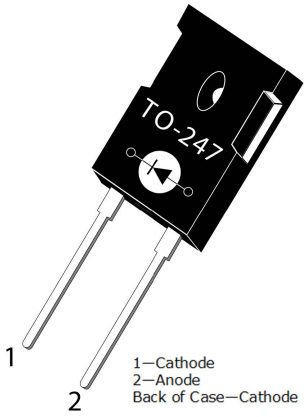
APT100S20BG High-Voltage Schottky Diode

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_J = 25 °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 °C, duty cycle = 0.5)	120	A
$I_{F(RMS)}$	RMS forward current	318	
I_{FSM}	Non-repetitive forward surge current (T_J = 45 °C, 8.3 ms)	1000	
T_J , T_{STG}	Operating and storage temperature range	–55 to 150	°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	°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

The following table shows the static characteristics of the APT100S20BG device. T_J = 25 °C unless otherwise specified.

Table 3 • Static Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_F	Forward voltage	I_F = 100 A		0.89	0.95	V
		I_F = 200 A		1.06		
		I_F = 100 A, T_J = 125 °C		0.76		
I_{RM}	Maximum reverse leakage current	V_R = 200 V			2	mA
		V_R = 200 V, T_J = 125 °C			40	
C_J	Junction capacitance	V_R = 200 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 A di_F/dt = –200 A/µs V_R = 133 V T_J = 25 °C		70		ns
Q_{rr}	Reverse recovery charge			230		nC
I_{RRM}	Maximum reverse recovery current			6		A
t_{rr}	Reverse recovery time	I_F = 100 A di_F/dt = –200 A/µs V_R = 133 V T_J = 125 °C		110		ns
Q_{rr}	Reverse recovery charge			690		nC
I_{RRM}	Maximum reverse recovery current			11		A
t_{rr}	Reverse recovery time	I_F = 100 A di_F/dt = –700 A/µs V_R = 133 V T_J = 125 °C		95		ns
Q_{rr}	Reverse recovery charge			1750		nC
I_{RRM}	Maximum reverse recovery current			32		A

2.3 Typical Performance Curves

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

Figure 1 • Maximum Transient Thermal Impedance

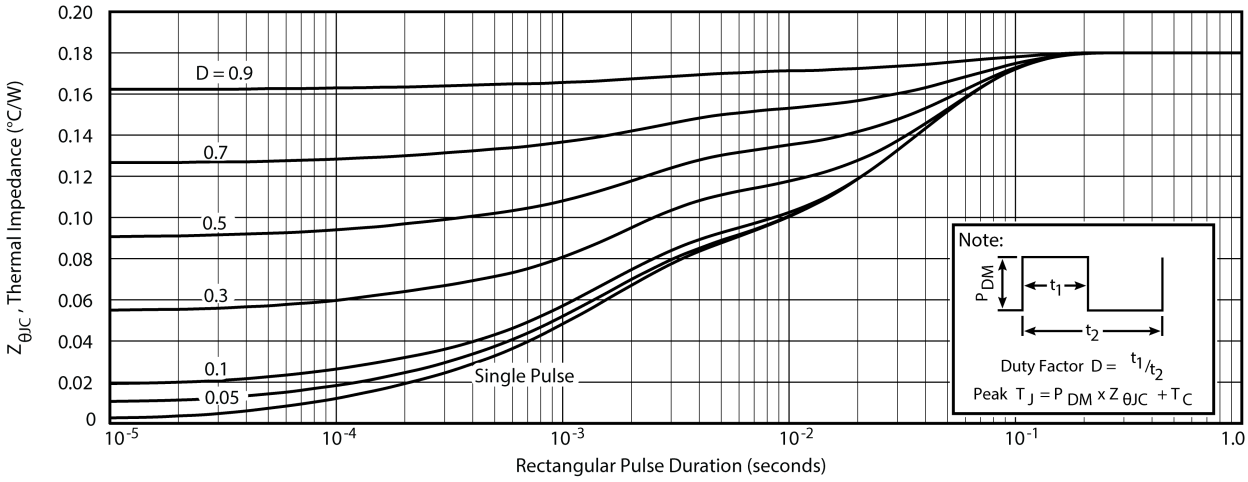


Figure 2 • Forward Current vs. Forward Voltage (V)

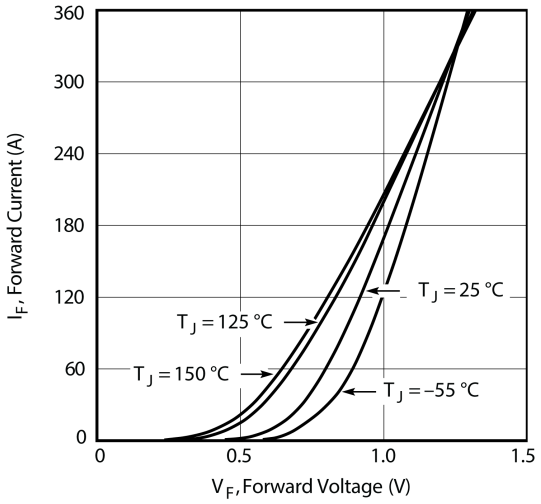


Figure 3 • RRT vs. Current Rate of Change

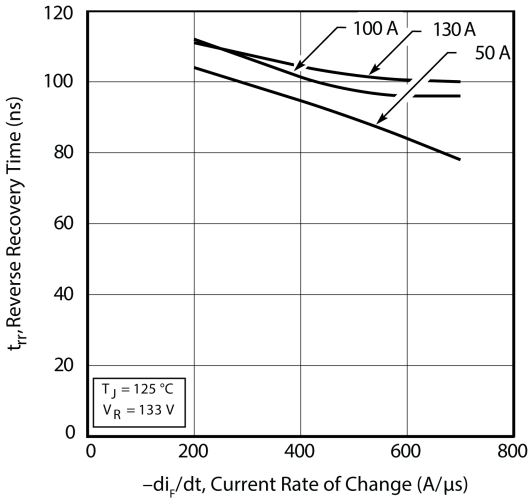


Figure 4 • Reverse Recovery Charge vs. Current Rate of Change

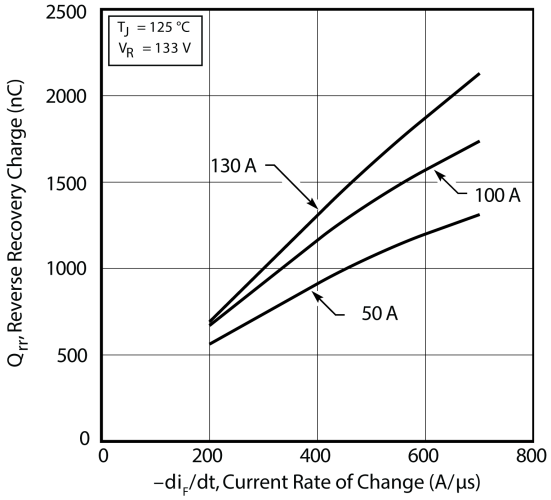


Figure 5 • Reverse Recovery Current vs. Current Rate of Change

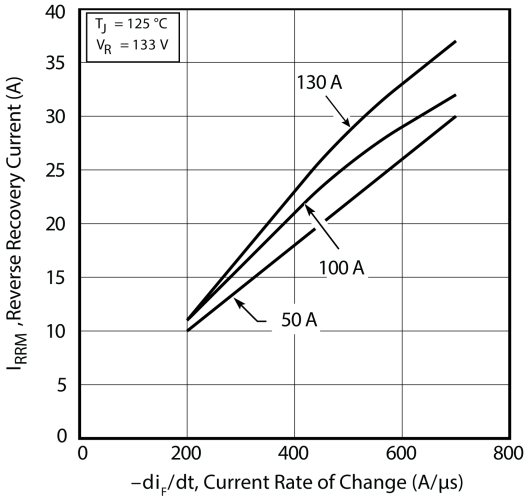


Figure 6 • Dynamic Parameters vs. Junction Temperature

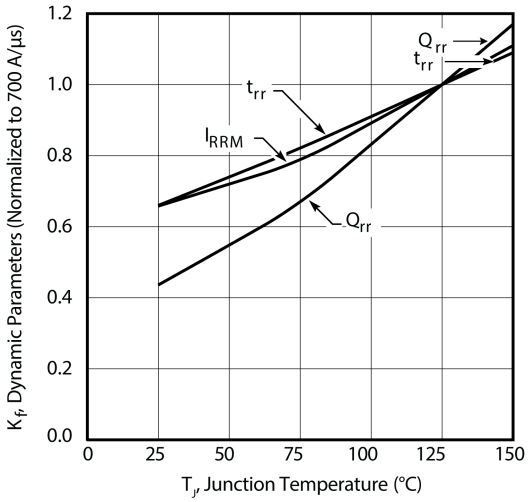


Figure 7 • Maximum Average Forward Current vs. Case Temperature

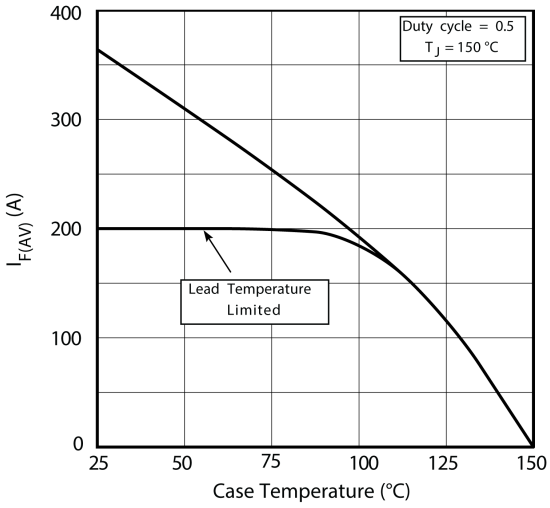


Figure 8 • Junction Capacitance vs. Reverse Voltage

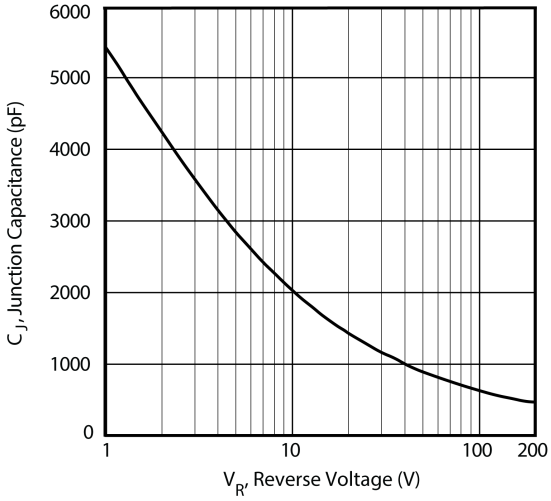
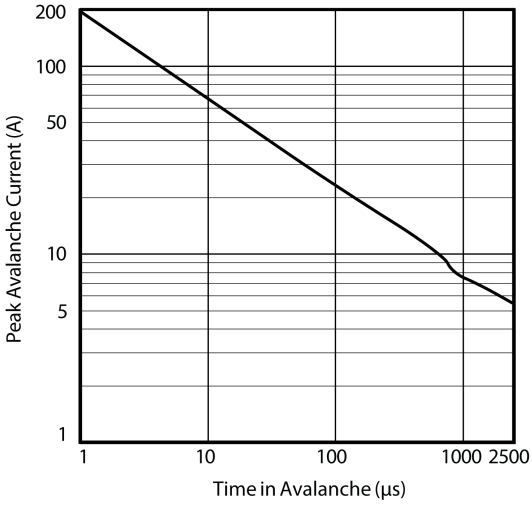


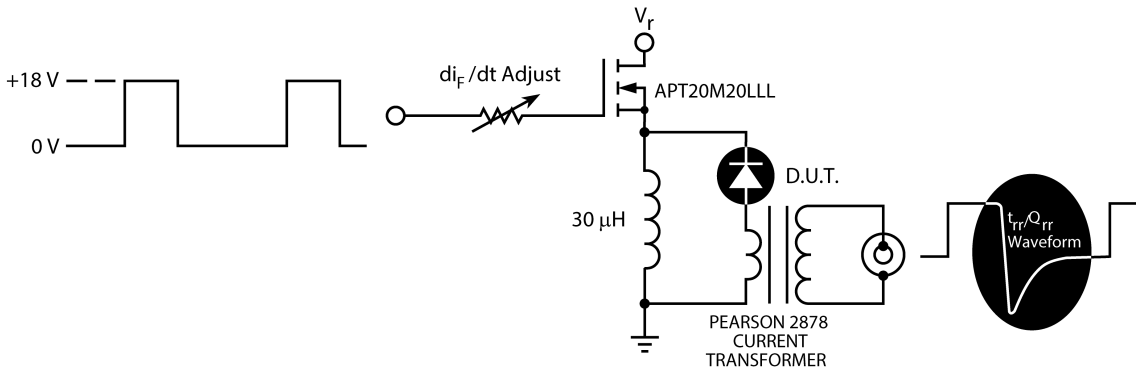
Figure 9 • Single Pulse UIS SOA



2.4 Reverse Recovery Overview

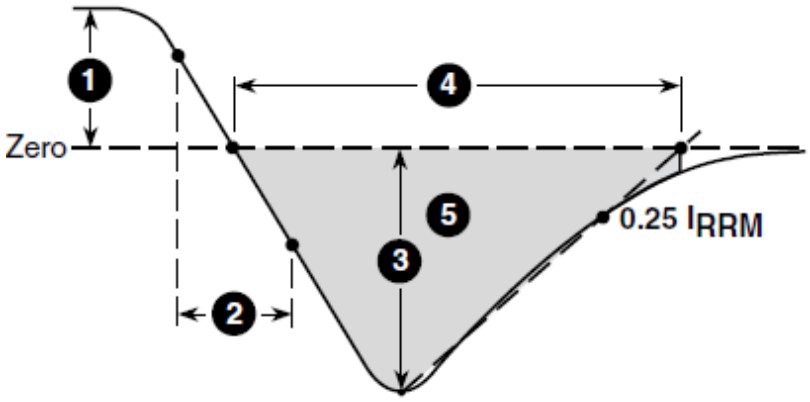
The following illustration shows the diode test circuit for the APT100S20BG device.

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•I_{RRM} passes through zero
5. Q_{rr}—Area under the curve defined by I_{RRM} and t_{rr}

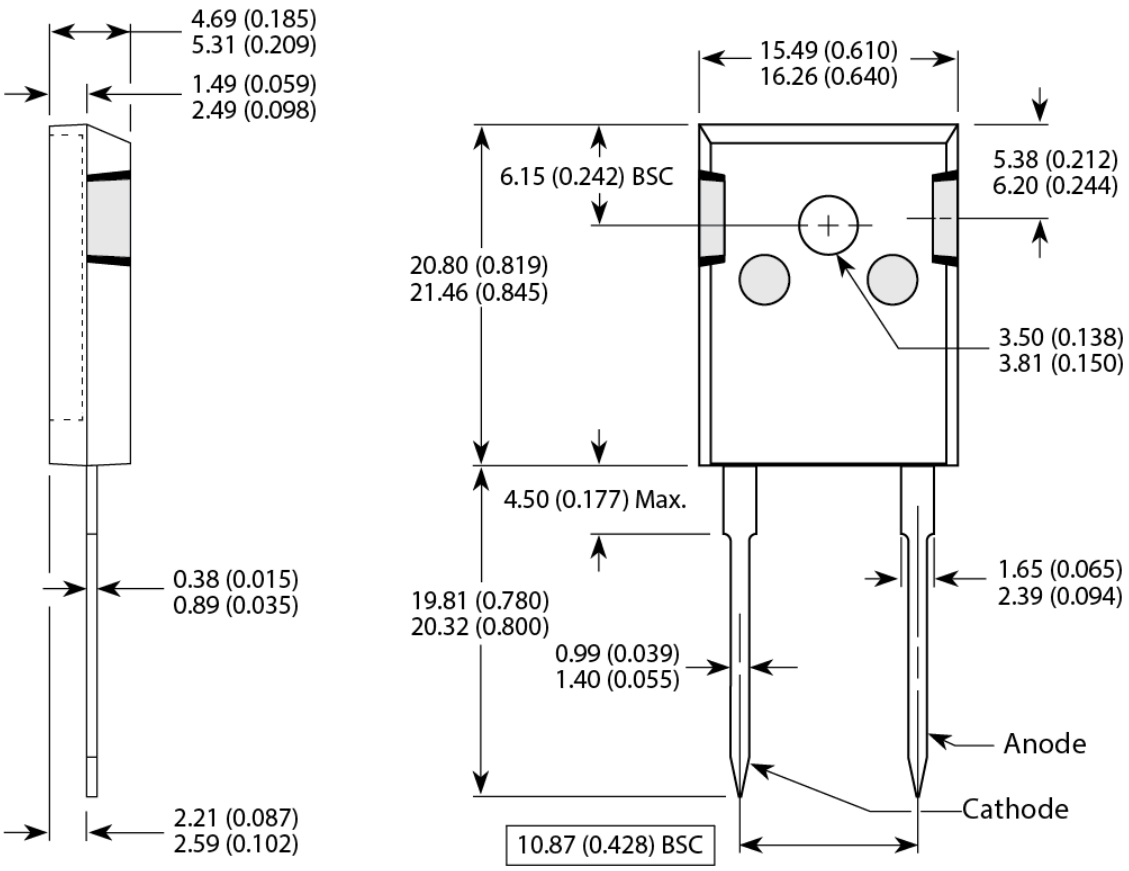
3 Package Specification

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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