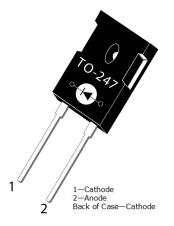


# APT100S20BG High-Voltage Schottky Diode

# **1 Product Overview**

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.  $T_1 = 25$  °C unless otherwise specified.

#### Table 1 • Absolute Maximum Ratings

Symbol	Parameter	Ratings	Unit
VR	Maximum DC reverse voltage	200	V
VRRM	Maximum peak repetitive reverse voltage		
Vrwm	Maximum working peak reverse voltage		
IF(AV)	Maximum average forward current (Tc = 125 °C, duty cycle = 0.5)	120	А
F(RMS)	RMS forward current	318	_
IFSM	Non-repetitive forward surge current (T <sub>J</sub> = 45 °C, 8.3 ms)	1000	
Tı , Tstg	Operating and storage temperature range	–55 to 150	°C
Τι	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	Тур	Max	Unit
Rөлс	Junction-to-case thermal resistance			0.18	°C/W
Wt	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

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The following table shows the static characteristics of the APT100S20BG device. T<sub>J</sub> = 25 °C unless otherwise specified.

### Table 3 • Static Characteristics

Symbol	Characteristic	Test Conditions	Min	Тур	Max	Unit
VF	Forward voltage	IF = 100 A		0.89	0.95	V
		IF = 200 A		1.06		- v
		IF = 100 A, TJ = 125 °C		0.76		-
Irm	Maximum reverse leakage current	V <sub>R</sub> = 200 V			2	mA
		V <sub>R</sub> = 200 V, T <sub>J</sub> = 125 °C			40	-
C	Junction capacitance	V <sub>R</sub> = 200 V		470		pF



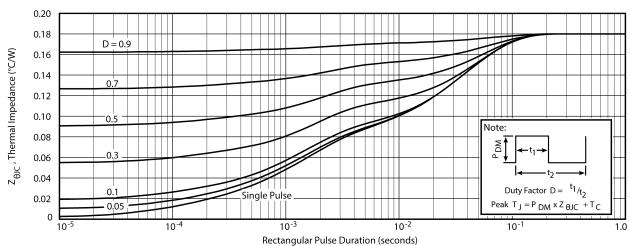
The following table shows the dynamic characteristics of the APT100S20BG device.

Symbol	Characteristic	Test Conditions	Min	Тур	Max	Unit
trr	Reverse recovery time	IF = 100 A		70		ns
Qrr	Reverse recovery charge	dir/dt = -200 A/μs V <sub>R</sub> = 133 V		230		nC
Irrm	Maximum reverse recovery current	T <sub>J</sub> = 25 °C		6		А
trr	Reverse recovery time	IF = 100 A		110		ns
Qrr	Reverse recovery charge	di⊧/dt = −200 A/µs V <sub>R</sub> = 133 V		690		nC
Irrm	Maximum reverse recovery current	TJ = 125 °C		11		А
trr	Reverse recovery time	IF = 100 A		95		ns
Qrr	Reverse recovery charge	di⊧/dt = −700 A/μs V <sub>R</sub> = 133 V		1750		nC
IRRM	Maximum reverse recovery current	VR = 135 V TJ = 125 °C		32		А

### Table 4 • Dynamic Characteristics

# 2.3 Typical Performance Curves

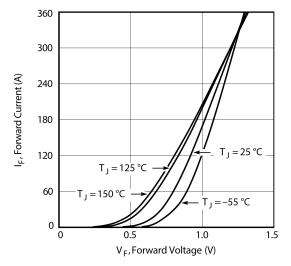
This section shows the typical performance curves for the APT100S20BG device.



### Figure 1 • Maximum Transient Thermal Impedance



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





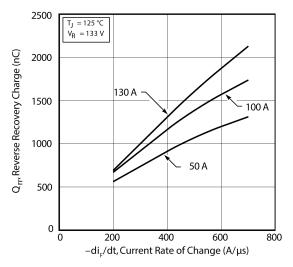


Figure 3 • RRT vs. Current Rate of Change

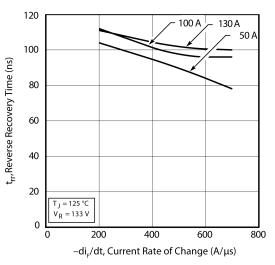
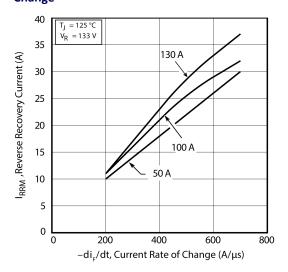
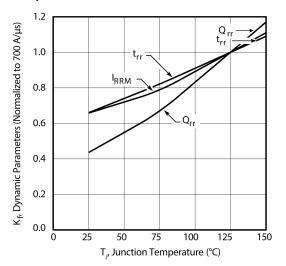


Figure 5 • Reverse Recovery Current vs. Current Rate of Change

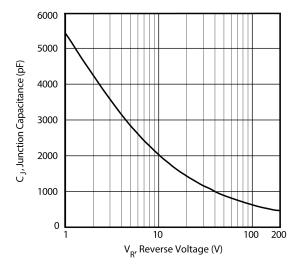




# Figure 6 • Dynamic Parameters vs. Junction Temperature









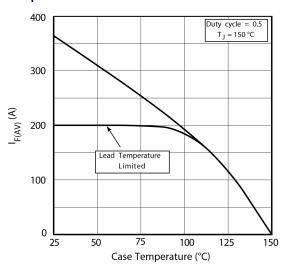
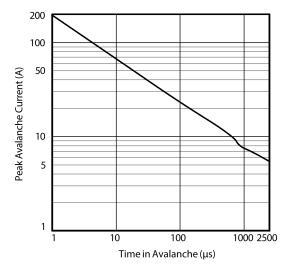


Figure 9 • Single Pulse UIS SOA

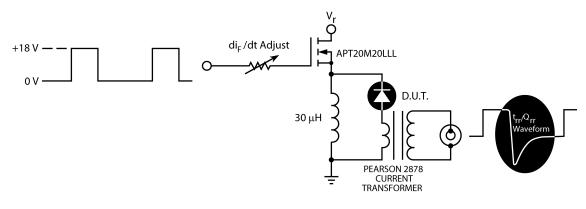




### 2.4 Reverse Recovery Overview

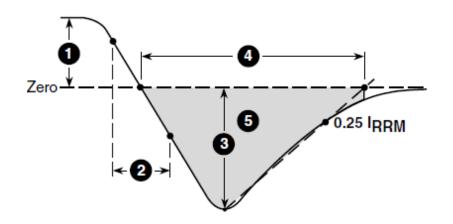
The following illustration shows the diode test circuit for the APT100S20BG device.

#### 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. IF-Forward conduction current
- 2. di<sub>F</sub>/dt—Rate of diode current change through zero crossing
- 3. IRRM—Maximum reverse recovery current
- 4. trr—Reverse recovery time, measured from zero crossing where diode current goes from positive to negative, to the point at which the straight line through IRRM and 0.25•IRRM passes through zero
- 5.  $Q_{rr}$ —Area under the curve defined by IRRM and  $t_{rr}$



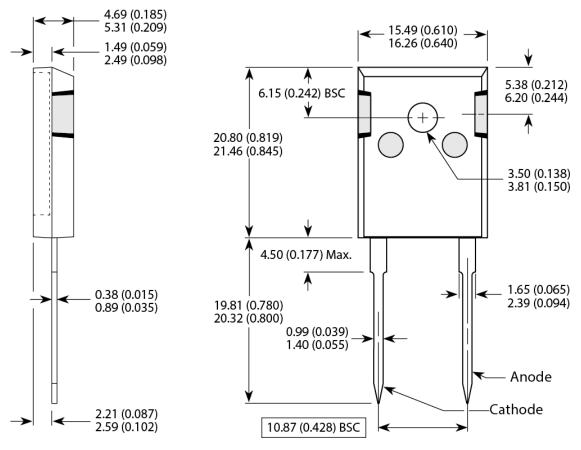
# 3 Package Specification

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).









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