

**Microsemi**  
POWER PRODUCTS GROUP

**APT2x61DQ100J** 1000V 60A  
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## DUAL DIE ISOTOP® PACKAGE

## ULTRAFAST SOFT RECOVERY RECTIFIER DIODE

PRODUCT APPLICATIONS	PRODUCT FEATURES	PRODUCT BENEFITS
• Anti-Parallel Diode -Switchmode Power Supply -Inverters	• Ultrafast Recovery Times	• Low Losses
• Free Wheeling Diode -Motor Controllers -Converters	• Soft Recovery Characteristics	• Low Noise Switching
• Snubber Diode	• Popular SOT-227 Package	• Cooler Operation
• Uninterruptible Power Supply (UPS)	• Low Forward Voltage	• Higher Reliability Systems
• Induction Heating	• High Blocking Voltage	• Increased System Power Density
• High Speed Rectifiers	• Low Leakage Current	
	• Avalanche Energy Rated	

### MAXIMUM RATINGS

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

Symbol	Characteristic / Test Conditions	APT2x61_60DQ100J	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 ( $T_C = 90^\circ\text{C}$ , Duty Cycle = 0.5)	60	Amps
$I_{F(RMS)}$	RMS Forward Current (Square wave, 50% duty)	77	
$I_{FSM}$	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	°C

### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$V_F$	Forward Voltage	$I_F = 60\text{A}$		2.2	2.8
		$I_F = 120\text{A}$		2.67	Volts
		$I_F = 60\text{A}, T_J = 125^\circ\text{C}$		1.68	
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1000\text{V}$		100	$\mu\text{A}$
		$V_R = 1000\text{V}, T_J = 125^\circ\text{C}$		500	
$C_T$	Junction Capacitance, $V_R = 200\text{V}$		80		pF

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## DYNAMIC CHARACTERISTICS

APT2x61\_60DQ100J

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
$t_{rr}$	Reverse Recovery Time $I_F = 1A, di_F/dt = -100A/\mu s, V_R = 30V, T_J = 25^\circ C$	$I_F = 60A, di_F/dt = -200A/\mu s$ $V_R = 667V, T_C = 25^\circ C$	-	36		ns
$t_{rr}$	Reverse Recovery Time		-	235		
$Q_{rr}$	Reverse Recovery Charge	$I_F = 60A, di_F/dt = -200A/\mu s$ $V_R = 667V, T_C = 25^\circ C$	-	445		nC
$I_{RRM}$	Maximum Reverse Recovery Current		-	5	-	Amps
$t_{rr}$	Reverse Recovery Time	$I_F = 60A, di_F/dt = -200A/\mu s$ $V_R = 667V, T_C = 125^\circ C$	-	285		ns
$Q_{rr}$	Reverse Recovery Charge		-	2290		nC
$I_{RRM}$	Maximum Reverse Recovery Current		-	13	-	Amps
$t_{rr}$	Reverse Recovery Time	$I_F = 60A, di_F/dt = -1000A/\mu s$ $V_R = 667V, T_C = 125^\circ C$	-	125		ns
$Q_{rr}$	Reverse Recovery Charge		-	4170		nC
$I_{RRM}$	Maximum Reverse Recovery Current		-	50		Amps

## THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction-to-Case Thermal Resistance			.56	°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.

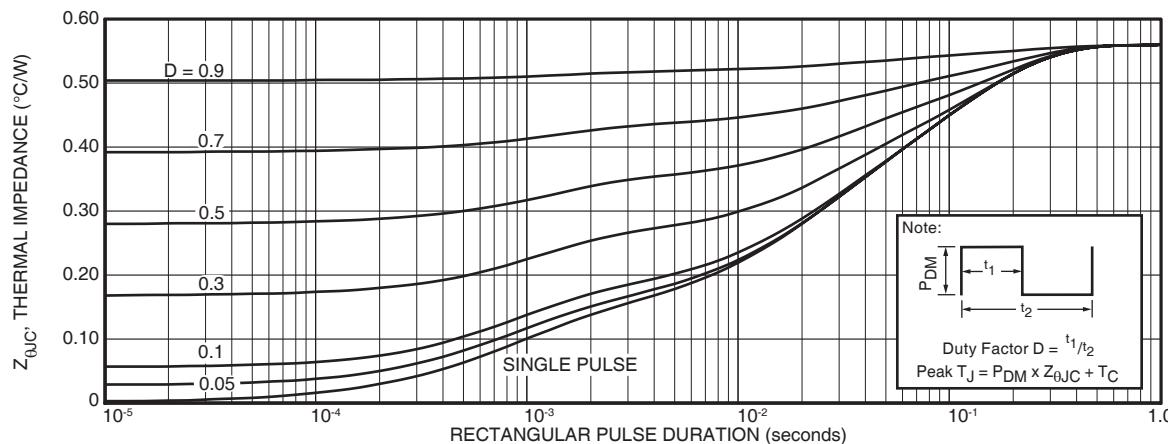


FIGURE 1a. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

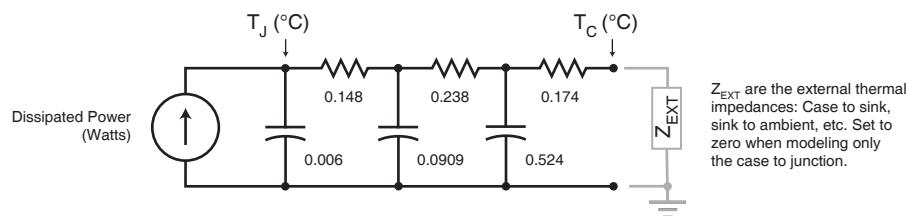


FIGURE 1b. TRANSIENT THERMAL IMPEDANCE MODEL

## TYPICAL PERFORMANCE CURVES

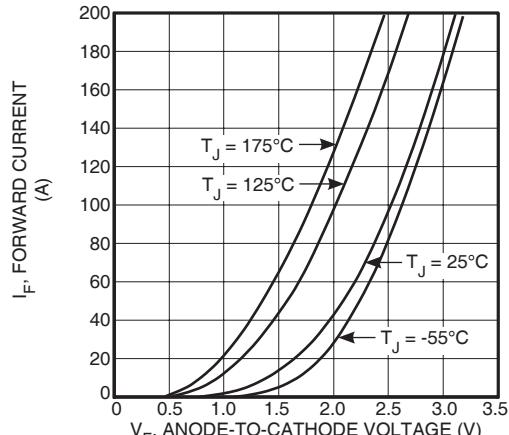


Figure 2. Forward Current vs. Forward Voltage

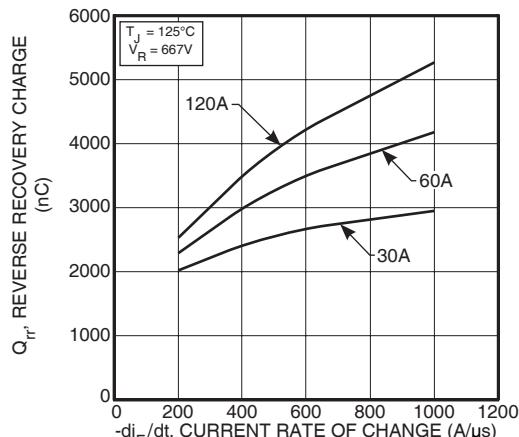


Figure 4. Reverse Recovery Charge vs. Current Rate of Change

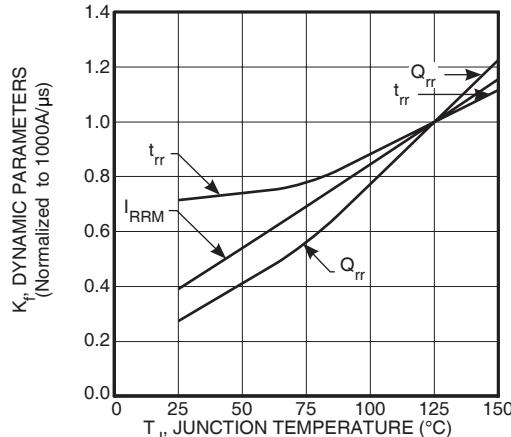


Figure 6. Dynamic Parameters vs. Junction Temperature

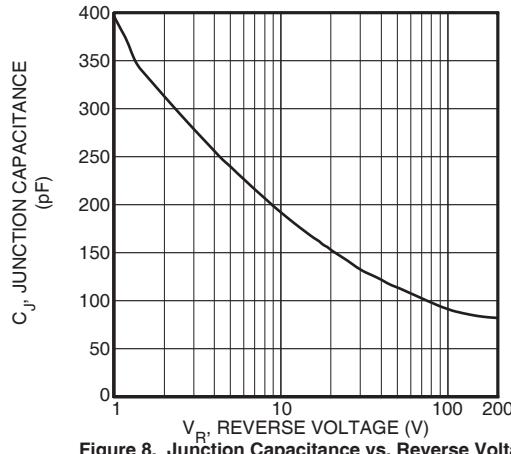


Figure 8. Junction Capacitance vs. Reverse Voltage

## APT2x61\_60DQ100J

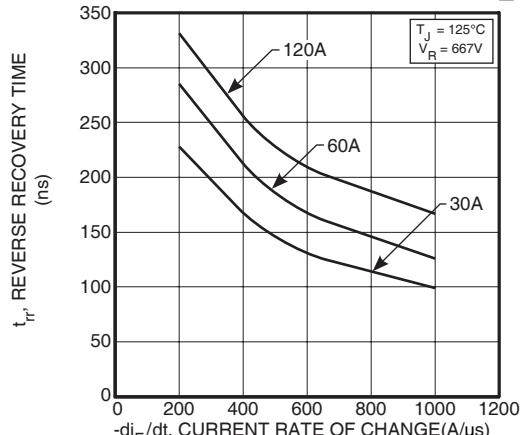


Figure 3. Reverse Recovery Time vs. Current Rate of Change

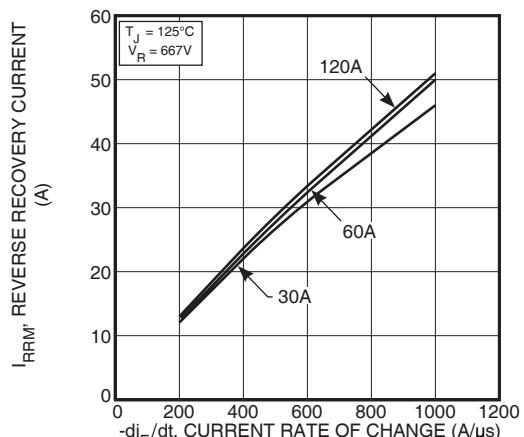


Figure 5. Reverse Recovery Current vs. Current Rate of Change

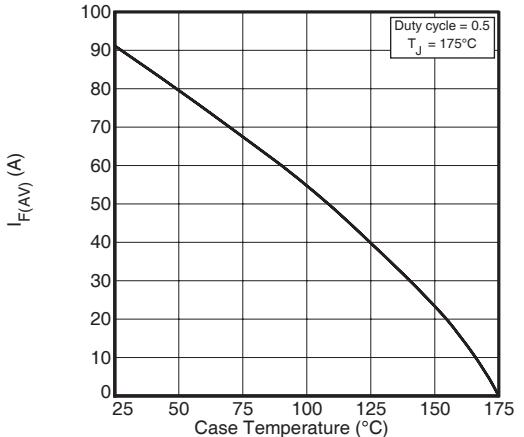


Figure 7. Maximum Average Forward Current vs. Case Temperature

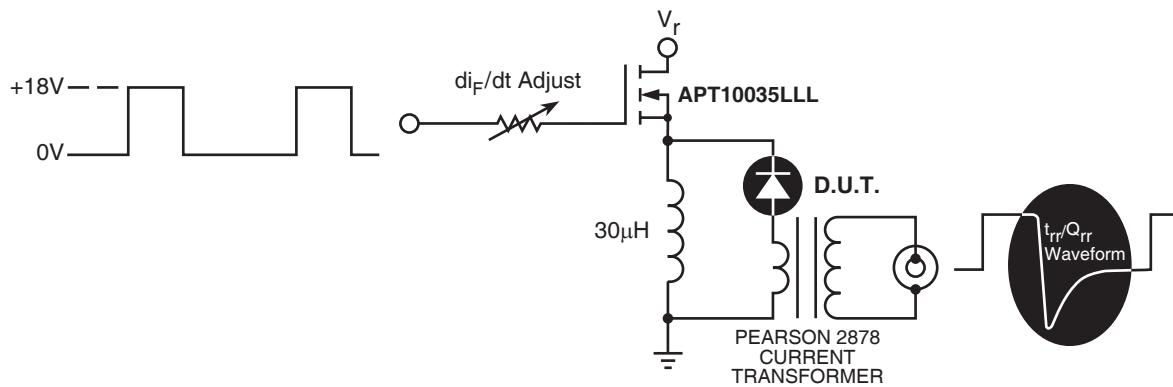


Figure 9. Diode Test Circuit

- 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  $t_{rr}$ .

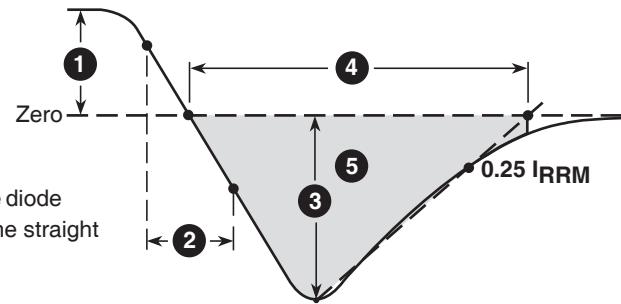


Figure 10, Diode Reverse Recovery Waveform and Definitions

### SOT-227 (ISOTOP®) Package Outline

