

**Microsemi®**  
POWER PRODUCTS GROUP

**APT2x61DQ120J 1200V 60A**  
**APT2x60DQ120J 1200V 60A**

## DUAL DIE ISOTOP® PACKAGE

## ULTRAFAST SOFT RECOVERY RECTIFIER DIODE

| PRODUCT APPLICATIONS                                                                                                                                                                                                                                                                                                                                                                                                                   | PRODUCT FEATURES                                                                                                                                                                                                                                                                          | PRODUCT BENEFITS                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Anti-Parallel Diode <ul style="list-style-type: none"> <li>-Switchmode Power Supply</li> <li>-Inverters</li> </ul> </li> <li>• Free Wheeling Diode <ul style="list-style-type: none"> <li>-Motor Controllers</li> <li>-Converters</li> </ul> </li> <li>• Snubber Diode</li> <li>• Uninterruptible Power Supply (UPS)</li> <li>• Induction Heating</li> <li>• High Speed Rectifiers</li> </ul> | <ul style="list-style-type: none"> <li>• Ultrafast Recovery Times</li> <li>• Soft Recovery Characteristics</li> <li>• Popular SOT-227 Package</li> <li>• Low Forward Voltage</li> <li>• High Blocking Voltage</li> <li>• Low Leakage Current</li> <li>• Avalanche Energy Rated</li> </ul> | <ul style="list-style-type: none"> <li>• Low Losses</li> <li>• Low Noise Switching</li> <li>• Cooler Operation</li> <li>• Higher Reliability Systems</li> <li>• Increased System Power Density</li> </ul> |

### MAXIMUM RATINGS

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

| Symbol         | Characteristic / Test Conditions                                               | APT2x61_60DQ120J | UNIT             |
|----------------|--------------------------------------------------------------------------------|------------------|------------------|
| $V_R$          | Maximum D.C. Reverse Voltage                                                   | 1200             | Volts            |
| $V_{RRM}$      | Maximum Peak Repetitive Reverse Voltage                                        |                  |                  |
| $V_{RWM}$      | Maximum Working Peak Reverse Voltage                                           |                  |                  |
| $I_{F(AV)}$    | Maximum Average Forward Current ( $T_C = 85^\circ\text{C}$ , Duty Cycle = 0.5) | 60               | Amps             |
| $I_{F(RMS)}$   | RMS Forward Current (Square wave, 50% duty)                                    | 73               |                  |
| $I_{FSM}$      | Non-Repetitive Forward Surge Current ( $T_J = 45^\circ\text{C}$ , 8.3ms)       | 540              |                  |
| $E_{AVL}$      | Avalanche Energy (1A, 40mH)                                                    | 20               | mJ               |
| $T_J, T_{STG}$ | Operating and Storage Temperature Range                                        | -55 to 175       | $^\circ\text{C}$ |

### STATIC ELECTRICAL CHARACTERISTICS

| Symbol   | Characteristic / Test Conditions          | MIN | TYP                                           | MAX  | UNIT          |
|----------|-------------------------------------------|-----|-----------------------------------------------|------|---------------|
| $V_F$    | Forward Voltage                           |     | $I_F = 60\text{A}$                            | 2.5  | Volts         |
|          |                                           |     | $I_F = 120\text{A}$                           | 3.07 |               |
|          |                                           |     | $I_F = 60\text{A}, T_J = 125^\circ\text{C}$   | 1.82 |               |
| $I_{RM}$ | Maximum Reverse Leakage Current           |     | $V_R = 1200\text{V}$                          | 100  | $\mu\text{A}$ |
|          |                                           |     | $V_R = 1200\text{V}, T_J = 125^\circ\text{C}$ | 500  |               |
| $C_T$    | Junction Capacitance, $V_R = 200\text{V}$ |     | 70                                            |      | pF            |

| Symbol    | Characteristic                   | Test Conditions                                                              | MIN | TYP  | MAX | UNIT |
|-----------|----------------------------------|------------------------------------------------------------------------------|-----|------|-----|------|
| $t_{rr}$  | Reverse Recovery Time            | $I_F = 1A$ , $di_F/dt = -100A/\mu s$ , $V_R = 30V$ , $T_J = 25^\circ C$      | -   | 60   |     | ns   |
| $t_{rr}$  | Reverse Recovery Time            | $I_F = 60A$ , $di_F/dt = -200A/\mu s$<br>$V_R = 800V$ , $T_C = 25^\circ C$   | -   | 265  |     |      |
| $Q_{rr}$  | Reverse Recovery Charge          |                                                                              | -   | 560  |     | nC   |
| $I_{RRM}$ | Maximum Reverse Recovery Current |                                                                              | -   | 5    | -   | Amps |
| $t_{rr}$  | Reverse Recovery Time            | $I_F = 60A$ , $di_F/dt = -200A/\mu s$<br>$V_R = 800V$ , $T_C = 125^\circ C$  | -   | 350  |     | ns   |
| $Q_{rr}$  | Reverse Recovery Charge          |                                                                              | -   | 2890 |     | nC   |
| $I_{RRM}$ | Maximum Reverse Recovery Current |                                                                              | -   | 13   | -   | Amps |
| $t_{rr}$  | Reverse Recovery Time            | $I_F = 60A$ , $di_F/dt = -1000A/\mu s$<br>$V_R = 800V$ , $T_C = 125^\circ C$ | -   | 150  |     | ns   |
| $Q_{rr}$  | Reverse Recovery Charge          |                                                                              | -   | 4720 |     | nC   |
| $I_{RRM}$ | Maximum Reverse Recovery Current |                                                                              | -   | 40   |     | Amps |

## THERMAL AND MECHANICAL CHARACTERISTICS

| Symbol          | Characteristic / Test Conditions                                                     | MIN  | TYP  | MAX | UNIT         |
|-----------------|--------------------------------------------------------------------------------------|------|------|-----|--------------|
| $R_{\theta JC}$ | Junction-to-Case Thermal Resistance                                                  |      |      | .56 | $^\circ C/W$ |
| $V_{Isolation}$ | RMS Voltage (50-60Hz Sinusoidal Waveform from 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.

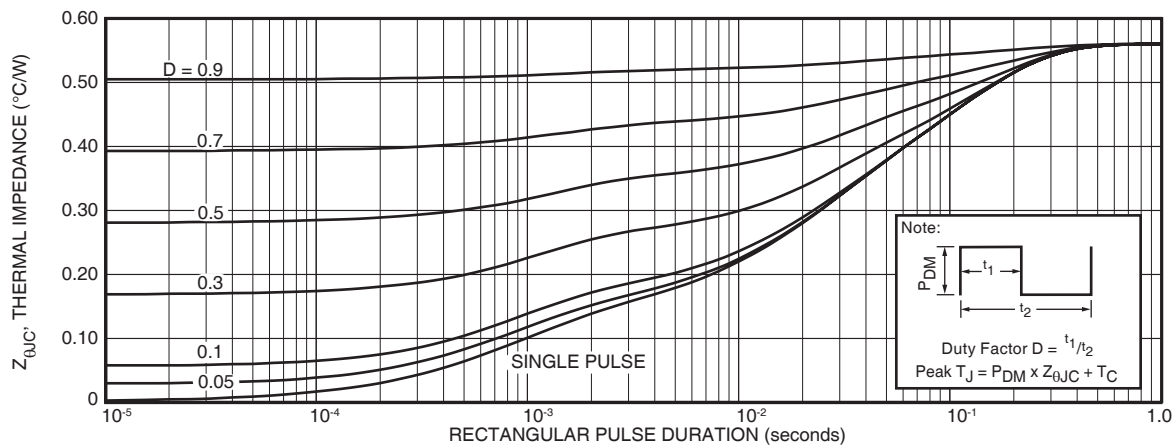


FIGURE 1a. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

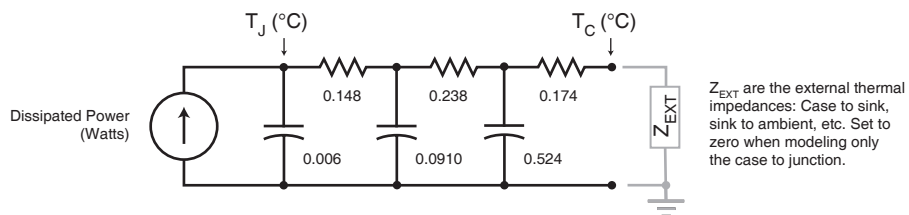


FIGURE 1b. TRANSIENT THERMAL IMPEDANCE MODEL

## TYPICAL PERFORMANCE CURVES

APT2x61\_60DQ120J

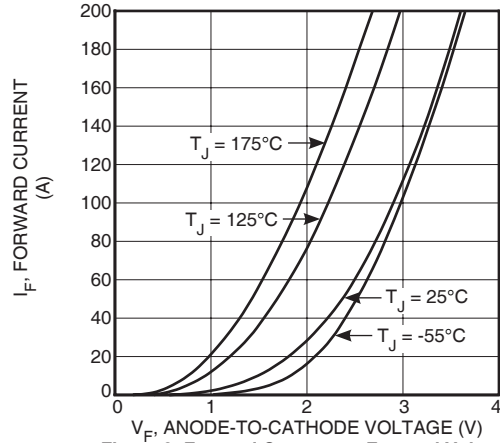


Figure 2. Forward Current vs. Forward Voltage

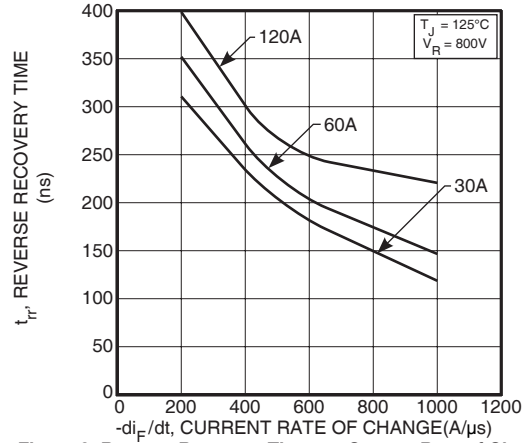


Figure 3. Reverse Recovery Time vs. Current Rate of Change

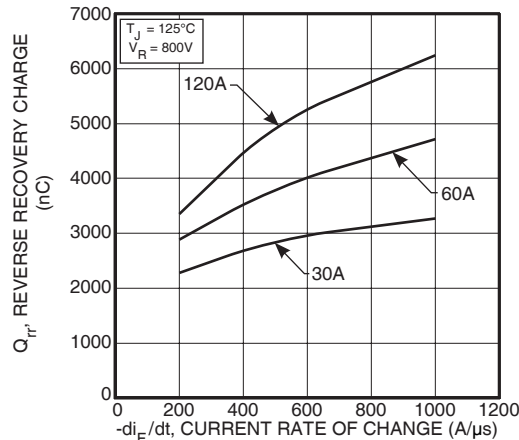


Figure 4. Reverse Recovery Charge vs. Current Rate of Change

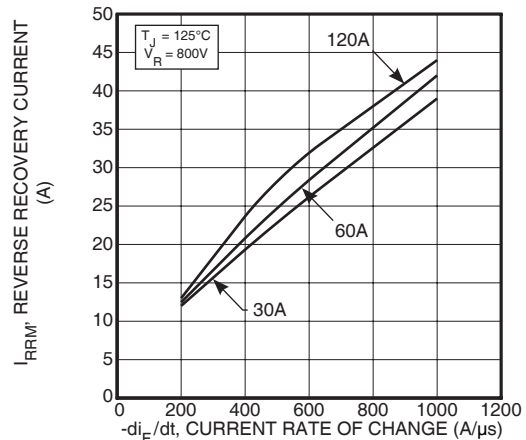


Figure 5. Reverse Recovery Current vs. Current Rate of Change

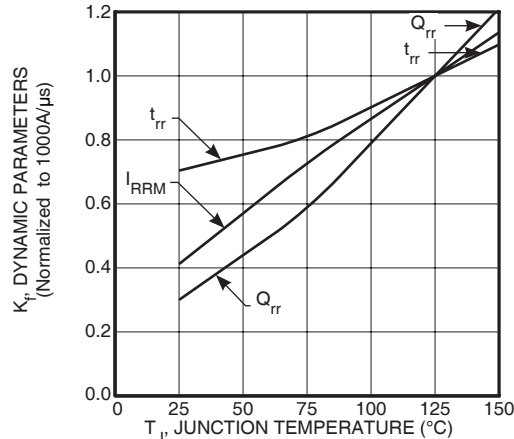


Figure 6. Dynamic Parameters vs. Junction Temperature

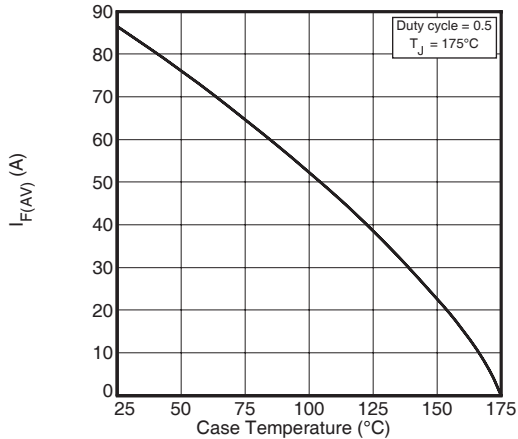


Figure 7. Maximum Average Forward Current vs. Case Temperature

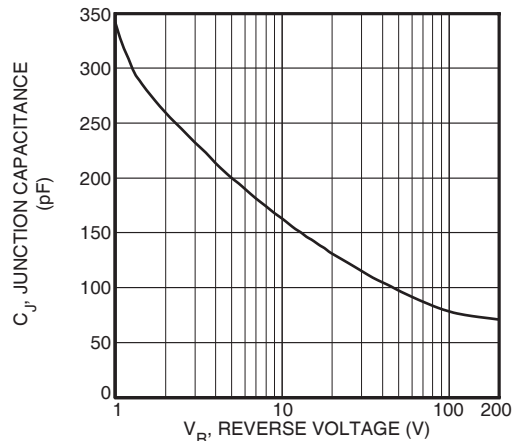


Figure 8. Junction Capacitance vs. Reverse Voltage

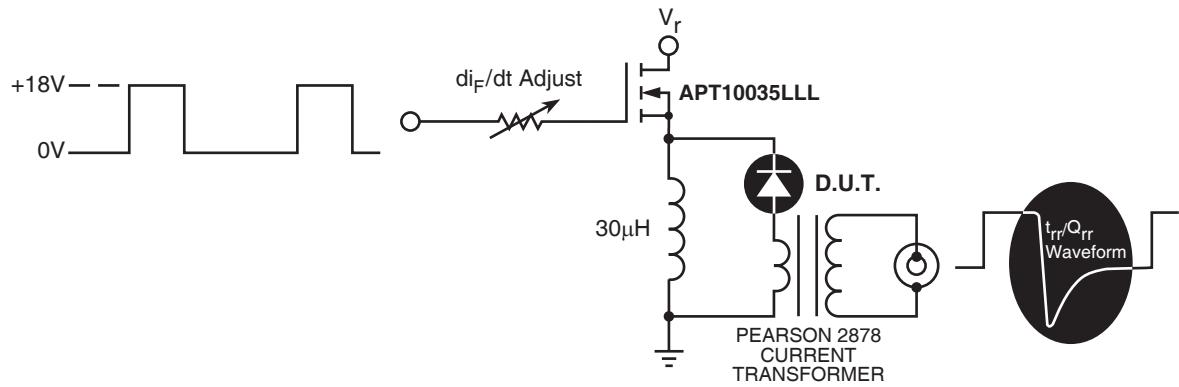


Figure 9. Diode Test Circuit

- 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  $t_{rr}$ .

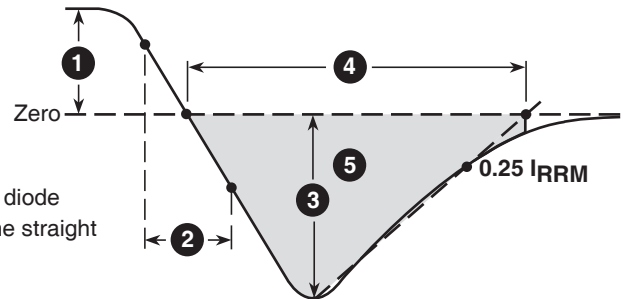
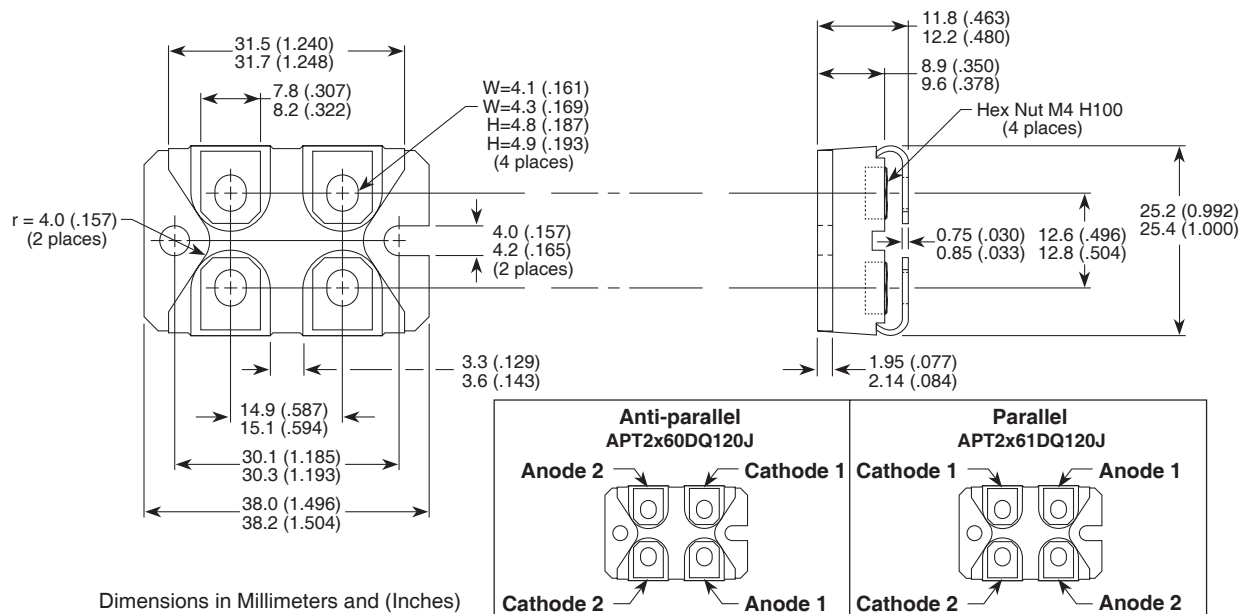


Figure 10. Diode Reverse Recovery Waveform and Definitions

### SOT-227 (ISOTOP®) Package Outline





**Стандарт  
Электрон  
Связь**

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

**Наши контакты:**

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331