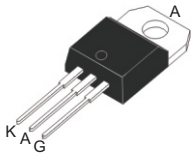
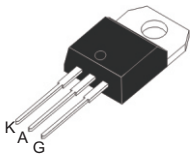
# Stansard SCRs, 40A

## Main Features

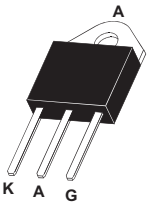
| Symbol | Value | Unit |
|---|---|---|
| $I_{T(RMS)}$ | 40 | A |
| $V_{DRM}/V_{RRM}$ | 600 to 1600 | V |
| $I_{GT}$ | 4 to 60 | mA |



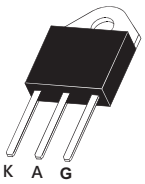

TO-220AB **(non-Insulated)**
(40PTxxA)



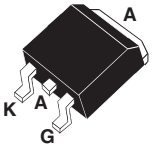

TO-220AB **(Insulated)**
(40PTxxAI)



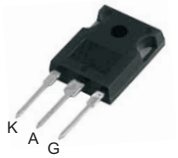

TO-3P (**non-Insulated)**
(40PTxxB)



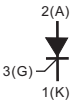

TO-3P (**Insulated)**
(40PTxxBI)




TO-263 (**$D^2PAK$)**
(40PTxxH)




TO-247AB **(non-Insulated)**
(40PTxxC)




## DESCRIPTION

The 40PT series of silicon controlled rectifiers are high performance glass passivated technology, and are suitable for general purpose applications, where in-rush current conditions are critical such as overvoltage crowbar protection circuits in power supplies, in-rush current limiting circuits, solid state relay in back to back configuration, welding equipment and high power motor control.

Base on a clip assembly technology, they offer a superior performance in surge current capabilities.

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUE | UNIT |
|---|---|---|---|---|---|
| RMS on-state current full sine wave (180° conduction angle ) | $I_{T(RMS)}$ | TO-3P/TO-247AB | $T_c$=95°C | 40 | A |
| | | TO-220AB/TO-263 | $T_c$=90°C | | |
| | | TO-220AB insulated/TO-3P insulated | $T_c$=80°C | | |
| Average on-state current (180° conduction angle) | $I_{T(AV)}$ | TO-3P/TO-247AB | $T_c$=95°C | 25 | A |
| | | TO-220AB/TO-263 | $T_c$=90°C | | |
| | | TO-220AB insulated/TO-3P insulated | $T_c$=80°C | | |
| Non repetitive surge peak on-state current (full cycle, $T_j$ initial = 25°C) | $I_{TSM}$ | F =50 Hz | t = 20 ms | 460 | A |
| | | F =60 Hz | t = 16.7 ms | 480 | |
| $I^2t$ Value for fusing | $I^2t$ | $t_p$ = 10 ms | | 1058 | $A^2s$ |
| Critical rate of rise of on-state current $I_G = 2xI_{GT}$, $t_r$≤100ns | dI/dt | F = 60 Hz | $T_j$ = 125°C | 50 | A/µs |
| Peak gate current | $I_{GM}$ | $T_p$ = 20 µs | $T_j$ = 125°C | 4 | A |
| Maximum gate power | $P_{GM}$ | $T_p$ =20µs | $T_j$ = 125°C | 10 | W |
| Average gate power dissipation | $P_{G(AV)}$ | $T_j$ =125°C | | 1 | W |
| Repetitive peak off-state voltage | $V_{DRM}$ | $T_j$ =125°C | | 600 to 1600 | V |
| Repetitive peak reverse voltage | $V_{RRM}$ | | | | |
| Storage temperature range | $T_{stg}$ | | | - 40 to + 150 | °C |
| Operating junction temperature range | $T_j$ | | | - 40 to + 125 | |
| Maximum peak reverse gate voltage | $V_{RGM}$ | | | 5 | V |

## ELECTRICAL SPECIFICATIONS ($T_J$ = 25 ºC unless otherwise specified)

| SYMBOL | TEST CONDITIONS | | | 40PT06XX 40PT08XX | 40PT10XX 40PT12XX | 40PT16XX | Unit |
|---|---|---|---|---|---|---|---|
| $I_{GT}$ | $V_D$ = 12V, $R_L$ = 33Ω | | Min. | 4 | 15 | 30 | mA |
| | | | Max. | 30 | 40 | 60 | |
| $V_{GT}$ | | | Max. | 1.3 | | | V |
| $V_{GD}$ | $V_D = V_{DRM}$, $R_L$ = 3.3KΩ, $R_{GK}$ = 220Ω | $T_j$ = 125°C | Min. | 0.2 | | | V |
| $I_H$ | $I_T$ = 500mA, Gate open | | Max. | 60 | 80 | 100 | mA |
| $I_L$ | $I_G = 1.2 \times I_{GT}$ | | Max. | 80 | 100 | 150 | mA |
| dV/dt | $V_D$ = 67% $V_{DRM}$, Gate open | $T_j$ = 125°C | Min. | 700 | 1000 | 1000 | V/μs |
| $V_{TM}$ | $I_T$ = 80A, $t_P$ = 380μs | $T_j$ = 25°C | Max. | 1.6 | | | V |
| $I_{DRM}$ | $V_D=V_{DRM}$, $V_R=V_{RRM}$ | $T_j$ = 25°C | Max. | 10 | | | μA |
| $I_{RRM}$ | $R_{GK}$ = 220Ω | $T_j$ = 125°C | Max. | 4 | | | mA |
| $V_{to}$ | Threshold Voltage | $T_j$ = 125°C | Max. | 0.85 | | | V |
| $R_d$ | Dynamic Resistance | $T_j$ = 125°C | Max. | 10 | | | mΩ |

## THERMAL RESISTANCE

| SYMBOL | Parameter | | | VALUE | UNIT |
|---|---|---|---|---|---|
| $R_{th(j-c)}$ | Junction to case (DC) | | $D^2PAK$/TO-220AB/TO-3P/TO-247AB | 0.8 | °C/W |
| | | | TO-220AB insulated/TO-3P insulated | 0.9 | |
| $R_{th(j-a)}$ | Junction to ambient | S = 1 $cm^2$ | TO-263($D^2PAK$) | 45 | °C/W |
| | | | TO-220AB/TO-220AB insulated | 60 | |
| | | | TO-3P/TO-247AB/TO-3P insulated | 50 | |

S=Copper surface under tab

## PRODUCT SELECTOR

| PART NUMBER | VOLTAGE (xx) | | | | | SENSITIVITY | PACKAGE |
|---|---|---|---|---|---|---|---|
| | 600 V | 800 V | 1000 V | 1200 V | 1600 V | | |
| 40PTxxA/40PTxxAI | V | V | V | V | V | 35 mA | TO-220AB |
| 40PTxxH | V | V | V | V | V | 35 mA | $D^2PAK$ |
| 40PTxxB/40PTxxBI | V | V | V | V | V | 35 mA | TO-3P |
| 40PTxxC | V | V | V | V | V | 35 mA | TO-247AB |

## ORDERING INFORMATION

| ORDERING TYPE | MARKING | PACKAGE | WEIGHT | BASE Q'TY | DELIVERY MODE |
|---|---|---|---|---|---|
| 40PTxxA | 40PTxxA | TO-220AB | 2.0g | 50 | Tube |
| 40PTxxAI | 40PTxxAI | TO-220AB (insulated) | 2.3g | 50 | Tube |
| 40PTxxH | 40PTxxH | TO-263($D^2PAK$) | 2.0g | 50 | Tube |
| 40PTxxB | 40PTxxB | TO-3P | 4.3g | 30 | Tube |
| 40PTxxBI | 40PTxxBI | TO-3P insulated | 4.8g | 30 | Tube |
| 40PTxxC | 40PTxxC | TO-247AB | 5g | 30 | Tube |

**Note**: xx = voltage

## ORDERING INFORMATION SCHEME

**40 PT 06 AI**

**Current**

40 = 40A, $I_{T(RMS)}$

**SCR series**

**Voltage Code**

06 = 600V
08 = 800V
10 = 1000V
12 = 1200V
16 = 1600V

**Package type**

A = TO-220AB (non-insulated)
AI = TO-220AB ( insulated)
B = TO-3P (non-insulated)
BI = TO-3P ( insulated)
C = TO-247AB
H = TO-263 ($D^2PAK$)

**Fig.1 Maximum average power dissipation versus average on-state current.**

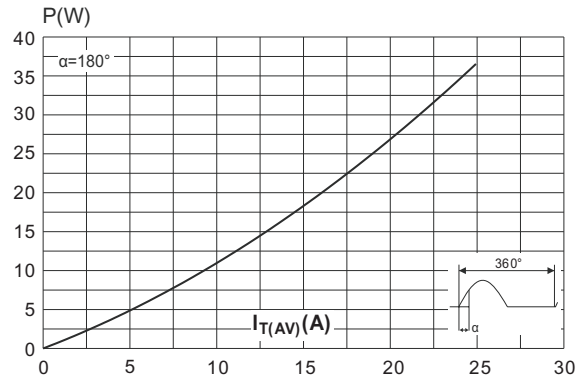



**Fig.2 RMS on-state current versus case temperature.**

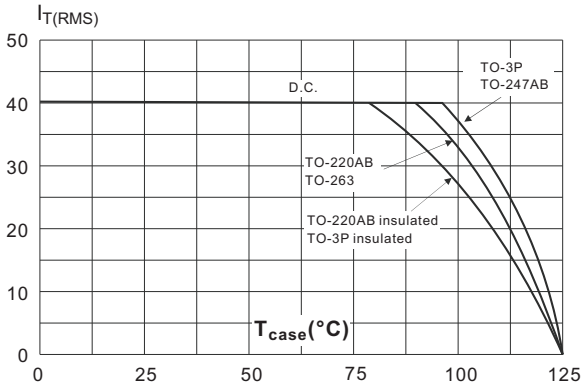



**Fig.3 Relative variation of thermal impedance versus pulse duration.**

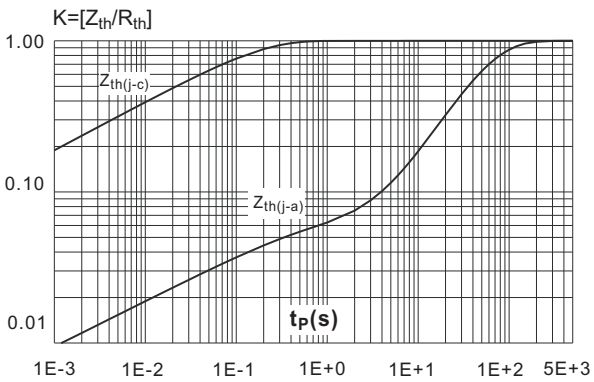



**Fig.4 Relative variation of gate trigger current, holding current and latching current versus junction temperature.**

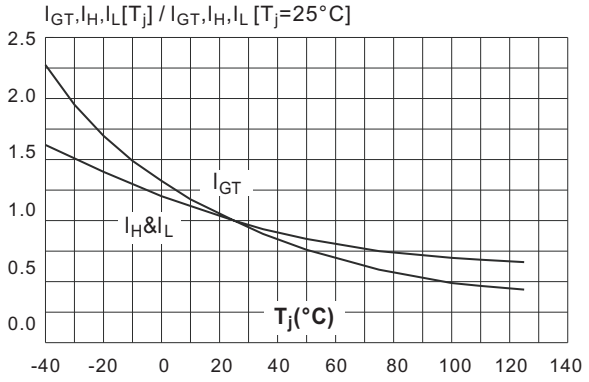


**Fig.5 Surge peak on-state current versus number of cycles.**

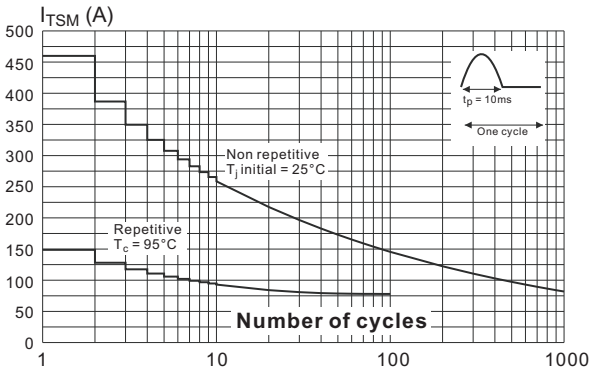



**Fig.6 Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp < 10 ms, and corresponding values of $I^2t$ .**

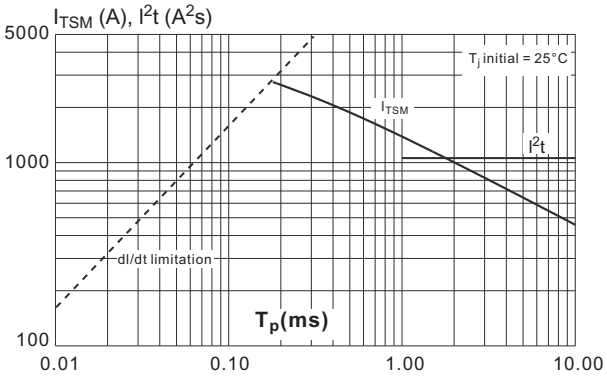
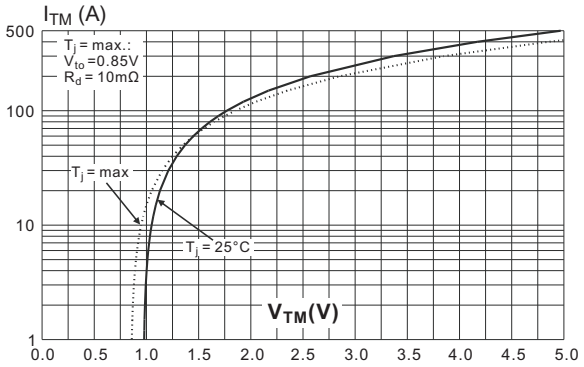
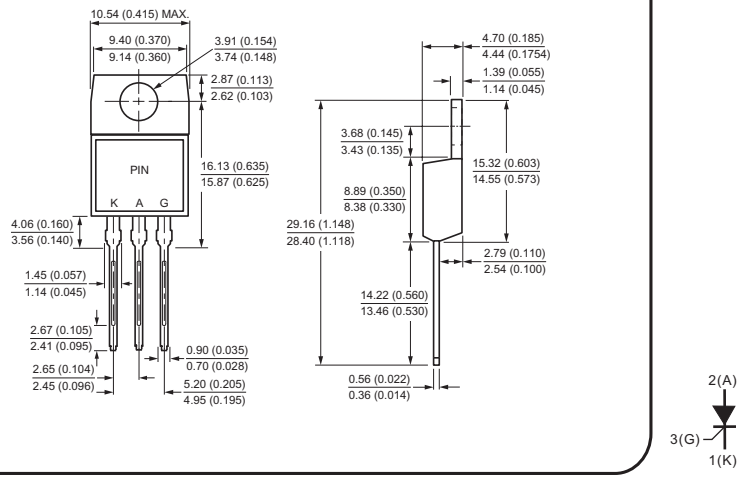



**Fig.7 On-state characteristics (maximum values)**




## Case Style

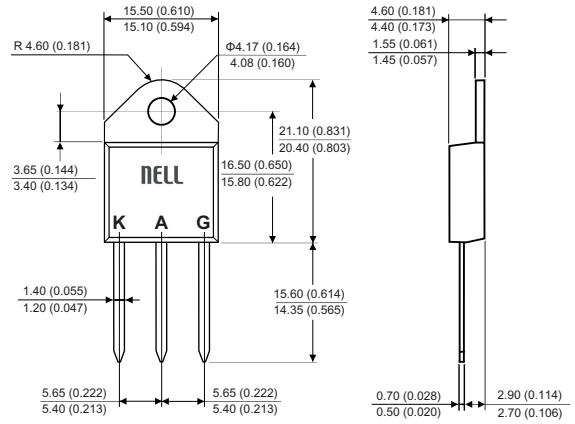
**TO-220AB**



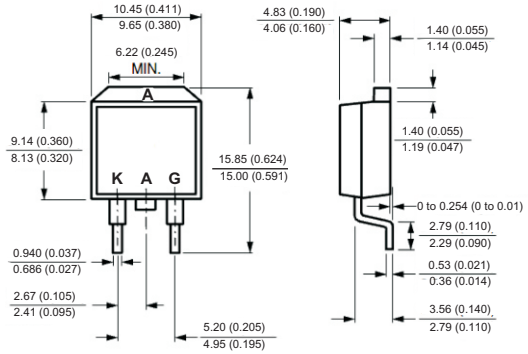

All dimensions in millimeters(inches)

# Case Style

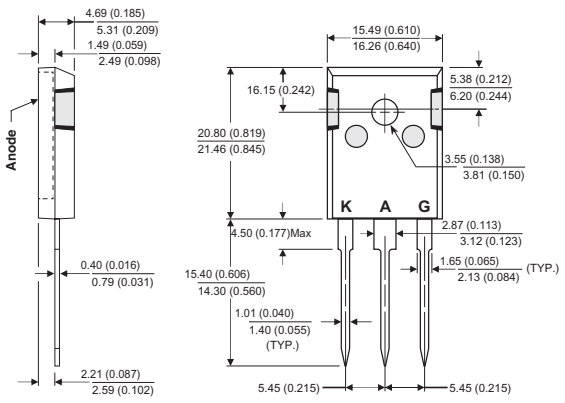
## TO-3P

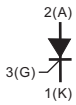



## TO-263(D²PAK)




## TO-247AB




All dimensions in millimeters(inches)