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Data Sheet

November 2013

15 A, 400 V - 600 V, Hyperfast Diode

The RHRP1540, RHRP1560 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
RHRP1540	TO-220AC-2L	RHRP1540
RHRP1560	TO-220AC-2L	RHRP1560

NOTE: When ordering, use the entire part number.

Symbol



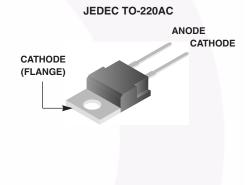
Features

- Hyperfast Recovery t_{rr} = 40 ns (@ I_F = 15 A)
- Max Forward Voltage, $V_F = 2.1 \text{ V}$ (@ $T_C = 25^{\circ}\text{C}$)
- 400 V, 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging



Absolute Maximum Ratings $T_{C} = 25^{\circ}C$, Unless Otherwise Specified

	RHRP1540	RHRP1560	UNIT
Peak Repetitive Reverse Voltage V _{RRM}	400	600	V
Working Peak Reverse VoltageV _{RWM}	400	600	V
DC Blocking Voltage	400	600	V
Average Rectified Forward Current	15	15	А
Repetitive Peak Surge CurrentI _{FRM} (Square Wave, 20 kHz)	30	30	А
Nonrepetitive Peak Surge Current I _{FSM} (Halfwave, 1 Phase, 60 Hz)	200	200	А
Maximum Power DissipationPD	100	100	W
Avalanche Energy (See Figures 10 and 11)EAVL	20	20	mJ
Operating and Storage Temperature	-65 to 175	-65 to 175	°C

SYMBOL	TEST CONDITION	RHRP1540		RHRP1560				
		MIN	ТҮР	МАХ	MIN	ТҮР	МАХ	UNIT
V _F	I _F = 15 A	-	-	2.1	-	-	2.1	V
	I _F = 15 A, T _C = 150 ^o C	-	-	1.7	-	-	1.7	V
I _R	V _R = 400 V	-	-	100	-	-	-	μA
	V _R = 600 V	-	-	-	-	-	100	μΑ
	$V_{R} = 400 \text{ V}, \text{ T}_{C} = 150^{\circ}\text{C}$	-	-	500	-	-	-	μΑ
	$V_{R} = 600 \text{ V}, \text{ T}_{C} = 150^{\circ}\text{C}$	-	-	-	-	-	500	μA
T _{rr}	$I_F = 1 \text{ A}, \text{ d}I_F/\text{d}t = 100 \text{ A}/\mu\text{s}$	-	-	35	-	-	35	ns
	$I_F = 15 \text{ A}, \text{ d}I_F/\text{d}t = 100 \text{ A}/\mu\text{s}$	-	-	40	-	-	40	ns
t _a	I _F = 15 A, dI _F /dt = 100 A/μs	-	20	-	-	20	-	ns
t _b	I _F = 15 A, dI _F /dt = 100 A/μs	-	15	-	-	15	-	ns
Q _{rr}	I _F = 15 A, dI _F /dt = 100 A/μs	-	40	-	-	40	-	nC
CJ	V _R = 10 V, I _F = 0 A	-	60	-	-	60	-	pF
R _{θJC}		-	-	1.5	-	-	1.5	°C/V

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

DEFINITIONS

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

I_R = Instantaneous reverse current .

 T_{rr} = Reverse recovery time (See Figure 9), summation of $t_a + t_b$.

 t_a = Time to reach peak reverse current (See Figure 9).

 t_b = Time from peak I_{RM} to projected zero crossing of I_{RM} based on a straight line from peak I_{RM} through 25% of I_{RM} (See Figure 9).

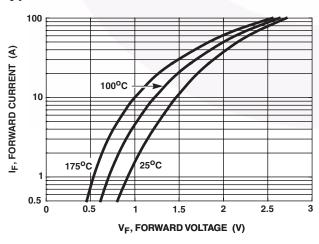
Q_{rr} = Reverse Recovery Change.

 $C_{J} =$ Junction Capacitance.

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

pw = Pulse Width.

D = Duty Cycle.







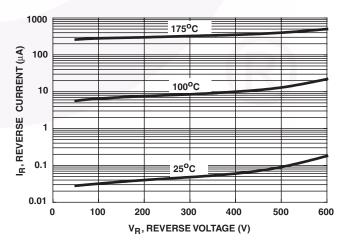


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

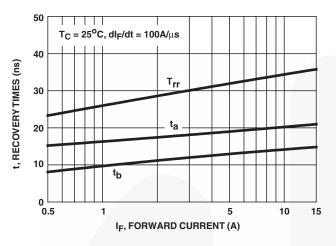
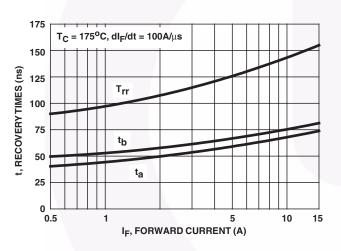


FIGURE 3. Trr, ta AND tb CURVES vs FORWARD CURRENT





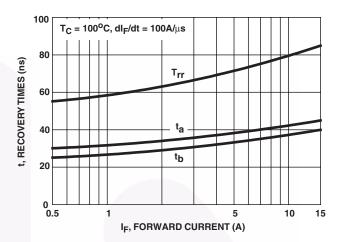


FIGURE 4. Trr, ta AND tb CURVES vs FORWARD CURRENT

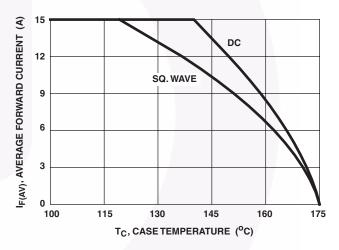


FIGURE 6. CURRENT DERATING CURVE

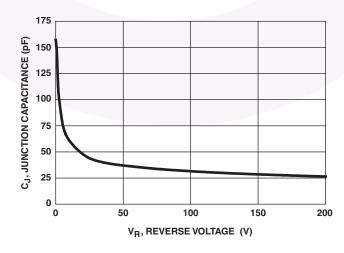
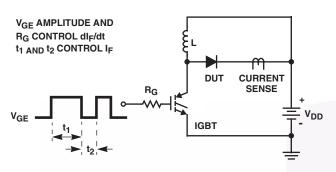


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms





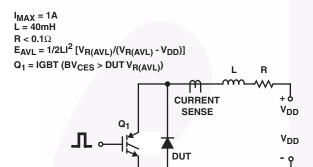


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

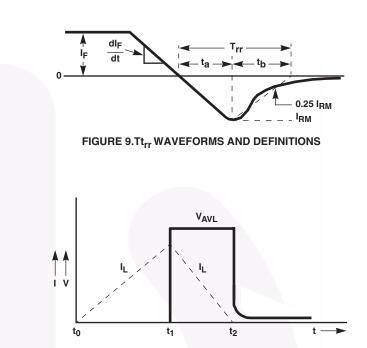


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Ø 4.09 3.50 ⊕ 0.36 M B A M 10.67 В Α 9.65 8.89 3.43 1.40 6.86 2.54 0.51 6.86 **7**° 5.84 3° T 13.40 16.51 12,19 14,22 16.15 9.40 15,75 8.38 **5**° **5°** 3° 3° 6.35 MAX 2 1 0.60 MAX С 14.73 13,60 1.65 (1.91)1.25 F Т 0.61 2.54 0.33 1.02 2.92 0.38 2.03 5.08 ⊕ 0.36 M C A B **5° 5°** 3° 3° -...... FAIRCHILD ... 4.80 4.30

NOTES:

- A. PACKAGE REFERENCE: JEDEC TO220,ISSUE K, VARIATION AC,DATED APRIL 2002.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSION AND TOLERANCE AS PER ASME Y14.5-2009.
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- E. DRAWING FILE NAME: TO220A02REV5

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