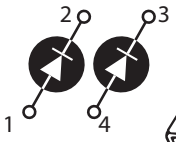



Anti-Paralle l
**APT2x100DQ100J**




P aralle l
**APT2x101DQ100J**




"UL Recognized"
file # E145592

Microsemi®
POWER PRODUCTS GROUP

**APT2x101DQ100J 1000V 100A**
**APT2x100DQ100J 1000V 100A**

# DUAL DIE ISOTOP® PACKAGE

# ULTRAFAST SOFT RECOVERY RECTIFIER DIODE

## PRODUCT APPLICATIONS

- **Anti-Parallel Diode**
  - **-Switchmode Power Supply**
  - **-Inverters**
- **Free Wheeling Diode**
  - **-Motor Controllers**
  - **-Converters**
- **Snubber Diode**
- **Uninterruptible Power Supply (UPS)**
- **Induction Heating**
- **High Speed Rectifiers**

## PRODUCT FEATURES

- **Ultrafast Recovery Times**
- **Soft Recovery Characteristics**
- **Popular SOT-227 Package**
- **Low Forward Voltage**
- **High Blocking Voltage**
- **Low Leakage Current**
- **Avalanche Energy Rated**

## PRODUCT BENEFITS

- **Low Losses**
- **Low Noise Switching**
- **Cooler Operation**
- **Higher Reliability Systems**
- **Increased System Power Density**

## MAXIMUM RATINGS

All Ratings: $T_C$ = 25°C unless otherwise specified.

| Symbol | Characteristic / Test Conditions | APT2x101_100DQ100J | UNIT |
|---|---|---|---|
| $V_R$ | Maximum D.C. Reverse Voltage | 1000 | Volts |
| $V_{RRM}$ | Maximum Peak Repetitive Reverse Voltage | | |
| $V_{RWM}$ | Maximum Working Peak Reverse Voltage | | |
| $I_{F(AV)}$ | Maximum Average Forward Current ($T_C$ = 64°C, Duty Cycle = 0.5) | 100 | Amps |
| $I_{F(RMS)}$ | RMS Forward Current (Square wave, 50% duty) | 133 | |
| $I_{FSM}$ | Non-Repetitive Forward Surge Current ($T_J$ = 45°C, 8.3ms) | 1000 | |
| $E_{AVL}$ | Avalanche Energy (1A, 40mH) | 20 | mJ |
| $T_J$,$T_{STG}$ | Operating and StorageTemperature Range | -55 to 175 | °C |

## STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $V_F$ | Forward Voltage | $I_F$ = 100A | | 2.1 | 2.7 | Volts |
| | | $I_F$ = 150A | | 2.34 | | |
| | | $I_F$ = 100A, $T_J$ = 125°C | | 1.64 | | |
| $I_{RM}$ | Maximum Reverse Leakage Current | $V_R$ = 1000V | | | 100 | µA |
| | | $V_R$ = 1000V, $T_J$ = 125°C | | | 500 | |
| $C_T$ | Junction Capacitance, $V_R$ = 200V | | | 120 | | pF |



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## DYNAMIC CHARACTERISTICS

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = 1A, $di_F/dt$ = -100A/µs, $V_R$ = 30V, $T_J$ = 25°C | - | 45 | | ns |
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = 100A, $di_F/dt$ = -200A/µs $V_R$ = 667V, $T_C$ = 25°C | - | 290 | | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 685 | | nC |
| $I_{RRM}$ | Maximum Reverse Recovery Current | | - | 6 | - | Amps |
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = 100A, $di_F/dt$ = -200A/µs $V_R$ = 667V, $T_C$ = 125°C | - | 340 | | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 3645 | | nC |
| $I_{RRM}$ | Maximum Reverse Recovery Current | | - | 18 | - | Amps |
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = 100A, $di_F/dt$ = -1000A/µs $V_R$ = 667V, $T_C$ = 125°C | - | 160 | | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 7085 | | nC |
| $I_{RRM}$ | Maximum Reverse Recovery Current | | - | 70 | | Amps |

## THERMAL AND MECHANICAL CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Junction-to-Case Thermal Resistance | | | .41 | °C/W |
| $V_{Isolation}$ | RMS Voltage (50-60hHz Sinusoidal Wavefomr Ffrom Terminals to Mounting Base for 1 Min.) | 2500 | | | Volts |
| $W_T$ | Package Weight | | 1.03 | | oz |
| | | | 29.2 | | g |
| Torque | Maximum Mounting Torque | | | 10 | lb•in |
| | | | | 1.1 | N•m |

**Microsemi reserves the right to change, without notice, the specifications and information contained herein.**

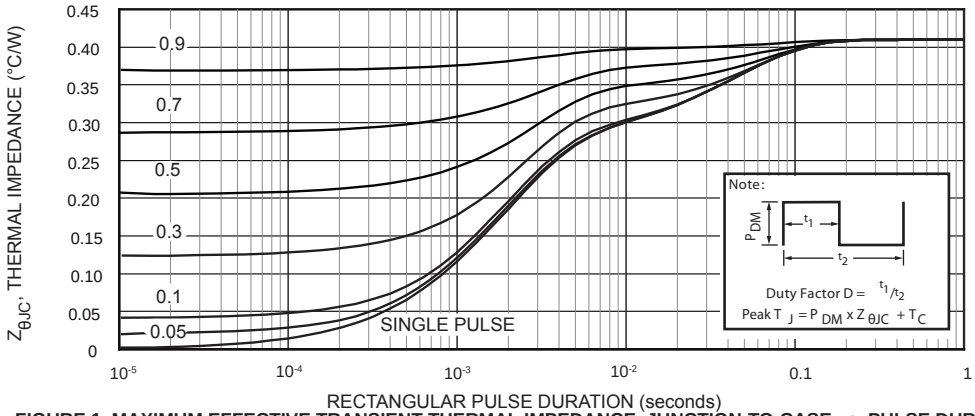



**FIGURE 1. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION**



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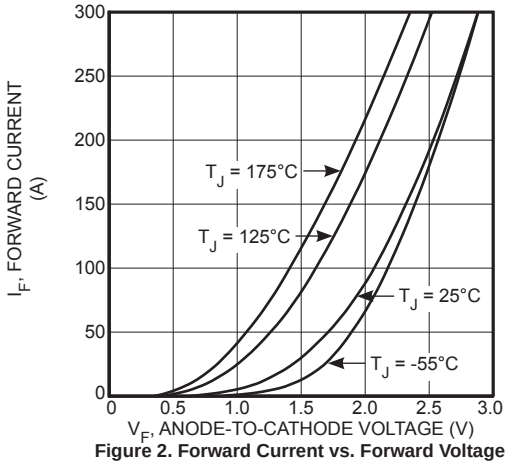



**Figure 2. Forward Current vs. Forward Voltage**

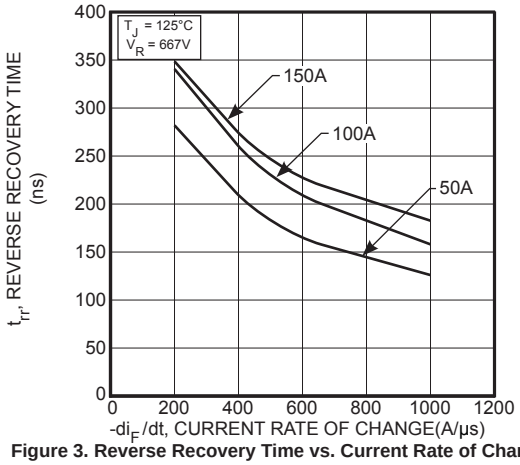



**Figure 3. Reverse Recovery Time vs. Current Rate of Change**

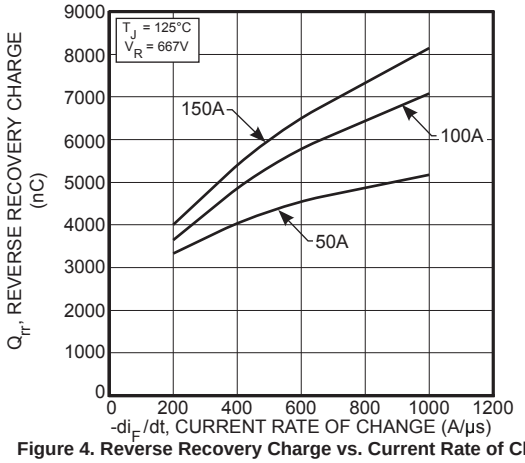



**Figure 4. Reverse Recovery Charge vs. Current Rate of Change**

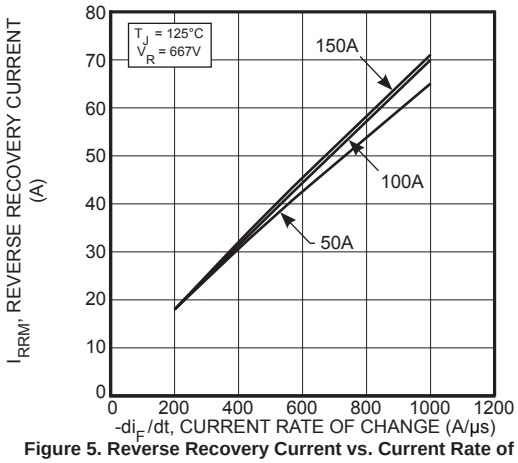



**Figure 5. Reverse Recovery Current vs. Current Rate of Change**

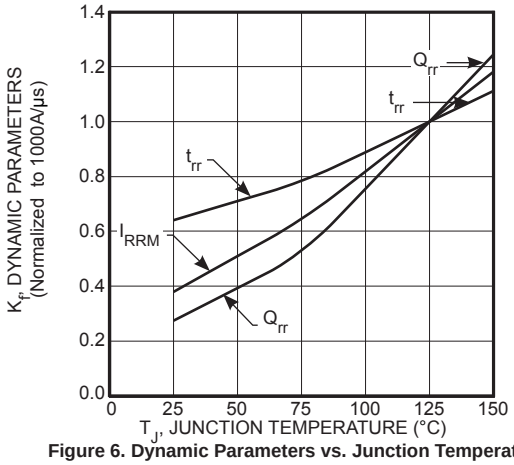



**Figure 6. Dynamic Parameters vs. Junction Temperature**

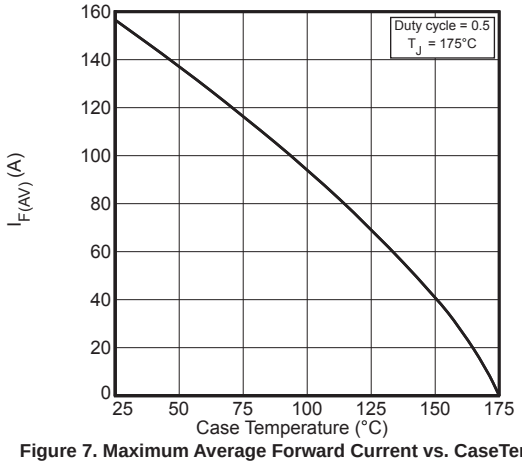



**Figure 7. Maximum Average Forward Current vs. CaseTemperature**

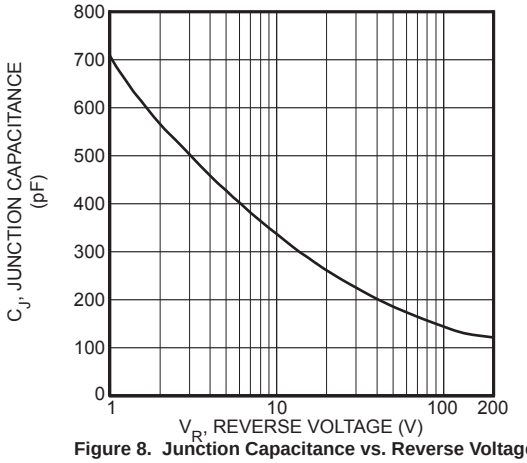



**Figure 8. Junction Capacitance vs. Reverse Voltage**



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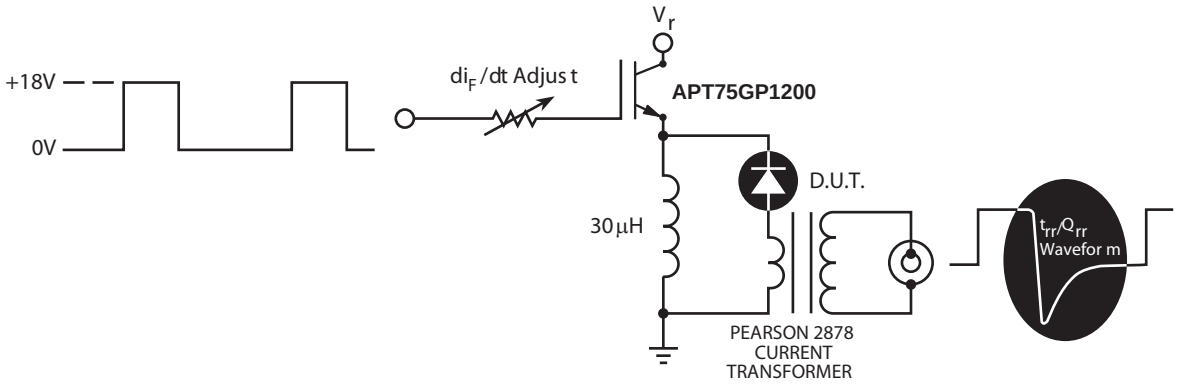



Figure 9. Diode Test Circuit

1. $I_F$ - Forward Conduction Current
2. $di_F/dt$ - Rate of Diode Current Change Through Zero Crossing.
3. $I_{RRM}$ - Maximum Reverse Recovery Current.
4. $t_{rr}$ - Reverse Recovery Time, measured from zero crossing where diode current goes from positive to negative, to the point at which the straight line through $I_{RRM}$ and 0.25 $I_{RRM}$ passes through zero.
5. $Q_{rr}$ - Area Under the Curve Defined by $I_{RRM}$ and $t_{rr}$.

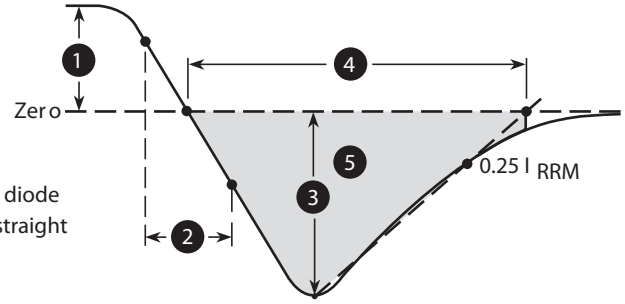
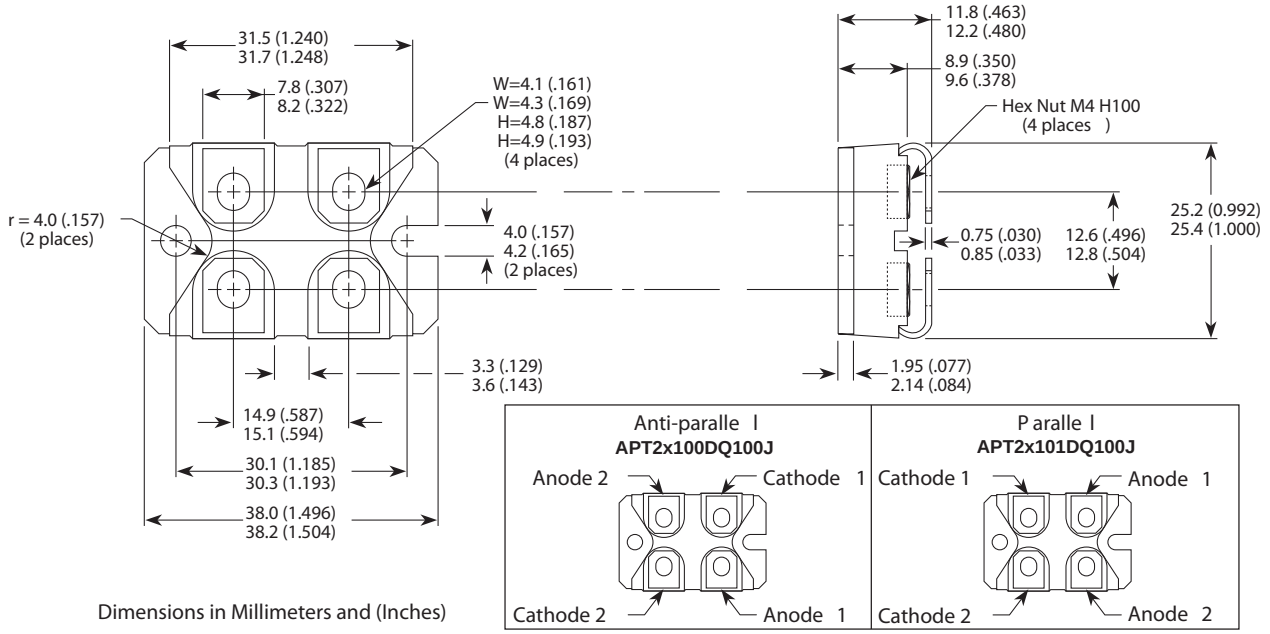



Figure 10, Diode Reverse Recovery Waveform and Definitions

## SOT-227 (ISOTOP®) Package Outline




Dimensions in Millimeters and (Inches)



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