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## 60 A, 400 V - 600 V, Hyperfast Dual Diode

### Description

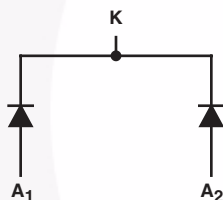
The RHRG3040CC, RHRG3060CC is a hyperfast dual diode with soft recovery characteristics. It has the half recovery time of ultrafast diodes and is silicon nitride passivated ionimplanted epitaxial planar construction. These devices are intended to be used as freewheeling/clamping diodes and diodes in 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
RHRG3040CC	TO-247	RHRG3040C
RHRG3060CC	TO-247	RHRG3060C

NOTE: When ordering, use the entire part number.

### Symbol



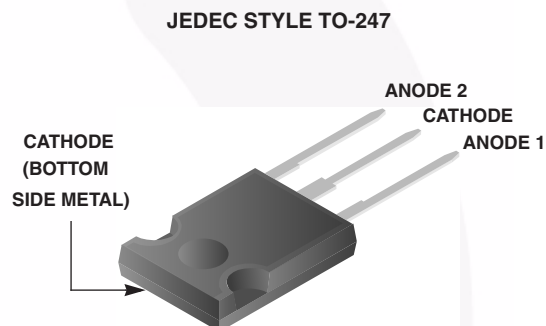
### Features

- Hyperfast Recovery  $t_{rr} = 45 \text{ ns}$  (@  $I_F = 30 \text{ A}$ )
- Max Forward Voltage,  $V_F = 2.1 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- High Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

### Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

### Packaging



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

	RHRG3040CC	RHRG3060CC	UNIT
Peak Repetitive Reverse Voltage .....	$V_{RRM}$ 400	600	V
Working Peak Reverse Voltage .....	$V_{RWM}$ 400	600	V
DC Blocking Voltage .....	$V_R$ 400	600	V
Average Rectified Forward Current .....	$I_{F(AV)}$ 30	30	A
( $T_C = 120^\circ\text{C}$ )			
Repetitive Peak Surge Current .....	$I_{FRM}$ 70	70	A
(Square Wave, 20 kHz)			
Nonrepetitive Peak Surge Current .....	$I_{FSM}$ 325	325	A
(Halfwave, 1 Phase, 60 Hz)			
Maximum Power Dissipation .....	$P_D$ 125	125	W
Avalanche Energy (See Figures 10 and 11) .....	$E_{AVL}$ 20	20	mJ
Operating and Storage Temperature .....	$T_{STG}, T_J$ -65 to 175	-65 to 175	$^\circ\text{C}$

**Electrical Specification** (Per Leg)  $T_C = 25^\circ\text{C}$ , Unless Otherwise Specified

SYMBOL	TEST CONDITION	RHRG3040CC			RHRG3060CC			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
$V_F$	$I_F = 30\text{ A}$	-	-	2.1	-	-	2.1	V
	$I_F = 30\text{ A}, T_C = 150^\circ\text{C}$	-	-	1.7	-	-	1.7	V
$I_R$	$V_R = 400\text{ V}$	-	-	250	-	-	-	$\mu\text{A}$
	$V_R = 600\text{ V}$	-	-	-	-	-	250	$\mu\text{A}$
	$V_R = 400\text{ V}, T_C = 150^\circ\text{C}$	-	-	1.0	-	-	-	mA
	$V_R = 600\text{ V}, T_C = 150^\circ\text{C}$	-	-	-	-	-	1.0	mA
$t_{rr}$	$I_F = 1\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	-	40	-	-	40	ns
	$I_F = 30\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	-	45	-	-	45	ns
$t_a$	$I_F = 30\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	22	-	-	22	-	ns
$t_b$	$I_F = 30\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	18	-	-	18	-	ns
$Q_{rr}$	$I_F = 30\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	100	-	-	100	-	nC
$C_J$	$V_R = 10\text{ V}, I_F = 0\text{ A}$	-	85	-	-	85	-	pF
$R_{\theta JC}$		-	-	1.2	-	-	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 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 charge.

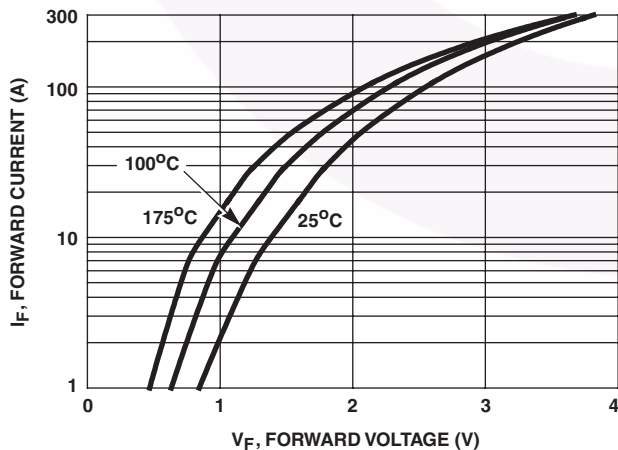
$C_J$  = Junction Capacitance.

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

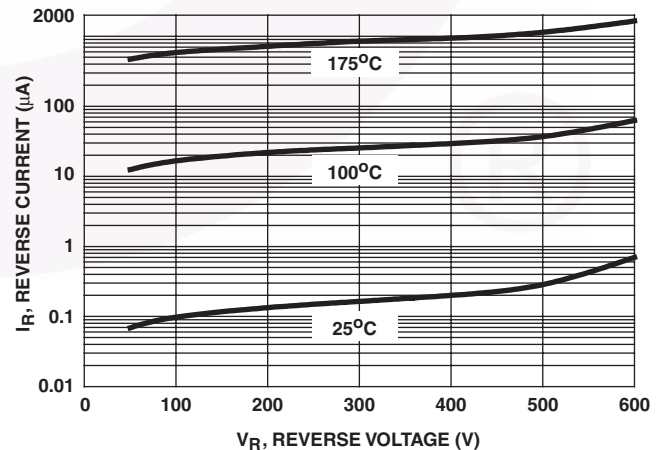
pw = pulse width.

D = duty cycle.

**Typical Performance Curves**



**FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE**



**FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE**

Typical Performance Curves (Continued)

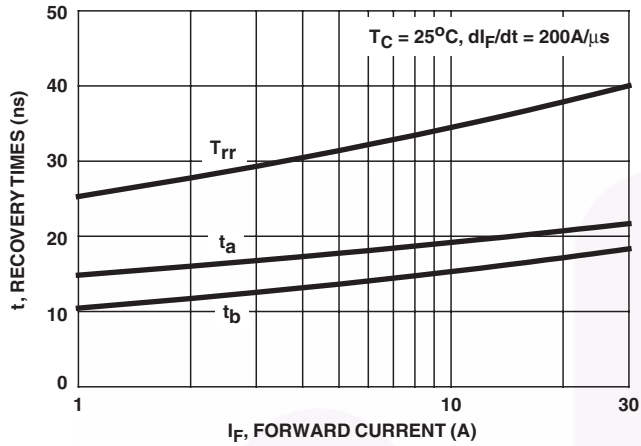


FIGURE 3.  $T_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

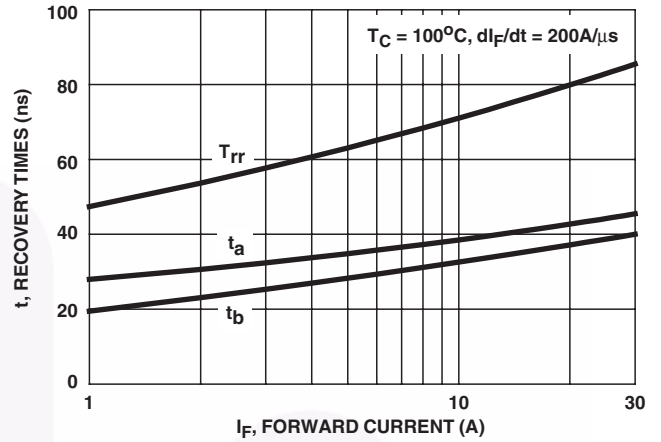


FIGURE 4.  $T_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

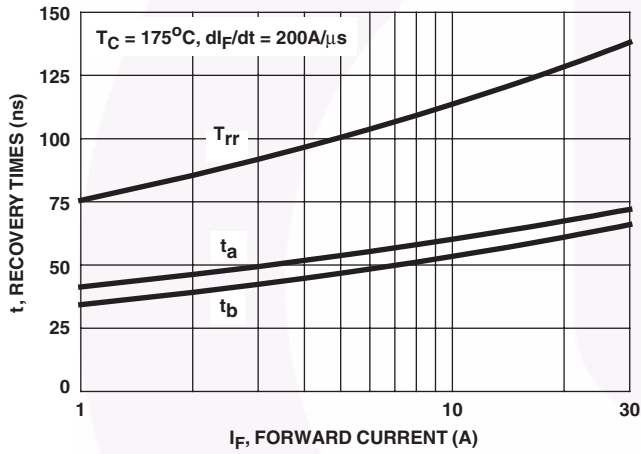


FIGURE 5.  $T_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

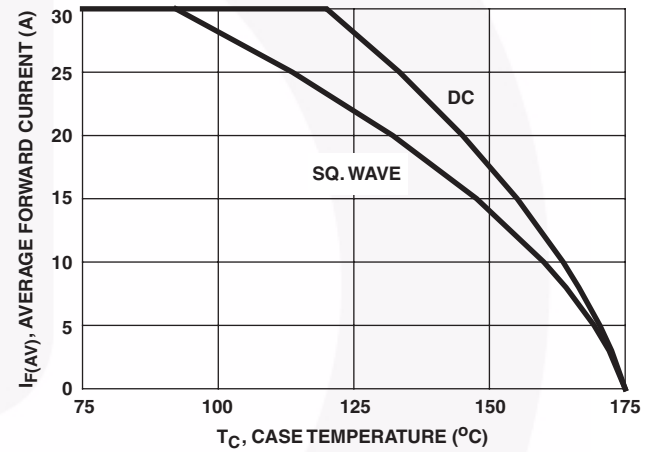


FIGURE 6. CURRENT DERATING CURVE

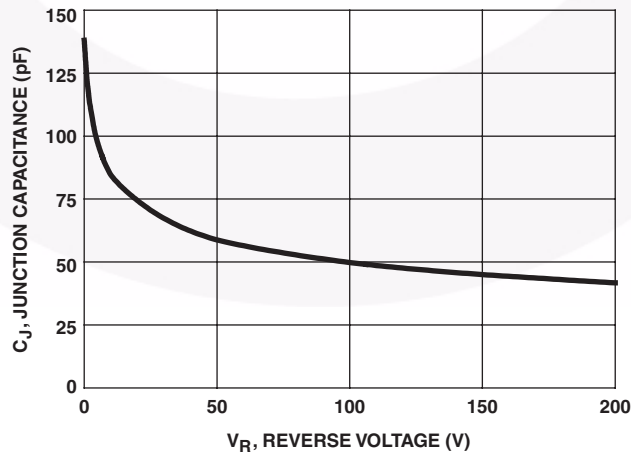


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

## Test Circuits and Waveforms

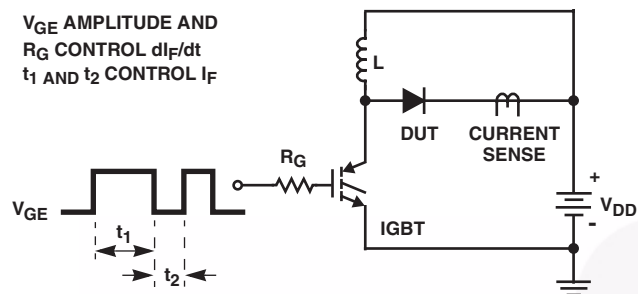
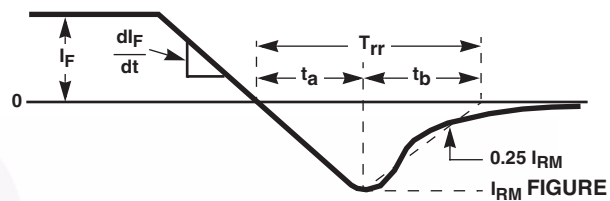


FIGURE 8.  $T_{rr}$  TEST CIRCUIT



9.  $T_{rr}$  WAVEFORMS AND DEFINITIONS

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

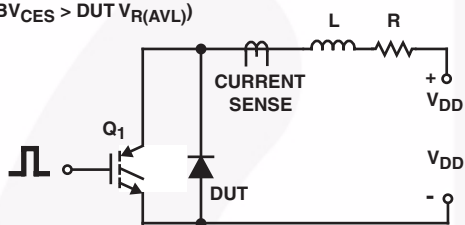


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

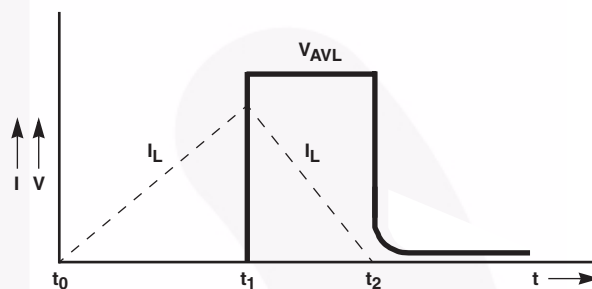
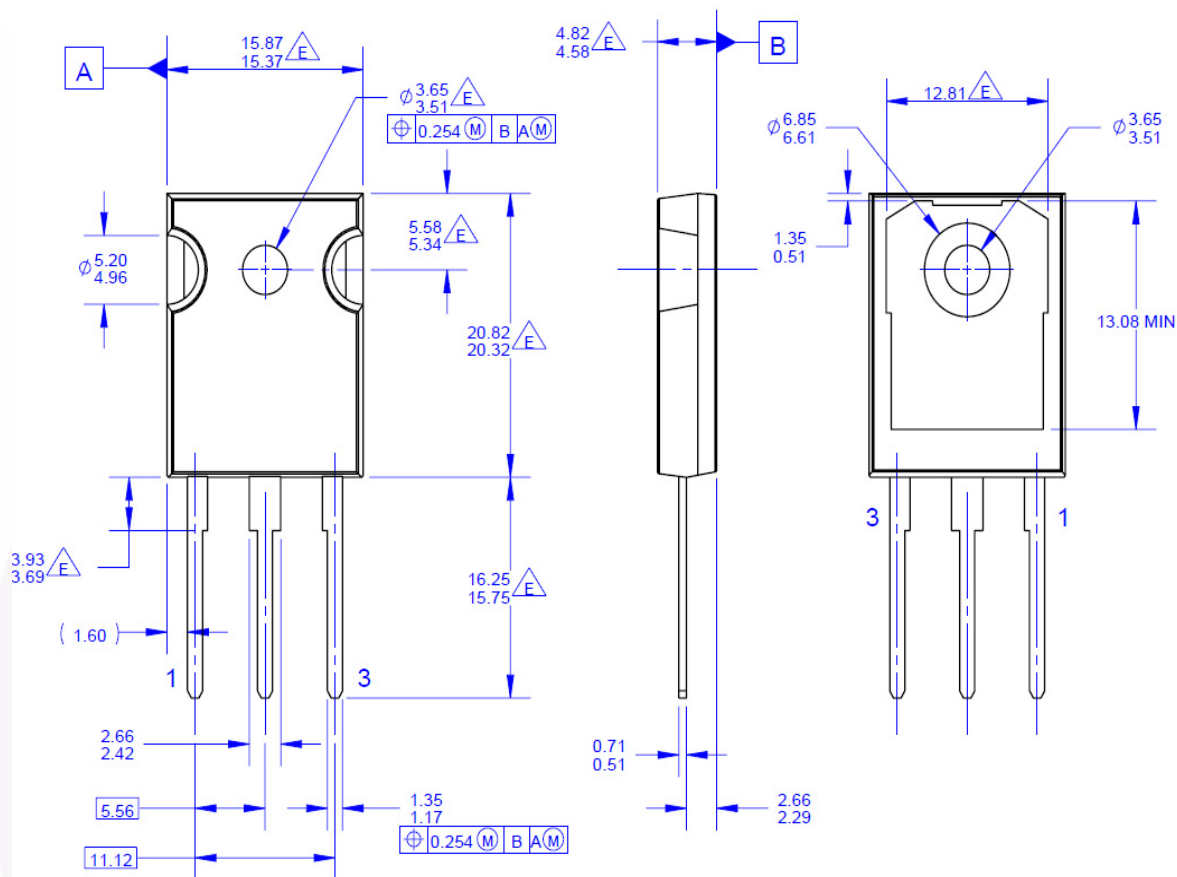


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## TO247-3L



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- D. DRAWING CONFORMS TO ASME Y14.5 - 1994

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F. DRAWING FILENAME: MKT-TO247A03\_REV03

**Figure 12. TO-247, Molded, 3LD, Jedec Option AB**

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Rev. I66