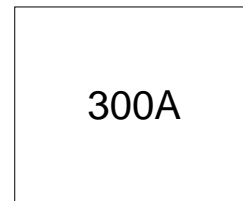


Features

- Wide current range
- High voltage ratings up to 2500V
- High surge current capabilities
- Stud cathode and stud anode version
- High resistance to acceleration

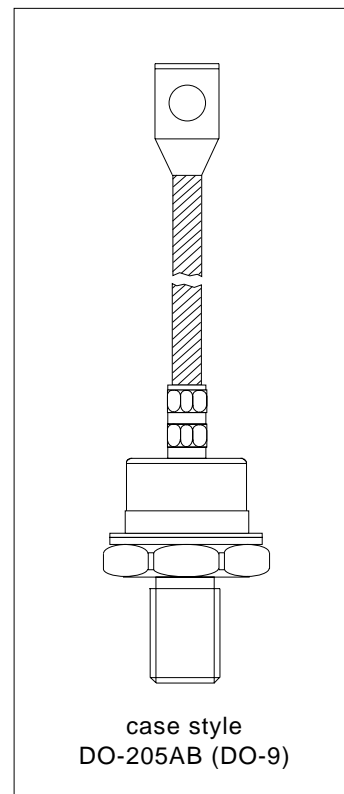


Typical Applications

- Converters
- Power supplies
- Machine tool controls
- High power drives
- Medium traction applications

Major Ratings and Characteristics

| Parameters | 301U(R) | | Units |
|------------------|--------------|-------------|-------------------|
| | 160 to 200 | 250 | |
| $I_{F(AV)}$ | 330 | 300 | A |
| @ T_C | 120 | 120 | °C |
| $I_{F(RMS)}$ | 520 | 470 | A |
| I_{FSM} @ 50Hz | 8250 | 6050 | A |
| @ 60Hz | 8640 | 6335 | A |
| I^2t @ 50Hz | 340 | 183 | KA ² s |
| @ 60Hz | 311 | 167 | KA ² s |
| V_{RRM} range | 1600 to 2000 | 2500 | V |
| T_J | - 40 to 180 | - 40 to 180 | °C |



301U(R) Series

Bulletin I2032 rev. B 03/03

International
IR Rectifier

ELECTRICAL SPECIFICATIONS

Voltage Ratings

| Type number | Voltage Code | V_{RRM} , maximum repetitive peak reverse voltage V | V_{RSM} , maximum non-repetitive peak rev. voltage V | I_{RRM} max. @ $T_J = T_J$ max. mA |
|-------------|--------------|--|---|--|
| 301U(R) | 160 | 1600 | 1700 | 15 |
| | 200 | 2000 | 2100 | |
| | 250 | 2500 | 2600 | |

Forward Conduction

| Parameter | 301U(R) | | Units | Conditions | | |
|--|----------|------|--------------------|--|-----------------------|---|
| | 160to200 | 250 | | | | |
| $I_{F(AV)}$ Max. average forward current @ Case temperature | 330 | 300 | A | 180° conduction, half sine wave | | |
| | 120 | 120 | °C | | | |
| $I_{F(RMS)}$ Max. RMS forward current | 520 | 470 | A | DC @ $T_C = 115^\circ\text{C}$ (up to 2000V), $T_C = 102^\circ\text{C}$ (2500V) | | |
| I_{FSM} Max. peak, one-cycle forward, non-repetitive surge current | 8250 | 6050 | A | t = 10ms | No voltage reappplied | Sinusoidal half wave, Initial $T_J = T_J$ max. |
| | 8640 | 6335 | | t = 8.3ms | reappplied | |
| | 6940 | 5090 | | t = 10ms | 100% V_{RRM} | |
| | 7270 | 5330 | | t = 8.3ms | reappplied | |
| I^2t Maximum I^2t for fusing | 340 | 183 | KA ² s | t = 10ms | No voltage reappplied | Initial $T_J = T_J$ max. |
| | 311 | 167 | | t = 8.3ms | reappplied | |
| | 241 | 129 | | t = 10ms | 100% V_{RRM} | |
| | 220 | 118 | | t = 8.3ms | reappplied | |
| $I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing | 3400 | 1830 | KA ² √s | t = 0.1 to 10ms, no voltage reappplied | | |
| $V_{F(TO)1}$ Low level value of threshold voltage | 0.77 | 0.90 | V | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ max. | | |
| $V_{F(TO)2}$ High level value of threshold voltage | 0.84 | 0.97 | | $(I > \pi \times I_{F(AV)})$, $T_J = T_J$ max. | | |
| r_{f1} Low level value of forward slope resistance | 0.49 | 0.59 | mΩ | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ max. | | |
| r_{f2} High level value of forward slope resistance | 0.49 | 0.55 | | $(I > \pi \times I_{F(AV)})$, $T_J = T_J$ max. | | |
| V_{FM} Max. forward voltage drop | 1.22 | 1.46 | V | $I_{pk} = 942\text{A}$, $T_J = T_J$ max, $t_p = 10\text{ms}$ sinusoidal wave | | |

Thermal and Mechanical Specifications

| Parameter | 301U(R) | Units | Conditions |
|---|-----------------|-------|--|
| T _J Max. junction operating temperature range | -40 to 180 | °C | |
| T _{stg} Max. storage temperature range | -40 to 200 | | |
| R _{thJC} Max. thermal resistance, junction to case | 0.14 | K/W | DC operation |
| R _{thCS} Max. thermal resistance, case to heatsink | 0.08 | | Mounting surface, smooth, flat and greased |
| T Max. allowed mounting torque +0 -20% | 37 | Nm | Not lubricated threads |
| | 28 | | Lubricated threads |
| wt Weight | 301U | g | |
| | 303U | | |
| | 305U | | |
| | 307U | | |
| | 309U | | |
| Case style | DO-205AB (DO-9) | | See Outline Table |

ΔR_{thJC} Conduction

(The following table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC)

| Conduction angle | Sinusoidal conduction | | Rectangular conduction | | Units | Conditions |
|------------------|-----------------------|-------|------------------------|-------|-------|--------------------------------------|
| | 80 to 200 | 250 | 00 to 200 | 250 | | |
| 180° | 0.015 | 0.015 | 0.011 | 0.011 | K/W | T _J = T _J max. |
| 120° | 0.018 | 0.018 | 0.019 | 0.019 | | |
| 90° | 0.023 | 0.023 | 0.025 | 0.025 | | |
| 60° | 0.034 | 0.034 | 0.035 | 0.035 | | |
| 30° | 0.056 | 0.056 | 0.057 | 0.057 | | |

Ordering Information Table

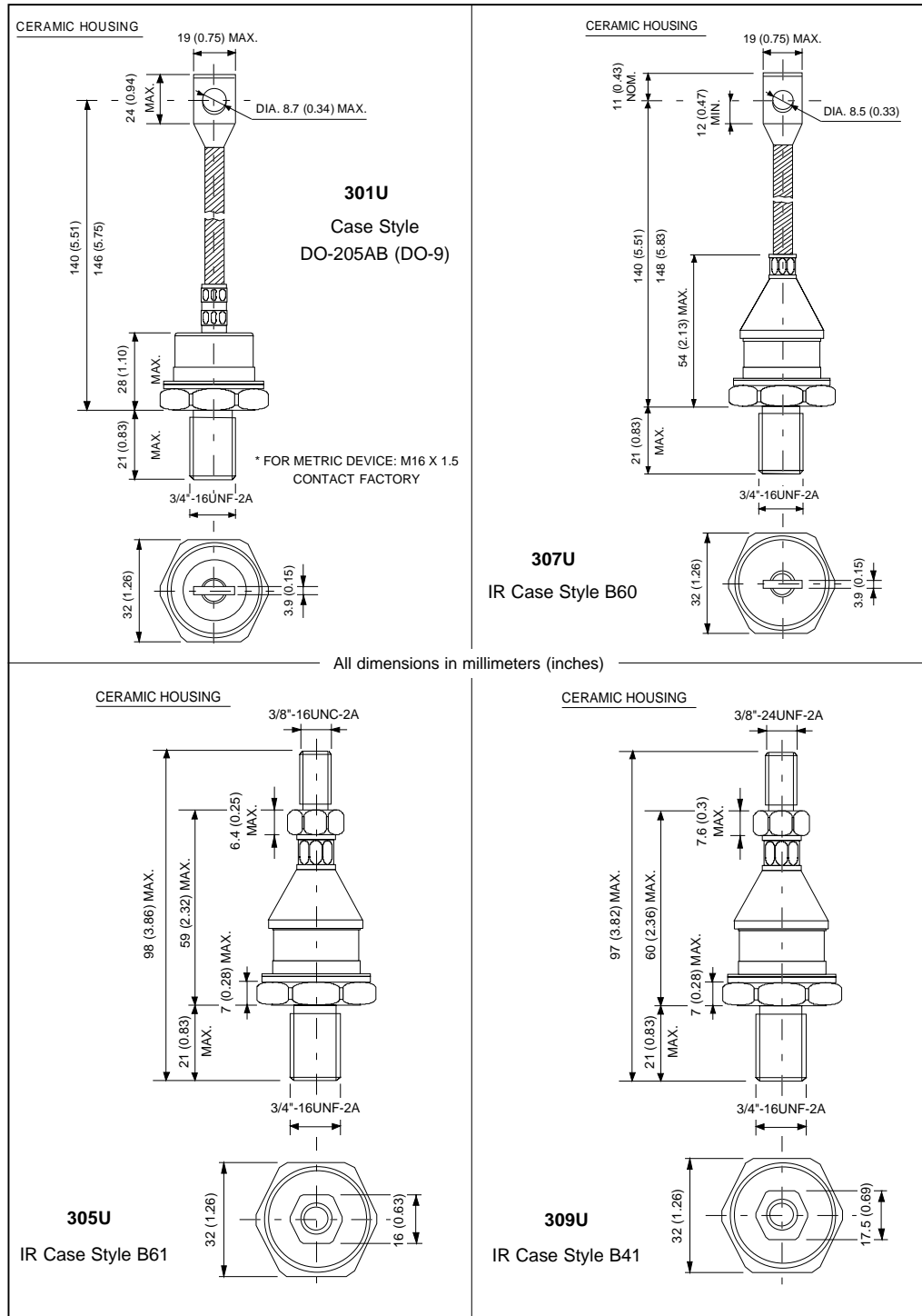
| Device Code | |
|---------------|--|
| | |
| 1 - 30 | = Essential Part Number |
| 2 - 1 | = Standard Device |
| 3 | = Top Threaded version |
| 5 | = Type for rotating application with Top Threaded version 3/8 16UNC-2A |
| 7 | = Type for rotating application with flexible lead |
| 9 | = Type for rotating application with Top Threaded version 3/8 24UNF |
| 3 - U | = Stud Normal Polarity (Cathode to Stud) |
| | UR = Stud Reverse Polarity (Anode to Stud) |
| 4 - A | = Max. Leakage selection I _{RRM} = 2mA T _J = 25°C |
| 5 - | Voltage code: Code x 10=V _{RRM} (See Voltage Ratings table) |

301U(R) Series

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Outline Table



Outline Table

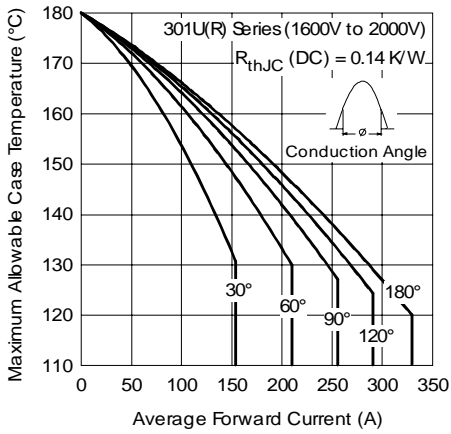
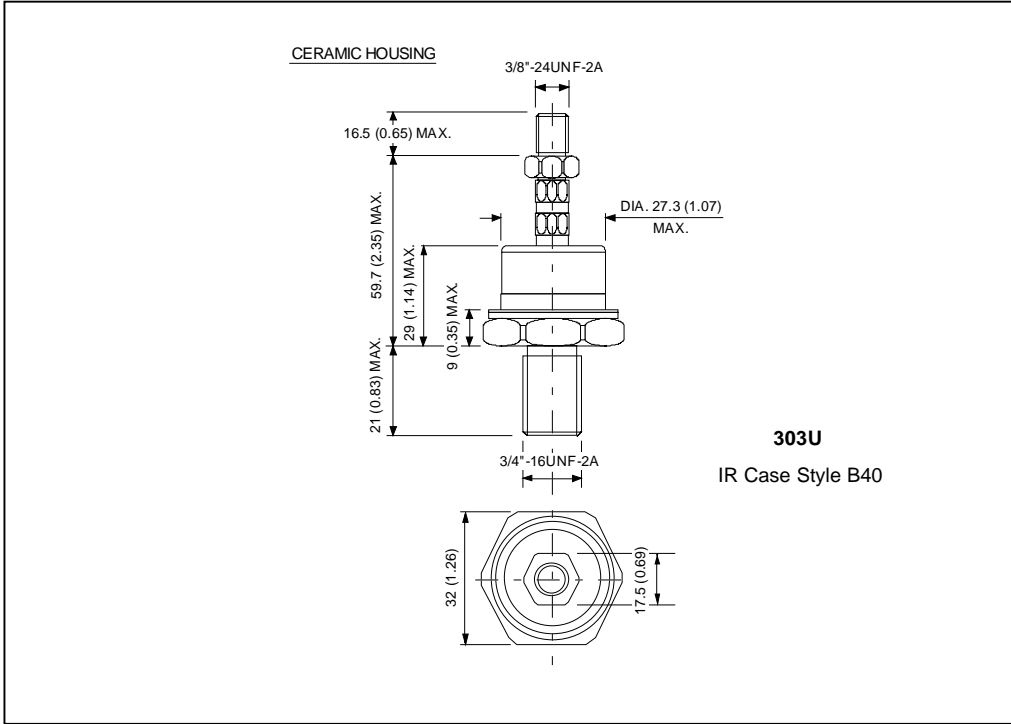


Fig. 1 - Current Ratings Characteristics

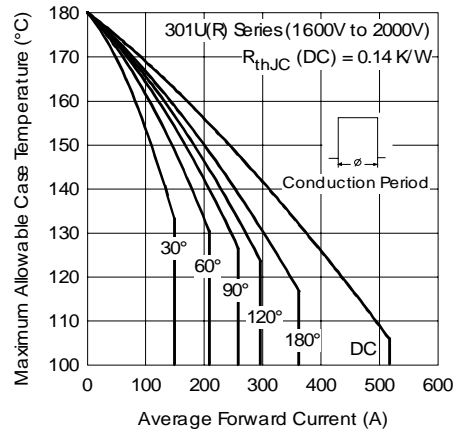


Fig. 2 - Current Ratings Characteristics

301U(R) Series

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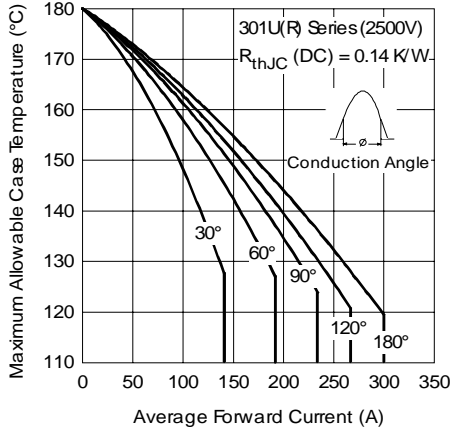


Fig. 3 - Current Ratings Characteristics

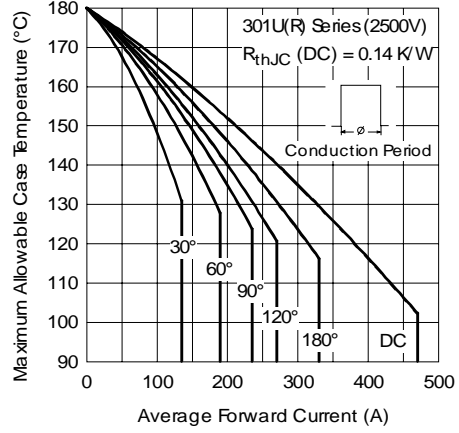


Fig. 4 - Current Ratings Characteristics

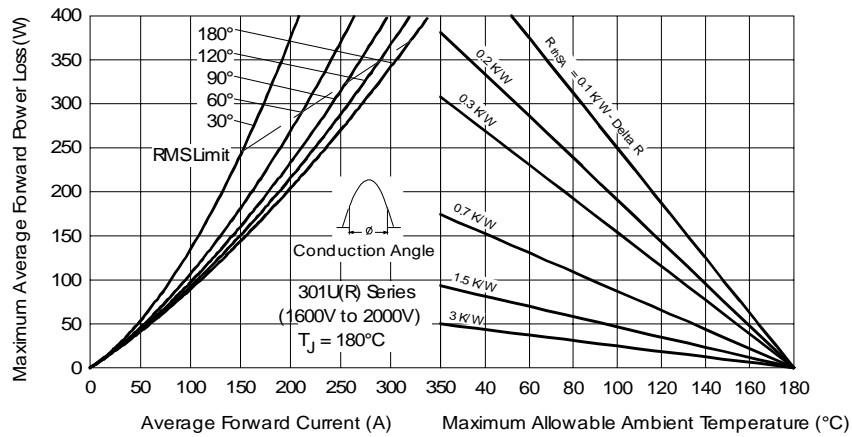


Fig. 5 - Forward Power Loss Characteristics

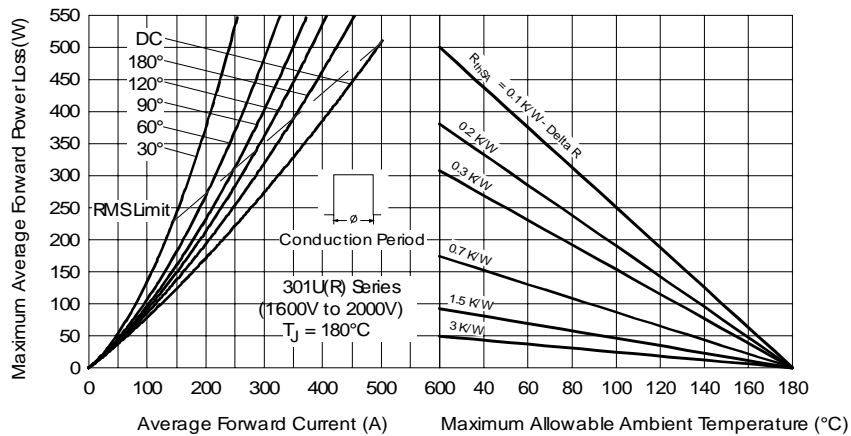


Fig. 6 - Forward Power Loss Characteristics

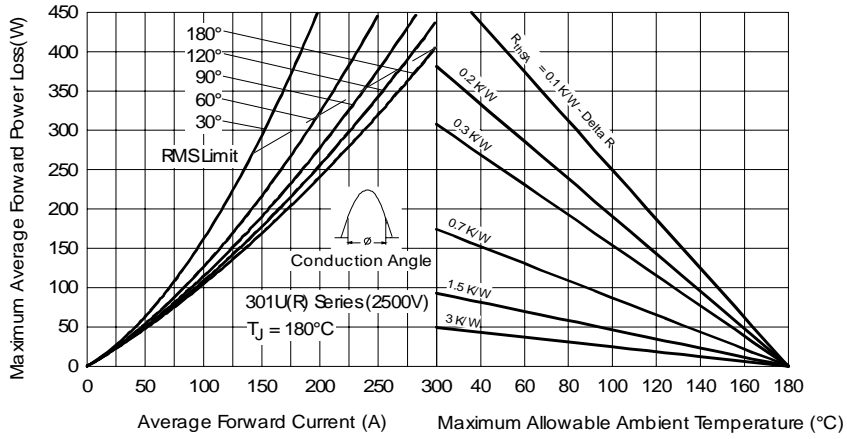


Fig. 7 - Forward Power Loss Characteristics

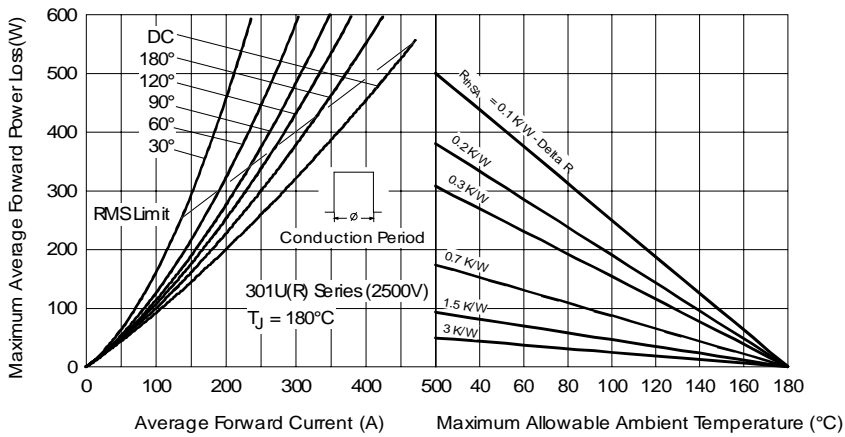


Fig. 8 - Forward Power Loss Characteristics

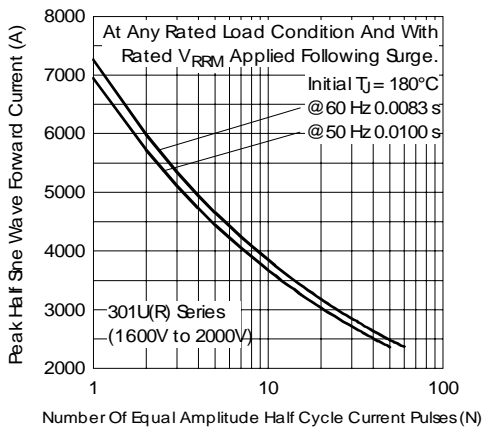


Fig. 9 - Maximum Non-Repetitive Surge Current

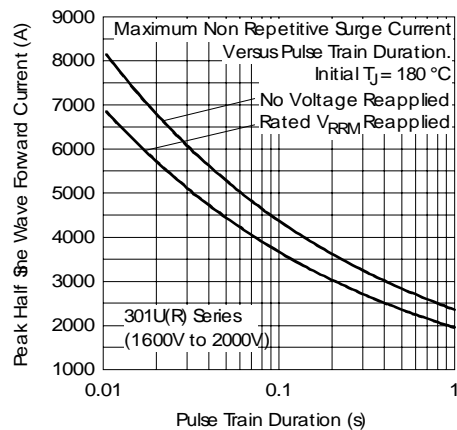


Fig. 10 - Maximum Non-Repetitive Surge Current

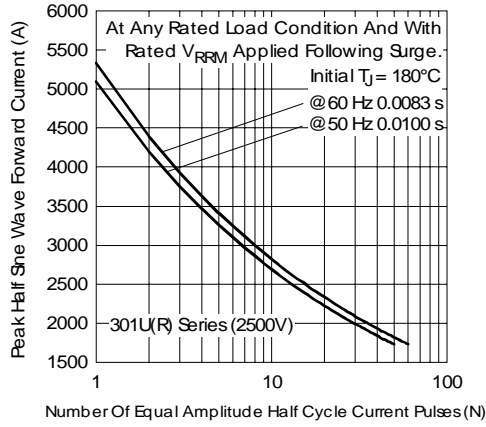


Fig. 11 - Maximum Non-Repetitive Surge Current

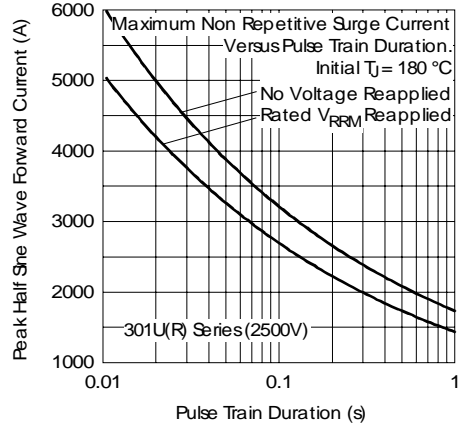


Fig. 12 - Maximum Non-Repetitive Surge Current

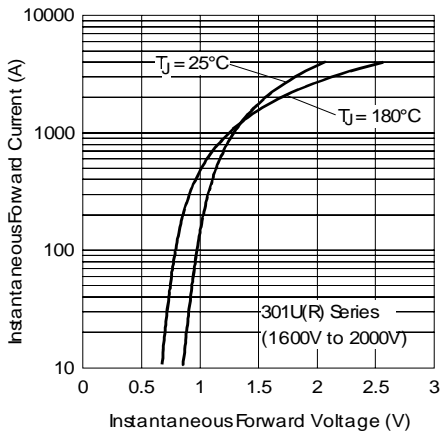


Fig. 13 - Forward Voltage Drop Characteristics

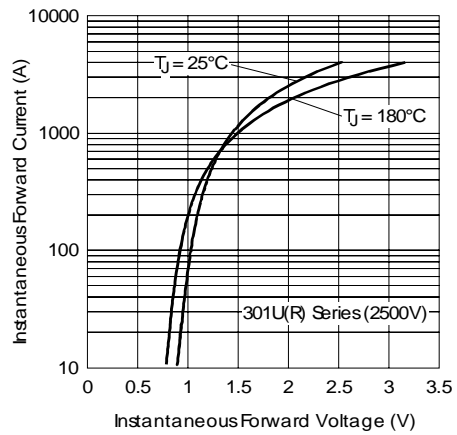


Fig. 14 - Forward Voltage Drop Characteristics

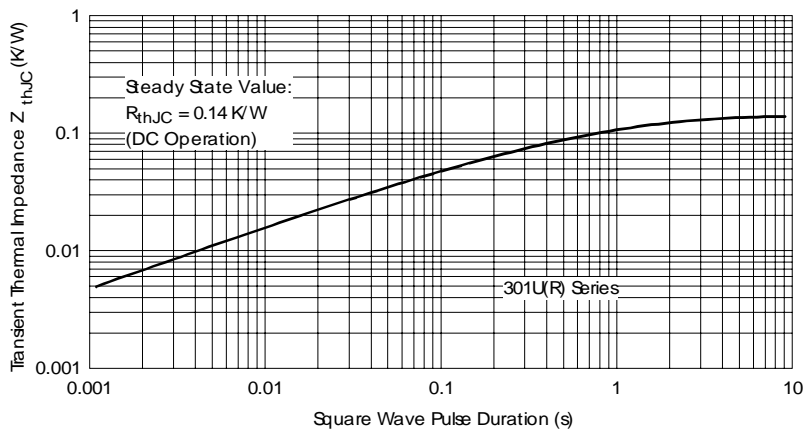


Fig. 15 - Thermal Impedance Z_{thJC} Characteristic

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

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IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
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