



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.

Ordering Information

PART NUMBER	PACKAGE	BRAND
RHRP30120	TO-220AC	RHR30120

NOTE: When ordering, use the entire part number.

Symbol



Features

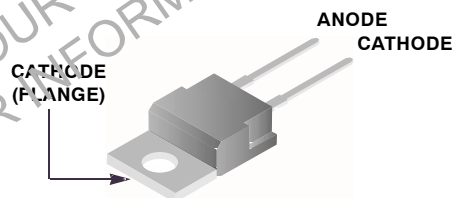
- Hyperfast Recovery $t_{rr} = 85$ ns (@ $I_F = 30$ A)
- Max Forward Voltage, $V_F = 3.2$ V (@ $T_J = 25^\circ\text{C}$)
- 1200 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging

JEDEC TO-220AC



Absolute Maximum Ratings $T_J = 25^\circ\text{C}$

		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	A	F(AV) 30	A
($T_J = 78^\circ\text{C}$)			
Repetitive Peak Surge Current	A	FRM 60	A
(Square Wave, 20 kHz)			
Nonrepetitive Peak Surge Current	A	FSM 300	A
(Halfwave, 1 Phase, 60 Hz)			
Maximum Power Dissipation	W	D 125	W
Avalanche Energy (See Figures 7 and 8)	J	AVL 30	mJ
Operating and Storage Temperature	$^\circ\text{C}$	STG, T J -65 to 175	$^\circ\text{C}$

Electrical Specifications $T_C = 25^\circ\text{C}$, Unless Otherwise Specified

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
V_F	$I_F = 30\text{ A}$	–	–	3.2	V
	$I_F = 30\text{ A}, T_C = 150^\circ\text{C}$	–	–	.2	V
I_R	$V_R = 1200\text{ V}$	–	–	250	mA
	$V_R = 1200\text{ V}, T_C = 150^\circ\text{C}$	–	–	1	A
t_{rr}	$I_F = 1\text{ A}, di_F/dt = 100\text{ A}/\mu\text{s}$	–	–	55	ns
	$I_F = 30\text{ A}, di_F/dt = 100\text{ A}/\mu\text{s}$	–	–	55	ns
t_a	$I_F = 30\text{ A}, di_F/dt = 100\text{ A}/\mu\text{s}$	–	4	–	s
t_b	$I_F = 30\text{ A}, di_F/dt = 100\text{ A}/\mu\text{s}$	–	2	–	s
$R_{\theta JC}$		–	–	.2	$^\circ\text{C}/\text{W}$

DEFINITIONS

V_F = Instantaneous forward voltage (pw=300 μs , D=2%).

I_R = Instantaneous reverse current.

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 = Time from projected zero crossing of I_{RM} back to I_{RM} through 25% of I_{RM} (See Figure 6).

$R_{\theta JC}$ = Thermal resistance junction to case.

pw = pulse width.

D = duty cycle.

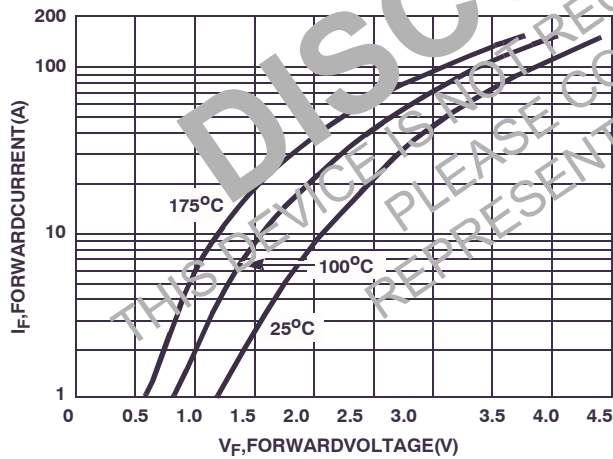
Typical Performance Curves

FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

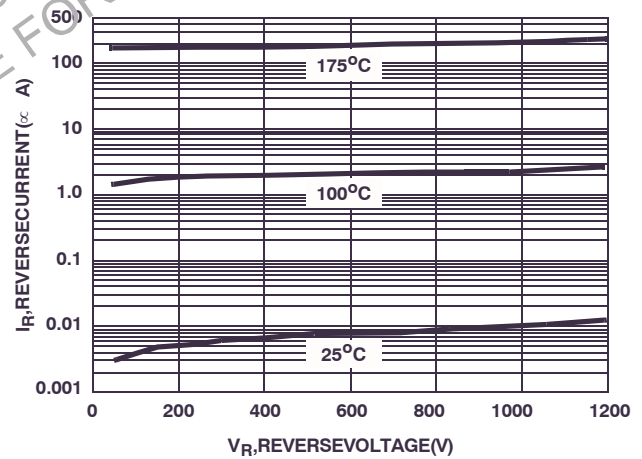


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

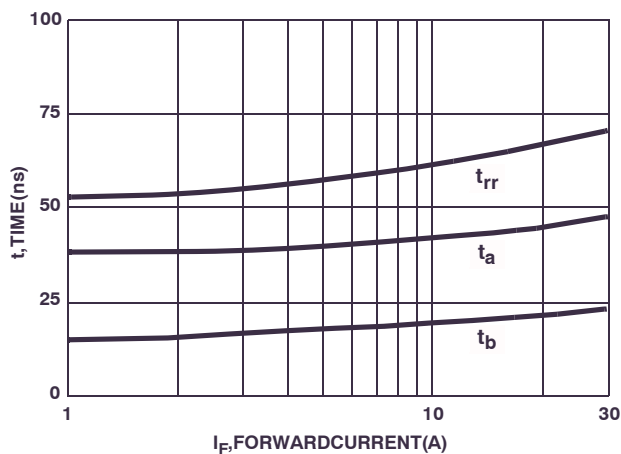


FIGURE 3. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

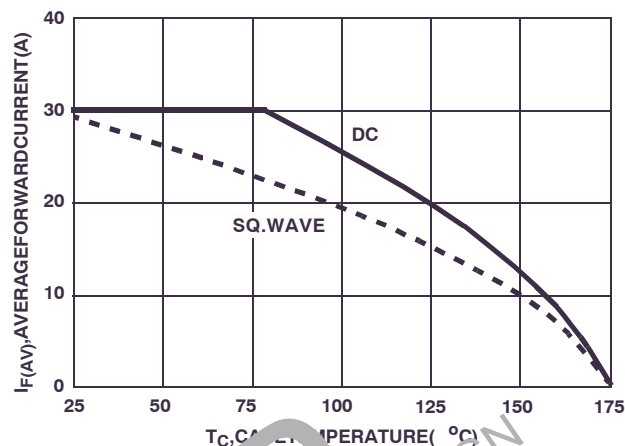


FIGURE 14. CURRENT-OPERATING CURVE

TestCircuitsandWaveforms

**V_{GE} AMPLITUDE AND
R_G CONTROL** dI_F/dt
t₁ AND t₂ CONTROL I_F

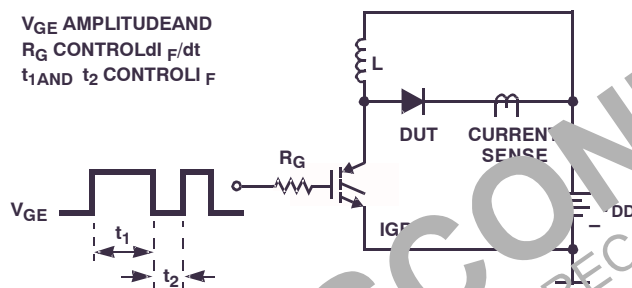


FIGURE 5. 100 Hz TEST CIRCUIT

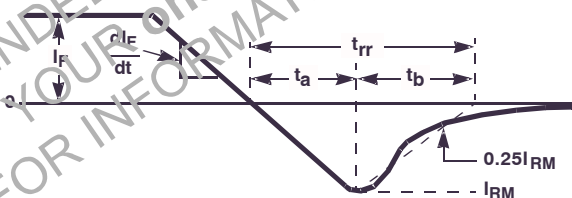


FIGURE 6. t_{rr} WAVEFORMS AND DEFINITIONS

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

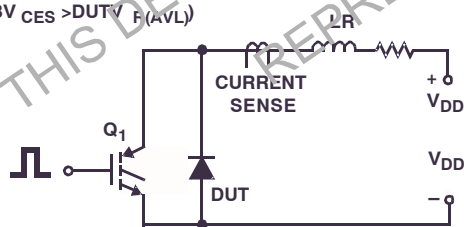


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

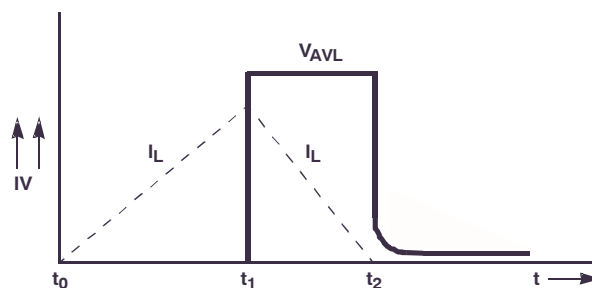


FIGURE8. AVALANCHECURRENTANDVOLTAGE WAVEFORMS

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