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2N3991

Silicon Controlled Rectifier

Reverse Blocking Triode Thyristor

MAXIMUM ALLOWABLE RATINGS

TYPE	PEAK FORWARD BLOCKING VOLTAGE, V_{FOM} (2) T_C = −40°C to +120°C	REPETITIVE PEAK REVERSE VOLTAGE, V_{ROM} (rep) (2) T_C = −40°C to +120°C	TRANSIENT PEAK REVERSE VOLTAGE (Non-recurrent <5 Millisec.) V_{ROM} (non-rep) T_C = +120°C
2N3991	1000 Volts	1000 Volts	1200 Volts

(2) Half sine wave voltage pulse, 10 millisecond maximum duration.

RMS Forward Current, On State ..... 110 amperes (all conduction angles)
Average Forward Current, On State ..... Depends on conduction angle
Peak One-Cycle Surge Forward Current, I_{FM}(surge) ..... 1500 amperes

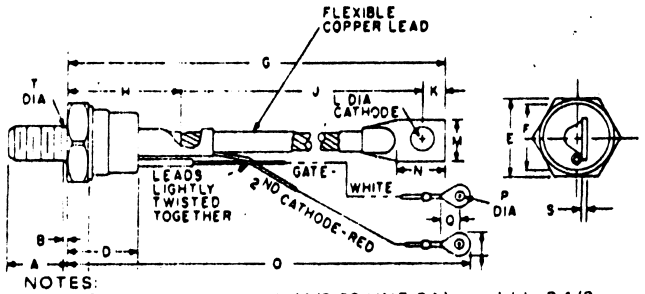
Maximum Rate of Rise of Anode Current During
Turn-On Interval (High Gate Drive Required, ... 75 amps/μsec

I^2t (for fusing) for times ≦ 1.5 milliseconds ..... 7000 amp² secs

Peak Gate Power Dissipation, P_{GM} ..... 10 Watts
Average Gate Power Dissipation, $P_{G(AV)}$ ..... 2 Watts
Peak Forward Gate Voltage, V_{GFM} ..... 40 Volts
Peak Reverse Gate Voltage, V_{GRM} ..... 5 Volts
Storage and Operating Temperature, T_J ..... −40°C to +125°C
Stud Torque ..... 125 Lbs.-in. (min.), 150 Lbs.-in. (max.)
150 Kg.-cm. (min.), 175 Kg.-cm. (max.)

OUTLINE DRAWING

(Conforms to JEDEC TO-94 Outline)



NOTES:
1. Complete stud threads (1/2-20 UNF 2A) to within 2-1/2 threads of head.
2. Flexible lead covered with silicon rubber insulation (Class H), 600 volt ASTM standard wall.
3. Orientation of cathode and gate terminals not defined.
4. One, 1/2-20 steel, nickel-plated nut and one silicon-bronze spring washer supplied with each unit.
5. Approximate weights: 4.0 oz..

TABLE OF DIMENSIONS

Conversion Table

DIM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.797	.837	20.243	21.095
B	–	.080	–	2.032
C	.278	.350	7.060	8.890
D	.874	1.030	22.099	26.162
E	1.049	1.063	26.644	26.975
F	.840	.910	21.335	23.115
G	6.204	6.512	157.619	165.443
G_1	–	1.750	–	44.450
H	1.484	1.646	37.652	41.656
J	4.437	5.623	112.698	142.824
K	.275	.325	6.985	8.255
K_1	.445	.485	11.302	12.319
L	.251	.301	6.375	7.137
L_1	.198	.312	5.029	5.385
M	.500	.600	12.700	15.240
M_1	.385	.415	9.778	10.541
N	.632	.725	16.052	18.390
N_1	.590	.640	14.985	16.256
O	7.000	7.343	177.799	186.487
O_1	.312 Ref.		7.925 Ref.	
P	.140	.150	3.555	3.811
P_1	.060	.075	1.524	1.905
Q	250 Nom.		6.350 Nom.	
R	290 Nom.		7.366 Nom.	
S	.065	.095	1.651	2.413
S_1	.058	.070	1.473	1.778
T	.463	.498	11.760	12.649

CHARACTERISTICS

TEST	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Peak Reverse and Forward Blocking Current	I_{RXM} and I_{FXM}	—	3	10	ma	$T_C = +25°C$ $V_{FXM} = V_{RXM} =$ 1000 Volts peak
Peak Reverse and Forward Blocking Current	I_{RXM} and I_{FXM}	—	15	20	ma	$T_C = 120°C$ $V_{FXM} = V_{RXM} =$ 1000 Volts peak
Effective Thermal Resistance	θ_{J-C}	—	.2	.3	°C/watt	Junction to case (DC)
Critical Exponential Rate of Rise of Forward Blocking Voltage (Higher values may cause device switching)	dv/dt	200	500	—	V/μsec	V_{FXM} = Rated, $T_C = +120°C$, Gate open. $dv/dt = \frac{(V_{FXM})\ (.632)}{\tau}$.
Holding Current	I_{HO}	—	20	500	mAdc	$T_C = +25°C$, Anode supply = 24Vdc. Initial forward current = 2 amps.
Turn-On Time (Delay Time + Rise Time)	$t_d + t_r$	—	8	—	μsec	$T_C = +25°C$, $I_F = 50$Adc, V_{FXM} = Rated. Gate supply: 10 volt open circuit, 20 ohm, 0.1 μsec max. rise time.
Gate Pulse Width Necessary to Trigger		—	8	10	μsec	$T_C = +25°C$. Gate supply: 5 volt open circuit, 5 ohm, 0.1 μsec rise time.
Gate Trigger Current	I_{GT}	—	50	150	mAdc	$T_C = +25°C$, $V_{FX} = 6$Vdc, $R_L = 12$ ohms.
		—	75	200	mAdc	$T_C = -40°C$, $V_{FX} = 6$Vdc, $R_L = 12$ ohms.
		—	15	125	mAdc	$T_C = +120°C$, $V_{FX} = 6$Vdc, $R_L = 12$ ohms.
Gate Trigger Voltage	V_{GT}	—	1.25	3.0	Vdc	$T_C = -40°C$ to $+120°C$, $V_{FX} = 6$Vdc, $R_L = 12$ ohms.
		0.15	—	—	Vdc	$T_C = +120°C$, V_{FX} = Rated, $R_L = 1000$ ohms.
Peak On-Voltage	V_{FM}	—	2.0	2.6	Volts	$T_C = +25°C$, $I_{FM} = 500$A peak. Duty cycle ≦ .01%
Circuited Commutated Turn-Off Time	t_{OFF}	— —	100 25	—† 30	μsec	(1) $T_C = +120°C$, (2) $I_{FM} = 50$A, (3) $V_{RX} = 50$ volts min., (4) V_{FXM} (reapplied) = Rated, (5) Rate of rise of reapplied forward blocking voltage = 20V/μsec linear.