

**Microsemi**  
POWER PRODUCTS GROUP



**APT2x101DQ60J 600V 100A**  
**APT2x100DQ60J 600V 100A**

## 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	APT2x101_100DQ60J	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 ( $T_C = 82^\circ\text{C}$ , Duty Cycle = 0.5)	100	Amps
$I_{F(RMS)}$	RMS Forward Current (Square wave, 50% duty)	146	
$I_{FSM}$	Non-Repetitive Forward Surge Current ( $T_J = 45^\circ\text{C}$ , 8.3ms)	1000	
$E_{AVL}$	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		$I_F = 100\text{A}$	1.6	2.2	Volts
			$I_F = 200\text{A}$	2.05		
			$I_F = 100\text{A}, T_J = 125^\circ\text{C}$	1.28		
$I_{RM}$	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, $V_R = 200\text{V}$		190		pF	

## DYNAMIC CHARACTERISTICS

APT2x101\_100DQ60J

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
$t_{rr}$	Reverse Recovery Time	$I_F = 1A, di_F/dt = -100A/\mu s, V_R = 30V, T_J = 25^\circ C$	-	34		ns
$t_{rr}$	Reverse Recovery Time	$I_F = 100A, di_F/dt = -200A/\mu s, V_R = 400V, T_C = 25^\circ C$	-	160		
$Q_{rr}$	Reverse Recovery Charge		-	290		nC
$I_{RRM}$	Maximum Reverse Recovery Current		-	5	-	Amps
$t_{rr}$	Reverse Recovery Time	$I_F = 100A, di_F/dt = -200A/\mu s, V_R = 400V, T_C = 125^\circ C$	-	220		ns
$Q_{rr}$	Reverse Recovery Charge		-	1530		nC
$I_{RRM}$	Maximum Reverse Recovery Current		-	13	-	Amps
$t_{rr}$	Reverse Recovery Time	$I_F = 100A, di_F/dt = -1000A/\mu s, V_R = 400V, T_C = 125^\circ C$	-	100		ns
$Q_{rr}$	Reverse Recovery Charge		-	2890		nC
$I_{RRM}$	Maximum Reverse Recovery Current		-	44		Amps

## THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction-to-Case Thermal Resistance			.42	$^\circ C/W$
$V_{Isolation}$	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.

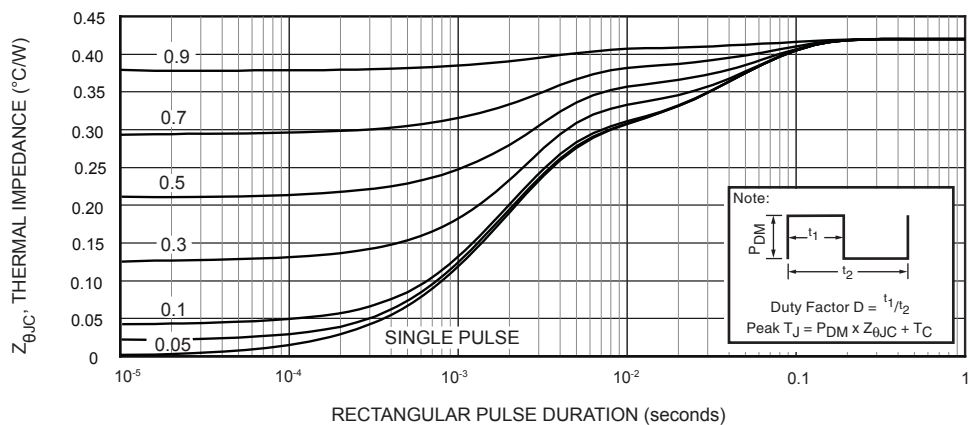


FIGURE 1. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

# TYPICAL PERFORMANCE CURVES

APT2x101\_100DQ60J

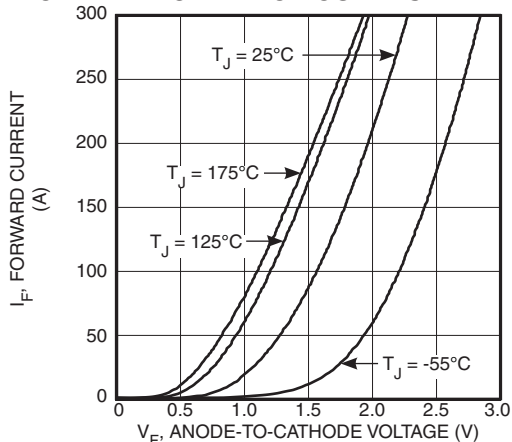


Figure 2. Forward Current vs. Forward Voltage

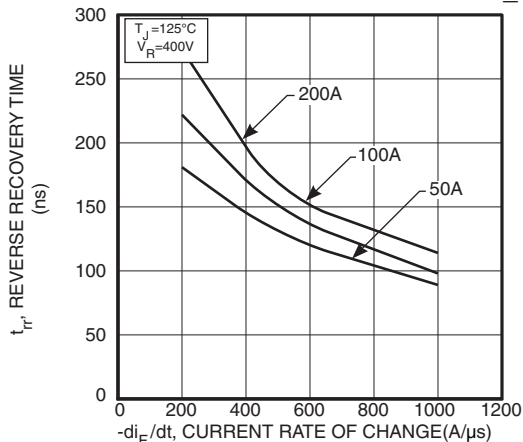


Figure 3. Reverse Recovery Time vs. Current Rate of Change

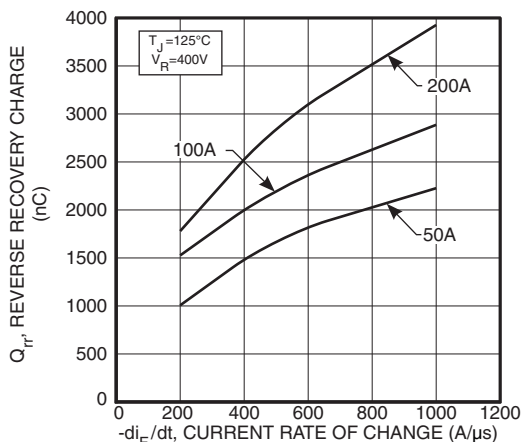


Figure 4. Reverse Recovery Charge vs. Current Rate of Change

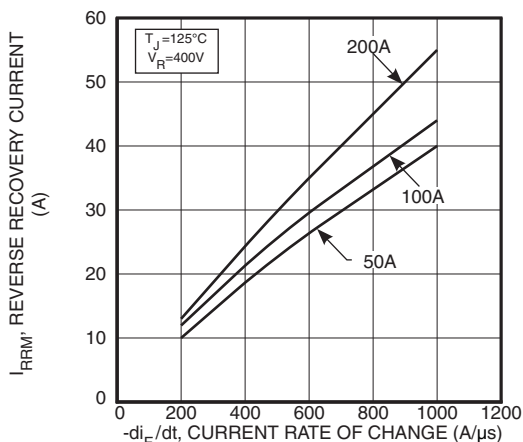


Figure 5. Reverse Recovery Current vs. Current Rate of Change

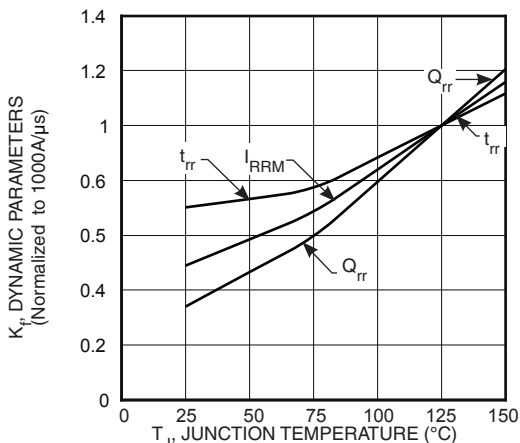


Figure 6. Dynamic Parameters vs. Junction Temperature

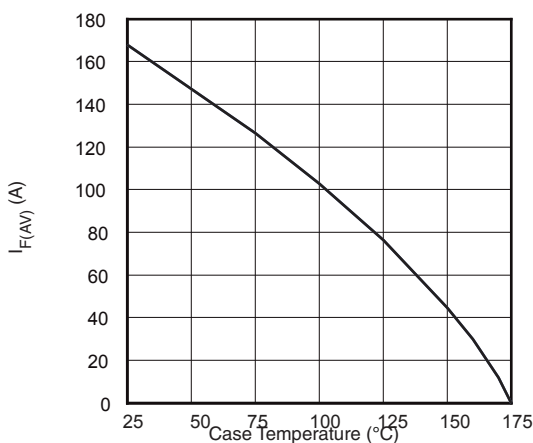


Figure 7. Maximum Average Forward Current vs. Case Temperature

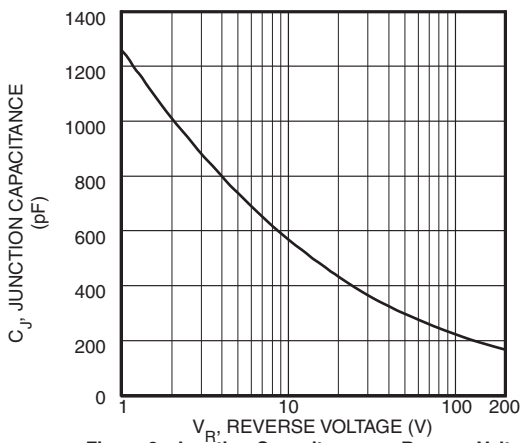


Figure 8. Junction Capacitance vs. Reverse Voltage

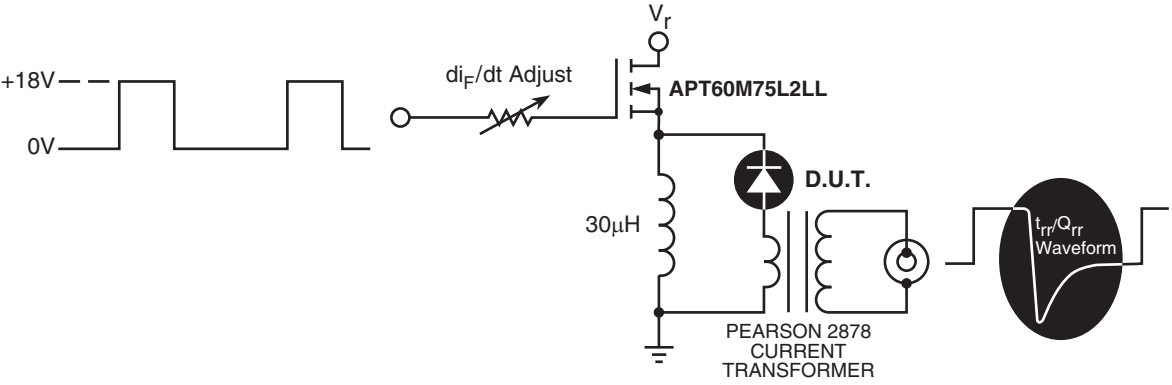


Figure 9. Diode Test Circuit

- 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  $t_{rr}$ .

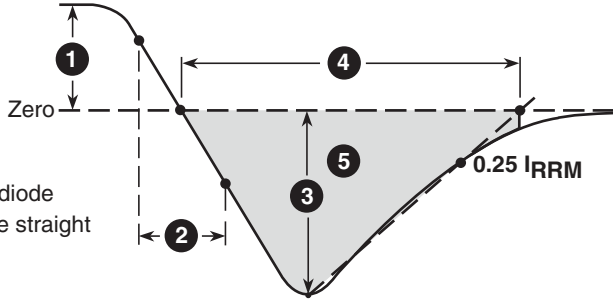
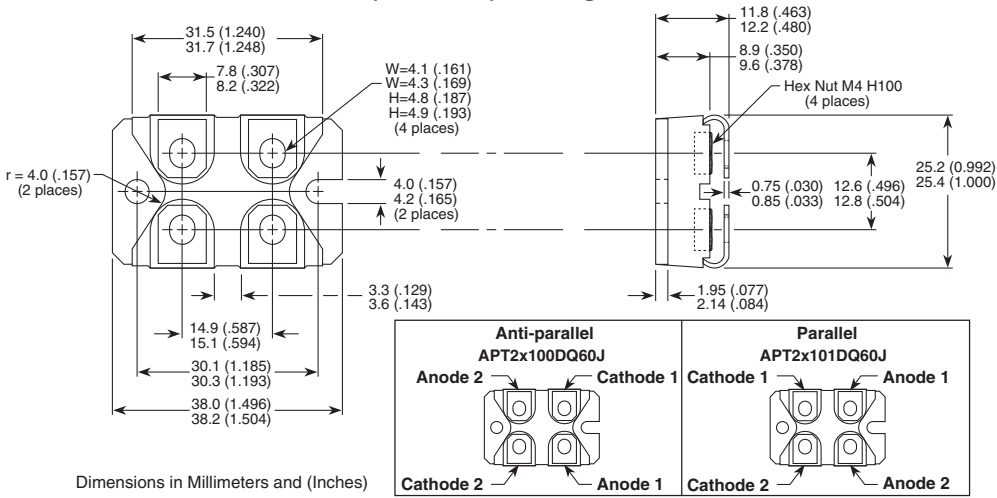


Figure 10, Diode Reverse Recovery Waveform and Definitions

SOT-227 (ISOTOP®) Package Outline



Dimensions in Millimeters and (Inches)

