NEW PRODUCT

# DSR8F600

**600V 8A HYPERFAST RECTIFIER**

## Product Summary

| $V_{RRM}$ (V) | $I_O$ (A) | $V_{F\_TYP}$ (V) @ +25°C | $t_{RR\_max}$ (ns) @ +25°C | $I_{RM\_TYP}$ (A) @ +25°C |
|---|---|---|---|---|
| 600 | 8 | 1.95 | 20 | 3.9 |

## Features and Benefits

- Low $V_F$ Minimizes Boost Diode Conduction Losses
- Very Fast $t_{RR}$ Reduces MOSFET PFC Switching Losses
- Soft Switching Ensures Ringing and EMI are Reduced
- Low $Q_{RR}$ and $I_{RM}$ Minimize Boost Diode Recovery Losses
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

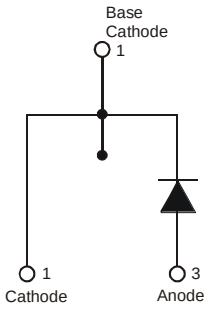
## Description and Application

The DSR8F600 Hyperfast Rectifier has been designed specifically for use as a boost diode in Power Factor Correction (PFC) applications. Its soft very fast switching characteristics make it ideal for use in hard switching and Continuous Conduction Mode (CCM) PFC circuits. It can be used in

- High Output SMPS
- Servers and Telecom Equipment
- Flat-panel TVs

## Mechanical Data

- Case: TO220AC
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 1.75 grams (Approximate)



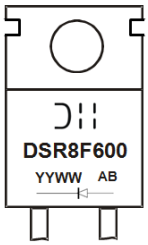

Package Pin Out Configuration

## Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---|---|---|
| DSR8F600 | TO220AC | 50 pieces/tube |

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

## Marking Information




DSR8F600 = Product Type Marking Code
AB = Foundry and Assembly Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 15 = 2015)
WW = Week (01 to 53)

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## Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

Single phase, half wave, 60Hz, resistive or inductive load.

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_{RM}$ | 600 | V |
| Average Rectified Output Current | $I_O$ | 8 | A |
| Non-Repetitive Peak Forward Surge Current 8.3ms<br>Single Half Sine-Wave Superimposed on Rated Load | $I_{FSM}$ | 75 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Typical Thermal Resistance, Junction to Case (Note 5) | $R_{\theta JC}$ | 3.4 | °C/W |
| Typical Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 46 | °C/W |
| Typical Thermal Resistance, Junction to Case (Note 6) | $R_{\theta JC}$ | 1.6 | °C/W |
| Typical Thermal Resistance, Junction to Ambient (Note 6) | $R_{\theta JA}$ | 7 | °C/W |
| Storage Temperature Range | $T_{STG}$ | -55 to +150 | °C |
| Maximum Operating Junction Temperature | $T_J$ | +150 | °C |

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Forward Voltage Drop | $V_F$ | — | 1.8 | — | V | $I_F$ = 5A, $T_J$ = +25°C |
| | | — | 1.95 | 2.7 | | $I_F$ = 8A, $T_J$ = +25°C |
| | | — | 1.6 | — | | $I_F$ = 8A, $T_J$ = +125°C |
| Leakage Current (Note 7) | $I_R$ | — | 9 | 80 | µA | $V_R$ = 600V, $T_J$ = +25°C |
| | | — | 500 | 1500 | | $V_R$ = 500V, $T_J$ = +100°C |
| Reverse Recovery Time | $t_{RR}$ | — | 14.6 | 20 | ns | $I_F$ = 0.5A, $I_R$ = 1.0A, $I_{RR}$ = 0.25A |
| Reverse Recovery Time | $t_{RR}$ | — | 35 | 45 | ns | $I_F$ = 8A, dI/dt = 300A/µs, |
| Reverse Recovery Charges | $Q_{RR}$ | — | 85 | — | nC | $V_R$ = 400V, $T_J$ = +25°C |
| Reverse Recovery Current | $I_{RM}$ | — | 5.9 | — | A | $I_F$ = 8A, dI/dt = 300A/µs,<br>$V_R$ = 400V, $T_J$ = +125°C |
| Junction Capacitance | $C_T$ | — | 9.3 | — | pF | 40.0V, 1MHz |

Notes: 5. Device free standing no heat sink.

6. Device with 50mm*50mm*23mm Al heat sink.

7. Short duration pulse test used to minimize self-heating effect.

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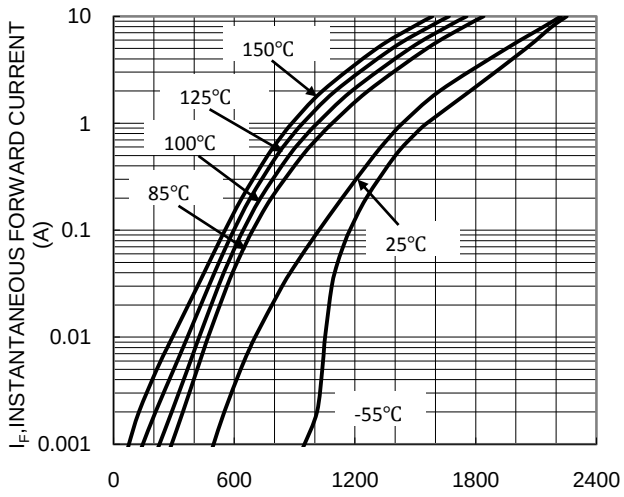


Figure 1. Typical Forward Characteristics

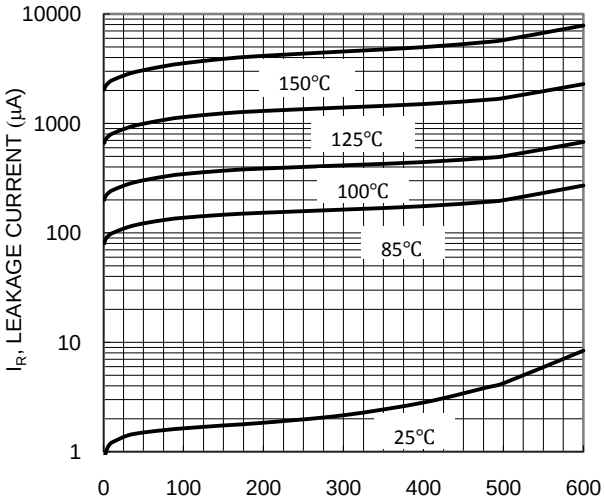


Figure 2. Typical Reverse Characteristics

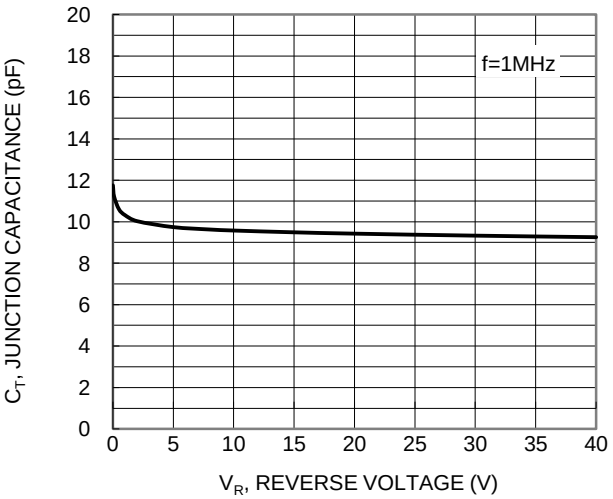


Figure 3. Typical Junction Capacitance

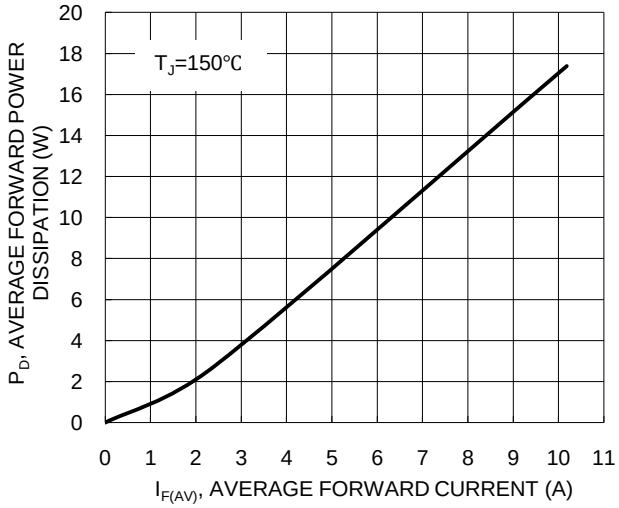


Figure 4. Forward Power Dissipation

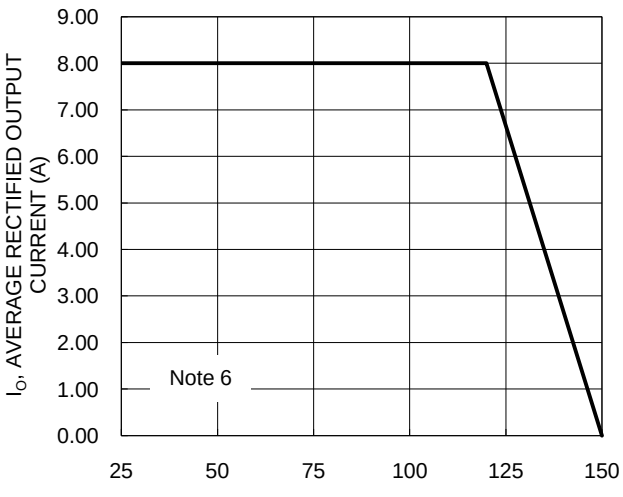


Figure 5. DC Forward Current Derating

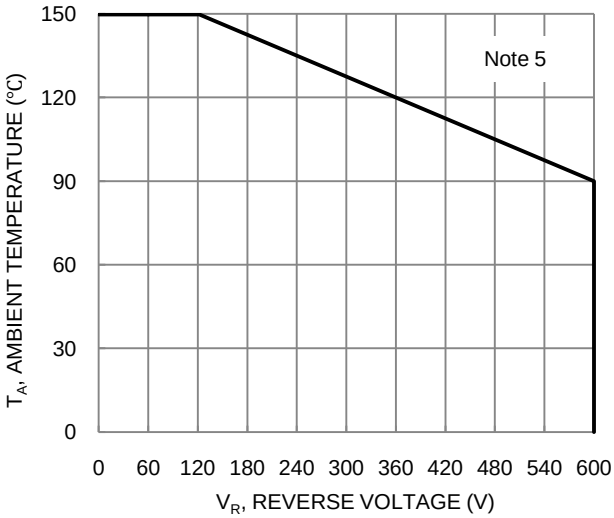


Figure 6. Operating Temperature Derating

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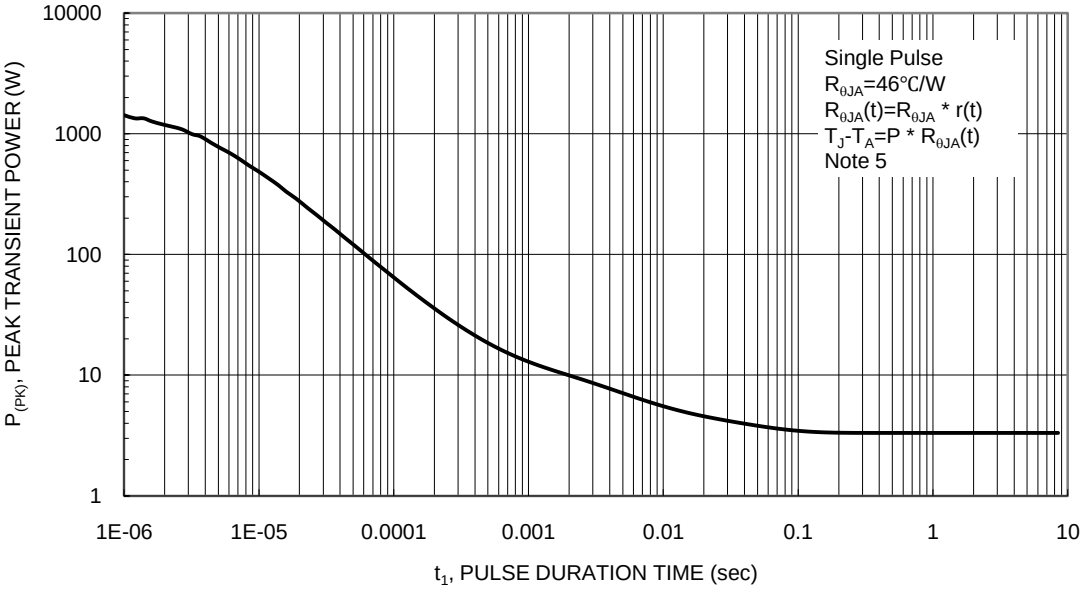


Figure 7. Single Pulse Maximum Power Dissipation

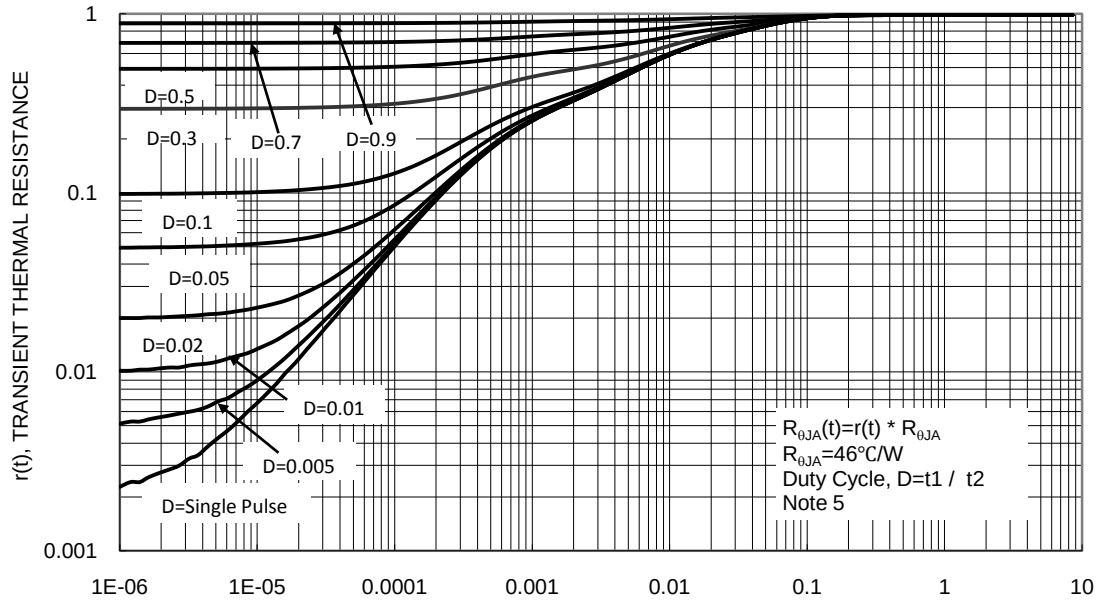


Figure 8. Transient Thermal Resistance

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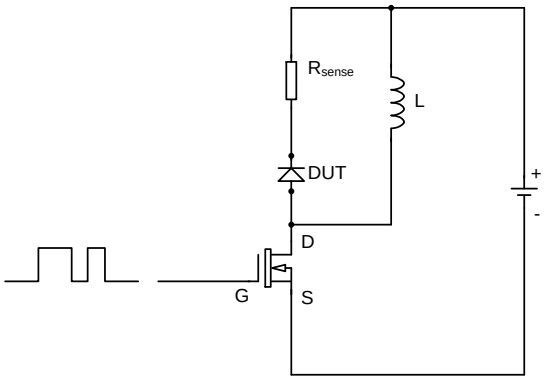
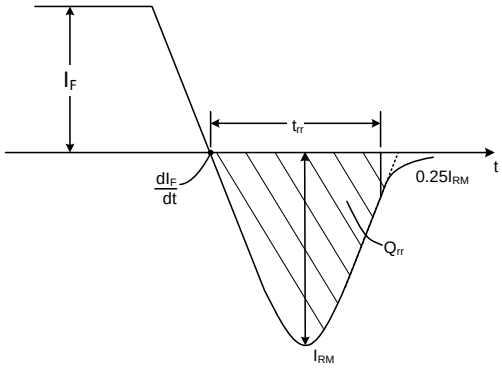
## Test Circuit and Waveform definitions



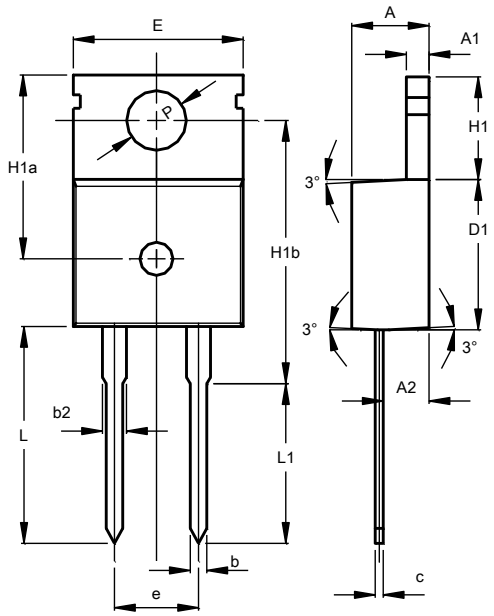

$t_{RR}$ Test Circuit




$t_{RR}$ Waveform and definitions

## Package Outline Dimensions

Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.




| TO220AC (Type BR) | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 4.30 | 4.70 | 4.50 |
| **A1** | 1.20 | 1.40 | 1.30 |
| **A2** | 2.20 | 2.60 | 2.40 |
| **b** | 0.70 | 0.90 | 0.80 |
| **b2** | - | - | 1.27 |
| **c** | 0.40 | 0.60 | 0.50 |
| **D1** | 9.00 | 9.40 | 9.20 |
| **E** | 9.80 | 10.20 | 10.00 |
| **e** | 4.88 | 5.28 | 5.08 |
| **H1** | 6.30 | 6.70 | 6.50 |
| **H1a** | 10.90 | 11.30 | 11.10 |
| **H1b** | 15.70 | 16.10 | 15.90 |
| **L** | 12.60 | 13.60 | 13.10 |
| **L1** | 9.60 | 10.60 | 10.10 |
| **P** | 3.56 | 3.64 | 3.60 |
| **All Dimensions in mm** | | | |

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