

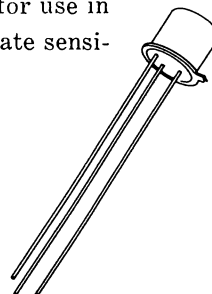
# SCR

1.6A RMS Up to 400 Volts

C5 Series
2N2322-29
2N2322A-28A

The C5 Series of Silicon Controlled Rectifiers are reverse blocking thyristors for use in low power switching and control applications. They feature two ranges of gate sensitivity and high external gate-cathode shunting resistance.

- All-diffused
- Two ranges of gate sensitivity—2N2322-29—200 $\mu$ A max. & 2N2322A-28A—20 $\mu$ A max.
- Low holding current
- Broad voltage range



## MAXIMUM ALLOWABLE RATINGS

TYPES†		REPETITIVE PEAK OFF-STATE VOLTAGE, $V_{DRM}$ $T_C = -65^\circ\text{C to } +125^\circ\text{C}$ $R_{GK} = 1000 \text{ OHMS (2N2322-29)}$ $= 2000 \text{ OHMS (2N2322A-28A)}$	REPETITIVE PEAK REVERSE VOLTAGE, $V_{RRM}$ $T_C = -65^\circ\text{C to } +125^\circ\text{C}$	NON-REPETITIVE PEAK REVERSE VOLTAGE, $V_{RRM}$ ( $\leq 10 \text{ Millisec.}$ ) $T_C = -65^\circ\text{C to } +125^\circ\text{C}$
JEDEC				
2N2322	C5U	25V.*	25V.*	40V.*
2N2322A	—	25V.*	25V.*	40V.*
2N2323	C5F	50V.*	50V.*	75V.*
2N2323A	—	50V.*	50V.*	75V.*
2N2324	C5A	100V.*	100V.*	150V.*
2N2324A	—	100V.*	100V.*	150V.*
2N2325	C5G	150V.*	150V.*	225V.*
2N2325A	—	150V.*	150V.*	225V.*
2N2326	C5B	200V.*	200V.*	300V.*
2N2326A	—	200V.*	200V.*	300V.*
2N2327	C5H	250V.*	250V.*	350V.*
2N2327A	—	250V.*	250V.*	350V.*
2N2328	C5C	300V.*	300V.*	400V.*
2N2328A	—	300V.*	300V.*	400V.*
2N2329	C5D	400V.*	400V.*	500V.*

Peak Positive Anode Voltage, PFV	500 Volts
RMS On-State Current, $I_{T(RMS)}$	1.6 Amperes (all conduction angles)
Average On-State Current, $I_{T(AV)}$	Depends on conduction angle (see Charts 2, 3, 5 and 6)
Critical Rate-of-Rise of On-State Current, di/dt:	
Gate Triggered Operation, Switching from Rated Voltage	50 Amperes per microsecond
Peak One Cycle Surge (non-rep) On-State Current, $I_{TSM}$	15 Amperes*
$I^2t$ (for fusing), for times $\geq 1.5$ milliseconds	0.5 Ampere <sup>2</sup> seconds
Peak Gate Power Dissipation, $P_{GM}$	0.1 Watts*
Average Gate Power Dissipation, $P_{G(AV)}$	0.01 Watts*
Peak Positive Gate Current, $I_{GM}$	0.1 Amperes*
Peak Positive Gate Voltage, $V_{GM}$	6 Volts*
Peak Negative Gate Voltage, $V_{GM}$	6 Volts*
Storage Temperature, $T_{STG}$	-65°C to +150°C*
Operating Temperature, $T_J$	-65°C to +125°C*

\*Indicates data included on JEDEC type number registration



**SOLID STATE INC.**

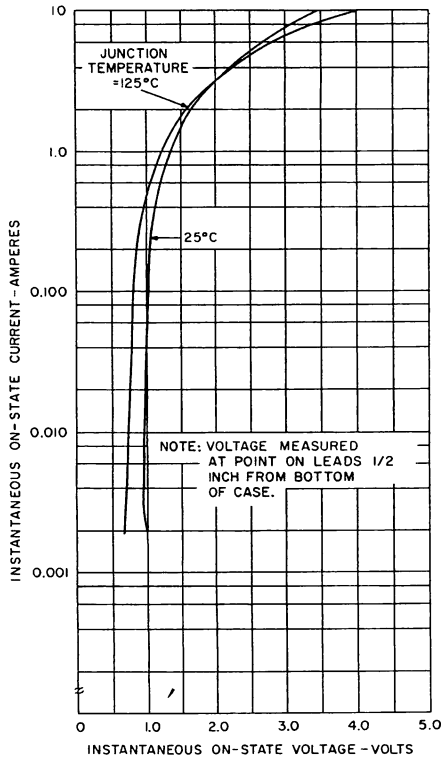
46 FARRAND STREET  
BLOOMFIELD, NEW JERSEY 07003

www.solidstateinc.com

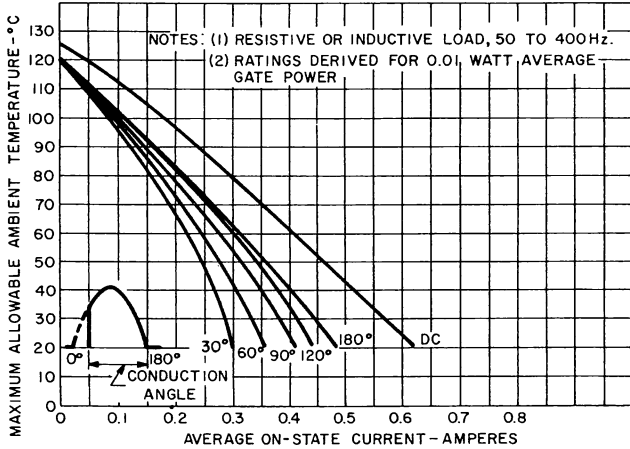
## CHARACTERISTICS

TEST	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS	
PEAK REVERSE or OFF-STATE CURRENT	$I_{RRM}$				$\mu A$	$V_{RRM} = V_{DRM} = \text{Rated.}$	
	or	—	2.0	10.0		$T_C = +25^\circ C, R_{GK} = 1000 \text{ Ohms } 2N2322-29 \text{ (C5 Series)}$ $= 2000 \text{ Ohms } 2N2322A-28A$	
All Types	$I_{DRM}$	—	40	100*		$T_C = +125^\circ C, R_{GK} = 1000 \text{ Ohms } 2N2322-29 \text{ (C5 Series)}$ $= 2000 \text{ Ohms } 2N2322A-28A$	
GATE TRIGGER CURRENT	$I_{GT}$				$\mu A$		
		2N2322-29 (C5 Series)	—	10		200	$T_C = +25^\circ C, V_D = 6Vdc, R_L = 100 \text{ Ohms}$ $R_{GK} = 1000 \text{ Ohms}$
		2N2322A-28A	—	2		20	$T_C = +25^\circ C, V_D = 6Vdc, R_L = 100 \text{ Ohms}$ $R_{GK} = 2000 \text{ Ohms}$
		2N2322-29 (C5 Series)	—	20.0		350*	$T_C = -65^\circ C, V_D = 6Vdc, R_L = 100 \text{ Ohms}$ $R_{GK} = 1000 \text{ Ohms}$
2N2322A-28A	—	10	75*		$T_C = -65^\circ C, V_D = 6Vdc, R_L = 100 \text{ Ohms}$ $R_{GK} = 2000 \text{ Ohms}$		
GATE TRIGGER VOLTAGE	$V_{GT}$				Vdc		
		2N2322-29 (C5 Series)	0.35	0.5		0.8	$T_C = +25^\circ C, V_D = 6Vdc, R_L = 100 \text{ Ohms}$ $R_{GK} = 1000 \text{ Ohms}$
		2N2322A-28A	0.35	0.4		0.6	$T_C = +25^\circ C, V_D = 6Vdc, R_L = 100 \text{ Ohms}$ $R_{GK} = 2000 \text{ Ohms}$
		2N2322-29 (C5 Series)	—	0.7		1.0*	$T_C = -65^\circ C, V_D = 6Vdc, R_L = 100 \text{ Ohms}$ $R_{GK} = 1000 \text{ Ohms}$
		2N2322A-28A	—	—		0.9*	$T_C = -65^\circ C, V_D = 6Vdc, R_L = 100 \text{ Ohms}$ $R_{GK} = 2000 \text{ Ohms}$
		2N2322-29 (C5 Series)	0.1*	0.25		0.5	$T_C = +125^\circ C, V_{DM} = \text{Rated } V_{DRM} \text{ Value}$ $R_{GK} = 1000 \text{ Ohms, } R_L = 100 \text{ Ohms}$
2N2322A-28A	0.1*	—	—	$T_C = +125^\circ C, V_{DM} = \text{Rated } V_{DRM} \text{ Value}$ $R_{GK} = 2000 \text{ Ohms, } R_L = 100 \text{ Ohms}$			
PEAK ON-STATE VOLTAGE	$V_{TM}$				V		
		2N2322-29 (C5 Series)	—	2.0		2.2	$T_C = +25^\circ C, I_{TM} = 4.0A, \text{ Single Half Sine Wave Pulse, } 2.0 \text{ Millisec. Wide}$
All Types		—	1.9	2.0*		$T_C = +85^\circ C, I_{T(AV)} = 1.0A, \text{ Half Sine Wave, } 60 \text{ Hz, } 180^\circ \text{ Conduction Angle}$	
HOLDING CURRENT	$I_H$				mA		
		All Types	—	1.0		2.0	$R_{GK} = 1000 \text{ Ohms } 2N2322-29 \text{ (C5 Series)}$ $= 2000 \text{ Ohms } 2N2322A-28A$
		All Types	—	1.5		3.0*	$T_C = +25^\circ C, R_L = 10K$
		2N2322-29	0.15*	0.4		—	$T_C = -65^\circ C, R_L = 10K$
		2N2322A-28A	0.10*	0.4		—	$T_C = +125^\circ C, R_L = 50K$
TURN-ON TIME All Types	$t_d + t_r$	—	1.4	—	$\mu sec$	$T_C = +25^\circ C, I_F = 1.0A, V_{DM} = \text{Rated } V_{DRM} \text{ Value, Gate Supply: } 6 \text{ Volt Open Circuit, } 330 \text{ Ohm Load Line, } 0.1 \mu sec. \text{ Rise Time, } 5 \mu sec. \text{ Min. Pulse Width.}$	
CIRCUIT-COMMUTATED TURN-OFF TIME All Types	$t_q$	—	40	—	$\mu sec$	$T_C = +125^\circ C, I_{TM} = 1.0A \text{ Peak. Rectangular current pulse, } 50 \mu sec \text{ duration. Rate of rise of current } < 10 \text{ amperes}/\mu sec. \text{ Commutation rate } \leq 5 \text{ amperes}/\mu sec. \text{ Peak reverse voltage } = \text{ rated } V_{RRM} \text{ volts max. Reverse voltage at end of turn-off time interval } = 15V. \text{ Repetition rate } = 60 \text{ pps. Rate of rise of re-applied off-state voltage } (dv/dt) = 20V/\mu sec. \text{ Off-state voltage } = \text{ rated } V_{DRM} \text{ volts. Gate bias during turn-off time interval } = 0 \text{ volts, } 100 \text{ ohms.}$	

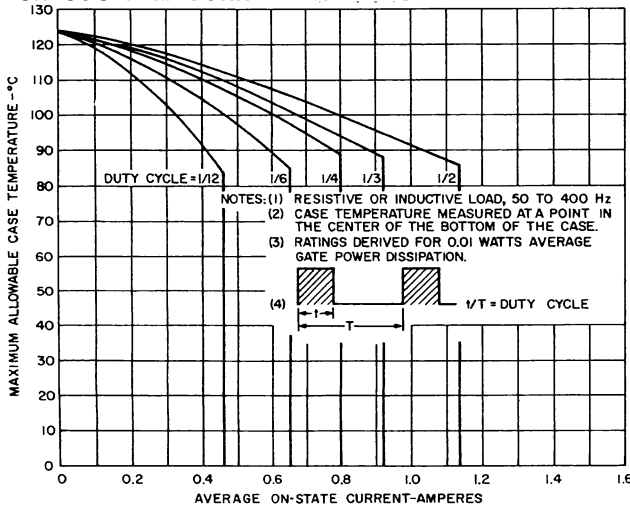
\*Indicates data included on JEDEC type number registration



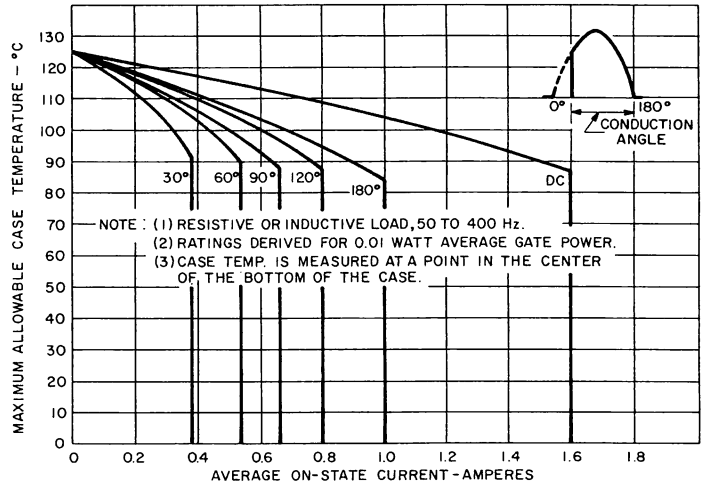
**1. MAXIMUM ON-STATE CHARACTERISTICS**



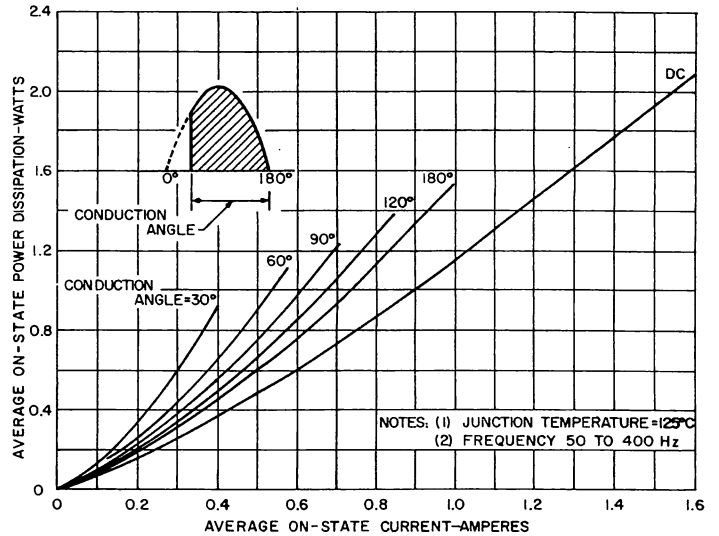
**3. MAXIMUM ALLOWABLE AMBIENT TEMPERATURE FOR SINUSOIDAL CURRENT WAVEFORM**



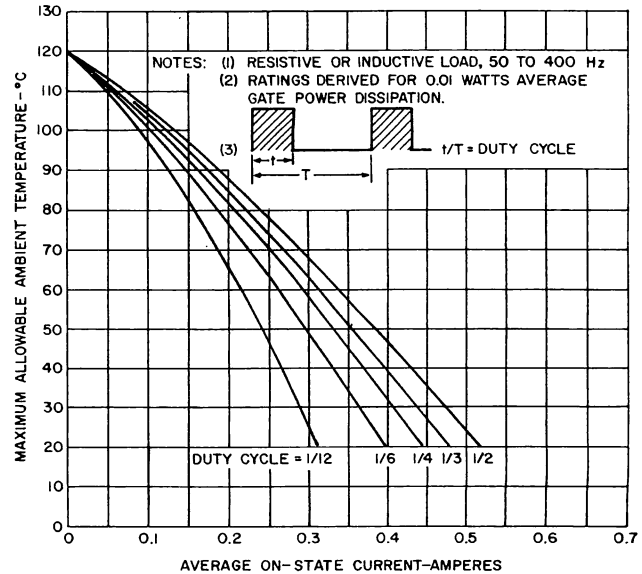
**5. MAXIMUM ALLOWABLE CASE TEMPERATURE FOR RECTANGULAR CURRENT WAVEFORM**



**2. MAXIMUM ALLOWABLE CASE TEMPERATURE FOR SINUSOIDAL CURRENT WAVEFORM**

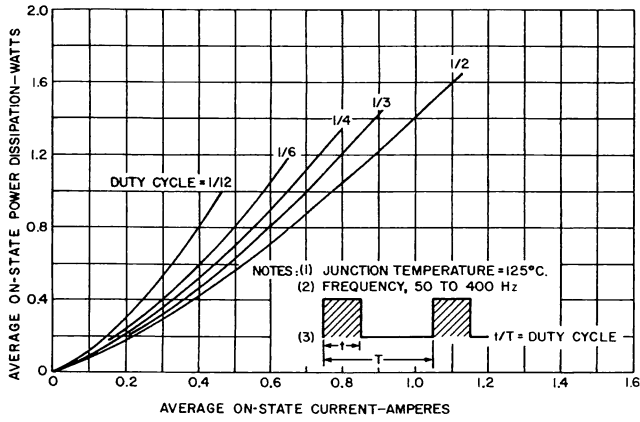


**4. MAXIMUM ON-STATE POWER DISSIPATION FOR SINUSOIDAL CURRENT WAVEFORM**

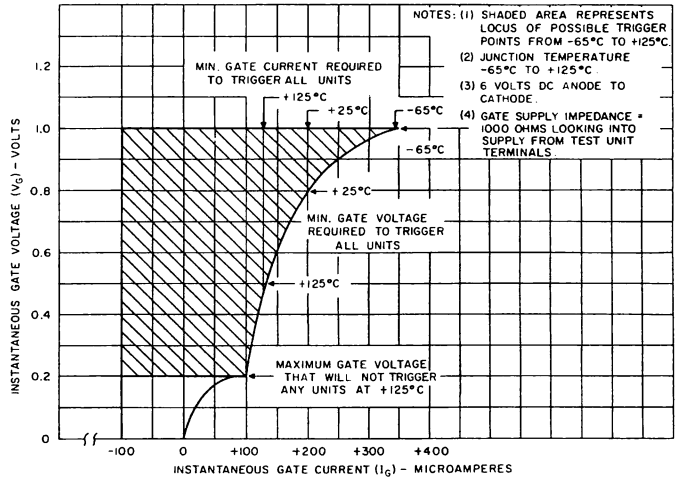


**6. MAXIMUM ALLOWABLE AMBIENT TEMPERATURE FOR RECTANGULAR CURRENT WAVEFORM**

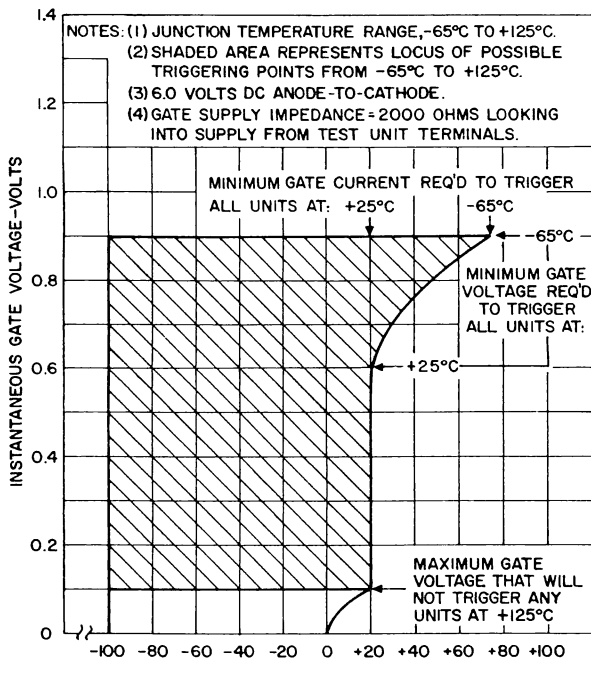
# C5 SERIES



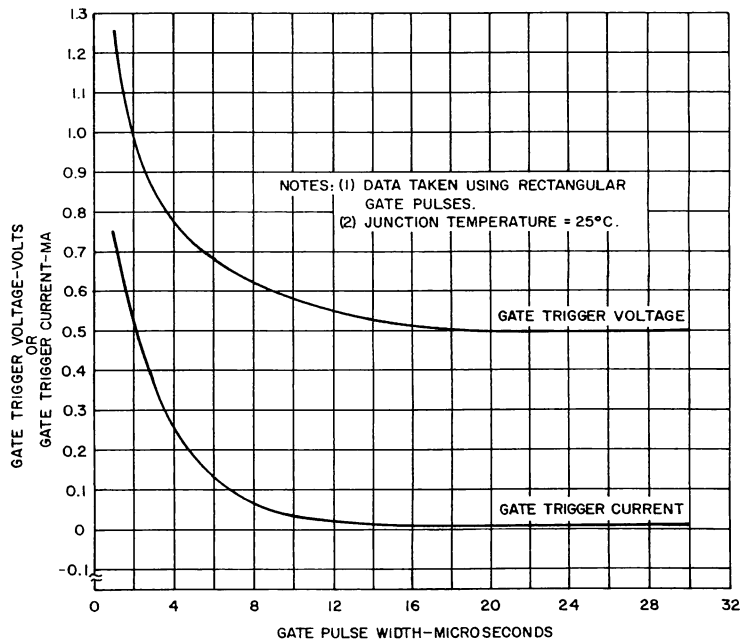
**7. MAXIMUM ON-STATE POWER DISSIPATION FOR RECTANGULAR CURRENT WAVEFORM**



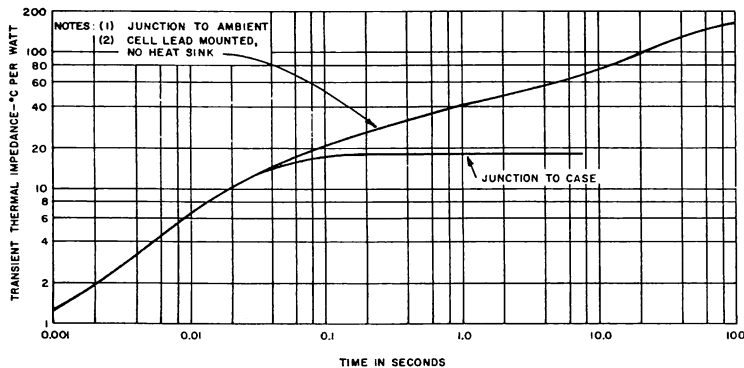
**8. GATE TRIGGERING CHARACTERISTICS FOR 2N2322-29 (C5 SERIES) ONLY**



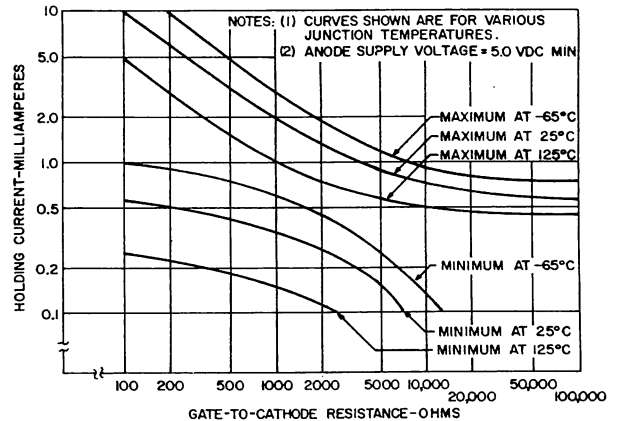
**9. GATE TRIGGERING CHARACTERISTICS FOR 2N2322A-28A ONLY**



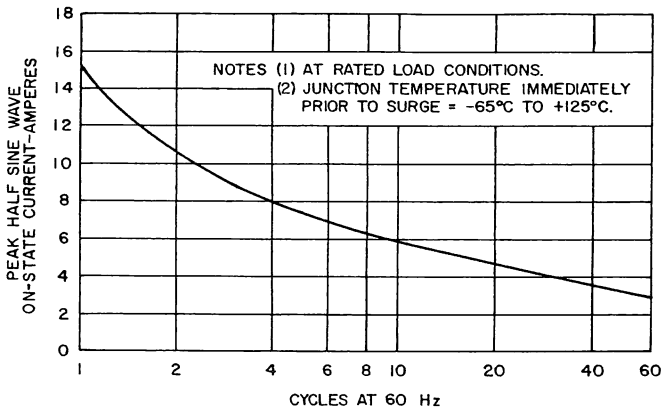
**10. TYPICAL GATE TRIGGER CURRENT AND VOLTAGE VARIATION WITH GATE PULSE WIDTH**



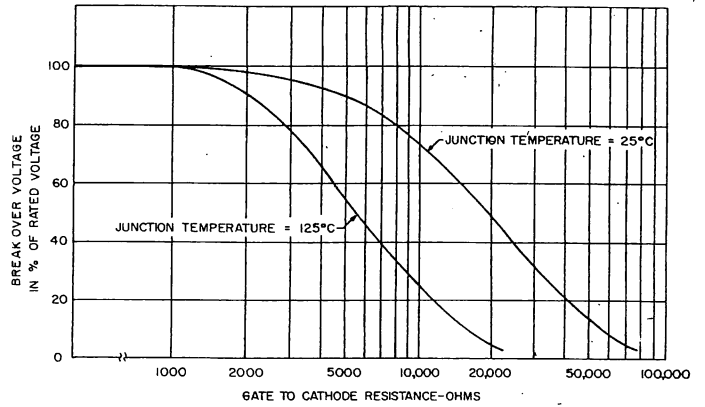
**11. MAXIMUM TRANSIENT THERMAL IMPEDANCE**



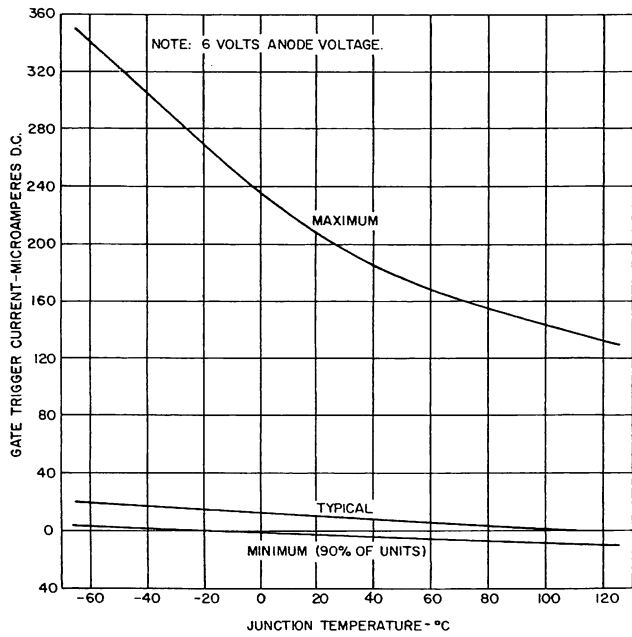
**12. MAXIMUM AND MINIMUM HOLDING CURRENT VARIATION WITH EXTERNAL GATE-TO-CATHODE RESISTANCE FOR 2N2322-29 (C5 SERIES) ONLY**



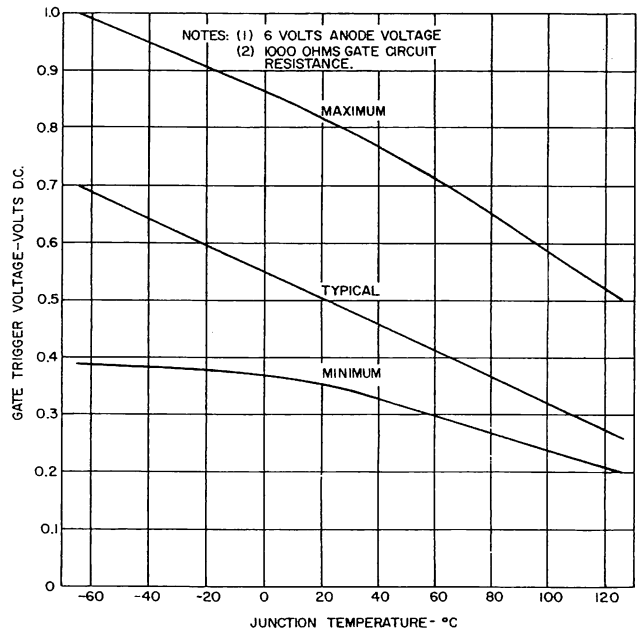
**13. MAXIMUM ALLOWABLE SURGE (NON-REPETITIVE) ON-STATE CURRENT**



**14. TYPICAL BREAKOVER VOLTAGE VARIATION WITH EXTERNAL GATE-TO-CATHODE RESISTANCE 2N2322-29 (C5 SERIES) ONLY**



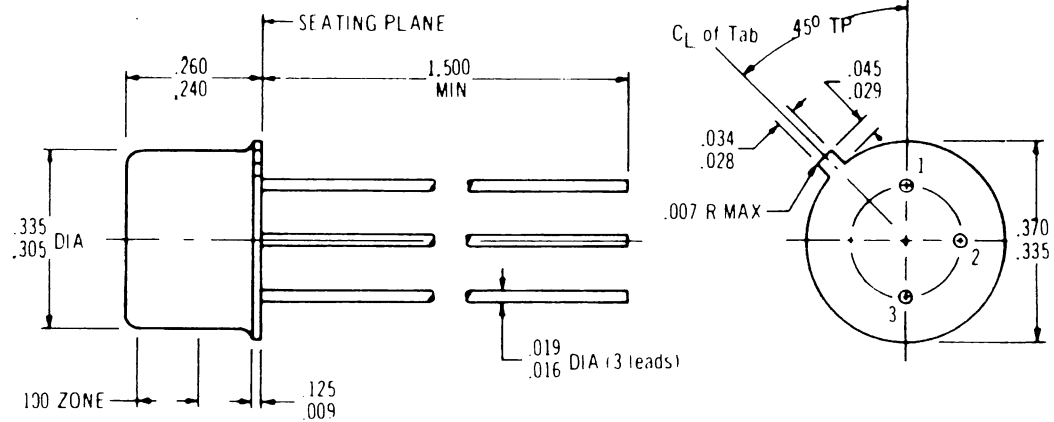
**15. VARIATION OF GATE TRIGGER CURRENT WITH TEMPERATURE FOR 2N2322-29 (C5 SERIES) ONLY**



**16. VARIATION OF GATE TRIGGER VOLTAGE WITH TEMPERATURE FOR 2N2322-29 (C5 SERIES) ONLY**

# PACKAGING DATA

## JEDEC TO-5 OUTLINE



### PIN CONNECTIONS

1. Cathode
2. Gate
3. Anode (connected to case)

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