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## NTE5511 thru NTE5513 Silicon Controlled Rectifier (SCR) 5 Amp

**Description:**

The NTE5511 thru NTE5513 all-diffused, three junction, silicon controlled rectifiers (SCR's) are intended for use in power-control and power-switching applications. These devices are available in a TO66 type package and have a blocking voltage capability of up to 600V and a forward current rating of 5A (rms value) at a case temperature of +75°C.

**Features:**

- Designed Especially for High-Volume Systems
- Readily Adaptable for PC Boards and Metal Heat Sinks
- Low Switching Losses
- High di/dt and dv/dt Capabilities
- Shorted Emitter Gate-Cathode Construction
- Forward and Reverse Gate Dissipation Ratings
- All-Diffused Construction Assures Exceptional Uniformity and Stability of Characteristics
- Direct-Soldered Internal Construction Assures Exceptional Resistance to Fatigue
- Symmetrical Gate-Cathode Construction Provides Uniform Current Density, Rapid Electrical Conduction, and Efficient Heat Dissipation
- All-Welded Construction and Hermetic Sealing
- Low Leakage Currents, Forward and Reverse
- Low Forward Voltage Drop at High Current Levels
- Low Thermal Resistance

**Absolute Maximum Ratings:** (For Operation with Sinusoidal AC Supply Voltage at a Frequency between 50Hz and 400Hz, and with Resistive or Inductive Load)

Transient Peak Reverse Voltage (Non-Repetitive), $V_{RM}$ (non-rep)	
NTE5511 .....	330V
NTE5512 .....	660V
NTE5513 .....	700V
Peak Reverse Voltage (Repetitive), $V_{RM}$ (rep)	
NTE5511 .....	200V
NTE5512 .....	400V
NTE5513 .....	600V
Peak Forward Blocking Voltage (Repetitive), $V_{FBOM}$ (rep)	
NTE5511 .....	600V
NTE5512 .....	600V
NTE5513 .....	700V
Average DC Forward Current, $I_{F(av)}$ ( $T_C = +75^\circ\text{C}$ mounted on heat sink, conduction angle or $180^\circ$ )	
	3.2A
RMS Forward Current ( $T_C = +75^\circ\text{C}$ mounted on heat sink), $I_{FRMS}$	
	5A
Peak Surge Current (For one cycle of applied voltage), $i_{FM(surge)}$	
	60A
Sub-Cycle Surge (Non-Repetitive, for a period of 1ms to 8.3ms), $I^2t$	
	15A <sup>2</sup> sec
Rate of Change of Forward Current (Note 1), di/dt	
	200A/ $\mu$ s
Gate Power (Peak, Forward, or Reverse, for 10 $\mu$ s duration, Note 2), $P_{GM}$	
	13W
Average Gate Power (Note 2), $P_{GAV}$	
	500mW
Operating Case Temperature Range, $T_C$	
	-40° to +100°C
Storage Temperature Range, $T_{stg}$	
	-40° to +125°C

Note 1.  $V_{FB} = V_{BOO}$ (min value),  $I_{GT} = 200\text{mA}$ ,  $0.5\mu\text{s}$  rise time  
 Note 2. Any values of peak gate current or peak gate voltage to give the maximum gate power is permissible.

**Electrical Characteristics:** (At Maximum Ratings,  $T_C = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Forward Breakover Voltage NTE5511	$V_{BOO}$	$T_C = +100^\circ\text{C}$	200	–	–	V	
NTE5512			400	–	–	V	
NTE5513			600	–	–	V	
Peak Blocking Forward Current NTE5511	$I_{FBOM}$	$V_{FBO} = 200\text{V}$	$T_C = +100^\circ\text{C}$	–	0.10	1.5	mA
NTE5512		$V_{FBO} = 400\text{V}$		–	0.20	3.0	mA
NTE5513		$V_{FBO} = 600\text{V}$		–	0.40	4.0	mA
Peak Blocking Reverse Current NTE5511	$I_{RBOM}$	$V_{RBO} = 200\text{V}$	$T_C = +100^\circ\text{C}$	–	0.05	0.75	mA
NTE5512		$V_{RBO} = 400\text{V}$		–	0.10	1.5	mA
NTE5513		$V_{RBO} = 600\text{V}$		–	0.20	2.0	mA
Forward Voltage Drop	$V_F$	$I_F = 30\text{A}$	–	2.15	2.80	V	
DC Gate–Trigger Current	$I_{GT}$		–	8	15	mA	
DC Gate–Trigger Voltage	$V_{GT}$		–	1.2	2.0	V	
Holding Current	$I_{Hold}$		–	10	20	mA	
Critical Rate of Applied Forward Voltage	$dv/dt$	$V_{FB} = v_{BOO}$ (min), exponential rise, $T_C = +100^\circ\text{C}$	10	200	–	V/ $\mu\text{s}$	
Turn–On Time (Delay Time + Rise Time)	$t_{on}$	$V_{FB} = v_{BOO}$ (min), $i_F = 4.5\text{A}$ , $I_{GT} = 200\text{mA}$ , $0.1\mu\text{s}$ rise time	0.75	1.5	–	$\mu\text{s}$	
Turn–Off Time (Reverse Recovery Time + Gate Recovery Time)	$t_{off}$	$i_F = 2\text{A}$ , $50\mu\text{s}$ pulse width, $dv_{FB}/dt = 20\text{V}/\mu\text{s}$ , $di_r/dt = 30\text{A}/\mu\text{s}$ , $I_{GT} = 200\text{mA}$ , $T_C = +75^\circ\text{C}$	–	15	50	$\mu\text{s}$	
Thermal Resistance, Junction–to–Case	$R_{\theta JC}$		–	–	4	$^\circ\text{C}/\text{W}$	

