File Number **1306**

S4060 Series

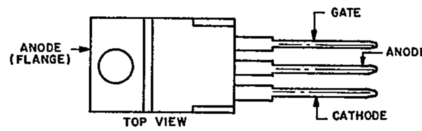
10-Ampere Sensitive-Gate Silicon Controlled Rectifiers

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*

TERMINAL DESIGNATIONS



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_{RRXM} $R_{GK} = 1000\ \Omega$, $T_C = -40$ to 125°C .. V_{DRXM} $R_{GK} = 1000\ \Omega$, $T_C = -40$ to 125°C ..	25	50	100	200	300	400	500	600	700	800	V

$I_{T(RMS)}$ Conduction angle = 180°, $T_C = 103$°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} ($t = 10\ \mu$sec)	0.2	A
V_{GRM}	6	V
di/dt $V_{DM} = V_{DROM}$, $I_{GT} = 1$ mA, $t_r = 0.5\ \mu$, $T_C = 110$°C	100	A/µs
P_{GM} (for 10 µs max.)	0.5	W
$P_{G(AV)}$ (averaging time = 10 ms max.)	0.1	W
T_{stg}	-40 to +150	°C
T_C	-40 to +125	°C
T_T .... For 10 s max......................	250	°C

S4060 Series

ELECTRICAL CHARACTERISTICS

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

S4060 Series

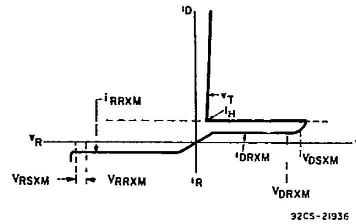


Fig. 1 - Typical volt-ampere characteristics.

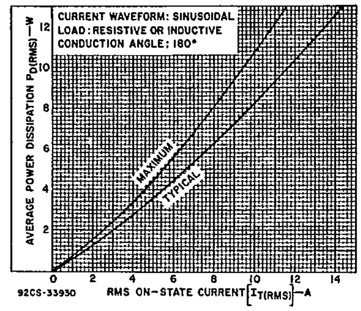


Fig. 2 - Power dissipation vs. rms on-state current.

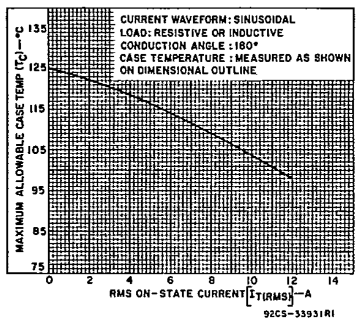


Fig. 3 - Maximum allowable case temp. vs. RMS on-state current.

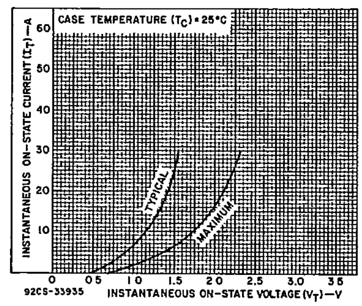


Fig. 4 - Instantaneous on-state current vs. on-state voltage.

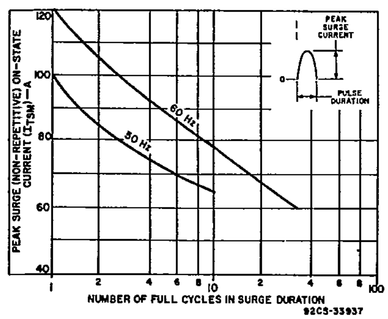


Fig. 5 - Allowable peak surge on-state current vs. surge duration.

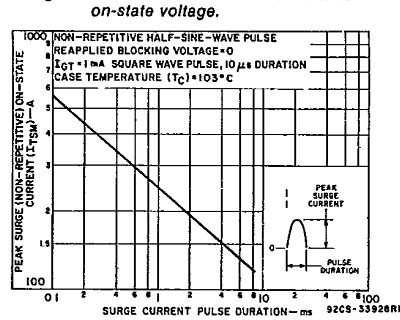


Fig. 6 - Surge capability without reapplied blocking voltage.

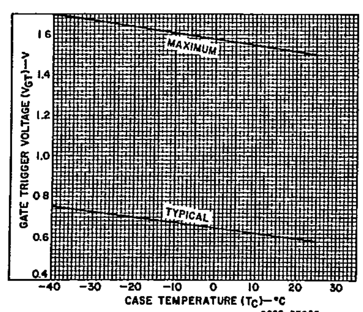


Fig. 7 - Gate trigger voltage vs. case temperature.

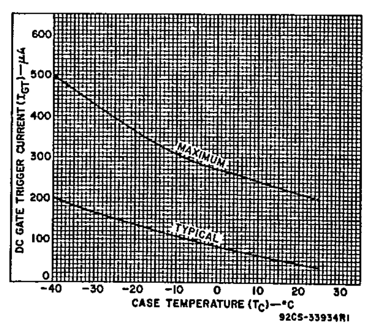


Fig. 8 - DC trigger current vs. case temperature.

S4060 Series

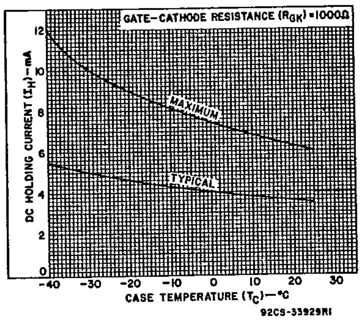


Fig. 9 - DC holding current vs. case temperature.

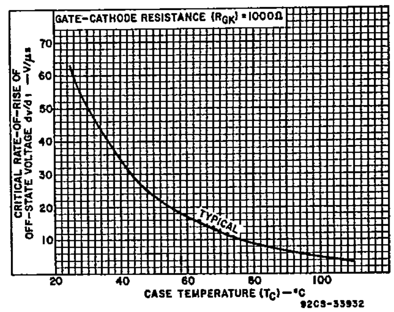


Fig. 10 - Critical rate-of-rise of off-state voltage vs. case temperature.

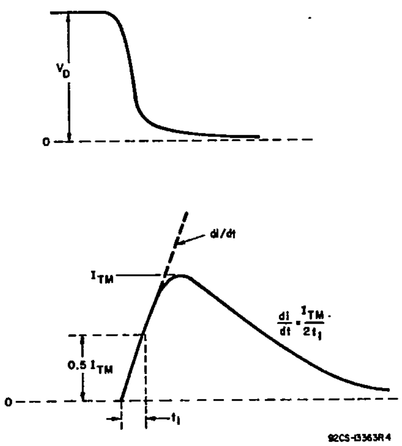


Fig. 11 - Rate of change of on-state current with time (defining di/dt).

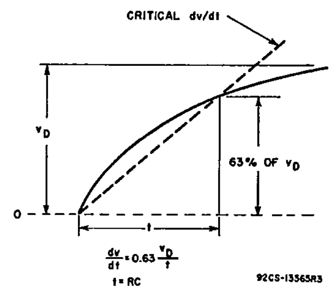


Fig. 12 - Rate of rise of off-state voltage with time (defining critical dv/dt).

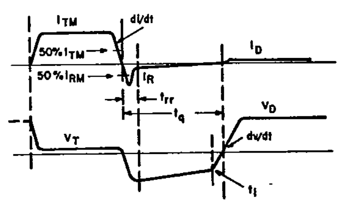


Fig. 13 - Relationship between instantaneous on-state current and voltage, showing reference points for measurement of circuit-commutated turn-off time (t_q).