—	μs
$R_{\theta JC}$	—	—	2.0	$^\circ C/W$
$R_{\theta JA}$	—	—	60	

3875081 G E SOLID STATE

01E 17733 D T-25-15
Silicon Controlled Rectifiers

S4060 Series

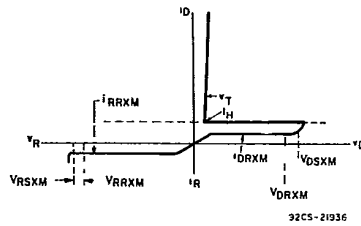


Fig. 1 - Typical volt-ampere characteristics.

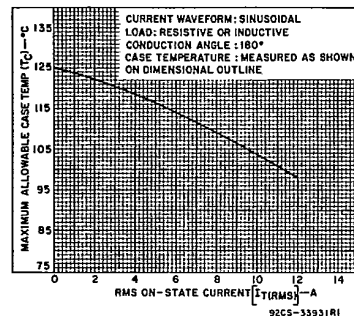


Fig. 3 - Maximum allowable case temp. vs. RMS on-state current.

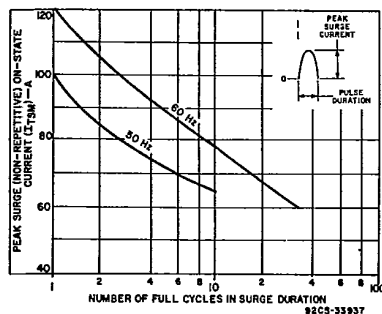


Fig. 5 - Allowable peak surge on-state current vs. surge duration.

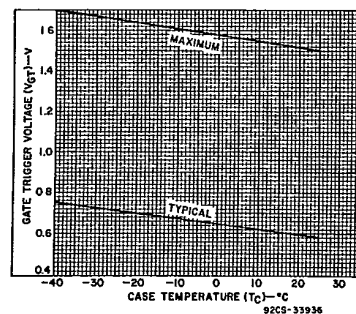


Fig. 7 - Gate trigger voltage vs. case temperature.

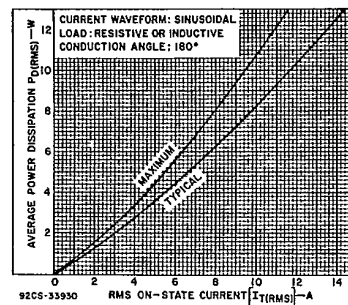


Fig. 2 - Power dissipation vs. rms on-state current.

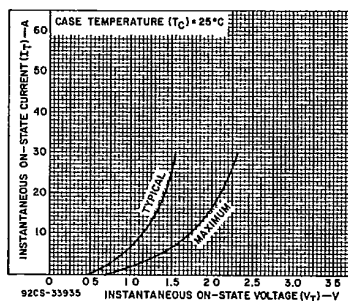


Fig. 4 - Instantaneous on-state current vs. on-state voltage.

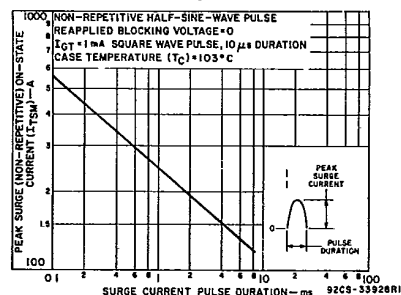


Fig. 6 - Surge capability without reapplied blocking voltage.

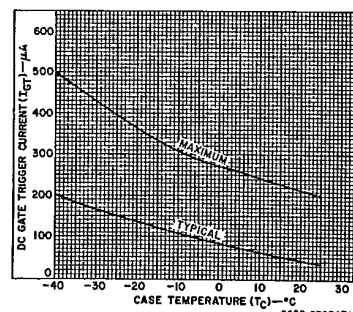


Fig. 8 - DC trigger current vs. case temperature.

3875081 G E SOLID STATE
Silicon Controlled Rectifiers

01E 17734 D T-25-15

S4060 Series

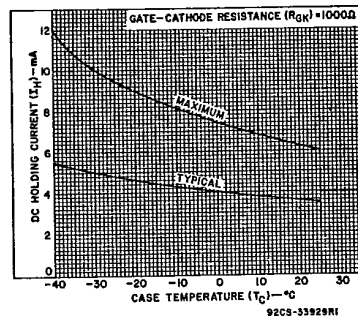


Fig. 9 - DC holding current vs. case temperature.

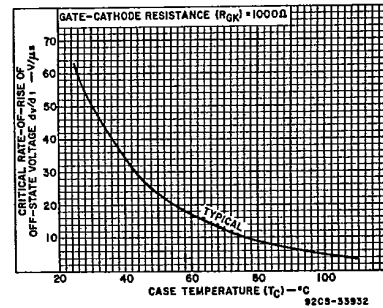


Fig. 10 - Critical rate-of-rise of off-state voltage vs. case temperature.

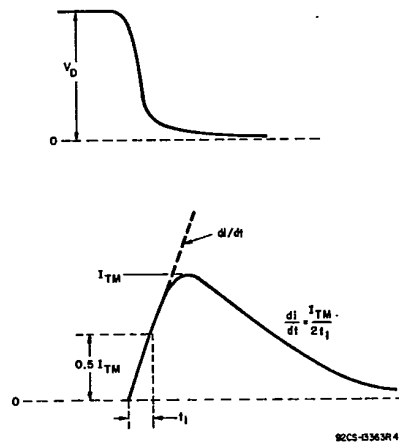


Fig. 11 - Rate of change of on-state current with time (defining di/dt).

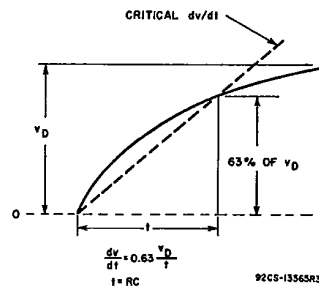


Fig. 12 - Rate of rise of off-state voltage with time (defining critical dv/dt).

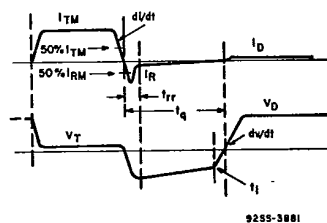


Fig. 13 - Relationship between instantaneous on-state current and voltage, showing reference points for measurement of circuit-commutated turn-off time (t_a).