


ULTRAFast SOFT RECOVERY RECTIFIER DIODE

PRODUCT APPLICATIONS

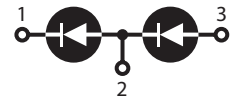
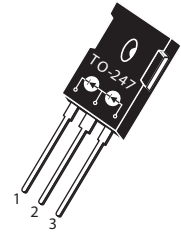
- Anti-Parallel Diode
 - Switchmode Power Supply
 - Inverters
- Free Wheeling Diode
 - Motor Controllers
 - Converters
 - Inverters
- Snubber Diode
- PFC
- RoHS Compliant 

PRODUCT FEATURES

- Ultrafast Recovery Time
- Soft Recovery Characteristics
- Popular TO-247 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



- 1 - Cathode 1
- 2 - Anode 1
Cathode 2
- 3 - Anode 2

MAXIMUM RATINGS

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

Symbol	Parameter	Ratings	Unit
V_R	Maximum D.C. Reverse Voltage	1200	V
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		
V_{RWM}	Maximum Working Peak Reverse Voltage		
$I_{F(AV)}$	Maximum Average Forward Current ($T_C = 74^\circ\text{C}$, Duty Cycle = 0.5)	15	A
$I_{F(RMS)}$	RMS Forward Current (Square wave, 50% duty)	17	
I_{FSM}	Non-Repetitive Forward Surge Current ($T_J = 45^\circ\text{C}$, 8.3ms)	110	
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	Parameter	MIN	TYP	MAX	Unit
V_F	Forward Voltage	$I_F = 15\text{A}$	3.0	3.5	V
		$I_F = 30\text{A}$	3.7		
		$I_F = 15\text{A}, T_J = 125^\circ\text{C}$	2.2		
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, $V_R = 200\text{V}$		17		



CAUTION: These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

DYNAMIC CHARACTERISTICS

APT15DQ120BHB(G)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse Recovery Time	$I_F = 1A, di_F/dt = -100A/\mu s$ $V_R = 30V, T_J = 25^\circ C$		21		ns
t_{rr}	Reverse Recovery Time	$I_F = 15A, di_F/dt = -200A/\mu s$ $V_R = 800V, T_C = 25^\circ C$		240		
Q_{rr}	Reverse Recovery Charge			260		nC
I_{RRM}	Reverse Recovery Current			3		Amps
t_{rr}	Reverse Recovery Time	$I_F = 15A, di_F/dt = -200A/\mu s$ $V_R = 800V, T_C = 125^\circ C$		290		ns
Q_{rr}	Reverse Recovery Charge			960		nC
I_{RRM}	Reverse Recovery Current			6		Amps
t_{rr}	Reverse Recovery Time	$I_F = 15A, di_F/dt = -1000A/\mu s$ $V_R = 800V, T_C = 125^\circ C$		130		ns
Q_{rr}	Reverse Recovery Charge			1340		nC
I_{RRM}	Maximum Reverse Recovery Current			19		Amps

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Parameter	Min	Typ	Max	Unit
$R_{\theta JC}$	Reverse Recovery Time			2.3	$^\circ C/W$
W_T	Package Weight		0.22		oz
			5.9		g
Torque	Maximum Mounting Torque			10	lb•in
				1.1	N•m

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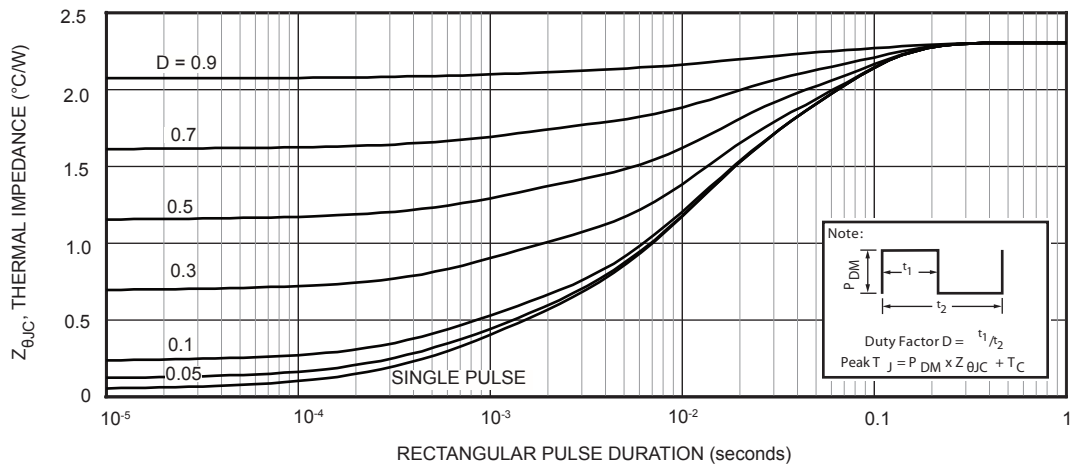


FIGURE 1. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

TYPICAL PERFORMANCE CURVES

APT15DQ120BHB(G)

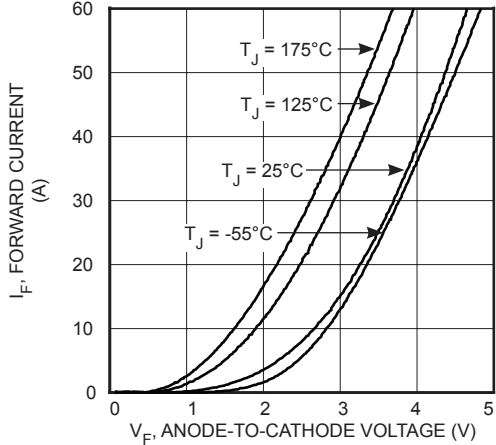


Figure 2. Forward Current vs. Forward Voltage

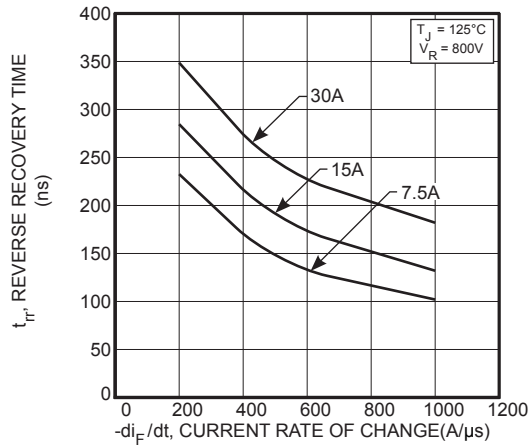


Figure 3. Reverse Recovery Time vs. Current Rate of Change

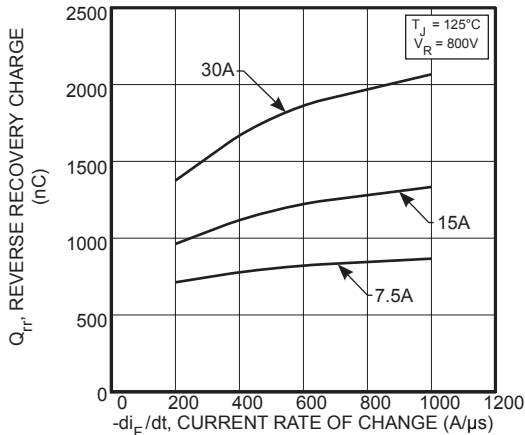


Figure 4. Reverse Recovery Charge vs. Current Rate of Change

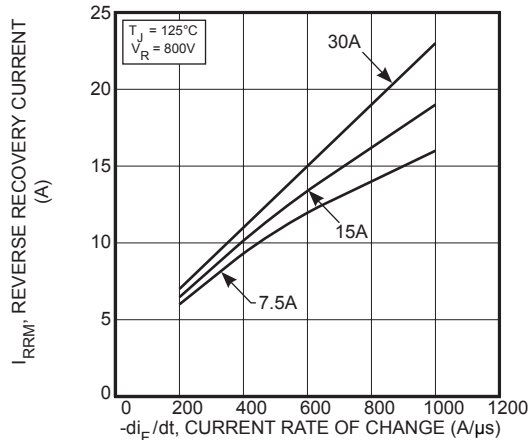


Figure 5. Reverse Recovery Current vs. Current Rate of Change

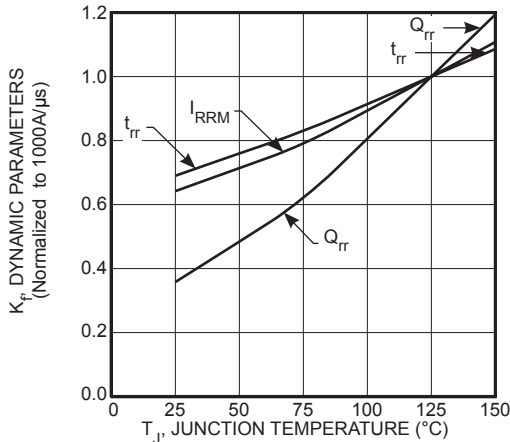


Figure 6. Dynamic Parameters vs. Junction Temperature

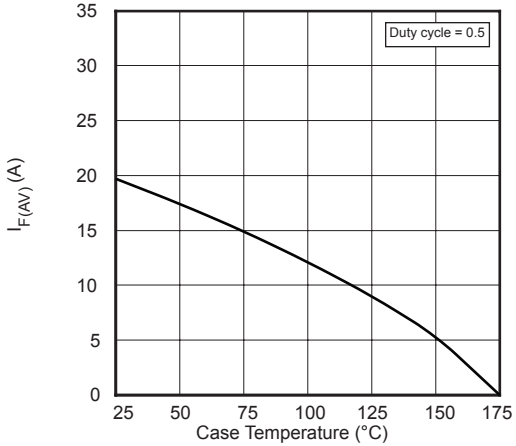


Figure 7. Maximum Average Forward Current vs. Case Temperature

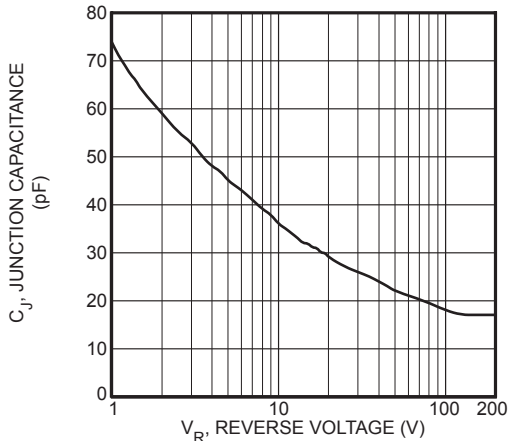


Figure 8. Junction Capacitance vs. Reverse Voltage

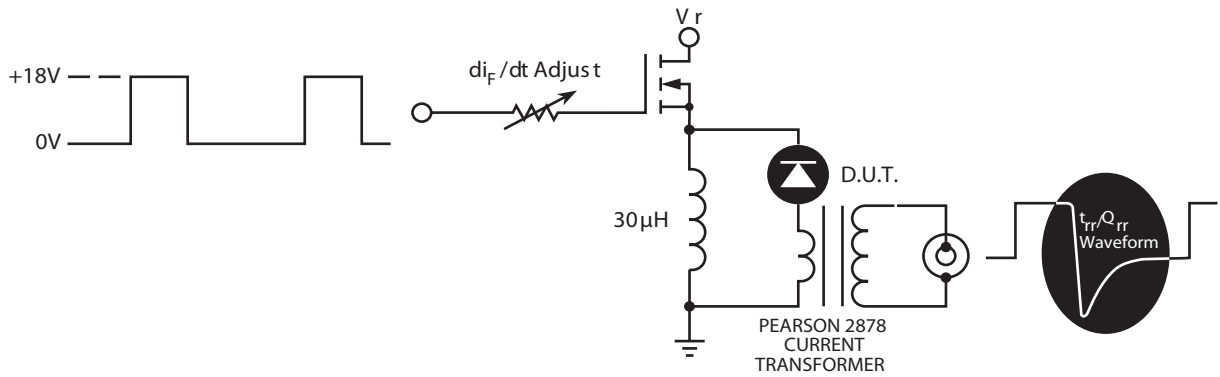


Figure 9. Diode Test Circuit

- 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 $0.25 I_{RRM}$ passes through zero.
- 5 Q_{rr} - Area Under the Curve Defined by I_{RRM} and t_{rr} .

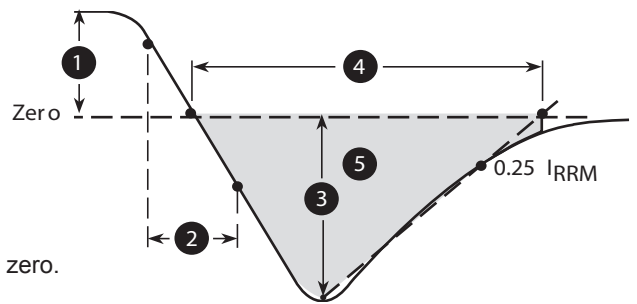
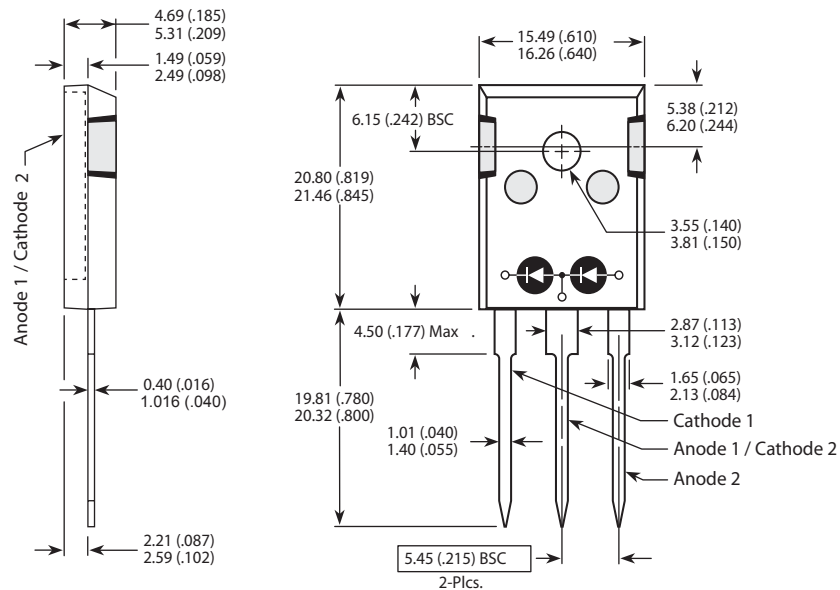


Figure 10. Diode Reverse Recovery Waveform Definition

TO-247 Package Outline

Ⓢ SAC: Tin, Silver, Copper



Dimensions in Millimeters and (Inches)

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