

File Number 1173

C122 Series

8-A Silicon Controlled Rectifiers

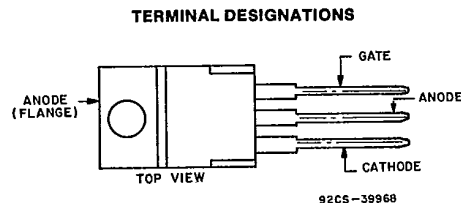
For Power Switching, Power Control

Features:

- High dv/dt capability
- Glass-passivated chip
- Shorted-emitter gate-cathode construction
- Low thermal resistance

The RCA-C122 series types are medium-power silicon controlled rectifiers designed for switching ac and dc currents. These devices can switch from the off-state to the on-state when both the anode and gate voltages are positive. Negative anode voltages make these devices revert to the blocking state regardless of gate-voltage polarity.

The TO-220AB package provides easy package mounting and low thermal resistance, allowing operation at high case temperatures and permitting reduced heat-sink size. These SCR's can be used in lighting and motorspeed controls and power-switching systems.



JEDEC TO-220AB

MAXIMUM RATINGS, Absolute-Maximum Values:

	C122F	C122A	C122B	C122C	C122D	C122E	C122M	
V_{RROMA} , V_{DROMA}	50	100	200	300	400	500	600	V
$I_{T(RMS)}$ ($T_C = 75^\circ\text{C}$, $\theta = 180^\circ$)				8				A
I_{TSM}								
For one full cycle of applied principal voltage 400-Hz				200				A
60-Hz				100				A
50-Hz				85				A
For more than one full cycle of applied principal voltage				See Fig. 3				
di/dt								
$V_D = V_{DROM}$				100				A/ μs
$I_{GT} = 80\text{ mA}$, $t_r = 0.5\text{ }\mu\text{s}$								
$ t_r $								
$T_J = -65$ to 100°C , $t = 1$ to 8.3 ms				40				A ² s
P_{GM}^* (for $10\text{ }\mu\text{s}$ max.)				16				W
$P_{G(AV)}^*$ (averaging time = 10 ms max.)				0.5				W
T_{sig}				-65 to +150				$^\circ\text{C}$
T_C				-65 to +100				$^\circ\text{C}$
T_T								
During soldering for 10 s maximum (terminal and case)				250				$^\circ\text{C}$

Δ These values do not apply if there is a positive gate signal. Gate must be open or negatively biased.
 • Any values of peak gate current or peak gate voltage which result in equal or lower power are permissible.

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Silicon Controlled Rectifiers

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ELECTRICAL CHARACTERISTICS

At Maximum Ratings Unless Otherwise Specified and at Indicated Case Temperature (T_C)

CHARACTERISTIC	LIMITS			UNITS
	FOR ALL TYPES Except as Specified			
	Min.	Typ.	Max.	
I_{DOM} or I_{ROM} $V_D = V_{DROM}$ or $V_R = V_{RROM}$, $T_C = +100^{\circ}\text{C}$	—	0.1	0.5	mA
V_T $i_T = 16\text{ A}$, $T_C = +25^{\circ}\text{C}$ For other values of i_T	—	1.45	1.83	V
← See Fig. 5 →				
I_{GT} $V_D = 12\text{ V (DC)}$, $R_L = 30\ \Omega$ $T_C = +25^{\circ}\text{C}$	—	10	15	mA
← See Fig. 6 →				
For other case temperatures				
V_{GT} $V_D = 12\text{ V (DC)}$, $R_L = 30\ \Omega$ $T_C = +25^{\circ}\text{C}$	—	1.0	1.5	V
← See Fig. 7 →				
For other case temperatures				
i_{HO} $T_C = +25^{\circ}\text{C}$	—	20	30	mA
← See Fig. 8 →				
For other case temperatures				
dv/dt $V_D = V_{DROM}$ Exponential voltage rise $T_C = +100^{\circ}\text{C}$ (See Fig. 12)	10	100	—	V/ μs
t_{gt} $V_D = V_{DROM}$, $i_T = 4.5\text{ A}$, $i_T = 2\text{ A}$ $I_{GT} = 80\text{ mA}$, $0.1\ \mu\text{s}$ rise time $T_C = +25^{\circ}\text{C}$ (See Fig. 10)	—	1.6	2.5	μs
t_q $V_D = V_{DROM}$, $i_T = 2\text{ A}$, $t_p = 50\ \mu\text{s}$ $dv/dt = 200\text{ V}/\mu\text{s}$, $di/dt = -10\text{ A}/\mu\text{s}$ $I_{GT} = 200\text{ mA}$ at t_{ON} , $T_C = +75^{\circ}\text{C}$ (See Fig. 13)	—	10	35	μs
$R_{\theta JC}$	—	—	1.8	$^{\circ}\text{C/W}$
$R_{\theta JA}$	—	—	75	

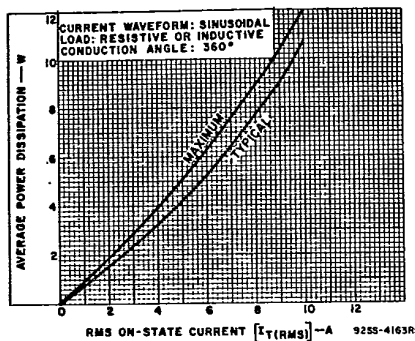


Fig. 1 — Power dissipation vs. on-state current.

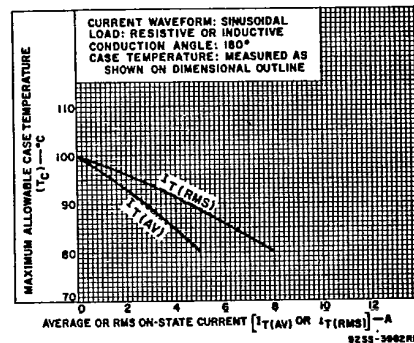


Fig. 2 — Maximum allowable case temperature vs. on-state current.

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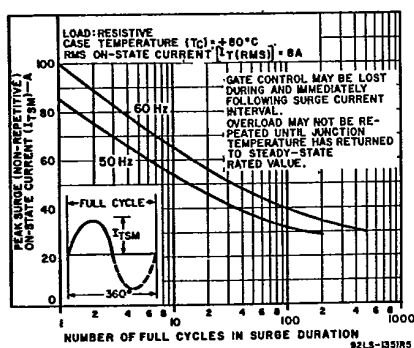


Fig. 3 — Allowable peak surge on-state current vs. surge duration.

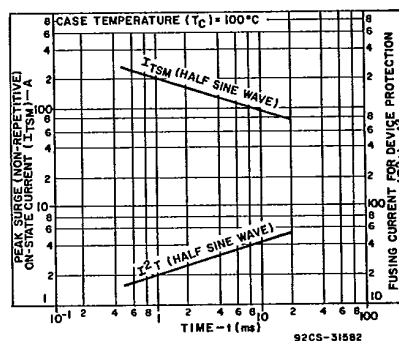


Fig. 4 — Peak surge on-state current and fusing current as a function of time.

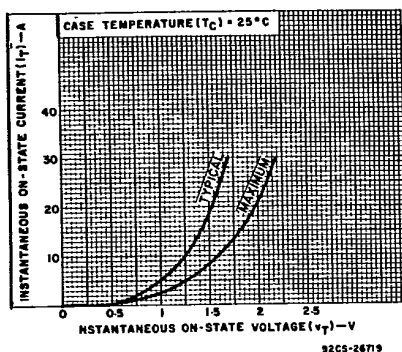


Fig. 5 — Instantaneous on-state current vs. on-state voltage.

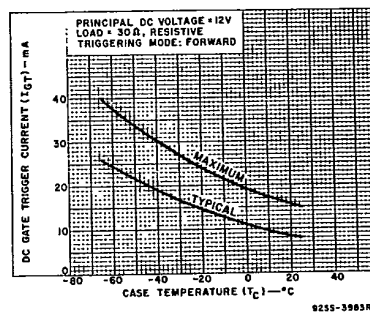


Fig. 6 — DC gate-trigger current vs. case temperature.

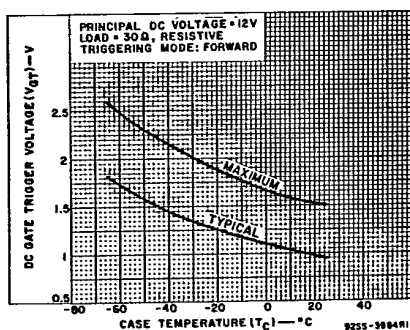


Fig. 7 — DC gate-trigger voltage vs. case temperature.

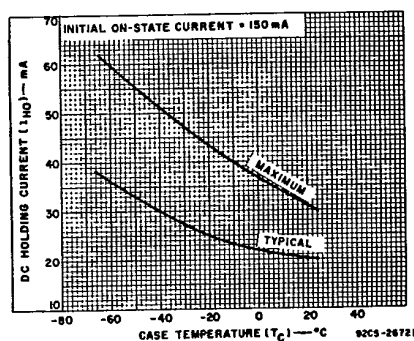


Fig. 8 — Holding current vs. case temperature.

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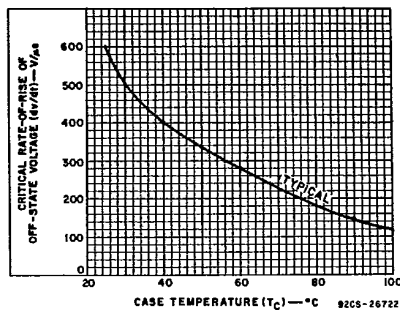


Fig. 9 — Critical rate of rise of off-state voltage vs. case temperature.

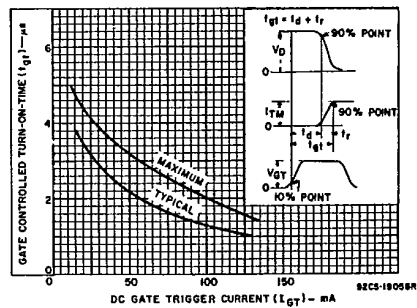
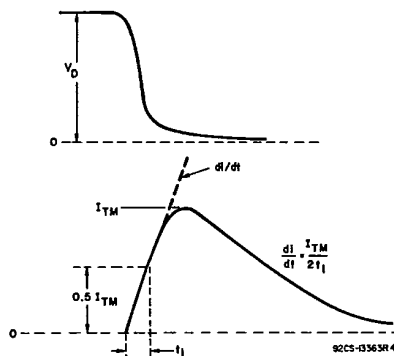
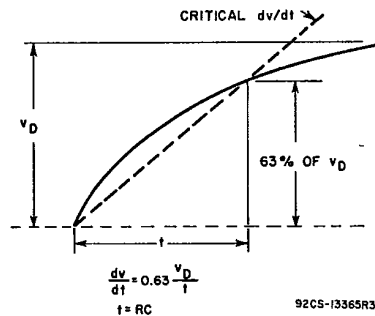
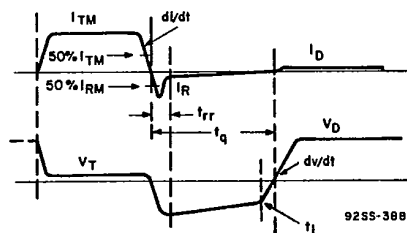


Fig. 10 — Gate-controlled turn-on time vs. gate trigger current.

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).