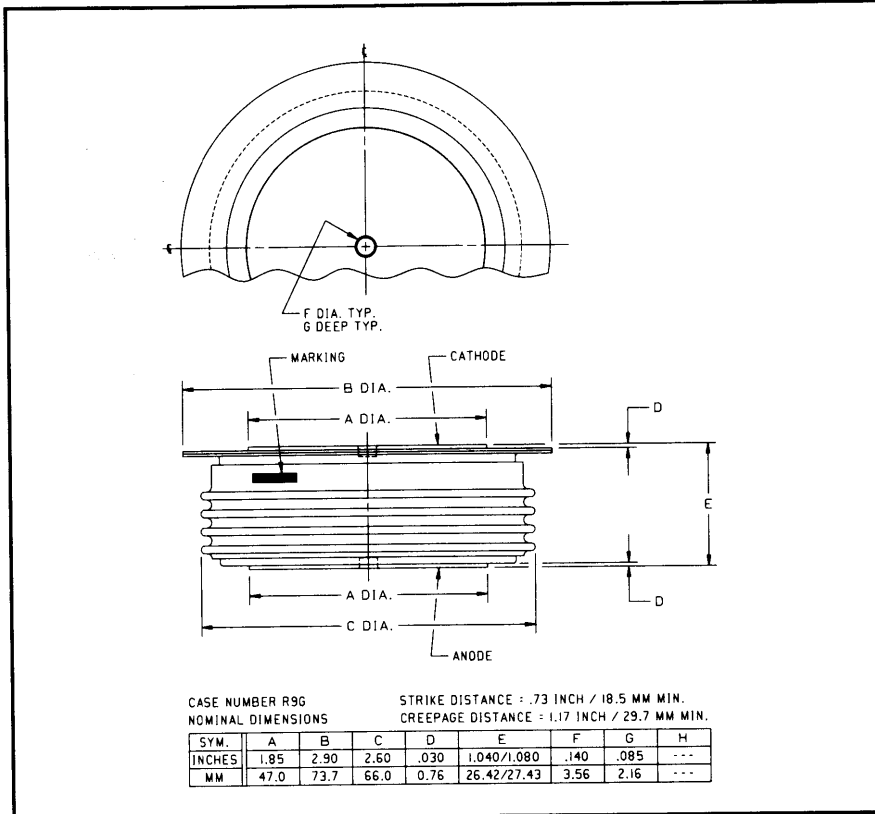


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Fast Recovery Rectifier
1500 Amperes Average
3600 Volts



R9G2__15
Fast Recovery Rectifier
1500 Amperes Average, 3600 Volts

R9G2__15 (Outline Drawing)

Ordering Information:

Select the complete part number you desire from the following table:

| Type | Voltage | | Current | | Recovery Time | | Leads | |
|------|--------------------------|------|------------------------|------|------------------------|------|-------|------|
| | V _{RRM} (Volts) | Code | I _{F(av)} (A) | Code | t _{rr} (μsec) | Code | Case | Code |
| R9G2 | 400 | 04 | 1500 | 15 | 5.0 | AS | R9G | OO |
| | 600 | 06 | | | | | | |
| | 800 | 08 | | | | | | |
| | 1000 | 10 | | | | | | |
| | 1200 | 12 | | | | | | |
| | 1400 | 14 | | | | | | |
| | 1600 | 16 | | | | | | |
| | 1800 | 18 | | | | | | |
| | 2000 | 20 | | | | | | |
| | 2200 | 22 | | | | | | |
| | 2400 | 24 | | | | | | |
| | 2600 | 26 | | | | | | |
| | 2800 | 28 | | | | | | |
| | 3000 | 30 | | | | | | |
| | 3200 | 32 | | | | | | |
| | 3400 | 34 | | | | | | |
| | 3600 | 36 | | | | | | |

Example: Type R9G2 rated at 1500A average with V_{RRM} = 3600V, Recovery Time = 5.0 μsec, order as:

| Type | Voltage | Current | Time | Leads |
|---------|---------|---------|------|-------|
| R 9 G 2 | 3 6 | 1 5 | AS | O O |

Features:

- Fast Recovery Times
- Soft Recovery Characteristics
- High Surge Current Ratings
- Special Selection of t_{rr} or Q_{rr} available

Applications:

- Inverters
- Choppers
- Transmitters
- Free Wheeling Diode

R9G2_15

Fast Recovery Rectifier

1500 Amperes Average, 3600 Volts

Absolute Maximum Ratings

| Characteristics | Symbol | R9G2_15 | Units |
|---|--------------|--------------------|-------------|
| RMS Forward Current | $I_{F(rms)}$ | 2350 | Amperes |
| Average Forward Current | $I_{F(av)}$ | 1500 | Amperes |
| One-half Cycle Surge Current | I_{FSM} | 18000 | Amperes |
| I^2t (for Fusing), Times ≥ 8.3 milliseconds | I^2t | 1.35×10^6 | A^2sec |
| Max I^2t , Package (for Times = 8.3 milliseconds) | I^2t | 90×10^6 | A^2sec |
| Storage Temperature | T_{stg} | -40 to +190 | $^{\circ}C$ |
| Operating Temperature | T_j | -40 to +150 | $^{\circ}C$ |
| Mounting Force | | 5000 to 6000 | lbs |

Electrical and Thermal Characteristics

| Characteristics | Symbol | Test Conditions | R9G2_15 | Units |
|---|-------------------|---|---------|------------------|
| Current - Conducting State Maximums | | | | |
| Forward Voltage Drop | V_{FM} | $T_j = 25^{\circ}C, I_{FM} = 1500A$ | 1.65 | Volts |
| Voltage - Blocking State Maximums | | | | |
| Repetitive Peak Reverse Voltage (Rated Limit) | V_{RRM} | | 3600 | Volts |
| Non-rep. Trans. Peak Rev. Voltage (Rated Limit) | V_{RSM} | $V \leq 5.0msec$ | 3800 | Volts |
| Reverse Leakage Current, mA peak | I_{RRM} | T_j at max., $V_{RRM} = \text{Rated}$ | 75 | mA |
| Switching | | | | |
| Maximum Reverse Recovery Time | t_{rr} | $I_{FM} = 1500A, t_p = 190\mu sec,$ $di_F/dt = 25A/\mu sec, T_C = 25^{\circ}C$ | 5.0 | μsec |
| Thermal | | | | |
| Maximum Resistance, Junction to Case | $R_{\theta(j-c)}$ | | 0.018 | $^{\circ}C/Watt$ |
| Maximum Resistance, Case to Sink (Lubricated) | $R_{\theta(c-s)}$ | | 0.0075 | $^{\circ}C/Watt$ |

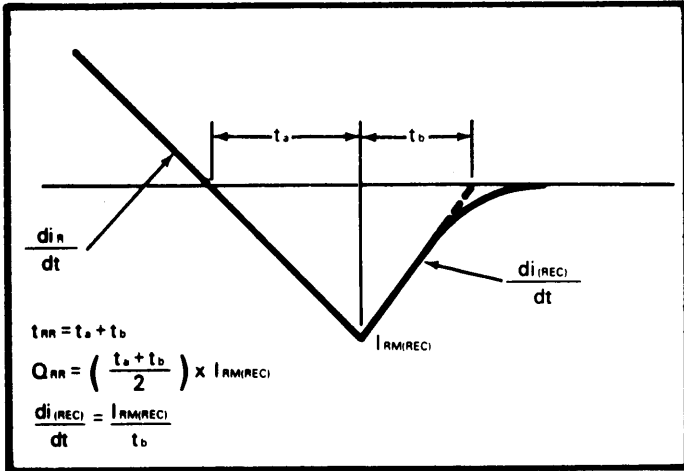
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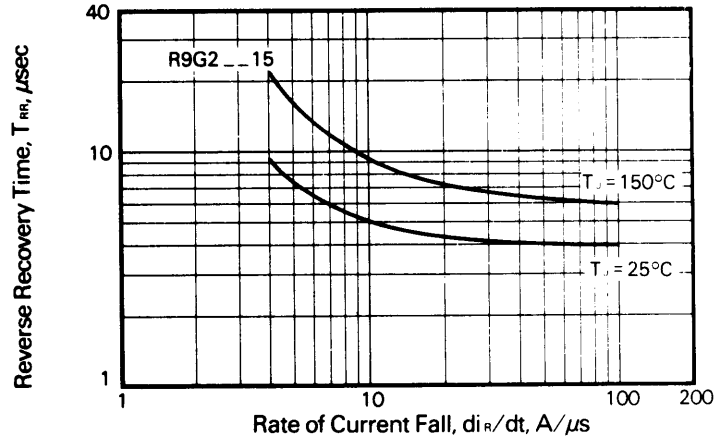
Fast Recovery Rectifier

1500 Amperes Average, 3600 Volts

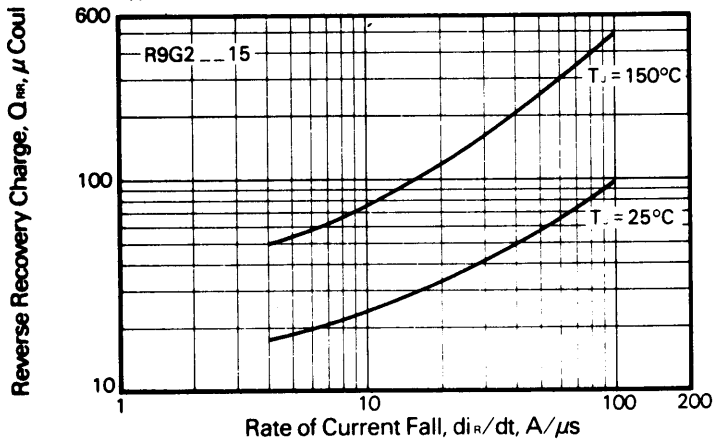
Reverse Recovery Wave Form



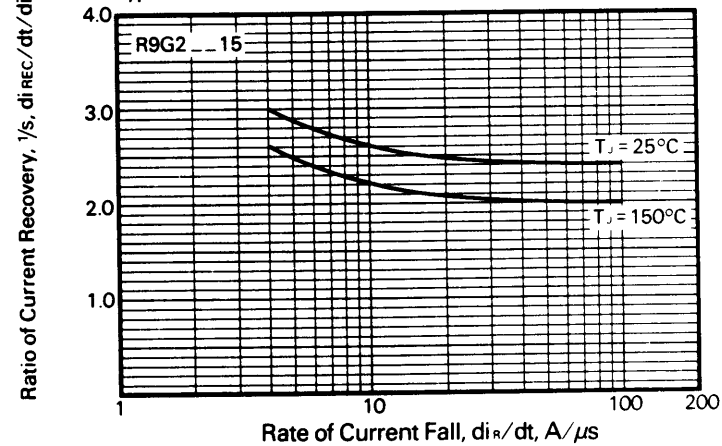
Typical Reverse Recovery Time vs. Rate of Current Fall



Typical Reverse Recovery Charge vs. Rate of Current Fall

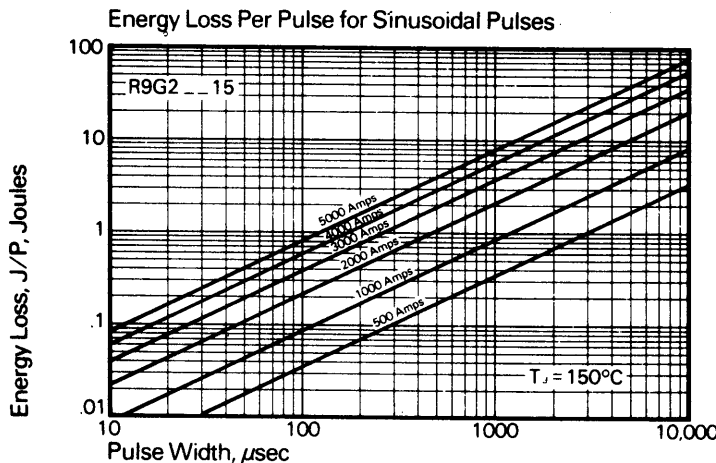
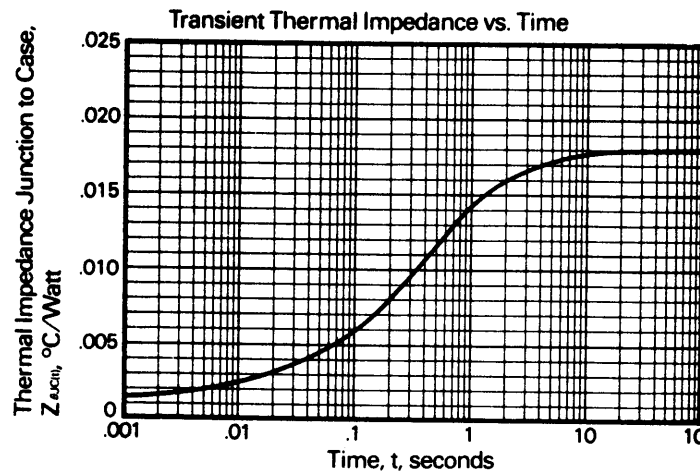
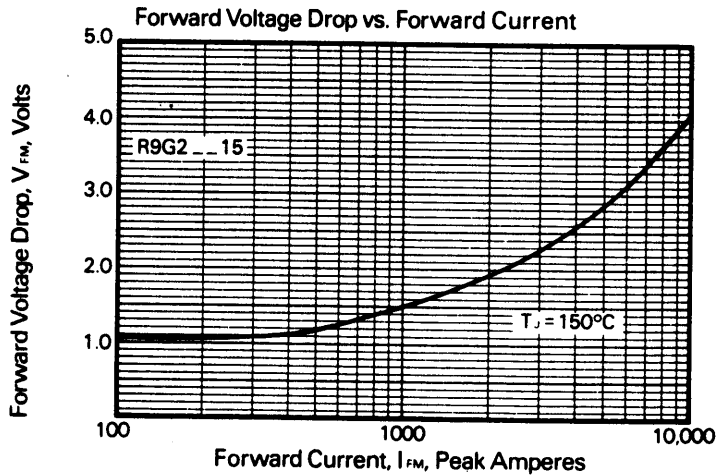


Typical Ratio of Current Recovery to Rate of Current Fall



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Fast Recovery Rectifier
 1500 Amperes Average, 3600 Volts



Calculation of Fast Recovery Diodes and Allowable Case Temperature

1. Conduction Losses

$$P_{av(cond)} = J/P \times F$$

2. Reverse Recovery Losses (Approximate)

$$P_{av(sw)} = 1/4 \times V_R \times \frac{di_R}{dt} \times T_{rr}^2 \times \left(\frac{1/s}{1 + 1/s} \right)^2 \times F \times 1 \times 10^{-6}$$

3. Maximum Allowable Case Temperature

$$T_{C(max)} = T_J - (P_{av(cond)} + P_{av(sw)} \times R_{\theta(j-c)})$$

Where:

$P_{av(cond)}$ = Forward Conduction Power Loss in Watts

$P_{av(sw)}$ = Reverse Recovery Power Loss in Watts

J/P = Energy Loss per Pulse in Joules

F = Frequency in Hertz

V_R = Steady State Reverse Operating Voltage in Volts

di_R/dt = Rate of Decay of Forward Current in Amperes/ μsec

T_{rr} = Reverse Recovery Time in Microseconds

$\frac{1}{"S"}$ = Ratio of Recovery $di/dt \left(\frac{di_F/dt}{di_R/dt} \right)$

F = Operating Frequency in Hertz

$T_{C(max)}$ = Maximum Allowable Case Temperature in $^\circ\text{C}$.

T_J = Maximum Operating Junction Temperature in $^\circ\text{C}$.

$R_{\theta(j-c)}$ = DC Junction to Case Thermal Impedance in $^\circ\text{C/Watt}$.