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NTE5380 Silicon Controlled Rectifier (SCR) for High Speed Switching, 600V, 400 Amp, TO200AB

Absolute Maximum Ratings:

Maximum Repetitive Peak Voltage, V_{DRM} , V_{RRM}	800V
Maximum Non-Repetitive Peak Voltage, V_{RSM}	900V
Repetitive Peak Off-State Current ($T_J = +125^\circ\text{C}$), I_{DRM} , I_{RRM}	40mA
Maximum Operating Temperature Range, T_J	-40° to $+125^\circ\text{C}$
Storage Temperature Range, T_{stg}	-40° to $+150^\circ\text{C}$
Maximum Thermal Resistance, Junction-to-Heatsink, R_{thJHS}	
DC Operation Single Side Cooled	0.17K/W
DC Operation Double Side Cooled	0.08K/W
Maximum Thermal Resistance, Case-to-Heatsink, R_{thCHS}	
DC Operation Single Side Cooled	0.033K/W
DC Operation Double Side Cooled	0.017K/W
Mounting Torque ($\pm 10\%$), F	4900N (500Kg)

Electrical Characteristics:

Parameter	Symbol	Test Conditions		Rating	Unit	
On-State Conduction						
Max. Average On-State Current at Heatsink Temperature	$I_{T(AV)}$	180° Conduction, Half Sine Wave	Single Side Cooled, $+85^\circ\text{C}$	130	A	
			Double Side Cooled, $+55^\circ\text{C}$	370	A	
Max. RMS On-State Current	$I_{T(RMS)}$	DC @ $+25^\circ\text{C}$ Heatsink Temperature, Double Side Cooled		690	A	
Max. Peak, One Half Cycle, Non-Repetitive Surge Current	I_{TSM}	t = 10ms t = 8.3ms	No Voltage Reapplied	Sinusoidal Half Wave, Initial $T_J = +125^\circ\text{C}$	4900	A
			100% V_{RRM} Reapplied		5130	A
		t = 10ms t = 8.3ms	100% V_{RRM} Reapplied		4120	A
			100% V_{RRM} Reapplied		4310	A
Max. I^2t for Fusing	I^2t	t = 10ms t = 8.3ms	No Voltage Reapplied	Sinusoidal Half Wave, Initial $T_J = +125^\circ\text{C}$	120	KA^2s
			100% V_{RRM} Reapplied		110	KA^2s
		t = 10ms t = 8.3ms	100% V_{RRM} Reapplied		85	KA^2s
			100% V_{RRM} Reapplied		78	KA^2s
Max. Peak On-State Voltage	V_{TM}	$I_{TM} = 600\text{V}$, $T_J = +125^\circ\text{C}$, $t_p = 10\text{ms}$ Sine Wave Pulse		1.8	V	
Threshold Voltage, Low Level	$V_{T(TO)1}$	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$, $T_J = +125^\circ\text{C}$		1.40	V	
Threshold Voltage, High Level	$V_{T(TO)2}$	$(I > \pi \times I_{T(AV)})$, $T_J = +125^\circ\text{C}$		1.45	V	

Electrical Characteristics (Cont'd):

Parameter	Symbol	Test Conditions	Rating	Unit
On-State Conduction (Cont'd)				
Forward Slope Resistance, Low Level	r_{t1}	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$, $T_J = +125^\circ\text{C}$	0.67	$\text{m}\Omega$
Forward Slope Resistance, High Level	r_{t2}	$(I > \pi \times I_{T(AV)})$, $T_J = +125^\circ\text{C}$	0.58	$\text{m}\Omega$
Maximum Holding Current	I_H	$T_J = +25^\circ\text{C}$, $I_T > 30\text{A}$	600	mA
Typical Latching Current	I_L	$T_J = +25^\circ\text{C}$, $V_A = 12\text{V}$, $R_a = 6\Omega$, $I_G = 1\text{A}$	1000	mA
Switching				
Max. Non-Repetitive Rate of Rise of Turned-On Current	di/dt	$T_J = +125^\circ\text{C}$, $V_{DRM} = 600\text{V}$, $I_{TM} = 2 \times di/dt$	1000	$\text{A}/\mu\text{s}$
Typical Delay Time	t_d	$T_J = +125^\circ\text{C}$, $V_{DRM} = 600\text{V}$, $I_{TM} = 50\text{A DC}$, $t_p = 1\mu\text{s}$, Resistive Load, gate Pulse: 10V, 5 Ω Source	1.1	μs
Max. Turn-Off Time	t_p	$T_J = +125^\circ\text{C}$, $I_{TM} = 30\text{A}$, Commutating $di/dt = 20\text{A}/\mu\text{s}$, $V_R = 50\text{V}$, $t_p = 500\mu\text{s}$, $dv/dt = 500\text{V}/\mu\text{s}$	10 - 20	μs
Blocking				
Maximum Critical Rate of Rise of Off-State Voltage	dv/dt	$T_J = +125^\circ\text{C}$, Linear to 80% V_{DRM}	500	$\text{V}/\mu\text{s}$
Max. Peak Reverse and Off-State Leakage Current	I_{RRM} , I_{DRM}	$T_J = +125^\circ\text{C}$, V_{DRM}/V_{RRM} Applied	40	mA
Triggering				
Maximum Peak Gate Power	P_{GM}	$T_J = +125^\circ\text{C}$, $f = 50\text{Hz}$, $d\% = 50$	60	W
Maximum Average Gate Power	$P_{G(AV)}$		10	W
Max. Peak Positive Gate Current	I_{GM}	$T_J = +125^\circ\text{C}$, $t_p \leq 5\text{ms}$	10	A
Max. Peak Positive Gate Voltage	$+V_{GM}$	$T_J = +125^\circ\text{C}$, $t_p \leq 5\text{ms}$	20	V
Max. Peak Negative Gate Voltage	$-V_{GM}$		5	V
Max. DC Gate Current Required to Trigger	I_{GT}	$T_J = +25^\circ\text{C}$, $V_A = 12\text{V}$, $R_a = 6\Omega$	150	mA
Max. DC Gate Voltage Required to Trigger	V_{GT}	$T_J = +25^\circ\text{C}$, $V_A = 12\text{V}$, $R_a = 6\Omega$	3	V
Max. DC Gate Current not to Trigger	I_{GD}	$T_J = +125^\circ\text{C}$, Rated V_{DRM} Applied	20	mA
Max. DC Gate Voltage not to Trigger	V_{GD}	$T_J = +125^\circ\text{C}$, Rated V_{DRM} Applied	0.25	V

