

## ULTRAFAST SOFT RECOVERY RECTIFIER DIODE

### PRODUCT APPLICATIONS

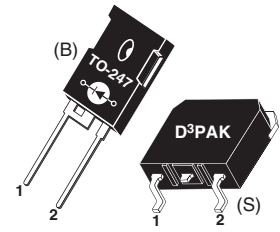
- Anti-Parallel Diode
  - Switchmode Power Supply
  - Inverters
- Free Wheeling Diode
  - Motor Controllers
  - Converters
  - Inverters
- Snubber Diode
- PFC

### PRODUCT FEATURES

- Ultrafast Recovery Times
- Soft Recovery Characteristics
- Popular TO-247 Package or Surface Mount D<sup>3</sup>PAK Package
- Low Forward Voltage
- Low Leakage Current
- Avalanche Energy Rated

### PRODUCT BENEFITS

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



1 - Cathode  
 2 - Anode  
 Back of Case - Cathode

### MAXIMUM RATINGS

All Ratings:  $T_C = 25^\circ\text{C}$  unless otherwise specified.

| Symbol         | Characteristic / Test Conditions                                                | APT30DQ60B_S(G) | UNIT             |
|----------------|---------------------------------------------------------------------------------|-----------------|------------------|
| $V_R$          | Maximum D.C. Reverse Voltage                                                    | 600             | Volts            |
| $V_{RRM}$      | Maximum Peak Repetitive Reverse Voltage                                         |                 |                  |
| $V_{RWM}$      | Maximum Working Peak Reverse Voltage                                            |                 |                  |
| $I_{F(AV)}$    | Maximum Average Forward Current ( $T_C = 117^\circ\text{C}$ , Duty Cycle = 0.5) | 30              | Amps             |
| $I_{F(RMS)}$   | RMS Forward Current (Square wave, 50% duty)                                     | 51              |                  |
| $I_{FSM}$      | Non-Repetitive Forward Surge Current ( $T_J = 45^\circ\text{C}$ , 8.3ms)        | 320             |                  |
| $E_{AVL}$      | Avalanche Energy (1A, 40mH)                                                     | 20              | mJ               |
| $T_J, T_{STG}$ | Operating and Storage Temperature Range                                         | -55 to 175      | $^\circ\text{C}$ |
| $T_L$          | Lead Temperature for 10 Sec.                                                    | 300             |                  |

### STATIC ELECTRICAL CHARACTERISTICS

| Symbol   | Characteristic / Test Conditions          | MIN                                          | TYP | MAX | UNIT          |
|----------|-------------------------------------------|----------------------------------------------|-----|-----|---------------|
| $V_F$    | Forward Voltage                           | $I_F = 30\text{A}$                           |     | 2.0 | Volts         |
|          |                                           | $I_F = 60\text{A}$                           |     | 2.4 |               |
|          |                                           | $I_F = 30\text{A}, T_J = 125^\circ\text{C}$  |     | 1.7 |               |
| $I_{RM}$ | Maximum Reverse Leakage Current           | $V_R = 600\text{V}$                          |     | 25  | $\mu\text{A}$ |
|          |                                           | $V_R = 600\text{V}, T_J = 125^\circ\text{C}$ |     | 500 |               |
| $C_T$    | Junction Capacitance, $V_R = 200\text{V}$ |                                              | 36  |     | pF            |

# DYNAMIC CHARACTERISTICS

APT30DQ60B\_S(G)

| Symbol    | Characteristic                   | Test Conditions                                                              | MIN | TYP | MAX | UNIT |
|-----------|----------------------------------|------------------------------------------------------------------------------|-----|-----|-----|------|
| $t_{rr}$  | Reverse Recovery Time            | $I_F = 1A$ , $di_F/dt = -100A/\mu s$ , $V_R = 30V$ , $T_J = 25^\circ C$      | -   | 23  |     | ns   |
| $t_{rr}$  | Reverse Recovery Time            | $I_F = 30A$ , $di_F/dt = -200A/\mu s$<br>$V_R = 400V$ , $T_C = 25^\circ C$   | -   | 30  |     |      |
| $Q_{rr}$  | Reverse Recovery Charge          |                                                                              | -   | 55  |     | nC   |
| $I_{RRM}$ | Maximum Reverse Recovery Current |                                                                              | -   | 3   | -   | Amps |
| $t_{rr}$  | Reverse Recovery Time            | $I_F = 30A$ , $di_F/dt = -200A/\mu s$<br>$V_R = 400V$ , $T_C = 125^\circ C$  | -   | 175 |     | ns   |
| $Q_{rr}$  | Reverse Recovery Charge          |                                                                              | -   | 485 |     | nC   |
| $I_{RRM}$ | Maximum Reverse Recovery Current |                                                                              | -   | 6   | -   | Amps |
| $t_{rr}$  | Reverse Recovery Time            | $I_F = 30A$ , $di_F/dt = -1000A/\mu s$<br>$V_R = 400V$ , $T_C = 125^\circ C$ | -   | 75  |     | ns   |
| $Q_{rr}$  | Reverse Recovery Charge          |                                                                              | -   | 855 |     | nC   |
| $I_{RRM}$ | Maximum Reverse Recovery Current |                                                                              | -   | 22  |     | Amps |

# THERMAL AND MECHANICAL CHARACTERISTICS

| Symbol          | Characteristic / Test Conditions    | MIN | TYP  | MAX | UNIT         |
|-----------------|-------------------------------------|-----|------|-----|--------------|
| $R_{\theta JC}$ | Junction-to-Case Thermal Resistance |     |      | .80 | $^\circ C/W$ |
| $W_T$           | Package Weight                      |     | 0.22 |     | oz           |
|                 |                                     |     | 5.9  |     | 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.

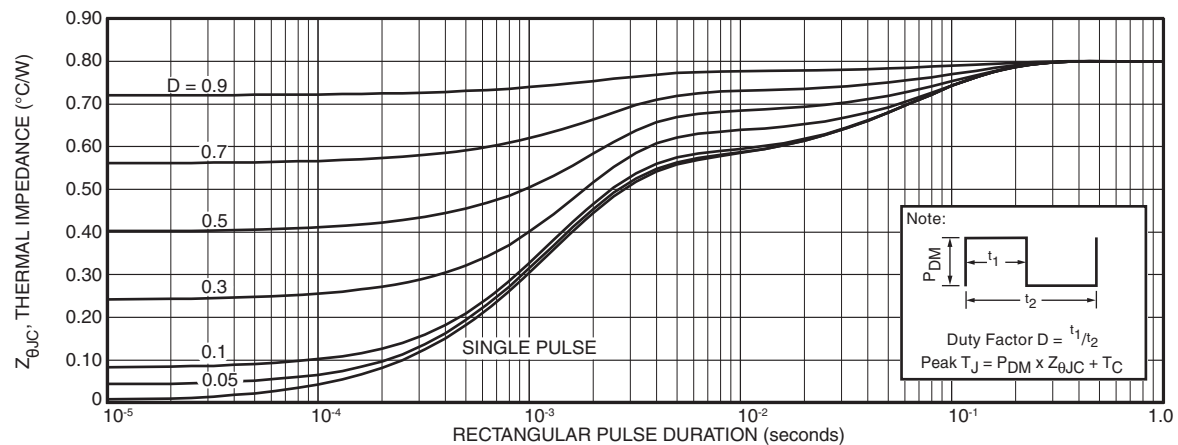


FIGURE 1. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

## TYPICAL PERFORMANCE CURVES

APT30DQ60B\_S(G)

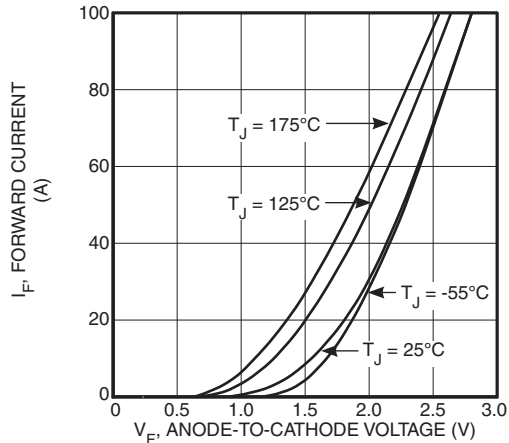


Figure 2. Forward Current vs. Forward Voltage

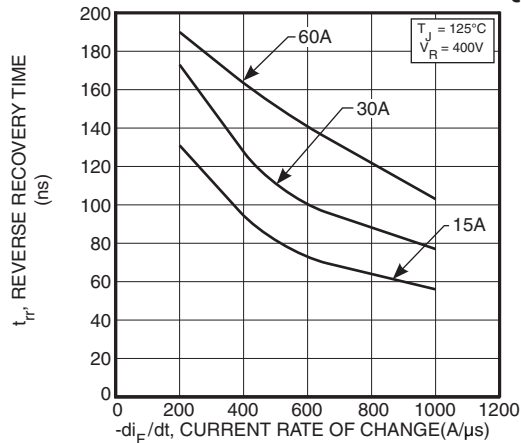


Figure 3. Reverse Recovery Time vs. Current Rate of Change

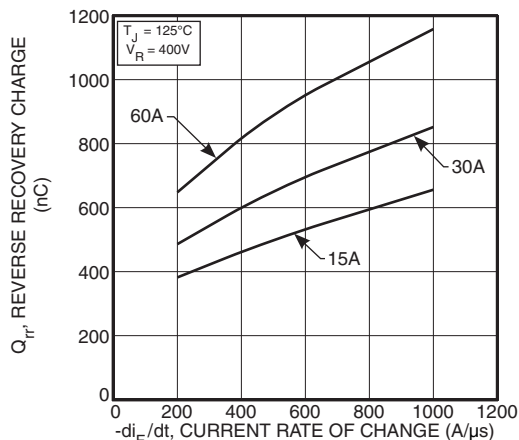


Figure 4. Reverse Recovery Charge vs. Current Rate of Change

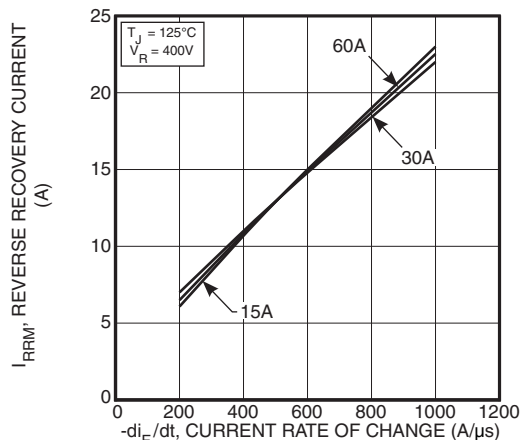


Figure 5. Reverse Recovery Current vs. Current Rate of Change

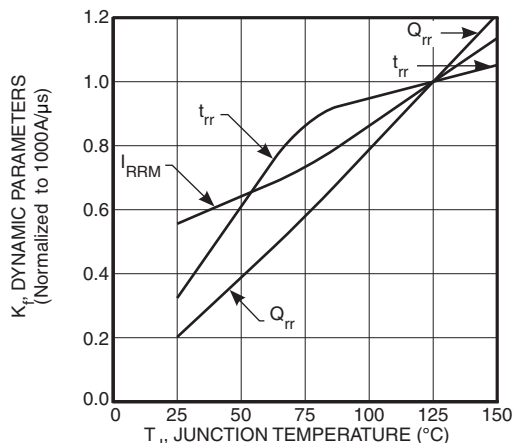


Figure 6. Dynamic Parameters vs. Junction Temperature

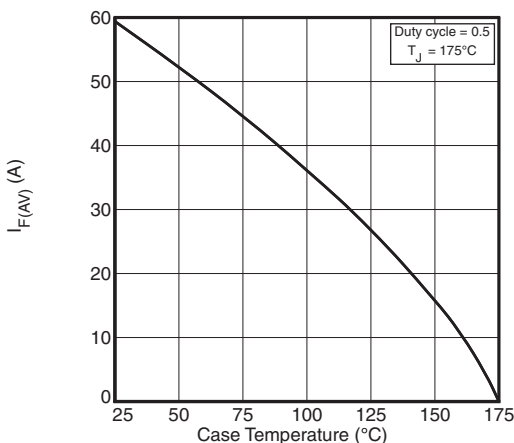


Figure 7. Maximum Average Forward Current vs. Case Temperature

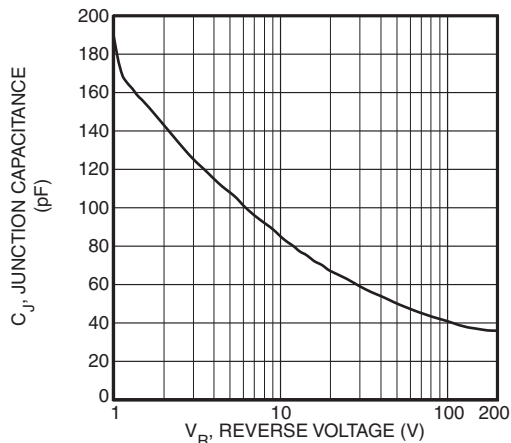


Figure 8. Junction Capacitance vs. Reverse Voltage

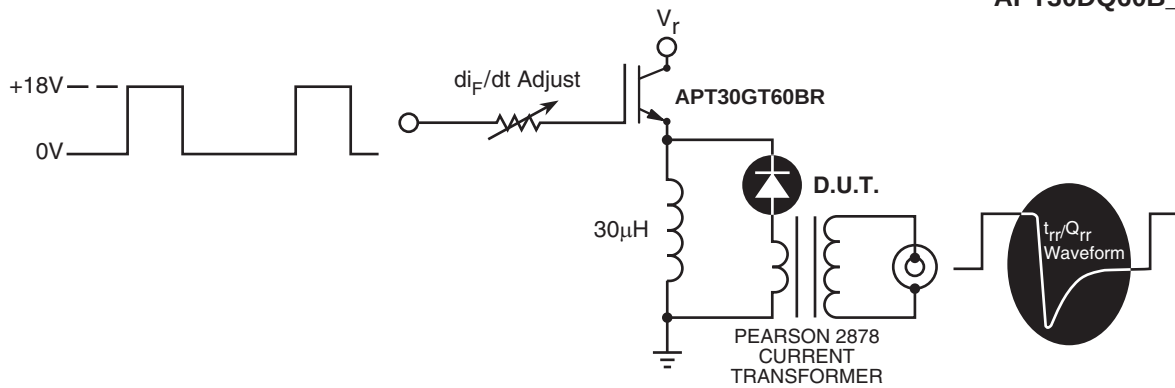


Figure 9. Diode Test Circuit

- 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  $0.25 \cdot I_{RRM}$  passes through zero.
- 5  $Q_{rr}$  - Area Under the Curve Defined by  $I_{RRM}$  and  $t_{rr}$ .

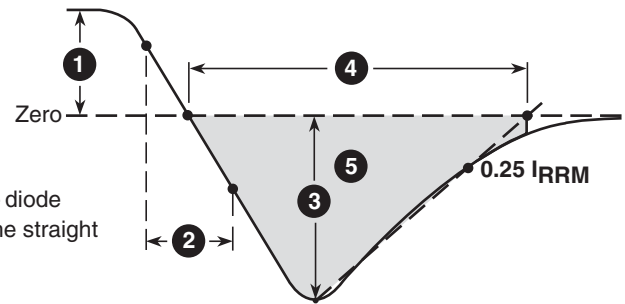
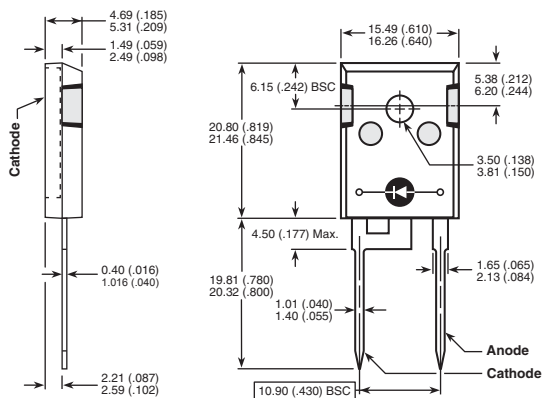


Figure 10. Diode Reverse Recovery Waveform and Definitions

### TO-247 Package Outline

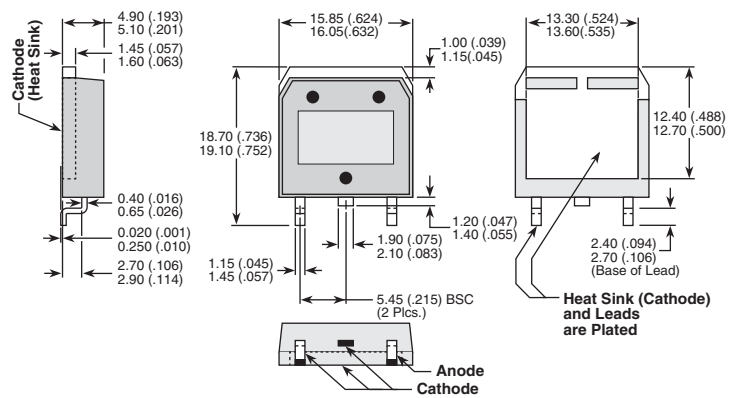
(e1) SAC: Tin, Silver, Copper



Dimensions in Millimeters and (Inches)

### D<sup>3</sup>PAK Package Outline

(e3) 100% Sn



Dimensions in Millimeters (Inches)



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.