

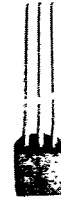
# Phase Control Thyristors (SCRs)

| $I_T(AV)$<br>$T_c=65^\circ\text{C}$<br>50% Duty<br>Cycle,<br>Half Sine<br>(Amps) | $I_{TSM}$<br>(Amps) |      | $I_{DRM}/I_{RRM}$<br>@ Rated<br>$V_{DRM}/V_{RRM}$<br>and $T_{J(Max)}$<br>(mA) | $I^2t$<br>for<br>Fusing<br>@ 8.3 ms<br>(A <sup>2</sup> sec) | $V_{DRM}/V_{RRM}$<br>Range<br>(Volts) | $V_{TM}$<br>@ $I_{TM}$<br>and $T_c=25^\circ\text{C}$<br>$I_{TM}$ (Amps)<br>$V_{TM}$ (Volts) | Chip<br>Size<br>(mm) | Junction<br>Temp.<br>Range<br>( $^\circ\text{C}$ ) | $R_{\theta JC}$<br>( $^\circ\text{C}/\text{W}$ ) | Typical<br>$t_q$<br>@ $T_{J(Max)}$<br>( $\mu\text{sec}$ ) |     |
|----------------------------------------------------------------------------------|---------------------|------|-------------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------|-----|
| 50 Hz                                                                            | 60 Hz               |      |                                                                               |                                                             |                                       |                                                                                             |                      |                                                    |                                                  |                                                           |     |
| 16                                                                               | 272                 | 300  | 1.7 to 3.3                                                                    | 374                                                         | 600-1200                              | 69                                                                                          | 2.3                  | —                                                  | -40 to 125                                       | 1.5                                                       | 75  |
| 22                                                                               | 272                 | 300  | 3                                                                             | 374                                                         | 50-600                                | 100                                                                                         | 1.9                  | —                                                  | -40 to 125                                       | 1.7                                                       | —   |
| 22                                                                               | 272                 | 300  | 3                                                                             | 374                                                         | 50-600                                | 100                                                                                         | 1.9                  | —                                                  | -40 to 125                                       | 1.7                                                       | —   |
| 23                                                                               | 272                 | 300  | 1.7 to 4                                                                      | 374                                                         | 500-1200                              | 70                                                                                          | 2.3                  | —                                                  | -65 to 125                                       | 1.0                                                       | 100 |
| 25                                                                               | 136                 | 150  | 3 to 10                                                                       | 93                                                          | 25-500                                | 50                                                                                          | 2                    | —                                                  | -65 to 150                                       | 1.5                                                       | 24  |
| 40<br>@ $105^\circ\text{C}$                                                      | 910                 | 1000 | 6 to 12                                                                       | 4150                                                        | 100-1200                              | 500                                                                                         | 3                    | 12                                                 | -40 to 125                                       | .35                                                       | 125 |
| 40<br>@ $85^\circ\text{C}$                                                       | 1090                | 1200 | 10                                                                            | 6000                                                        | 700-1600                              | 500                                                                                         | 3.7                  | 16                                                 | -40 to 125                                       | .28                                                       | 100 |
| 50<br>@ $85^\circ\text{C}$                                                       | 1090                | 1200 | 10                                                                            | 6000                                                        | 50-600                                | 500                                                                                         | 3.5                  | 16                                                 | -40 to 125                                       | .28                                                       | 100 |
| 52<br>@ $75^\circ\text{C}$                                                       | 910                 | 1000 | 10                                                                            | 4150                                                        | 25-1200                               | 500                                                                                         | 3.1                  | —                                                  | -40 to 125                                       | .4                                                        | 80  |
| 52<br>@ $75^\circ\text{C}$                                                       | 910                 | 1000 | 10                                                                            | 4150                                                        | 25-1200                               | 500                                                                                         | 3.1                  | —                                                  | -40 to 125                                       | .4                                                        | 80  |
| 70                                                                               | 910                 | 1000 | 12-20                                                                         | 4150                                                        | 25-400                                | 500                                                                                         | 2.3                  | 16                                                 | -40 to 125                                       | .4                                                        | 100 |
| 70                                                                               | 910                 | 1000 | 10                                                                            | 4150                                                        | 25-1200                               | 500                                                                                         | 2.5                  | 12                                                 | -40 to 125                                       | .4                                                        | 80  |
| 70                                                                               | 910                 | 1000 | 10                                                                            | 4150                                                        | 25-1200                               | 500                                                                                         | 2.5                  | 12                                                 | -40 to 125                                       | .4                                                        | 80  |
| 70                                                                               | 910                 | 1000 | 10-20                                                                         | 4150                                                        | 50-600                                | 500                                                                                         | 2.3                  | 16                                                 | -40 to 125                                       | .40                                                       | 100 |
| 70<br>@ $80^\circ\text{C}$                                                       | 1400                | 1500 | 5 to 10                                                                       | 9340                                                        | 500-1300                              | 500                                                                                         | 2.6                  | 18                                                 | -40 to 125                                       | .3                                                        | 100 |
| 70<br>@ $80^\circ\text{C}$                                                       | 1400                | 1500 | 5 to 10                                                                       | 9340                                                        | 500-1300                              | 500                                                                                         | 2.6                  | 18                                                 | -40 to 125                                       | .3                                                        | 100 |
| 70                                                                               | 910                 | 1000 | 10                                                                            | 4150                                                        | 500-600                               | 500                                                                                         | 2.3                  | 16                                                 | -40 to 125                                       | .4                                                        | 100 |
| 70<br>@ $85^\circ\text{C}$                                                       | 1450                | 1600 | 10                                                                            | 10,700                                                      | 100-1400                              | 500                                                                                         | 2.5                  | 16                                                 | -40 to 125                                       | .28                                                       | 100 |
| 70<br>@ $85^\circ\text{C}$                                                       | 1450                | 1600 | 10                                                                            | 10,700                                                      | 100-1400                              | 500                                                                                         | 2.5                  | 16                                                 | -40 to 125                                       | .28                                                       | 100 |
| 80                                                                               | 1450                | 1600 | 10                                                                            | 6000                                                        | 50-600                                | 500                                                                                         | 3.5                  | 16                                                 | -40 to 125                                       | .28                                                       | 100 |
| 80                                                                               | 1640                | 1800 | 10                                                                            | 13,500                                                      | 700-1600                              | 500                                                                                         | 2.2                  | 16                                                 | -40 to 125                                       | .28                                                       | 100 |

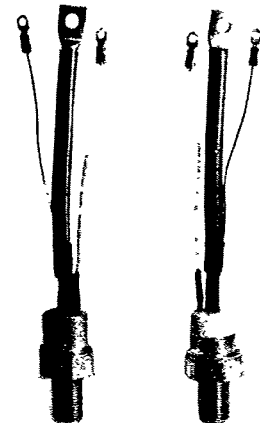
\* =  $25^\circ\text{C}$  Rating

° = Other Packages Available, Contact Factory

| Typical<br>ton<br>( $\mu$ sec) | Min<br>di/dt<br>@ $T_{J(Max)}$<br>Repetitive<br>on-state<br>(A/ $\mu$ sec) | Min<br>dv/dt<br>@ $T_{J(Max)}$<br>(V/ $\mu$ sec) | Max<br>V <sub>GT</sub><br>(V) | Max<br>I <sub>GT</sub><br>(mA) | PACKAGE INFORMATION                           |              | STYLE          | Outline           | TYPE NO.    |
|--------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|-------------------------------|--------------------------------|-----------------------------------------------|--------------|----------------|-------------------|-------------|
|                                |                                                                            |                                                  |                               |                                | Max<br>Mounting<br>Force or<br>Torque         |              |                |                   |             |
| —                              | 100                                                                        | 100                                              | 3                             | 40-80                          | $\frac{30 \text{ lb-in}}{35 \text{ kg-cm}}$   |              | 1/4-28<br>Stud | TO-48             | 2N5204-5207 |
| —                              | 30-100                                                                     | —                                                | 3                             | 80                             | $\frac{25 \text{ lb-in}}{29 \text{ kg-cm}}$   | Non-Isolated | Stud           | —                 | °C228       |
| —                              | 30-100                                                                     | —                                                | 3                             | 80                             | $\frac{800 \text{ lb}}{3.6 \text{ KN}}$       | Press<br>Fit | —              | —                 | C229        |
| —                              | 75-150                                                                     | 100                                              | 3                             | 80                             | $\frac{30 \text{ lb-in}}{35 \text{ kg-cm}}$   |              | 1/4-28<br>Stud | TO-48             | C137        |
| 1.4                            | 80                                                                         | 20                                               | 3                             | 80                             | $\frac{30 \text{ lb-in}}{35 \text{ kg-cm}}$   |              | 1/4-28<br>Stud | TO-48             | C38         |
| —                              | 100-200                                                                    | 200                                              | 3.5                           | 300                            | $\frac{30 \text{ lb-in}}{35 \text{ kg-cm}}$   |              | 1/4-28<br>Stud | Modified<br>TO-65 | C147        |
| 4                              | 800                                                                        | 300                                              | 3*                            | 150*                           | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-94<br>TO-83    | T500__40    |
| 4                              | 100                                                                        | 300                                              | 3*                            | 150*                           | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-94<br>TO-83    | T510__50    |
| —                              | 100                                                                        | 200                                              | 3                             | 130                            | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-83             | C45         |
| —                              | 100                                                                        | 200                                              | 3                             | 130                            | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-94             | C46         |
| 4                              | 200                                                                        | 200                                              | 3*                            | 75*                            | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-94             | 2N1909-1916 |
| —                              | 100-200                                                                    | 200                                              | 3                             | 130                            | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-94             | C50         |
| —                              | 100-200                                                                    | 200                                              | 3                             | 130                            | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-83             | C52         |
| 4                              | 200                                                                        | 200                                              | 3*                            | 75*                            | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-83             | 2N1792-1800 |
| —                              | 500                                                                        | 200                                              | 3                             | 200                            | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-94             | C150        |
| —                              | 500                                                                        | 200                                              | 3                             | 200                            | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-83             | C152        |
| 4                              | 800                                                                        | 300                                              | 3*                            | 70*                            | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-94             | 2N1805-1806 |
| 4                              | 800                                                                        | 100                                              | 3*                            | 250*                           | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-94             | 2N4361-4368 |
| 4                              | 800                                                                        | 100                                              | 3*                            | 250*                           | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-83             | 2N4371-4378 |
| 4                              | 100                                                                        | 300                                              | 3*                            | 70 to<br>150*                  | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-83/<br>TO-94   | T510__80    |
| 4                              | 800                                                                        | 300                                              | 3*                            | 100 to<br>150*                 | $\frac{130 \text{ lb-in}}{152 \text{ kg-cm}}$ |              | 1/2-20<br>Stud | TO-83             | T500__80    |



JEDEC TO-92



JEDEC TO-93



T-91-01

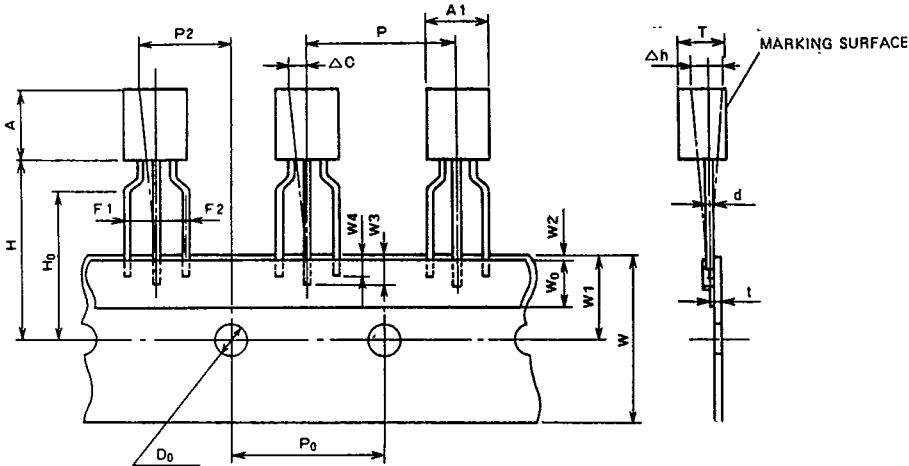
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272  
Powerex Europe, S.A., 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Taping

STANDARD SPECIFICATIONS  
FOR TAPING OF MOLDED  
PACKAGE THYRISTORS AND  
TRIACS

TO-92 Package

Thyristor  
CR02AM, CR03AM, CR04AM  
Triac  
BCR1AM



Taping dimensions

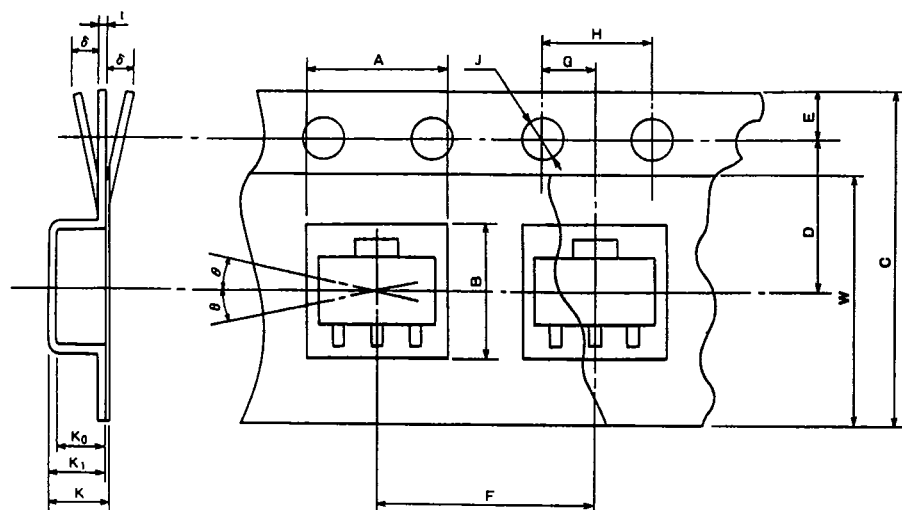
| Description of symbol              | Symbol         | Dimensions (Unit:mm)                 | Remark                                              |
|------------------------------------|----------------|--------------------------------------|-----------------------------------------------------|
| Product width                      | A1             | 5.0 MAX                              |                                                     |
| Product height                     | A              | 5.0 MAX                              |                                                     |
| Product thickness                  | T              | 3.7 MAX                              |                                                     |
| Lead wire diameter                 | d              | 0.6 MAX                              |                                                     |
| Sticker lead wire length (1)       | W3             | 2.5 MIN                              |                                                     |
| Sticker lead wire length (2)       | W4             | 2.0 MIN                              |                                                     |
| Pitch between products             | P              | 12.7 ± 1.0                           |                                                     |
| Feed hole pitch                    | P <sub>0</sub> | 12.7 ± 0.3                           | The cumulative pitch error is ± 1mm per 20 pitches. |
| Feed hole deviation (1)            | P2             | 6.35 ± 1.3                           |                                                     |
| Distance between lead wires        | F1, F2         | 2.5 ± 0.4                            |                                                     |
| Defective product (1)              | Δh             | 0 ± 2.0                              |                                                     |
| Tape width                         | W              | 18.0 ± <sup>1.0</sup> <sub>0.5</sub> |                                                     |
| Sticker tape width                 | W <sub>0</sub> | 6.0 ± 0.5                            |                                                     |
| Feed hole deviation (2)            | W1             | 9.0 ± 0.5                            |                                                     |
| Sticker tape deviation             | W2             | 0.5 MAX                              |                                                     |
| Position of product bottom surface | H              | 17.5 MIN                             |                                                     |
| Lynch height of lead wire          | H <sub>0</sub> | 16.0 ± 0.5                           |                                                     |
| Feed hole diameter                 | D <sub>0</sub> | 4.0 ± 0.2                            |                                                     |
| Tape thickness                     | t              | 0.7 ± 0.2                            |                                                     |
| Defective product (2)              | ΔC             | 0 ± 1.0                              |                                                     |



Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

Powerex Europe, S.A., 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

**Powerex Semiconductor Data Book**  
**Taping**



**SOT-89 Package**

Thyristor  
CR08AS

**Taping dimensions**

| Description of symbol         |                    | Symbol         | Dimensions/angles<br>Unit:mm | Remark                                                    |
|-------------------------------|--------------------|----------------|------------------------------|-----------------------------------------------------------|
| Parts Insertion               | Height             | A              | $5.0 \pm 0.1$                | Cross-section of the surface 0.5mm above the inner bottom |
|                               | Width              | B              | $4.6 \pm 0.1$                | Cross-section of the surface 0.5mm above the inner bottom |
| Concave square hole           | Depth              | K <sub>0</sub> | $1.8 \pm 0.1$                | Inner space                                               |
|                               | Pitch              | F              | $8.0 \pm 0.1$                | Cumulative error +0.1/-0.3 MAX/10 pitches                 |
| Round feed hole               | Diameter           | J              | $\phi 1.5 \pm 0.05$          |                                                           |
|                               | Pitch              | H              | $4.0 \pm 0.1$                | Cumulative error +0.1/-0.3 MAX/10 pitches                 |
|                               | Position           | E              | $1.5 \pm 0.1$                | Distance between the tape edge and the hole center        |
| Distance between center lines | Vertical           | G              | $2.0 \pm 0.5$                | Center line of concave square hole and round feed hole    |
|                               | Horizontal         | D              | $5.65 \pm 0.05$              | Center line of concave square hole and round feed hole    |
| Cover tape                    | Width              | W              | $9.5 + 0.3/-0$               | Thickness: 0.1 MAX                                        |
| Carrier tape                  | Width              | C              | $12 \pm 0.2$                 | Warp $\pm 0.3$ MAX                                        |
|                               | Thickness          | t              | $0.3 \pm 0.05$               |                                                           |
|                               | Package hole depth | K <sub>1</sub> | $2.1 \pm 0.1$                |                                                           |
| Device                        | Package dimensions | —              | —                            | As shown in (e)                                           |
|                               | Inclination        | $\theta$       | 30° MAX.                     |                                                           |
| Total Thickness               |                    | K              | $2.3 \pm 0.1$                | Total thickness including cover and carrier tapes         |