

SCR

1.6A RMS Up to 400 Volts

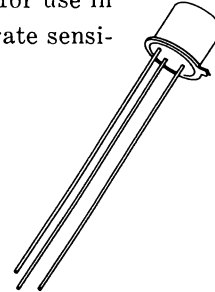
C5 Series

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 μ A max.
& 2N2322A-28A—20 μ 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.*

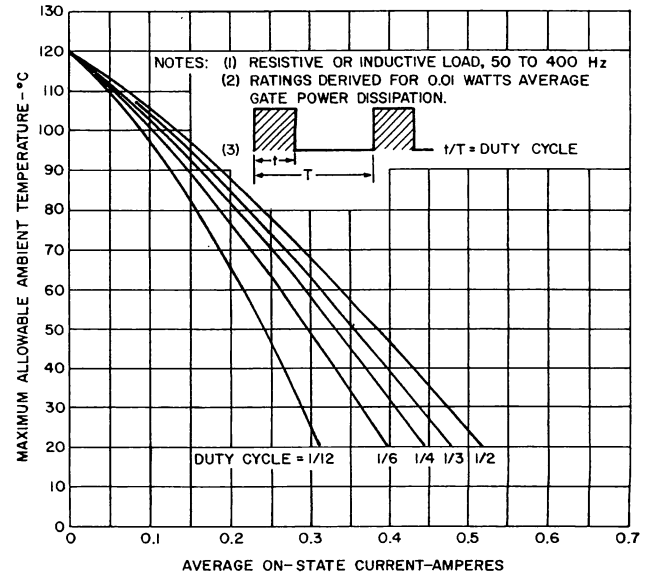
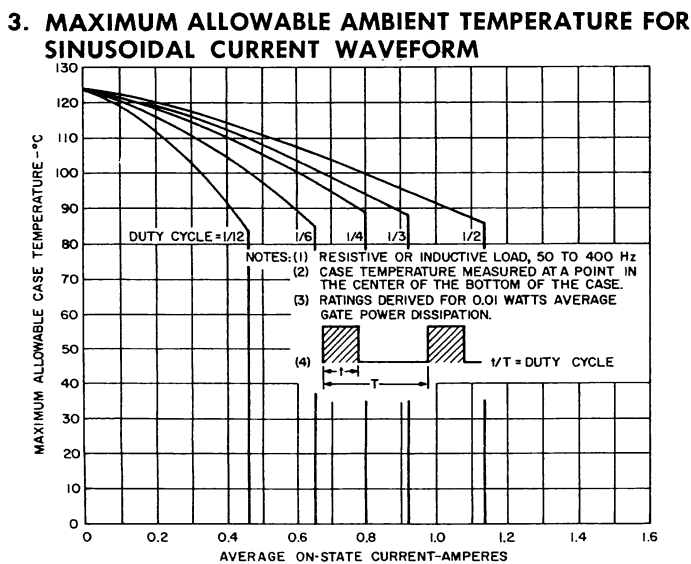
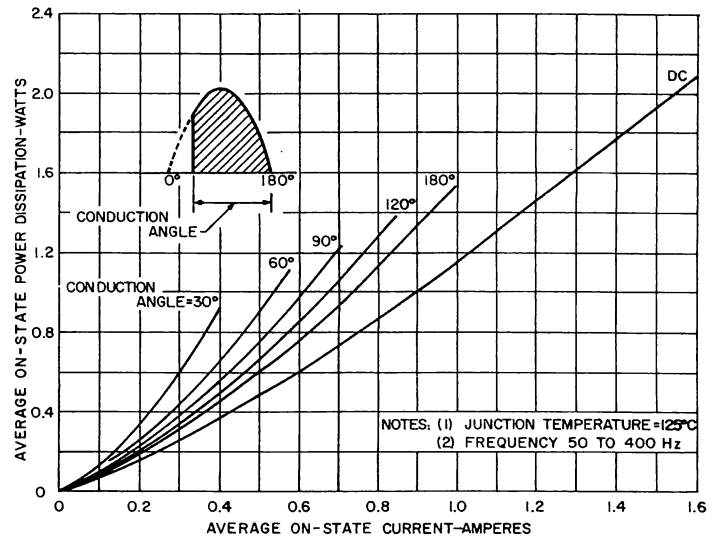
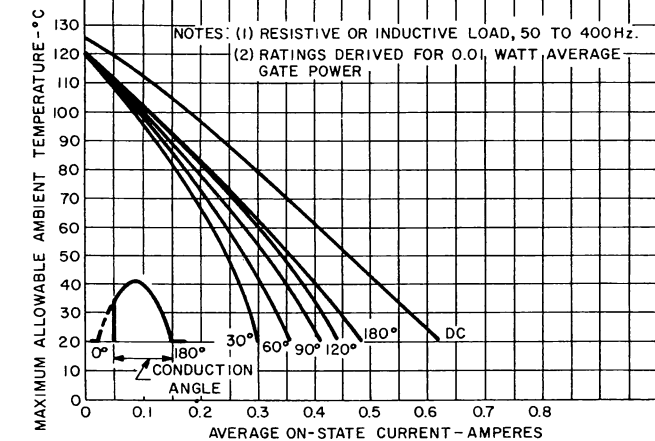
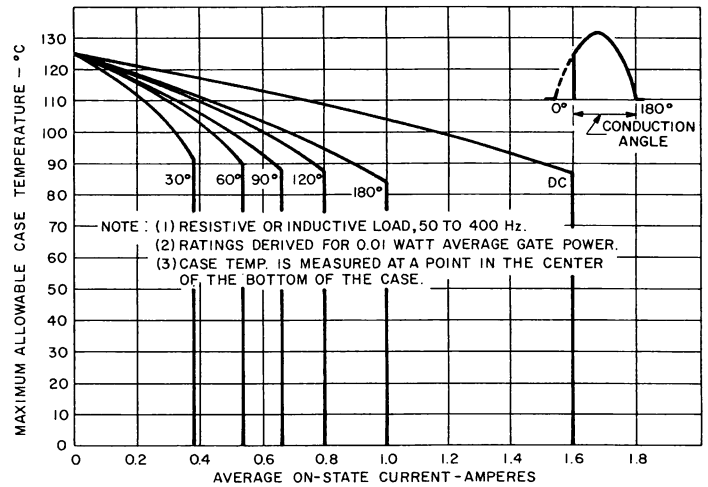
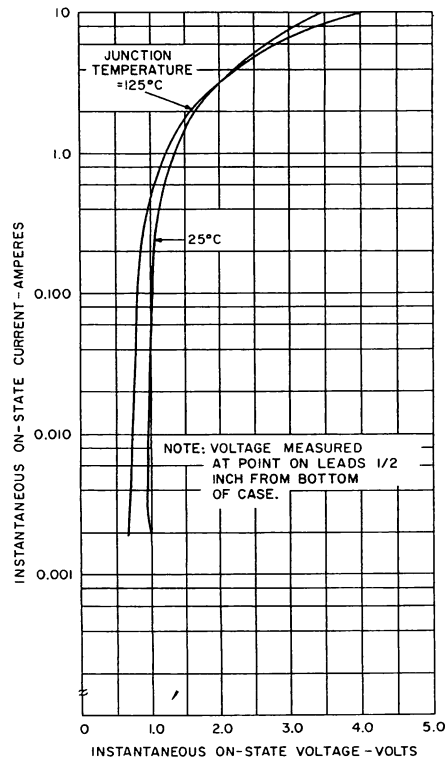
Peak Positive Anode Voltage, PFV	500 Volts
RMS On-State Current, $I_{T(RMS)}$	1.6 Amperes (all conduction angles)
Average On-State Current, $I_{T(AV)}$	Depends on conduction angle (see Charts 2, 3, 5 and 6)
Critical Rate-of-Rise of On-State Current, di/dt :	
Gate Triggered Operation, Switching from Rated Voltage	50 Amperes per microsecond
Peak One Cycle Surge (non-rep) On-State Current, I_{TSM}	15 Amperes*
I^2t (for fusing), for times ≥ 1.5 milliseconds	0.5 Ampere ² 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}	$-65^\circ\text{C to } +150^\circ\text{C}$
Operating Temperature, T_J	$-65^\circ\text{C to } +125^\circ\text{C}$

*Indicates data included on JEDEC type number registration

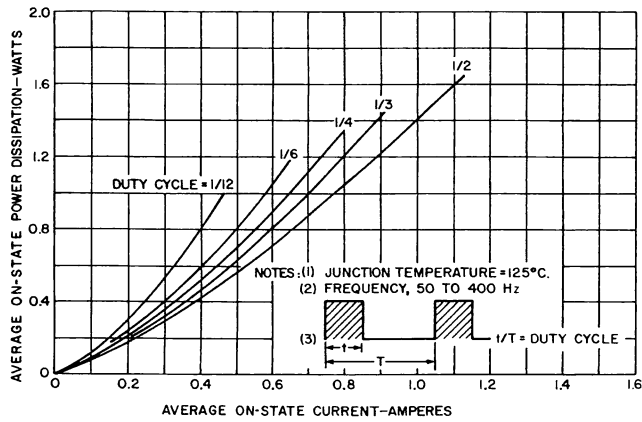
CHARACTERISTICS

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

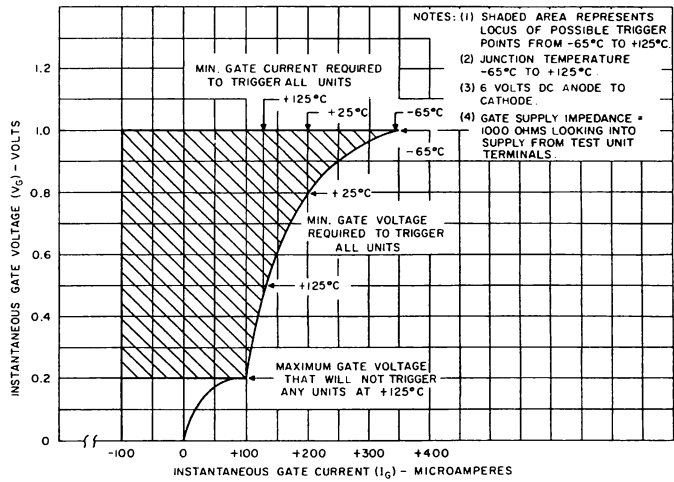
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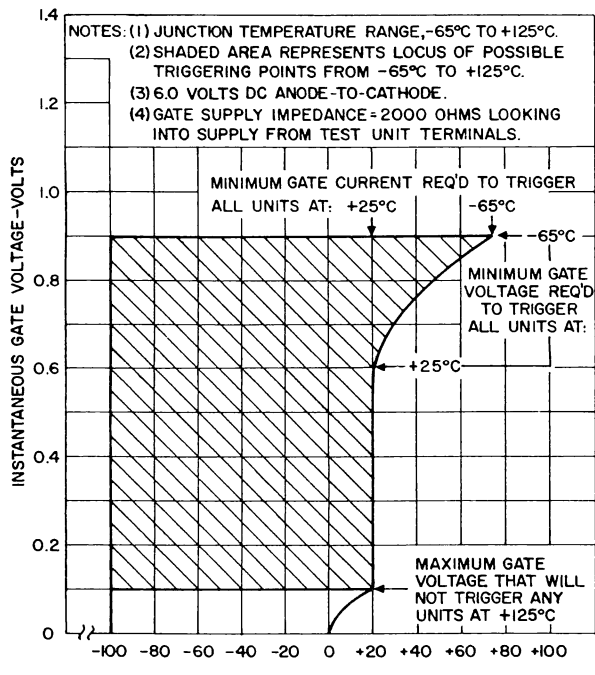
C5 SERIES



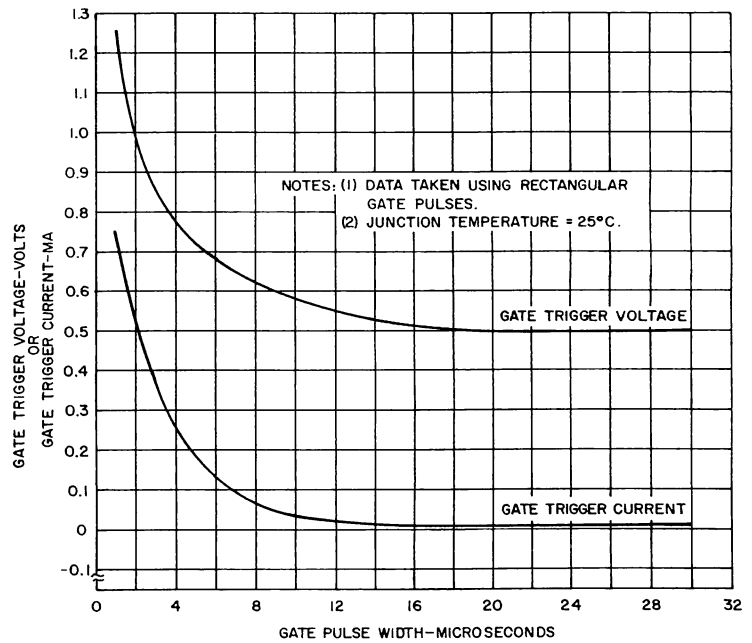
7. MAXIMUM ON-STATE POWER DISSIPATION FOR RECTANGULAR CURRENT WAVEFORM



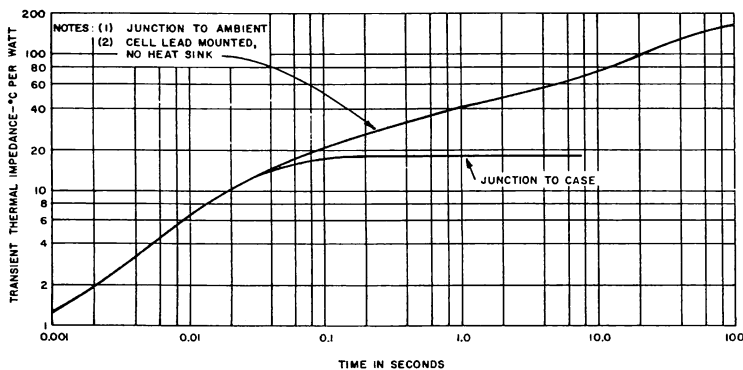
8. GATE TRIGGERING CHARACTERISTICS FOR 2N2322-29 (C5 SERIES) ONLY



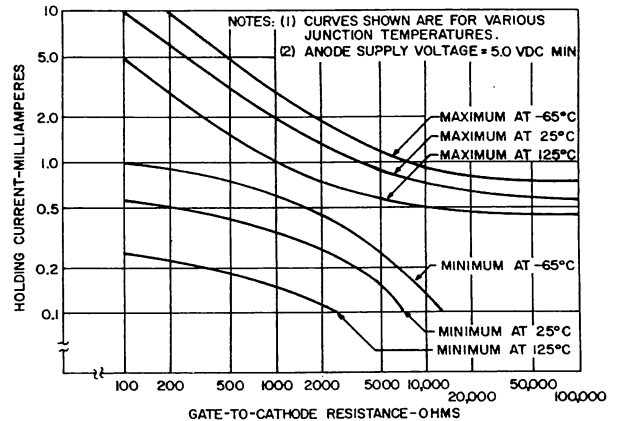
9. GATE TRIGGERING CHARACTERISTICS FOR 2N2322A-28A ONLY



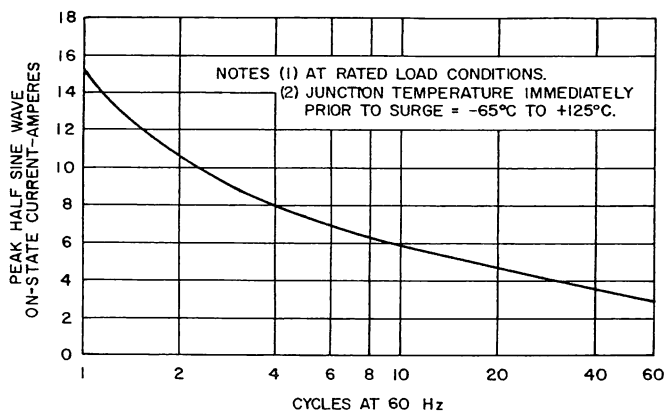
10. TYPICAL GATE TRIGGER CURRENT AND VOLTAGE VARIATION WITH GATE PULSE WIDTH



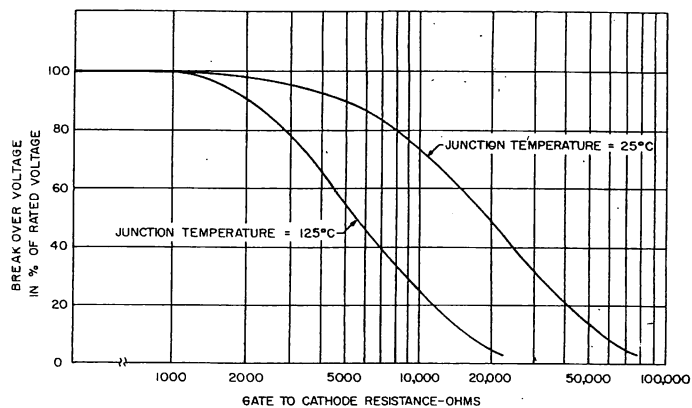
11. MAXIMUM TRANSIENT THERMAL IMPEDANCE



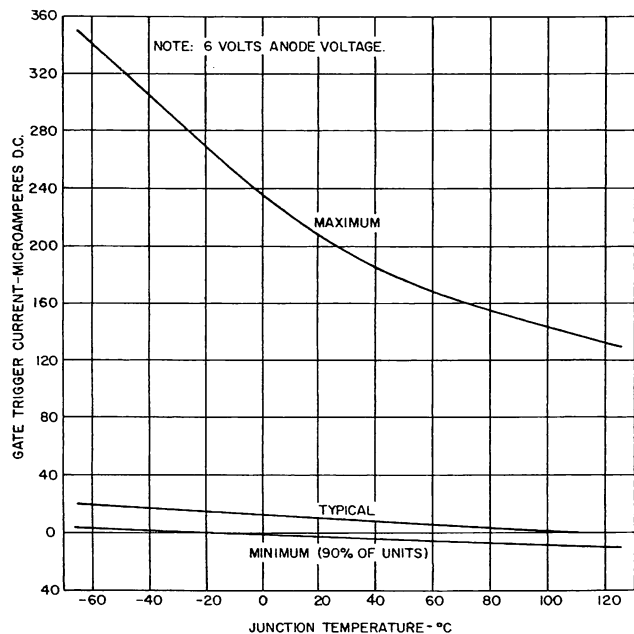
12. MAXIMUM AND MINIMUM HOLDING CURRENT VARIATION WITH EXTERNAL GATE-TO-CATHODE RESISTANCE FOR 2N2322-29 (C5 SERIES) ONLY



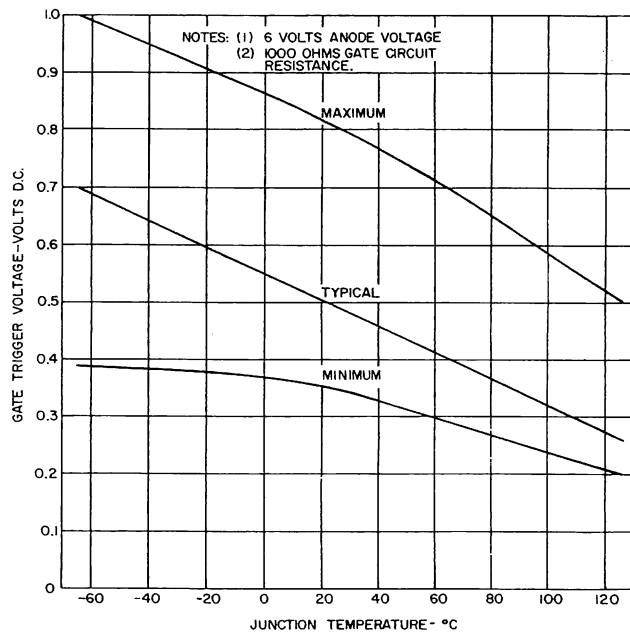
13. MAXIMUM ALLOWABLE SURGE
(NON-REPETITIVE) ON-STATE CURRENT



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



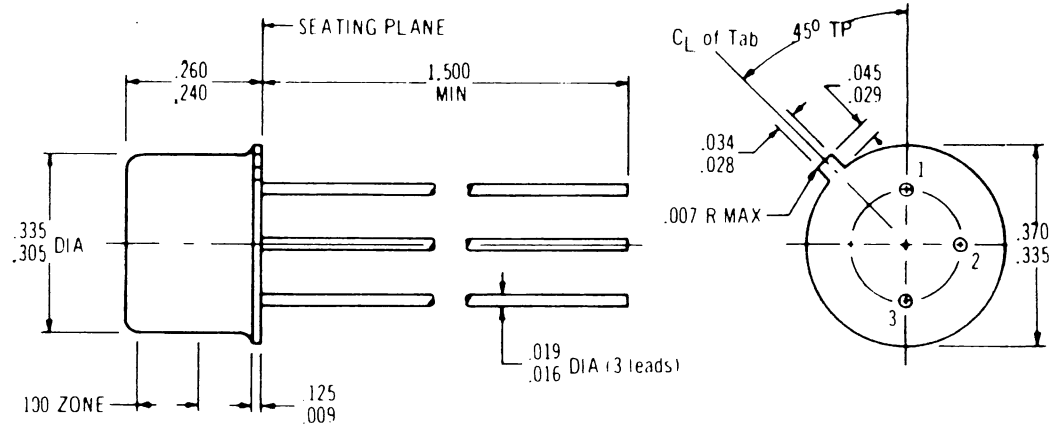
15. VARIATION OF GATE TRIGGER CURRENT WITH
TEMPERATURE FOR 2N2322-29 (C5 SERIES) ONLY



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)