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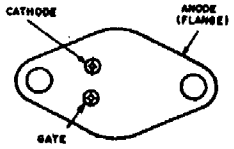
S3700 Series

5-A Silicon Controlled Rectifiers

For Inverter Applications

Features:
- *600V, 125°C T_J operating*
- *High dv/dt and di/dt capability*
- *Low switching losses*
- *High pulse-current capability*
- *Low forward and reverse leakage*
- *SIPOS oxide glass multilayer passivation system*
- *Advanced unisurface construction*
- *Precise ion-implanted diffusion source*

TERMINAL DESIGNATIONS



BOTTOM VIEW

JEDEC TO-213AA

MAXIMUM RATINGS, *Absolute-Maximum Values:*		**S3700B**	**S3700D**	**S3700M**	
Non-repetitive peak reverse voltage:■					
Gate Open	V_{RSOM}	300	500	700	V
Non-repetitive peak off-state voltage:■					
Gate Open	V_{DSOM}	300	500	700	V
Repetitive peak reverse voltage:■					
Gate Open	V_{RROM}	200	400	600	V
Repetitive peak off-state voltage:■					
Gate Open	V_{DROM}	200	400	600	V
On-state current:					
T_C = 85°C; conduction angle = 180°:					
RMS	$I_{T(RMS)}$		5		A
Average	$I_{T(AV)}$		3.2		A
For other conditions			See Figs. 3 & 4		
Peak surge (non-repetitive) on-state current:	I_{TSM}				
For one full cycle of applied principal voltage, T_C = 85°C					
60 Hz (sinusoidal)			80		A
50 Hz (sinusoidal)			65		A
For more than one full cycle of applied principal voltage			See Fig. 5		
Rate of change of on-state current					
$V_D = V_{DROM}$, I_{GT} = 50 mA, t_r = 0.1 μs	dI/dt		200		A/μs
Fusing current (for SCR protection):					
T_J = -40 to 100°C, t = 1 to 8.3 ms	I^2t		25		A
Gate power dissipation:•					
Peak Forward (for 10 μs max., See Fig. 7)	P_{GM}		13		W
Peak Reverse (for 10 μs max., See Fig. 8)	P_{RGM}		13		W
Average (averaging time = 10 ms max.)	$P_{G(AV)}$		0.5		W
Temperature Range:†					
Storage	T_{stg}		-40 to 150		°C
Operating (Case)	T_C		-40 to 125		°C
Pin Temperature (During soldering):					
At distances ≥ 1/32 in. (0.8 mm) from seating plane for 10 s max.	T_P		225		°C

■ These values do not apply if there is a positive gate signal. Gate must be open or negatively biased.

• Any product of gate current and gate voltage which results in a gate power less then the maximum is permitted.

† For temperature measurement reference point, *see Dimensional Outline.*

NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

Quality Semi-Conductors

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

CHARACTERISTIC	SYMBOL	LIMITS FOR ALL TYPES Except as Specified			UNITS
		MIN.	TYP.	MAX.	
Peak Off-State Current: (Gate open, T_C = 125°C)					
Forward Current (I_{DOM}) at $V_D = V_{DROM}$	I_{DOM}	–	0.5	3	mA
Reverse Current (I_{ROM}) at $V_R = V_{RROM}$	I_{ROM}	–	0.3	1.5	mA
Instantaneous On-State Voltage: i_T = 30 A (peak), T_C = 25°C	v_T	–	2.2	3	V
For other conditions				See Fig. 6	
Instantaneous Holding Current: Gate open, T_C = 25°C	i_{HO}	–	20	50	mA
Critical Rate of Rise of Off-State Voltage: $V_D = V_{DROM}$, exponential voltage rise, Gate open, T_C = 125°C	dv/dt	100	250	–	V/μs
DC Gate Trigger Current: V_D = 12 V (dc), R_L = 30 Ω, T_C = 25°C	I_{GT}	–	15	40	mA
For other conditions				See Fig. 7	
DC Gate Trigger Voltage: V_D = 12 V (dc), R_L = 30 Ω, T_C = 25°C	V_{GT}	–	1.8	3.5	V
For other conditions				See Fig. 7	
Gate Controlled Turn-On Time: (Delay Time + Rise Time) For $V_{DX} = V_{DROM}$, I_{GT} = 300 mA, t_r = 0.1 μs, I_T = 2 A (peak), T_C = 25°C (See Fig. 10)	t_{gt}	–	0.7	–	μs
Circuit Commutated Turn-Off Time: $V_{DX} = V_{DROM}$, i_T = 2 A, pulse duration = 50 μs, dv/dt = 100 V/μs, −di/dt = −10 A/μs, I_{GT} = 100 mA, V_{GT} = 0 V (at turn-off), T_C = 80°C (See Fig. 13)	t_q		4	6	μs
Thermal Resistance: Junction-to-Case	$R_{\theta JC}$	–	4	8	°C/W
Junction-to-Ambient	$R_{\theta JA}$	–	–	40	°C/W

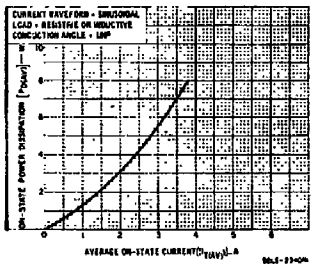


Fig. 1—Power dissipation vs. average on-state current.

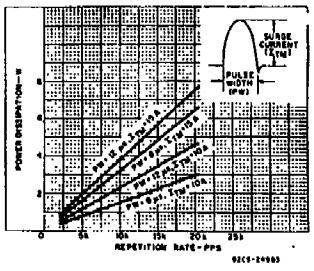


Fig. 2—Dissipation vs. repetition rate.