Device Specifications

This section shows the specifications of the APT30DQ120KG device.

Absolute Maximum Ratings

The following table shows the absolute maximum ratings of the APT30DQ120KG device. T_C = 25 °C unless otherwise specified.

Table 1 • Absolute Maximum Ratings

Symbol	Parameter	Ratings	Unit
V_R	Maximum DC reverse voltage	1200	V
V_{RRM}	Maximum peak repetitive reverse voltage		
V_{RWM}	Maximum working peak reverse voltage		
$I_{F(AV)}$	Maximum average forward current (T_C = 103 °C, duty cycle = 0.5)	30	A
I_{FSM}	Non-repetitive forward surge current (T_J = 45 °C, 8.3 ms)	210	
E_{AVL}	Avalanche energy (1 A, 40 mH)	20	mJ

The following table shows the thermal and mechanical characteristics of the APT30DQ120KG device.

Table 2 • Thermal and Mechanical Characteristics

Symbol	Characteristic/Test Conditions	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction-to-case thermal resistance			0.80	°C/W
T_J , T_{STG}	Operating and storage temperature range	–55		175	°C
T_L	Lead temperature for 10 seconds			300	
Wt	Package weight		0.07		oz
			1.9		g
	Mounting torque, 6-32 or M3 screw			10	lbf•in
				1.1	N•m

Electrical Performance

The following table shows the static characteristics of the APT30DQ120KG 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 = 30 A		2.8	3.3	V
		I_F = 60 A		3.4		
		I_F = 30 A, T_J = 125 °C		2.1		
I_{RM}	Maximum reverse leakage current	V_R = 1200 V			100	µA
		V_R = 1200 V, T_J = 125 °C			500	
C_J	Junction capacitance	V_R = 200 V		36		pF

The following table shows the dynamic characteristics of the APT30DQ120KG device.

Table 4 • Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	I_F = 1 A, di_F/dt = –100 A/µs V_R = 30 V		26		ns
t_{rr}	Reverse recovery time	I_F = 30 A, di_F/dt = –200 A/µs V_R = 800 V		320		
Q_{rr}	Reverse recovery charge			545		nC
I_{RRM}	Maximum reverse recovery current			4		A
t_{rr}	Reverse recovery time	I_F = 30 A, di_F/dt = –200 A/µs V_R = 800 V, T_J = 125 °C		435		ns
Q_{rr}	Reverse recovery charge			2100		nC
I_{RRM}	Maximum reverse recovery current			9		A
t_{rr}	Reverse recovery time	I_F = 30 A, di_F/dt = –1000 A/µs V_R = 800 V, T_J = 125 °C		180		ns
Q_{rr}	Reverse recovery charge			2975		nC
I_{RRM}	Maximum reverse recovery current			28		A

Typical Performance Curves

This section shows the typical performance curves of the APT30DQ120KG device.

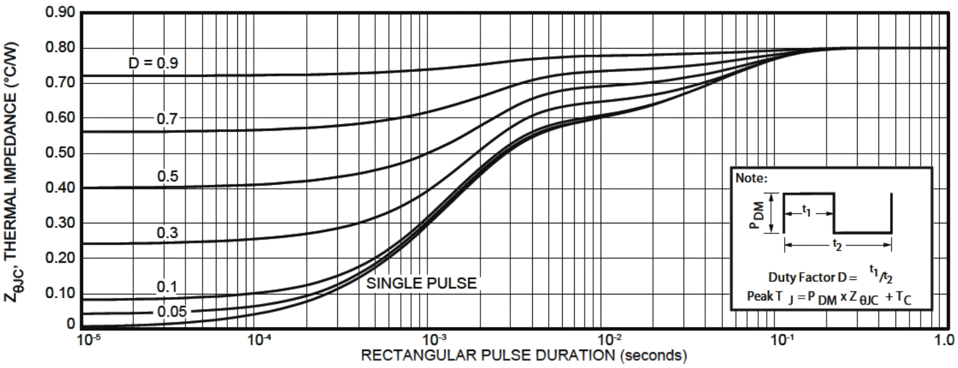

Figure 1 • Maximum Transient Thermal Impedance

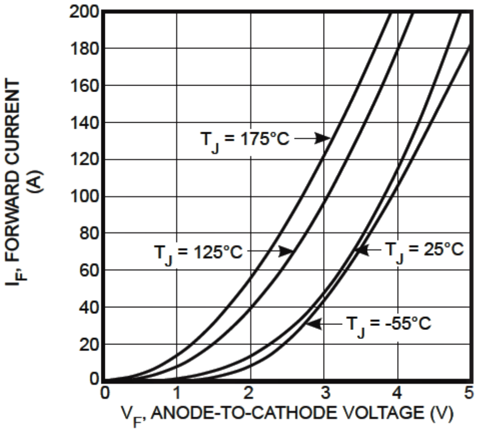

Figure 2 • Forward Current vs. Forward Voltage

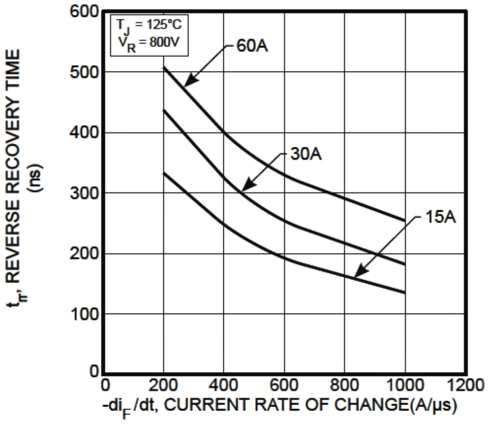

Figure 3 • Reverse Recovery Time vs. Current Rate of Change

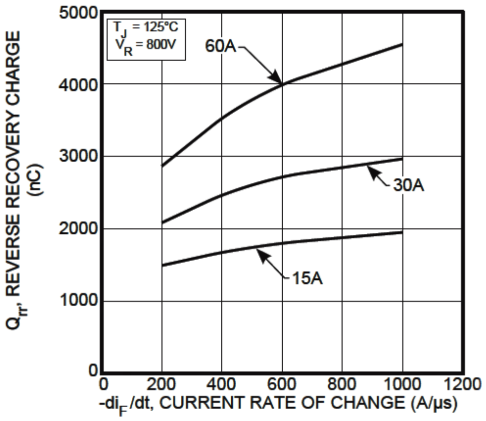

Figure 4 • Reverse Recovery Charge vs. Current Rate of Change

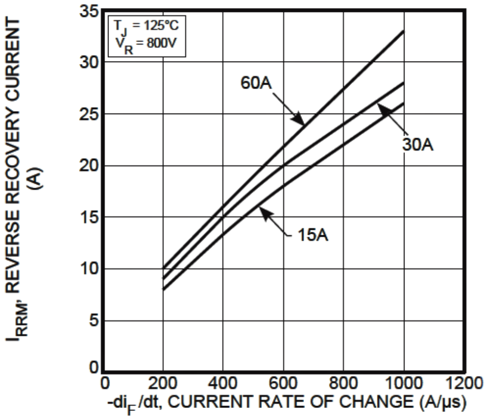

Figure 5 • Reverse Recovery Current vs. Current Rate of Change

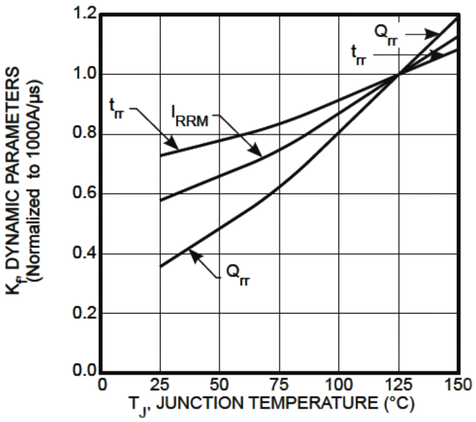

Figure 6 • Dynamic Parameters vs. Junction Temperature

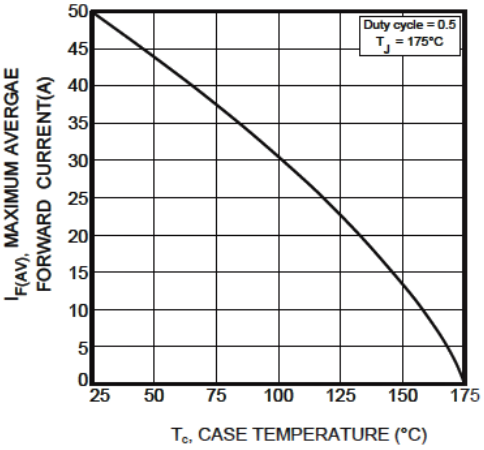

Figure 7 • Maximum Average Forward Current vs. Case Temperature

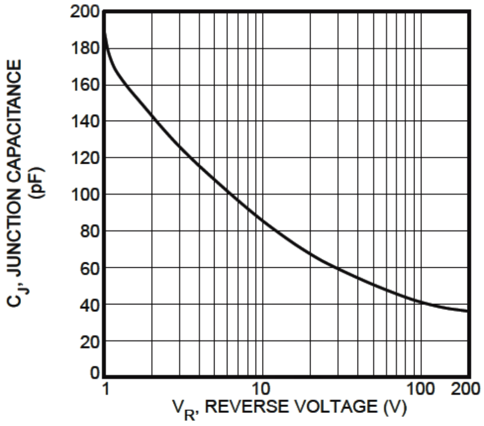

Figure 8 • Junction Capacitance vs. Reverse Voltage

Reverse Recovery Overview

The following figure illustrates the diode test circuit of the APT30DQ120KG device.

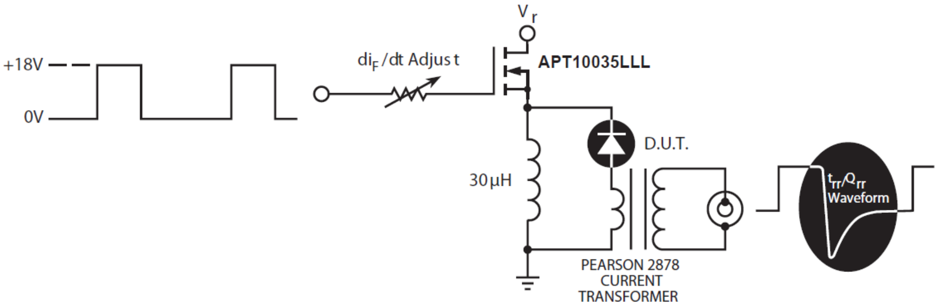

Figure 9 • Diode Test Circuit

The following figure illustrates the diode reverse recovery waveform and definitions of the APT30DQ120KG device.

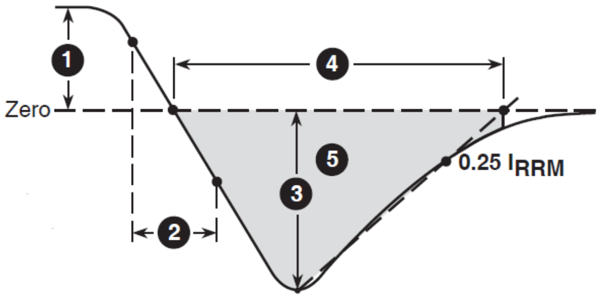

Figure 10 • Diode Reverse Recovery Waveform and Definitions

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 $0.25 \bullet I_{RRM}$ passes through zero
5. Q_{rr} — Area under the curve defined by I_{RRM} and t_{rr}

Package Specification

This section shows the package specification of the APT30DQ120KG device.

Package Outline Drawing

The following figure illustrates the TO-220 package outline of the APT30DQ120KG device.

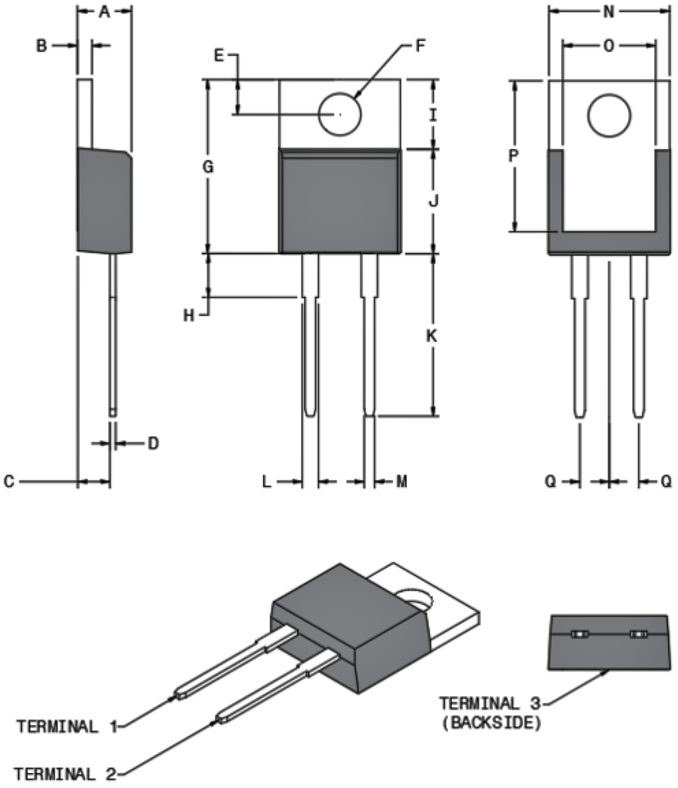

Figure 11 • Package Outline Drawing

The following table shows the TO-220 dimensions and should be used in conjunction with the package outline drawing.

Table 5 • TO-220 Dimensions

Symbol	Min	Max	Min	Max
	(mm)		(Inch)	
A	4.32	4.57	0.170	0.180
B	1.14	1.40	0.045	0.055
C	2.50	2.74	0.098	0.108
D	0.36	0.53	0.014	0.021

Symbol	Min	Max	Min	Max
	(mm)		(Inch)	
E	2.65	3.05	0.104	0.120
F	3.60	3.96	0.142	0.156
G	14.50	15.60	0.571	0.614
H	2.39	3.65	0.094	0.144
I	6.00	6.80	0.236	0.268
J	8.40	9.00	0.331	0.354
K	13.00	14.00	0.512	0.551
L	1.23	1.39	0.048	0.055
M	0.69	0.88	0.027	0.035
N	10.00	10.36	0.394	0.408
O	7.57	7.90	0.298	0.311
P	12.20	13.10	0.480	0.516
Q	2.54 BSC		0.100 BSC	
Terminal 1	CATHODE			
Terminal 2	ANODE			
Terminal 3	CATHODE			

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