



## NTE5411 thru NTE5416 Silicon Controlled Rectifier (SCR) 4 Amp, Sensitive Gate

**Description:**

The NTE5411 through NTE5416 are PNP silicon controlled rectifier (SCR) devices designed for high volume consumer applications such as temperature, light, and speed control: process and remote control, and warning systems where reliability of operation is important.

**Features:**

- Passivated Surface for Reliability and Uniformity
- Power Rated at Economical Prices
- Practical Level Triggering and Holding Characteristics

**Absolute Maximum Ratings:** ( $T_C = +110^\circ\text{C}$  unless otherwise specified)

Repetitive Peak Forward and Reverse Blocking Voltage,  $V_{DRM}$ ,  $V_{RRM}$   
(1/2 Sine Wave,  $R_{GK} = 1000\Omega$ ,  $T_C = -40^\circ$  to  $+110^\circ\text{C}$ , Note 1)

NTE5411	30V
NTE5412	60V
NTE5413	100V
NTE5414	200V
NTE5415	400V
NTE5416	600V

Non-Repetitive Peak Reverse Blocking Voltage,  $V_{RSM}$   
(1/2 Sine Wave,  $R_{GK} = 1000\Omega$ ,  $T_C = -40^\circ$  to  $+110^\circ\text{C}$ )

NTE5411	100V
NTE5412	100V
NTE5413	150V
NTE5414	250V
NTE5415	450V
NTE5416	650V

Average On-State Current,  $I_{T(AV)}$

$T_C = -40^\circ$ to $+110^\circ\text{C}$	2.6A
$T_C = +100^\circ\text{C}$	1.6A

Surge On-State Current ( $T_C = +90^\circ\text{C}$ ),  $I_{TSM}$

1/2 Sine wave, 60Hz	25A
1/2 Sine wave, 1.5ms	35A

Circuit Fusing ( $t = 8.3\text{ms}$ ),  $I^2t$  . . . . . 2.6A<sup>2</sup>s

Peak Gate Power (Pulse Width = 10 $\mu$ s,  $T_C = +90^\circ\text{C}$ ),  $P_{GM}$  . . . . . 0.5W

Note 1. Ratings apply for zero or negative gate voltage. Devices shall not have a positive bias applied to the gate concurrently with a negative potential on the anode. Devices should not be tested with a constant current source for forward or reverse blocking capability such that the voltage applied exceeds the rated blocking voltage.

**Absolute Maximum Ratings (Cont'd):** ( $T_C = +110^\circ\text{C}$  unless otherwise specified)

Average Gate Power ( $t = 8.2\text{ms}$ , $T_C = +90^\circ\text{C}$ ), $P_{G(AV)}$ .....	0.1W
Peak Forward Gate Current, $I_{GM}$ .....	0.2A
Peak Reverse Gate Voltage, $V_{RGM}$ .....	6V
Operating Junction Temperature Range, $T_J$ .....	$-40^\circ$ to $+110^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-40^\circ$ to $+150^\circ\text{C}$
Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	$3^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....	$75^\circ\text{C/W}$
Mounting Torque (Note 2) .....	6 in. lb.

Note 2. Torque rating applies with the use of a compression washer. Mounting torque in excess of 6 in. lb. does not appreciably lower case-to-sink thermal resistance. Anode lead and heat-sink contact pad are common.

**Electrical Characteristics:** ( $T_C = +25^\circ\text{C}$ ,  $R_{GK} = 1000\Omega$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Peak Forward or Reverse Blocking Current	$I_{DRM}$ , $I_{RRM}$	Rated $V_{DRM}$ or $V_{RRM}$ , $T_C = +25^\circ\text{C}$	–	–	10	$\mu\text{A}$
		Rated $V_{DRM}$ or $V_{RRM}$ , $T_C = +110^\circ\text{C}$	–	–	200	$\mu\text{A}$
Peak Forward “ON” Voltage	$V_{TM}$	$I_{TM} = 8.2\text{A}$ Peak, Note 3	–	–	2.2	V
Gate Trigger Current (Continuous DC, Note 4)	$I_{GT}$	$V_{AK} = 12\text{V}$ , $R_L = 24\Omega$	–	–	200	$\mu\text{A}$
		$V_{AK} = 12\text{V}$ , $R_L = 24\Omega$ , $T_C = -40^\circ\text{C}$	–	–	500	$\mu\text{A}$
Gate Trigger Voltage (Continuous DC)	$V_{GT}$	Source Voltage = $12\text{V}$ , $R_S = 50\Omega$ , $V_{AK} = 12\text{V}$ , $R_L = 24\Omega$ , $T_C = -40^\circ\text{C}$	–	–	1	V
Gate Non-Trigger Voltage	$V_{GD}$	$V_{AK} = \text{Rated } V_{DRM}$ , $R_L = 100\Omega$ , $T_C = +110^\circ\text{C}$	0.2	–	–	V
Holding Current	$I_H$	$V_{AK} = 12\text{V}$ , $I_{GT} = 2\text{mA}$ , $T_C = +25^\circ\text{C}$	–	–	5	mA
		Initiating On-State Current = $200\text{mA}$ , $T_C = -40^\circ\text{C}$	–	–	10	mA
Total Turn-On Time	$t_{gt}$	Source Voltage = $12\text{V}$ , $R_S = 6\text{k}\Omega$ , $I_{TM} = 8.2\text{A}$ , $I_{GT} = 2\text{mA}$ , Rated $V_{DRM}$ , Rise Time = $20\text{ns}$ , Pulse Width = $10\mu\text{s}$	–	2	–	$\mu\text{s}$
Forward Voltage Application Rate	$dv/dt$	$V_D = \text{Rated } V_{DRM}$ , $T_C = +110^\circ\text{C}$	–	10	–	$\text{V}/\mu\text{s}$

Note 3. Pulse Width = 1ms to 2ms, Duty Cycle = 2%.

Note 4. Measurement does not include  $R_{GK}$  current.

