

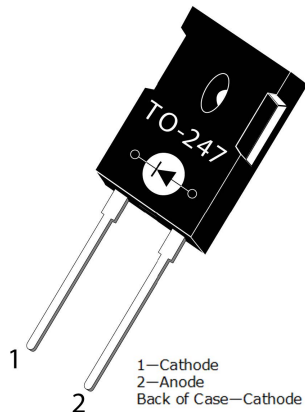
# APT100S20BG High-Voltage Schottky Diode

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## 1 Product Overview

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This section outlines the product overview for the APT100S20BG device.



### 1.1 Features

The following are key features of the APT100S20BG device:

- Low forward voltage
- Low leakage current
- Ultrafast reverse recovery
- Avalanche energy rated
- RoHS compliant

### 1.2 Benefits

The following are benefits of the APT100S20BG device:

- High switching frequency
- Low switching losses
- Low noise (EMI) switching
- Higher reliability systems
- Increased system power density

### 1.3 Applications

The APT100S20BG device is designed for the following applications:

- Power supply and distribution
- Switch-mode power supply
- Inverter, converter, and industrial motor drivers
- High-speed rectifiers

## 2 Device Specifications

This section shows the device specifications for the APT100S20BG device.

### 2.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings for the APT100S20BG device.  $T_J = 25\text{ }^\circ\text{C}$  unless otherwise specified.

**Table 1 • Absolute Maximum Ratings**

Symbol	Parameter	Ratings	Unit
$V_R$	Maximum DC reverse voltage	200	V
$V_{RRM}$	Maximum peak repetitive reverse voltage		
$V_{RWM}$	Maximum working peak reverse voltage		
$I_{F(AV)}$	Maximum average forward current ( $T_c = 125\text{ }^\circ\text{C}$ , duty cycle = 0.5)	120	A
$I_{F(RMS)}$	RMS forward current	318	
$I_{FSM}$	Non-repetitive forward surge current ( $T_J = 45\text{ }^\circ\text{C}$ , 8.3 ms)	1000	
$T_J, T_{STG}$	Operating and storage temperature range	-55 to 150	$^\circ\text{C}$
$T_L$	Lead temperature for 10 seconds	300	

The following table shows the thermal and mechanical characteristics of the APT100S20BG device.

**Table 2 • Thermal and Mechanical Characteristics**

Symbol	Characteristic/Test Conditions	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction-to-case thermal resistance			0.18	$^\circ\text{C}/\text{W}$
$W_t$	Package weight		0.22		oz
			6.2		g
	Maximum mounting torque, 6-32 or M3 screw			10	lbf-in
				1.1	N-m

### 2.2 Electrical Performance

The following table shows the static characteristics of the APT100S20BG device.  $T_J = 25\text{ }^\circ\text{C}$  unless otherwise specified.

**Table 3 • Static Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_F$	Forward voltage	$I_F = 100\text{ A}$		0.89	0.95	V
		$I_F = 200\text{ A}$		1.06		
		$I_F = 100\text{ A}, T_J = 125\text{ }^\circ\text{C}$		0.76		
$I_{RM}$	Maximum reverse leakage current	$V_R = 200\text{ V}$			2	mA
		$V_R = 200\text{ V}, T_J = 125\text{ }^\circ\text{C}$			40	
$C_J$	Junction capacitance	$V_R = 200\text{ V}$		470		pF

The following table shows the dynamic characteristics of the APT100S20BG device.

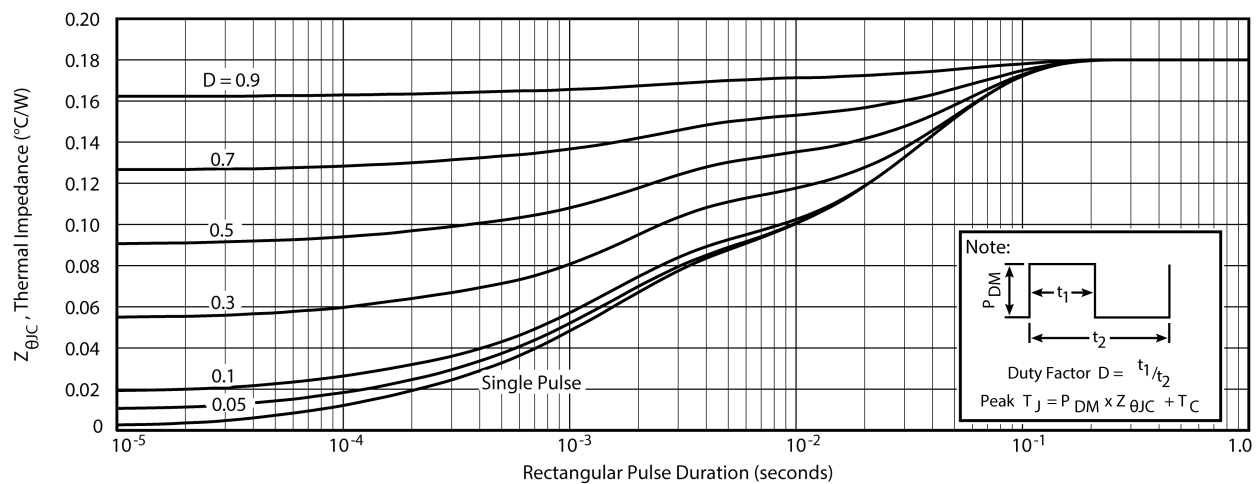
**Table 4 • Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$t_{rr}$	Reverse recovery time	$I_F = 100\text{ A}$		70		ns
$Q_{rr}$	Reverse recovery charge	$di_r/dt = -200\text{ A}/\mu\text{s}$		230		nC
$I_{RRM}$	Maximum reverse recovery current	$V_R = 133\text{ V}$ $T_J = 25\text{ }^\circ\text{C}$		6		A
$t_{rr}$	Reverse recovery time	$I_F = 100\text{ A}$		110		ns
$Q_{rr}$	Reverse recovery charge	$di_r/dt = -200\text{ A}/\mu\text{s}$		690		nC
$I_{RRM}$	Maximum reverse recovery current	$V_R = 133\text{ V}$ $T_J = 125\text{ }^\circ\text{C}$		11		A
$t_{rr}$	Reverse recovery time	$I_F = 100\text{ A}$		95		ns
$Q_{rr}$	Reverse recovery charge	$di_r/dt = -700\text{ A}/\mu\text{s}$		1750		nC
$I_{RRM}$	Maximum reverse recovery current	$V_R = 133\text{ V}$ $T_J = 125\text{ }^\circ\text{C}$		32		A

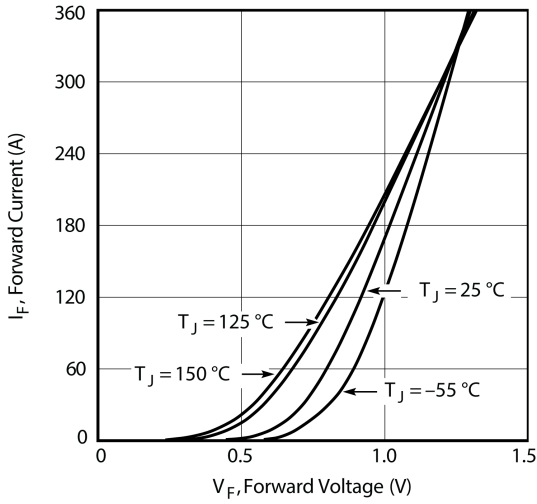
## 2.3 Typical Performance Curves

This section shows the typical performance curves for the APT100S20BG device.

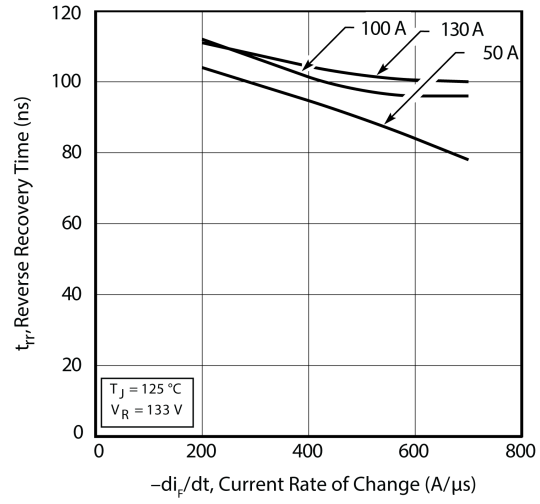
**Figure 1 • Maximum Transient Thermal Impedance**



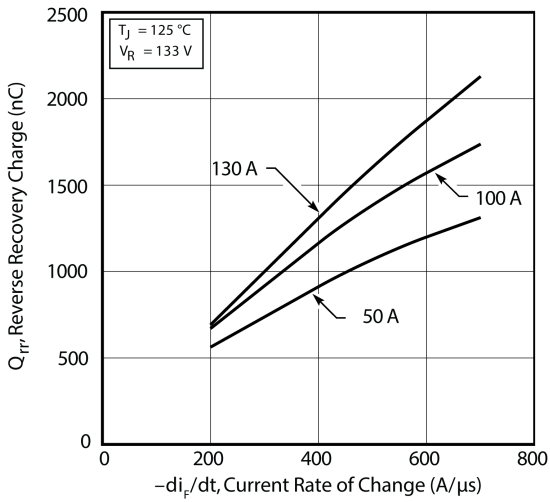
**Figure 2 • Forward Current vs. Forward Voltage (V)**



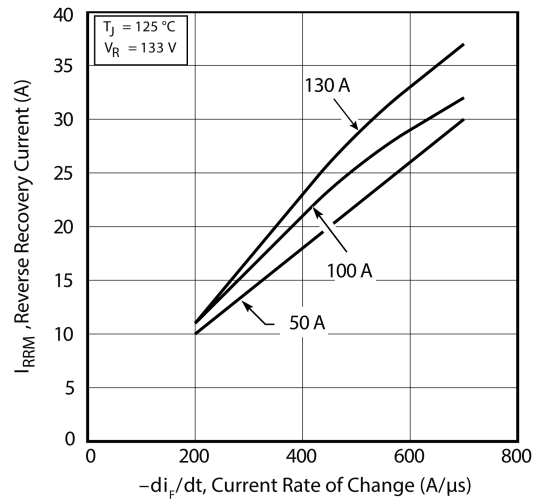
**Figure 3 • RRT vs. Current Rate of Change**



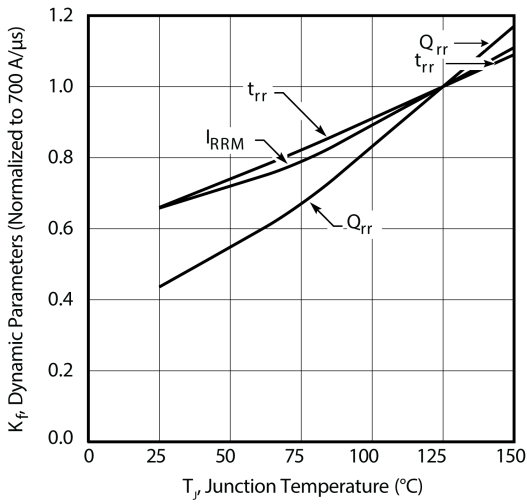
**Figure 4 • Reverse Recovery Charge vs. Current Rate of Change**



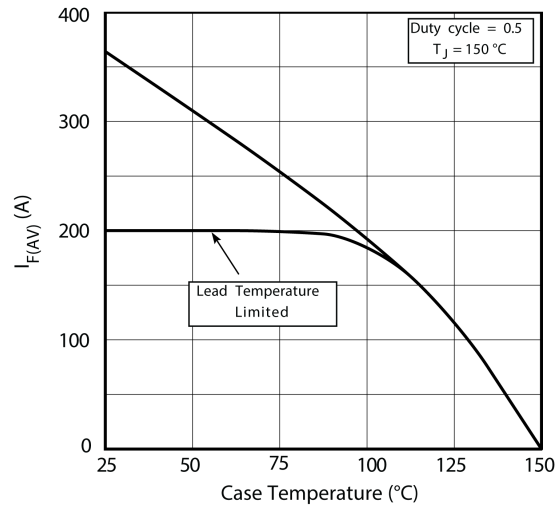
**Figure 5 • Reverse Recovery Current vs. Current Rate of Change**



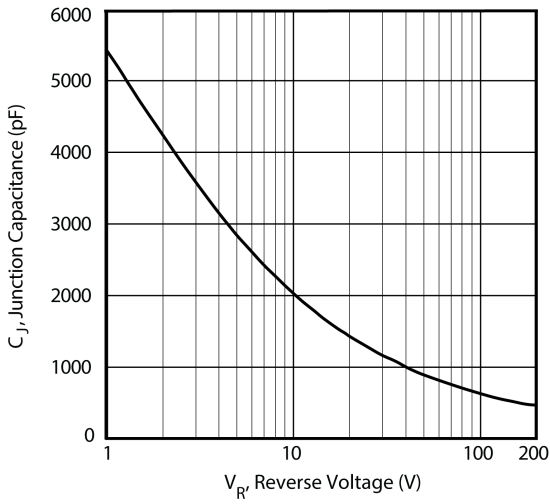
**Figure 6 • Dynamic Parameters vs. Junction Temperature**



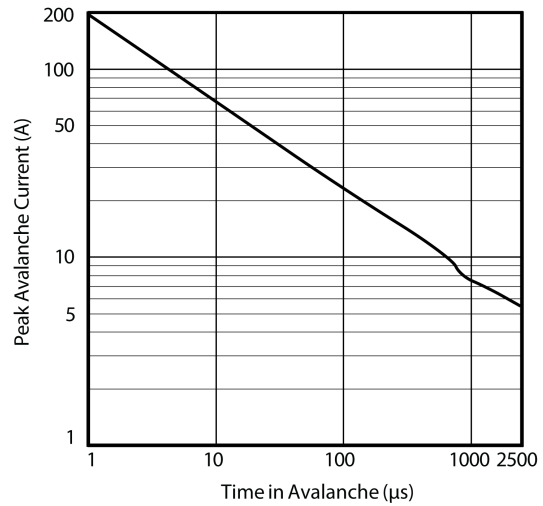
**Figure 7 • Maximum Average Forward Current vs. Case Temperature**



**Figure 8 • Junction Capacitance vs. Reverse Voltage**



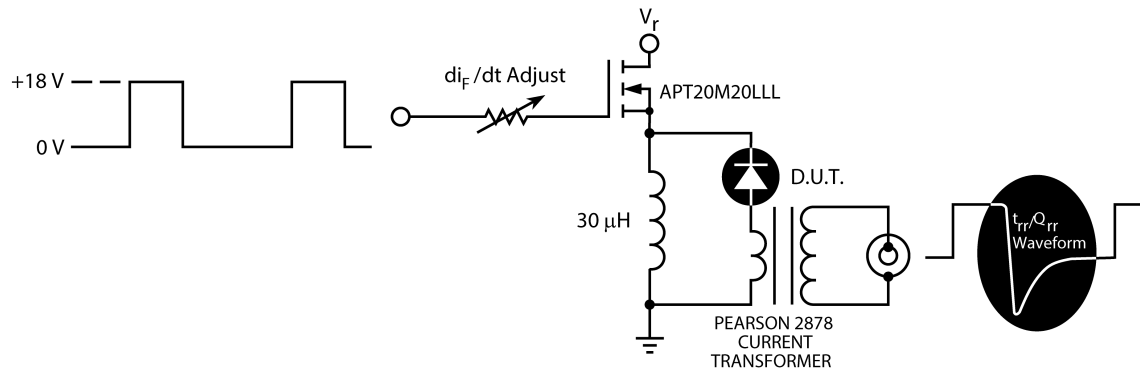
**Figure 9 • Single Pulse UIS SOA**



## 2.4 Reverse Recovery Overview

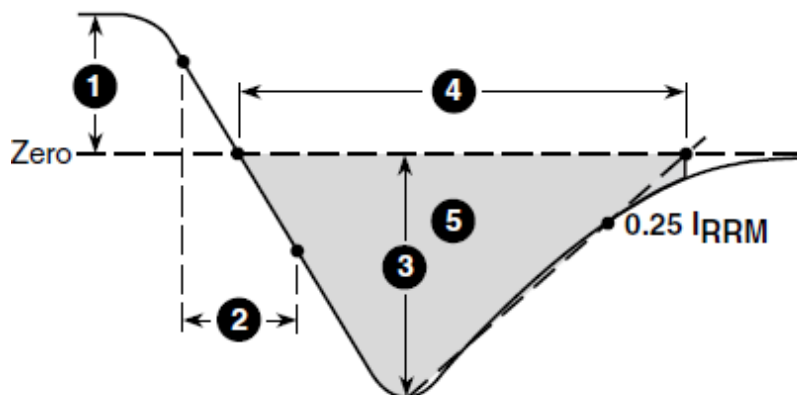
The following illustration shows the diode test circuit for the APT100S20BG device.

Figure 10 • Diode Test Circuit



The following illustration shows the diode reverse recovery waveform and definitions for the APT100S20BG device.

Figure 11 • Diode Reverse Recovery Waveform and Definitions



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  $t_{rr}$

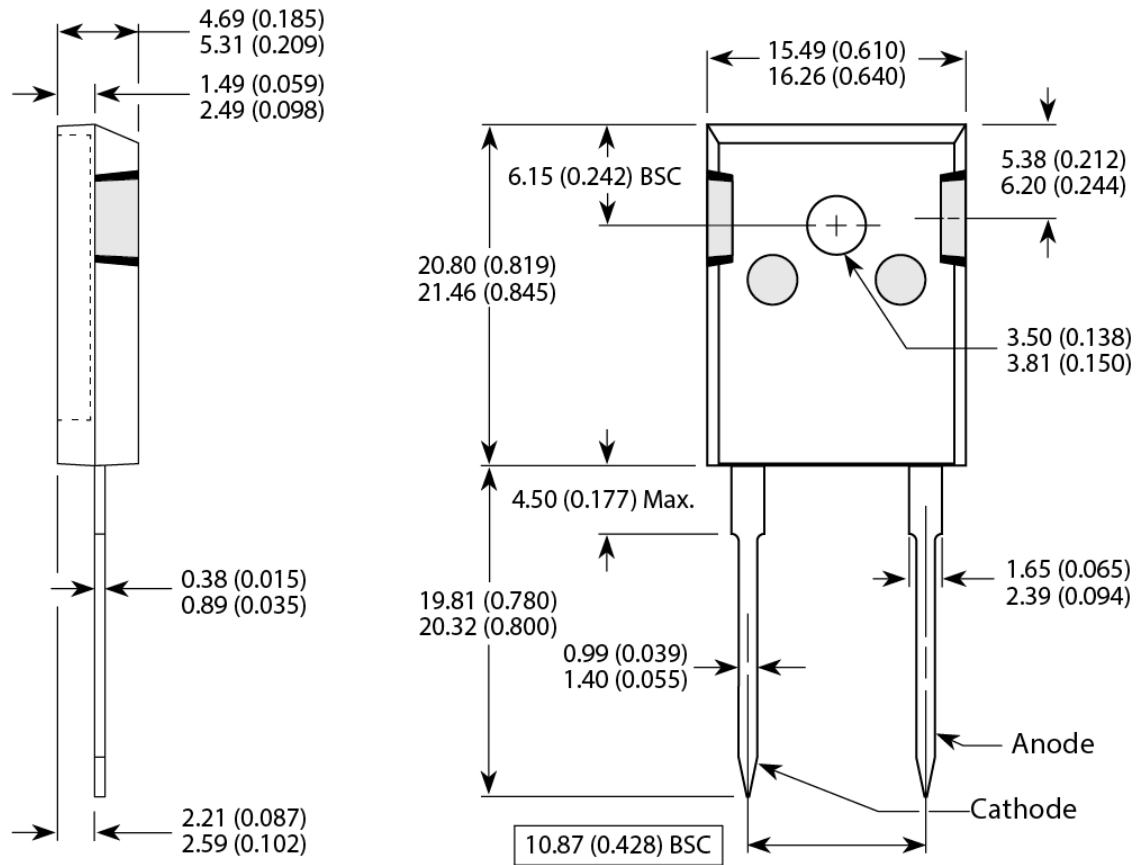
### 3 Package Specification

This section outlines the package specification for the APT100S20BG device.

#### 3.1 Package Outline Drawing

The following figure shows the package outline drawing of the APT100S20BG device. Dimensions are in millimeters and (inches).

**Figure 12 • Package Outline Drawing**



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