

## 30 A, 1200 V, Hyperfast Diode

The RHRG30120 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
RHRG30120	TO-247-2L	RHRG30120

NOTE: When ordering, use the entire part number.

### Symbol



### Absolute Maximum Rating $T_C = 25^\circ\text{C}$ , Unless Otherwise Specified

	RHRG30120	UNIT
Peak Repetitive Reverse Voltage .....	$V_{RRM}$	1200
Working Peak Reverse Voltage .....	$V_{RWM}$	1200
DC Blocking Voltage .....	$V_R$	1200
Average Rectified Forward Current .....	$I_{F(AV)}$	30
( $T_C = 120^\circ\text{C}$ )		A
Repetitive Peak Surge Current .....	$I_{FRM}$	60
(Square Wave, 20 kHz)		A
Nonrepetitive Peak Surge Current .....	$I_{FSM}$	300
(Halfwave, 1 Phase, 60 Hz)		A
Maximum Power Dissipation .....	$P_D$	125
Avalanche Energy (See Figures 10 and 11) .....	$E_{AVL}$	30
Operating and Storage Temperature .....	$T_{STG}, T_J$	$^\circ\text{C}$
	-65 to 175	

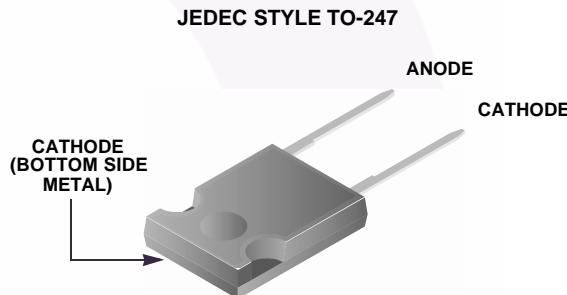
### Features

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

### Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

### Packaging



**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
	$I_F = 30 \text{ A}, T_C = 150^\circ\text{C}$	-	-	2.6	V
$I_R$	$V_R = 1200 \text{ V}$	-	-	250	$\mu\text{A}$
	$V_R = 1200 \text{ V}, T_C = 150^\circ\text{C}$	-	-	1	mA
$t_{rr}$	$I_F = 1 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}$	-	-	65	ns
	$I_F = 30 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}$	-	-	85	ns
$t_a$	$I_F = 30 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}$	-	48	-	ns
$t_b$	$I_F = 30 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}$	-	22	-	ns
$R_{\theta\text{JC}}$		-	-	1.2	$^\circ\text{C}/\text{W}$

## DEFINITIONS

$V_F$  = Instantaneous forward voltage ( $pw = 300 \mu\text{s}$ ,  $D = 2\%$ ).

$I_R$  = 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 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 6).

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

$pw$  = pulse width.

$D$  = duty cycle.

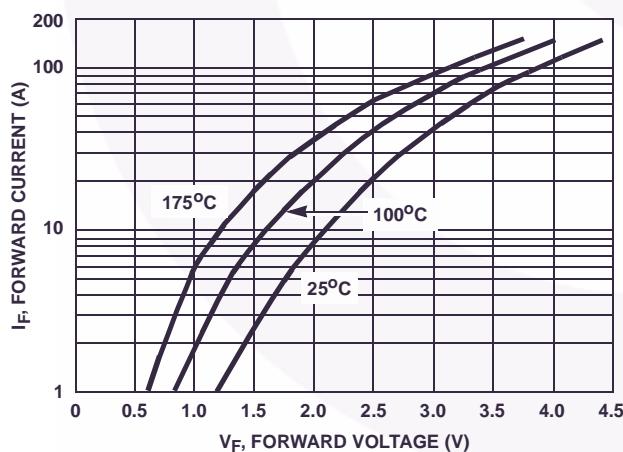
**Typical Performance Curves**

FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

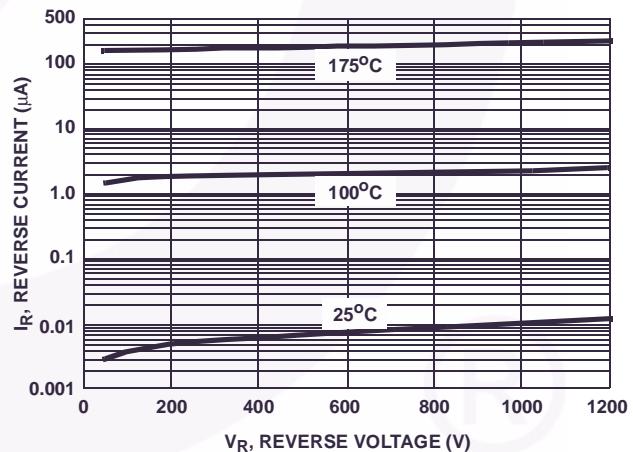


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

## Typical Performance Curves (Continued)

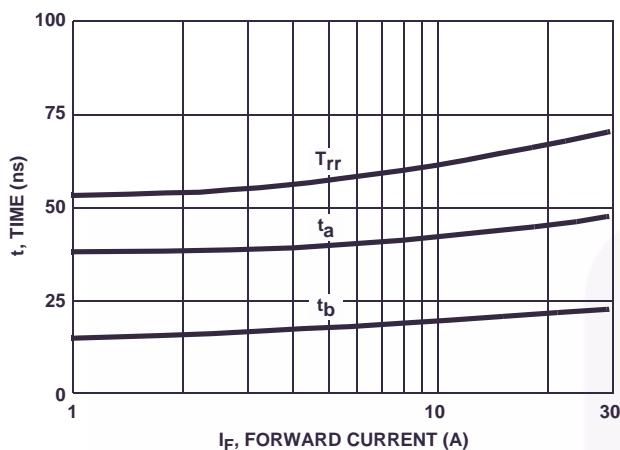
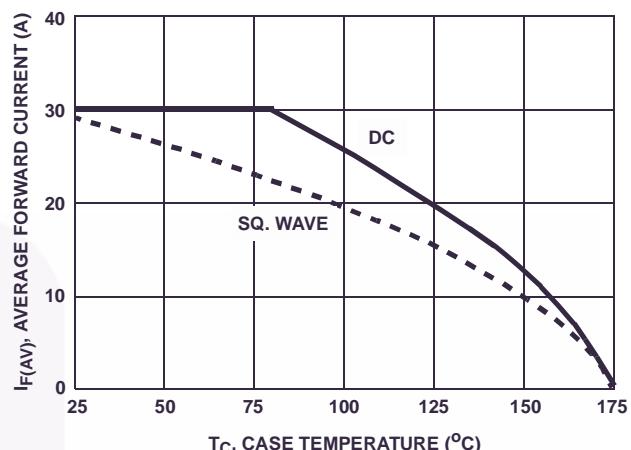
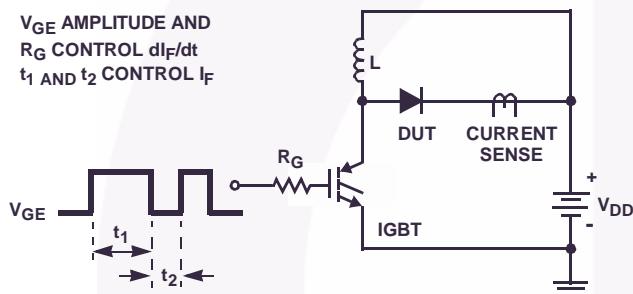
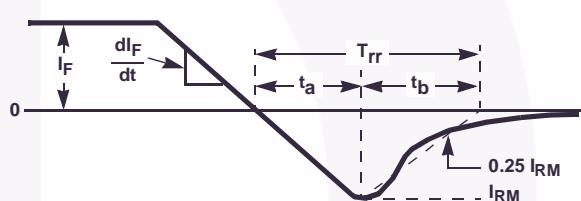
FIGURE 3.  $T_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

FIGURE 4. CURRENT DERATING CURVE

## Test Circuits and Waveforms

FIGURE 5.  $T_{rr}$  TEST CIRCUITFIGURE 6.  $T_{rr}$  WAVEFORMS AND DEFINITIONS

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

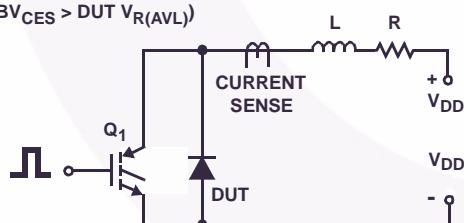


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

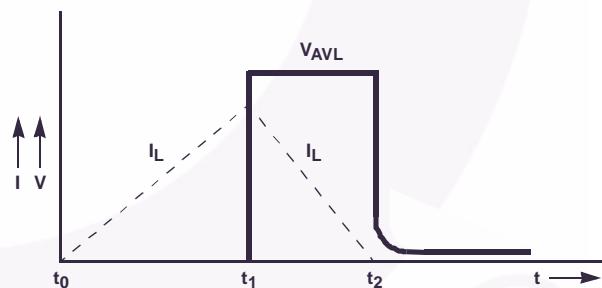
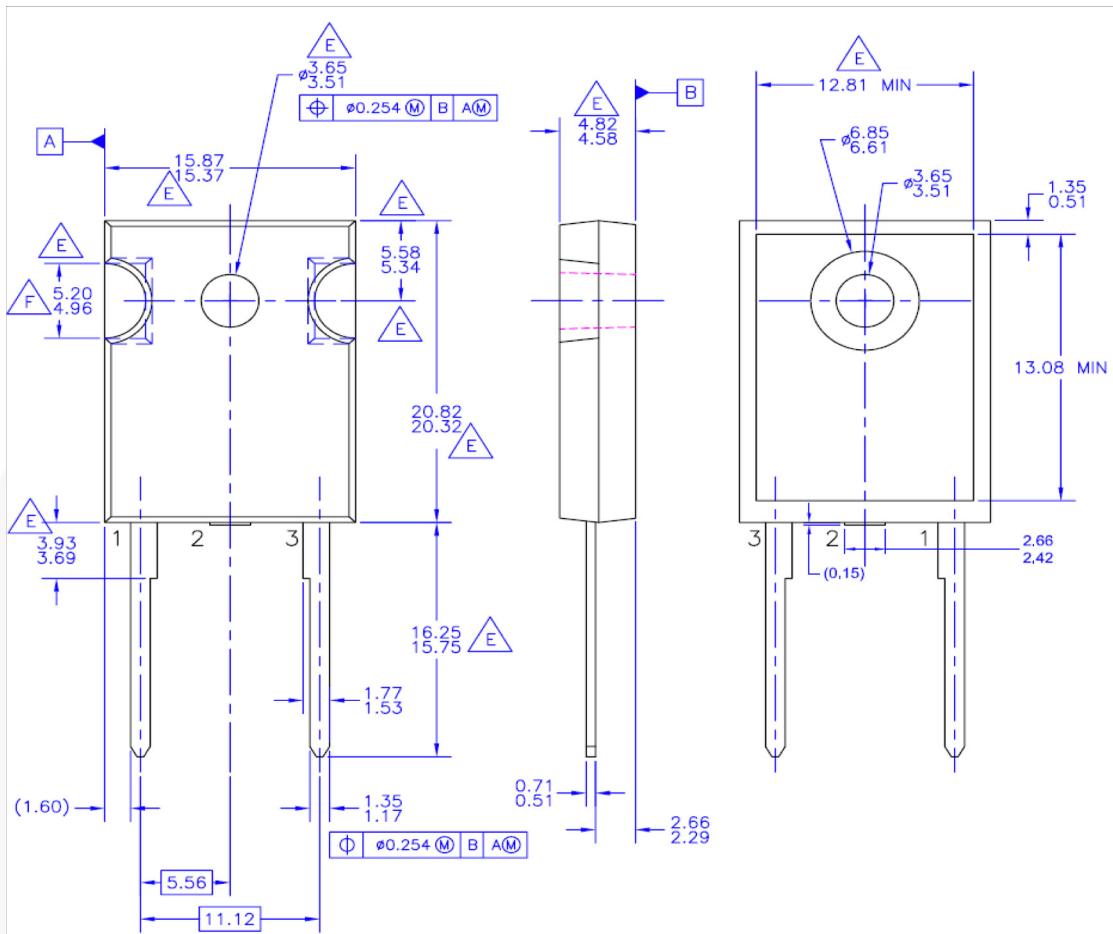


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Mechanical Dimensions

TO247-2L



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#### E. DOES NOT COMPLY JEDEC STANDARD VALUE

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G. DRAWING FILE NAME: MKT-TQ247B02 BEV02

**Figure 9. TO-247, Molded, 2LD, Jedec Option AB**

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