NTE5442 thru NTE5448
Silicon Controlled Rectifier (SCR)
8 Amp, TO127

Description:
The NTE5442 thru NTE5448 are silicon controlled rectifiers (SCR's) in a TO127 type package designed for high-volume consumer phase-control applications such as motor speed, temperature, and light controls, and for fast switching applications in ignition and starting systems, voltage regulators, vending machines, and lamp drivers.

Features:
- Small, Rugged Construction
- Practical Level Triggering and Holding Characteristics @ +25°C:
  \[ I_{GT} = 7\text{mA Typ} \]
  \[ I_{Hold} = 6\text{mA Typ} \]
- Low "ON" Voltage: \[ V_{TM} = 1\text{V Typ} @ 5\text{A} @ +25°C \]
- High Surge Current Rating: \[ I_{TSM} = 80\text{A} \]

Absolute Maximum Ratings: (Note 1, \( T_J = +100°C \) unless otherwise specified)
- Peak Repetitive Forward and Reverse Blocking Voltage (Note 2), \( V_{DRM} \) or \( V_{RRM} \)
  - NTE5442 ................................................................. 50V
  - NTE5444 .................................................................. 200V
  - NTE5446 .................................................................. 400V
  - NTE5448 .................................................................. 600V
- Non-Repetitive Peak Reverse Blocking Voltage (\( t = 5\text{ms (max)} \) duration), \( V_{RSM} \)
  - NTE5442 ................................................................. 75V
  - NTE5444 .................................................................. 300V
  - NTE5446 .................................................................. 500V
  - NTE5448 .................................................................. 700V
- RMS On-State Current (All Conduction Angles), \( I_{T(RMS)} \) .......................................................... 8A
- Average On-State Current (\( T_C = +73°C \)), \( I_{T(AV)} \) ................................................................. 5.1A
- Peak Non-Repetitive Surge Current, \( I_{TSM} \)
  (1/2 cycle, 60Hz preceded and followed by rated current and voltage) ........................................... 80A
- Circuit Fusing (\( T_J = -40° \) to +100°C, \( t = 1\text{ms to 8.3ms} \), \( I^2t \) .................................................. 25A^2sec
- Peak Gate Power, \( P_{GM} \) ........................................................................................................... 5W
- Average Gate Power, \( P_{G(AV)} \) .................................................................................................. 500mW
- Peak Forward Gate Current, \( I_{GM} \) ......................................................................................... 2A
- Peak Reverse Gate Voltage, \( V_{RGM} \) ....................................................................................... 10V
- Operating Junction Temperature Range, \( T_J \) ................................................................. \(-40° \) to +100°C
- Storage Temperature Range, \( T_{stg} \) ...................................................................................... \(-40° \) to +150°C
- Maximum Thermal Resistance, Junction–to–Case, \( R_{thJC} \) ........................................................ 2.5°C/W
- Typical Thermal Resistance, Junction–to–Ambient, \( R_{thJA} \) .................................................. 40°C/W

Note 1. NTE5446 is a discontinued device and is replaced by NTE5448.
Note 2. Ratings apply for zero or negative gate voltage but positive gate voltage shall not be applied concurrently with a negative potential on the anode. When checking forward or reverse blocking capability, thyristor devices should not be tested with a constant current source in a manner that the voltage applied exceeds the rated blocking voltage.
**Electrical Characteristics:** \( T_C = +25\degree C \) unless otherwise specified

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Forward or Reverse Blocking Current</td>
<td>( I_{DRM}, I_{RRM} )</td>
<td>Rated ( V_{DRM} ) or ( V_{RRM} ), Gate Open</td>
<td>( T_J = +25\degree C )</td>
<td>–</td>
<td>–</td>
<td>10  μA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( T_J = +100\degree C )</td>
<td>–</td>
<td>–</td>
<td>2   mA</td>
</tr>
<tr>
<td>Gate Trigger Current (Continuous DC)</td>
<td>( I_{GT} )</td>
<td>( V_D = 7V, R_L = 100\Omega )</td>
<td>( T_C = +25\degree C )</td>
<td>–</td>
<td>7</td>
<td>30  mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( T_C = -40\degree C )</td>
<td>–</td>
<td>–</td>
<td>60  mA</td>
</tr>
<tr>
<td>Gate Trigger Voltage (Continuous DC)</td>
<td>( V_{GT} )</td>
<td>( V_D = 7V, R_L = 100\Omega )</td>
<td>( T_C = +25\degree C )</td>
<td>–</td>
<td>0.75</td>
<td>1.5  V</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>( T_C = -40\degree C )</td>
<td>–</td>
<td>–</td>
<td>2.5  V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_D = \text{Rated } V_{DRM}, R_L = 100\Omega, T_J = +100\degree C )</td>
<td></td>
<td>0.2</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Peak On–State Voltage</td>
<td>( V_{TM} )</td>
<td>Pulse Width = 1ms to 2 ms, Duty Cycle ( \leq 2% )</td>
<td>( I_{TM} = 5A_{\text{peak}} )</td>
<td>–</td>
<td>1.0</td>
<td>1.5  V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( I_{TM} = 15.7A_{\text{peak}} )</td>
<td>–</td>
<td>–</td>
<td>2.0  V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_D = \text{Rated } V_{DRM}, R_L = 100\Omega, T_J = +100\degree C )</td>
<td></td>
<td>0.2</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Holding Current</td>
<td>( I_{Hold} )</td>
<td>( V_D = 7V, \text{Gate Open} )</td>
<td>( T_C = +25\degree C )</td>
<td>–</td>
<td>6</td>
<td>40  mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( T_C = -40\degree C )</td>
<td>–</td>
<td>–</td>
<td>70  mA</td>
</tr>
<tr>
<td>Gate Controlled Turn–On Time</td>
<td>( t_{gt} )</td>
<td>( I_{TM} = 5A, I_{GT} = 20mA, V_D = \text{Rated } V_{DRM} )</td>
<td></td>
<td>–</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Circuit Commutated Turn–Off Time</td>
<td>( t_q )</td>
<td>( I_{TM} = 5A, I_R = 5A )</td>
<td>( T_J = +100\degree C )</td>
<td>–</td>
<td>15</td>
<td>–</td>
</tr>
<tr>
<td>Critical Rate–of–Rise of Off–State Voltage</td>
<td>( dv/dt )</td>
<td>( V_D = \text{Rated } V_{DRM}, \text{Exponential Waveform, } T_J = +100\degree C, \text{Gate Open} )</td>
<td></td>
<td>–</td>
<td>50</td>
<td>–</td>
</tr>
</tbody>
</table>

![Diagram](image_url)

- Heat Sink Contact Area (Bottom): .150 (3.82) Max
- A (Heat Sink Area): .166 (4.23) Max
- .143 (3.65) Dia Thru
- .668 (17.0) Max
- .530 (13.4) Max
- .655 (16.6) Max
- .150 (4.23) Max