

# SCRs

(1 A to 70 A) RoHS

## General Description

The Teccor line of thyristor SCR semi-conductors are half-wave, unidirectional, gate-controlled rectifiers which complement Teccor's line of sensitive SCRs. Teccor offers devices with ratings of 1 A to 70 A and 200 V to 1000 V, with gate sensitivities from 10 mA to 50 mA. If gate currents in the 12  $\mu$ A to 500  $\mu$ A ranges are required, see "Sensitive SCRs" section of this catalog.

Three packages are offered in electrically isolated construction where the case or tab is internally isolated to allow the use of low-cost assembly and convenient packaging techniques.

The Teccor line of SCRs features glass-passivated junctions to ensure long-term reliability and parameter stability. Teccor's glass offers a rugged, reliable barrier against junction contamination.

Variations of devices covered in this data sheet are available for custom design applications. Consult the factory for more information.

## Features

- RoHS Compliant
- Electrically-isolated package
- High voltage capability — 200 V to 1000 V
- High surge capability — up to 950 A
- Glass-passivated chip

## Compak SCR

- Surface mount package — 1 A series
- New small profile three-leaded Compak package
- Packaged in embossed carrier tape with 2,500 devices per reel
- Can replace SOT-223

| TYPE  | Part Number |          |         |              |              |        | $I_T$        |             | $V_{DRM}$ & $V_{RRM}$ |      | $I_{GT}$ |       |
|---|-------------|----------|---------|--------------|--------------|--------|--------------|-------------|-----------------------|------|----------|-------|
|   | TO-92       | Isolated |         | Non-isolated |              |        | (1) (2) (15) |             |                       |      | (4)      |       |
|   |             | TO-220   | TO-202  | TO-220       | TO-251 V-Pak | Compak | TO-252 D-Pak | Amps        |                       |      | Volts    | mAmps |
| See "Package Dimensions" section for variations. (11) |             |          |         |              |              |        | $I_{T(RMS)}$ | $I_{T(AV)}$ | MIN                   | MIN  | MAX      |       |
| 1 A   | S201E       |          |         |              |              | S2N1   | 1            | 0.64        | 200                   | 1    | 10       |       |
|   | S401E       |          |         |              |              | S4N1   | 1            | 0.64        | 400                   | 1    | 10       |       |
|   | S601E       |          |         |              |              | S6N1   | 1            | 0.64        | 600                   | 1    | 10       |       |
| 6 A   |             | S2006L   | S2006F1 |              | S2006V       |        | S2006D       | 6           | 3.8                   | 200  | 1        | 15    |
|   |             | S4006L   | S4006F1 |              | S4006V       |        | S4006D       | 6           | 3.8                   | 400  | 1        | 15    |
|   |             | S6006L   | S6006F1 |              | S6006V       |        | S6006D       | 6           | 3.8                   | 600  | 1        | 15    |
|   |             | S8006L   |         |              | S8006V       |        | S8006D       | 6           | 3.8                   | 800  | 1        | 15    |
|   |             | SK006L   |         |              | SK006V       |        | SK006D       | 6           | 3.8                   | 1000 | 1        | 15    |
| 8 A   |             | S2008L   | S2008F1 | S2008R       | S2008V       |        | S2008D       | 8           | 5.1                   | 200  | 1        | 15    |
|   |             | S4008L   | S4008F1 | S4008R       | S4008V       |        | S4008D       | 8           | 5.1                   | 400  | 1        | 15    |
|   |             | S6008L   | S6008F1 | S6008R       | S6008V       |        | S6008D       | 8           | 5.1                   | 600  | 1        | 15    |
|   |             | S8008L   |         | S8008R       | S8008V       |        | S8008D       | 8           | 5.1                   | 800  | 1        | 15    |
|   |             | SK008L   |         | SK008R       | SK008V       |        | SK008D       | 8           | 5.1                   | 1000 | 1        | 15    |
| 10 A  |             | S2010L   | S2010F1 | S2010R       | S2010V       |        | S2010D       | 10          | 6.4                   | 200  | 1        | 15    |
|   |             | S4010L   | S4010F1 | S4010R       | S4010V       |        | S4010D       | 10          | 6.4                   | 400  | 1        | 15    |
|   |             | S6010L   | S6010F1 | S6010R       | S6010V       |        | S6010D       | 10          | 6.4                   | 600  | 1        | 15    |
|   |             | S8010L   |         | S8010R       | S8010V       |        | S8010D       | 10          | 6.4                   | 800  | 1        | 15    |
|   |             | SK010L   |         | SK010R       | SK010V       |        | SK010D       | 10          | 6.4                   | 1000 | 1        | 15    |
| 12 A  |             |          |         | S2012R       | S2012V       |        | S2012D       | 12          | 7.6                   | 200  | 1        | 20    |
|   |             |          |         | S4012R       | S4012V       |        | S4012D       | 12          | 7.6                   | 400  | 1        | 20    |
|   |             |          |         | S6012R       | S6012V       |        | S6012D       | 12          | 7.6                   | 600  | 1        | 20    |
|   |             |          |         | S8012R       | S8012V       |        | S8012D       | 12          | 7.6                   | 800  | 1        | 20    |
|   |             |          |         | SK012R       | SK012V       |        | SK012D       | 12          | 7.6                   | 1000 | 1        | 20    |

**Specific Test Conditions**

- $di/dt$  — Maximum rate-of-rise of on-state current;  $I_{GT} = 150$  mA with  $\leq 0.1$   $\mu$ s rise time
- $dv/dt$  — Critical rate of applied forward voltage
- $I^2t$  — RMS surge (non-repetitive) on-state current for period of 8.3 ms for fusing
- $I_{DRM}$  and  $I_{RRM}$  — Peak off-state forward and reverse current at  $V_{DRM}$  and  $V_{RRM}$
- $I_{gt}$  — dc gate trigger current;  $V_D = 12$  V dc;  $R_L = 60$   $\Omega$  for 1 to 16 A devices and 30  $\Omega$  for 20 to 70 A devices
- $I_{GM}$  — Peak gate current
- $I_H$  — dc holding current; gate open
- $I_T$  — Maximum on-state current
- $I_{TSM}$  — Peak one-cycle forward surge current
- $P_{G(AV)}$  — Average gate power dissipation
- $P_{GM}$  — Peak gate power dissipation
- $t_{gt}$  — Gate controlled turn-on time; gate pulse = 100 mA; minimum width = 15  $\mu$ s with rise time  $\leq 0.1$   $\mu$ s
- $t_q$  — Circuit commutated turn-off time

- $V_{DRM}$  and  $V_{RRM}$  — Repetitive peak off-state forward and reverse voltage
- $V_{gt}$  — DC gate trigger voltage;  $V_D = 12$  V dc;  $R_L = 60$   $\Omega$  for 1 to 16 A devices and 30  $\Omega$  for 20 to 70 A devices
- $V_{TM}$  — Peak on-state voltage at maximum rated RMS current

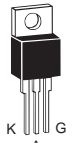
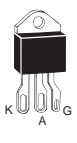
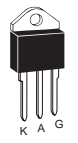
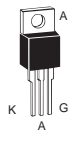
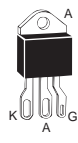
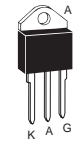
**General Notes**

- All measurements are made at 60 Hz with a resistive load at an ambient temperature of +25 °C unless otherwise specified.
- Operating temperature range ( $T_J$ ) is -65 °C to +125 °C for TO-92 devices and -40 °C to +125 °C for all other packages.
- Storage temperature range ( $T_S$ ) is -65 °C to +150 °C for TO-92 devices, -40 °C to +150 °C for TO-202 and TO-220 devices, and -40 °C to +125 °C for all others.
- Lead solder temperature is a maximum of 230 °C for 10 seconds maximum;  $\geq 1/16"$  (1.59 mm) from case.
- The case temperature ( $T_C$ ) is measured as shown on dimensional outline drawings in the "Package Dimensions" section of this catalog.

| I <sub>DRM</sub> & I <sub>RRM</sub> |                            |                            | V <sub>TM</sub>           | V <sub>GT</sub>           | I <sub>H</sub> | I <sub>GM</sub> | P <sub>GM</sub> | P <sub>G(AV)</sub> | I <sub>TSM</sub> | dv/dt                      |                            | I <sup>2</sup> t      | di/dt     | t <sub>gt</sub> | t <sub>q</sub> |
|-------------------------------------|----------------------------|----------------------------|---------------------------|---------------------------|----------------|-----------------|-----------------|--------------------|------------------|----------------------------|----------------------------|-----------------------|-----------|-----------------|----------------|
| (14)                                |                            |                            | (3)                       | (8)<br>(17)               | (5) (13)       | (12)            | (12)            |                    | (6) (10)         |                            |                            |                       |           | (7)             | (9) (10)       |
| mAmps                               |                            |                            | Volts                     | Volts                     |                |                 |                 |                    | Amps             | Volts/μSec                 |                            |                       |           |                 |                |
| T <sub>C</sub> =<br>25 °C           | T <sub>C</sub> =<br>100 °C | T <sub>C</sub> =<br>125 °C | T <sub>C</sub> =<br>25 °C | T <sub>C</sub> =<br>25 °C | mAmps          | Amps            | Watts           | Watts              | 60/50 Hz         | T <sub>C</sub> =<br>100 °C | T <sub>C</sub> =<br>125 °C | Amps <sup>2</sup> Sec | Amps/μSec | μSec            | μSec           |
| MAX                                 |                            |                            | MAX                       | MAX                       | MAX            |                 |                 |                    |                  | MIN                        | MIN                        |                       |           | TYP             | MAX            |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 1.5             | 15              | 0.3                | 30/25            | 40                         | 20                         | 3.7                   | 50        | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 1.5             | 15              | 0.3                | 30/25            | 40                         | 20                         | 3.7                   | 50        | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 1.5             | 15              | 0.3                | 30/25            | 40                         | 20                         | 3.7                   | 50        | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 350                        | 250                        | 41                    | 100       | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 350                        | 250                        | 41                    | 100       | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 300                        | 225                        | 41                    | 100       | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 250                        | 200                        | 41                    | 100       | 2               | 35             |
| 0.02                                | 3                          |                            | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 100                        |                            | 41                    | 100       | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 350                        | 250                        | 41                    | 100       | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 350                        | 250                        | 41                    | 100       | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 300                        | 225                        | 41                    | 100       | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 250                        | 200                        | 41                    | 100       | 2               | 35             |
| 0.02                                | 3                          |                            | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 100                        |                            | 41                    | 100       | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 350                        | 250                        | 41                    | 100       | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 350                        | 250                        | 41                    | 100       | 2               | 35             |
| 0.01                                | 0.2                        | 0.5                        | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 300                        | 225                        | 41                    | 100       | 2               | 35             |
| 0.02                                | 0.5                        | 1                          | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 250                        | 200                        | 41                    | 100       | 2               | 35             |
| 0.02                                | 3                          |                            | 1.6                       | 1.5                       | 30             | 2               | 20              | 0.5                | 100/83           | 100                        |                            | 41                    | 100       | 2               | 35             |
| 0.01                                | 0.5                        | 1                          | 1.6                       | 1.5                       | 40             | 2               | 20              | 0.5                | 120/100          | 350                        | 250                        | 60                    | 100       | 2               | 35             |
| 0.01                                | 0.5                        | 1                          | 1.6                       | 1.5                       | 40             | 2               | 20              | 0.5                | 120/100          | 350                        | 250                        | 60                    | 100       | 2               | 35             |
| 0.01                                | 0.5                        | 1                          | 1.6                       | 1.5                       | 40             | 2               | 20              | 0.5                | 120/100          | 300                        | 225                        | 60                    | 100       | 2               | 35             |
| 0.02                                | 0.5                        | 1                          | 1.6                       | 1.5                       | 40             | 2               | 20              | 0.5                | 120/100          | 250                        | 200                        | 60                    | 100       | 2               | 35             |
| 0.02                                | 3                          |                            | 1.6                       | 1.5                       | 40             | 2               | 20              | 0.5                | 120/100          | 100                        |                            | 60                    | 100       | 2               | 35             |

## Electrical Specification Notes

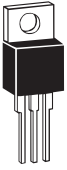
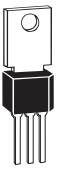
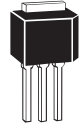

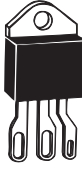
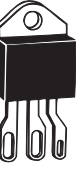
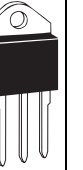


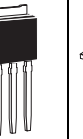

- See Figure E6.5 through Figure E6.16 for current rating at specified operating case temperature.
- See Figure E6.1 and Figure E6.2 for free air current rating.
- See Figure E6.19 and Figure E6.20 for instantaneous on-state current versus on-state voltage (typical).
- See Figure E6.18 for I<sub>GT</sub> versus T<sub>C</sub>.
- See Figure E6.17 for I<sub>H</sub> versus T<sub>C</sub>.
- For more than one full cycle rating, see Figure E6.23.
- See Figure E6.22 for t<sub>gt</sub> versus I<sub>GT</sub>.
- See Figure E6.21 for V<sub>GT</sub> versus T<sub>C</sub>.
- Test conditions are as follows:
  - I<sub>T</sub> = 1 A for 1 A devices and 2 A for all other devices
  - Pulse duration = 50 μs, dv/dt = 20 V/μs, di/dt = -10 A/μs for 1 A devices, and -30 A/μs for other devices
  - I<sub>GT</sub> = 200 mA at turn-on
- See Figure E6.5 through Figure E6.10 for maximum allowable case temperatures at maximum rated current.
- See package outlines for lead form configuration. When ordering special lead forming, add type number as suffix to part number.
- Pulse width ≤ 10 μs
- Initial on-state current = 200 mA dc for 1 A through 16 A devices; 400 mA dc for 20 A through 70 A devices.
- T<sub>C</sub> = T<sub>J</sub> for test conditions in off state.
- The R, K, or M package rating is intended for high surge condition use only and not recommended for ≥ 50 A rms continuous current use since narrow pin lead temperature can exceed PCB solder melting temperature. Teccor's J package or W package is recommended for ≥ 50 A rms continuous current requirements.
- For various durations of an exponentially decaying current waveform, see Figure E6.3 and Figure E6.4. (t<sub>W</sub> is defined as 5 time constants.)
- Minimum non-trigger V<sub>GT</sub> at 125 °C is 0.2 V.

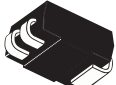
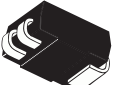
| TYPE  | Part Number   |   |   |   |   |   | I <sub>T</sub>      |                    | V <sub>DRM</sub> & V <sub>RRM</sub> | I <sub>GT</sub> |                         | I <sub>DRM</sub> & I <sub>RRM</sub> |      |     |   |
|---|---|---|---|---|---|---|---------------------|--------------------|-------------------------------------|-----------------|-------------------------|-------------------------------------|------|-----|---|
|   | Isolated  |   |   | Non-isolated  |   |   | (1) (15)            |                    | Volts                               | (4)             |                         | (14)                                |      |     |   |
|   |  |  |  |  |  |  | Amps                |                    |                                     | mAmps           | mAmps                   |                                     |      |     |   |
|   | TO-220  | TO-218X   | TO-218  | TO-220  | TO-218X   | TO-218  | I <sub>T(RMS)</sub> | I <sub>T(AV)</sub> | T <sub>C</sub> = 25 °C              |                 | T <sub>C</sub> = 100 °C | T <sub>C</sub> = 125 °C             |      |     |   |
| See "Package Dimensions" section for variations. (11) |   |   |   |   |   |   | MAX                 |                    | MIN                                 | MIN             | MAX                     | MAX                                 |      |     |   |
| 15 A  | S2015L  |   |   |   |   |   | 15                  | 9.5                | 200                                 | 1               | 30                      | 0.01                                | 0.5  | 1   |   |
|   | S4015L  |   |   |   |   |   | 15                  | 9.5                | 400                                 | 1               | 30                      | 0.01                                | 0.5  | 1   |   |
|   | S6015L  |   |   |   |   |   | 15                  | 9.5                | 600                                 | 1               | 30                      | 0.01                                | 0.5  | 1   |   |
|   | S8015L  |   |   |   |   |   | 15                  | 9.5                | 800                                 | 1               | 30                      | 0.02                                | 1    | 2   |   |
|   | SK015L  |   |   |   |   |   | 15                  | 9.5                | 1000                                | 1               | 30                      | 0.02                                | 3    |     |   |
| 16 A  |   |   |   | S2016R  |   | S2016N  | 16                  | 10                 | 200                                 | 1               | 30                      | 0.01                                | 0.5  | 1   |   |
|   |   |   |   | S4016R  |   | S4016N  | 16                  | 10                 | 400                                 | 1               | 30                      | 0.01                                | 0.5  | 1   |   |
|   |   |   |   | S6016R  |   | S6016N  | 16                  | 10                 | 600                                 | 1               | 30                      | 0.01                                | 0.5  | 1   |   |
|   |   |   |   | S8016R  |   | S8016N  | 16                  | 10                 | 800                                 | 1               | 30                      | 0.02                                | 1    | 2   |   |
|   |   |   |   | SK016R  |   | SK016N  | 16                  | 10                 | 1000                                | 1               | 30                      | 0.02                                | 3    |     |   |
| 20 A  | S2020L  |   |   |   |   |   | 20                  | 12.8               | 200                                 | 1               | 30                      | 0.01                                | 0.5  | 1   |   |
|   | S4020L  |   |   |   |   |   | 20                  | 12.8               | 400                                 | 1               | 30                      | 0.01                                | 0.5  | 1   |   |
|   | S6020L  |   |   |   |   |   | 20                  | 12.8               | 600                                 | 1               | 30                      | 0.01                                | 0.5  | 1   |   |
|   | S8020L  |   |   |   |   |   | 20                  | 12.8               | 800                                 | 1               | 30                      | 0.02                                | 1.0  | 2   |   |
|   | SK020L  |   |   |   |   |   | 20                  | 12.8               | 1000                                | 1               | 30                      | 0.02                                | 3    |     |   |
| 25 A  | S2025L  |   |   | S2025R  |   | S2025N  | 25                  | 16                 | 200                                 | 1               | 35                      | 0.01                                | 1    | 2   |   |
|   | S4025L  |   |   | S4025R  |   | S4025N  | 25                  | 16                 | 400                                 | 1               | 35                      | 0.01                                | 1    | 2   |   |
|   | S6025L  |   |   | S6025R  |   | S6025N  | 25                  | 16                 | 600                                 | 1               | 35                      | 0.01                                | 1    | 2   |   |
|   | S8025L  |   |   | S8025R  |   | S8025N  | 25                  | 16                 | 800                                 | 1               | 35                      | 0.02                                | 1.5  | 3   |   |
|   | SK025L  |   |   | SK025R  |   | SK025N  | 25                  | 16                 | 1000                                | 1               | 35                      | 0.02                                | 3    |     |   |
| 35 A  |   | S2035J  | S2035K  |   |   |   | 35                  | 22                 | 200                                 | 5               | 40                      | 0.01                                | 1    | 2   |   |
|   |   | S4035J  | S4035K  |   |   |   | 35                  | 22                 | 400                                 | 5               | 40                      | 0.01                                | 1    | 2   |   |
|   |   | S6035J  | S6035K  |   |   |   | 35                  | 22                 | 600                                 | 5               | 40                      | 0.01                                | 1    | 2   |   |
|   |   | S8035J  | S8035K  |   |   |   | 35                  | 22                 | 800                                 | 5               | 40                      | 0.02                                | 1.5  | 3   |   |
|   |   |   | SK035K  |   |   |   | 35                  | 22                 | 1000                                | 5               | 40                      | 0.02                                | 3    |     |   |
| 40 A  |   |   |   | S2040R  |   | S2040N  | 40                  | 25                 | 200                                 | 5               | 40                      | 0.01                                | 1    | 2   |   |
|   |   |   |   | S4040R  |   | S4040N  | 40                  | 25                 | 400                                 | 5               | 40                      | 0.01                                | 1    | 2   |   |
|   |   |   |   | S6040R  |   | S6040N  | 40                  | 25                 | 600                                 | 5               | 40                      | 0.01                                | 1    | 2   |   |
|   |   |   |   | S8040R  |   | S8040N  | 40                  | 25                 | 800                                 | 5               | 40                      | 0.02                                | 1.5  | 3   |   |
|   |   |   |   | SK040R  |   | SK040N  | 40                  | 25                 | 1000                                | 5               | 40                      | 0.03                                | 5    |     |   |
| 55 A  |   |   |   | S2055R  | S2055W  | S2055M  | S2055N              | 55                 | 35                                  | 200             | 5                       | 40                                  | 0.01 | 1   | 2 |
|   |   |   |   | S4055R  | S4055W  | S4055M  | S4055N              | 55                 | 35                                  | 400             | 5                       | 40                                  | 0.01 | 1   | 2 |
|   |   |   |   | S6055R  | S6055W  | S6055M  | S6055N              | 55                 | 35                                  | 600             | 5                       | 40                                  | 0.01 | 1   | 2 |
|   |   |   |   | S8055R  | S8055W  | S8055M  | S8055N              | 55                 | 35                                  | 800             | 5                       | 40                                  | 0.02 | 1.5 | 3 |
|   |   |   |   | SK055R  |   | SK055M  | SK055N              | 55                 | 35                                  | 1000            | 5                       | 40                                  | 0.03 | 5   |   |
| 65 A  |   | S2065J  | S2065K  |   |   |   | 65                  | 41                 | 200                                 | 5               | 50                      | 0.02                                | 1.5  | 3   |   |
|   |   | S4065J  | S4065K  |   |   |   | 65                  | 41                 | 400                                 | 5               | 50                      | 0.02                                | 1.5  | 3   |   |
|   |   | S6065J  | S6065K  |   |   |   | 65                  | 41                 | 600                                 | 5               | 50                      | 0.02                                | 1.5  | 3   |   |
|   |   | S8065J  | S8065K  |   |   |   | 65                  | 41                 | 800                                 | 5               | 50                      | 0.02                                | 2    | 5   |   |
|   |   |   | SK065K  |   |   |   | 65                  | 41                 | 1000                                | 5               | 50                      | 0.03                                | 5    |     |   |
| 70 A  |   |   |   | S2070W  |   |   | 70                  | 45                 | 200                                 | 5               | 50                      | 0.02                                | 1.5  | 3   |   |
|   |   |   |   | S4070W  |   |   | 70                  | 45                 | 400                                 | 5               | 50                      | 0.02                                | 1.5  | 3   |   |
|   |   |   |   | S6070W  |   |   | 70                  | 45                 | 600                                 | 5               | 50                      | 0.02                                | 1.5  | 3   |   |
|   |   |   |   | S8070W  |   |   | 70                  | 45                 | 800                                 | 5               | 50                      | 0.02                                | 2    | 5   |   |

See "General Notes" on page E6 - 2 and "Electrical Specification Notes" on page E6 - 3.

| V <sub>TM</sub>        | V <sub>GT</sub>        | I <sub>H</sub> | I <sub>GM</sub> | P <sub>GM</sub> | P <sub>G(AV)</sub> | I <sub>TSM</sub> | dv/dt                   |                         | I <sup>2</sup> t      | di/dt     | t <sub>gt</sub> | t <sub>q</sub> |
|------------------------|------------------------|----------------|-----------------|-----------------|--------------------|------------------|-------------------------|-------------------------|-----------------------|-----------|-----------------|----------------|
| (3)                    | (8) (17)               | (5) (13)       | (12)            | (12)            |                    | (6) (10) (16)    |                         |                         |                       |           | (7)             | (9) (10)       |
| Volts                  | Volts                  | mAmps          | Amps            | Watts           | Watts              | Amps             | Volts/μSec              |                         | Amps <sup>2</sup> Sec | Amps/μSec | μSec            | μSec           |
| T <sub>C</sub> = 25 °C | T <sub>C</sub> = 25 °C |                |                 |                 |                    | 60/50 Hz         | T <sub>C</sub> = 100 °C | T <sub>C</sub> = 125 °C |                       |           |                 |                |
| MAX                    | MAX                    | MAX            |                 |                 |                    |                  | MIN                     | MIN                     |                       |           | TYP             | MAX            |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 225/188          | 450                     | 350                     | 210                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 225/188          | 450                     | 350                     | 210                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 225/188          | 425                     | 325                     | 210                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 225/188          | 400                     | 300                     | 210                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 225/188          | 200                     |                         | 210                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 225/188          | 450                     | 350                     | 210                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 225/188          | 450                     | 350                     | 210                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 225/188          | 425                     | 325                     | 210                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 225/188          | 400                     | 300                     | 210                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 225/188          | 200                     |                         | 210                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 300/255          | 450                     | 350                     | 374                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 300/255          | 450                     | 350                     | 374                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 300/255          | 425                     | 325                     | 374                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 300/255          | 400                     | 300                     | 374                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 40             | 3               | 30              | 0.6                | 300/255          | 200                     |                         | 374                   | 125       | 2               | 35             |
| 1.6                    | 1.5                    | 50             | 3.5             | 35              | 0.8                | 350/300          | 450                     | 350                     | 510                   | 150       | 2               | 35             |
| 1.6                    | 1.5                    | 50             | 3.5             | 35              | 0.8                | 350/300          | 450                     | 350                     | 510                   | 150       | 2               | 35             |
| 1.6                    | 1.5                    | 50             | 3.5             | 35              | 0.8                | 350/300          | 425                     | 325                     | 510                   | 150       | 2               | 35             |
| 1.6                    | 1.5                    | 50             | 3.5             | 35              | 0.8                | 350/300          | 400                     | 300                     | 510                   | 150       | 2               | 35             |
| 1.6                    | 1.5                    | 50             | 3.5             | 35              | 0.8                | 350/300          | 200                     |                         | 510                   | 150       | 2               | 35             |
| 1.8                    | 1.5                    | 50             | 3.5             | 35              | 0.8                | 500/425          | 450                     | 350                     | 1035                  | 150       | 2               | 35             |
| 1.8                    | 1.5                    | 50             | 3.5             | 35              | 0.8                | 500/425          | 450                     | 350                     | 1035                  | 150       | 2               | 35             |
| 1.8                    | 1.5                    | 50             | 3.5             | 35              | 0.8                | 500/425          | 425                     | 325                     | 1035                  | 150       | 2               | 35             |
| 1.8                    | 1.5                    | 50             | 3.5             | 35              | 0.8                | 500/425          | 400                     | 300                     | 1035                  | 150       | 2               | 35             |
| 1.8                    | 1.5                    | 50             | 3.5             | 35              | 0.8                | 500/425          | 200                     |                         | 1035                  | 150       | 2               | 35             |
| 1.8                    | 1.5                    | 60             | 3.5             | 35              | 0.8                | 520/430          | 650                     | 550                     | 1122                  | 175       | 2.5             | 35             |
| 1.8                    | 1.5                    | 60             | 3.5             | 35              | 0.8                | 520/430          | 650                     | 550                     | 1122                  | 175       | 2.5             | 35             |
| 1.8                    | 1.5                    | 60             | 3.5             | 35              | 0.8                | 520/430          | 600                     | 500                     | 1122                  | 175       | 2.5             | 35             |
| 1.8                    | 1.5                    | 60             | 3.5             | 35              | 0.8                | 520/430          | 500                     | 475                     | 1122                  | 175       | 2.5             | 35             |
| 1.8                    | 1.5                    | 60             | 3.5             | 35              | 0.8                | 520/430          | 250                     |                         | 1122                  | 175       | 2.5             | 35             |
| 1.8                    | 1.5                    | 60             | 4               | 40              | 0.8                | 650/550          | 650                     | 550                     | 1750                  | 175       | 2.5             | 35             |
| 1.8                    | 1.5                    | 60             | 4               | 40              | 0.8                | 650/550          | 650                     | 550                     | 1750                  | 175       | 2.5             | 35             |
| 1.8                    | 1.5                    | 60             | 4               | 40              | 0.8                | 650/550          | 600                     | 500                     | 1750                  | 175       | 2.5             | 35             |
| 1.8                    | 1.5                    | 60             | 4               | 40              | 0.8                | 650/550          | 500                     | 475                     | 1750                  | 175       | 2.5             | 35             |
| 1.8                    | 1.5                    | 60             | 4               | 40              | 0.8                | 650/550          | 250                     |                         | 1750                  | 175       | 2.5             | 35             |
| 1.8                    | 2                      | 80             | 5               | 50              | 1                  | 950/800          | 650                     | 550                     | 3745                  | 200       | 2.5             | 35             |
| 1.8                    | 2                      | 80             | 5               | 50              | 1                  | 950/800          | 650                     | 550                     | 3745                  | 200       | 2.5             | 35             |
| 1.8                    | 2                      | 80             | 5               | 50              | 1                  | 950/800          | 600                     | 500                     | 3745                  | 200       | 2.5             | 35             |
| 1.8                    | 2                      | 80             | 5               | 50              | 1                  | 950/800          | 500                     | 475                     | 3745                  | 200       | 2.5             | 35             |
| 1.8                    | 2                      | 80             | 5               | 50              | 1                  | 950/800          | 250                     |                         | 3745                  | 200       | 2.5             | 35             |
| 1.8                    | 2                      | 80             | 5               | 50              | 1                  | 950/800          | 650                     | 550                     | 3745                  | 200       | 2.5             | 35             |
| 1.8                    | 2                      | 80             | 5               | 50              | 1                  | 950/800          | 650                     | 550                     | 3745                  | 200       | 2.5             | 35             |
| 1.8                    | 2                      | 80             | 5               | 50              | 1                  | 950/800          | 600                     | 500                     | 3745                  | 200       | 2.5             | 35             |
| 1.8                    | 2                      | 80             | 5               | 50              | 1                  | 950/800          | 500                     | 475                     | 3745                  | 200       | 2.5             | 35             |

See "General Notes" on page E6 - 2 and "Electrical Specification Notes" on page E6 - 3.

| Thermal Resistance (Steady State)<br>R <sub>θJC</sub> [R <sub>θJA</sub> ] °C/W (TYP.) |   |   |   |   |  |  |   |   |   |  |  |
|---|---|---|---|---|--|--|---|---|---|--|--|
| Pkg. Code   | L   | F   | F2  | R   | J  | W  | K   | M   | D   | V  | N  |
| Type  | <br>TO-220<br>Isolated | <br>TO-202<br>Type 1<br>Non-isolated | <br>TO-202<br>Type 2<br>Non-isolated | <br>TO-220<br>Non-isolated | <br>TO-218X<br>Isolated | <br>TO-218X<br>Non-isolated | <br>TO-218<br>Isolated | <br>TO-218<br>Non-isolated | <br>TO-252<br>D-Pak<br>Surface Mount | <br>TO-251AA<br>V-Pak<br>Non-isolated | <br>TO-263<br>D²Pak<br>Non-isolated |
| 1 A   | See below   |   |   |   |  |  |   |   |   |  |  |
| 6 A   | 4.0 [50]  | 4.3 [45]  | 9.5 [70]  |   |  |  |   |   | 1.7   | 2.3 [70]   |  |
| 8 A   | 3.4   | 3.9   |   | 1.8 [40]  |  |  |   |   | 1.5   | 2.0  |  |
| 10 A  | 3.0   | 3.4   |   | 1.6   |  |  |   |   | 1.45  | 1.7  |  |
| 12 A  |   |   |   | 1.5   |  |  |   |   | 1.4   | 1.6  |  |
| 15 A  | 2.5   |   |   |   |  |  |   |   |   |  |  |
| 16 A  |   |   |   | 1.3   |  |  |   |   |   |  | 1.3  |
| 20 A  | 2.4   |   |   |   |  |  |   |   |   |  |  |
| 25 A  | 2.35  |   |   | 1.0   |  |  |   |   |   |  | 1.0  |
| 35 A  |   |   |   |   | 0.70   |  | 0.70  |   |   |  |  |
| 40 A  |   |   |   | 0.6   |  |  |   |   |   |  | 0.6  |
| 55 A  |   |   |   | 0.5   |  | 0.53   |   | 0.53  |   |  | 0.5  |
| 65 A  |   |   |   |   | 0.86   |  | 0.86  |   |   |  |  |
| 70 A  |   |   |   |   |  | 0.60   |   |   |   |  |  |

| Thermal Resistance (Steady State)<br>R <sub>θJC</sub> [R <sub>θJA</sub> ] °C/W (TYP.) |   |  |
|---|---|--|
| Package Code  | C   | E  |
| Type  | <br>Compak | <br>TO-92 |
| 1 A   | 35 *  | 50 [145]   |

\* Mounted on 1cm<sup>2</sup> copper foil surface; two-ounce copper foil

### Electrical Isolation

Teccor's isolated SCR packages will withstand a minimum high potential test of 2500 V ac rms from leads to mounting tab over the device's operating temperature range. The following table shows standard and optional isolation ratings.

| Electrical Isolation *<br>from Leads to Mounting Tab |                 |                  |                 |
|--|-----------------|------------------|-----------------|
| V AC RMS   | TO-220 Isolated | TO-218X Isolated | TO-218 Isolated |
| 2500   | Standard        | Standard         | Standard        |
| 4000   | Optional **     | N/A              | N/A             |

\* UL Recognized File #E71639

\*\* For 4000 V isolation, use "V" suffix in part number.

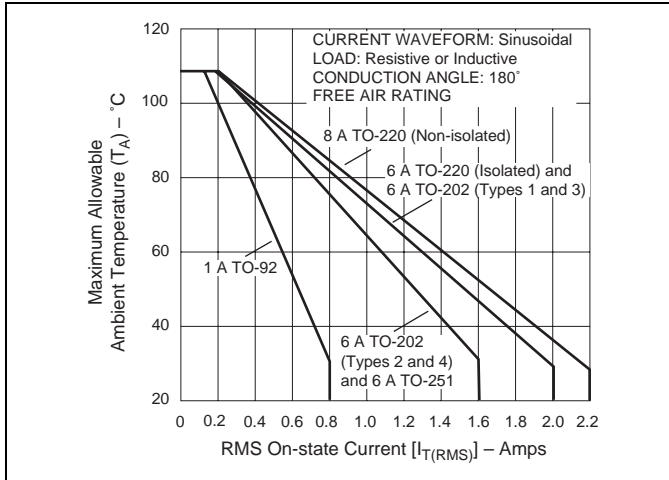


Figure E6.1 Maximum Allowable Ambient Temperature versus RMS On-state Current

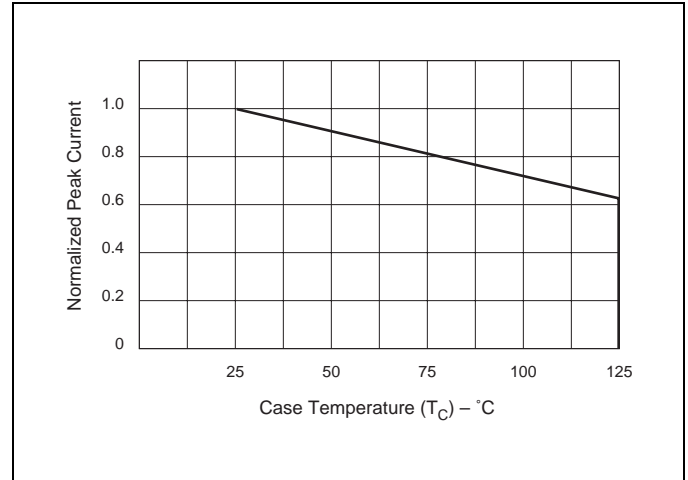


Figure E6.4 Peak Capacitor Discharge Current Derating (6 A through 55 A)

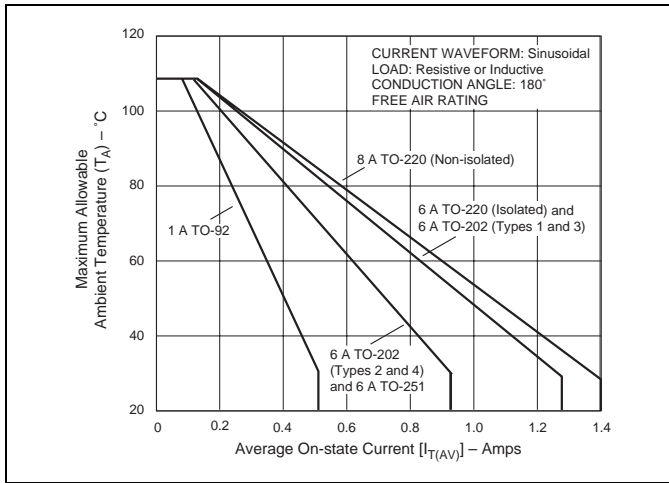


Figure E6.2 Maximum Allowable Ambient Temperature versus Average On-state Current

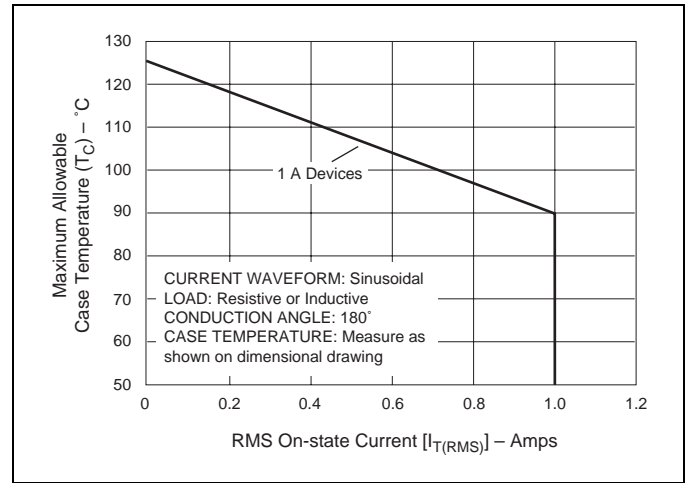


Figure E6.5 Maximum Allowable Case Temperature versus RMS On-state Current (1 A)

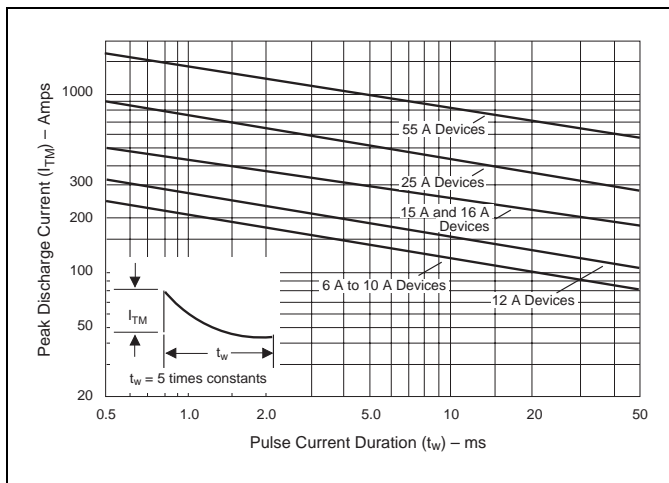


Figure E6.3 Peak Capacitor Discharge Current (6 A through 55 A)

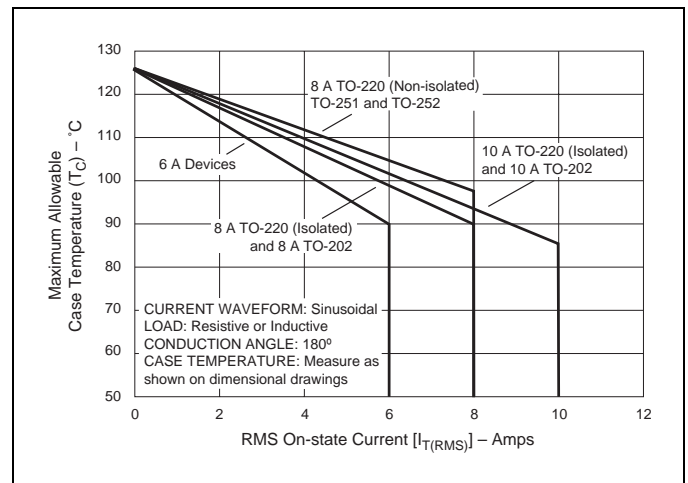


Figure E6.6 Maximum Allowable Case Temperature versus RMS On-state Current (6 A, 8 A, and 10 A)

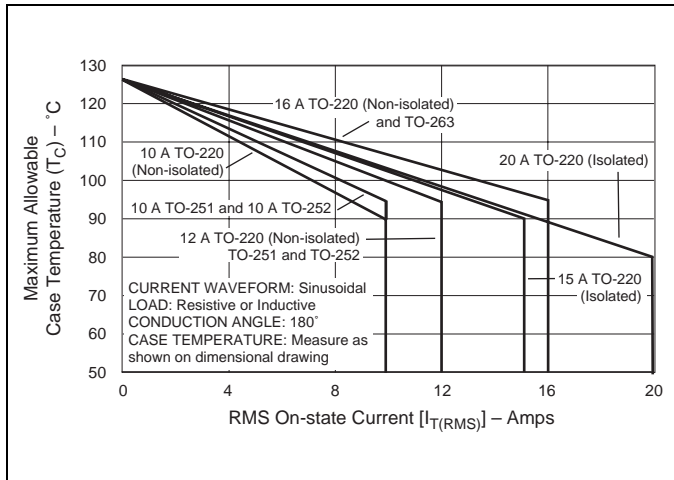


Figure E6.7 Maximum Allowable Case Temperature versus RMS On-state Current (10 A, 12 A, 16 A, and 20 A)

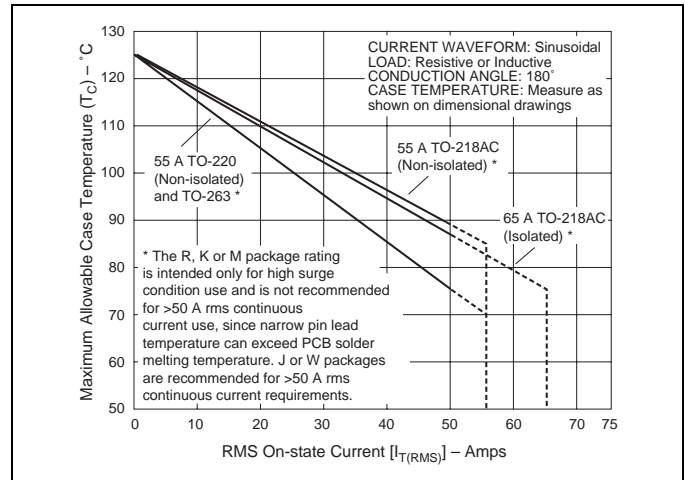


Figure E6.10 Maximum Allowable Case Temperature versus RMS On-state Current (55 A and 65 A)

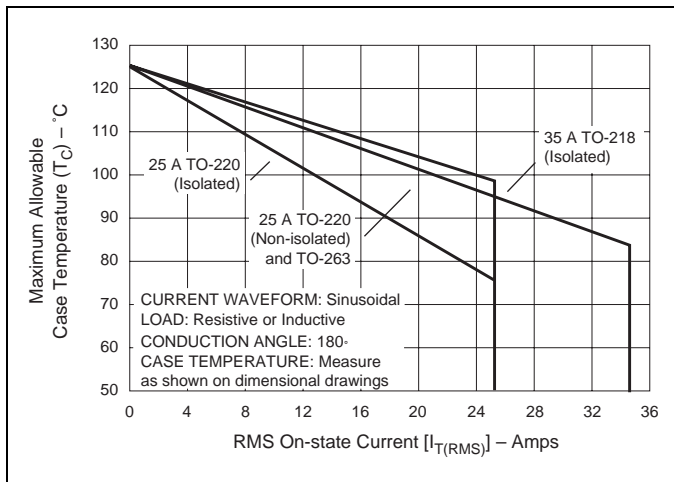


Figure E6.8 Maximum Allowable Case Temperature versus RMS On-state Current (25 A and 35 A)

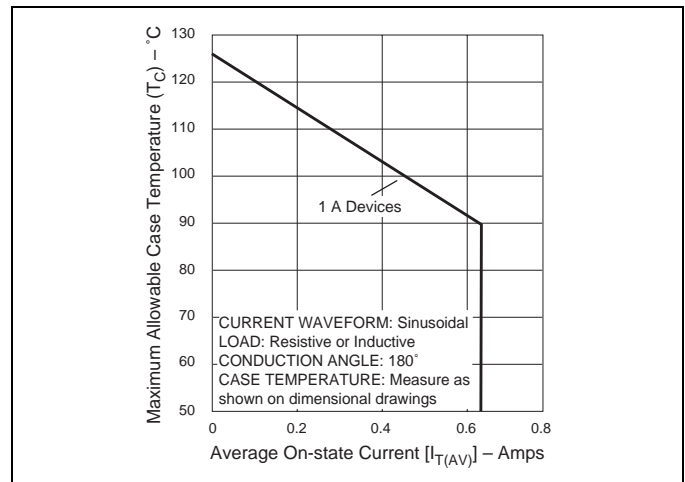


Figure E6.11 Maximum Allowable Case Temperature versus Average On-state Current (1 A)

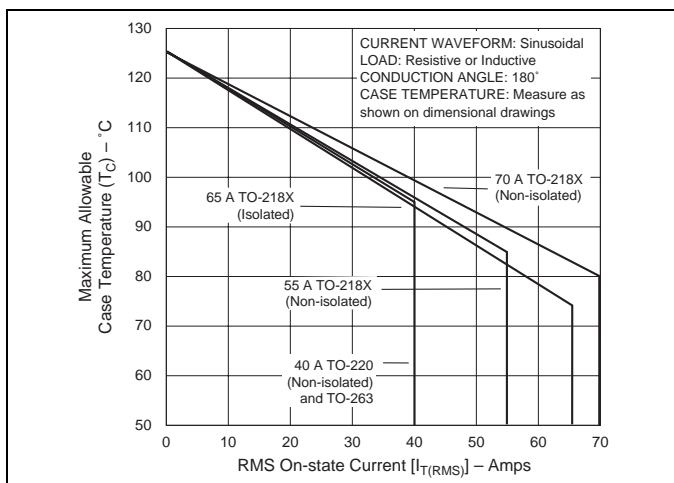


Figure E6.9 Maximum Allowable Case Temperature versus RMS On-state Current (40 A through 70 A)

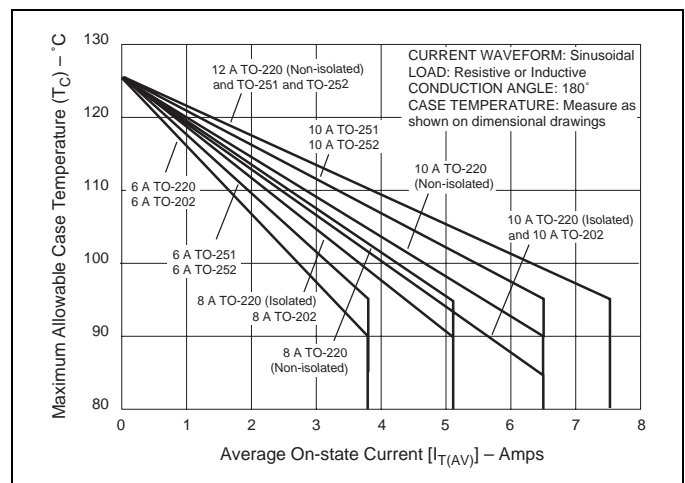


Figure E6.12 Maximum Allowable Case Temperature versus Average On-state Current (8 A, 10 A, and 12 A)



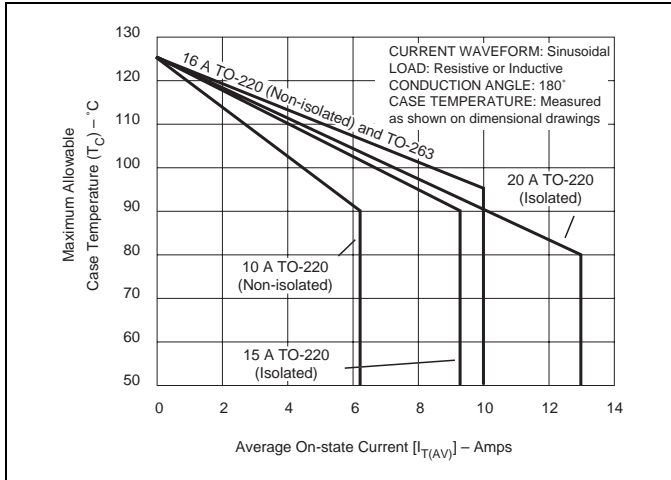


Figure E6.13 Maximum Allowable Case Temperature versus Average On-state Current (10 A through 20 A)

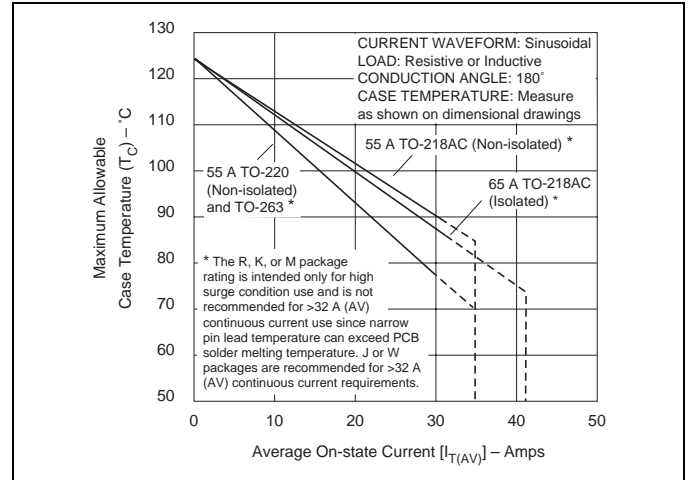


Figure E6.16 Maximum Allowable Case Temperature versus Average On-state Current (55 A and 65 A)

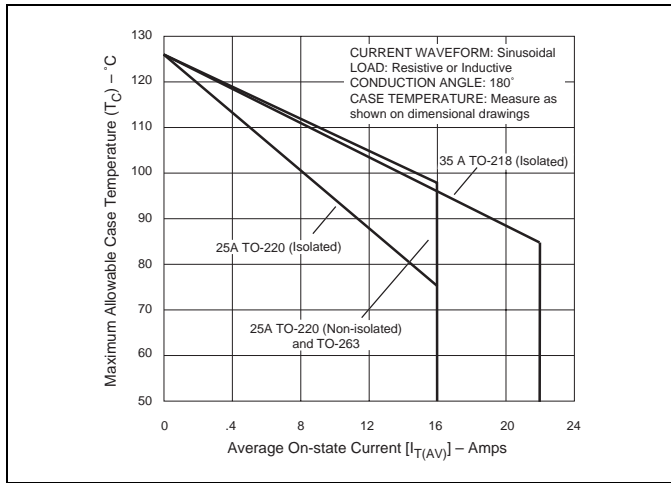


Figure E6.14 Maximum Allowable Case Temperature versus Average On-state Current (25 A and 35 A)

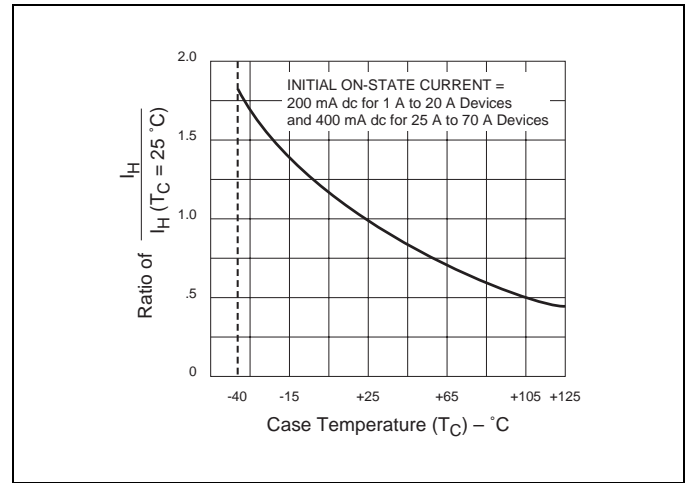


Figure E6.17 Normalized dc Holding Current versus Case Temperature

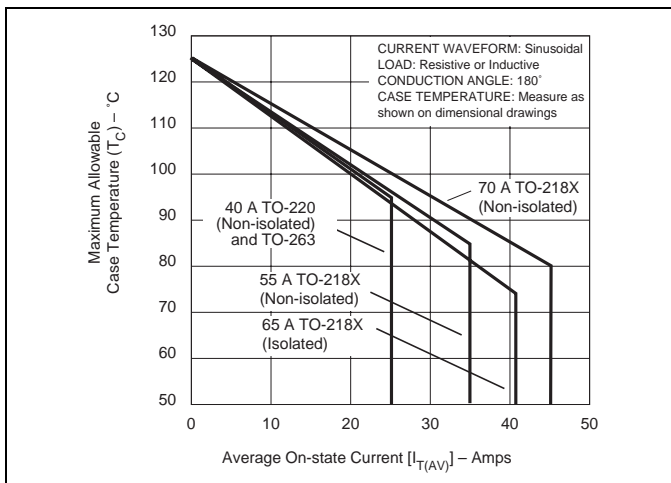


Figure E6.15 Maximum Allowable Case Temperature versus Average On-state Current (40 A through 70 A)

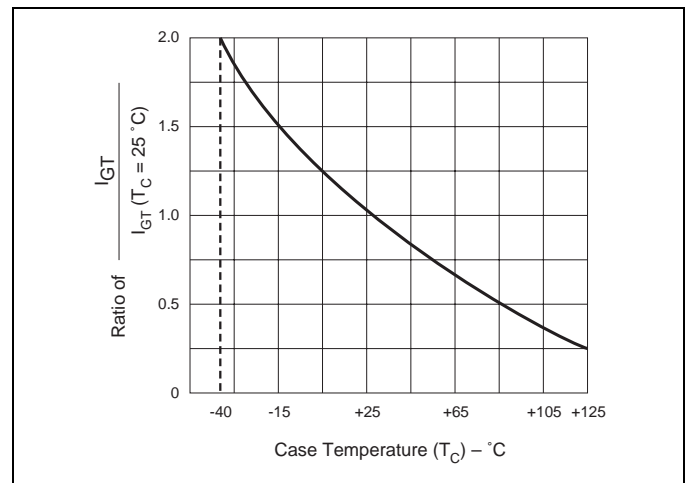


Figure E6.18 Normalized DC Gate-Trigger Current versus Case Temperature

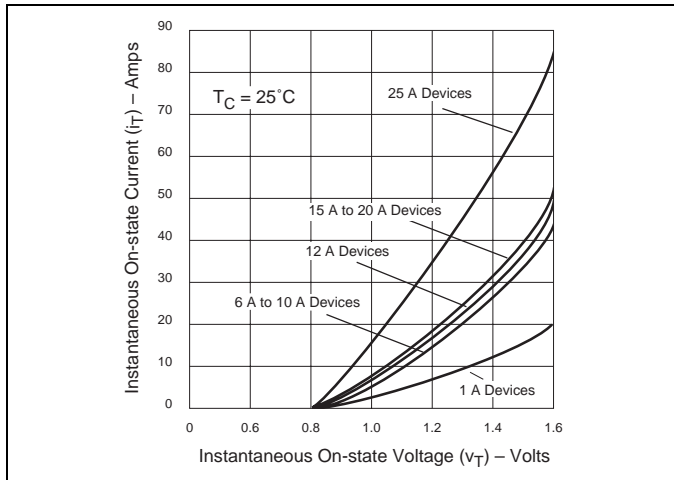


Figure E6.19 Instantaneous On-state Current versus On-state Voltage (Typical) (6 A through 25 A)

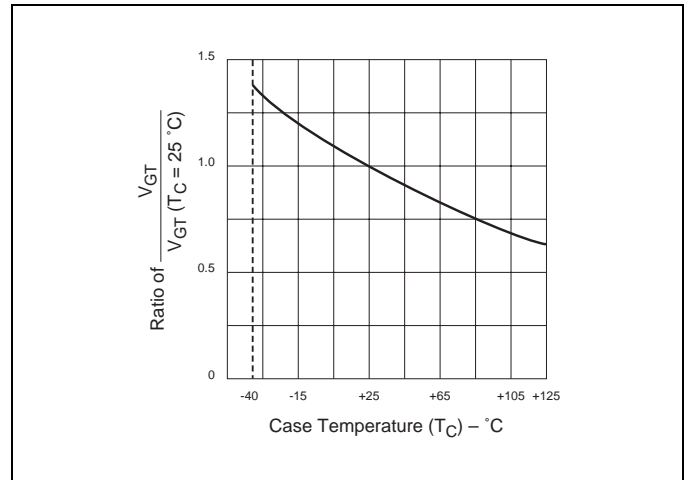


Figure E6.21 Normalized DC Gate-trigger Voltage versus Case Temperature

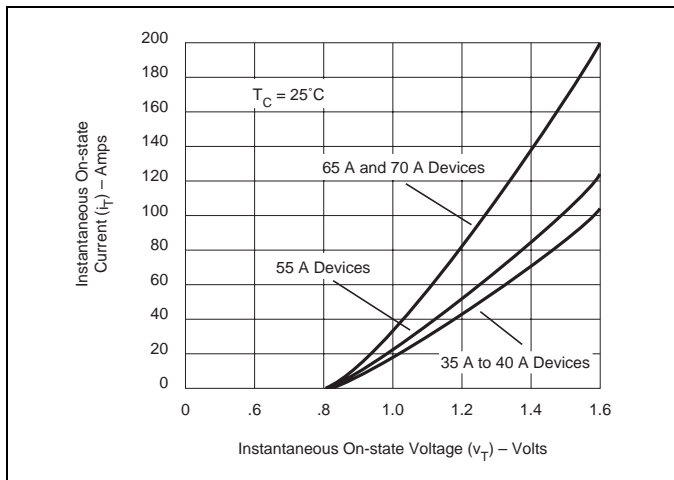


Figure E6.20 Instantaneous On-state Current versus On-state Voltage (Typical) (35 A through 70 A)

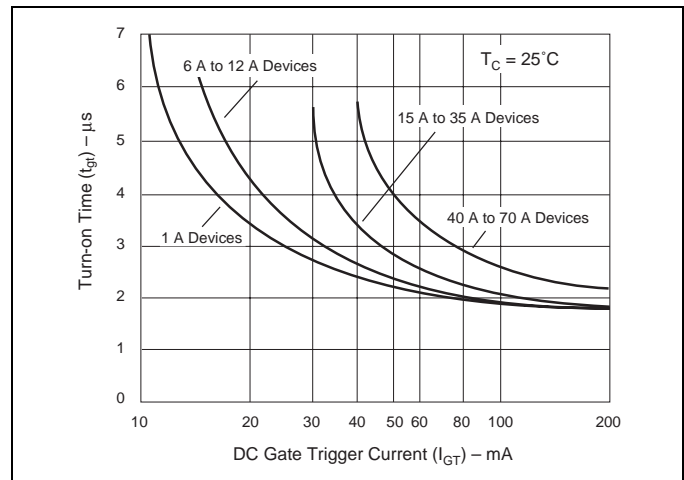


Figure E6.22 Typical Turn-on Time versus Gate-trigger Current

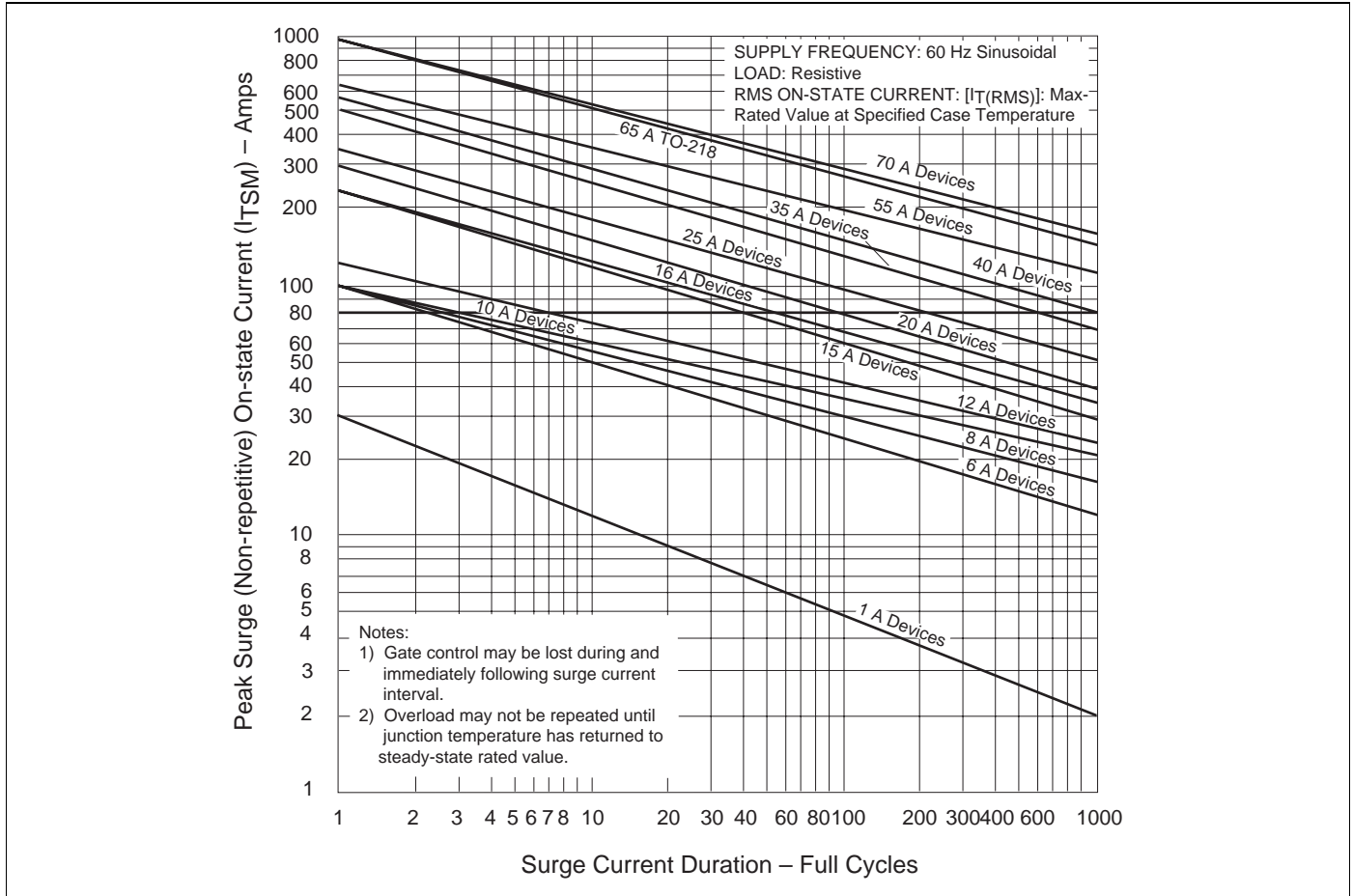


Figure E6.23 Peak Surge Current versus Surge Current Duration

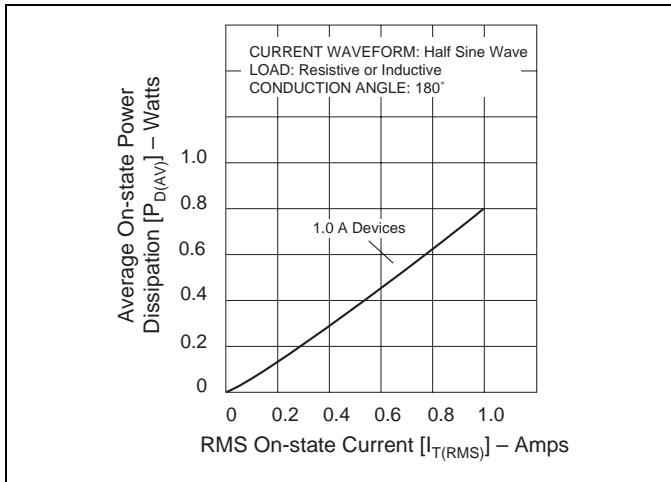


Figure E6.24 Power Dissipation (Typical) versus RMS On-state Current (1 A)

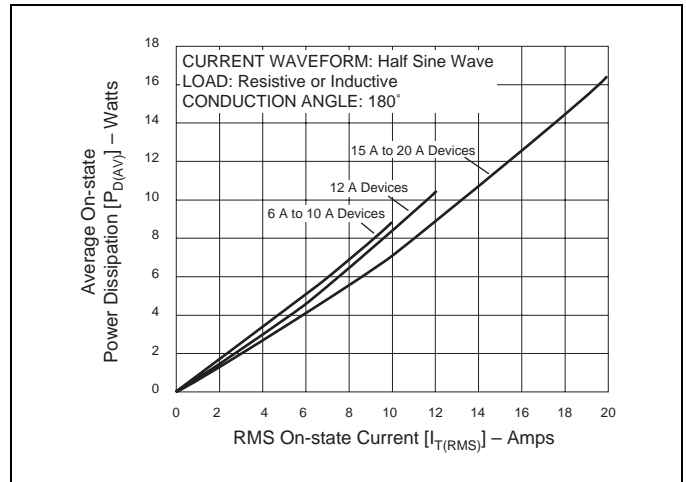


Figure E6.25 Power Dissipation (Typical) versus RMS On-state Current (6 A through 20 A)

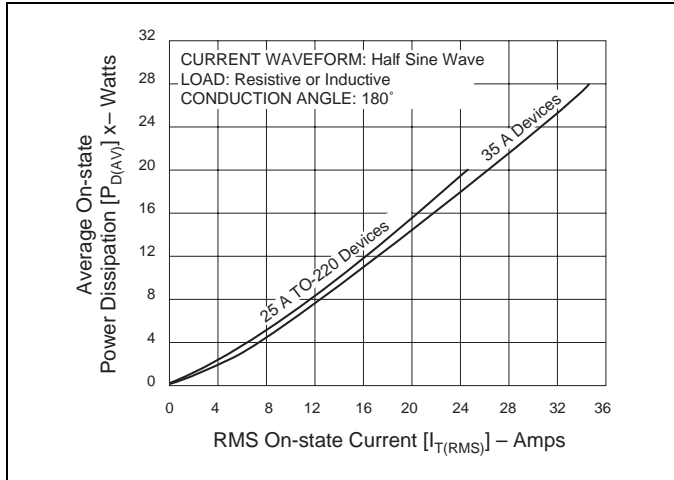


Figure E6.26 Power Dissipation (Typical) versus RMS On-state Current (25 A and 35 A)

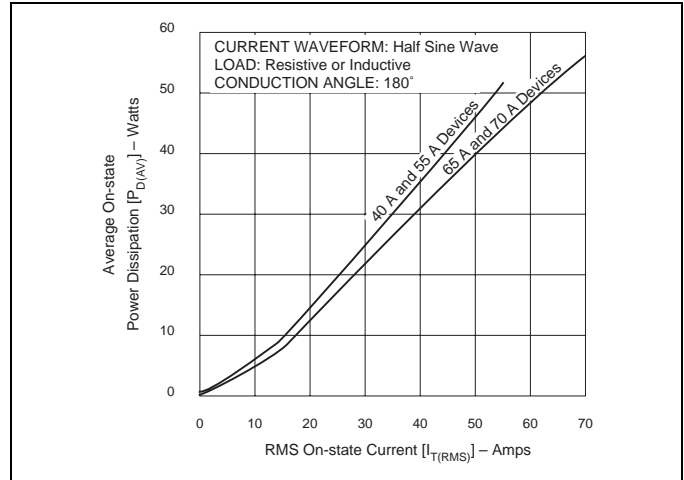


Figure E6.27 Power Dissipation (Typical) versus RMS On-state Current (40 A through 70 A)