

**RoHS Qxx25xx & Qxx25xHx Series**



**Agency Approval**

| Agency | Agency File Number                                   |
|--------|------------------------------------------------------|
|        | TO-220L, TO-218K, TO-218J & Fastpak Packages: E71639 |

**Main Features**

| Symbol            | Value    | Unit |
|-------------------|----------|------|
| $I_{T(RMS)}$      | 25       | A    |
| $V_{DRM}/V_{RRM}$ | 1000     | V    |
| $I_{GT}$          | 50 to 80 | mA   |

**Schematic Symbol**



**Description**

25 Amp bi-directional solid state switch series is designed for AC switching and phase control applications such as motor speed and temperature modulation controls, lighting controls, and static switching relays.

Standard type devices normally operate in Quadrants I & III triggered from AC line.

Alternistor type devices only operate in quadrants I, II, & III and are used in circuits requiring high dv/dt capability.

**Features & Benefits**

- RoHS compliant
- Glass – passivated junctions
- Voltage capability up to 1000 V
- Surge capability up to 250 A

**Applications**

Excellent for AC switching and phase control applications such as heating, lighting, and motor speed controls.

Typical applications are AC solid-state switches, industrial power tools, exercise equipment, white goods and commercial appliances.

Alternistor Triacs (no snubber required) are used in applications with extremely inductive loads requiring highest commutation performance.

Internally constructed isolated packages are offered for ease of heat sinking with highest isolation voltage.

### Absolute Maximum Ratings – Standard Triac

| Symbol       | Parameter                                 | Test Conditions                              |                                                                                  | Value      | Unit                   |
|--------------|-------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------|------------|------------------------|
| $I_{T(RMS)}$ | RMS on-state current                      | Qxx25R5<br>Qxx25N5                           | $T_c = 85^{\circ}\text{C}$                                                       | 25         | A                      |
|              |                                           | Qxx25P5                                      | $T_c = 57^{\circ}\text{C}$                                                       |            |                        |
| $I_{TSM}$    | Peak non-repetitive surge current         | Qxx25R5<br>Qxx25N5                           | single half cycle; $f = 50\text{Hz}$ ;<br>$T_J$ (initial) = $25^{\circ}\text{C}$ | 167        | A                      |
|              |                                           |                                              | single half cycle; $f = 60\text{Hz}$ ;<br>$T_J$ (initial) = $25^{\circ}\text{C}$ | 200        |                        |
|              |                                           | Qxx25P5                                      | single half cycle; $f = 50\text{Hz}$ ;<br>$T_J$ (initial) = $25^{\circ}\text{C}$ | 220        |                        |
|              |                                           |                                              | single half cycle; $f = 60\text{Hz}$ ;<br>$T_J$ (initial) = $25^{\circ}\text{C}$ | 250        |                        |
| $I^2t$       | $I^2t$ Value for fusing                   | Qxx25R5<br>Qxx25N5                           | $t_p = 8.3\text{ms}$                                                             | 166        | $\text{A}^2\text{s}$   |
|              |                                           | Qxx25P5                                      |                                                                                  | 260        |                        |
| $di/dt$      | Critical rate-of-rise of on-state current | $f = 60\text{Hz}; T_J = 125^{\circ}\text{C}$ |                                                                                  | 100        | $\text{A}/\mu\text{s}$ |
| $I_{GTM}$    | Peak gate current                         | $T_J = 125^{\circ}\text{C}$                  |                                                                                  | 2          | A                      |
| $P_{G(AV)}$  | Average gate power dissipation            | $T_J = 125^{\circ}\text{C}$                  |                                                                                  | 0.5        | W                      |
| $T_{stg}$    | Storage temperature range                 |                                              |                                                                                  | -40 to 125 | $^{\circ}\text{C}$     |
| $T_J$        | Operating junction temperature range      | Qxx25R5<br>Qxx25N5                           |                                                                                  | -40 to 125 | $^{\circ}\text{C}$     |
|              |                                           | Qxx25P5                                      |                                                                                  | -25 to 125 |                        |

### Absolute Maximum Ratings – Alternistor Triac

| Symbol       | Parameter                                 | Test Conditions                                                                       |                            | Value      | Unit                   |
|--------------|-------------------------------------------|---------------------------------------------------------------------------------------|----------------------------|------------|------------------------|
| $I_{T(RMS)}$ | RMS on-state current                      | Qxx25LH5<br>Qxx25L6                                                                   | $T_C = 65^{\circ}\text{C}$ | 25         | A                      |
|              |                                           | Qxx25K6<br>Qxx25J6                                                                    | $T_C = 85^{\circ}\text{C}$ |            |                        |
|              |                                           | Qxx25RH5<br>Qxx25NH5<br>Qxx25R6<br>Qxx25NH6                                           | $T_C = 95^{\circ}\text{C}$ |            |                        |
| $I_{TSM}$    | Peak non-repetitive surge current         | single half cycle; $f = 50\text{Hz}$ ;<br>$T_J (\text{initial}) = 25^{\circ}\text{C}$ |                            | 208        | A                      |
|              |                                           | single half cycle; $f = 60\text{Hz}$ ;<br>$T_J (\text{initial}) = 25^{\circ}\text{C}$ |                            | 250        |                        |
| $I^2t$       | $I^2t$ Value for fusing                   | $t_p = 8.3\text{ms}$                                                                  |                            | 260        | $\text{A}^2\text{s}$   |
| $di/dt$      | Critical rate-of-rise of on-state current | $f = 60\text{Hz}; T_J = 125^{\circ}\text{C}$                                          |                            | 100        | $\text{A}/\mu\text{s}$ |
| $I_{GTM}$    | Peak gate current                         | $T_J = 125^{\circ}\text{C}$                                                           |                            | 2          | A                      |
| $P_{G(AV)}$  | Average gate power dissipation            | $T_J = 125^{\circ}\text{C}$                                                           |                            | 0.5        | W                      |
| $T_{stg}$    | Storage temperature range                 |                                                                                       |                            | -40 to 125 | $^{\circ}\text{C}$     |
| $T_J$        | Operating junction temperature range      |                                                                                       |                            | -40 to 125 | $^{\circ}\text{C}$     |

Note: xx = voltage

**Electrical Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified) — Standard Triac**

| Symbol          | Test Conditions                                                                      | Quadrant     |      | Value              |         | Unit |
|-----------------|--------------------------------------------------------------------------------------|--------------|------|--------------------|---------|------|
|                 |                                                                                      |              |      | Qxx25R5<br>Qxx25N5 | Qxx25P5 |      |
| I <sub>GT</sub> | V <sub>D</sub> = 12V; R <sub>L</sub> = 60 Ω                                          | I – II – III | MAX. | 50                 |         | mA   |
|                 |                                                                                      | IV           | TYP. | 120                |         |      |
| V <sub>GT</sub> |                                                                                      | I – II – III | MAX. | 1.3                |         | V    |
|                 |                                                                                      | IV           | TYP. | 2.5                |         |      |
| V <sub>GD</sub> | V <sub>D</sub> = V <sub>DRM</sub> ; R <sub>L</sub> = 3.3 kΩ ; T <sub>J</sub> = 125°C | ALL          | MIN. | 0.2                |         | V    |
| I <sub>H</sub>  | I <sub>T</sub> = 400mA (initial)                                                     |              | MAX. | 100                | 50      | mA   |
| dv/dt           | V <sub>D</sub> = V <sub>DRM</sub> ; Gate Open; T <sub>J</sub> = 125°C                | 400V         | MIN. | 275                | —       | V/μs |
|                 |                                                                                      | 600V         |      | 225                | 475     |      |
|                 |                                                                                      | 800V         |      | 200                | 400     |      |
|                 | V <sub>D</sub> = V <sub>DRM</sub> ; Gate Open; T <sub>J</sub> = 100°C                | 1000V        |      | 200                | —       |      |
| (dv/dt)c        | (di/dt)c = 13.3 A/ms; T <sub>J</sub> = 125°C                                         |              | MIN. | 5                  |         | V/μs |
| t <sub>gt</sub> | I <sub>G</sub> = 2 × I <sub>GT</sub> ; PW = 15μs; I <sub>T</sub> = 35.4 A            |              | TYP. | 4                  | 3       | μs   |

**Electrical Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified) — Alternistor Triac**

| Symbol     | Test Conditions                                                     | Quadrant     |      | Value                            |                                                      | Unit             |
|------------|---------------------------------------------------------------------|--------------|------|----------------------------------|------------------------------------------------------|------------------|
|            |                                                                     |              |      | Qxx25RH5<br>Qxx25LH5<br>Qxx25NH5 | Qxx25R6<br>Qxx25L6<br>Qxx25NH6<br>Qxx25K6<br>Qxx25J6 |                  |
| $I_{GT}$   | $V_D = 12\text{V}; R_L = 60\ \Omega$                                | I – II – III | MAX. | 50                               | 80                                                   | mA               |
| $V_{GT}$   |                                                                     | I – II – III | MAX. | 1.3                              |                                                      | V                |
| $V_{GD}$   | $V_D = V_{DRM}; R_L = 3.3\ \text{k}\Omega; T_J = 125^\circ\text{C}$ | I – II – III | MIN. | 0.2                              |                                                      | V                |
| $I_H$      | $I_T = 400\text{mA}$ (initial)                                      |              | MAX. | 50                               | 100                                                  | mA               |
| $dv/dt$    | $V_D = V_{DRM};$ Gate Open; $T_J = 125^\circ\text{C}$               | 400V         | MIN. | 575                              | 600                                                  | V/ $\mu\text{s}$ |
|            |                                                                     | 600V         |      | 500                              | 600                                                  |                  |
|            |                                                                     | 800V         |      | 400                              | 475                                                  |                  |
|            | $V_D = V_{DRM};$ Gate Open; $T_J = 100^\circ\text{C}$               | 1000V        |      | —                                | 400                                                  |                  |
| $(dv/dt)c$ | $(di/dt)c = 13.3\ \text{A/ms}; T_J = 125^\circ\text{C}$             |              | MIN. | 20                               | 30                                                   | V/ $\mu\text{s}$ |
| $t_{gt}$   | $I_G = 2 \times I_{GT}; PW = 15\ \mu\text{s}; I_T = 35.4\ \text{A}$ |              | TYP. | 3                                | 5                                                    | $\mu\text{s}$    |

**Static Characteristics**

| Symbol            | Test Conditions                              |                           |            |      | Value                                                 |         | Unit          |
|-------------------|----------------------------------------------|---------------------------|------------|------|-------------------------------------------------------|---------|---------------|
|                   |                                              |                           |            |      | Qxx25R5<br>Qxx25N5<br>Qxx25xH5<br>Qxx25x6<br>Qxx25NH6 | Qxx25P5 |               |
| $V_{TM}$          | $I_T = 35.4\text{A}; t_p = 380\ \mu\text{s}$ |                           |            | MAX. | 1.8                                                   | 1.4     | V             |
| $I_{DRM}/I_{RRM}$ | $V_{DRM}/V_{RRM}$                            | $T_J = 25^\circ\text{C}$  | 600 – 800V | MAX. | 10                                                    | 100     | $\mu\text{A}$ |
|                   |                                              |                           | 1000V      |      | 20                                                    | —       |               |
|                   |                                              | $T_J = 100^\circ\text{C}$ | 600 – 800V |      | 500                                                   | —       |               |
|                   |                                              |                           | 1000V      |      | 1000                                                  | —       |               |
|                   |                                              | $T_J = 125^\circ\text{C}$ | 600 – 800V |      | 2000                                                  | 5000    |               |
|                   |                                              |                           |            |      |                                                       |         |               |

Note: xx = voltage, x = package

### Thermal Resistances

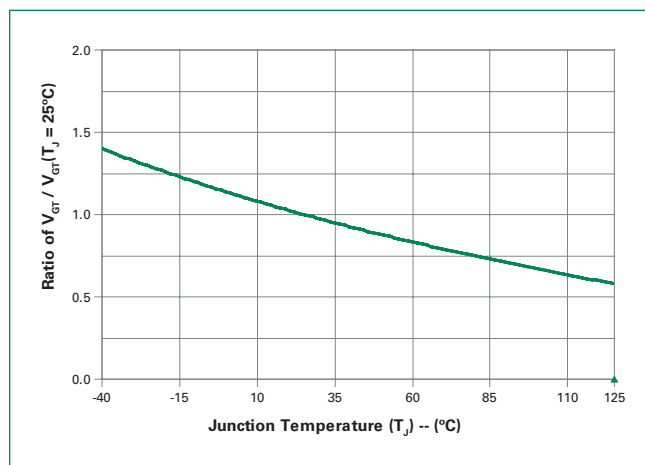
| Symbol            | Parameter             |                                                                | Value | Unit |
|-------------------|-----------------------|----------------------------------------------------------------|-------|------|
| $R_{\theta(J-C)}$ | Junction to case (AC) | Qxx25R5 / Qxx25N5<br>Qxx25R6 / Qxx25NH6<br>Qxx25RH5 / Qxx25NH5 | 0.89  | °C/W |
|                   |                       | Qxx25P5                                                        | 1.6   |      |
|                   |                       | Qxx25L6 / Qxx25LH5                                             | 2.0   |      |
|                   |                       | Qxx25K6 / Qxx25J6                                              | 1.32  |      |
| $R_{\theta(J-A)}$ | Junction to ambient   | Qxx25Ry                                                        | 45    | °C/W |
|                   |                       | Qxx25L6 / Qxx25LH5                                             | 50    |      |

Note: xx = voltage, y = sensitivity

**Figure 1: Normalized DC Gate Trigger Current vs. Junction Temperature**



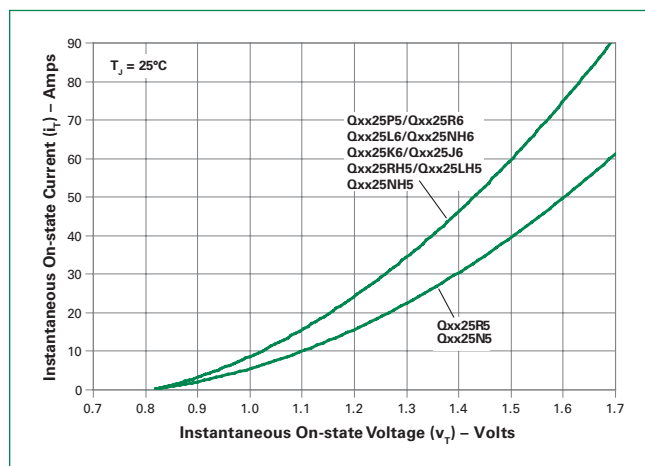
**Figure 2: Normalized DC Gate Trigger Voltage vs. Junction Temperature**



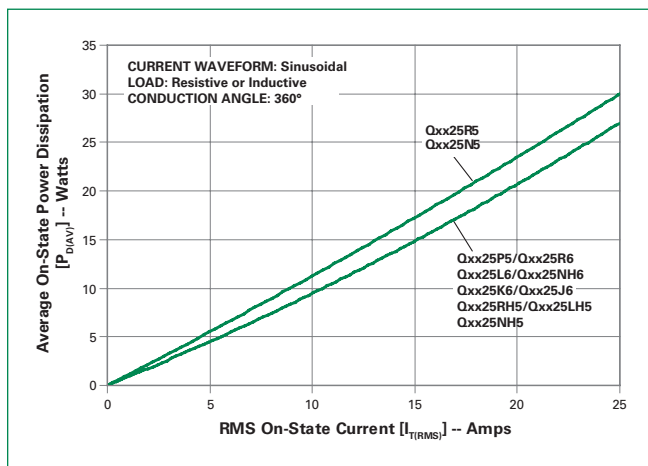
**Figure 3: Normalized DC Holding Current vs. Junction Temperature**



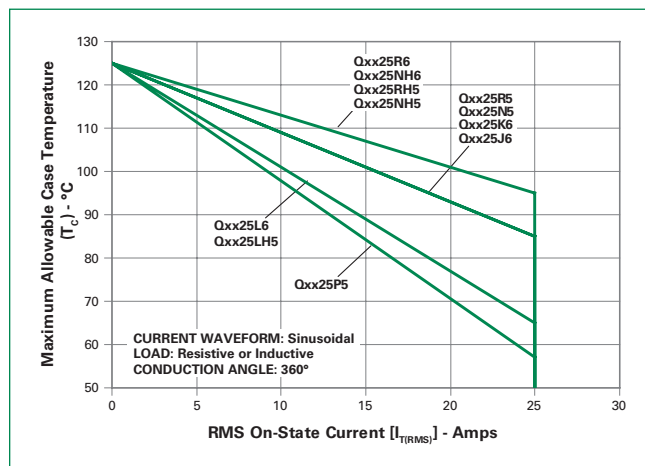
**Figure 4: On-State Current vs. On-State Voltage (Typical)**



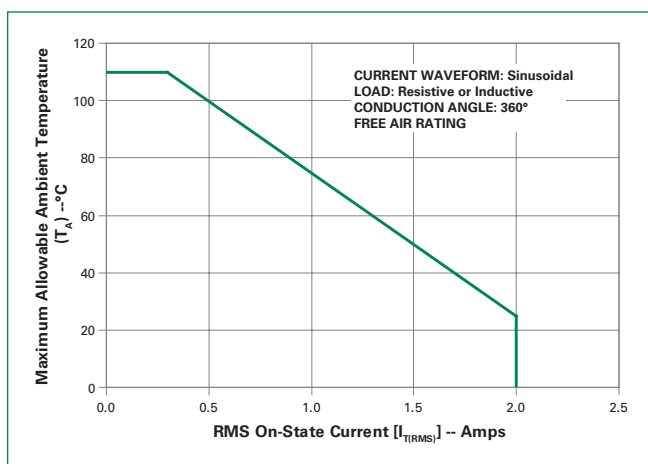
**Figure 5: Power Dissipation (Typical) vs. RMS On-State Current**



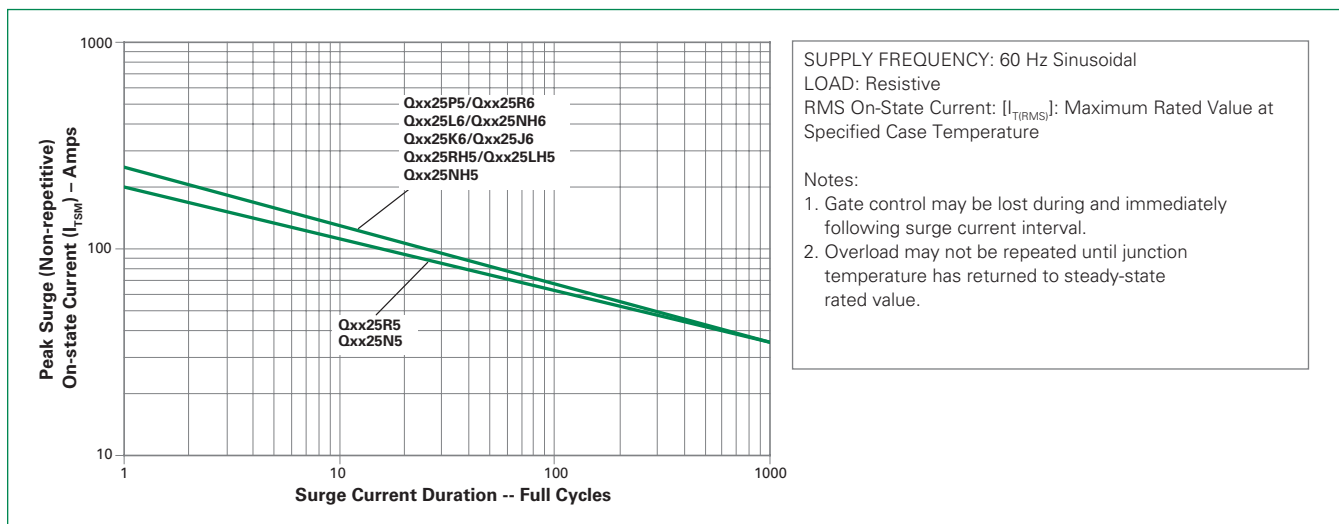
**Figure 6: Maximum Allowable Case Temperature vs. RMS On-State Current**



**Figure 7: Maximum Allowable Ambient Temperature vs. RMS On-State Current (TO-220 packages only)**



**Figure 8: Surge Peak On-State Current vs. Number of Cycles**



## Soldering Parameters

|                                                        |                                    |                         |
|--------------------------------------------------------|------------------------------------|-------------------------|
| Reflow Condition                                       |                                    | Pb – Free assembly      |
| Pre Heat                                               | - Temperature Min ( $T_{s(min)}$ ) | 150°C                   |
|                                                        | - Temperature Max ( $T_{s(max)}$ ) | 200°C                   |
|                                                        | - Time (min to max) ( $t_s$ )      | 60 – 180 secs           |
| Average ramp up rate (Liquidus Temp) ( $T_L$ ) to peak |                                    | 5°C/second max          |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                   |                                    | 5°C/second max          |
| Reflow                                                 | - Temperature ( $T_L$ ) (Liquidus) | 217°C                   |
|                                                        | - Temperature ( $t_L$ )            | 60 – 150 seconds        |
| Peak Temperature ( $T_p$ )                             |                                    | 260 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $t_p$ )   |                                    | 20 – 40 seconds         |
| Ramp-down Rate                                         |                                    | 5°C/second max          |
| Time 25°C to peak Temperature ( $T_p$ )                |                                    | 8 minutes Max.          |
| Do not exceed                                          |                                    | 280°C                   |



## Physical Specifications

|                        |                                                               |
|------------------------|---------------------------------------------------------------|
| <b>Terminal Finish</b> | 100% Matte Tin-plated                                         |
| <b>Body Material</b>   | UL recognized epoxy meeting flammability classification 94V-0 |
| <b>Lead Material</b>   | Copper Alloy                                                  |

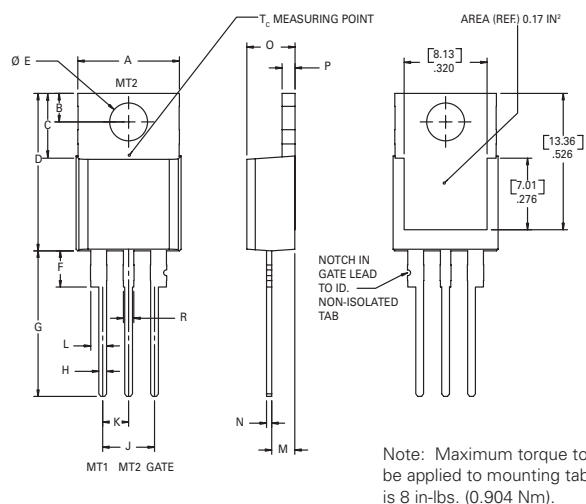
## Design Considerations

Careful selection of the correct device for the application's operating parameters and environment will go a long way toward extending the operating life of the Thyristor. Good design practice should limit the maximum continuous current through the main terminals to 75% of the device rating. Other ways to ensure long life for a power discrete semiconductor are proper heat sinking and selection of voltage ratings for worst case conditions. Overheating, overvoltage (including dv/dt), and surge currents are the main killers of semiconductors. Correct mounting, soldering, and forming of the leads also help protect against component damage.

## Environmental Specifications

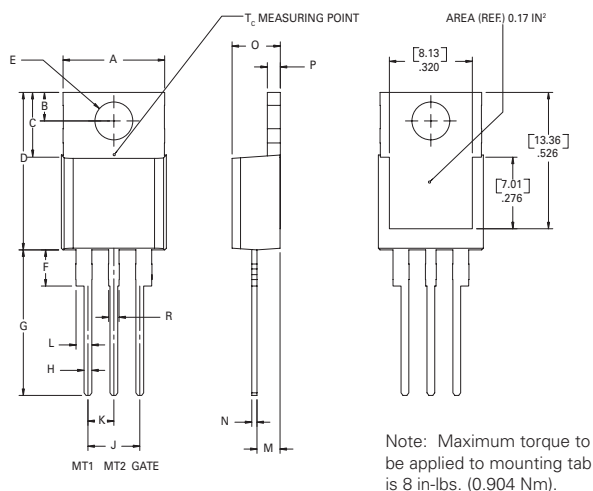
| Test                                     | Specifications and Conditions                                                           |
|------------------------------------------|-----------------------------------------------------------------------------------------|
| <b>High Temperature Voltage Blocking</b> | MIL-STD-750: Method 1040, Condition A<br>Rated $V_{RRM}$ , 125°C, 1008 hours            |
| <b>Temperature Cycling</b>               | MIL-STD-750: Method 1051<br>-40°C to 125°C, 15-minute dwell, 100 cycles                 |
| <b>Biased Temp &amp; Humidity</b>        | EIA/JEDEC: JESD22-A101<br>320VDC, 85°C, 85%RH, 1008 hours                               |
| <b>High Temp. Storage</b>                | MIL-STD-750: Method 1031<br>150°C, 1008 hours                                           |
| <b>Low-Temp Storage</b>                  | -40°C, 1008 hours                                                                       |
| <b>Thermal Shock</b>                     | MIL-STD-750: Method 1056<br>0°C to 100°C, 5-minute dwell, 10-second transfer, 10 cycles |
| <b>Autoclave (Pressure Cooker Test)</b>  | EIA/JEDEC: JESD22-A102<br>121°C, 100%RH, 2atm, 168 hours                                |
| <b>Resistance to Solder Heat</b>         | MIL-STD-750: Method 2031<br>260°C, 10 seconds                                           |
| <b>Solderability</b>                     | ANSI/J-STD-002, Category 3, Test A                                                      |
| <b>Lead Bend</b>                         | MIL-STD-750: Method 2036, Condition E                                                   |

**Dimensions — TO-220AB (R Package) — Non-isolated Mounting Tab**



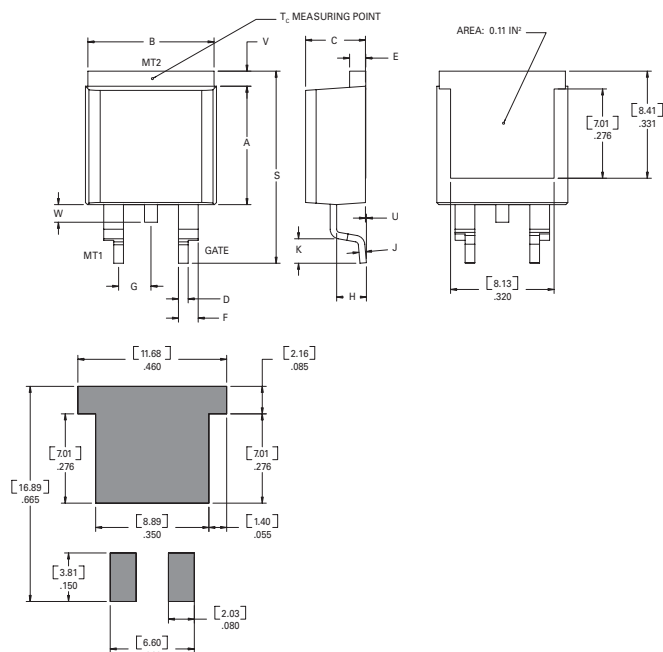
| Dimension | Inches |       | Millimeters |       |
|-----------|--------|-------|-------------|-------|
|           | Min    | Max   | Min         | Max   |
| A         | 0.380  | 0.420 | 9.65        | 10.67 |
| B         | 0.105  | 0.115 | 2.67        | 2.92  |
| C         | 0.230  | 0.250 | 5.84        | 6.35  |
| D         | 0.590  | 0.620 | 14.99       | 15.75 |
| E         | 0.142  | 0.147 | 3.61        | 3.73  |
| F         | 0.110  | 0.130 | 2.79        | 3.30  |
| G         | 0.540  | 0.575 | 13.72       | 14.61 |
| H         | 0.025  | 0.035 | 0.64        | 0.89  |
| J         | 0.195  | 0.205 | 4.95        | 5.21  |
| K         | 0.095  | 0.105 | 2.41        | 2.67  |
| L         | 0.060  | 0.075 | 1.52        | 1.91  |
| M         | 0.085  | 0.095 | 2.16        | 2.41  |
| N         | 0.018  | 0.024 | 0.46        | 0.61  |
| O         | 0.178  | 0.188 | 4.52        | 4.78  |
| P         | 0.045  | 0.060 | 1.14        | 1.52  |
| R         | 0.038  | 0.048 | 0.97        | 1.22  |

**Dimensions — TO-220AB (L Package) — Isolated Mounting Tab**



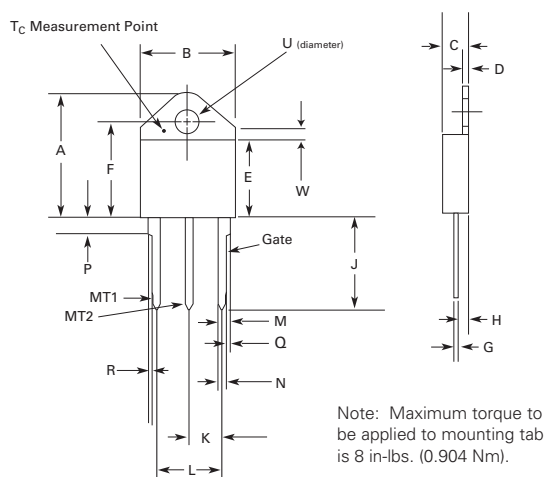
| Dimension | Inches |       | Millimeters |       |
|-----------|--------|-------|-------------|-------|
|           | Min    | Max   | Min         | Max   |
| A         | 0.380  | 0.420 | 9.65        | 10.67 |
| B         | 0.105  | 0.115 | 2.66        | 2.92  |
| C         | 0.230  | 0.250 | 5.85        | 6.35  |
| D         | 0.590  | 0.620 | 14.98       | 15.75 |
| E         | 0.142  | 0.147 | 3.61        | 3.73  |
| F         | 0.110  | 0.130 | 2.80        | 3.30  |
| G         | 0.540  | 0.575 | 13.71       | 14.60 |
| H         | 0.025  | 0.035 | 0.63        | 0.89  |
| J         | 0.195  | 0.205 | 4.95        | 5.21  |
| K         | 0.095  | 0.105 | 2.41        | 2.67  |
| L         | 0.060  | 0.075 | 1.52        | 1.91  |
| M         | 0.085  | 0.095 | 1.78        | 2.16  |
| N         | 0.018  | 0.024 | 0.45        | 0.61  |
| O         | 0.178  | 0.188 | 4.52        | 4.78  |
| P         | 0.045  | 0.060 | 1.14        | 1.53  |
| R         | 0.038  | 0.048 | 0.97        | 1.22  |

**Dimensions — TO-263 (N Package) — D<sup>2</sup>Pak Surface Mount**



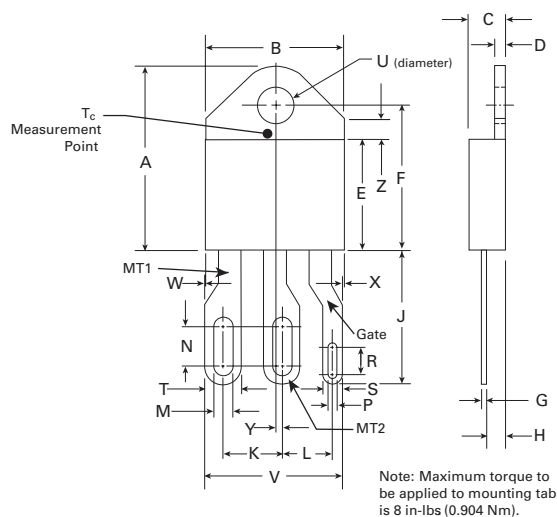
| Dimension | Inches |       | Millimeters |       |
|-----------|--------|-------|-------------|-------|
|           | Min    | Max   | Min         | Max   |
| A         | 0.360  | 0.370 | 9.14        | 9.40  |
| B         | 0.380  | 0.420 | 9.65        | 10.67 |
| C         | 0.178  | 0.188 | 4.52        | 4.78  |
| D         | 0.025  | 0.035 | 0.64        | 0.89  |
| E         | 0.045  | 0.060 | 1.14        | 1.52  |
| F         | 0.060  | 0.075 | 1.52        | 1.91  |
| G         | 0.095  | 0.105 | 2.41        | 2.67  |
| H         | 0.092  | 0.102 | 2.34        | 2.59  |
| J         | 0.018  | 0.024 | 0.46        | 0.61  |
| K         | 0.090  | 0.110 | 2.29        | 2.79  |
| S         | 0.590  | 0.625 | 14.99       | 15.88 |
| V         | 0.035  | 0.045 | 0.89        | 1.14  |
| U         | 0.002  | 0.010 | 0.05        | 0.25  |
| W         | 0.040  | 0.070 | 1.02        | 1.78  |

**Dimensions — TO-218AC (K Package) — Isolated Mounting Tab**



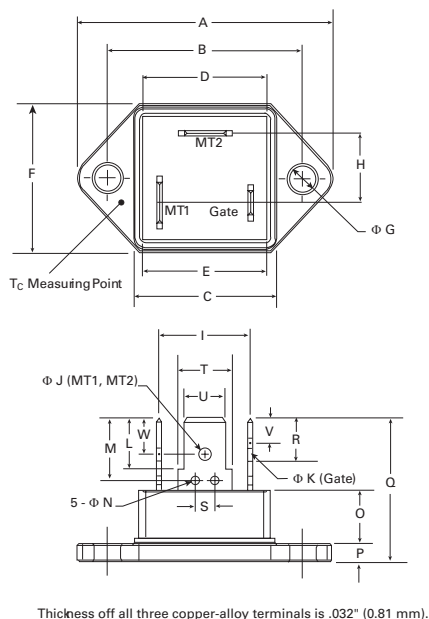
| Dimension | Inches |       | Millimeters |       |
|-----------|--------|-------|-------------|-------|
|           | Min    | Max   | Min         | Max   |
| A         | 0.810  | 0.835 | 20.57       | 21.21 |
| B         | 0.610  | 0.630 | 15.49       | 16.00 |
| C         | 0.178  | 0.188 | 4.52        | 4.78  |
| D         | 0.055  | 0.070 | 1.40        | 1.78  |
| E         | 0.487  | 0.497 | 12.37       | 12.62 |
| F         | 0.635  | 0.655 | 16.13       | 16.64 |
| G         | 0.022  | 0.029 | 0.56        | 0.74  |
| H         | 0.075  | 0.095 | 1.91        | 2.41  |
| J         | 0.575  | 0.625 | 14.61       | 15.88 |
| K         | 0.211  | 0.219 | 5.36        | 5.56  |
| L         | 0.422  | 0.437 | 10.72       | 11.10 |
| M         | 0.058  | 0.068 | 1.47        | 1.73  |
| N         | 0.045  | 0.055 | 1.14        | 1.40  |
| P         | 0.095  | 0.115 | 2.41        | 2.92  |
| Q         | 0.008  | 0.016 | 0.20        | 0.41  |
| R         | 0.008  | 0.016 | 0.20        | 0.41  |
| U         | 0.164  | 0.165 | 4.10        | 4.20  |
| W         | 0.085  | 0.095 | 2.17        | 2.42  |

**Dimensions — TO-218X (J Package) — Isolated Mounting Tab**



| Dimension | Inches |       | Millimeters |       |
|-----------|--------|-------|-------------|-------|
|           | Min    | Max   | Min         | Max   |
| A         | 0.810  | 0.835 | 20.57       | 21.21 |
| B         | 0.610  | 0.630 | 15.49       | 16.00 |
| C         | 0.178  | 0.188 | 4.52        | 4.78  |
| D         | 0.055  | 0.070 | 1.40        | 1.78  |
| E         | 0.487  | 0.497 | 12.37       | 12.62 |
| F         | 0.635  | 0.655 | 16.13       | 16.64 |
| G         | 0.022  | 0.029 | 0.56        | 0.74  |
| H         | 0.075  | 0.095 | 1.91        | 2.41  |
| J         | 0.575  | 0.625 | 14.61       | 15.88 |
| K         | 0.256  | 0.264 | 6.50        | 6.71  |
| L         | 0.220  | 0.228 | 5.58        | 5.79  |
| M         | 0.080  | 0.088 | 2.03        | 2.24  |
| N         | 0.169  | 0.177 | 4.29        | 4.49  |
| P         | 0.034  | 0.042 | 0.86        | 1.07  |
| R         | 0.113  | 0.121 | 2.87        | 3.07  |
| S         | 0.086  | 0.096 | 2.18        | 2.44  |
| T         | 0.156  | 0.166 | 3.96        | 4.22  |
| U         | 0.164  | 0.165 | 0.410       | 0.420 |
| V         | 0.603  | 0.618 | 15.31       | 15.70 |
| W         | 0.000  | 0.005 | 0.00        | 0.13  |
| X         | 0.003  | 0.012 | 0.07        | 0.30  |
| Y         | 0.028  | 0.032 | 0.71        | 0.81  |
| Z         | 0.085  | 0.095 | 2.17        | 2.42  |

**Dimensions — TO-3 (P Package) Fastpak — Isolated Mounting Tab**



| Dimension | Inches |       | Millimeters |       |
|-----------|--------|-------|-------------|-------|
|           | Min    | Max   | Min         | Max   |
| A         | 1.531  | 1.543 | 38.90       | 39.20 |
| B         | 1.177  | 1.185 | 29.90       | 30.10 |
| C         | 0.843  | 0.850 | 21.40       | 21.60 |
| D         | 0.780  | 0.795 | 19.80       | 20.20 |
| E         | 0.783  | 0.791 | 19.90       | 20.10 |
| F         | 0.874  | 0.906 | 22.20       | 23.00 |
| G         | 0.161  | 0.169 | 4.10        | 4.30  |
| H         | 0.386  | 0.465 | 9.80        | 11.80 |
| I         | 0.508  | 0.587 | 12.90       | 14.90 |
| J         | 0.079  | 0.087 | 2.00        | 2.20  |
| K         | 0.047  | 0.055 | 1.20        | 1.40  |
| L         | 0.307  | 0.319 | 7.80        | 8.10  |
| M         | 0.372  | 0.396 | 9.45        | 10.05 |
| N         | 0.043  | 0.059 | 1.10        | 1.50  |
| O         | 0.315  | 0.331 | 8.00        | 8.40  |
| P         | 0.098  | 0.106 | 2.50        | 2.70  |
| Q         | 0.846  | 0.886 | 21.50       | 22.50 |
| R         | 0.244  | 0.256 | 6.20        | 6.50  |
| S         | 0.106  | 0.130 | 2.70        | 3.30  |
| T (MT1)   | 0.321  | 0.329 | 8.15        | 8.35  |
| T (MT2)   | 0.321  | 0.329 | 8.15        | 8.35  |
| T (Gate)  | 0.220  | 0.228 | 5.60        | 5.80  |
| U (MT1)   | 0.246  | 0.254 | 6.25        | 6.45  |
| U (MT2)   | 0.246  | 0.254 | 6.25        | 6.45  |
| U (Gate)  | 0.183  | 0.191 | 4.65        | 4.85  |
| V         | 0.120  | 0.130 | 3.05        | 3.30  |
| W         | 0.175  | 0.185 | 4.45        | 4.70  |

Maximum torque to be applied to mounting tab is 8 in-lbs (0.904Nm).

## Product Selector

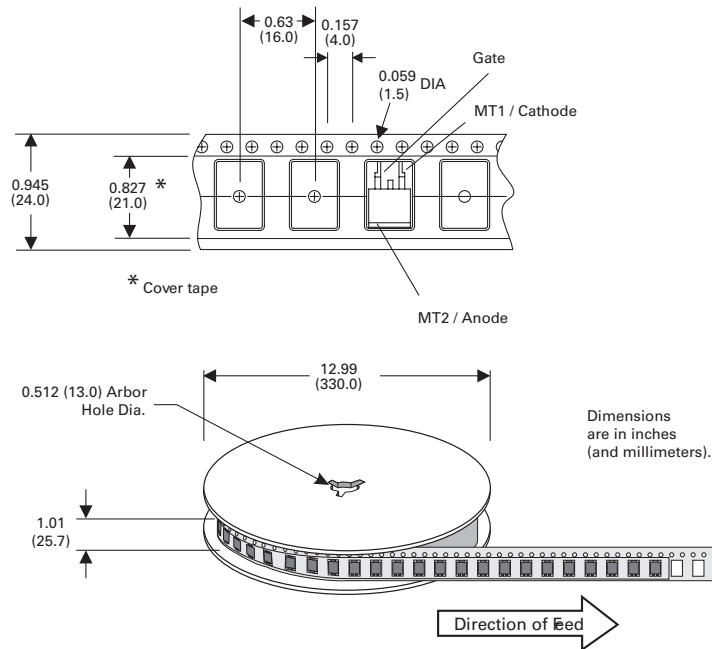
| Part Number | Voltage |      |      |       | Gate Sensitivity Quadrants |              | Package                    |
|-------------|---------|------|------|-------|----------------------------|--------------|----------------------------|
|             | 400V    | 600V | 800V | 1000V | I - II - III               | IV           |                            |
| Qxx25R5     | X       | X    | X    | X     | 50 mA                      | 120 mA (TYP) | TO-220R                    |
| Qxx25N5     | X       | X    | X    | X     | 50 mA                      | 120 mA (TYP) | TO-263 D <sup>2</sup> -Pak |
| Qxx25P5     |         | X    | X    |       | 50 mA                      | 120 mA (TYP) | Fastpak                    |
| Qxx25RH5    | X       | X    | X    |       | 50 mA                      |              | TO-220R                    |
| Qxx25LH5    | X       | X    | X    |       | 50 mA                      |              | TO-220L                    |
| Qxx25NH5    | X       | X    | X    |       | 50 mA                      |              | TO-263 D <sup>2</sup> -Pak |
| Qxx25R6     | X       | X    | X    | X     | 80 mA                      |              | TO-220R                    |
| Qxx25L6     | X       | X    | X    | X     | 80 mA                      |              | TO-220L                    |
| Qxx25NH6    | X       | X    | X    | X     | 80 mA                      |              | TO-263 D <sup>2</sup> -Pak |
| Qxx25J6     | X       | X    | X    |       | 80 mA                      |              | TO-218X                    |
| Qxx25K6     | X       | X    | X    | X     | 80 mA                      |              | TO-218AC                   |

## Packing Options

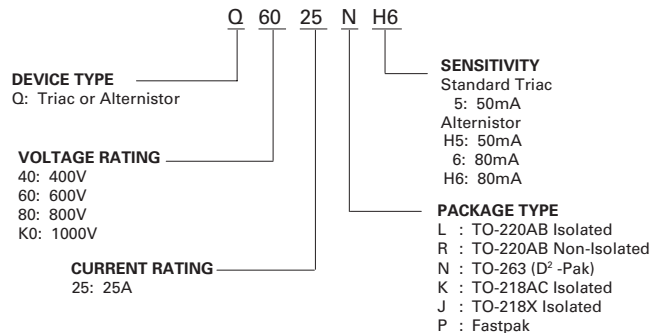
| Part Number | Marking  | Weight | Packing Mode     | Base Quantity     |
|-------------|----------|--------|------------------|-------------------|
| Qxx25R5     | Qxx25R5  | 2.20g  | Bulk             | 500               |
| Qxx25R5TP   | Qxx25R5  | 2.20g  | Tube             | 500 (50 per tube) |
| Qxx25N5TP   | Qxx25N5  | 1.60g  | Tube             | 500 (50 per tube) |
| Qxx25N5RP   | Qxx25N5  | 1.60g  | Embossed Carrier | 500               |
| Qxx25RH5    | Qxx25RH5 | 2.20g  | Bulk             | 500               |
| Qxx25RH5TP  | Qxx25RH5 | 2.20g  | Tube             | 500 (50 per tube) |
| Qxx25LH5    | Qxx25LH5 | 2.20g  | Bulk             | 500               |
| Qxx25LH5TP  | Qxx25LH5 | 2.20g  | Tube             | 500 (50 per tube) |
| Qxx25NH5TP  | Qxx25NH5 | 1.60g  | Tube             | 500 (50 per tube) |
| Qxx25NH5RP  | Qxx25NH5 | 1.60g  | Embossed Carrier | 500               |
| Qxx25P5     | Qxx25P5  | 21.4g  | Bulk             | 200               |
| Qxx25R6     | Qxx25R6  | 2.20g  | Bulk             | 500               |
| Qxx25R6TP   | Qxx25R6  | 2.20g  | Tube             | 500 (50 per tube) |
| Qxx25L6     | Qxx25L6  | 2.20g  | Bulk             | 500               |
| Qxx25L6TP   | Qxx25L6  | 2.20g  | Tube             | 500 (50 per tube) |
| Qxx25NH6TP  | Qxx25NH6 | 1.60g  | Tube             | 500 (50 per tube) |
| Qxx25NH6RP  | Qxx25NH6 | 1.60g  | Embossed Carrier | 500               |
| Qxx25J6TP   | Qxx25J6  | 5.23g  | Tube             | 250 (25 per tube) |
| Qxx25K6TP   | Qxx25K6  | 4.40g  | Tube             | 250 (25 per tube) |

## TO-263 Embossed Carrier Reel Pack (RP) Specifications

Meets all EIA-481-2 Standards



## Part Numbering System



## Part Marking System

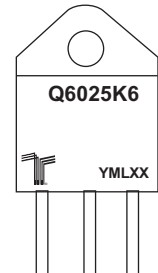
TO-220 AB – (R Package)  
TO-263 AB – (N Package)



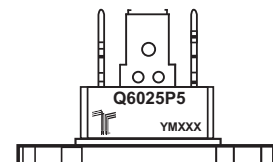
TO-220 AB – (L Package)



TO-218AC (K Package)  
TO-218X (J Package)



Fastpak (P Package)





**Стандарт  
Электрон  
Связь**

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