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## NTE5586 Silicon Controlled Rectifier (SCR) 600V, 360 Amps, TO93

**Absolute Maximum Ratings:** ( $T_J = +125^\circ\text{C}$  unless otherwise specified)

Repetitive Peak Voltages, $V_{DRM}$ & $V_{RRM}$ .....	600V
Non-Repetitive Peak Reverse Blocking Voltage, $V_{RSM}$ .....	700V
Average On-State Current (180° Conduction, Half Sine Wave, $T_C = +85^\circ\text{C}$ ), $I_{T(AV)}$ .....	230A
RMS On-State Current ( $T_C = +78^\circ\text{C}$ ), $I_{T(RMS)}$ .....	360A
Peak Gate Power ( $t_p \leq 5\text{ms}$ ), $P_{GM}$ .....	10W
Average Gate Power ( $f = 50\text{Hz}$ , $d\% = 50$ ), $P_{G(AV)}$ .....	2W
Peak Positive Gate Current ( $t_p \leq 5\text{ms}$ ), $I_{GM}$ .....	3A
Peak Gate Voltage ( $t_p \leq 5\text{ms}$ ), $V_{GM}$	
Positive .....	20V
Negative .....	5V
Critical Rate of Rise of Off-State Voltage (To 80% $V_{DRM}$ ), $dv/dt$ .....	500V/ $\mu\text{s}$
Repetitive Peak Off-State Current (At $V_{DRM}$ ), $I_{DRM}$ .....	30mA
Repetitive Peak Reverse Current (At $V_{RRM}$ ), $I_{RRM}$ .....	30mA
On-State Voltage ( $I_{pk} = 720\text{A}$ , $t_p = 10\text{ms}$ Sine Pulse), $V_{TM}$ .....	1.55V
Holding Current ( $T_J = +25^\circ\text{C}$ , Anode Supply 12V Resistive Load), $I_H$ .....	600mA
Operating Temperature Range, $T_J$ .....	-40° to +125°C
Storage Temperature Range, $T_{stg}$ .....	-40° to +150°C
Thermal Resistance, Junction-to-Case (DC Operation), $R_{thJC}$ .....	0.10°C/W
Thermal Resistance, Case-to-Heat Sink, $R_{thCS}$	
Mounting Surface Smooth, Flat and Greased .....	0.04°C/W

**Electrical Characteristics:** ( $T_J = +125^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions			Min	Typ	Max	Unit
Peak, One-Cycle, Non-Repetitive Surge Current	$I_{TSM}$	$t = 10\text{ms}$	No Voltage Reapplied	Sinusoidal Half Wave, Initial	-	-	5700	A
		$t = 8.3\text{ms}$			-	-	5970	A
		$t = 10\text{ms}$	100% $V_{RRM}$ Applied		-	-	4800	A
		$t = 8.3\text{ms}$			-	-	5000	A
$I^2t$ for Fusing	$I^2t$	$t = 10\text{ms}$	No Voltage Reapplied	Sinusoidal Half Wave, Initial	-	-	163	$\text{KA}^2\text{s}$
		$t = 8.3\text{ms}$			-	-	148	$\text{KA}^2\text{s}$
		$t = 10\text{ms}$	100% $V_{RRM}$ Applied		-	-	115	$\text{KA}^2\text{s}$
		$t = 8.3\text{ms}$			-	-	105	$\text{KA}^2\text{s}$
$I^2\sqrt{t}$ for Fusing	$I^2\sqrt{t}$	$t = 0.1$ to $10\text{ms}$ , No Voltage Reapplied			-	-	1630	$\text{KA}^2\sqrt{\text{s}}$
Threshold Voltage, Low Level	$V_{T(TO)1}$	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$			-	0.92	-	V
Threshold Voltage, High Level	$V_{T(TO)2}$	$(I > \pi \times I_{T(AV)})$			-	0.98	-	V
On-State Slope Resistance, Low Level	$r_{t1}$	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$			-	0.88	-	$\text{m}\Omega$
On-State Slope Resistance, High Level	$r_{t2}$	$(I > \pi \times I_{T(AV)})$			-	0.81	-	$\text{m}\Omega$

**Electrical Characteristics (Cont'd):** ( $T_J = +125^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Latching Current	$I_L$	$T_J = +25^\circ\text{C}$ , Anode Supply 12V Resistive Load	-	300	1000	mA	
Non-Repetitive Rate of Rise of Turned-On Current	$di/dt$	Gate Drive 20V, $20\Omega$ , $t_r \leq 1\mu\text{s}$ , Anode Voltage $\leq 80\% V_{\text{DRM}}$	-	-	1000	A/ $\mu\text{s}$	
Delay Time	$t_d$	Gate Current 1A, $di_g/dt = 1\text{A}/\mu\text{s}$ , $V_d = 0.67\% V_{\text{DRM}}$	-	1.0	-	$\mu\text{s}$	
Turn-Off Time	$t_q$	$I_{\text{TM}} = 300\text{A}$ , $di/dt = 20\text{A}/\mu\text{s}$ , $V_R = 50\text{V}$ , $dv/dt = 20\text{V}/\mu\text{s}$ , Gate 0V $100\Omega$ $t_p = 500\mu\text{s}$	-	100	-	$\mu\text{s}$	
DC Gate Current Required to Trigger	$I_{\text{GT}}$	$T_J = -40^\circ\text{C}$	Maximum required gate trigger current/voltage is the lowest value which will trigger the unit, 12V anode-to-cathode applied.	-	180	-	mA
		$T_J = +25^\circ\text{C}$		-	90	150	mA
		$T_J = +125^\circ\text{C}$		-	40	-	mA
DC Gate Voltage Required to Trigger	$V_{\text{GT}}$	$T_J = -40^\circ\text{C}$		-	2.9	-	V
		$T_J = +25^\circ\text{C}$		-	1.8	3.0	V
		$T_J = +125^\circ\text{C}$		-	1.2	-	V
DC Gate Current not to Trigger	$I_{\text{GD}}$	Maximum gate current/voltage not to trigger is the maximum value which will not trigger the unit with rated $V_{\text{DRM}}$ anode-to-cathode applied.	-	10	-	mA	
DC Gate Voltage not to Trigger	$V_{\text{GD}}$		-	0.25	-	V	

