

Microsemi®
POWER PRODUCTS GROUP

APT2x61DQ120J 1200V 60A
APT2x60DQ120J 1200V 60A

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: $T_C = 25^\circ\text{C}$ 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	μA
			$V_R = 1200\text{V}, T_J = 125^\circ\text{C}$	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	$I_F = 60A$, $di_F/dt = -200A/\mu s$ $V_R = 800V$, $T_C = 25^\circ C$	-	265		
Q_{rr}	Reverse Recovery Charge		-	560		nC
I_{RRM}	Maximum Reverse Recovery Current		-	5	-	Amps
t_{rr}	Reverse Recovery Time	$I_F = 60A$, $di_F/dt = -200A/\mu s$ $V_R = 800V$, $T_C = 125^\circ C$	-	350		ns
Q_{rr}	Reverse Recovery Charge		-	2890		nC
I_{RRM}	Maximum Reverse Recovery Current		-	13	-	Amps
t_{rr}	Reverse Recovery Time	$I_F = 60A$, $di_F/dt = -1000A/\mu s$ $V_R = 800V$, $T_C = 125^\circ C$	-	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.

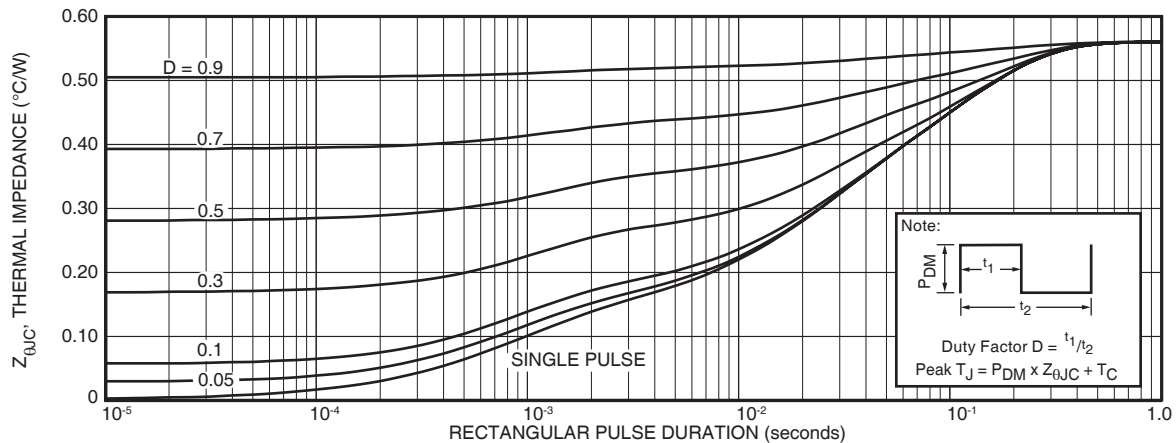


FIGURE 1a. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

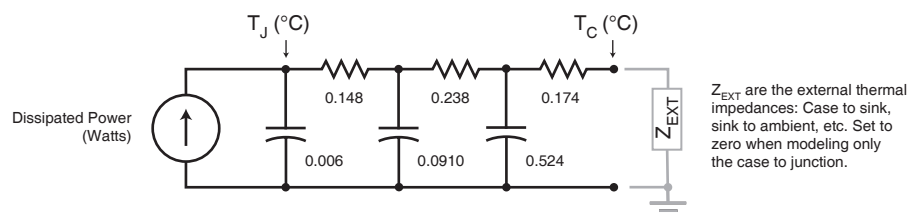


FIGURE 1b. TRANSIENT THERMAL IMPEDANCE MODEL

TYPICAL PERFORMANCE CURVES

APT2x61_60DQ120J

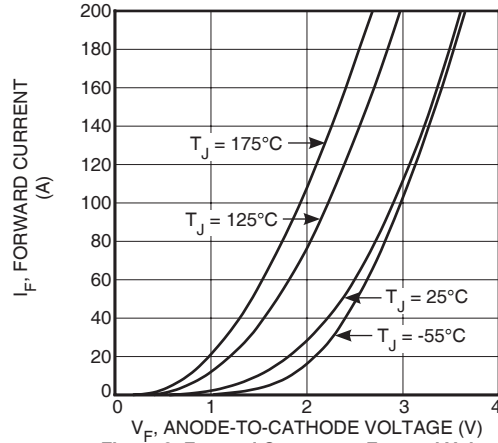


Figure 2. Forward Current vs. Forward Voltage

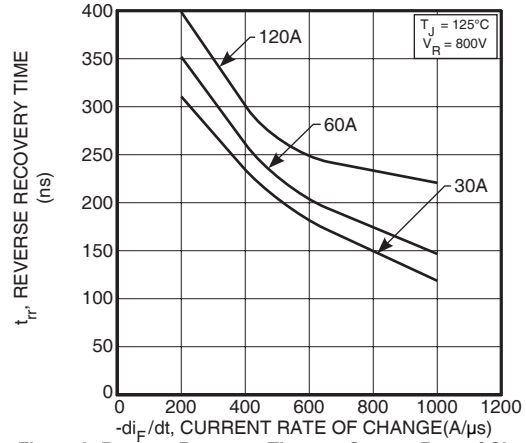


Figure 3. Reverse Recovery Time vs. Current Rate of Change

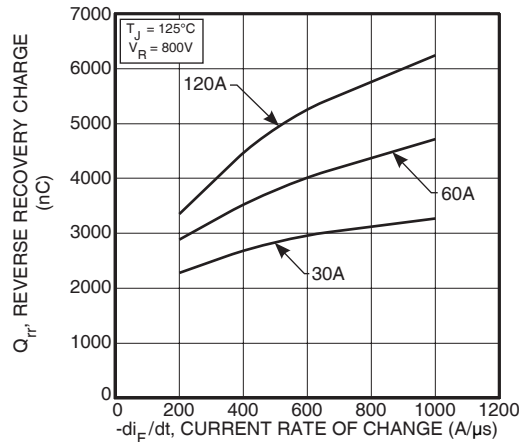


Figure 4. Reverse Recovery Charge vs. Current Rate of Change

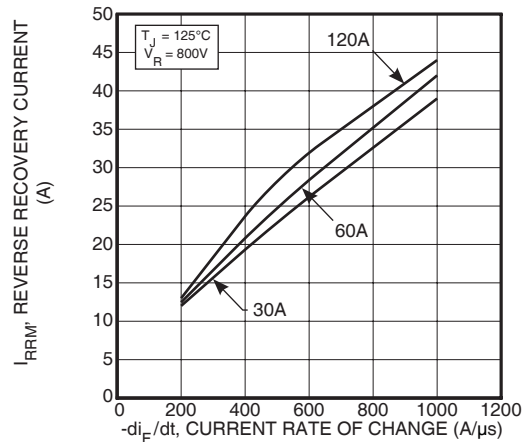


Figure 5. Reverse Recovery Current vs. Current Rate of Change

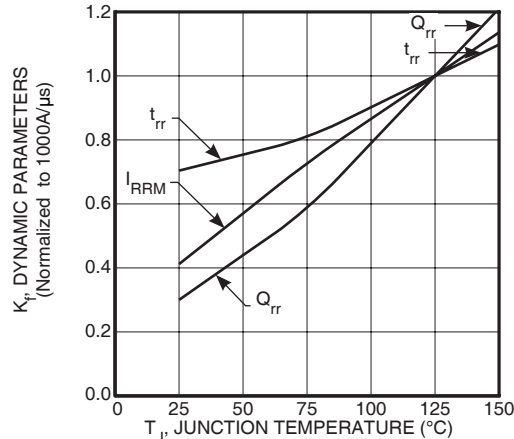


Figure 6. Dynamic Parameters vs. Junction Temperature

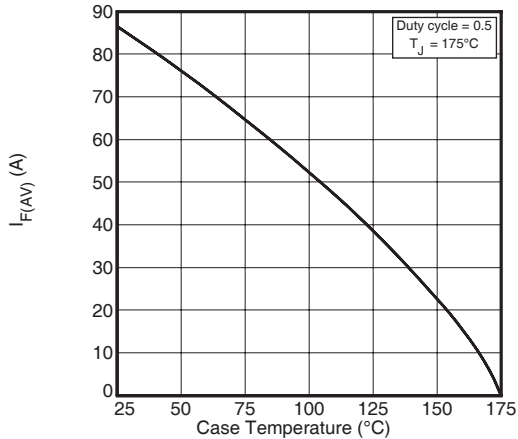


Figure 7. Maximum Average Forward Current vs. Case Temperature

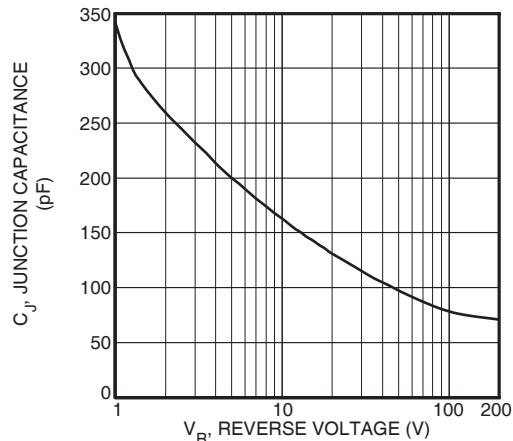


Figure 8. Junction Capacitance vs. Reverse Voltage



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Figure 10, Diode Reverse Recovery Waveform and Definitions

Technical drawing of the APT2x60DQ120J and APT2x61DQ120J components, showing dimensions in millimeters and inches.

Top View Dimensions:

- Overall width: 31.5 (1.240) / 31.7 (1.248)
- Distance between top features: 7.8 (.307) / 8.2 (.322)
- Radius: $r = 4.0 (.157)$ (2 places)
- Distance between bottom features: 4.0 (.157) / 4.2 (.165) (2 places)
- Distance between side features: 3.3 (.129) / 3.6 (.143)
- Distance between top features (inner): 14.9 (.587) / 15.1 (.594)
- Distance between bottom features (inner): 30.1 (1.185) / 30.3 (1.193)
- Overall width (inner): 38.0 (1.496) / 38.2 (1.504)

Side View Dimensions:

- Top width: 11.8 (.463) / 12.2 (.480)
- Bottom width: 8.9 (.350) / 9.6 (.378)
- Hex Nut M4 H100 (4 places)
- Height: 25.2 (0.992) / 25.4 (1.000)
- Distance between side features: 0.75 (.030) / 0.85 (.033)
- Distance between side features (inner): 12.6 (.496) / 12.8 (.504)
- Bottom width (inner): 1.95 (.077) / 2.14 (.084)

End Views:

- Anti-parallel APT2x60DQ120J:** Shows Anode 2, Cathode 1, Cathode 2, and Anode 1.
- Parallel APT2x61DQ120J:** Shows Cathode 1, Anode 1, Cathode 2, and Anode 2.

Dimensions in Millimeters and (Inches)

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