

APT2X30D60J	600V	30A
APT2X30D50J	500V	30A
APT2X30D40J	400V	30A

## DUAL DIE ISOTOP® PACKAGE

## ULTRAFAST SOFT RECOVERY DUAL RECTIFIER DIODES

PRODUCT APPLICATIONS	PRODUCT FEATURES	PRODUCT BENEFITS
<ul style="list-style-type: none"> <li>• Anti-Parallel Diode                             <ul style="list-style-type: none"> <li>-Switchmode Power Supply</li> <li>-Inverters</li> </ul> </li> <li>• Free Wheeling Diode                             <ul style="list-style-type: none"> <li>-Motor Controllers</li> <li>-Converters</li> </ul> </li> <li>• Snubber Diode</li> <li>• Uninterruptible Power Supply (UPS)</li> <li>• Induction Heating</li> <li>• High Speed Rectifiers</li> </ul>	<ul style="list-style-type: none"> <li>• Ultrafast Recovery Times</li> <li>• Soft Recovery Characteristics</li> <li>• Popular SOT-227 Package</li> <li>• Low Forward Voltage</li> <li>• High Blocking Voltage</li> <li>• Low Leakage Current</li> </ul>	<ul style="list-style-type: none"> <li>• Low Losses</li> <li>• Low Noise Switching</li> <li>• Cooler Operation</li> <li>• Higher Reliability Systems</li> <li>• Increased System Power Density</li> </ul>

### MAXIMUM RATINGS

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

Symbol	Characteristic / Test Conditions	APT2X30D60J-50J-40J	UNIT
$V_R$	Maximum D.C. Reverse Voltage	600-500-400	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)	30	Amps
$I_F(RMS)$	RMS Forward Current	70	
$I_{FSM}$	Non-Repetitive Forward Surge Current ( $T_J = 45^\circ\text{C}$ , 8.3ms)	320	
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_L$	Lead Temperature: 0.063" from Case for 10 Sec.	300	

### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$V_F$	Maximum Forward Voltage			1.6	Volts
				$I_F = 30\text{A}$	
				$I_F = 60\text{A}$	
$I_{RM}$	Maximum Reverse Leakage Current			250	$\mu\text{A}$
				$V_R = V_R \text{ Rated}$	
				$V_R = V_R \text{ Rated}, T_J = 125^\circ\text{C}$	
$C_T$	Junction Capacitance, $V_R = 200\text{V}$		40		pF
$L_S$	Series Inductance (Lead to Lead 5mm from Base)		10		nH

405 S.W. COLUMBIA STREET  
BEND, OREGON 97702-1035  
U.S.A.

PHONE . . . (503) 382-8028

FAX . . . . . (503) 388-0364

DYNAMIC CHARACTERISTICS

APT2X30D60J-50J-40J

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$t_{rr1}$	Reverse Recovery Time, $I_F = 1.0A$ , $di_F/dt = -15A/\mu S$ , $V_R = 30V$ , $T_J = 25^\circ C$		50	65	nS
$t_{rr2}$	Reverse Recovery Time		50	65	
$t_{rr3}$	$I_F = 30A$ , $di_F/dt = -240A/\mu S$ , $V_R = 350V$		80	180	
$t_{fr1}$	Forward Recovery Time		200		
$t_{fr2}$	$I_F = 30A$ , $di_F/dt = 240A/\mu S$ , $V_R = 350V$		200		
$I_{RRM1}$	Reverse Recovery Current		4	10	Amps
$I_{RRM2}$	$I_F = 30A$ , $di_F/dt = -240A/\mu S$ , $V_R = 350V$		7.5	15	
$Q_{rr1}$	Recovery Charge		100	325	nC
$Q_{rr2}$	$I_F = 30A$ , $di_F/dt = -240A/\mu S$ , $V_R = 350V$		300	1350	
$V_{fr1}$	Forward Recovery Voltage		3		Volts
$V_{fr2}$	$I_F = 30A$ , $di_F/dt = 240A/\mu S$ , $V_R = 350V$		3		
$di_M/dt$	Rate of Fall of Recovery Current		400		A/ $\mu S$
	$I_F = 30A$ , $di_F/dt = -240A/\mu S$ , $V_R = 350V$ (See Figure 10)		200		

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction-to-Case Thermal Resistance			0.90	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance			20	
$V_{Isolation}$	RMS Voltage (50-60 Hz Sinusoidal Waveform from Terminals to Mounting Base for 1 Min.)	2500			Volts
$W_T$	Package Weight		1.03		oz
			29.2		gm
Torque	Maximum Torque (Mounting = 8-32 or 4mm Machine and Terminals = 4mm Machine)			13.6	lb-in
				1.5	N·m

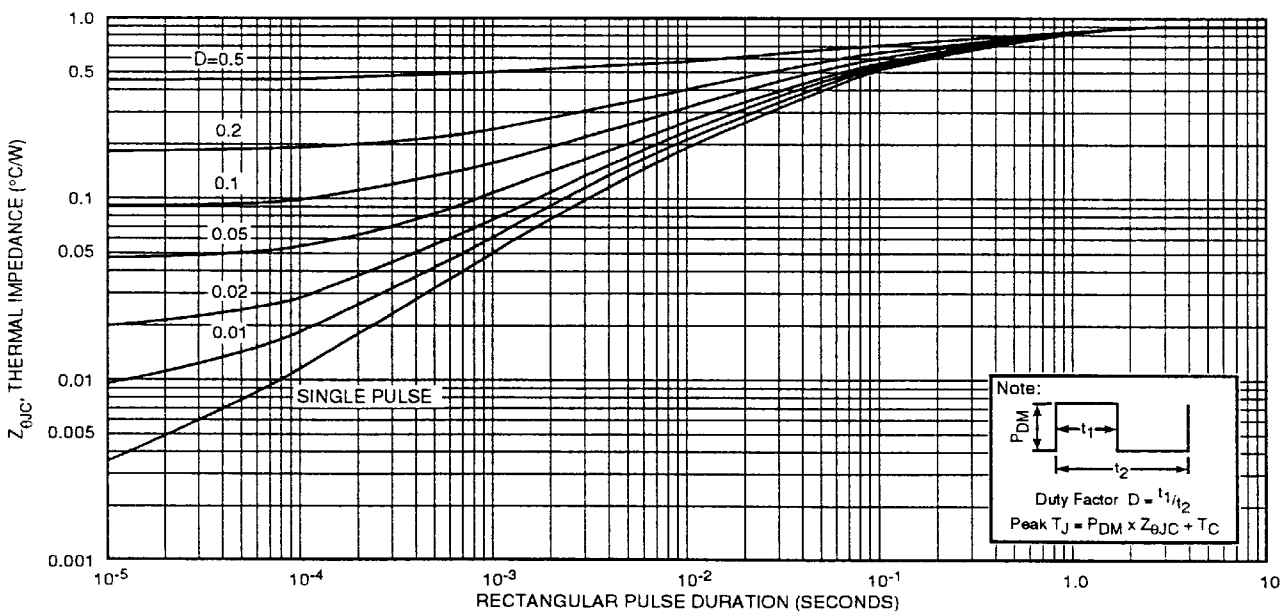


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

AFT2X30D60J-50J-40J

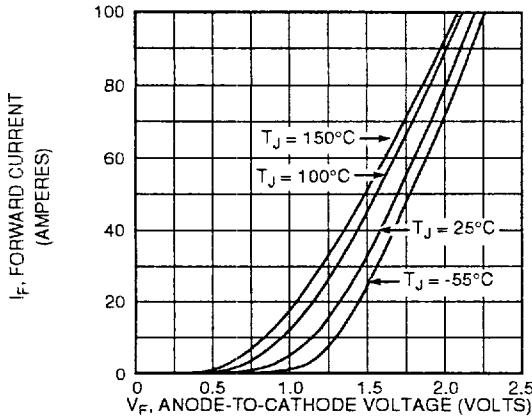


Figure 2, Forward Voltage Drop vs Forward Current

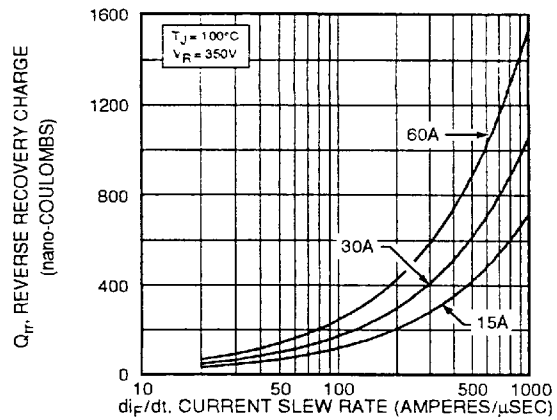


Figure 3, Reverse Recovery Charge vs Current Slew Rate

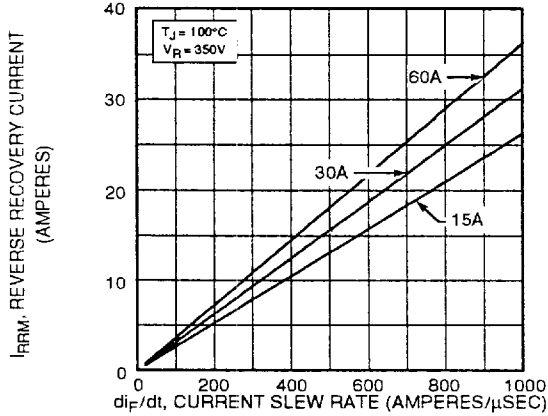


Figure 4, Reverse Recovery Current vs Current Slew Rate

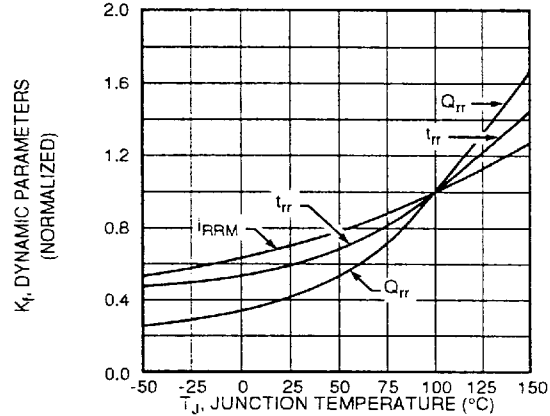


Figure 5, Dynamic Parameters vs Junction Temperature

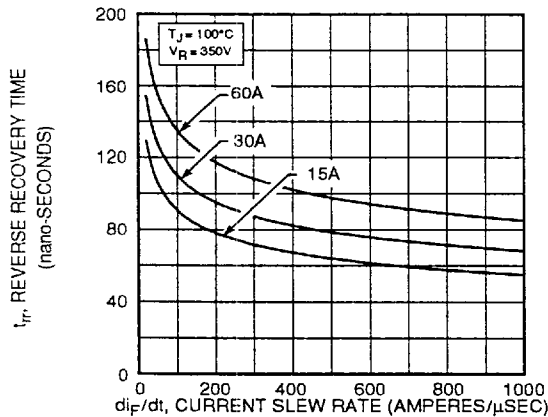


Figure 6, Reverse Recovery Time vs Current Slew Rate

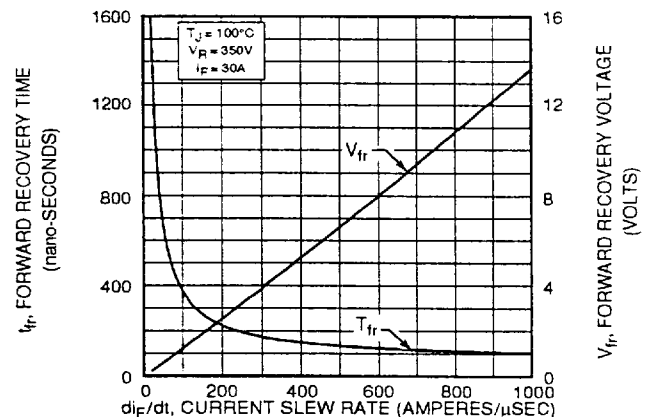


Figure 7, Forward Recovery Voltage/Time vs Current Slew Rate

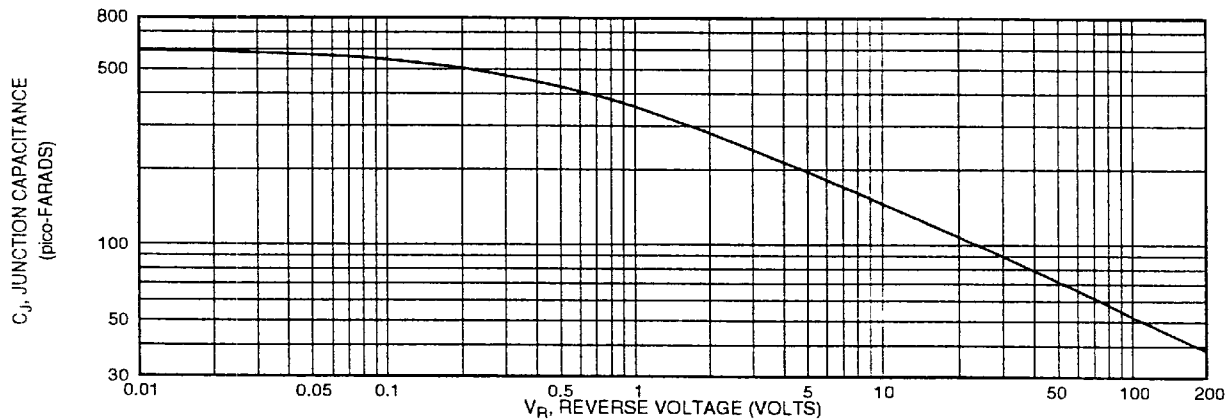


Figure 8, Junction Capacitance vs Reverse Voltage

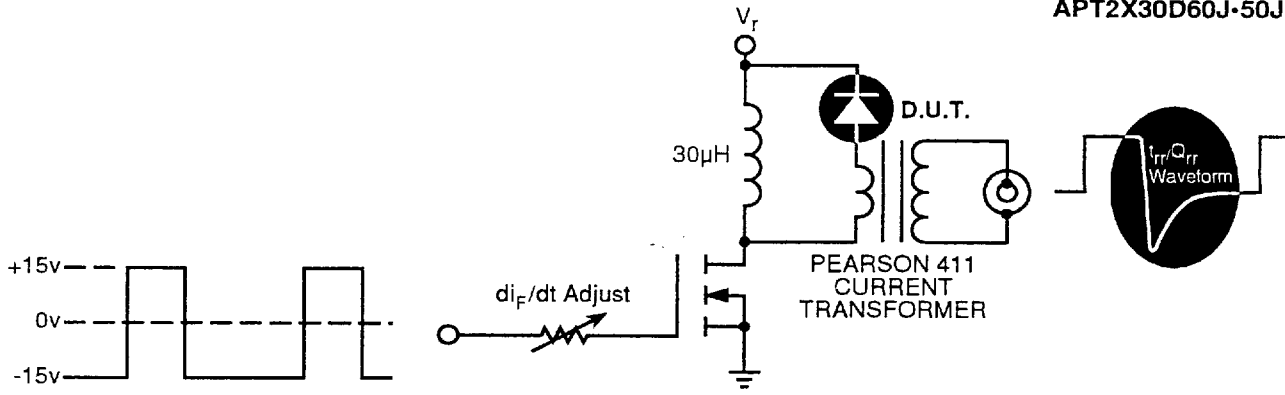


Figure 9, Diode Reverse Recovery Test Circuit and Waveforms

- 1  $I_F$  - Forward Conduction Current
- 2  $di_F/dt$  - Current Slew Rate, Rate of Forward Current Change Through Zero Crossing.
- 3  $I_{RRM}$  - Peak Reverse Recovery Current.
- 4  $t_{rr}$  - Reverse Recovery Time Measured from Point of  $I_F$  Current Falling Through Zero to a Tangent Line { 6  $diM/dt$  } Extrapolated Through Zero Defined by 0.75 and 0.50  $I_{RRM}$ .
- 5  $Q_{rr}$  - Area Under the Curve Defined by  $I_{RRM}$  and  $t_{rr}$ .
- 6  $diM/dt$  - Maximum Rate of Current Change During the Trailing Portion of  $t_{rr}$ .

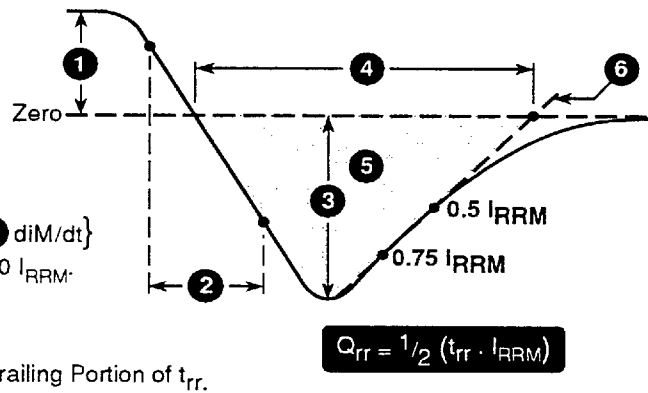
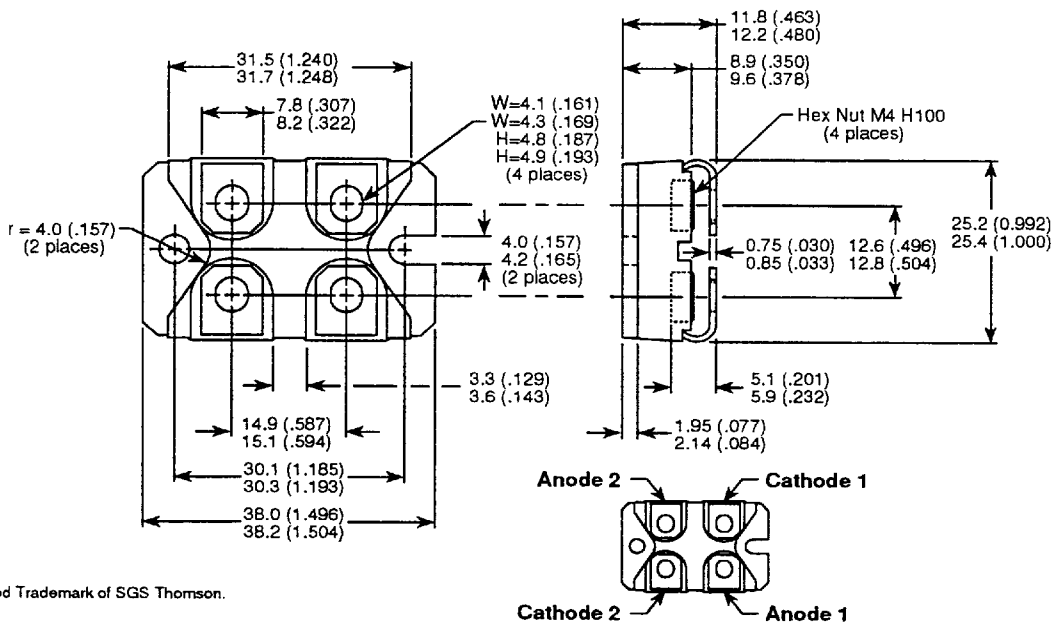


Figure 10, Diode Reverse Recovery Waveform and Definitions

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

SOT-227 (Anti-Parallel Diode) Package Outline



ISOTOP® is a Registered Trademark of SGS Thomson.

Dimensions in Millimeters and (Inches)

✓