APT30D120SG

Datasheet

Ultrafast Soft Recovery Rectifier Diode

Final

March 2018

Microsemi

Power Matters.™

Contents

1 Revision History

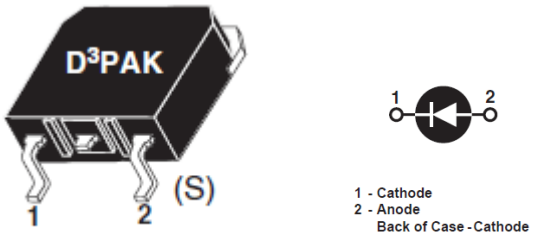
The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

1.1 Revision A

Revision A was published in March 2018. It is the first publication of this document.

2 Product Overview

This section outlines the product overview for the APT30D120SG device.



2.1 Features

The following are key features of the APT30D120SG device:

- Ultrafast recovery times
- Soft recovery characteristics
- Low forward voltage
- Low leakage current
- RoHS compliant

2.2 Benefits

The following are benefits of the APT30D120SG device:

- Low switching losses
- Low noise (EMI) switching
- Cooler operation
- Higher reliability systems
- Increased system power density

2.3 Applications

The APT30D120SG device is designed for the following applications:

- Power factor correction (PFC)
- Anti-parallel diode
  - Switchmode power supply
  - Inverters
- Freewheeling diode
  - Motor controllers
  - Converters
  - Inverters
- Snubber diode

3 Electrical Specifications

This section details the electrical specifications for the APT30D120SG device.

3.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings for the APT30D120SG device.

All Ratings: 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	1200	
V_{RWM}	Maximum working peak reverse voltage	1200	
$I_{F(AV)}$	Maximum average forward current (TC= 128 °C, duty cycle = 0.5)	30	A
$I_{F(RMS)}$	RMS forward current	59	
I_{FSM}	Non-repetitive forward surge current (T_J = 45 °C, 8.3 ms)	210	
T_J, T_{STG}	Operating and storage temperature range	-55 to 175	°C
T_L	Lead temperature for 10 s	300	

3.2 Typical Electrical Performance

The following table shows the static electrical characteristics of the APT30D120SG device.

Table 2 • Static Electrical Characteristics

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	Unit
V_F	Forward voltage	I_F = 30 A		2.0	2.5	V
		I_F = 60 A		2.3		
		I_F = 30 A, T_J = 125 °C		1.8		
I_{RM}	Maximum reverse leakage current	V_R = V_R rated			250	µA
		V_R = V_R rated, T_J = 125 °C			500	
C_T	Junction capacitance	V_R = 200 V		32		pF

The following table shows the dynamic characteristics of the APT30D120SG device.

Table 3 • 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 T_J = 25 °C		31		ns
t_{rr}	Reverse recovery time	I_F = 30 A di_F/dt = –200 A/µs V_R = 800 V T_C = 25 °C		370		
Q_{rr}	Reverse recovery charge			660		nC
I_{RRM}	Maximum reverse recovery current			5		A
t_{rr}	Reverse recovery time	I_F = 30 A di_F/dt = –200 A/µs V_R = 800 V T_C = 125 °C		500		ns
Q_{rr}	Reverse recovery charge			3450		nC
I_{RRM}	Maximum reverse recovery current			12		A
t_{rr}	Reverse recovery time	I_F = 30 A di_F/dt = –1000 A/µs V_R = 800 V T_C = 125 °C		220		ns
Q_{rr}	Reverse recovery charge			4650		nC
I_{RRM}	Maximum reverse recovery current			37		A

The following table shows the thermal and mechanical characteristics of the APT30D120SG device.

Table 4 • Thermal and Mechanical Characteristics

Symbol	Characteristic/Test Conditions	MIN	TYP	MAX	Unit
$R_{\theta JC}$	Junction-to-case thermal resistance			0.61	°C/W
$R_{\theta JA}$	Junction-to-ambient thermal resistance			40	
W_T	Package weight		0.14		oz
			4.0		g

3.3 Typical Performance Curves

This section shows the typical performance curves for the APT30D120SG device.

Figure 1 • Maximum Effective Thermal Impedance, Junction-to-Case vs. Pulse Duration

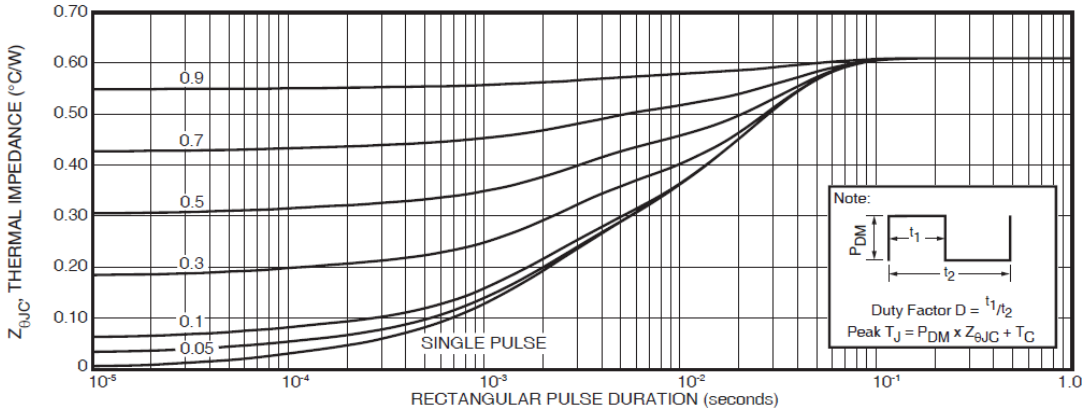


Figure 2 • Transient Thermal Impedance Model

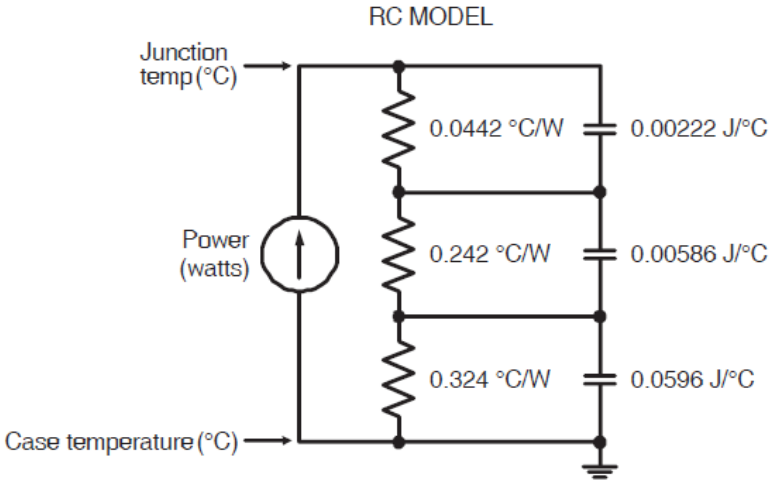


Figure 3 • Forward Current vs. Forward Voltage

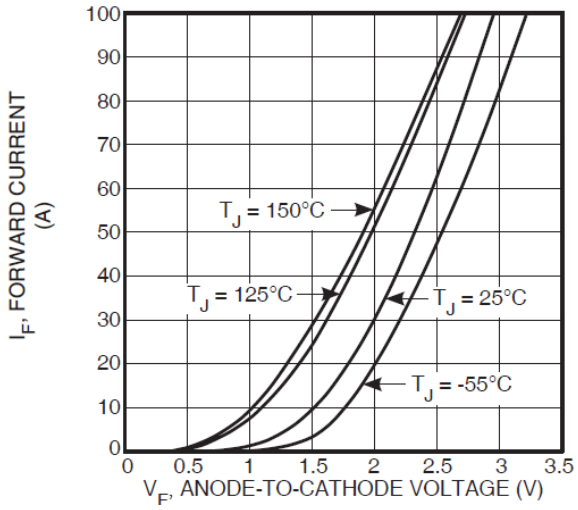


Figure 4 • trr vs. Current Rate of Change

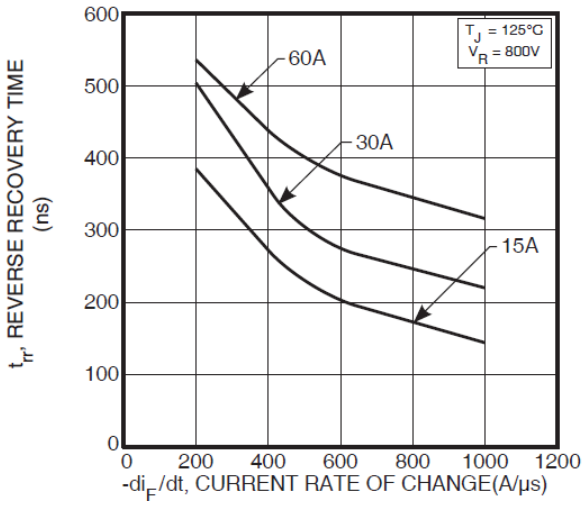


Figure 5 • Qrr vs. Current Rate of Change

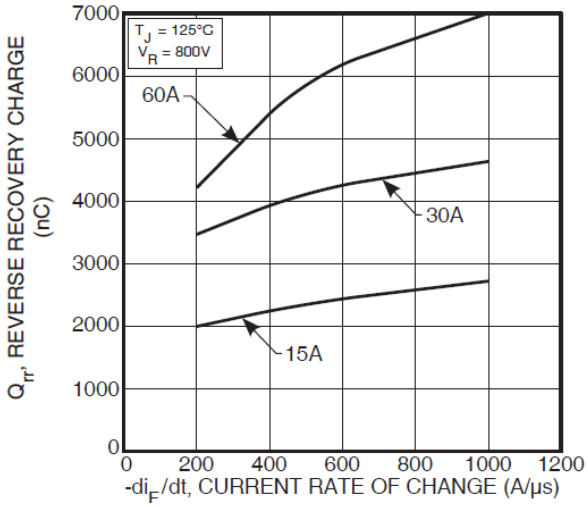


Figure 6 • Irrm vs. Current Rate of Change

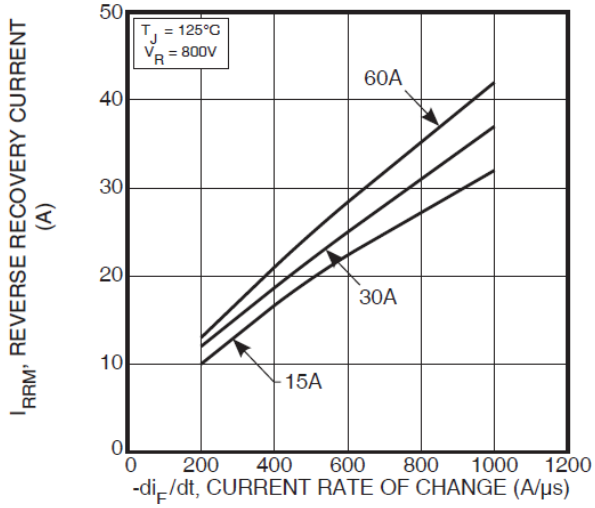


Figure 7 • Dynamic Parameters vs. Junc Temp

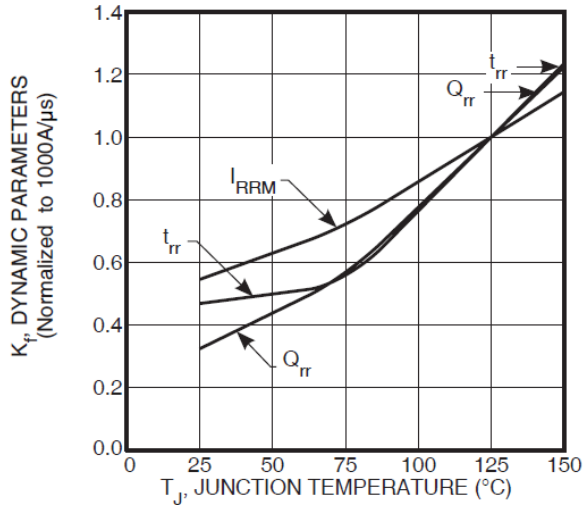


Figure 8 • Max Avg Forward Current vs. Case Temp

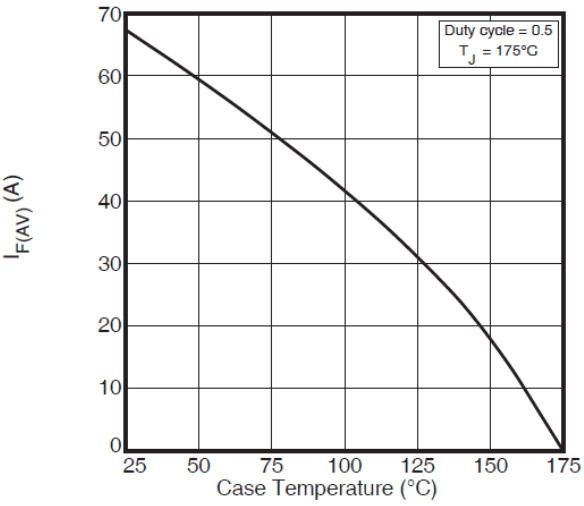
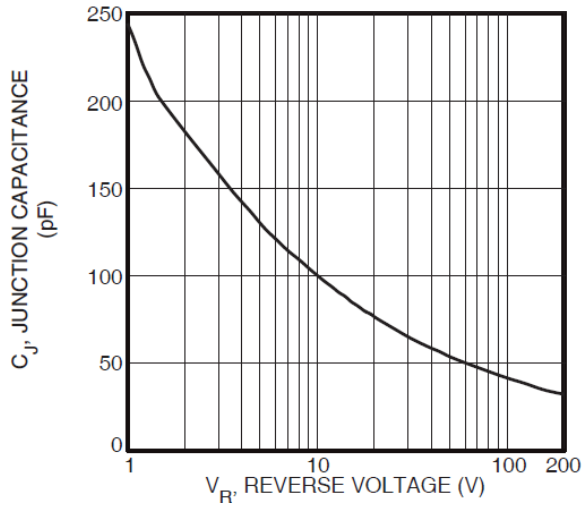


Figure 9 • Junction Capacitance vs. Reverse Voltage



3.4 Reverse Recovery Overview

The following illustration shows the reverse recovery testing and measurement information for the APT30D120SG device.

Figure 10 • Diode Test Circuit

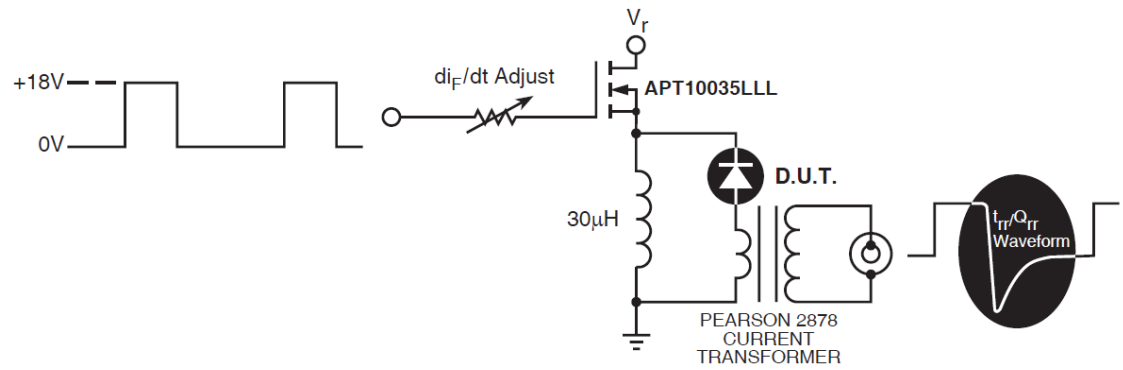
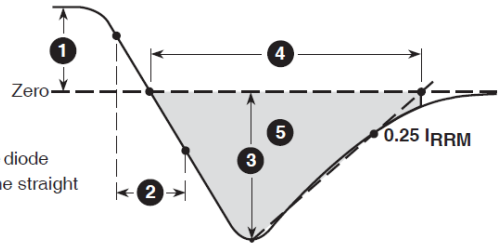


Figure 11 • Diode Reverse Recovery Waveform and Defintions



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}.

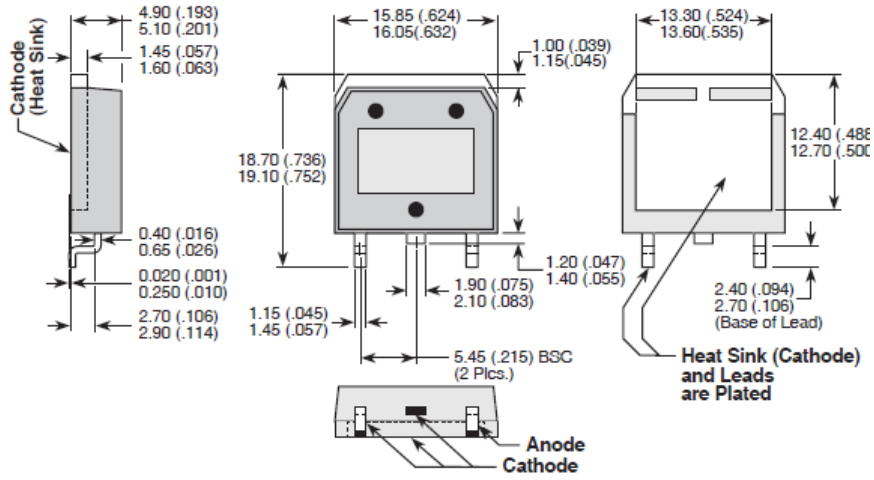
4 Package Specification

This section outlines the package specification for the APT30D120SG device.

4.1 Package Outline Drawing

This section details the D3PAK package drawing of the APT30D120SG device. Dimensions are in millimeters and (inches).

Figure 12 • Package Outline Drawing



Microsemi Corporate Headquarters
One Enterprise, Aliso Viejo,
CA 92656 USA
Within the USA: +1 (800) 713-4113
Outside the USA: +1 (949) 380-6100
Fax: +1 (949) 215-4996
Email: sales.support@microsemi.com
www.microsemi.com

Microsemi Corporation (Nasdaq: MSCC) offers a comprehensive portfolio of semiconductor and system solutions for aerospace & defense, communications, data center and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions; security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, California, and has approximately 4,800 employees globally. Learn more at www.microsemi.com.

050-5946

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Rectifiers ***category:***

Click to view products by Microchip ***manufacturer:***

Other Similar products are found below :

FERD15S50SB-TR D91A DA24F4100L DD89N1600K-A DD89N16K-K RL252-TP DLA11C-TR-E DSA17G JANTX1N4148UB JANTX1N5634A 1N4005-TR BAV199-TP UES1306HR2 UF4003-TP UFS120Je3/TR13 JANS1N6640US DD89N16K DD89N16K-A 481235F DSP10G-TR-E RRE02VS6SGTR 067907F MS306 ND104N08K SPA2003-B-D-A01 VS-80-6193 VS-66-9903 VGF0136AB US2JFL-TP UFS105Je3/TR13 A1N5404G-G ACGRA4007-HF ACGRB207-HF RF301B2STL RF501B2STL 1SS355 RR UES1306 UES1302 BAV199E6433HTMA1 ACGRC307-HF ACEFC304-HF DZ-1380 JANTXV1N5637A JANTX1N5555 JANTXV1N5660A JAN1N5555 JANTX1N5822US MUH1PCHM389A UES1106 GS2K-LTP