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## NTE5381 Silicon Controlled Rectifier (SCR) for High Speed Switching, 1200V, 400 Amp, TO200AB

**Features:**

- High di/dt with Soft Gate Control
- High Frequency Operation
- Low Dynamic Forward Voltage Drop
- Low Switching Losses at High Frequency

**Applications:**

- Inverters for UPS, Induction Heating, and Motor Control
- Choppers
- Crowbars

**Voltage: Blocking State Maximums** ( $T_J = +125^\circ\text{C}$ , Note 1 unless otherwise specified)

|   |       |
|---|-------|
| Repetitive Peak Forward Blocking Voltage, $V_{DRM}$ .....                           | 1200V |
| Repetitive Peak Reverse Voltage, $V_{RRM}$ .....                                    | 1200V |
| Non-Repetitive Transient Peak Reverse Voltage ( $t \leq 5.0$ msec), $V_{RSM}$ ..... | 1300V |
| Peak Forward Leakage Current, $I_{DRM}$ .....                                       | 25mA  |
| Peak Reverse Leakage Current, $I_{RRM}$ .....                                       | 25mA  |

**Current: Conducting State Maximums** ( $T_J = +125^\circ\text{C}$  unless otherwise specified)

|  |                          |
|--|--------------------------|
| RMS Forward Current, $I_{T(RMS)}$ .....  | 400A                     |
| Average Forward Current, $I_{T(AV)}$ .....   | 250A                     |
| One-Half Cycle Surge Current, $I_{TSM}$ .....  | 4500A                    |
| $I^2t$ for Fusing (for times $\geq 8.3$ ms), $I^2t$ .....                            | 84,000A <sup>2</sup> sec |
| Forward Voltage Drop ( $I_{TM} = 625$ A, $T_J = +25^\circ\text{C}$ ), $V_{TM}$ ..... | 1.85V                    |
| Minimum Repetitive Rate of Rise of Turned-On Current (Note 2), di/dt .....           | 300A/ $\mu$ s            |

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

|   |                  |
|---|------------------|
| Maximum Turn-Off Time, $t_q$<br>( $I_T = 150$ A, $di_R/dt = 12.5$ A/ $\mu$ s, Reapplied $dv/dt = 20$ V/ $\mu$ s. Linear to $0.8V_{DRM}$ ) ... | 10 to 50 $\mu$ s |
| Typical Turn-On Time ( $I_T = 100$ A, $V_D = 100$ V, Note 2), $t_{on}$ .....  | 3.5 $\mu$ s      |
| Minimum Critical Rate of Rise of Off-State Voltage, $dv/dt$<br>(Exponential to $V_{DRM}$ , $T_J = +125^\circ\text{C}$ ) .....                 | 300V/ $\mu$ s    |
| Minimum Rate of Rise of Turned-On Current (Note 2), di/dt .....   | 800A/ $\mu$ s    |

Note 1. Applies for zero or negative gate bias.

Note 2. With recommended gate drive.

**Gate: Maximum Parameters** ( $T_J = +25^\circ\text{C}$  unless otherwise specified)

|  |       |
|--|-------|
| Gate Current to Trigger ( $V_D = 12\text{V}$ ), $I_{GT}$ .....   | 150mA |
| Gate Voltage to Trigger ( $V_D = 12\text{V}$ ), $V_{GT}$ .....   | 3V    |
| Non-Triggering Gate Voltage ( $V_{DRM} = \text{Rated Voltage}$ , $T_J = +125^\circ\text{C}$ ), $V_{GDM}$ ..... | 0.15V |
| Peak Forward Gate Current, $I_{GTM}$ .....   | 4A    |
| Peak Reverse Gate Voltage, $V_{GRM}$ .....   | 5V    |
| Peak Gate Power, $P_{GM}$ .....  | 16W   |
| Average Gate Power, $P_{G(AV)}$ .....  | 3W    |

**Thermal and Mechanical:**

|  |                                     |
|--|-------------------------------------|
| Maximum Operating Temperature Range, $T_J$ .....   | $-40^\circ$ to $+125^\circ\text{C}$ |
| Storage Temperature Range, $T_{stg}$ .....   | $-40^\circ$ to $+150^\circ\text{C}$ |
| Max Thermal Resistance, Junction-to-Heatsink (Double Side Cooled), $R_{thJC}$ .....      | $0.08^\circ\text{C/W}$              |
| Max Thermal Resistance, Case-to-Heatsink (Double Side Cooled, Lubricated), $R_{thCS}$ .. | $0.02^\circ\text{C/W}$              |
| Mounting Torque Range, F .....   | 1000 to 1400lb.                     |

