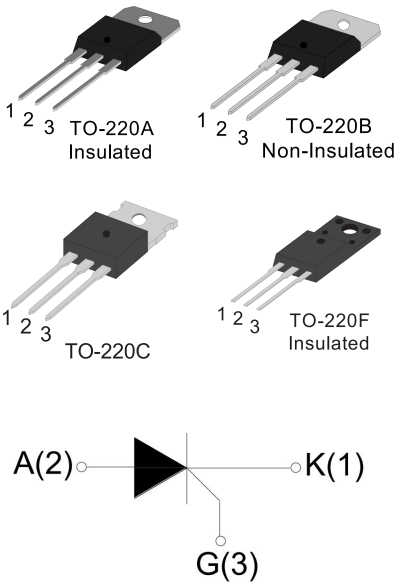
# S1615 16A SCRs

## FEATURES

- High thermal cycling performance
- High voltage capacity
- Very high current surge capability




## APPLICATIONS

- Line rectifying 50/60 Hz
- Softstart AC motor control
- DC Motor control
- Power converter
- AC power control
- Lighting and temperature control




## Parameters Summary

**VD/VR:600V/800V/1000V**

**IT(RMS):16A**

**IGT :15mA**

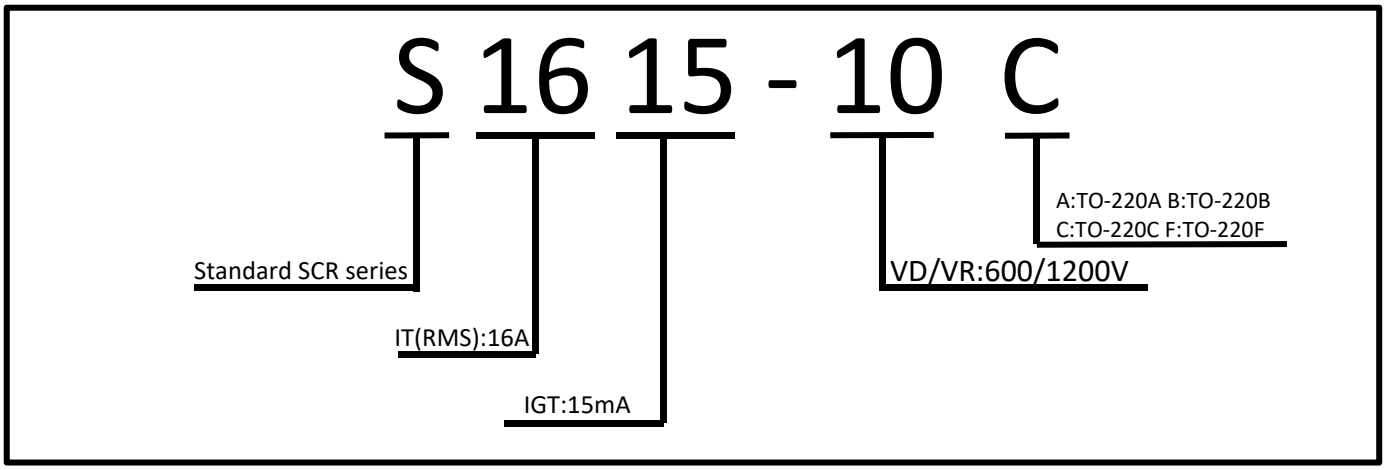
| ABSOLUTE MAXIMUM RATINGS | | | |
|---|---|---|---|
| **Parameter** | **Symbol** | **Value** | **Unit** |
| Storage junction temperature range | Tstg | -40 ~150 | ℃ |
| Operating junction temperature range | Tj | -40~125 | ℃ |
| Repetitive peak off-state voltage (T =25℃) | $V_{DRM}$ | 600/800/1000 | V |
| Repetitive peak reverse voltage (T =25℃) | $V_{RRM}$ | 600/800/1000 | V |
| Non repetitive surge peak Off-state voltage | $V_{DSM}$ | $V_{DRM}$ +100 | V |
| Non repetitive peak reverse voltage | $V_{RSM}$ | $V_{RRM}$ +100 | V |
| RMS on-state current (T =110℃) | $I_{T(RMS)}$ | 16 | A |
| Non repetitive surge peak on-state current(180° conduction angle, F=50Hz) | $I_{TSM}$ | 190 | A |
| Average on-state current (180° conduction angle) | $I_{T(AV)}$ | 10 | A |
| $I^2t$ value for fusing (tp=10ms) | $I^2t$ | 180 | $A^2S$ |
| Critical rate of rise of on-state current(I =2×IGT, tr ≤ 100 ns) | dI/dt | 50 | A/μS |
| Peak gate current | $I_{GM}$ | 4 | A |
| Average gate power dissipation | $P_{G(AV)}$ | 1 | W |

| Thermal Resistances | | | | |
|---|---|---|---|---|
| **Symbol** | **Parameter** | | **Value** | **Unit** |
| Rth(j-c) | Junction to case (DC) | TO-220A | 2. 1 | ℃/W |
| | | TO-220B | 1. 1 | |
| | | TO-220C | 1. 1 | |
| | | TO-220F | 2. 3 | |

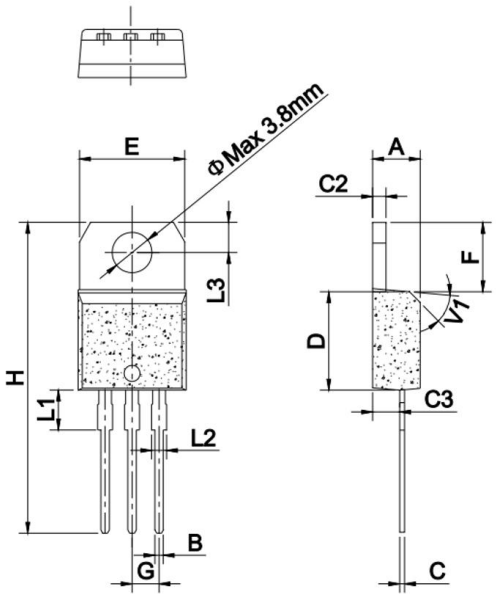
| ELECTRICAL CHARACTERISTICS (T=25℃unless otherwise specified) | | | | |
|---|---|---|---|---|
| **Symbol** | **Test Condition** | | **Value** | **Unit** |
| $I_{GT}$ | V =12V R =140Ω | MAX. | 15 | mA |
| $V_{GT}$ | | MAX. | 1. 3 | V |
| $V_{GD}$ | VD=VDRM Tj=125℃ | MIN. | 0.2 | V |
| $I_L$ | $I_G$=1.2$I_{GT}$ | MAX. | 60 | mA |
| $I_H$ | IT=50mA | MAX. | 50 | mA |
| dV/dt | $V_D$=2/3$V_{DRM}$ Gate Open Tj=125℃ | MIN. | 500 | V/μs |

| STATIC CHARACTERISTICS | | | | |
|---|---|---|---|---|
| **Symbol** | **Parameter** | | **Value(MAX. )** | **Unit** |
| $V_{TM}$ | ITM =32A tp=380μs | Tj =25℃ | 1. 6 | V |
| $I_{DRM}$ | $V_D$=$V_{DRM}$ $V_R$=$V_{RRM}$ | Tj =25℃ | 5 | μA |
| $I_{RRM}$ | | Tj =125℃ | 2 | mA |

## Ordering Information Scheme

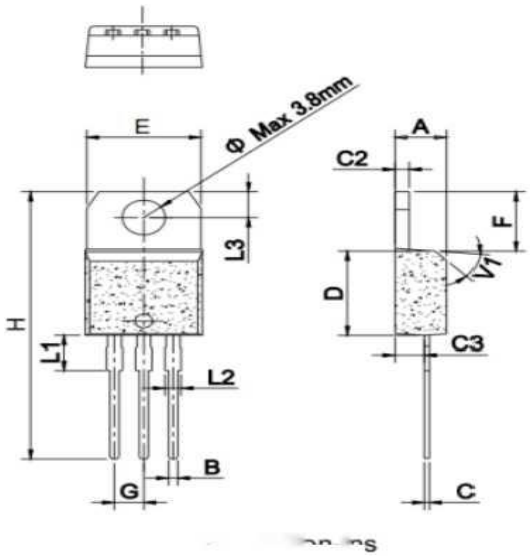



## TO-220A Package Mechanical Data



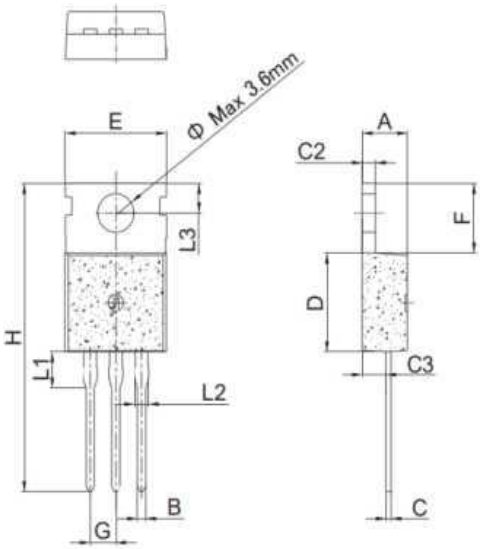

| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ- | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| B | 0.70 | | 0.90 | 0.028 | | 0.035 |
| C | 0.45 | | 0.60 | 0.018 | | 0.024 |
| C2 | 1.30 | | 1.48 | 0.048 | | 0.052 |
| C3 | 2.20 | | 2.60 | 0.087 | | 0.102 |
| D | 8.90 | | 9.90 | 0.350 | | 0.390 |
| E | 9.90 | | 10.3 | 0.390 | | 0.406 |
| F | 6.30 | | 6.90 | 0.248 | | 0.272 |
| G | | 2.54 | | | 0.1 | |
| H | 28.0 | | 29.8 | 1.102 | | 1.173 |
| L1 | | 3.39 | | | 0.133 | |
| L2 | 1.14 | | 1.70 | 0.045 | | 0.067 |
| L3 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| e | | 3.6 | | | 0.142 | |

# TO-220B Package Mechanical Data



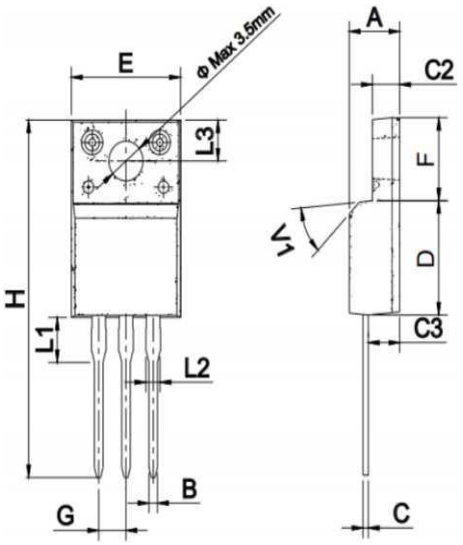

| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ- | Max. | Min. | Typ. | Max. |
| A | 4.10 | | 4.30 | 0.173 | | 0.181 |
| B | 0.61 | | 0.88 | 0.024 | | 0.035 |
| C | 0.46 | | 0.70 | 0.018 | | 0.028 |
| C2 | 1.21 | | 1.32 | 0.048 | | 0.052 |
| C3 | 2.40 | | 2.72 | 0.094 | | 0.107 |
| D | 8.60 | | 9.70 | 0.339 | | 0.382 |
| E | 9.60 | | 10.4 | 0.378 | | 0.409 |
| F | 6.25 | | 7.05 | 0.244 | | 0.260 |
| G | | 2.54 | | | 0.1 | |
| H | 28.0 | | 29.8 | 1.102 | | 1.173 |
| L1 | | | | | 0.148 | |
| L2 | 1.14 | | 1.70 | 0.045 | | 0.067 |
| L3 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| V1 | | 45 | | | 45 | |

# TO-220C Package Mechanical Data




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ- | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| B | 0.70 | | 0.90 | 0.028 | | 0.035 |
| C | 0.45 | | 0.60 | 0.018 | | 0.024 |
| C2 | 1.30 | | 1.48 | 0.048 | | 0.052 |
| C3 | 2.20 | | 2.60 | 0.087 | | 0.102 |
| D | 8.90 | | 9.90 | 0.350 | | 0.390 |
| E | 9.90 | | 10.3 | 0.390 | | 0.406 |
| F | 6.30 | | 6.90 | 0.248 | | 0.272 |
| G | | 2.54 | | | 0.1 | |
| H | 28.0 | | 29.8 | 1.102 | | 1.173 |
| L1 | | 3.39 | | | 0.133 | |
| L2 | 1.14 | | 1.70 | 0.045 | | 0.067 |
| L3 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| e | | 3.6 | | | 0.142 | |

# TO-220F Package Mechanical Data




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ- | Max. | Min. | Typ. | Max. |
| A | 4.50 | | 4.90 | 0.177 | | 0.193 |
| B | 0.74 | 0.80 | 0.83 | 0.029 | 0.031 | 0.033 |
| C | 0.47 | | 0.65 | 0.019 | | 0.026 |
| C2 | 2.50 | | 3.10 | 0.096 | | 0.108 |
| C3 | 2.40 | | 2.80 | 0.102 | | 0.118 |
| D | 8.60 | | 8.90 | 0.346 | | 0.366 |
| E | 9.80 | | 10.4 | 0.386 | | 0.410 |
| F | 6.70 | | 7.50 | 0.252 | | 0.268 |
| G | | 2.54 | | | 0.1 | |
| H | 28.0 | | 29.8 | 1.102 | | 1.173 |
| L1 | | 3.63 | | | 0.143 | |
| L2 | 1.14 | | 1.70 | 0.045 | | 0.067 |
| L3 | | 3.30 | | | 0.130 | |
| V1 | | 45° | | | 45° | |

FIG.1 Maximum power dissipation versus Average on-state current

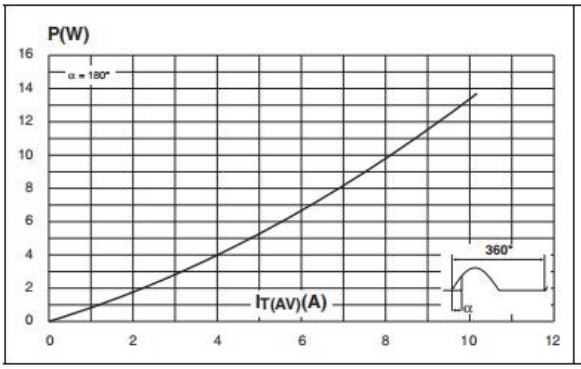



FIG.2: on-state current versus case temperature

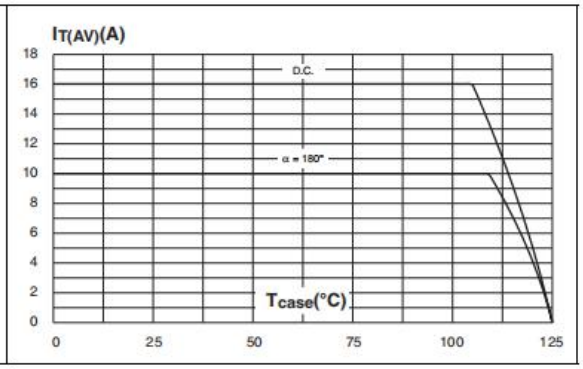



FIG.3: Surge peak on-state current versus number of cycles

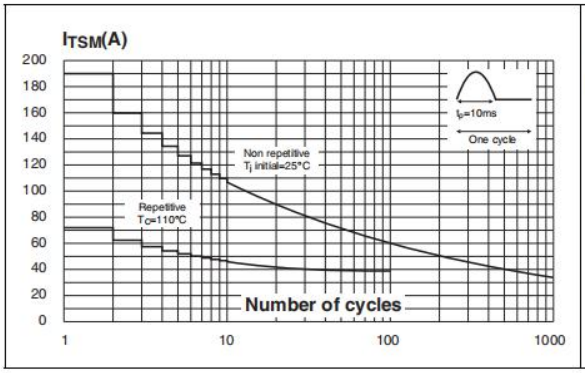



FIG.4: On-state characteristics (maximum values)

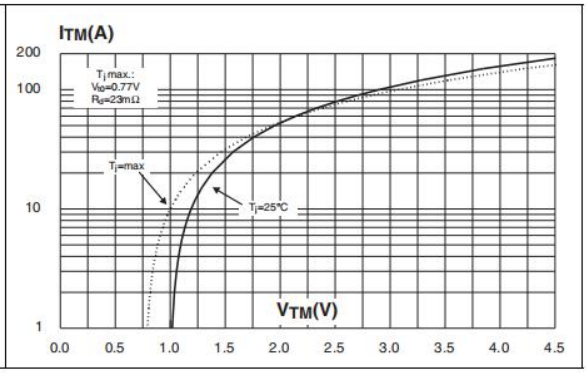



FIG.5: Non-repetitive surge peak on-state currentfor a sinusoidal pulse with width tp<10ms, and corresponding value of I2 t (dI/dt < 50A/µs)

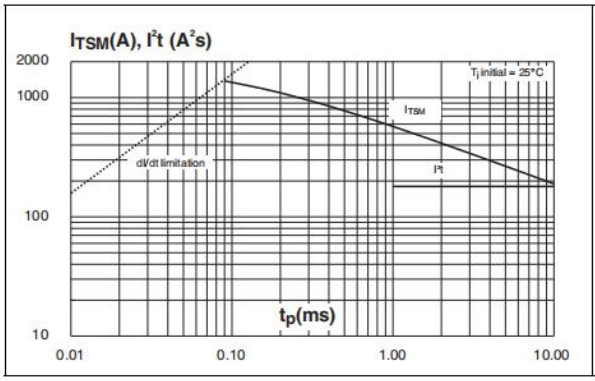



FIG.6: Relative variations of gate trigger current holding current and latching current versus junction temperature