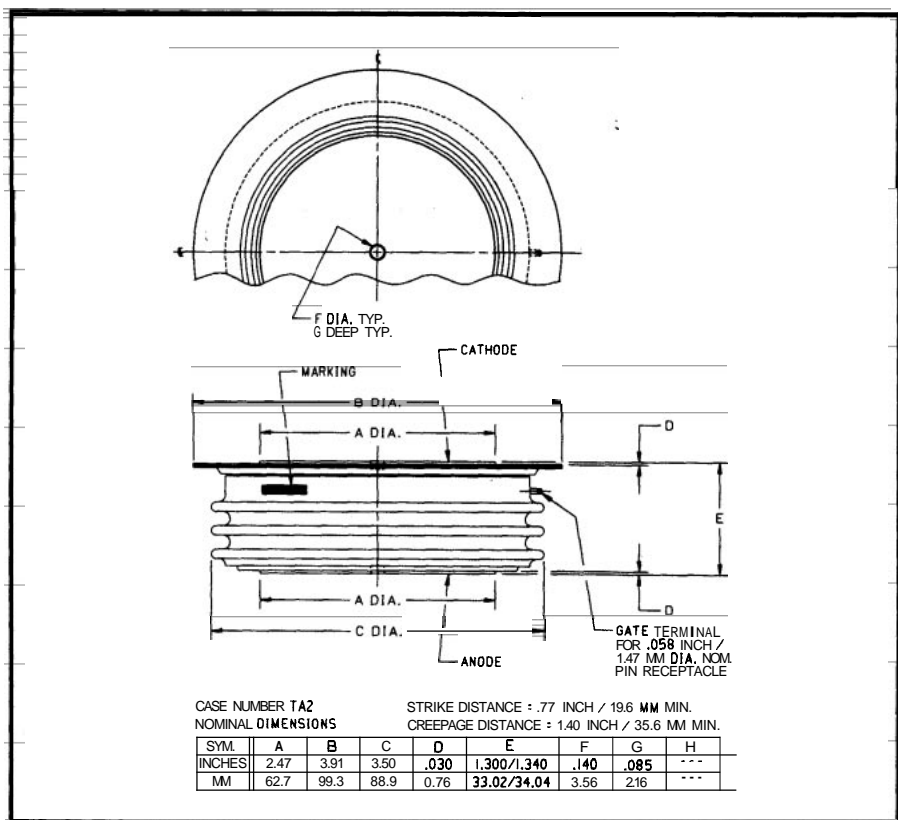


Phase Control SCR 1600 Amperes Average 2200 Volts



TA20 1600A (Outline Drawing)



TA20 1600A Phase Control SCR
1600 Amperes Average, 2200 Volts

Description:

Powerex Silicon Controlled Rectifiers (SCR) are designed for phase control applications. These are all-diffused, Press-Pak, hermetic Pow-R-Disc devices employing the field proven amplifying gate.

Features:

- Low On-State Voltage
- High di/dt Capability
- High dv/dt Capability
- Hermetic Packaging
- Excellent Surge and I^2t Ratings

Applications:

- Power Supplies
- Motor Control

Ordering Information:

Select the complete 12 digit part number you desire from the table below.

| Type | Voltage | Current | Turn-off | Gate Current | Lead Code |
|------|---|--------------------|----------------------------------|------------------|---------------|
| | V_{ORM}/V_{RRM} (Volts) | $I_{T(av)}$ (A) | t_q (μ sec) | I_{GT} (mA) | |
| TA20 | 02 through 22 200V through 2200V | 16 1600A | 0 250 μ sec (Typical) | 3 200mA | DH 12" |



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TA20 1600A
Phase Control SCR
1600 Amperes Average, 2200 Volts

Absolute Maximum Ratings

| Characteristics | Symbol | TA20 1600A | Units |
|---|--------------|--------------------|--------------------|
| Non-repetitive Transient Peak Reverse Voltage | V_{RSM} | $V_{RRM} + 100V$ | Volts |
| RMS On-state Current, $T_C = 80^\circ C$ | $I_{T(rms)}$ | 2500 | Amperes |
| Average Current 180° Sine Wave, $T_C = 80^\circ C$ | $I_{T(av)}$ | 1600 | Amperes |
| RMS On-state Current, $T_C = 55^\circ C$ | $I_{T(rms)}$ | 3390 | Amperes |
| Average Current 180° Sine Wave, $T_C = 55^\circ C$ | $I_{T(av)}$ | 2160 | Amperes |
| Peak One Cycle Surge On-state Current (Non-repetitive) 60Hz | I_{tsm} | 29500 | Amperes |
| Peak One Cycle Surge On-state Current (Non-repetitive) 50Hz | I_{tsm} | 26900 | Amperes |
| Critical Rate-of-rise of On-state Current (Non-repetitive) | di/dt | 400 | A/ μ sec |
| Critical Rate-of-rise of On-state Current (Repetitive) | di/dt | 150 | A/ μ sec |
| I^2t (for Fusing) for One Cycle, 60Hz | I^2t | 3.63×10^6 | A ² sec |
| Peak Gate Power Dissipation | P_{GM} | 16 | Watts |
| Average Gate Power Dissipation | $P_{G(av)}$ | 3 | Watts |
| Operating Temperature | T_j | -40 to +125°C | °C |
| Storage Temperature | T_{stg} | -40 to +150°C | °C |
| Approximate Weight | | 2.1 | lb. |
| | | 950 | g |
| Mounting Force | | 9000 to 11000 | lb. |
| | | 4100 to 5000 | kg. |



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Electrical Characteristics, $T_j = 25^\circ\text{C}$ Unless Otherwise Specified

| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|-------------|--|------|------|---------|--|
| Repetitive Peak Reverse Leakage Current | I_{RRM} | $T_j = 125^\circ\text{C}, V_R = V_{RRM}$ | | | 100 | mA |
| Repetitive Peak Forward Leakage Current | I_{DRM} | $T_j = 125^\circ\text{C}, V_D = V_{DRM}$ | | | 100 | mA |
| Peak On-state Voltage | V_{TM} | $I_{TM} = 3000\text{A Peak}$ Duty Cycle < 0.1% | | | 1.75 | Volts |
| Threshold Voltage, Low-level | $V_{(TO)1}$ | $T_j = 125^\circ\text{C}, I = 15\%, I_{T(av)}$ to $\pi I_{T(av)}$ | | | 0.89109 | Volts |
| Slope Resistance, Low-level | r_{T1} | | | | 0.2148 | m Ω |
| Threshold Voltage, High-level | $V_{(TO)2}$ | $T_j = 125^\circ\text{C}, I = \pi I_{T(av)}$ to I_{TSM} | | | 1.7405 | Volts |
| Slope Resistance, High-level | r_{T2} | | | | 0.1024 | m Ω |
| V_{TM} Coefficients, Low-level | | $T_j = 125^\circ\text{C}, I = 15\% I_{T(av)}$ to $\pi I_{T(av)}$ | | | | $A_1 = 1.1219$ $B_1 = -0.10195$ $C_1 = 4.764\text{E-}05$ $D_1 = 0.02077$ |
| V_{TM} Coefficients, High-level | | $T_j = 125^\circ\text{C}, I = \pi I_{T(av)}$ to I_{TSM} | | | | $A_2 = -3.7832$ $B_2 = 0.56271$ $C_2 = 3.607\text{E-}05$ $D_2 = 0.010389$ |
| Typical Turn-on Time | t_{on} | $I_{TM} = 1000\text{A}, V_D = 1500\text{V}$ | | 4 | | μsec |
| Typical Turn-off Time | t_q | $T_j = 125^\circ\text{C}, I_T = 250\text{A},$ $di_R/dt = 50\text{A}/\mu\text{sec}$ Reapplied $dv/dt = 20\text{V}/\mu\text{sec}$ Linear to 80% V_{DRM} | | 250 | | μsec |
| Minimum Critical dv/dt - Exponential to V_{DRM} | dv/dt | $T_j = 125^\circ\text{C}$ | 300 | | | V/ μsec |
| Gate Trigger Current | I_{GT} | $T_j = 25^\circ\text{C}, V_D = 12\text{V}$ | | | 200 | mA |
| Gate Trigger Voltage | V_{GT} | $T_j = 25^\circ\text{C}, V_D = 12\text{V}$ | | | 4.5 | Volts |
| Non-Triggering Gate Voltage | V_{GDM} | $T_j = 125^\circ\text{C}, V_D = V_{DRM}$ | | | 0.15 | Volts |
| Peak Forward Gate Current | I_{GTM} | | | | 4 | A |
| Peak Reverse Gate Voltage | V_{GRM} | | | | 5 | Volts |

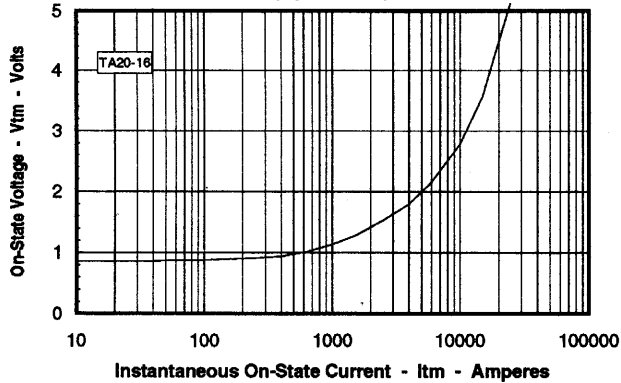
Thermal Characteristics

Maximum Thermal Resistance, Double Sided Cooling

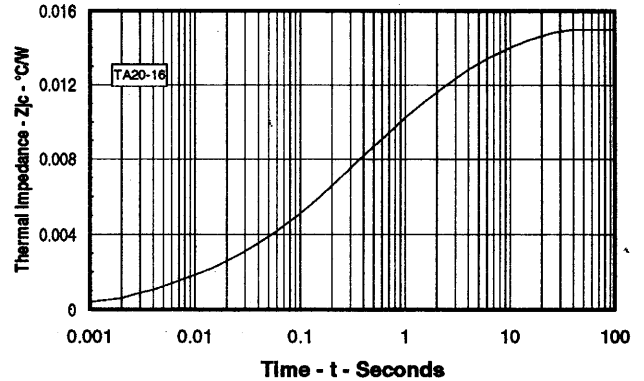
| | | | |
|------------------|-------------------|-------|--------------------|
| Junction-to-Case | $R_{\theta(j-c)}$ | 0.015 | $^\circ\text{C/W}$ |
| Case-to-Sink | $R_{\theta(c-s)}$ | 0.007 | $^\circ\text{C/W}$ |

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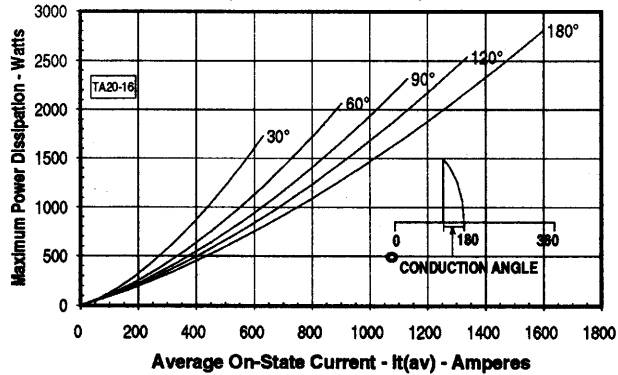
Maximum On-State Forward Voltage Drop
 ($T_J = 125^\circ\text{C}$)



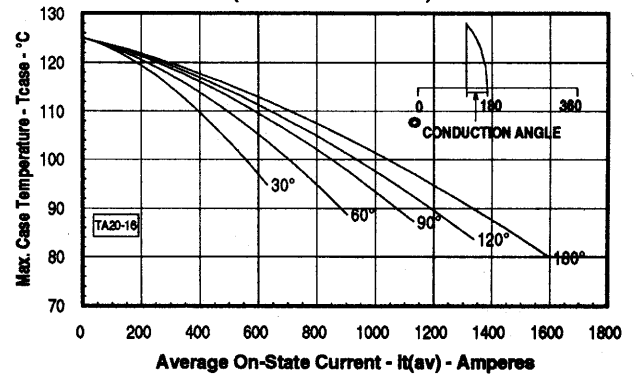
Maximum Transient Thermal Impedance
 (Junction to Case)



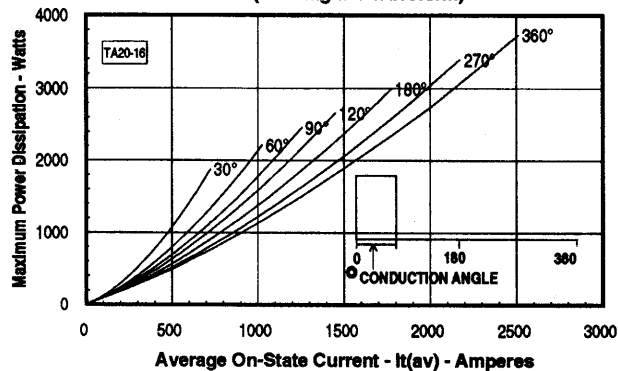
Maximum On-State Power Dissipation
 (Sinusoidal Waveform)



Maximum Allowable Case Temperature
 (Sinusoidal Waveform)



Maximum On-State Power Dissipation
 (Rectangular Waveform)



Maximum Allowable Case Temperature
 (Rectangular Waveform)

