

**APT2X31S20J 200V 45A**

## DUAL DIE ISOTOP® PACKAGE HIGH VOLTAGE SCHOTTKY DIODES

PRODUCT APPLICATIONS	PRODUCT FEATURES	PRODUCT BENEFITS
<ul style="list-style-type: none"> <li>• 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>• 48 Volt Output Rectifiers</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	APT2X31S20J	UNIT
$V_R$	Maximum D.C. Reverse Voltage	200	Volts
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		
$V_{RWM}$	Maximum Working Peak Reverse Voltage		
$I_F(AV)$	Maximum Average Forward Current ( $T_C = 105^\circ\text{C}$ , Duty Cycle = 0.5)	45	Amps
$I_F(RMS)$	RMS Forward Current (Square wave, 50% duty)	81	
$I_{FSM}$	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	$^\circ\text{C}$
$E_{AVL}$	Avalanche Energy (2A, 15mH)	30	mJ

### STATIC ELECTRICAL CHARACTERISTICS

Symbol		MIN	TYP	MAX	UNIT
$V_F$	Forward Voltage	$I_F = 30\text{A}$	.80	.85	Volts
		$I_F = 60\text{A}$	.91		
		$I_F = 30\text{A}, T_J = 125^\circ\text{C}$	.67		
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = V_R \text{ Rated}$		0.5	mA
		$V_R = V_R \text{ Rated}, T_J = 125^\circ\text{C}$		15	
$C_T$	Junction Capacitance, $V_R = 200\text{V}$		150		pF

**DYNAMIC CHARACTERISTICS**

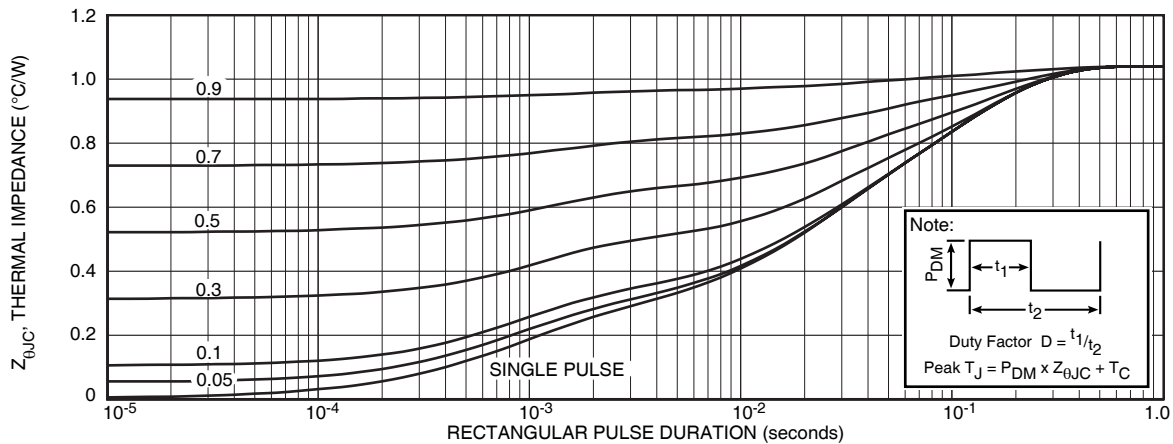
**APT2X31S20J**

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
$t_{rr}$	Reverse Recovery Time	$I_F = 30A, di_F/dt = -200A/\mu s$ $V_R = 133V, T_C = 25^\circ C$	-	55		ns
$Q_{rr}$	Reverse Recovery Charge		-	190		nC
$I_{RRM}$	Maximum Reverse Recovery Current		-	6	-	Amps
$t_{rr}$	Reverse Recovery Time	$I_F = 30A, di_F/dt = -200A/\mu s$ $V_R = 133V, T_C = 125^\circ C$	-	100		ns
$Q_{rr}$	Reverse Recovery Charge		-	450		nC
$I_{RRM}$	Maximum Reverse Recovery Current		-	9	-	Amps
$t_{rr}$	Reverse Recovery Time	$I_F = 30A, di_F/dt = -700A/\mu s$ $V_R = 133V, T_C = 125^\circ C$	-	70		ns
$Q_{rr}$	Reverse Recovery Charge		-	960		nC
$I_{RRM}$	Maximum Reverse Recovery Current		-	24		Amps

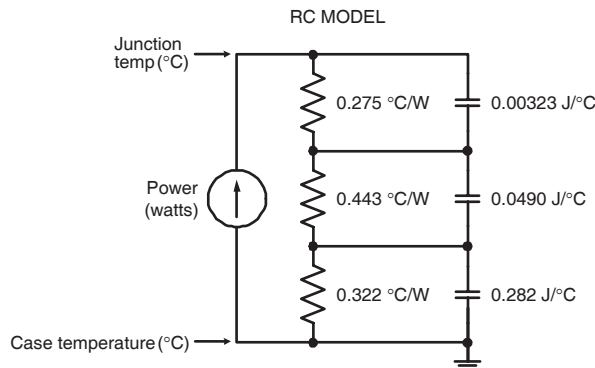
**THERMAL AND MECHANICAL CHARACTERISTICS**

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction-to-Case Thermal Resistance			1.04	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance			20	
$W_T$	Package Weight		1.03		oz
			29.2		g
Torque	Maximum Terminal & 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

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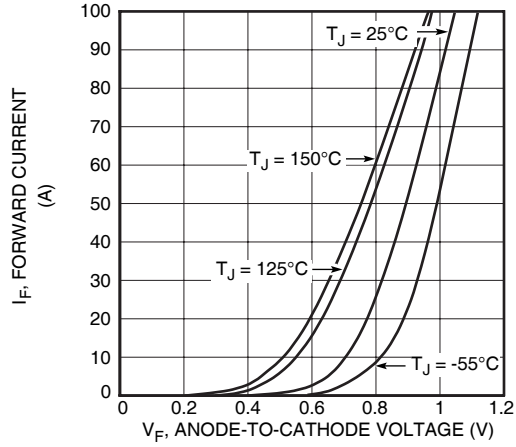


Figure 2. Forward Current vs. Forward Voltage

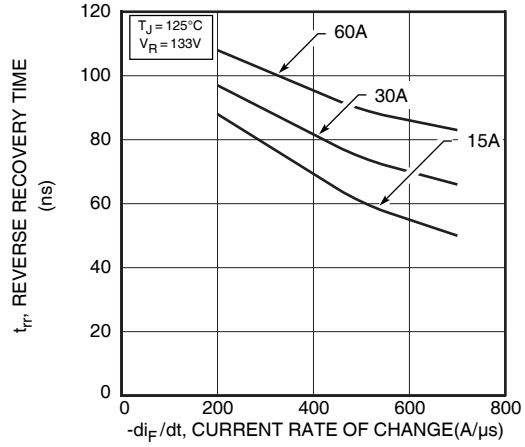


Figure 3. Reverse Recovery Time vs. Current Rate of Change

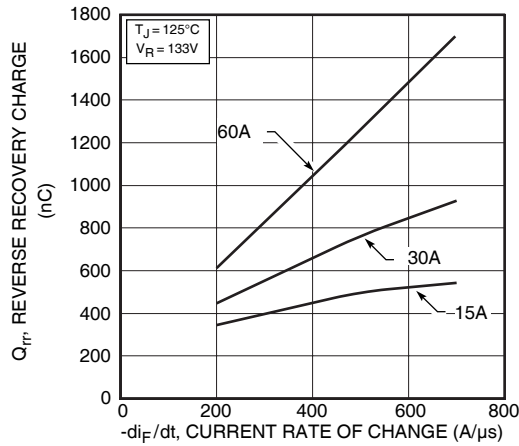


Figure 4. Reverse Recovery Charge vs. Current Rate of Change

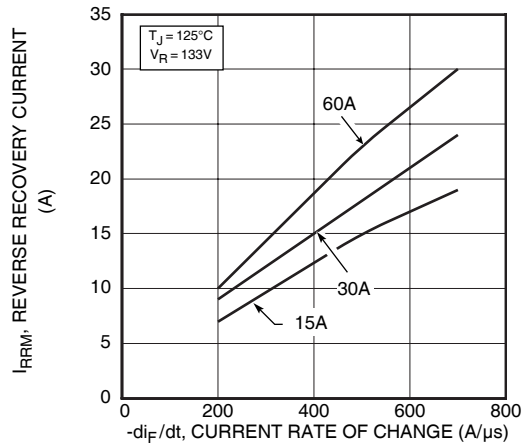


Figure 5. Reverse Recovery Current vs. Current Rate of Change

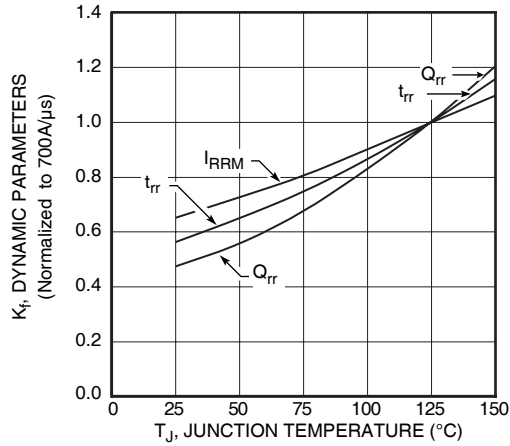


Figure 6. Dynamic Parameters vs. Junction Temperature

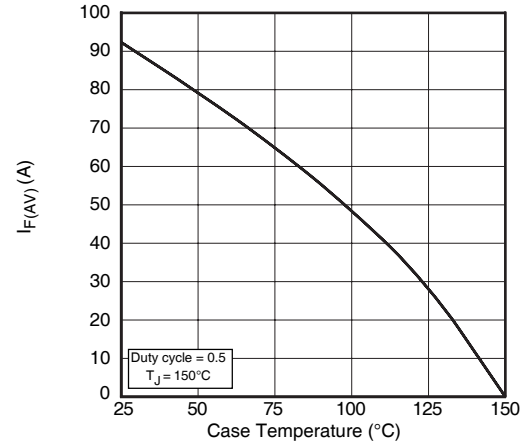


Figure 7. Maximum Average Forward Current vs. Case Temperature

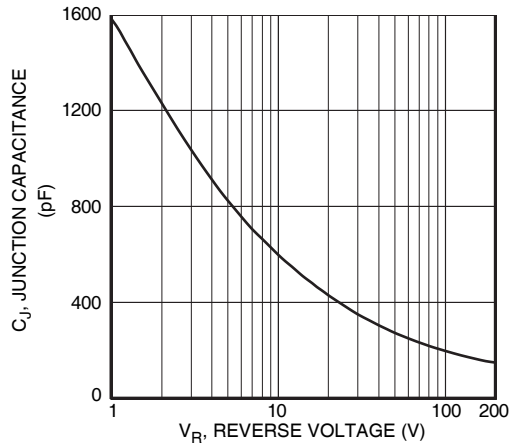


Figure 8. Junction Capacitance vs. Reverse Voltage

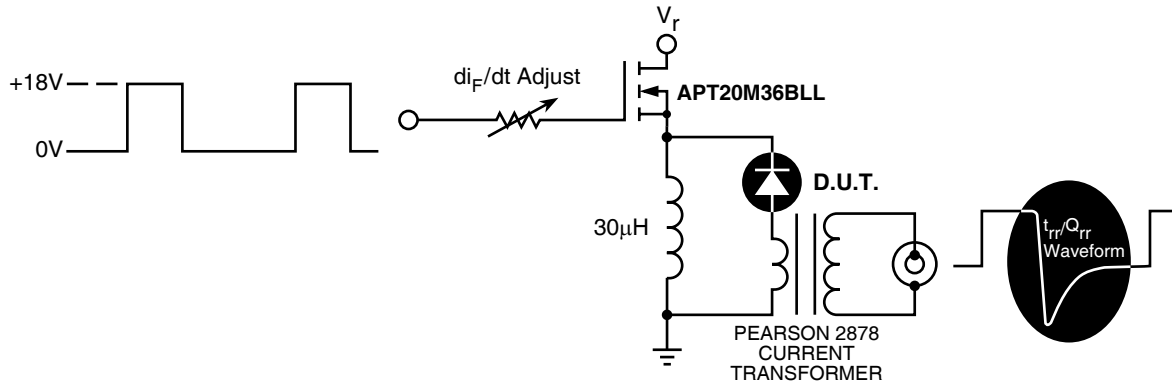


Figure 9. Diode Test Circuit

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

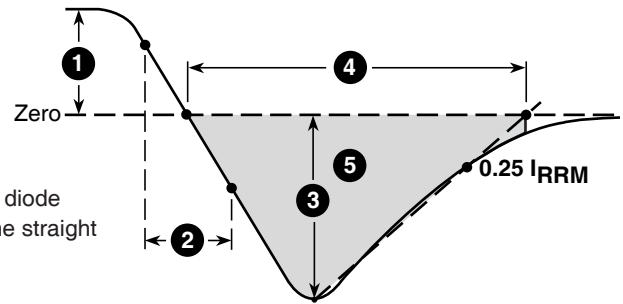
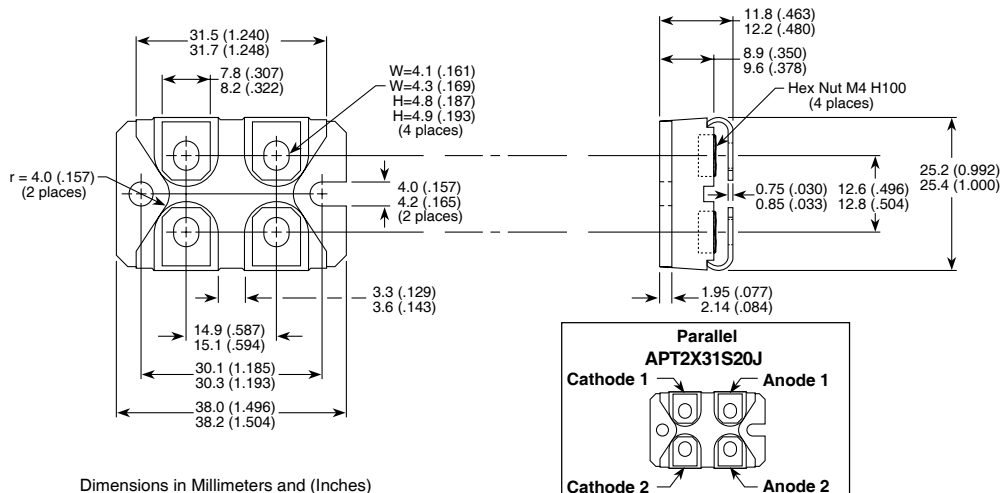


Figure 10, Diode Reverse Recovery Waveform and Definitions

SOT-27 Package Outline



Dimensions in Millimeters and (Inches)

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