

ULTRAFAST SOFT RECOVERY RECTIFIER DIODE

PRODUCT APPLICATIONS

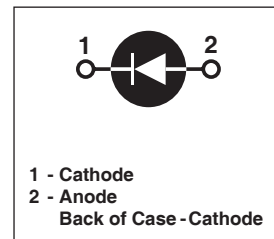
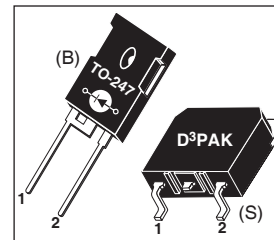
- Anti-Parallel Diode
 - Switchmode Power Supply
 - Inverters
- Free Wheeling Diode
 - Motor Controllers
 - Converters
 - Inverters
- Snubber Diode
- PFC

PRODUCT FEATURES

- Ultrafast Recovery Times
- Soft Recovery Characteristics
- Popular TO-247 Package or Surface Mount D³PAK 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



MAXIMUM RATINGS

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

Symbol	Characteristic / Test Conditions	APT75DQ60B(G)_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 ($T_C = 108^\circ\text{C}$, Duty Cycle = 0.5)	75	Amps
$I_{F(RMS)}$	RMS Forward Current (Square wave, 50% duty)	117	
I_{FSM}	Non-Repetitive Forward Surge Current ($T_J = 45^\circ\text{C}$, 8.3ms)	600	
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	$I_F = 75\text{A}$		2.0	Volts
		$I_F = 150\text{A}$		2.4	
		$I_F = 75\text{A}, T_J = 125^\circ\text{C}$		1.7	
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600\text{V}$		25	μA
		$V_R = 600\text{V}, T_J = 125^\circ\text{C}$		500	
C_T	Junction Capacitance, $V_R = 200\text{V}$		110		pF

DYNAMIC CHARACTERISTICS**APT75DQ60B(G)_S(G)**

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
t_{rr}	Reverse Recovery Time	$I_F = 1A$, $di_F/dt = -100A/\mu s$, $V_R = 30V$, $T_J = 25^\circ C$	-	29		ns
t_{rr}	Reverse Recovery Time	$I_F = 75A$, $di_F/dt = -200A/\mu s$ $V_R = 400V$, $T_C = 25^\circ C$	-	31		
Q_{rr}	Reverse Recovery Charge		-	55		nC
I_{RRM}	Maximum Reverse Recovery Current		-	4	-	Amps
t_{rr}	Reverse Recovery Time	$I_F = 75A$, $di_F/dt = -200A/\mu s$ $V_R = 400V$, $T_C = 125^\circ C$	-	140		ns
Q_{rr}	Reverse Recovery Charge		-	650		nC
I_{RRM}	Maximum Reverse Recovery Current		-	9	-	Amps
t_{rr}	Reverse Recovery Time	$I_F = 75A$, $di_F/dt = -1000A/\mu s$ $V_R = 400V$, $T_C = 125^\circ C$	-	90		ns
Q_{rr}	Reverse Recovery Charge		-	1300		nC
I_{RRM}	Maximum Reverse Recovery Current		-	27		Amps

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction-to-Case Thermal Resistance			.34	$^\circ C/W$
W_T	Package Weight		0.22		oz
			5.9		g
Torque	Maximum Mounting Torque			10	lb•in
				1.1	N•m

APT Reserves the right to change, without notice, the specifications and information contained herein.

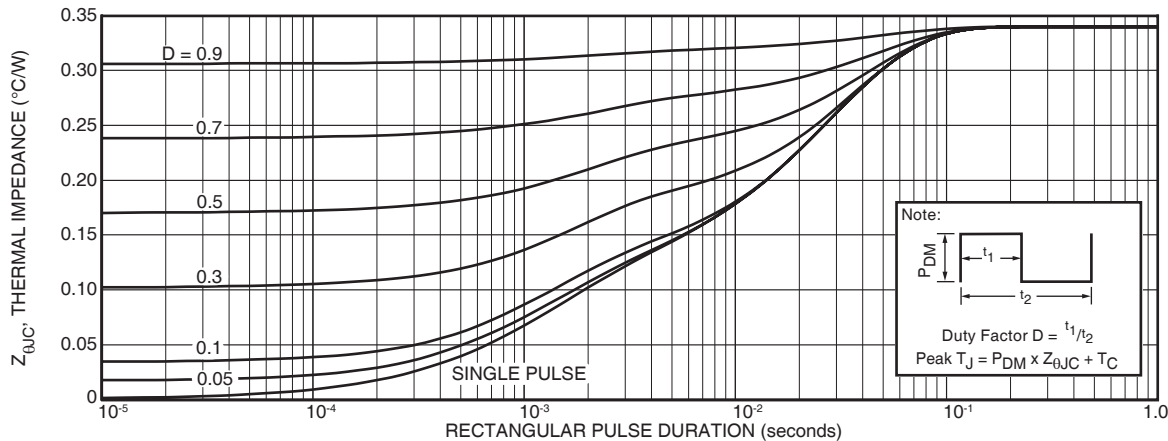


FIGURE 1a. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

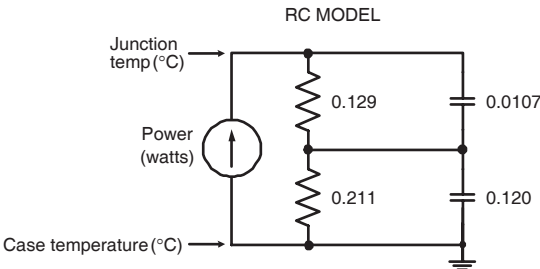


FIGURE 1b. TRANSIENT THERMAL IMPEDANCE MODEL

TYPICAL PERFORMANCE CURVES

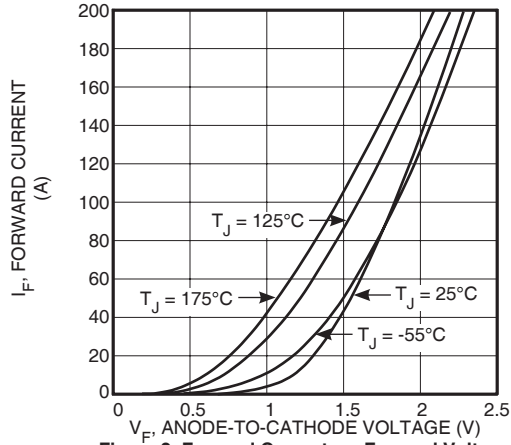


Figure 2. Forward Current vs. Forward Voltage

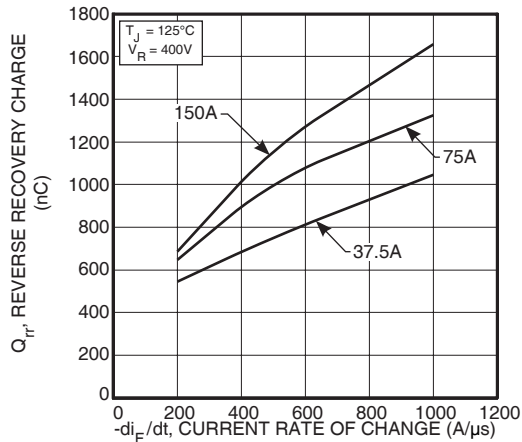


Figure 4. Reverse Recovery Charge vs. Current Rate of Change

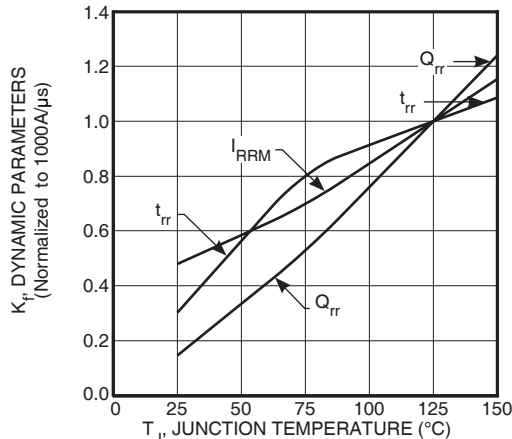


Figure 6. Dynamic Parameters vs. Junction Temperature

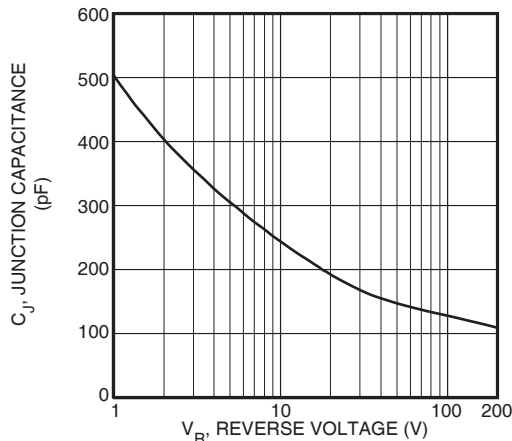


Figure 8. Junction Capacitance vs. Reverse Voltage

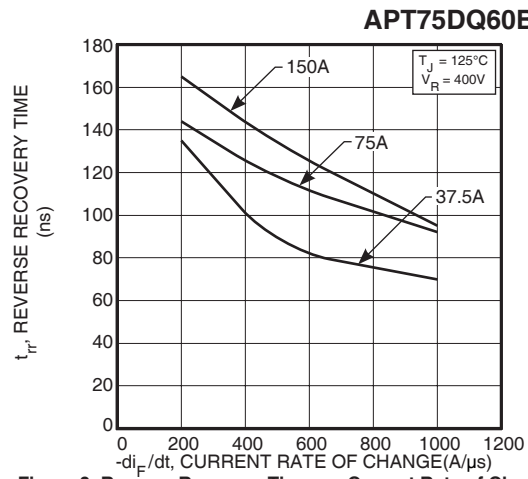


Figure 3. Reverse Recovery Time vs. Current Rate of Change

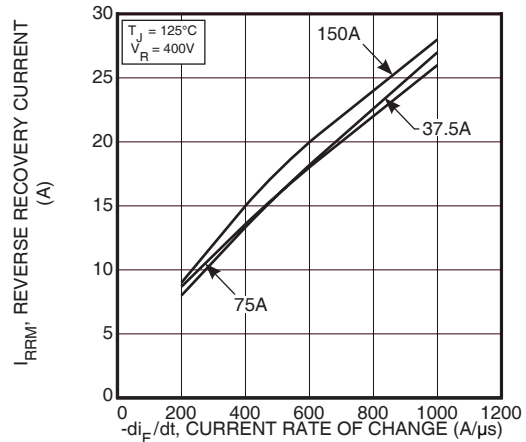


Figure 5. Reverse Recovery Current vs. Current Rate of Change

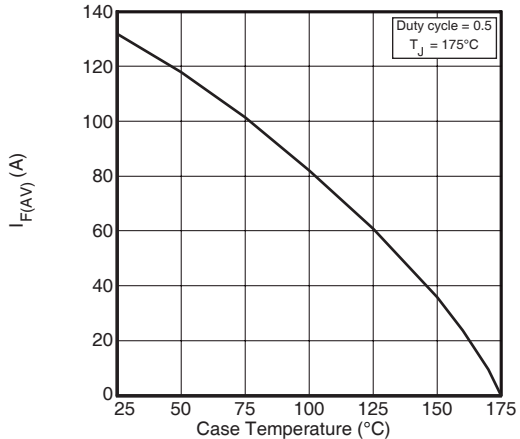
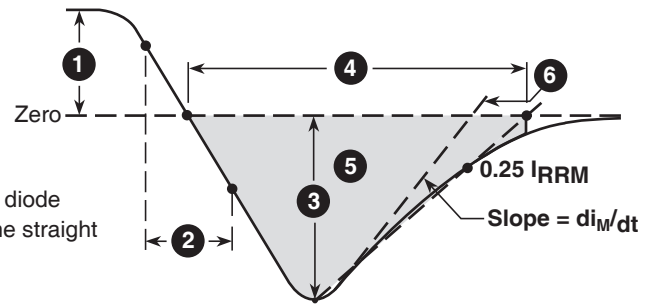


Figure 7. Maximum Average Forward Current vs. Case Temperature

- ➊ I_F - Forward Conduction Current
- ➋ di_F/dt - Rate of Diode Current Change Through Zero Crossing.
- ➌ I_{RRM} - Maximum Reverse Recovery Current.
- ➍ t_{rr} - Reverse Recovery Time, measured from zero crossing where current goes from positive to negative, to the point at which line through I_{RRM} and $0.25 \cdot I_{RRM}$ passes through zero.
- ➎ Q_{rr} - Area Under the Curve Defined by I_{RRM} and t_{rr} .
- ➏ di_M/dt - Maximum Rate of Current Increase During the Trailing



Technical drawing of the 6X4 vacuum tube, showing the pinout and dimensions. The drawing includes the following dimensions (in inches and millimeters):

- Top dimensions: 4.69 (.185), 5.31 (.209), 1.49 (.059), 2.49 (.098)
- Right dimensions: 15.49 (.610), 16.26 (.640), 5.38 (.212), 6.20 (.244), 3.50 (.138), 3.81 (.150)
- Bottom dimensions: 1.65 (.065), 2.13 (.084)
- Left dimensions: 2.21 (.087), 2.59 (.102)
- Internal dimensions: 6.15 (.242) BSC, 20.80 (.819), 21.46 (.845), 4.50 (.177) Max., 19.81 (.780), 20.32 (.800), 1.01 (.040), 1.40 (.055), 10.90 (.430) BSC

The drawing also shows the internal structure of the tube, including the cathode, anode, and various internal components.

Figure 1: Dimensions of the Cathode (Heat Sink) and Leads. The diagram shows three views of the component: a side view, a top view, and a bottom view. The side view shows a rectangular heat sink with a central rectangular opening. The top view shows the heat sink with two leads extending from the bottom. The bottom view shows the heat sink with two leads extending from the top. Dimensions are given in inches and millimeters.

Side View Dimensions:

- Top width: 4.90 (.193) and 5.10 (.201)
- Bottom width: 1.45 (.057) and 1.60 (.063)
- Lead width: 0.40 (.016) and 0.65 (.026)
- Lead spacing: 0.020 (.001) and 0.250 (.010)
- Lead height: 2.70 (.106) and 2.90 (.114)

Top View Dimensions:

- Top width: 15.85 (.624) and 16.05 (.632)
- Top height: 1.00 (.039) and 1.15 (.045)
- Lead width: 1.20 (.047) and 1.40 (.055)
- Lead spacing: 1.90 (.075) and 2.10 (.083)
- Lead height: 1.15 (.045) and 1.45 (.057)
- Lead spacing (BSC): 5.45 (.215) BSC (2 Plcs.)

Bottom View Dimensions:

- Top width: 13.30 (.524) and 13.60 (.535)
- Top height: 12.40 (.488) and 12.70 (.500)
- Lead width: 2.40 (.094) and 2.70 (.106) (Base of Lead)

Labels:

- Cathode (Heat Sink)
- Heat Sink (Cathode) and Leads are Plated
- Anode

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