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## NTE5411 thru NTE5416 Silicon Controlled Rectifier (SCR) 4 Amp, Sensitive Gate, TO126

**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 ( $t = 8.3\text{ms}$ ),  $I^2t$  .....

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

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.                           |

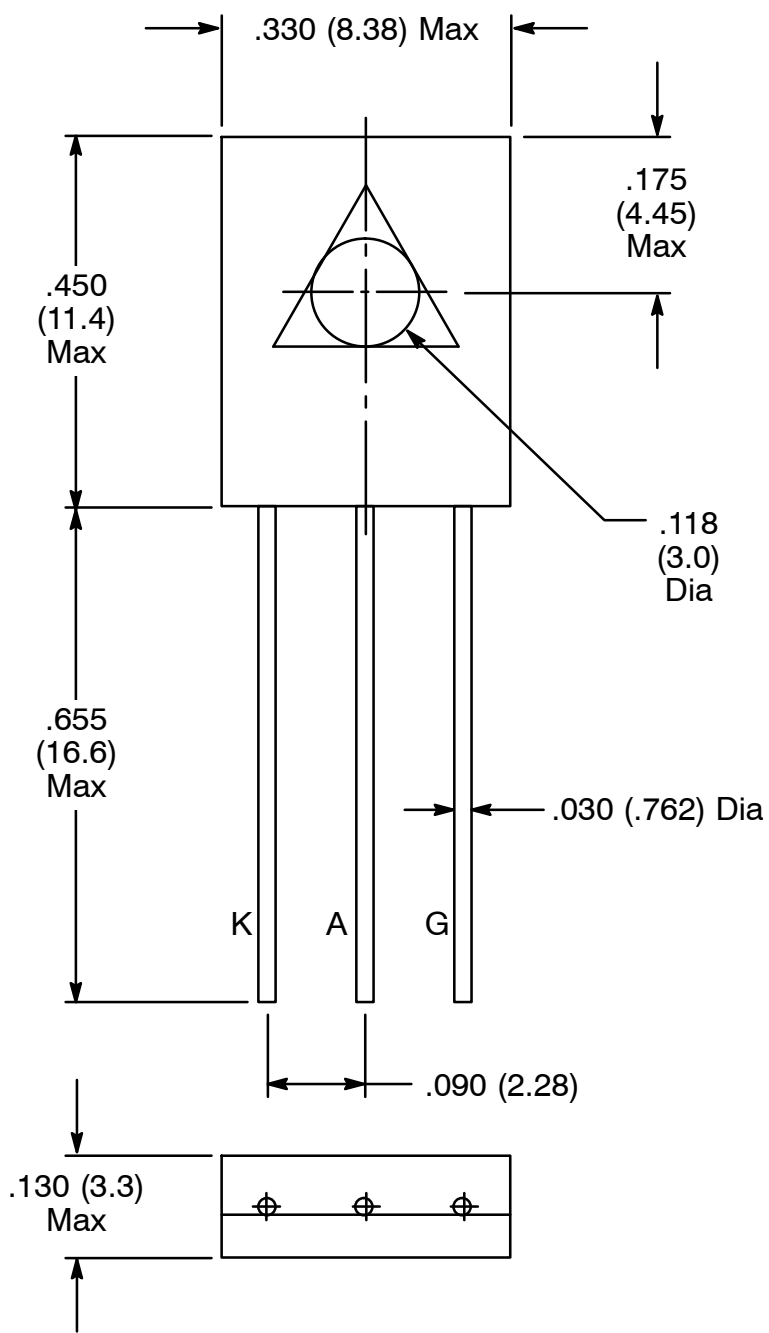
Note 2. Torque rating applies with the use of a compression washer. Mounting torque in excess of 6 in. lb. does not appreciably lower case-to-sink thermal resistance. Anode lead and heat-sink contact pad are common.

**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     | $I_{DRM}$ ,<br>$I_{RRM}$ | 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 = 12V, $R_S = 50\Omega$ ,<br>$V_{AK} = 12\text{V}$ , $R_L = 24\Omega$ , $T_C = -40^\circ\text{C}$  | -   | -   | 1   | V                |
| Gate Non-Trigger Voltage                     | $V_{GD}$                 | $V_{AK} = \text{Rated } V_{DRM}$ , $R_L = 100\Omega$ ,<br>$T_C = +110^\circ\text{C}$  | 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 = 200mA,<br>$T_C = -40^\circ\text{C}$   | -   | -   | 10  | mA               |
| Total Turn-On Time                           | $t_{gt}$                 | Source Voltage = 12V, $R_S = 6\text{k}\Omega$ ,<br>$I_{TM} = 8.2\text{A}$ , $I_{GT} = 2\text{mA}$ , Rated $V_{DRM}$ ,<br>Rise Time = 20ns, 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  | -   | V/ $\mu\text{s}$ |

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

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



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