

## Ultrafast Soft Recovery Dual Rectifier Diode

### PRODUCT APPLICATIONS

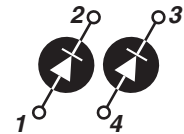
- Anti-Parallel Diode
  - Switchmode Power Supply
  - Inverters
- Free Wheeling Diode
  - Motor Controllers
  - Converters
- Snubber Diode
- Uninterruptible Power Supply
- Induction Heating
- High Speed Rectifiers

### PRODUCT FEATURES

- Ultrafast Recovery Times ( $t_{rr}$ )
- Soft Recovery Characteristics
- Low Forward Voltage
- Low Forward Voltage
- High Blocking Voltage
- Low Leakage Current

### PRODUCT BENEFITS

- Low Losses
- Low Noise Switching
- Cooler Operation
- Higher Reliability Systems
- Increased System Power Density



APT2X101DL40J

### MAXIMUM RATINGS

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

Symbol	Characteristic / Test Conditions	Ratings	Unit
$V_R$	Maximum D.C. Reverse Voltage	400	Volts
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		
$V_{RWM}$	Maximum Working Peak Reverse Voltage		
$I_{F(AV)}$	Maximum Average Forward current ( $T_C = 127^\circ\text{C}$ , Duty Cycle = 0.5)	100	Amps
$I_{F(RMS)}$	RMS Forward Current (Square wave, 50% duty)	204	
$I_{FSM}$	Non-Repetitive Forward Surge Current ( $T_J = 45^\circ\text{C}$ , 8.3 ms)	1000	
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to 175	$^\circ\text{C}$

### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	Min	Typ	Max	Unit	
$V_F$	Forward Voltage		$I_F = 100\text{A}$	1.0	1.125	Volts
			$I_F = 150\text{A}$	1.1		
			$I_F = 200\text{A}$	1.2		
		$I_F = 100\text{A}, T_J = 150^\circ\text{C}$		.95		
$I_{RM}$	Maximum Reverse Leakage Current		$V_R = 400\text{V}$		500	$\mu\text{A}$
			$V_R = 400\text{V}, T_J = 125^\circ\text{C}$		1000	
$C_T$	Junction Capacitance, $V_R = 200\text{V}$		215		pF	
$L_S$	Series Inductance _Lead to Lead 5mm from Base)		10		nH	

**DYNAMIC CHARACTERISTICS**

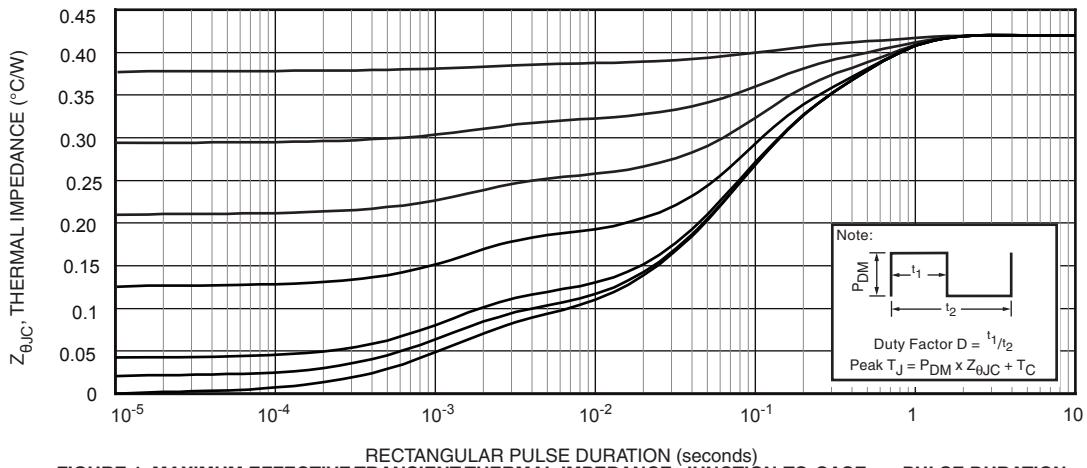
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Symbol	Characteristic / Test Conditions	Min	Typ	Max	Unit
$t_{rr}$	Reverse Recovery Time $I_F = 1A, di_F/dt = -100A/\mu s, V_R = 30V, T_J = 25^\circ C$		40		ns
$t_{rr}$	Reverse Recovery Time		120		
$Q_{rr}$	Reverse Recovery Charge		830		nC
$I_{RRM}$	Maximum Reverse Recovery Current		13		Amps
$t_{rr}$	Reverse Recovery Time		240		ns
$Q_{rr}$	Reverse Recovery Charge		3500		nC
$I_{RRM}$	Maximum Reverse Recovery Current		25		Amps
$t_{rr}$	Reverse Recovery Time		160		ns
$Q_{rr}$	Reverse Recovery Charge		6600		nC
$I_{RRM}$	Maximum Reverse Recovery Current		76		Amps

**THERMAL AND MECHANICAL CHARACTERISTICS**

Symbol	Characteristic / Test Conditions	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction-to-Case Thermal Resistance			0.42	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance			20	
$W_T$	Package Weight		1.03		oz
			29.2		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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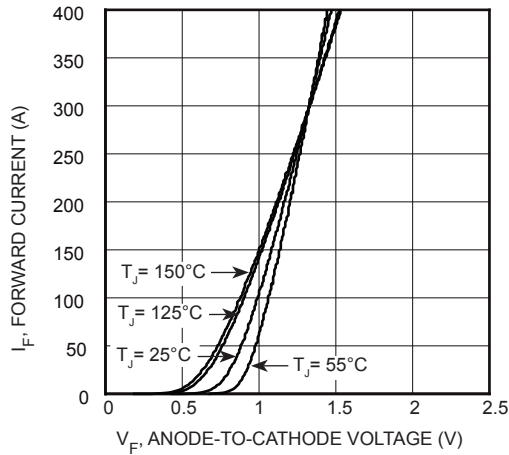


FIGURE 2, Forward Current vs. Forward Voltage

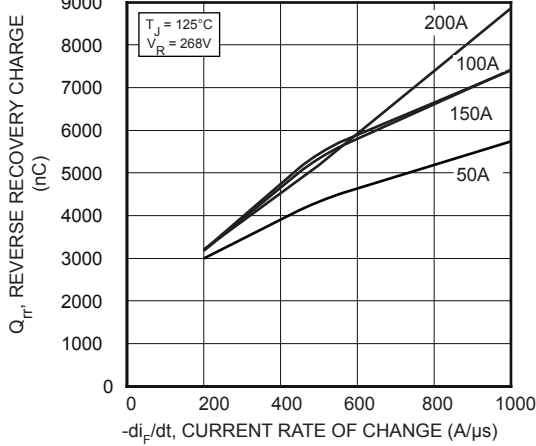


FIGURE 4, Reverse Recovery Charge vs. Current Rate of Change

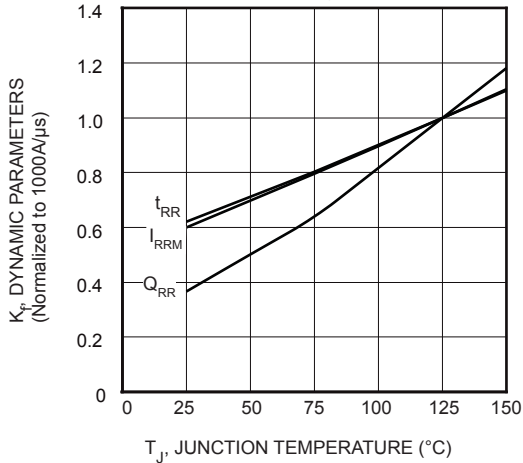


FIGURE 6, Dynamic Parameters vs. Junction Temperature

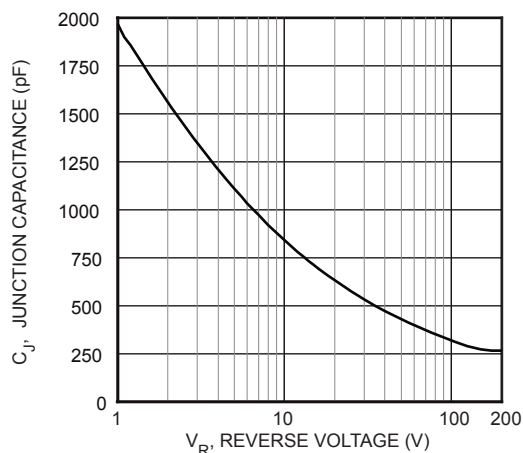


FIGURE 8, Junction Capacitance vs. Reverse Voltage

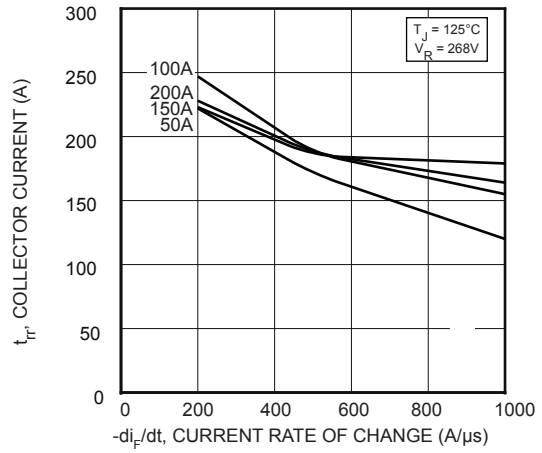


FIGURE 3, Reverse Recovery Time vs. Current Rate of Change

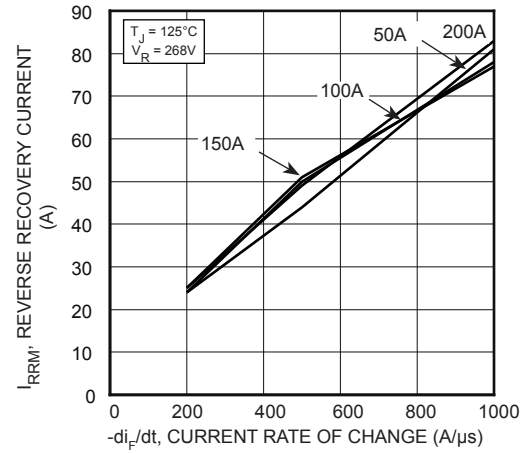


FIGURE 5, Reverse Recovery Current vs. Current Rate of Change

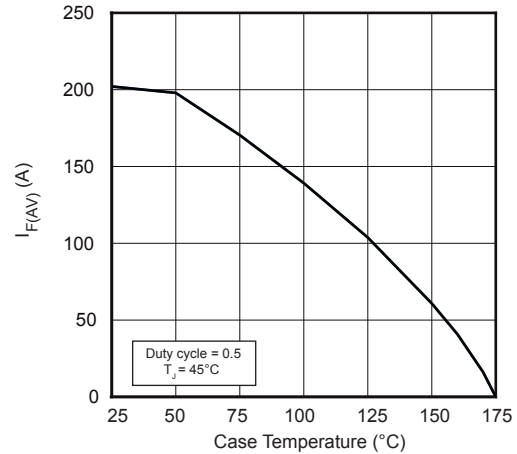


FIGURE 7, Maximum Average Forward Current vs. Case Temperature

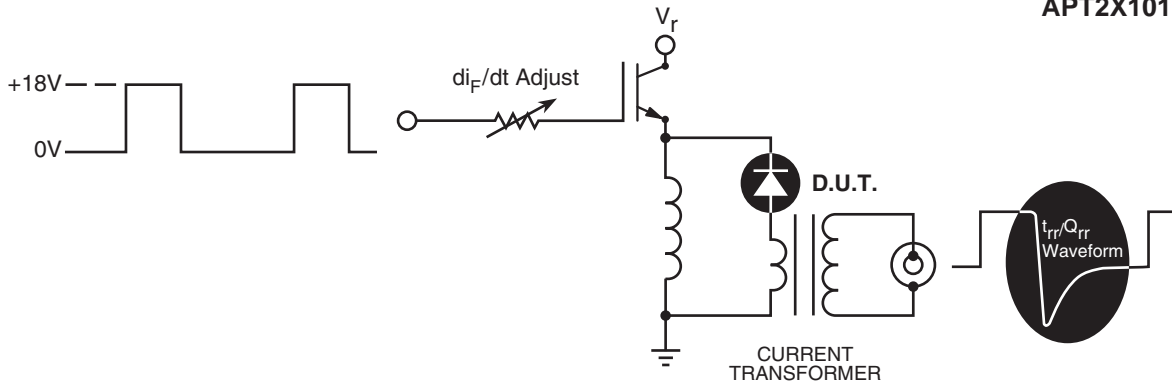


Figure 9. Diode Test Circuit

- 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  $t_{rr}$ .

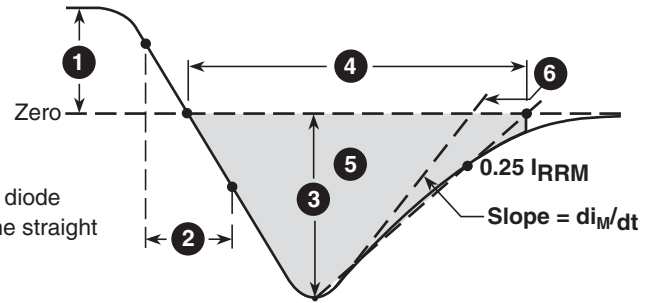
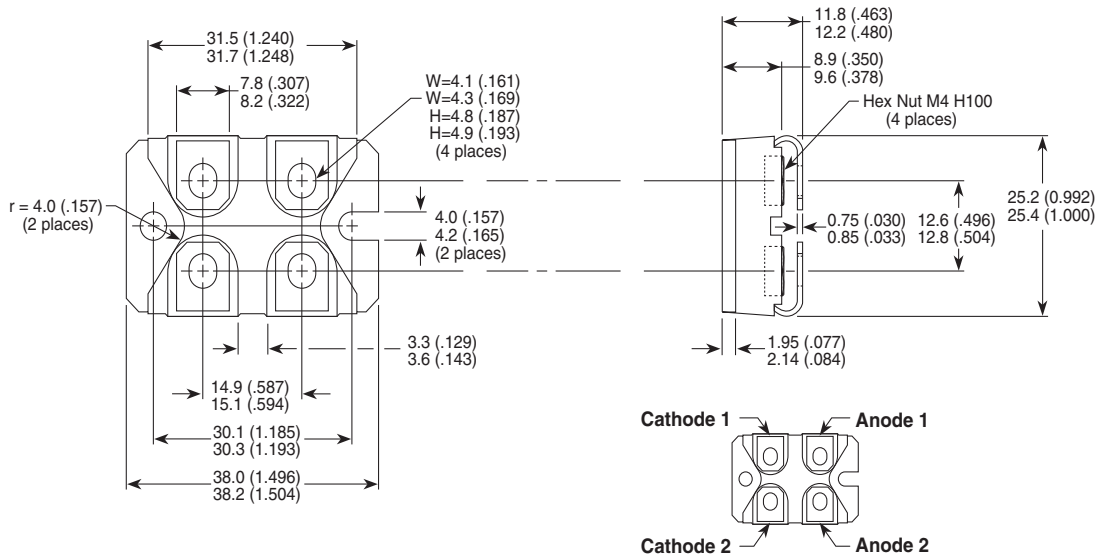


Figure 10, Diode Reverse Recovery Waveform and Definitions

SOT-227 (ISOTOP®) Package Outline



Dimensions in Millimeters and (Inches)