

## Ultrasoft Recovery Rectifier Diode

### PRODUCT APPLICATIONS

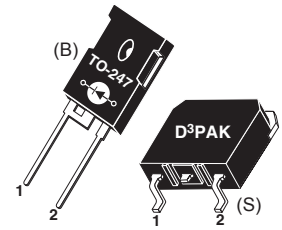
- Anti-Parallel Diode
  - Switchmode Power Supply
  - Inverters
- Applications
  - Induction Heating
- Resonant Mode Circuits
  - ZVS and ZCS Topologies
  - Phase Shifted Bridge

### PRODUCT FEATURES

- Ultrasoft Recovery Times ( $t_{rr}$ )
- Popular TO-247 Package or Surface Mount D<sup>3</sup>PAK Package
- Ultra Low Forward Voltage
- Low Leakage Current

### PRODUCT BENEFITS

- Soft Switching - High  $Q_{rr}$
- Low Noise Switching
  - Reduced Ringing
- Higher Reliability Systems
- Minimizes or eliminates snubber



1 - Cathode  
 2 - Anode  
 Back of Case - Cathode

### MAXIMUM RATINGS

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

Symbol	Characteristic / Test Conditions	Ratings	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 ( $T_C = 126^\circ\text{C}$ , Duty Cycle = 0.5)	30	Amps
$I_{F(RMS)}$	RMS Forward Current (Square wave, 50% duty)	51	
$I_{FSM}$	Non-Repetitive Forward Surge Current ( $T_J = 45^\circ\text{C}$ , 8.3 ms)	110	
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to 175	$^\circ\text{C}$
$T_L$	Lead Temperature for 10 Seconds	300	

### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	Min	Typ	Max	Unit	
$V_F$	Forward Voltage		$I_F = 30\text{A}$	1.25	1.6	Volts
			$I_F = 60\text{A}$	2.03		
			$I_F = 30\text{A}, T_J = 125^\circ\text{C}$	1.9		
$I_{RM}$	Maximum Reverse Leakage Current			$V_R = 600\text{V}$	25	$\mu\text{A}$
				$V_R = 600\text{V}, T_J = 125^\circ\text{C}$	250	
$C_T$	Junction Capacitance, $V_R = 200\text{V}$		31		pF	

## DYNAMIC CHARACTERISTICS

APT30DL60B\_S(G)

Symbol	Characteristic / Test Conditions	Min	Typ	Max	Unit
$t_{rr}$	Reverse Recovery Time $I_F = 1A, di_F/dt = -100A/\mu s, V_R = 30V, T_J = 25^\circ C$		64		ns
$t_{rr}$	Reverse Recovery Time		317		
$Q_{rr}$	Reverse Recovery Charge		962		nC
$I_{RRM}$	Maximum Reverse Recovery Current		7		Amps
$t_{rr}$	Reverse Recovery Time		561		ns
$Q_{rr}$	Reverse Recovery Charge		2244		nC
$I_{RRM}$	Maximum Reverse Recovery Current		9		Amps
$t_{rr}$	Reverse Recovery Time		264		ns
$Q_{rr}$	Reverse Recovery Charge		3191		nC
$I_{RRM}$	Maximum Reverse Recovery Current		26		Amps

## THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction-to-Case Thermal Resistance			.88	$^\circ C/W$
$W_T$	Package Weight		0.22		oz
			5.9		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.

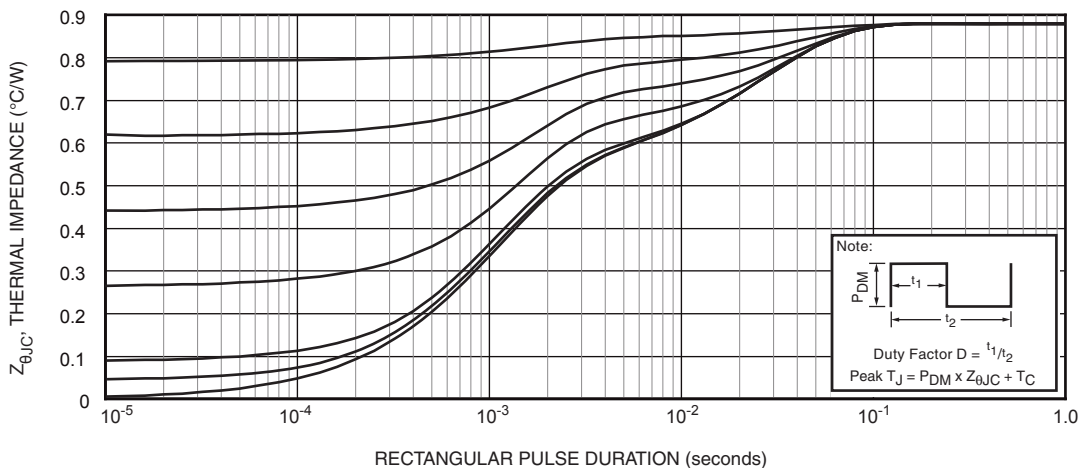


FIGURE 1. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

# TYPICAL PERFORMANCE CURVES

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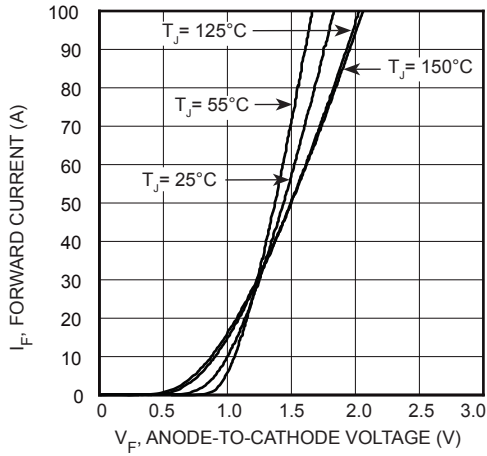


FIGURE 2, Forward Current vs. Forward Voltage

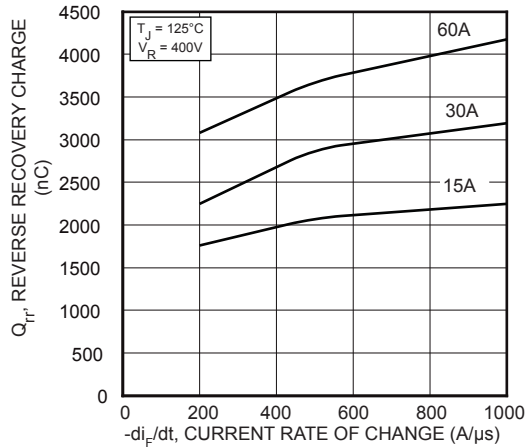


FIGURE 4, Reverse Recovery Charge vs. Current Rate of Change

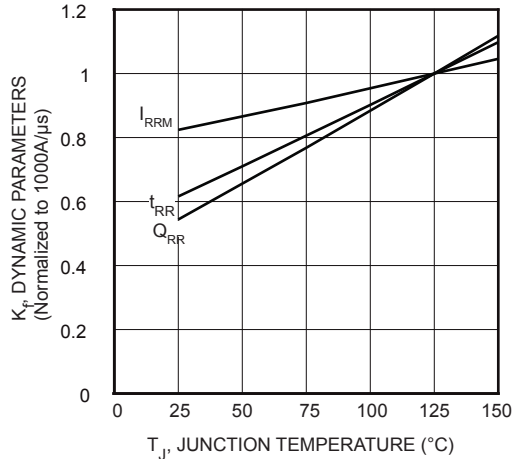


FIGURE 6, Dynamic Parameters vs. Junction Temperature

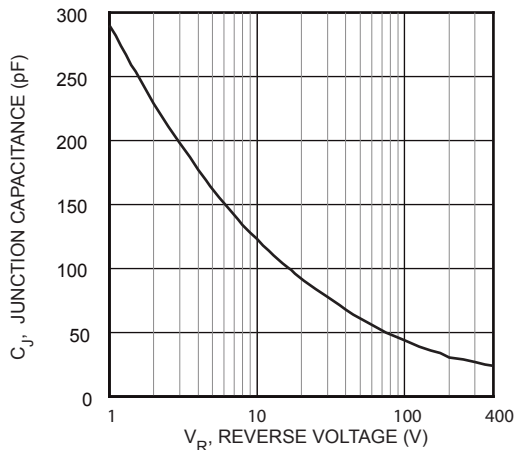


FIGURE 8, Junction Capacitance vs. Reverse Voltage

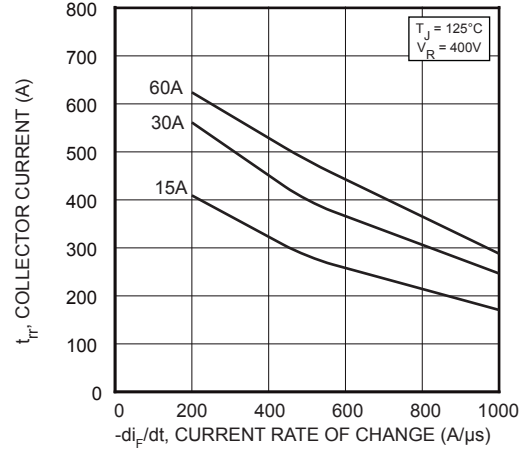


FIGURE 3, Reverse Recovery Time vs. Current Rate of Change

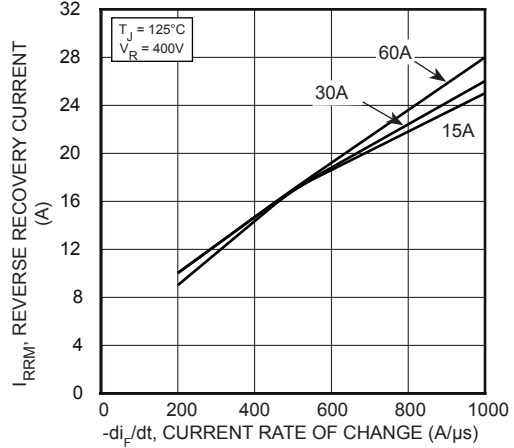


FIGURE 5, Reverse Recovery Current vs. Current Rate of Change

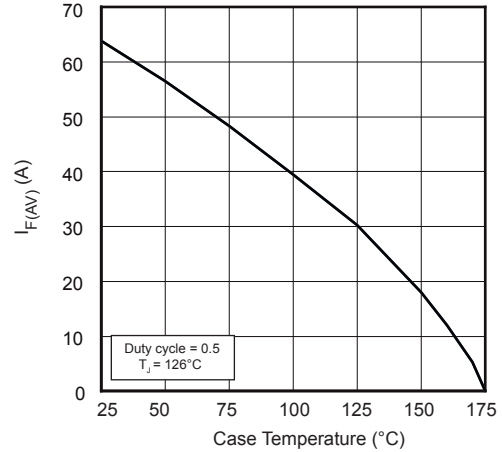


FIGURE 7, Maximum Average Forward Current vs. Case Temperature

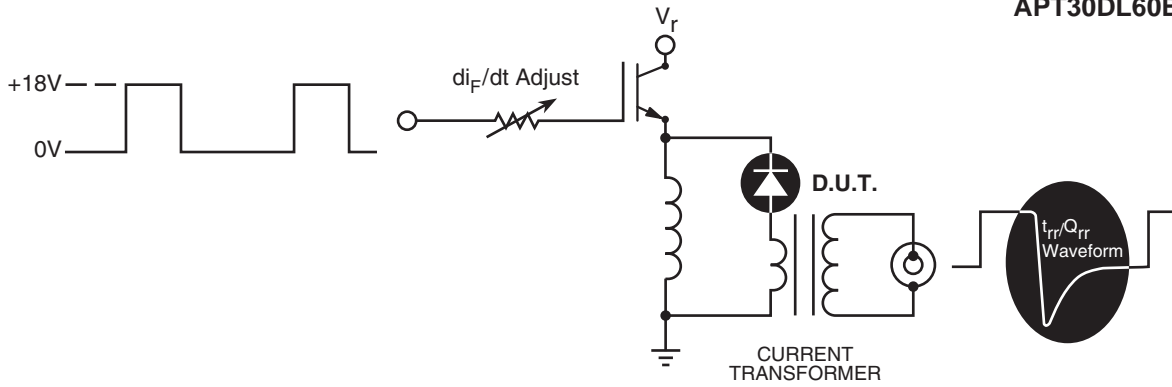


Figure 9. Diode Test Circuit

- 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  $t_{rr}$ .
- 6  $di_M/dt$  - Maximum Rate of Current Increase During the Trailing Portion of  $t_{rr}$ .

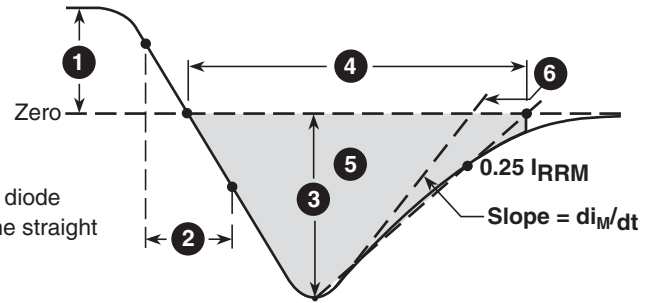
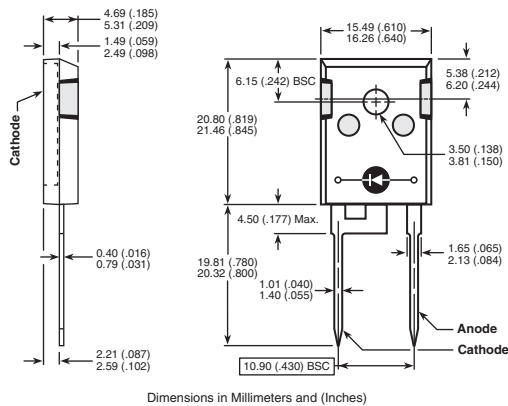


Figure 10, Diode Reverse Recovery Waveform and Definitions

### TO-247 Package Outline

e1 SAC: Tin, Silver, Copper



### D<sup>3</sup>PAK Package Outline

e1 100% Sn

