

4855452 INTERNATIONAL RECTIFIER

55C 04915 D

Data Sheet No. PD-2.009D

T-01-17

INTERNATIONAL RECTIFIER 

6F, 12F, 12F-B, 16F SERIES

6, 12 and 16 Amp Diffused Silicon Rectifier Diodes

Major Ratings and Characteristics

| | 6F... | 12F... | 12F-B | 16F... | Units |
|---------------|-------------|--------|-------|--------|---------------|
| $I_F(AV)$ | 6 | 12 | 12 | 16 | A |
| @ Max. T_C | 158 | 144 | 146 | 140 | $^{\circ}C$ |
| I_{FSM} | 50Hz | 134 | 225 | 285 | A |
| | 60Hz | 141 | 235 | 300 | A |
| I^2t | 50Hz | 90 | 247 | 405 | A^2s |
| | 60Hz | 82 | 226 | 370 | A^2s |
| $I^2\sqrt{t}$ | 1270 | 3580 | 4031 | 6150 | $A^2\sqrt{s}$ |
| V_{RRM} | 100 to 1200 | | | | V |
| T_J | -65 to 175 | | | | $^{\circ}C$ |

Description

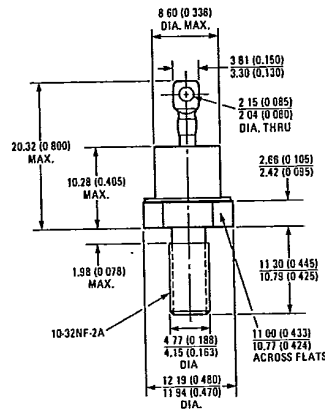
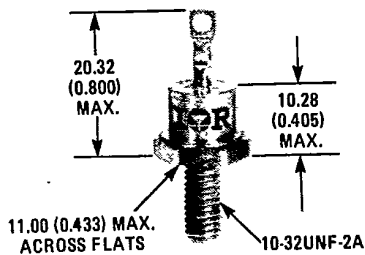
This range of low power general purpose rectifier diodes is designed for battery chargers, converters, power supplies, machine tool controls.

Features

- Wide current range
- High surge capabilities
- Types up to 1200V V_{RRM}
- Stud cathode and stud anode versions
- Avalanche types available

B

CASE STYLE AND DIMENSIONS



Conforms to JEDEC Outline DO-203AA (DO-4)
Dimensions in Millimeters and (Inches)

4855452 INTERNATIONAL RECTIFIER

55C 04916 D

6F, 12F, 12F-B, 16F Series

INTERNATIONAL RECTIFIER 

T-01-17

REVERSE VOLTAGE RATINGS

| ① Part Number | | | | V _{RRM} , Maximum peak repetitive reverse voltage, T _J = 175°C | V _{RSM} , Maximum peak non-repetitive reverse voltage, T _J = 175°C | I _{RM} , Maximum peak reverse leakage current at rated V _{RRM} , T _J = 175°C | V _(BR) [*] - Maximum avalanche voltage |
|---------------|--------|---------|--------|--|--|---|--|
| | | | | V | V | mA | V |
| 6F10 | 12F10 | 12F10B | 16F10 | 100 | 150 | 12 | - |
| 6F20 | 12F20 | 12F20B | 16F20 | 200 | 275 | 12 | - |
| 6F40 | 12F40 | 12F40B | 16F40 | 400 | 500 | 12 | 500 |
| 6F60 | 12F60 | 12F60B | 16F60 | 600 | 725 | 12 | 750 |
| 6F80 | 12F80 | 12F80B | 16F80 | 800 | 950 | 12 | 950 |
| 6F100 | 12F100 | 12F100B | 16F100 | 1000 | 1200 | 12 | 1150 |
| 6F120 | 12F120 | 12F120B | 16F120 | 1200 | 1400 | 12 | 1350 |

* Avalanche versions only available from 400 to 1200 V V_{RRM}
 ① Types listed are cathode case, for anode case include "R" in code i.e. 6FR10, 12FR20, 16FR40.

AVALANCHE RATINGS

Avalanche versions available with the following reverse power ratings, to specify add 'A' prefix e.g. A6F40, A12F120 etc. N.B. All other parameters are the same as 6F, 12F and 16F.

| | A6F... | A12F... | A12F-B | A16F... | Units | Conditions |
|--|--------|---------|--------|---------|-------|---|
| P _R Maximum non-repetitive peak reverse power | 4 | 7 | - | 15 | kW | 10/μs square pulse, T _J = T _J max |

ELECTRICAL SPECIFICATIONS

| | 6F... | 12F... | 12F-B | 16F... | Units | Conditions |
|--|----------|-----------|-----------|-----------|-------------------|---|
| I _{F(AV)} Maximum average forward current @ T _C [*] | 6 158 | 12 144 | 12 146 | 16 140 | A °C | 180° conduction, half sine wave |
| I _{F(RMS)} Maximum rms forward current | 9.5 | 19 | 19 | 25 | A | |
| I _{FSM} Maximum peak one cycle non-repetitive current | 134 | 225 | 285 | 295 | A | t = 10ms No voltage reapplied |
| | 141 | 235 | 300 | 310 | A | t = 8.3ms |
| | 159 | 265 | 240 | 350 | A | t = 10ms 100% rated V _{RRM} reapplied |
| | 167 | 280 | 250 | 370 | A | t = 8.3ms |
| I ² t Maximum I ² t for fusing | 90 | 247 | 405 | 435 | A ² s | t = 10ms No voltage reapplied |
| | 82 | 226 | 370 | 395 | A ² s | t = 8.3ms |
| | 127 | 351 | 285 | 612 | A ² s | t = 10ms 100% rated V _{RRM} reapplied |
| | 116 | 320 | 265 | 560 | A ² s | t = 8.3ms |
| ① I ² /t Maximum I ² /t for Ind. dev. fusing | 1270 | 3511 | 4031 | 6125 | A ² /s | t = 0.1 - 10ms No voltage reapplied |
| V _{FM} Maximum peak forward voltage | 1.10 | 1.26 | 1.20 | 1.23 | V | T _J = 25°C I _{FM} = 7x rated I _{F(AV)} |
| V _{F(TO)} Maximum value of threshold voltage | 0.60 | 0.68 | - | 0.78 | V | T _J = 175°C |
| r _F Maximum value of forward slope resistance | 17.20 | 13.51 | - | 7.55 | mΩ | |

① I²t for time t_x = I²√t_x + √t_x

THERMAL AND MECHANICAL SPECIFICATIONS

| | 6F... | 12F & A12F-B | 16F... | Units | Conditions |
|---|-----------------|--------------|--------|--------|---|
| T _J Junction operating temp. range | -65 to 175 (1) | | | °C | |
| T _{stg} Storage temp. range | -65 to 200 | | | °C | |
| R _{thJC} Maximum internal thermal resistance, junction to case | 2.5 | 2.0 | 1.6 | K/W | DC operation |
| R _{thCS} Maximum thermal resistance case to heatsink | 0.5 | | | K/W | Mounting surface flat, smooth and greased |
| T Mounting torque ± 10% | to nut | 10.5 (13.5) | | lbf.in | Lubricated threads (non-lubricated threads) |
| | | 0.12 (0.16) | | kgf.m | |
| | to device | 1.2 (1.5) | | N.m | |
| | | 11.5 | | lbf.in | |
| | | 0.13 | | kgf.m | |
| wt Approximate weight | 7 | | g. | | |
| | 0.25 | | oz. | | |
| Case style | DO-203AA (DO-4) | | | | JEDEC |

4855452 INTERNATIONAL RECTIFIER

55C 04917 D



6F, 12F, 12F-B, 16F Series

T-01-17

6F Series

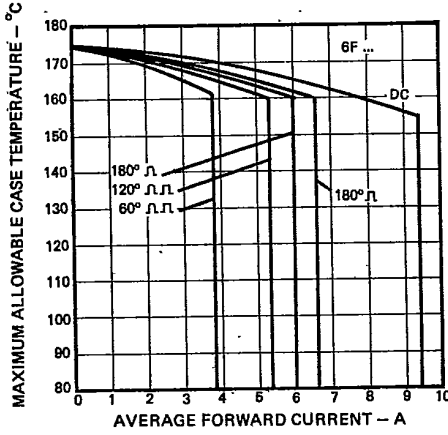


Fig. 1 - Average Forward Current Vs. Maximum Allowable Case Temperature, 6F Series

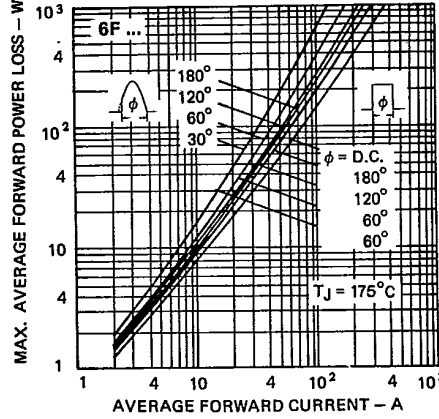


Fig. 2 - Maximum Forward Power Loss Vs. Average Forward Current, 6F Series

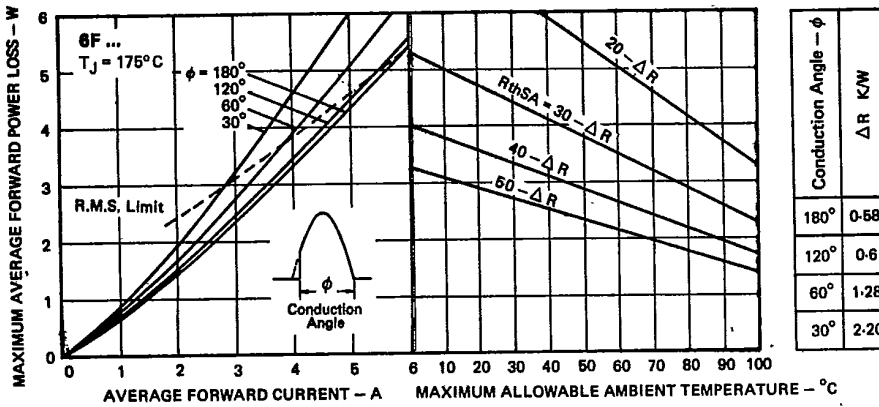


Fig. 3 - Current Rating Nomogram (Sinusoidal Waveforms), 6F Series

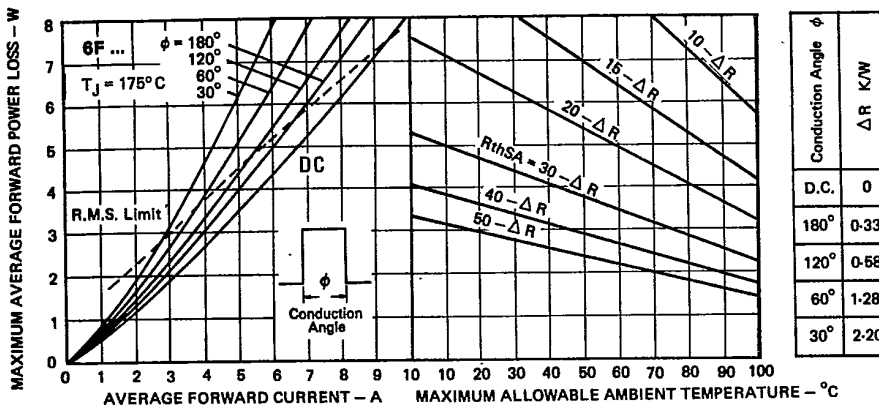


Fig. 4 - Current Rating Nomogram (Rectangular Waveforms), 6F Series

B

4855452 INTERNATIONAL RECTIFIER

55C 04918 D

6F, 12F, 12F-B, 16F Series

INTERNATIONAL RECTIFIER **IR**

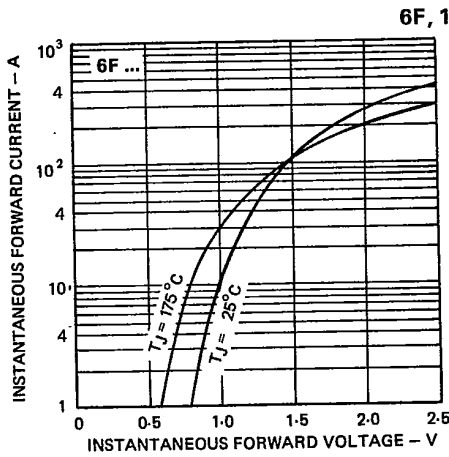


Fig. 5 - Maximum Forward Voltage Vs. Forward Current, 6F Series

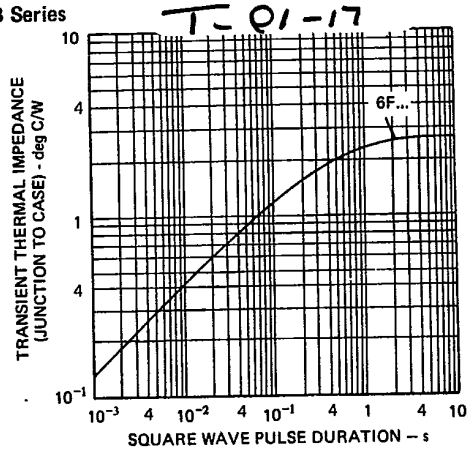


Fig. 6 - Maximum Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration, 6F Series

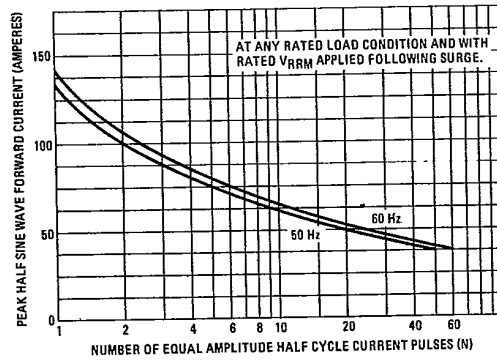


Fig. 7 - Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 6F Series

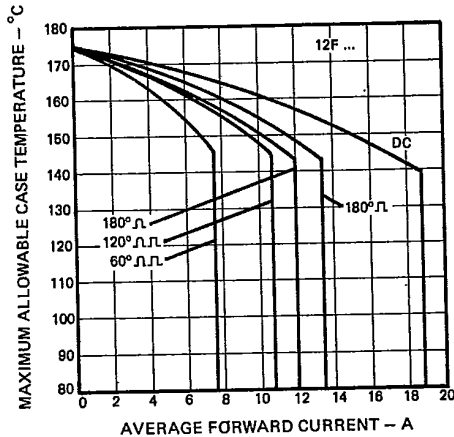


Fig. 8 - Average Forward Current Vs. Maximum Allowable Case Temperature, 12F Series

Note: add 2°C to above curves at full rated load for 12F-B series.

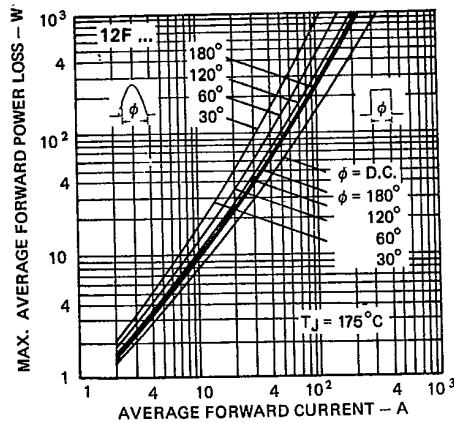


Fig. 9 - Maximum Forward Power Loss Vs. Average Forward Current, 12F Series

Note: subtract 3 percent from above curves at full rated load for 12F-B series.

4855452 INTERNATIONAL RECTIFIER

55C 04919 D



6F, 12F, 12F-B, 16F Series

T-01-17

12F and 12F-B Series

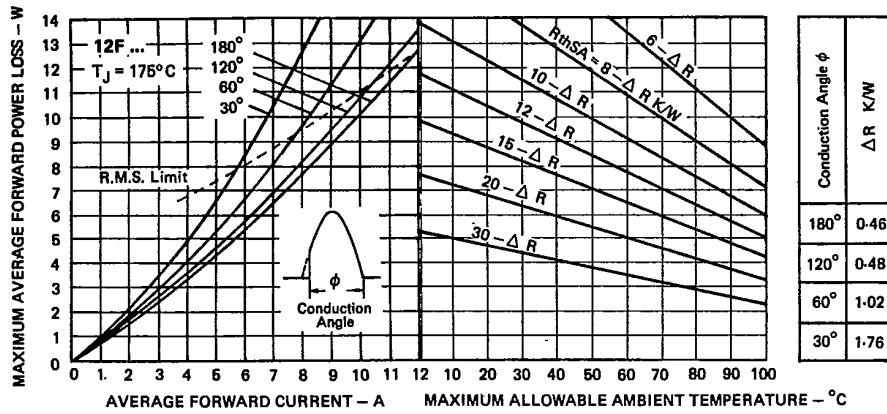


Fig. 10 - Current Rating Nomogram (Sinusoidal Waveform), 12F and 12F-B Series.

B

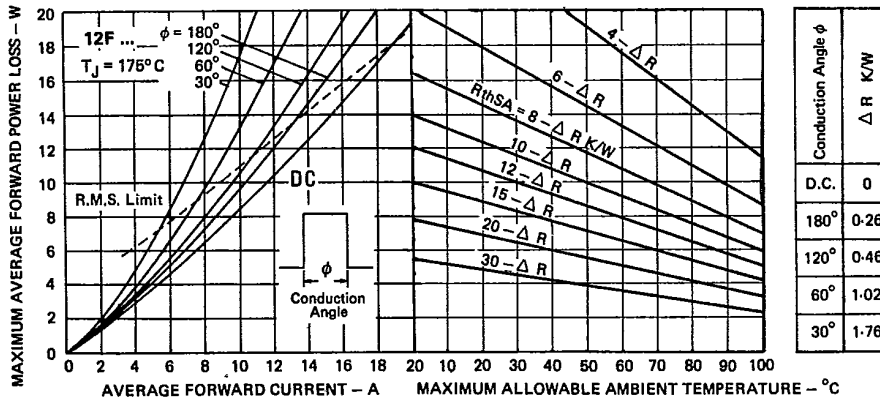


Fig. 11 - Current Rating Nomogram (Rectangular Waveforms), 12F and 12F-B Series.

4855452 INTERNATIONAL RECTIFIER

55C 04920 D

6F, 12F, 12F-B, 16F Series

INTERNATIONAL RECTIFIER 

12F, 12F-B and 16F Series

T-01-17

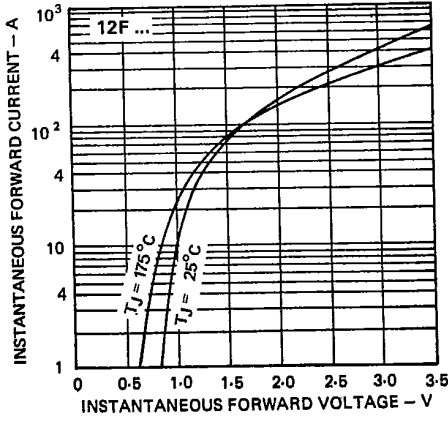


Fig. 12 - Maximum Forward Voltage Vs. Forward Current, 12F Series

Note: subtract 0.06V at 38A for 12F-B Series.

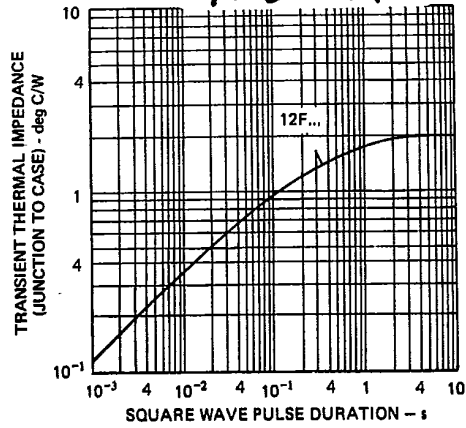


Fig. 13 - Maximum Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration, 12F and 12F-B Series

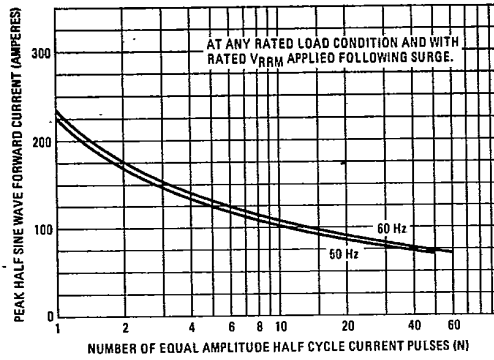


Fig. 14 - Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 12F Series

Note: 12F-B ratings are 11 percent higher at one cycle and 5 percent higher at 50 and 60 cycles.

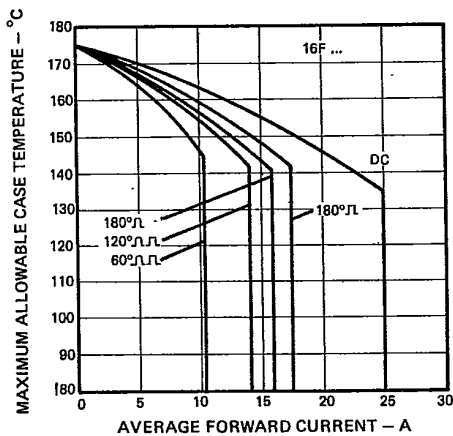


Fig. 15 - Average Forward Current Vs. Maximum Allowable Case Temperature, 16F Series

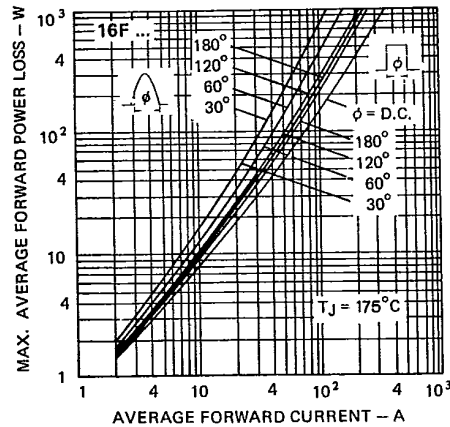


Fig. 16 - Maximum Forward Power Loss Vs. Average Forward Current, 16F Series

4855452 INTERNATIONAL RECTIFIER

55C 04921 D



6F, 12F, 12F-B, 16F Series

T-01-17

16F Series

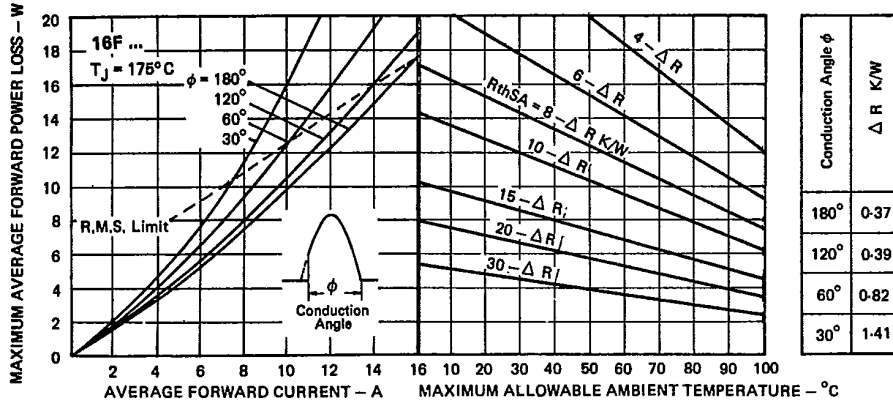


Fig. 17 - Current Rating Nomogram (Sinusoidal Waveforms), 16F Series

B

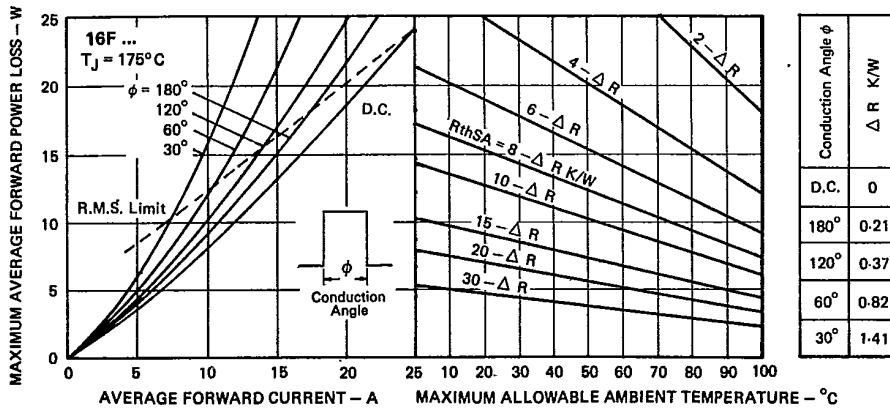


Fig. 18 - Current Rating Nomogram (Rectangular Waveforms), 16F Series

4855452 INTERNATIONAL RECTIFIER

55C 04922 D

6F, 12F, 12F-B, 16F Series

INTERNATIONAL RECTIFIER 

16F Series

T-01-17

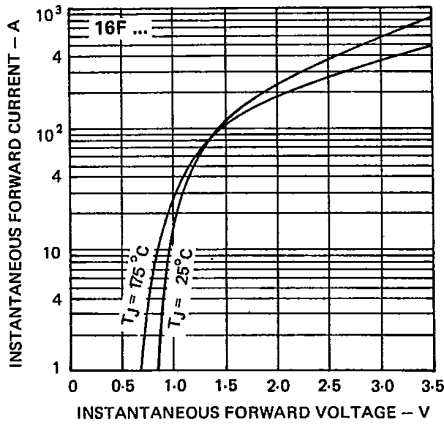


Fig. 19 - Maximum Forward Voltage Vs. Forward Current, 16F Series

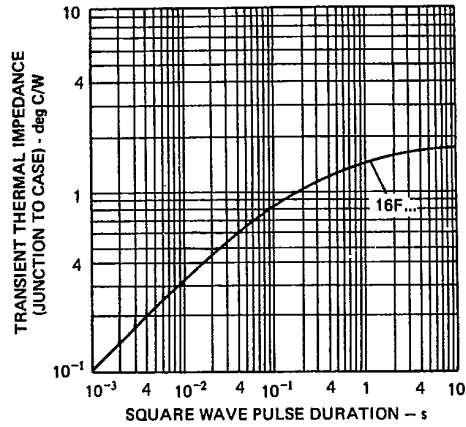


Fig. 20 - Maximum Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration, 16F Series

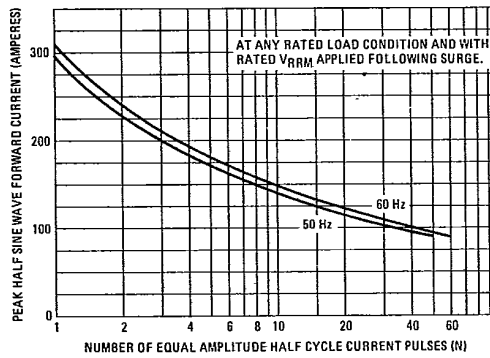


Fig. 21 - Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 16F Series