Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!


## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

# Teccor® brand Thyristors

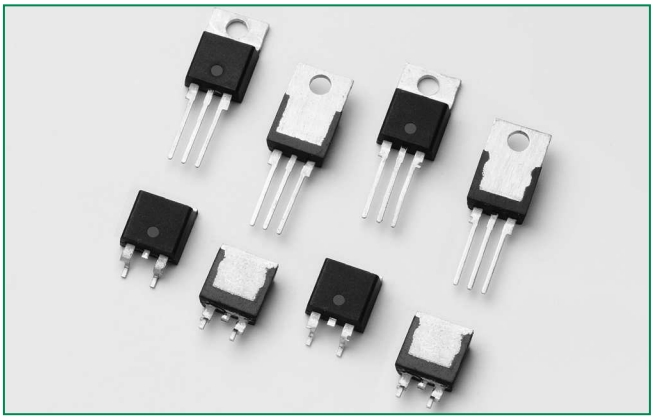
40 Amp Standard SCRs

Littelfuse®

Expertise Applied | Answers Delivered

## Sxx40x Series

RoHS



## Description

Excellent unidirectional switches for phase control applications such as heating and motor speed controls.

Standard phase control SCRs are triggered with few milliamperes of current at less than 1.5V potential.

## Features & Benefits

- RoHS compliant
- Glass – passivated junctions
- Voltage capability up to 1000 V
- Surge capability up to 520 A

## Main Features

| Symbol | Value | Unit |
|---|---|---|
| $I_{T(RMS)}$ | 40 | A |
| $V_{DRM}/V_{RRM}$ | 400 to 1000 | V |
| $I_{GT}$ | 40 | mA |

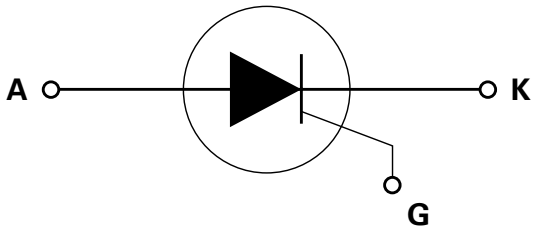
## Applications

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

## Additional Information

**Datasheet** | **Resources** | **Samples**

## Schematic Symbol




## Absolute Maximum Ratings

| Symbol | Parameter | Test Conditions | Value | Unit |
|---|---|---|---|---|
| $I_{T(RMS)}$ | RMS on-state current | $T_C$ = 100°C | 40 | A |
| $I_{T(AV)}$ | Average on-state current | $T_C$ = 100°C | 25.0 | A |
| $I_{TSM}$ | Peak non-repetitive surge current | single half cycle; f = 50Hz; $T_J$ (initial) = 25°C | 430 | A |
| | | single half cycle; f = 60Hz; $T_J$ (initial) = 25°C | 520 | |
| $I^2t$ | $I^2t$ Value for fusing | $t_p$ = 8.3 ms | 1122 | $A^2s$ |
| di/dt | Critical rate of rise of on-state current | f = 60Hz ; $T_J$ = 125°C | 175 | A/µs |
| $I_{GM}$ | Peak gate current | $T_J$ = 125°C | 3.5 | A |
| $P_{G(AV)}$ | Average gate power dissipation | $T_J$ = 125°C | 0.8 | W |
| $T_{stg}$ | Storage temperature range | | -40 to 150 | °C |
| $T_J$ | Operating junction temperature range | | -40 to 125 | °C |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## Electrical Characteristics ($T_J$ = 25°C, unless otherwise specified)

| Symbol | Test Conditions | | | Value | Unit |
|---|---|---|---|---|---|
| $I_{GT}$ | $V_D$ = 12V; $R_L$ = 30 Ω | | MAX. | 40 | mA |
| | | | MIN. | 5 | |
| $V_{GT}$ | | | MAX. | 1.5 | V |
| dv/dt | $V_D = V_{DRM}$; gate open; $T_J$ = 100°C | 400V | MIN. | 650 | V/µs |
| | | 600V | | 600 | |
| | | 800V | | 500 | |
| | | 1000V | | 250 | |
| | $V_D = V_{DRM}$; gate open; $T_J$ = 125°C | 400V | | 550 | |
| | | 600V | | 500 | |
| | | 800V | | 475 | |
| $V_{GD}$ | $V_D = V_{DRM}$; $R_L$ = 3.3 kΩ; $T_J$ = 125°C | | MIN. | 0.2 | V |
| $I_H$ | $I_T$ = 400mA (initial) | | MAX. | 60 | mA |
| $t_q$ | (1) | | MAX. | 35 | µs |
| $t_{gt}$ | $I_G$ = 2 x $I_{GT}$; PW = 15µs; $I_T$ = 80A | | TYP. | 2.5 | µs |

Note :
(1) $I_T$=2A; $t_p$=50µs; dv/dt=5V/µs; di/dt=-30A/µs

## Static Characteristics

| Symbol | Test Conditions | | | Value | Unit |
|---|---|---|---|---|---|
| $V_{TM}$ | $I_T$ = 80A; $t_p$ = 380µs | | MAX. | 1.8 | V |
| $I_{DRM}$ / $I_{RRM}$ | $V_{DRM}$ / $V_{RRM}$ | $T_J$ = 25°C | 400 – 600V | 10 | µA |
| | | | 800 V | 20 | |
| | | | 1000 V | 30 | |
| | | $T_J$ = 100°C | 400 – 600V | 1000 | |
| | | | 800V | 1500 | |
| | | | 1000V | 5000 | |
| | | $T_J$ = 125°C | 400 – 600V | 2000 | |
| | | | 800V | 3000 | |

## Thermal Resistances

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $R_{\theta(J-C)}$ | Junction to case (AC) | Sxx40R / Sxx40N | 0.6 | °C/W |
| $R_{\theta(J-A)}$ | Junction to ambient | Sxx40R | 40 | °C/W |

Note: xx = voltage


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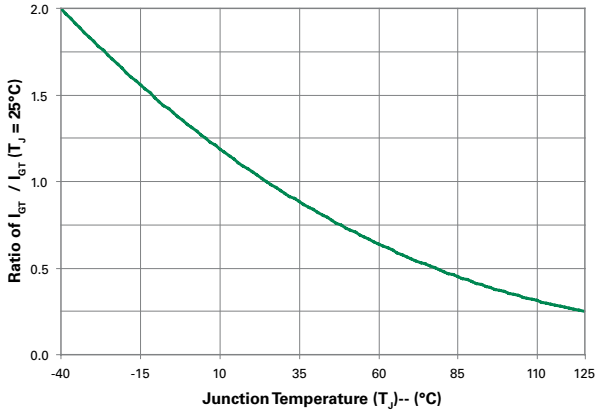
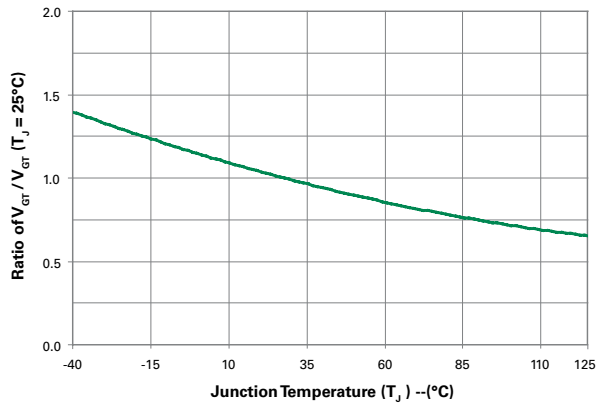
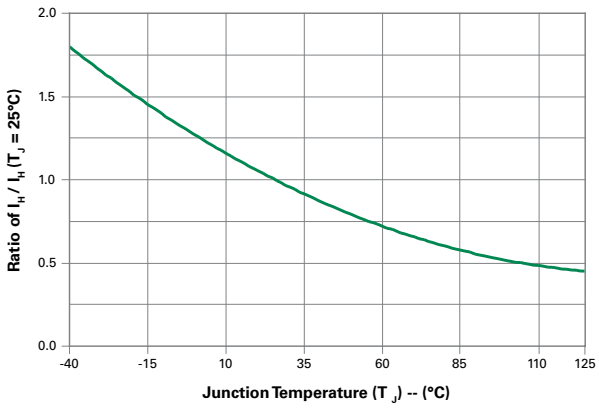
## Figure 1: Normalized DC Gate Trigger Current vs. Junction Temperature



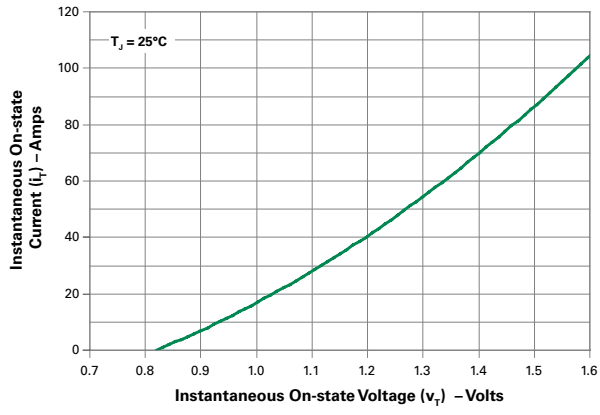

## Figure 2: Normalized DC Gate Trigger Voltage vs. Junction Temperature



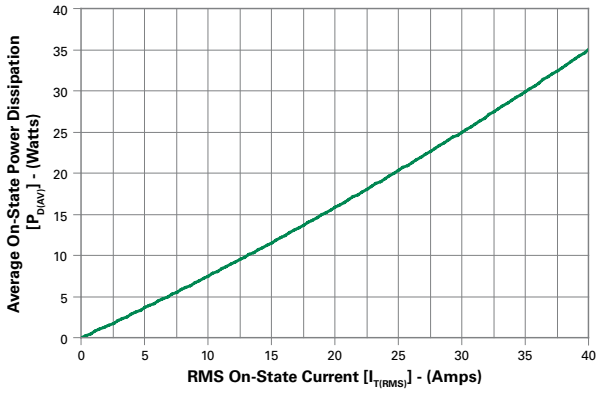

## Figure 3: Normalized DC Holding Current vs. Junction Temperature



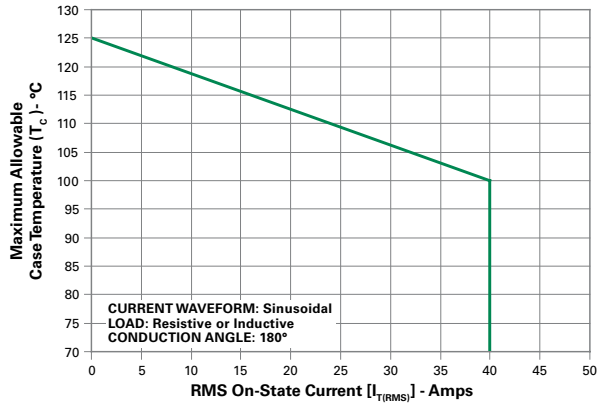

## Figure 4: On-State Current vs. On-State Voltage (Typical)




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




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





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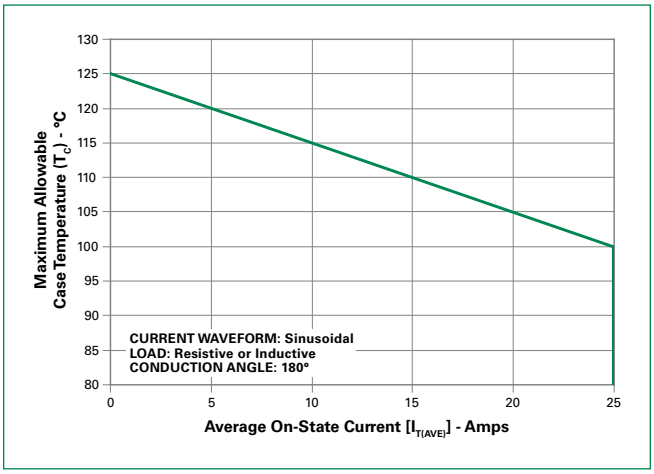
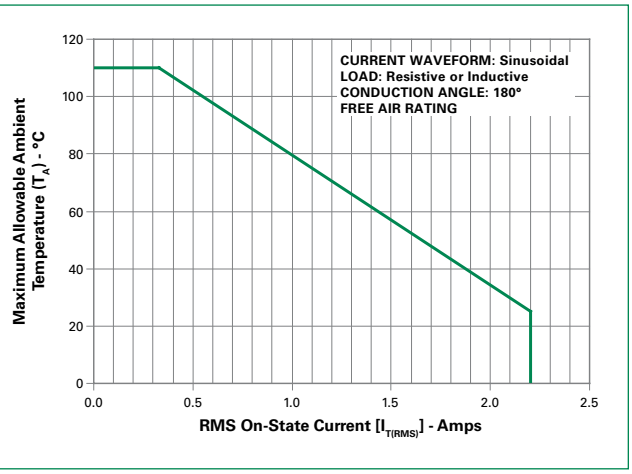
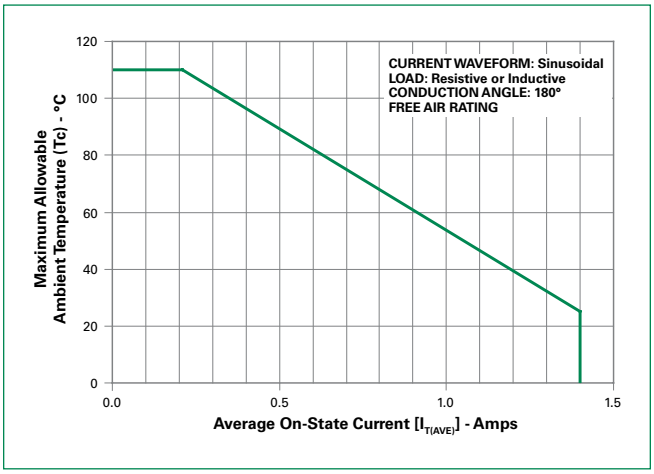
## Figure 7: Maximum Allowable Case Temperature vs. Average On-State Current



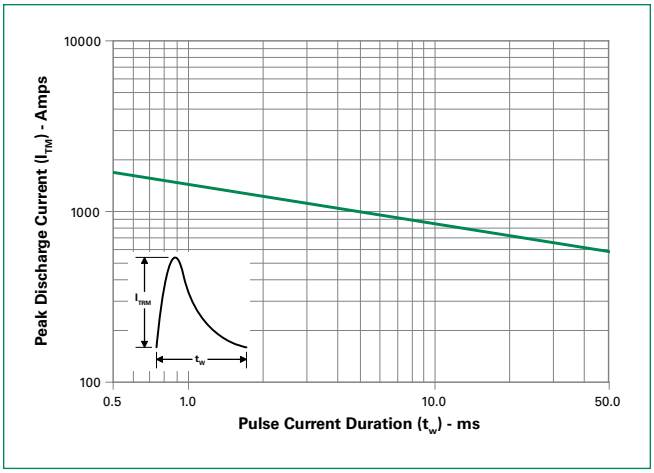

## Figure 8: Maximum Allowable Ambient Temperature vs. RMS On-State Current



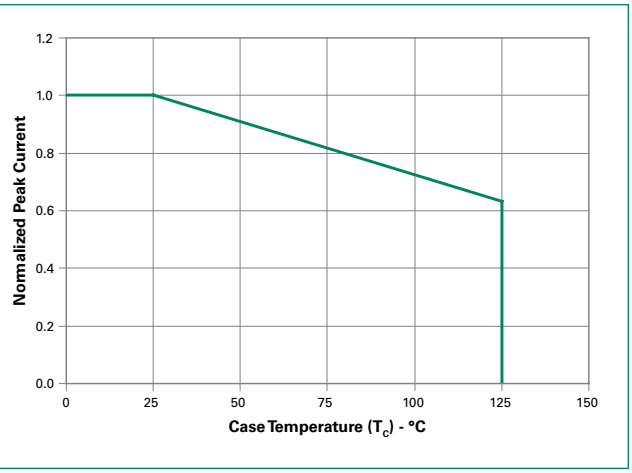

## Figure 9: Maximum Allowable Ambient Temperature vs. Average On-State Current




## Figure 10: Peak Capacitor Discharge Current




## Figure 11: Peak Capacitor Discharge Current Derating





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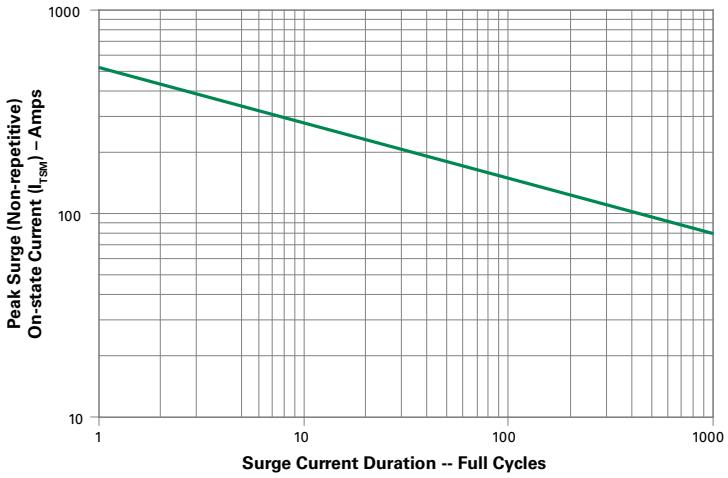
## Figure 12: Surge Peak On-State Current vs. Number of Cycles

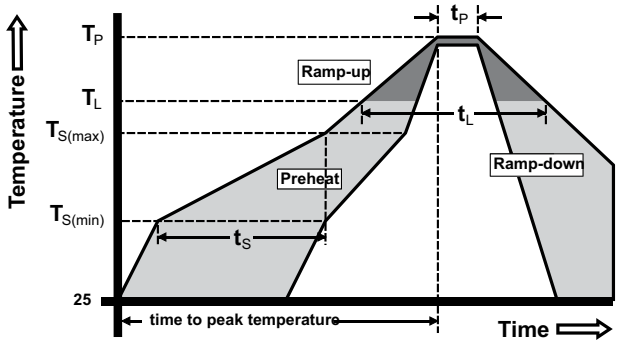



SUPPLY FREQUENCY: 60 Hz Sinusoidal
LOAD: Resistive
RMS On-State Current: [$I_{T(RMS)}$]: Maximum Rated Value at Specified Case Temperature

Notes:
1. Gate control may be lost during and immediately following surge current interval.
2. Overload may not be repeated until junction temperature has returned to steady-state rated value.

## 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 ($T_P$) | | $260^{+0/-5}$ °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 |





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# Teccor® brand Thyristors
## 40 Amp Standard SCRs

## Physical Specifications

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

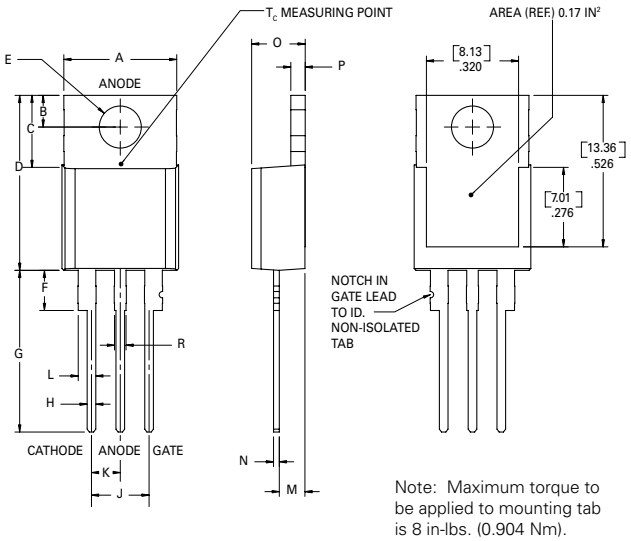
## Design Considerations

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 |
|---|---|
| **AC Blocking** | MIL-STD-750, M-1040, Cond A Applied Peak AC voltage @ 125°C for 1008 hours |
| **Temperature Cycling** | MIL-STD-750, M-1051, 100 cycles; -40°C to +150°C; 15-min dwell-time |
| **Temperature/ Humidity** | EIA / JEDEC, JESD22-A101 1008 hours; 320V - DC: 85°C; 85% rel humidity |
| **High Temp Storage** | MIL-STD-750, M-1031, 1008 hours; 150°C |
| **Low-Temp Storage** | 1008 hours; -40°C |
| **Thermal Shock** | MIL-STD-750, M-1056 10 cycles; 0°C to 100°C; 5-min dwelltime at each temperature; 10 sec (max) transfer time between temperature |
| **Autoclave** | EIA / JEDEC, JESD22-A102 168 hours (121°C at 2 ATMs) and 100% R/H |
| **Resistance to Solder Heat** | MIL-STD-750 Method 2031 |
| **Solderability** | ANSI/J-STD-002, category 3, Test A |
| **Lead Bend** | MIL-STD-750, M-2036 Cond E |

## Dimensions — TO-220AB (R-Package) — Non-Isolated Mounting Tab Common with Center Lead




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

| 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 |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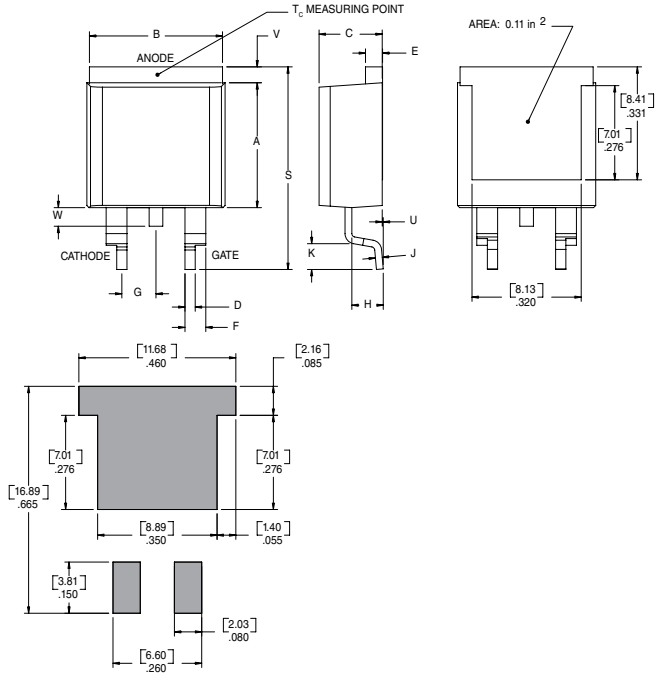
## Dimensions – TO- 263 (N-package) — D²-Pak Surface Mount




| 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 | 0.63 | 0.89 |
| E | 0.048 | 0.055 | 1.22 | 1.40 |
| F | 0.060 | 0.075 | 1.52 | 1.91 |
| G | 0.095 | 0.105 | 2.41 | 2.67 |
| H | 0.083 | 0.093 | 2.11 | 2.36 |
| 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 | 15.87 |
| 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 |

## Part Numbering System

S 60 40 R _ 56

**DEVICE TYPE**
S: SCR

**VOLTAGE RATING**
40: 400V
60: 600V
80: 800V
K0: 1000V

**CURRENT RATING**
40: 40A

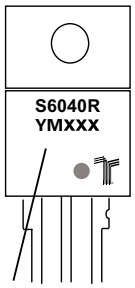
**PACKAGE TYPE**
R: TO-220 (Non-isolated)
N: TO-263 ($D^2$ - Pak)

**SENSITIVITY & TYPE**
[blank]: 40mA

**Lead Form Dimensions**
xx: Lead Form Option

## Part Marking System

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




Date Code Marking
Y:Year Code
M: Month Code
XXX: Lot Trace Code


Revised: 09/22/16

# Teccor® brand Thyristors
## 55 Amp Standard SCRs

## Product Selector

| Part Number | Voltage | | | | Gate Sensitivity | Type | Package |
|---|---|---|---|---|---|---|---|
| | 400V | 600V | 800V | 1000V | | | |
| Sxx40R | X | X | X | X | 40mA | Standard SCR | TO-220R |
| Sxx40N | X | X | X | X | 40mA | Standard SCR | TO-263 |

Note: xx = Voltage

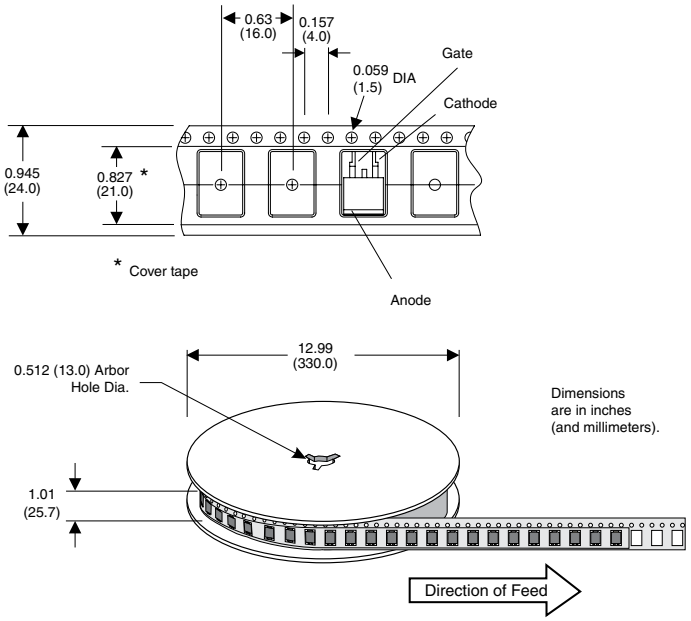
## Packing Options

| Part Number | Marking | Weight | Packing Mode | Base Quantity |
|---|---|---|---|---|
| Sxx40RTP | Sxx40R | 2.2g | Tube | 500 (50 per tube) |
| Sxx40NTP | Sxx40N | 1.6g | Tube | 500 (50 per tube) |
| Sxx40NRP | Sxx40N | 1.6g | Embossed Carrier | 500 |

Note: xx = Voltage

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

### Meets all EIA-481-2 Standards





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