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## NTE5381 Silicon Controlled Rectifier (SCR) for High Speed Switching, TO200AB

### Absolute Maximum Ratings:

Maximum Repetitive Peak Voltage, $V_{DRM}$ , $V_{RRM}$ .....	1200V
Maximum Non-Repetitive Peak Voltage, $V_{RSM}$ .....	1300V
Repetitive Peak Off-State Current ( $T_J = +125^\circ\text{C}$ ), $I_{DRM}$ , $I_{RRM}$ .....	40mA
Maximum Operating Temperature Range, $T_J$ .....	$-40^\circ$ to $+125^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-40^\circ$ 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
<b>On-State Conduction</b>					
Max. Average On-State Current at Heatsink Temperature	$I_{T(AV)}$	180° Conduction, Half Sine Wave	Single Side Cooled, $+85^\circ\text{C}$	120	A
			Double Side Cooled, $+55^\circ\text{C}$	330	A
Max. RMS On-State Current	$I_{T(RMS)}$	DC @ $+25^\circ\text{C}$ Heatsink Temperature, Double Side Cooled		610	A
Max. Peak, One Half Cycle, Non-Repetitive Surge Current	$I_{TSM}$	t = 10ms t = 8.3ms	No Voltage Reapplied	Sinusoidal Half Wave, Initial $T_J = +125^\circ\text{C}$	
				4680	A
		t = 10ms t = 8.3ms	100% $V_{RRM}$ Reapplied	3940	A
				4120	A
Max. $I^2t$ for Fusing	$I^2t$	t = 10ms t = 8.3ms	No Voltage Reapplied	Sinusoidal Half Wave, Initial $T_J = +125^\circ\text{C}$	
				110	KA <sup>2</sup> s
		t = 10ms t = 8.3ms	100% $V_{RRM}$ Reapplied	100	KA <sup>2</sup> s
				77	KA <sup>2</sup> s
71	KA <sup>2</sup> s				
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		2.07	V
Threshold Voltage, Low Level	$V_{T(TO)1}$	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$ , $T_J = +125^\circ\text{C}$		1.55	V
Threshold Voltage, High Level	$V_{T(TO)2}$	$(I > \pi \times I_{T(AV)})$ , $T_J = +125^\circ\text{C}$		1.61	V

## Electrical Characteristics (Cont'd):

Parameter	Symbol	Test Conditions	Rating	Unit
<b>On-State Conduction (Cont'd)</b>				
Forward Slope Resistance, Low Level	$r_{t1}$	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$ , $T_J = +125^\circ\text{C}$	0.87	$\text{m}\Omega$
Forward Slope Resistance, High Level	$r_{t2}$	$(I > \pi \times I_{T(AV)})$ , $T_J = +125^\circ\text{C}$	0.77	$\text{m}\Omega$
Maximum Holding Current	$I_H$	$T_J = +25^\circ\text{C}$ , $I_T > 30\text{A}$	600	$\text{mA}$
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	$\text{mA}$
<b>Switching</b>				
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 $\Omega$ Source	1.1	$\mu\text{s}$
Max. Turn-Off Time	$t_p$	$T_J = +125^\circ\text{C}$ , $I_{TM} = 30\text{A}$ , Commutating $di/dt = 20\text{A}/\mu\text{s}$ , $V_R = 50\text{V}$ , $t_p = 500\mu\text{s}$ , $dv/dt = 500\text{V}/\mu\text{s}$	15 – 30	$\mu\text{s}$
<b>Blocking</b>				
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	$\text{mA}$
<b>Triggering</b>				
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	$\text{mA}$
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	$\text{mA}$
Max. DC Gate Voltage not to Trigger	$V_{GD}$	$T_J = +125^\circ\text{C}$ , Rated $V_{DRM}$ Applied	0.25	V

