New Jersey Semi-Conductor Products, Inc.

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C38 SERIES

Type	Minimum Forward Breakover Voltage (V_{BO})* T_J = −65°C to +150°C	Repetitive Peak Reverse Voltage (PRV)* T_J = −65°C to +150°C	Transient Peak Reverse Voltage (Non-recurrent <5.0 Millisec.)* T_J = −65°C to +150°C
C38U	25 volts	25 volts	35 volts

*Values apply for zero or negative gate voltage only. Maximum case to ambient thermal resistance for which maximum PRV ratings apply — equals 11°C/watt.

MAXIMUM ALLOWABLE RATINGS

RMS Forward Current ..... 35 amperes (all conduction angles)
Average Forward Current (I_O) ..... Depends on conduction angle (see charts 3 & 5)
Peak One-cycle Non-recurrent Surge Current (i_{surge}) ..... 150 amperes
Peak Non-recurrent Surge Current during Turn-on time Interval ..... See Chart 10
I^2t (for fusing) ..... 75 ampere² seconds (for times ≧ 1.5 milliseconds)
Peak Gate Power (p_G) ..... 12 watts
Average Gate Power (P_G) ..... 0.5 watt
** Peak Gate Current (i_G) ..... 2.0 amperes
** Peak Gate Voltage (v_G) (Forward and Reverse) ..... 10 volts
Storage Temperature ..... −65°C to + 150°C
Operating Temperature ..... −65°C to + 150°C
Stud Torque ..... 30 inch-pounds

**NOT TO EXCEED GATE POWER RATINGS

CHARACTERISTICS

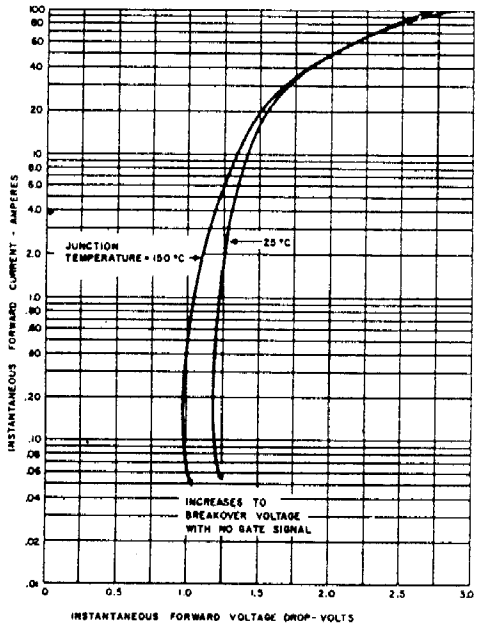
Test	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Peak Reverse and Forward Blocking Current* C38U	i_R and i_S	—	6.0	10.0	ma	T_J = 25°C, $v_{AC} = v_{CA}$ = 25v peak
Peak Reverse and Forward Blocking Current* C38U	i_R and i_S	—	9.0	13.0	ma	T_J = 150°C, $v_{AC} = v_{CA}$ = 25v peak
Rate of Rise of Forward Voltage that Will Not Turn on SCR**	dv/dt	20.0	40.0	—	volts/μsec	T_J = 150°C. Gate open circuited. v_{AC} = Rated.
Gate Current to Fire	I_{GF}	—	15	40	mAdc	T_J = 25°C, V_{AC} = 6 Vdc, R_L = 50 ohms
		—	35	80	mAdc	T_J = −65°C, V_{AC} = 6 Vdc, R_L = 50 ohms
		—	7.5	20	mAdc	T_J = 150°C, V_{AC} = 6 Vdc, R_L = 50 ohms
Gate Voltage to Fire	V_{GF}	—	1.2	3.0	Vdc	V_{AC} = 6 Vdc, T_J = 25°C, R_L = 50 ohms
		—	2.0	3.0	Vdc	V_{AC} = 6 Vdc, T_J = −65°C, R_L = 50 ohms
		0.15	—	—	Vdc	v_{AC} = Rated, T_J = 150°C, R_L = 1000 ohms
Forward Voltage Drop	v_F	—	1.7	2.0	v	i_F = 50a peak, T_J = 25°C
Holding Current	I_H	—	10	80	mAdc	T_J = 25°C, Anode Supply = 6 Vdc
Turn-on Time	$t_d + t_r$	—	1.4	—	μsec	T_J = 25°C, I_F = 5.0 Adc, v_{AC} = Rated. Gate supply: 10 volt open circuit, 25 ohm, 0.1 μsec. max. rise time.
Turn-off Time	t_{off}	—	24	—	μsec	T_J = 150°C, i_F = 10a, i_R = 5a, v_{AC} (reapplied) = Rated, dv/dt = 20v/μsec Linear
Thermal Resistance	θ_{J-C}	—	.75	1.5	°C/watt	Junction to case

*Values apply for zero or negative gate voltage. Max. case to ambient thermal resistance for which max. PRV ratings apply = 11°C per watt.
**See Chart 8.

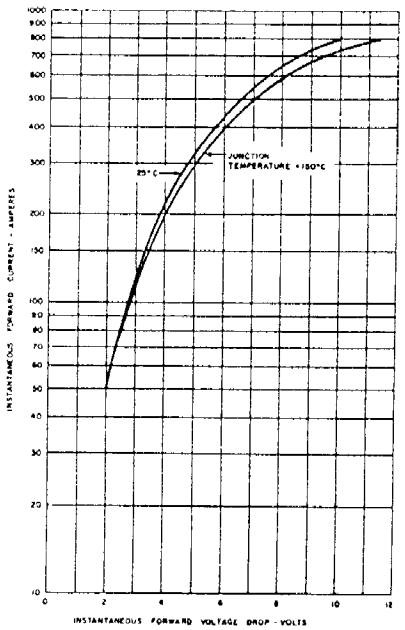
CHARACTERISTICS

Test	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Peak Reverse and Forward Blocking Current*	i_R and i_S					T_J = 25°C
C38U		——	6.0	10.0	ma	V_{AC} = V_{CA} = 25v peak
C38F		——	5.5	10.0	ma	50
C38A		——	5.0	10.0	ma	100
C38G		——	4.5	10.0	ma	150
C38B		——	4.0	8.0	ma	200
C38H		——	3.0	6.0	ma	250
C38C		——	2.5	5.0	ma	300
C38D		——	2.0	4.0	ma	400
C38E		——	1.5	3.0	ma	500
Peak Reverse and Forward Blocking Current*	i_R and i_S					T_J = 150°C
C38U		——	9.0	13.0	ma	V_{AC} = V_{CA} = 25v peak
C38F		——	8.9	13.0	ma	50
C38A		——	7.8	13.0	ma	100
C38G		——	7.7	13.0	ma	150
C38B		——	7.5	12.0	ma	200
C38H		——	7.3	11.0	ma	250
C38C		——	6.8	10.0	ma	300
C38D		——	5.3	8.0	ma	400
C38E		——	2.6	6.0	ma	500
Rate of Rise of Forward Voltage that Will Not Turn on SCR**	dv/dt	20.0	40.0	——	volts/ μsec	T_J = 150°C. Gate open circuited. V_{AC} = Rated.
Gate Current to Fire	I_{GF}	——	15	40	mAdc	T_J = 25°C, V_{AC} = 6 Vdc, R_L = 50 ohms
		——	35	80	mAdc	T_J = −65°C, V_{AC} = 6 Vdc, R_L = 50 ohms
		——	7.5	20	mAdc	T_J = 150°C, V_{AC} = 6 Vdc, R_L = 50 ohms
Gate Voltage to Fire	V_{GF}	——	1.2	3.0	Vdc	V_{AC} = 6 Vdc, T_J = 25°C, R_L = 50 ohms
		——	2.0	3.0	Vdc	V_{AC} = 6 Vdc, T_J = −65°C, R_L = 50 ohms
		0.15	——	——	Vdc	V_{AC} = Rated, T_J = 150°C, R_L = 1000 ohms
Forward Voltage Drop	v_F	——	1.7	2.0	v	i_F = 50a peak, T_J = 25°C
Holding Current	I_H	——	10	80	mAdc	T_J = 25°C, Anode Supply = 6 Vdc
Turn-on Time	$t_d + t_r$	——	1.4	——	μsec	T_J = 25°C, I_F = 5.0 Adc, V_{AC} = Rated. Gate supply: 10 volt open circuit, 25 ohm, 0.1 μsec. max. rise time.
Turn-off Time	t_{off}	——	24	——	μsec	T_J = 150°C, i_F = 10a, i_R = 5a, V_{AC} (reapplied) = Rated, dv/dt = 20v/μsec Linear
Thermal Resistance	θ_{J-C}	——	.75	1.5	°C/watt	Junction to case

*Values apply for zero or negative gate voltage. Max. case to ambient thermal resistance for which max. PRV ratings apply = 11°C per watt.
**See Chart 8.



1. MAXIMUM FORWARD CHARACTERISTICS CONDUCTING STATE



2. MAXIMUM FORWARD CHARACTERISTICS HIGH CURRENT LEVEL—CONDUCTING STATE