Data Sheet **November 2013**

30 A, 1200 V, Hyperfast Diode

The RHRP30120 is a hyperfast diode with soft recovery characteristics. It has the half recovery time of ultrafast diodes and is silicon nitride passivated ionimplanted epitaxial planar construction. These devices are intended to be used as freewheeling/ clamping diodes and diodes in a variety of switching power supplies and other power switching applications. Their low stored charge and hyperfast soft recovery minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

Features

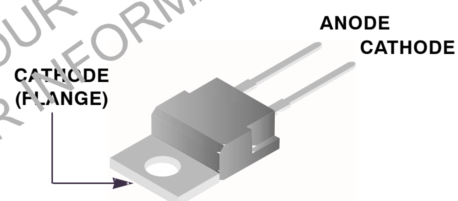
- Hyperfast Recovery t_{rr} = 85 ns (@ I_F = 30 A)
- Max Forward Voltage, V_F = 3.2 V (@ T_C = 25°C)
- 1200 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging

JEDEC TO-220AC



Ordering Information

PART NUMBER	PACKAGE	BRAND
RHRP30120	TO-220AC	RHR30120

NOTE: When ordering, use the entire part number.

Symbol

Absolute Maximum Ratings T_C = 25 °C

		RHRP30120	UNIT
Peak Repetitive Reverse Voltage	V_{RRM}	1200	V
Working Peak Reverse Voltage	V_{RWM}	1200	V
DC Blocking Voltage	V_R	1200	V
Average Rectified Forward Current (T_C = 78 °C)	$I_{F(AV)}$	30	A
Repetitive Peak Surge Current (Square Wave, 20 kHz)	I_{FRM}	60	A
Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60 Hz)	I_{FSM}	300	A
Maximum Power Dissipation	P_D	125	W
Avalanche Energy (See Figures 7 and 8)	E_{AVL}	30	mJ
Operating and Storage Temperature	T_{STG}, T_J	−65 to 175	°C

ElectricalSpecifications T_C =25 °C,UnlessOtherwiseSpecified

SYMBOL	TESTCONDITION	MIN	TYP	MAX	UNIT
V_F	I_F = 30 A	–	–	3.2	V
	I_F =30 A,T $_C$ =150 °C	–	–	.62	V
I_R	V_R = 1200 V	–	–	250	¿A
	V_R = 1200 V, T_C =150 °C	–	–	1	Am
t_{rr}	I_F =1 A, di $_F$/dt = 100 A/∝s	–	–	56	ns
	I_F =30 A,di $_F$/dt = 100 A/∝s	–	–	58	ns
t_a	I_F =30 A,di $_F$/dt = 100 A/∝s	–	48	–	ns
t_b	I_F =30 A,di $_F$/dt = 100 A/∝s	–	22	–	ns
R¿JC		–	–	.21	°C/W

DEFINITIONS

V_F =Instantaneousforwardvoltage(pw=300 ∝s,D=2%).

I_R =Instantaneousreversecurrent.

T_{rr} = Reverse recovery time (See Figure 6), summation of t_a +t_b.

t_a = Time to reach peak reverse current (See Figure 6).

t_b = T f i r pmo elemato projected zero crossing of I_{RM} b a s d o I_{RM} through 25% of I_{RM} (See Figure 6). g h t l

R¿JC =Thermalresistancejunctiontocase.

pw=pulsewidth.

D=dutycycle.

TypicalPerformanceCurves

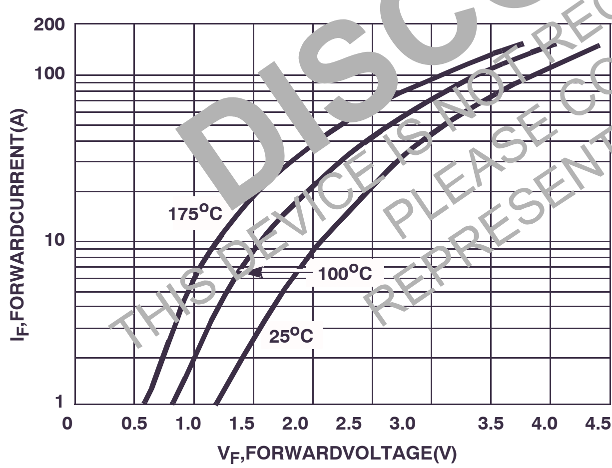


FIGURE1. FORWARDCURRENTvsFORWARDVOLTAGE

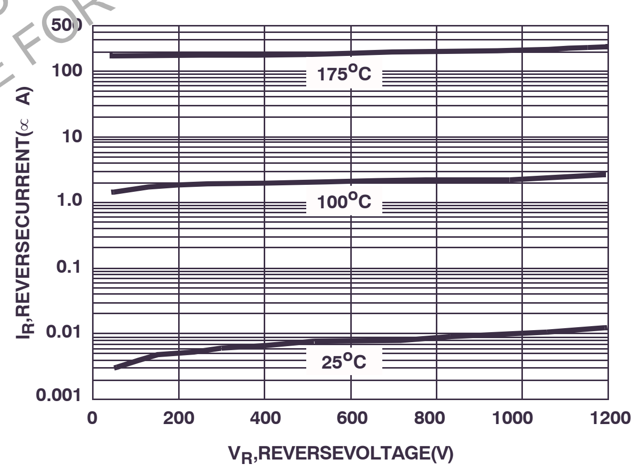


FIGURE2. REVERSECURRENTvsREVERSEVOLTAGE

Typical Performance Curves (Continued)

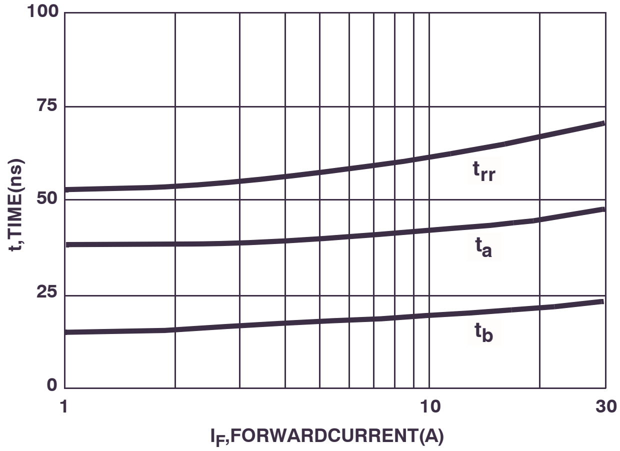


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

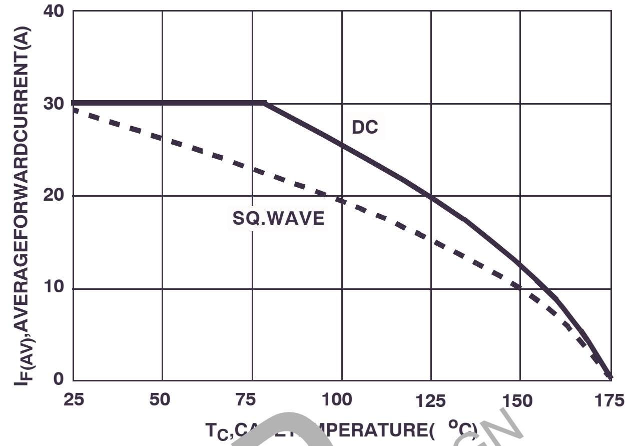


FIGURE 4. CURRENT DERATING CURVE

Test Circuits and Waveforms

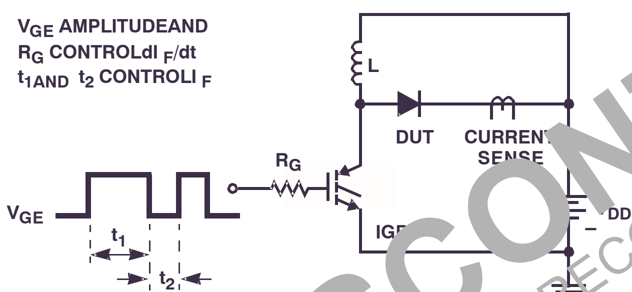


FIGURE 5. t_{rr} TEST CIRCUIT

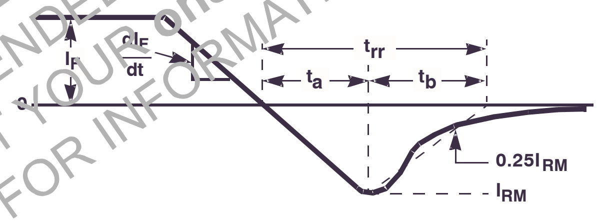


FIGURE 6. t_{rr} WAVEFORMS AND DEFINITIONS

I_{MAX} = 1.225A
L = 40mH
R < 0.1 Ω
$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
Q_1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)

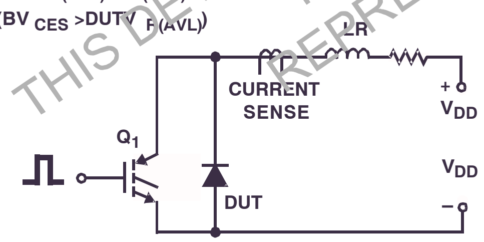


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

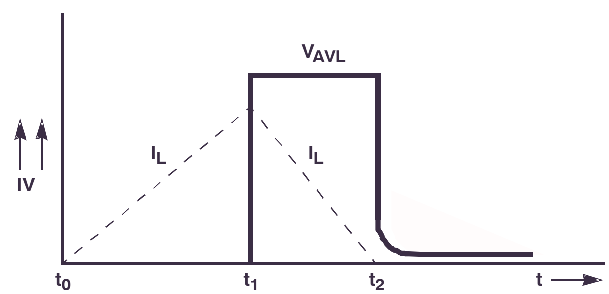


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

PUBLICATION ORDERING INFORMATION

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