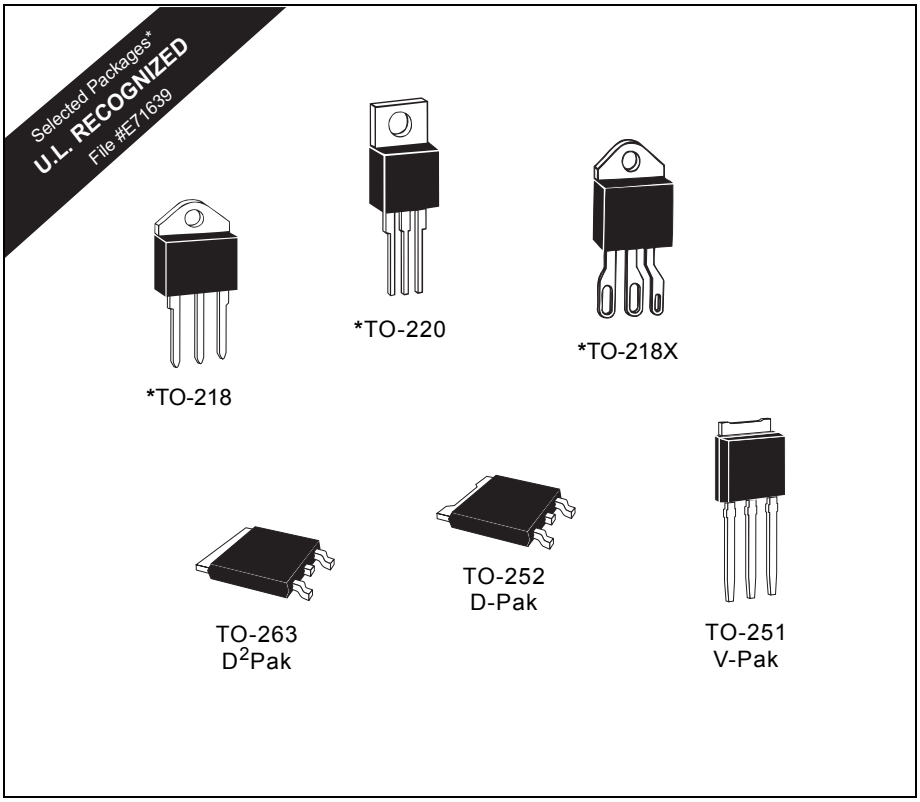
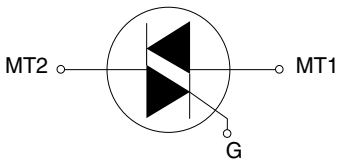



E4




# Alternistor Triacs

## (6 A to 40 A)

### General Description

Teccor offers bidirectional alternistors with current ratings from 6 A to 40 A and voltages from 200 V to 1000 V as part of Teccor's broad line of thyristors. Teccor's alternistor is specifically designed for applications that switch highly inductive loads. A special chip offers the same performance as two thyristors (SCRs) wired inverse parallel (back-to-back), providing better turn-off behavior than a standard triac. An alternistor may be triggered from a blocking to conduction state for either polarity of applied AC voltage with operating modes in Quadrants I, II, and III.

This new chip construction provides two electrically separate SCR structures, providing enhanced dv/dt characteristics while retaining the advantages of a single-chip device.

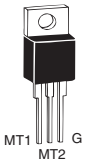
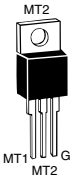
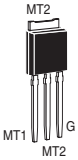
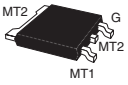
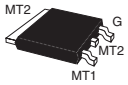
All alternistors have glass-passivated junctions to ensure long-term reliability and parameter stability. Teccor's glass-passivated junctions offer a reliable barrier against junction contamination.

Teccor's TO-218X package is designed for heavy, steady power-handling capability. It features large eyelet terminals for ease of soldering heavy gauge hook-up wire. All the isolated packages have a standard isolation voltage rating of 2500 V rms.

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

### Features

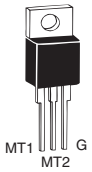
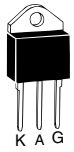
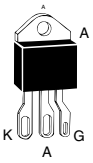
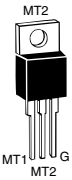
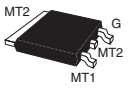
- **High surge current capability**
- **Glass-passivated junctions**
- **2500 V ac isolation for L, J, and K Packages**
- **High commutating dv/dt**
- **High static dv/dt**

| $I_{T(RMS)}$ | Part Number | | | | | $V_{DRM}$ | $I_{GT}$ | | | $I_{DRM}$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Isolated | Non-isolated | | | | | | | | | | |
| (4)(16) |  |  |  |  |  | (1) | (3) (7) (15) (17) | | | (1) (18) | | |
| | | | | | | | mAmps | | | mAmps | | |
| | T0-220 | TO-220 | TO-251<br>V-Pak | TO-252<br>D-Pak | TO-263<br>$D^2$Pak | Volts | QI | QII | QIII | $T_C$ = 25 °C | $T_C$ = 100 °C | $T_C$ = 125 °C |
| MAX | See “Package Dimensions” section for variations. (11) | | | | | MIN | MAX | | | MAX | | |
| | | | **Q2006VH3** | **Q2006DH3** | | **200** | **10** | **10** | **10** | **0.01** | **0.5** | **2** |
| | | | **Q4006VH3** | **Q4006DH3** | | **400** | **10** | **10** | **10** | **0.01** | **0.5** | **2** |
| | | | **Q6006VH3** | **Q6006DH3** | | **600** | **10** | **10** | **10** | **0.01** | **0.5** | **2** |
| | | | **Q8006VH3** | **Q8006DH3** | | **800** | **10** | **10** | **10** | **0.01** | **0.5** | **2** |
| | | | **QK006VH3** | **QK006DH3** | | **1000** | **10** | **10** | **10** | **0.02** | **2** | |
| | | | **Q2006VH4** | **Q2006DH4** | | **200** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| **6 A** | | | **Q4006VH4** | **Q4006DH4** | | **400** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | | | **Q6006VH4** | **Q6006DH4** | | **600** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | | | **Q8006VH4** | **Q8006DH4** | | **800** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | | | **QK006VH4** | **QK006DH4** | | **1000** | **35** | **35** | **35** | **0.02** | **2** | |
| | **Q2006LH4** | **Q2006RH4** | | | **Q2006NH4** | **200** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | **Q4006LH4** | **Q4006RH4** | | | **Q4006NH4** | **400** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | **Q6006LH4** | **Q6006RH4** | | | **Q6006NH4** | **600** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | **Q8006LH4** | **Q8006RH4** | | | **Q8006NH4** | **800** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | **QK006LH4** | **QK006RH4** | | | **QK006NH4** | **1000** | **35** | **35** | **35** | **0.02** | **3** | |
| | | | **Q2008VH3** | **Q2008DH3** | | **200** | **10** | **10** | **10** | **0.01** | **0.5** | **2** |
| | | | **Q4008VH3** | **Q4008DH3** | | **400** | **10** | **10** | **10** | **0.01** | **0.5** | **2** |
| | | | **Q6008VH3** | **Q6008DH3** | | **600** | **10** | **10** | **10** | **0.01** | **0.5** | **2** |
| | | | **Q8008VH3** | **Q8008DH3** | | **800** | **10** | **10** | **10** | **0.01** | **0.5** | **2** |
| | | | **QK008VH3** | **QK008DH3** | | **1000** | **10** | **10** | **10** | **0.02** | **2** | |
| | | | **Q2008VH4** | **Q2008DH4** | | **200** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| **8 A** | | | **Q4008VH4** | **Q4008DH4** | | **400** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | | | **Q6008VH4** | **Q6008DH4** | | **600** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | | | **Q8008VH4** | **Q8008DH4** | | **800** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | | | **QK008VH4** | **QK008DH4** | | **1000** | **35** | **35** | **35** | **0.02** | **2** | |
| | **Q2008LH4** | **Q2008RH4** | | | **Q2008NH4** | **200** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | **Q4008LH4** | **Q4008RH4** | | | **Q4008NH4** | **400** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | **Q6008LH4** | **Q6008RH4** | | | **Q6008NH4** | **600** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | **Q8008LH4** | **Q8008RH4** | | | **Q8008NH4** | **800** | **35** | **35** | **35** | **0.01** | **0.5** | **2** |
| | **QK008LH4** | **QK008RH4** | | | **QK008NH4** | **1000** | **35** | **35** | **35** | **0.02** | **3** | |
| | **Q2010LH5** | **Q2010RH5** | | | **Q2010NH5** | **200** | **50** | **50** | **50** | **0.01** | **0.5** | **2** |
| **10 A** | **Q4010LH5** | **Q4010RH5** | | | **Q4010NH5** | **400** | **50** | **50** | **50** | **0.01** | **0.5** | **2** |
| | **Q6010LH5** | **Q6010RH5** | | | **Q6010NH5** | **600** | **50** | **50** | **50** | **0.01** | **0.5** | **2** |
| | **Q8010LH5** | **Q8010RH5** | | | **Q8010NH5** | **800** | **50** | **50** | **50** | **0.01** | **0.5** | **2** |
| | **QK010LH5** | **QK010RH5** | | | **QK010NH5** | **1000** | **50** | **50** | **50** | **0.02** | **3** | |
| | **Q2012LH5** | **Q2012RH5** | | | **Q2012NH5** | **200** | **50** | **50** | **50** | **0.01** | **0.5** | **2** |
| **12 A** | **Q4012LH5** | **Q4012RH5** | | | **Q4012NH5** | **400** | **50** | **50** | **50** | **0.01** | **0.5** | **2** |
| | **Q6012LH5** | **Q6012RH5** | | | **Q6012NH5** | **600** | **50** | **50** | **50** | **0.01** | **0.5** | **2** |
| | **Q8012LH5** | **Q8012RH5** | | | **Q8012NH5** | **800** | **50** | **50** | **50** | **0.01** | **0.5** | **2** |
| | **QK012LH5** | **QK012RH5** | | | **QK012NH5** | **1000** | **50** | **50** | **50** | **0.02** | **3** | |

See “General Notes” and “Electrical Specification Notes” on page E4 - 5.

| $V_{GT}$ | $V_{TM}$ | $I_H$ | $I_{GTM}$ | $P_{GM}$ | $P_{G(AV)}$ | $I_{TSM}$ | dv/dt(c) | dv/dt | | $t_{gt}$ | $I^2t$ | di/dt |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (2) (6) (15) (17) (20) | (1) (5) | (1) (8) (12) | (14) | (14) | | (9) (13) | (1) (4) (13) | (1) | | (10) | | (19) |
| Volts | | | | | | Amps | | Volts/μSec | | | | |
| $T_C$ = 25 °C | Volts | mAmps | Amps | Watts | Watts | 60/50 Hz | Volts/μSec | $T_C$ = 100 °C | $T_C$ = 125 °C | μSec | $Amps^2Sec$ | Amps/μSec |
| MAX | MAX | MAX | | | | | MIN | MIN | | TYP | | |
| **1.3** | **1.6** | **15** | **1.6** | **18** | **0.4** | **65/55** | **20** | **100** | **75** | **4** | **17.5** | **70** |
| **1.3** | **1.6** | **15** | **1.6** | **18** | **0.4** | **65/55** | **20** | **100** | **75** | **4** | **17.5** | **70** |
| **1.3** | **1.6** | **15** | **1.6** | **18** | **0.4** | **65/55** | **20** | **75** | **50** | **4** | **17.5** | **70** |
| **1.3** | **1.6** | **15** | **1.6** | **18** | **0.4** | **65/55** | **20** | **50** | **40** | **4** | **17.5** | **70** |
| **1.3** | **1.6** | **15** | **1.6** | **18** | **0.4** | **65/55** | **20** | **40** | | **4** | **17.5** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **65/55** | **25** | **500** | **400** | **4** | **17.5** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **65/55** | **25** | **500** | **400** | **4** | **17.5** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **65/55** | **25** | **400** | **300** | **4** | **17.5** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **65/55** | **25** | **300** | **200** | **4** | **17.5** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **65/55** | **25** | **150** | | **4** | **17.5** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **85/80** | **25** | **750** | **600** | **4** | **30** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **85/80** | **25** | **575** | **450** | **4** | **30** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **85/80** | **25** | **425** | **350** | **4** | **30** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **85/80** | **25** | **300** | **250** | **4** | **30** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **85/80** | **25** | **150** | | **4** | **30** | **70** |
| **1.3** | **1.6** | **15** | **1.6** | **18** | **0.4** | **85/80** | **20** | **100** | **75** | **4** | **30** | **70** |
| **1.3** | **1.6** | **15** | **1.6** | **18** | **0.4** | **85/80** | **20** | **100** | **75** | **4** | **30** | **70** |
| **1.3** | **1.6** | **15** | **1.6** | **18** | **0.4** | **85/80** | **20** | **75** | **50** | **4** | **30** | **70** |
| **1.3** | **1.6** | **15** | **1.6** | **18** | **0.4** | **85/80** | **20** | **50** | **40** | **4** | **30** | **70** |
| **1.3** | **1.6** | **15** | **1.6** | **18** | **0.4** | **85/80** | **20** | **40** | | **4** | **30** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **85/80** | **25** | **750** | **400** | **4** | **30** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **85/80** | **25** | **575** | **450** | **4** | **30** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **85/80** | **25** | **425** | **350** | **4** | **30** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **85/80** | **25** | **300** | **250** | **4** | **30** | **70** |
| **1.3** | **1.6** | **35** | **1.6** | **18** | **0.5** | **85/80** | **25** | **150** | | **4** | **30** | **70** |
| **1.3** | **1.6** | **35** | **2** | **20** | **0.5** | **100/83** | **25** | **500** | **400** | **4** | **41** | **70** |
| **1.3** | **1.6** | **35** | **2** | **20** | **0.5** | **100/83** | **25** | **500** | **400** | **4** | **41** | **70** |
| **1.3** | **1.6** | **35** | **2** | **20** | **0.5** | **100/83** | **25** | **400** | **300** | **4** | **41** | **70** |
| **1.3** | **1.6** | **35** | **2** | **20** | **0.5** | **100/83** | **25** | **300** | **200** | **4** | **41** | **70** |
| **1.3** | **1.6** | **35** | **2** | **20** | **0.5** | **100/83** | **25** | **150** | | **4** | **41** | **70** |
| **1.3** | **1.6** | **50** | **2** | **20** | **0.5** | **120/110** | **30** | **1150** | **1000** | **4** | **60** | **70** |
| **1.3** | **1.6** | **50** | **2** | **20** | **0.5** | **120/110** | **30** | **1000** | **750** | **4** | **60** | **70** |
| **1.3** | **1.6** | **50** | **2** | **20** | **0.5** | **120/110** | **30** | **850** | **650** | **4** | **60** | **70** |
| **1.3** | **1.6** | **50** | **2** | **20** | **0.5** | **120/110** | **30** | **650** | **500** | **4** | **60** | **70** |
| **1.3** | **1.6** | **50** | **2** | **20** | **0.5** | **120/110** | **30** | **300** | | **4** | **60** | **70** |
| **1.3** | **1.6** | **50** | **2** | **20** | **0.5** | **120/110** | **30** | **1150** | **1000** | **4** | **60** | **70** |
| **1.3** | **1.6** | **50** | **2** | **20** | **0.5** | **120/110** | **30** | **1000** | **750** | **4** | **60** | **70** |
| **1.3** | **1.6** | **50** | **2** | **20** | **0.5** | **120/110** | **30** | **850** | **650** | **4** | **60** | **70** |
| **1.3** | **1.6** | **50** | **2** | **20** | **0.5** | **120/110** | **30** | **650** | **500** | **4** | **60** | **70** |
| **1.3** | **1.6** | **50** | **2** | **20** | **0.5** | **120/110** | **30** | **300** | | **4** | **60** | **70** |

See “General Notes” and “Electrical Specification Notes” on page E4 - 5.

| $I_{T(RMS)}$ | Part Number | | | | | $V_{DRM}$ | $I_{GT}$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | Isolated | | | Non-isolated | | | | | |
| (4)(16) |  |  |  |  |  | (1) | (3) (7) (15) (17) | | |
| | T0-220 | TO-218 (16) | TO-218X | TO-220 | TO-263 $D^2Pak$ | Volts | mAmps QI | QII | QIII |
| MAX | See “Package Dimensions” section for variations. (11) | | | | | | MAX | | |
| **16 A** | **Q2016LH3** | | | **Q2016RH3** | **Q2016NH3** | **200** | **20** | **20** | **20** |
| | **Q4016LH3** | | | **Q4016RH3** | **Q4016NH3** | **400** | **20** | **20** | **20** |
| | **Q6016LH3** | | | **Q6016RH3** | **Q6016NH3** | **600** | **20** | **20** | **20** |
| | **Q8016LH3** | | | **Q8016RH3** | **Q8016NH3** | **800** | **20** | **20** | **20** |
| | **QK016LH3** | | | **QK016RH3** | **QK016NH3** | **1000** | **20** | **20** | **20** |
| | **Q2016LH4** | | | **Q2016RH4** | **Q2016NH4** | **200** | **35** | **35** | **35** |
| | **Q4016LH4** | | | **Q4016RH4** | **Q4016NH4** | **400** | **35** | **35** | **35** |
| | **Q6016LH4** | | | **Q6016RH4** | **Q6016NH4** | **600** | **35** | **35** | **35** |
| | **Q8016LH4** | | | **Q8016RH4** | **Q8016NH4** | **800** | **35** | **35** | **35** |
| | **QK016LH4** | | | **QK016RH4** | **QK016NH4** | **1000** | **35** | **35** | **35** |
| | **Q2016LH6** | | | **Q2016RH6** | **Q2016NH6** | **200** | **80** | **80** | **80** |
| | **Q4016LH6** | | | **Q4016RH6** | **Q4016NH6** | **400** | **80** | **80** | **80** |
| | **Q6016LH6** | | | **Q6016RH6** | **Q6016NH6** | **600** | **80** | **80** | **80** |
| | **Q8016LH6** | | | **Q8016RH6** | **Q8016NH6** | **800** | **80** | **80** | **80** |
| | **QK016LH6** | | | **QK016RH6** | **QK016NH6** | **1000** | **80** | **80** | **80** |
| **25 A** | **Q2025L6** | **Q2025K6** | **Q2025J6** | **Q2025R6** | **Q2025NH6** | **200** | **80** | **80** | **80** |
| | **Q4025L6** | **Q4025K6** | **Q4025J6** | **Q4025R6** | **Q4025NH6** | **400** | **80** | **80** | **80** |
| | **Q6025L6** | **Q6025K6** | **Q6025J6** | **Q6025R6** | **Q6025NH6** | **600** | **80** | **80** | **80** |
| | **Q8025L6** | **Q8025K6** | **Q8025J6** | **Q8025R6** | **Q8025NH6** | **800** | **80** | **80** | **80** |
| | **QK025L6** | **QK025K6** | | **QK025R6** | **QK025NH6** | **1000** | **80** | **80** | **80** |
| **30 A** | **Q2030LH5** | | | | | **200** | **50** | **50** | **50** |
| | **Q4030LH5** | | | | | **400** | **50** | **50** | **50** |
| | **Q6030LH5** | | | | | **600** | **50** | **50** | **50** |
| **35 A** | | | | **Q2035RH5** | **Q2035NH5** | **200** | **50** | **50** | **50** |
| | | | | **Q4035RH5** | **Q4035NH5** | **400** | **50** | **50** | **50** |
| | | | | **Q6035RH5** | **Q6035NH5** | **600** | **50** | **50** | **50** |
| **40 A** | | **Q2040K7** | **Q2040J7** | | | **200** | **100** | **100** | **100** |
| | | **Q4040K7** | **Q4040J7** | | | **400** | **100** | **100** | **100** |
| | | **Q6040K7** | **Q6040J7** | | | **600** | **100** | **100** | **100** |
| | | **Q8040K7** | **Q8040J7** | | | **800** | **100** | **100** | **100** |
| | | **QK040K7** | | | | **1000** | **100** | **100** | **100** |

See “General Notes” and “Electrical Specification Notes” on page E4 - 5.

## Test Conditions

**di/dt** — Maximum rate-of-change of on-state current

**dv/dt** — Critical rate-of-rise of off-state voltage at rated $V_{DRM}$ gate open

**dv/dt(c)** — Critical rate-of-rise of commutation voltage at rated $V_{DRM}$ and $I_{T(RMS)}$ commutating di/dt = 0.54 rated $I_{T(RMS)}$/ms; gate unenergized

**$I^2t$** — RMS surge (non-repetitive) on-state current for period of 8.3 ms for fusing

**$I_{DRM}$** — Peak off-state current gate open; $V_{DRM}$ = maximum rated value

**$I_{GT}$** — DC gate trigger current in specific operating quadrants; $V_D$ = 12 V dc

**$I_{GTM}$** — Peak gate trigger current

**$I_H$** — Holding current (DC); gate open

**$I_{T(RMS)}$** — RMS on-state current conduction angle of 360°

**$I_{TSM}$** — Peak one-cycle surge

**$P_{G(AV)}$** — Average gate power dissipation

**$P_{GM}$** — Peak gate power dissipation; $I_{GT} \leq I_{GTM}$

**$t_{gt}$** — Gate controlled turn-on time; $I_{GT}$ = 300 mA with 0.1 µs rise time

**$V_{DRM}$** — Repetitive peak blocking voltage

**$V_{GT}$** — DC gate trigger voltage; $V_D$ = 12 V dc

**$V_{TM}$** — Peak on-state voltage at maximum rated RMS current

| $I_{DRM}$ | | | $V_{GT}$ | $V_{TM}$ | $I_H$ | $I_{GTM}$ | $P_{GM}$ | $P_{G(AV)}$ | $I_{TSM}$ | dv/dt(c) | dv/dt | | $t_{gt}$ | $I^2t$ | di/dt |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) (18) | | | (2) (6) (15) (17) (20) | (1) (5) | (1) (8) (12) | (14) | (14) | | (9) (13) | (1) (4) (13) | (1) | | (10) | | (19) |
| mAmps | | | Volts | Volts | | | | | Amps | | Volts/µSec | | | | |
| $T_C$ = 25 °C | $T_C$ = 100 °C | $T_C$ = 125 °C | $T_C$ = 25 °C | $T_C$ = 25 °C | mAmps | Amps | Watts | Watts | 60/50 Hz | Volts/µSec | $T_C$ = 100 °C | $T_C$ = 125 °C | µSec | $Amps^2Sec$ | Amps/µSec |
| MAX | | | MAX | MAX | MAX | | | | | MIN | MIN | | TYP | | |
| **0.05** | **0.5** | **2** | **1.5** | **1.6** | **35** | **2** | **20** | **0.5** | **200/167** | **20** | **500** | **400** | **3** | **166** | **100** |
| **0.05** | **0.5** | **27** | **1.5** | **1.6** | **35** | **2** | **20** | **0.5** | **200/167** | **20** | **400** | **350** | **3** | **166** | **100** |
| **0.05** | **0.5** | **2** | **1.5** | **1.6** | **35** | **2** | **20** | **0.5** | **200/167** | **20** | **300** | **250** | **3** | **166** | **100** |
| **0.1** | **1** | **3** | **1.5** | **1.6** | **35** | **2** | **20** | **0.5** | **200/167** | **20** | **275** | **200** | **3** | **166** | **100** |
| **0.1** | **3** | | **1.5** | **1.6** | **35** | **2** | **20** | **0.5** | **200/167** | **20** | **200** | | **3** | **166** | **100** |
| **0.05** | **0.5** | **2** | **2** | **1.6** | **50** | **2** | **20** | **0.5** | **200/167** | **25** | **650** | **500** | **3** | **166** | **100** |
| **0.05** | **0.5** | **2** | **2** | **1.6** | **50** | **2** | **20** | **0.5** | **200/167** | **25** | **600** | **475** | **3** | **166** | **100** |
| **0.05** | **0.5** | **2** | **2** | **1.6** | **50** | **2** | **20** | **0.5** | **200/167** | **25** | **500** | **400** | **3** | **166** | **100** |
| **0.1** | **1** | **3** | **2** | **1.6** | **50** | **2** | **20** | **0.5** | **200/167** | **25** | **425** | **350** | **3** | **166** | **100** |
| **0.1** | **3** | | **2** | **1.6** | **50** | **2** | **20** | **0.5** | **200/167** | **25** | **300** | | **3** | **166** | **100** |
| **0.05** | **0.5** | **2** | **2.5** | **1.6** | **70** | **2** | **20** | **0.5** | **200/167** | **30** | **875** | **600** | **5** | **166** | **100** |
| **0.05** | **0.5** | **2** | **2.5** | **1.6** | **70** | **2** | **20** | **0.5** | **200/167** | **30** | **875** | **600** | **5** | **166** | **100** |
| **0.05** | **0.5** | **2** | **2.5** | **1.6** | **70** | **2** | **20** | **0.5** | **200/167** | **30** | **800** | **520** | **5** | **166** | **100** |
| **0.1** | **1** | **3** | **2.5** | **1.6** | **70** | **2** | **20** | **0.5** | **200/167** | **30** | **700** | **475** | **5** | **166** | **100** |
| **0.1** | **3** | | **2.5** | **1.6** | **70** | **2** | **20** | **0.5** | **200/167** | **30** | **350** | | **5** | **166** | **100** |
| **0.05** | **0.5** | **2** | **2.5** | **1.8** | **100** | **2** | **20** | **0.5** | **250/208** | **30** | **875** | **600** | **5** | **259** | **100** |
| **0.05** | **0.5** | **2** | **2.5** | **1.8** | **100** | **2** | **20** | **0.5** | **250/208** | **30** | **875** | **600** | **5** | **259** | **100** |
| **0.05** | **0.5** | **2** | **2.5** | **1.8** | **100** | **2** | **20** | **0.5** | **250/208** | **30** | **800** | **520** | **5** | **259** | **100** |
| **0.1** | **1** | **3** | **2.5** | **1.8** | **100** | **2** | **20** | **0.5** | **250/208** | **30** | **700** | **475** | **5** | **259** | **100** |
| **0.1** | **3** | | **2.5** | **1.8** | **100** | **2** | **20** | **0.5** | **250/208** | **30** | **400** | | **5** | **259** | **100** |
| **0.05** | **0.5** | **2** | **2** | **1.4** | **75** | **2** | **20** | **0.5** | **350/290** | **20** | **650** | **500** | **3** | **508** | **100** |
| **0.05** | **0.5** | **2** | **2** | **1.4** | **75** | **2** | **20** | **0.5** | **350/290** | **20** | **600** | **475** | **3** | **508** | **100** |
| **0.05** | **0.5** | **2** | **2** | **1.4** | **75** | **2** | **20** | **0.5** | **350/290** | **20** | **500** | **400** | **3** | **508** | **100** |
| **0.05** | **0.5** | **2** | **2** | **1.5** | **75** | **2** | **20** | **0.5** | **350/290** | **20** | **650** | **500** | **3** | **508** | **100** |
| **0.05** | **0.5** | **2** | **2** | **1.5** | **75** | **2** | **20** | **0.5** | **350/290** | **20** | **600** | **475** | **3** | **508** | **100** |
| **0.05** | **0.5** | **2** | **2** | **1.5** | **75** | **2** | **20** | **0.5** | **350/290** | **20** | **500** | **400** | **3** | **508** | **100** |
| **0.2** | **2** | **5** | **2.5** | **1.8** | **120** | **4** | **40** | **0.8** | **400/335** | **50** | **1100** | **700** | **5** | **664** | **150** |
| **0.2** | **2** | **5** | **2.5** | **1.8** | **120** | **4** | **40** | **0.8** | **400/335** | **50** | **1100** | **700** | **5** | **664** | **150** |
| **0.2** | **2** | **5** | **2.5** | **1.8** | **120** | **4** | **40** | **0.8** | **400/335** | **50** | **1000** | **625** | **5** | **664** | **150** |
| **0.2** | **2** | **5** | **2.5** | **1.8** | **120** | **4** | **40** | **0.8** | **400/335** | **50** | **900** | **575** | **5** | **664** | **150** |
| **0.2** | **5** | | **2.5** | **1.8** | **120** | **4** | **40** | **0.8** | **400/335** | **50** | **500** | | **5** | **664** | **150** |

## General Notes

- All measurements are made at 60 Hz with a resistive load at an ambient temperature of +25 °C unless specified otherwise.
- Operating temperature range ($T_J$) is -40 °C to +125 °C.
- Storage temperature range ($T_S$) is -40 °C to +125 °C.
- Lead solder temperature is a maximum of 230 °C for 10 seconds maximum ≥1/16" (1.59 mm) from case.
- The case temperature ($T_C$) is measured as shown in the dimensional outline drawings. See “Package Dimensions” section.

## Electrical Specification Notes

(1) For either polarity of MT2 with reference to MT1 terminal

(2) For either polarity of gate voltage ($V_{GT}$) with reference to MT1 terminal

(3) See Gate Characteristics and Definition of Quadrants.

(4) See Figure E4.1 through Figure E4.4 for current rating at specific operating temperature and Figure 4.16 for free air rating (no heat sink).

(5) See Figure E4.5 and Figure E4.6 for $i_T$ and $v_T$.

(6) See Figure E4.7 for $V_{GT}$ versus $T_C$.

(7) See Figure E4.8 for $I_{GT}$ versus $T_C$.

(8) See Figure E4.9 for $I_H$ versus $T_C$.

(9) See Figure E4.10 and Figure E4.11 for surge rating with specific durations.

(10) See Figure E4.12 for $t_{gt}$ versus $I_{GT}$.

(11) See package outlines for lead form configurations. When ordering special lead forming, add type number as suffix to part number.

(12) Initial on-state current = 400 mA dc for 16 A to 40 A devices and 100 mA for 6 A to 12 A devices.

(13) See Figure E4.1 through Figure E4.4 for maximum allowable case temperature at maximum rated current.

(14) Pulse width ≤10 µs; $I_{GT} \leq I_{GTM}$

(15) For 6 A to 12 A devices, $R_L$ = 60 Ω; 16 A and above, $R_L$ = 30 Ω

(16) 40 A pin terminal leads on K package can run 100 °C to 125 °C.

(17) Alternistor does not turn on in Quadrant IV.

(18) $T_C = T_J$ for test conditions in off state

(19) $I_{GT}$ = 200 mA for 6 A to 12 A devices and 500 mA for 16 A to 40 A devices with gate pulse having rise time of ≤0.1 µs.

(20) Minimum non-trigger $V_{GT}$ at 125 °C is 0.2 V.

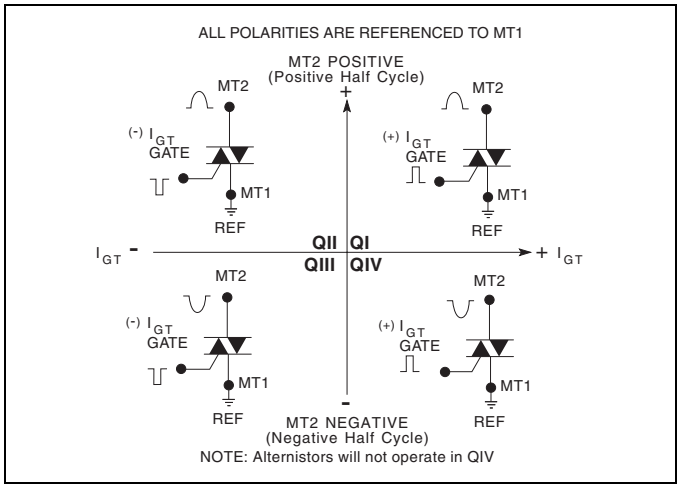
## Gate Characteristics

Teccor triacs may be turned on in the following ways:

- In-phase signals (with standard AC line) using Quadrants I and III
- Application of unipolar pulses (gate always negative), using Quadrants II and III with negative gate pulses

In all cases, if maximum surge capability is required, gate pulses should be a minimum of one magnitude above minimum $I_{GT}$ rating with a steep rising waveform (≤1 µs rise time).

If QIV and QI operation is required (gate always positive), see Figure AN1002.8, “Amplified Gate” Thyristor Circuit.




Definition of Quadrants

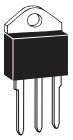
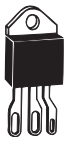
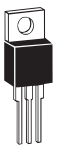
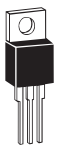
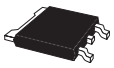
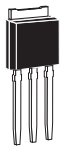
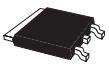
## Electrical Isolation

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

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

* UL Recognized File E71639

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

| Thermal Resistance (Steady State) $R_{\theta JC}$ [$R_{\theta JA}$] (TYP.) °C/W | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Package Code** | K | J | L | R | D | V | N |
| **Type** |  TO-218 Isolated * |  TO-218X Isolated * |  TO-220 Isolated ** |  TO-220 Non-Isolated |  TO-252 D-Pak |  TO-251 V-Pak |  TO-263 $D^2$Pak |
| **6 A** | | | **3.3 [50]** | **1.80 [45]** | **2.1** | **2.3 [64]** | **1.80** |
| **8 A** | | | **2.8** | **1.50** | **1.8** | **2.1** | **1.50** |
| **10 A** | | | **2.6** | **1.30** | | | **1.30** |
| **12 A** | | | **2.3** | **1.20** | | | **1.20** |
| **16 A** | | | **2.1** | **1.10** | | | **1.10** |
| **25 A** | **1.35** | **1.32** | **2.0** | **0.87** | | | **0.87** |
| **30 A** | | | **2.3** | | | | |
| **35 A** | | | | **0.85** | | | |
| **40 A** | **0.97** | **0.95** | | | | | |

* UL Recognized Product per UL File E71639

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

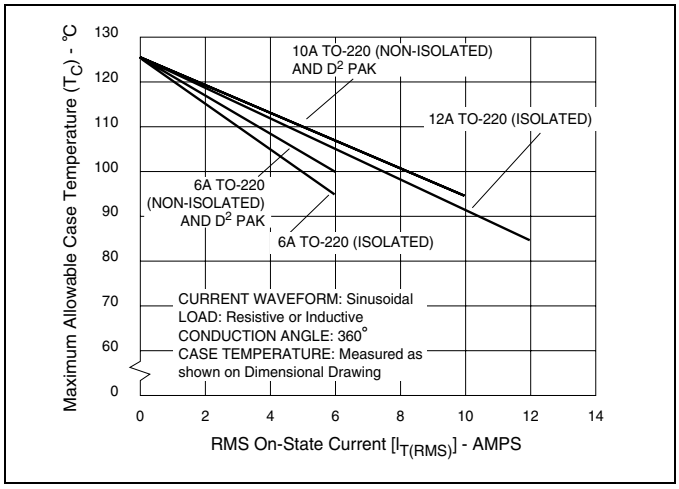



Figure E4.1 Maximum Allowable Case Temperature versus On-state Current (6 A to 12 A)

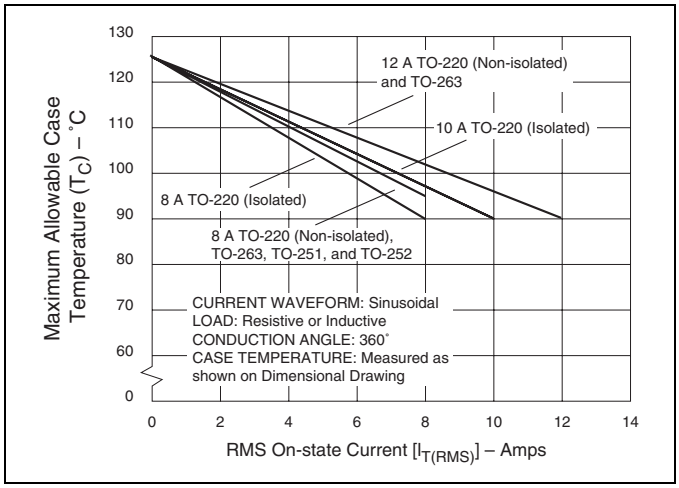



Figure E4.2 Maximum Allowable Case Temperature versus On-state Current (8 A to 12 A)

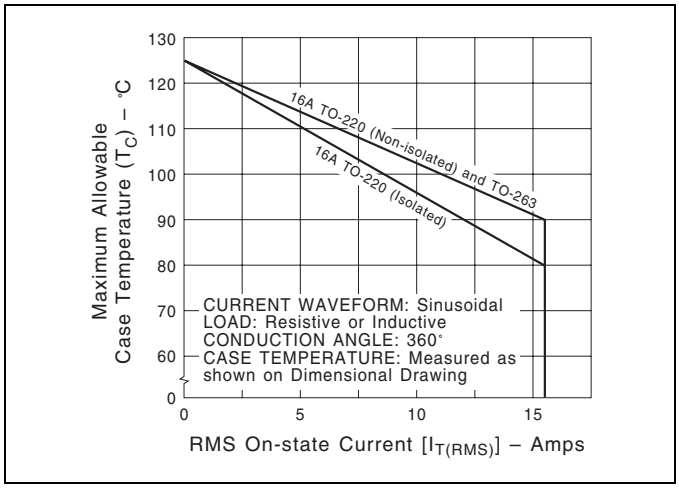



Figure E4.3 Maximum Allowable Case Temperature versus On-state Current (16 A)

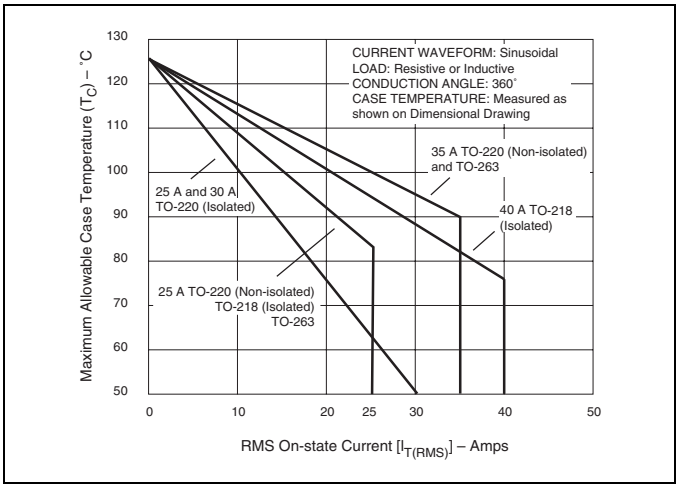



Figure E4.4 Maximum Allowable Case Temperature versus On-state Current (25 A to 40 A)

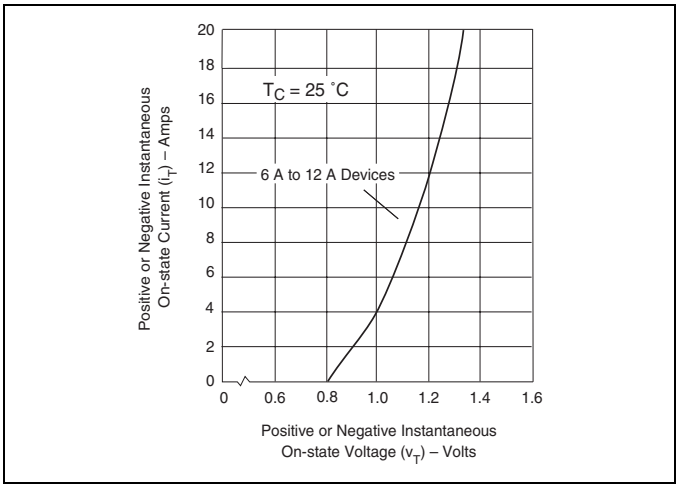



Figure E4.5 On-state Current versus On-state Voltage (Typical) (6 A to 12 A)

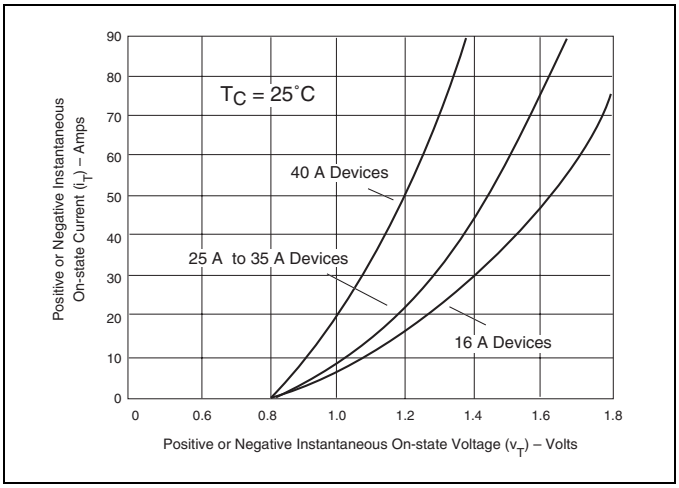



Figure E4.6 On-state Current versus On-state Voltage (Typical) (16 A to 40 A)

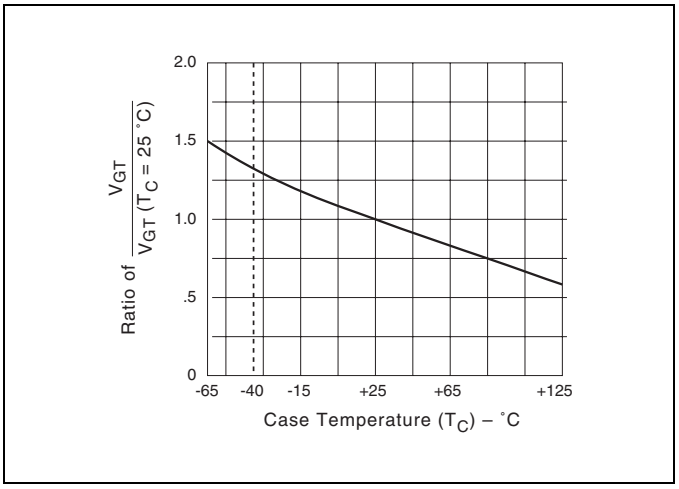



Figure E4.7 Normalized DC Gate Trigger Voltage for all Quadrants versus Case Temperature

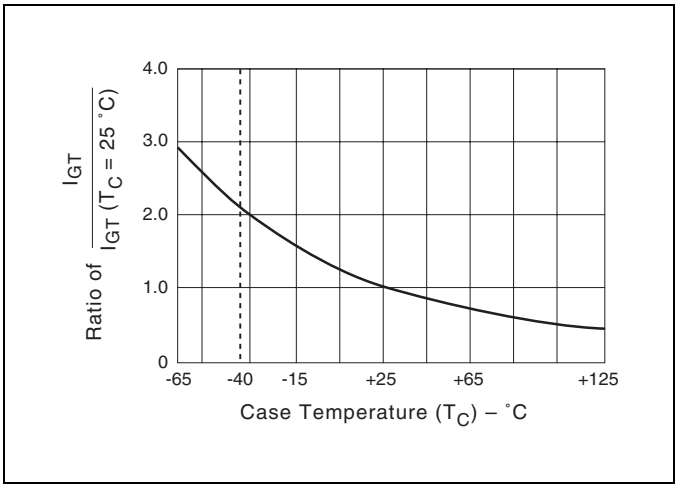



Figure E4.8 Normalized DC Gate Trigger Current for all Quadrants versus Case Temperature

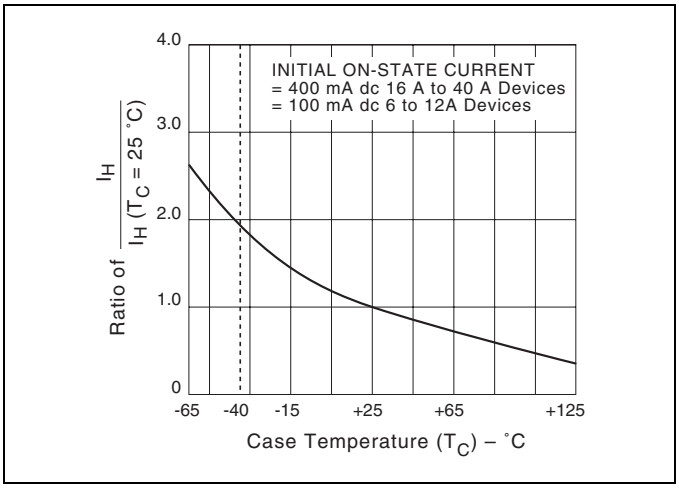



Figure E4.9 Normalized DC Holding Current versus Case Temperature

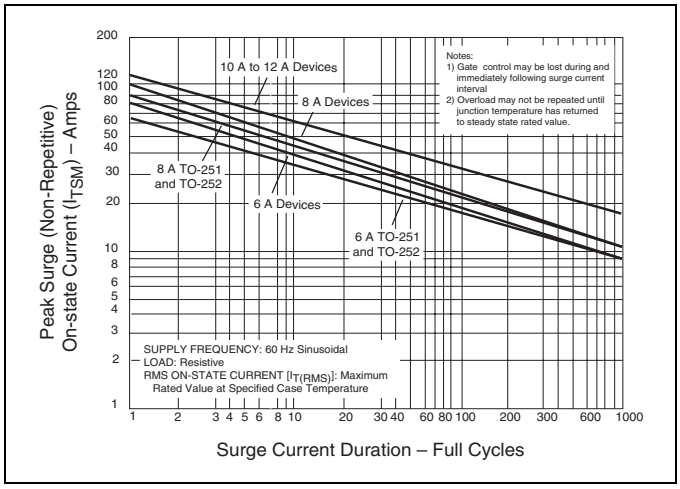



Figure E4.10 Peak Surge Current versus Surge Current Duration (6 A to 12 A)

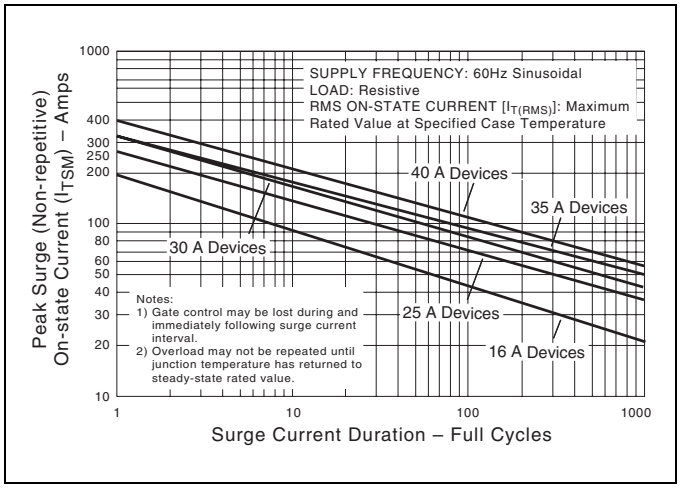



Figure E4.11 Peak Surge Current versus Surge Current Duration (16 A to 40 A)

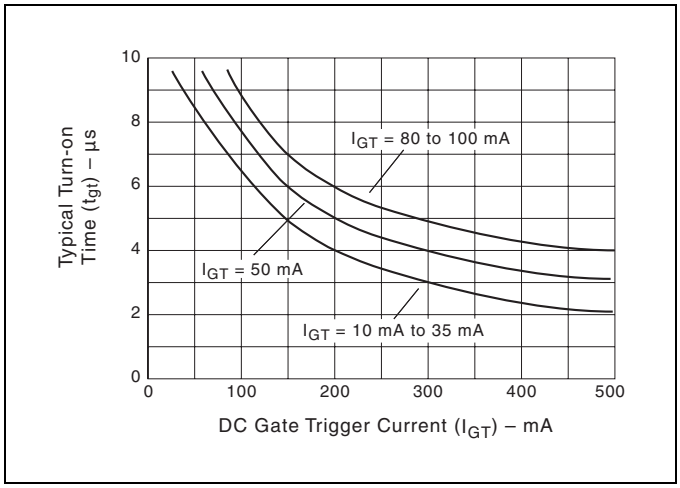



Figure E4.12 Turn-on Time versus Gate Trigger Current (Typical)

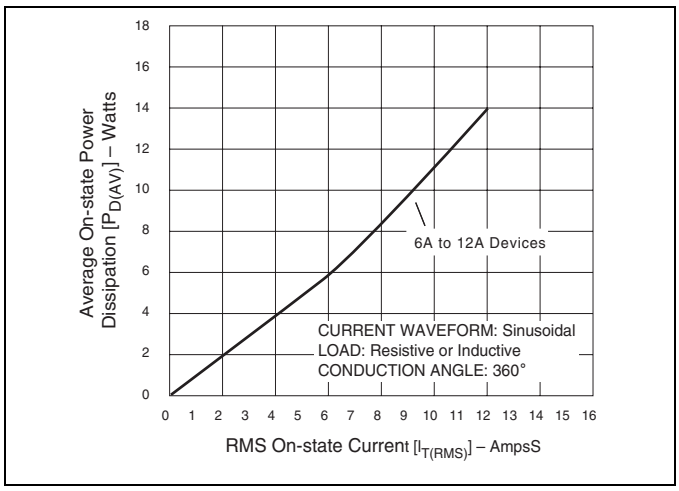



Figure E4.13 Power Dissipation (Typical) versus On-state Current (6 A to 12 A)

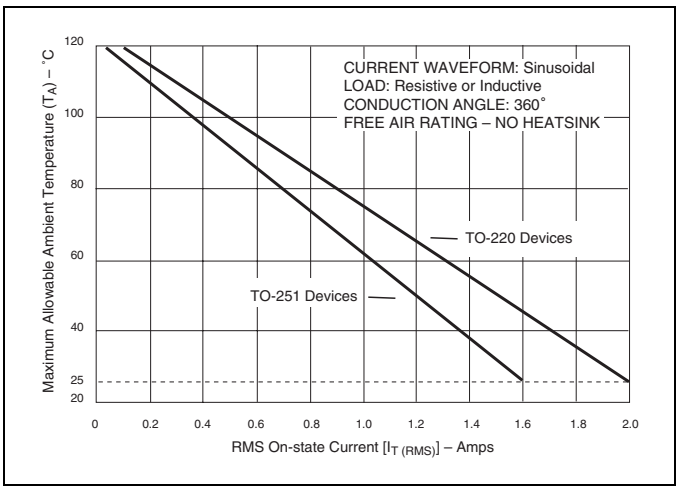



Figure E4.16 Maximum Allowable Ambient Temperature versus On-state Current

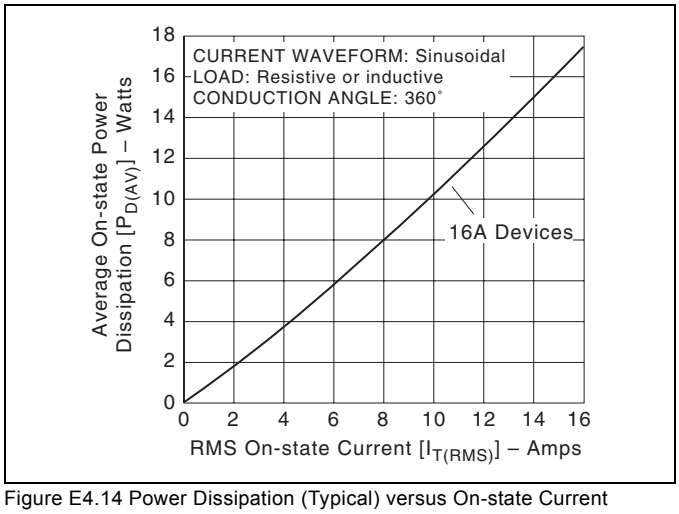



Figure E4.14 Power Dissipation (Typical) versus On-state Current (16 A)

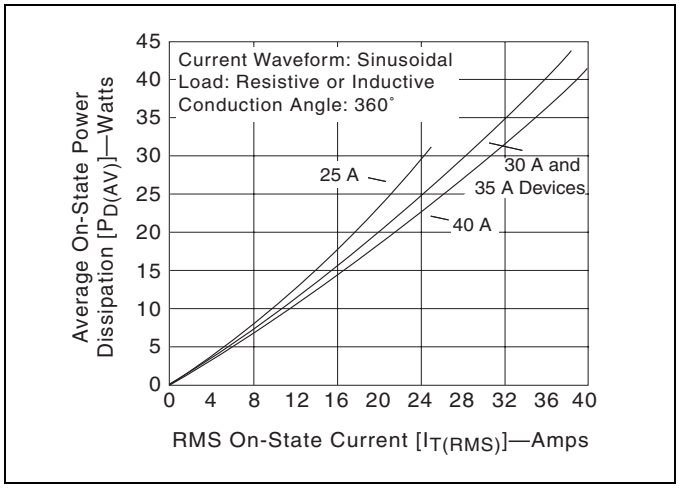



Figure E4.15 Power Dissipation (Typical) versus On-state Current (25 A to 40 A)

# Notes