



**ELECTRONICS, INC.**  
 44 FARRAND STREET  
 BLOOMFIELD, NJ 07003  
 (973) 748-5089

## NTE5538 Silicon Controlled Rectifier (SCR) 800V<sub>DRM</sub>, 50A

**Description:**

The NTE5538 general purpose SCR is suited for power supplies up to 400Hz on resistive or inductive loads.

**Features:**

- Glass Passivated Chip
- High Stability and Reliability
- High Surge Capability
- High On-State Current
- Easy Mounting on Heatsink
- Isolated Package: Insulating Voltage 2500V<sub>RMS</sub>

**Absolute Maximum Ratings:**

Peak Forward Blocking Voltage ( $T_J = +125^{\circ}\text{C}$ ), $V_{\text{DRM}}$ .....	800V
Peak Reverse Blocking Voltage ( $T_J = +125^{\circ}\text{C}$ ), $V_{\text{RRM}}$ .....	800V
RMS On-State Current ( $T_C = +70^{\circ}\text{C}$ , Note 1), $I_T(\text{RMS})$ .....	50A
Average On-State Current ( $T_C = +70^{\circ}\text{C}$ , Note 1), $I_T(\text{AV})$ .....	32A
Non-Repetitive Surge Peak On-State Current ( $T_J$ initial = $+25^{\circ}\text{C}$ , Note 2), $I_{\text{TSM}}$	
( $t = 8.3\text{ms}$ ) .....	525A
( $t = 10\text{ms}$ ) .....	500A
$I^2t$ Value ( $t = 10\text{ms}$ ), $I^2t$ .....	1250A <sup>2</sup> sec
Critical Rate of Rise of On-State Current (Note 3), $di/dt$ .....	100A/ $\mu\text{s}$
Storage and Operating Junction Temperature Range, $T_{\text{stg}}$ , $T_J$ .....	$-40^{\circ}$ to $+125^{\circ}\text{C}$
Thermal Resistance	
Junction-to-Case for DC, $R_{\text{thJC}}$ .....	1 $^{\circ}\text{C}/\text{W}$
Contact (Case-to-Heatsink), $R_{\text{thCH}}$ .....	0.2 $^{\circ}\text{C}/\text{W}$

Note 1. Single phase circuit, 180° conducting angle.

Note 2. Half sine wave.

Note 3.  $I_G = 800\text{mA}$ ,  $di_G/dt = 1\text{A}/\mu\text{s}$ .

**Gate Characteristics:** (Maximum Values)

Peak Gate Power ( $t = 10\mu\text{s}$ ), $P_{\text{GM}}$ .....	50W
Average Gate Power Dissipation, $P_G(\text{AV})$ .....	1W
Peak Forward Gate Current ( $t = 10\mu\text{s}$ ), $I_{\text{FGM}}$ .....	2A
Peak Forward Gate Voltage ( $t = 10\mu\text{s}$ ), $V_{\text{FGM}}$ .....	15V
Peak Reverse Gate Voltage, $V_{\text{RGM}}$ .....	5V

**Electrical Characteristics:** ( $T_J = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Gate Trigger Current	$I_{GT}$	$V_D = 12\text{V}, R_L = 33\Omega, t_p \geq 20\mu\text{s}$	-	-	80	mA
Gate Trigger Voltage	$V_{GT}$		-	-	1.5	V
Gate Non-Trigger Voltage	$V_{GD}$	$T_J = +125^\circ\text{C}, V_D = 800\text{V}, R_L = 3.3\text{k}\Omega$	0.2	-	-	V
Holding Current	$I_H$	$I_T = 0.5\text{A}, \text{Gate Open}$	-	20	150	mA
Peak On-State Voltage	$V_{TM}$	$I_{TM} = 100\text{A}, t_p = 10\text{ms}$	-	-	1.9	V
Forward Leakage Current	$I_{DRM}$	$V_{DRM} = 800\text{V}$	-	-	0.02	mA
			$T_J = +125^\circ\text{C}$	-	-	6.0
Reverse Leakage Current	$I_{RRM}$	$V_{DRM} = 800\text{V}$	-	-	0.02	mA
			$T_J = +125^\circ\text{C}$	-	-	6.0
Total Turn-On Time	$t_{gt}$	$I_T = 80\text{A}, V_D = 800\text{V}, I_G = 200\text{mA}, di_G/dt = 0.2\text{A}/\mu\text{s}$	-	2	-	$\mu\text{s}$
Turn-Off Time	$t_q$	$T_J = +125^\circ\text{C}, I_T = 80\text{A}, V_R = 75\text{V}, V_D = 536\text{V}, di_R/dt = 30\text{A}/\mu\text{s}, dv/dt = 20\text{V}/\mu\text{s}, \text{Gate Open}$	-	100	-	$\mu\text{s}$
Critical Rate of Rise of Off-State Voltage	$dv/dt$	$T_J = +125^\circ\text{C}, V_{DRM} = 536\text{V}, \text{Gate Open}, \text{Linear Slope Up}$	500	-	-	$\text{V}/\mu\text{s}$

