Microsemi
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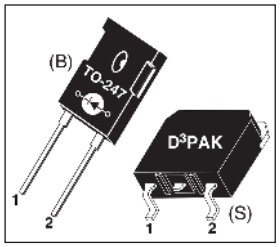
600V 40A
APT40DQ60BG
APT40DQ60SG

Pb Free Terminal Finish.

ULTRAFAST SOFT RECOVERY RECTIFIER DIODE



1 - Cathode
2 - Anode
Back of Case - Cathode

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°C unless otherwise specified.

Symbol	Characteristic / Test Conditions	APT40DQ60(B/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 = 111°C, Duty Cycle = 0.5)	40	Amps
$I_{F(RMS)}$	RMS Forward Current (Square wave, 50% duty)	63	
I_{FSM}	Non-Repetitive Forward Surge Current (T_J = 45°C, 8.3ms)	320	
E_{AVL}	Avalanche Energy (1A, 40mH)	20	mJ
T_J,T_{STG}	Operating and StorageTemperature Range	-55 to 175	°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 = 40A		2.0	2.4	Volts
		I_F = 80A		2.5		
		I_F = 40A, T_J = 125°C		1.7		
I_{RM}	Maximum Reverse Leakage Current	V_R = 600V			25	µA
		V_R = 600V, T_J = 125°C			500	
C_T	Junction Capacitance, V_R = 200V			36		pF

DYNAMIC CHARACTERISTICS

APT40DQ60(B/S)G

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
t_{rr}	Reverse Recovery Time	I_F = 1A, di_F/dt = -100A/µs, V_R = 30V, T_J = 25°C	-	22		ns
t_{rr}	Reverse Recovery Time	I_F = 40A, di_F/dt = -200A/µs, V_R = 400V, T_C = 25°C	-	25		ns
Q_{rr}	Reverse Recovery Charge		-	35		nC
I_{RRM}	Maximum Reverse Recovery Current		-	3	-	Amps
t_{rr}	Reverse Recovery Time	I_F = 40A, di_F/dt = -200A/µs, V_R = 400V, T_C = 125°C	-	160		ns
Q_{rr}	Reverse Recovery Charge		-	480		nC
I_{RRM}	Maximum Reverse Recovery Current		-	6	-	Amps
t_{rr}	Reverse Recovery Time	I_F = 40A, di_F/dt = -1000A/µs, V_R = 400V, T_C = 125°C	-	85		ns
Q_{rr}	Reverse Recovery Charge		-	920		nC
I_{RRM}	Maximum Reverse Recovery Current		-	20		Amps

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction-to-Case Thermal Resistance			.67	°C/W
W_T	Package Weight		0.22		oz
			5.9		g
Torque	Maximum Mounting Torque			10	lb•in
				1.1	N•m

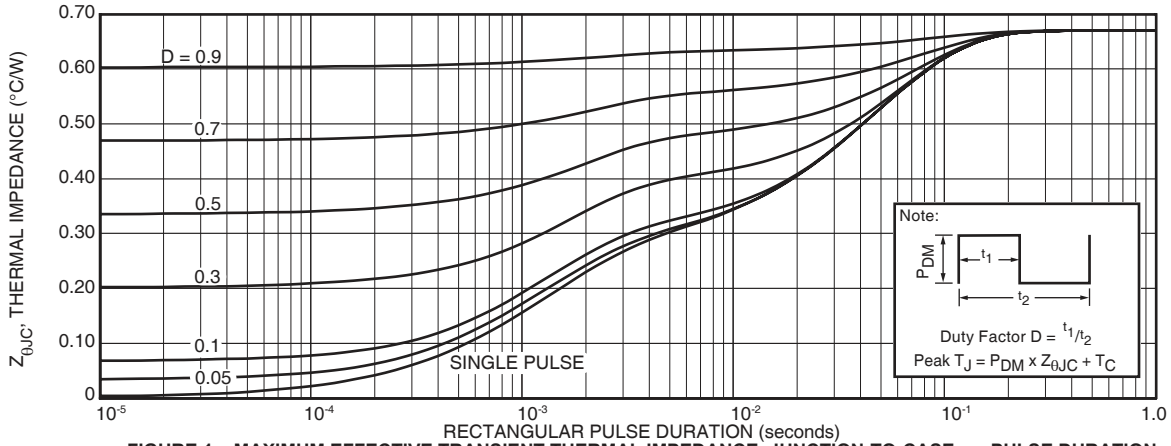


FIGURE 1a. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

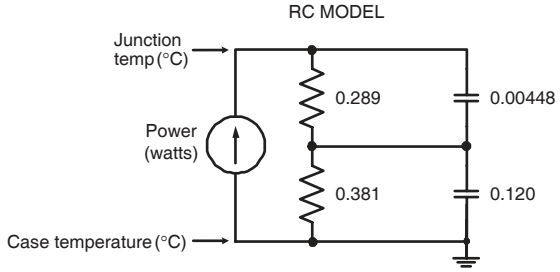


FIGURE 1b, TRANSIENT THERMAL IMPEDANCE MODEL

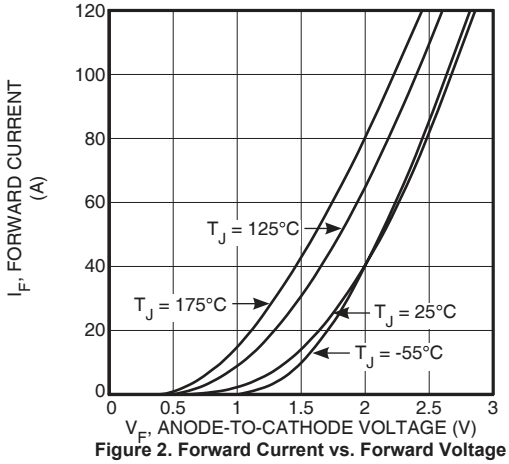


Figure 2. Forward Current vs. Forward Voltage

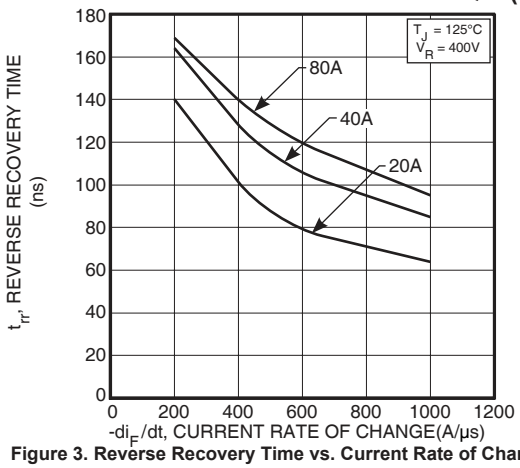


Figure 3. Reverse Recovery Time vs. Current Rate of Change

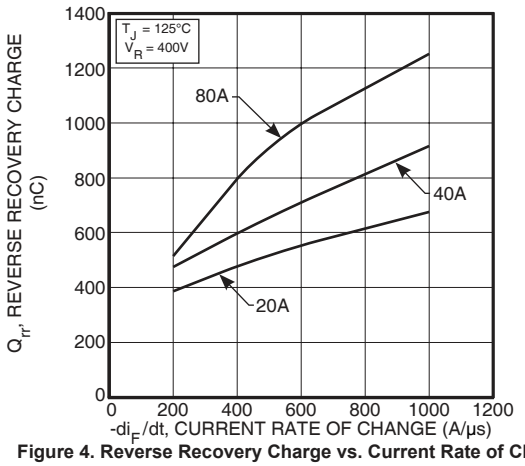


Figure 4. Reverse Recovery Charge vs. Current Rate of Change

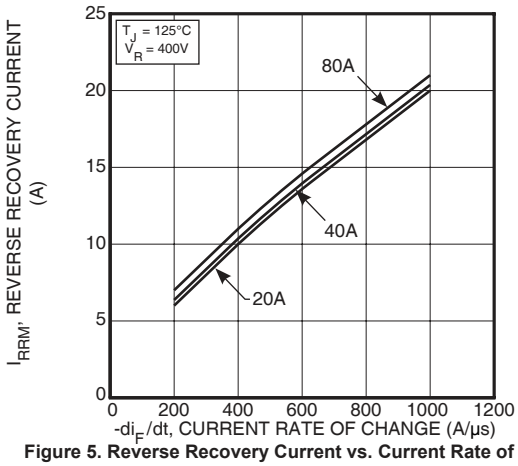


Figure 5. Reverse Recovery Current vs. Current Rate of Change

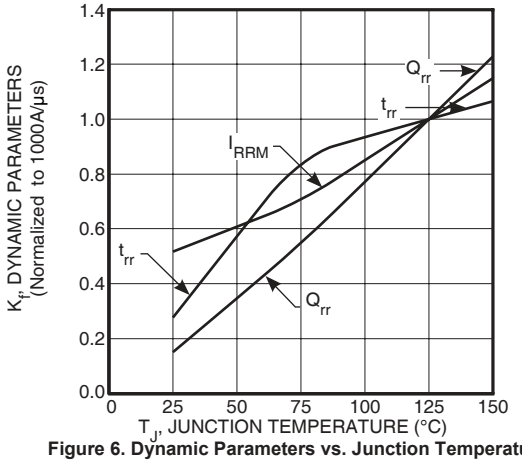


Figure 6. Dynamic Parameters vs. Junction Temperature

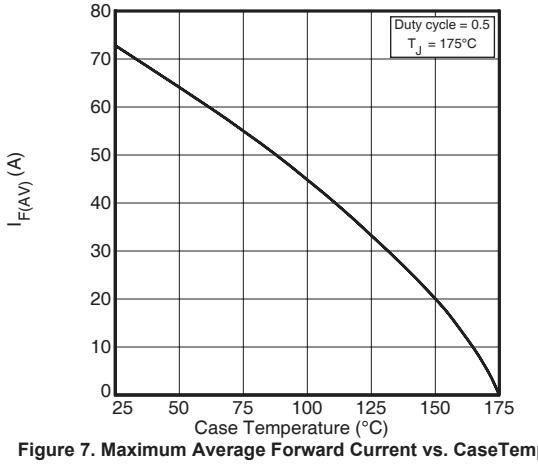


Figure 7. Maximum Average Forward Current vs. CaseTemperature

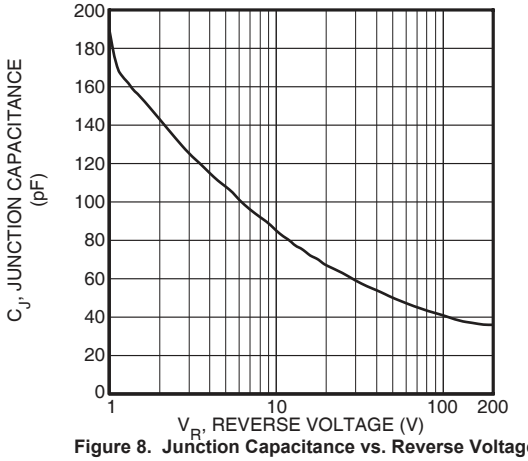


Figure 8. Junction Capacitance vs. Reverse Voltage

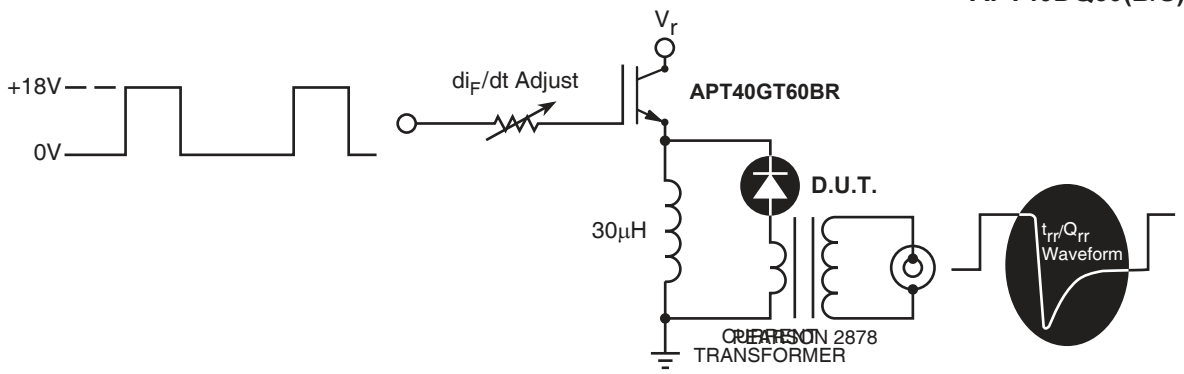


Figure 9. Diode Test Circuit

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 $0.25 \bullet I_{RRM}$ passes through zero.
5. Q_{rr} - Area Under the Curve Defined by I_{RRM} and t_{rr}.
6. di_M/dt - Maximum Rate of Current Increase During the Trailing Portion of t_{rr}.

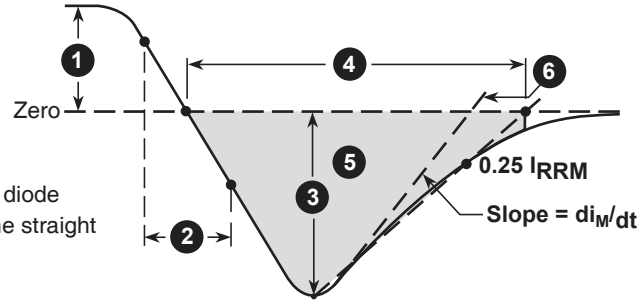
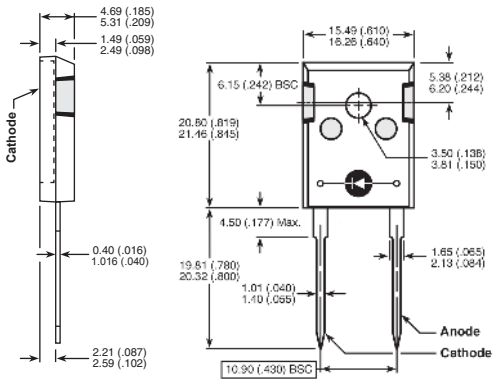


Figure 10, Diode Reverse Recovery Waveform and Definitions

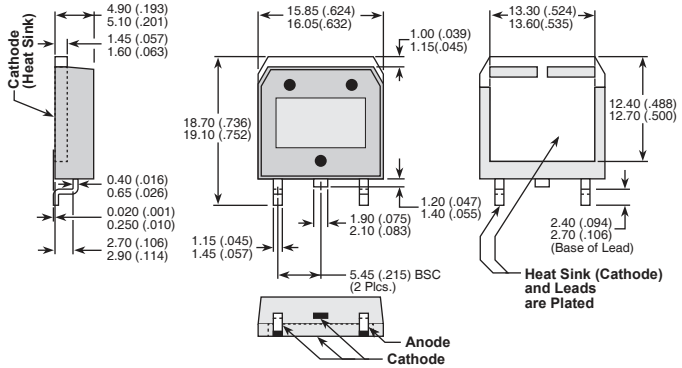
TO-247 Package Outline



Dimensions in Millimeters and (Inches)

D³PAK Package Outline

e3 100% Sn



Dimensions in Millimeters (Inches)

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