

## 30A, 600V Ultrafast Diode

The RURP3060 is an ultrafast diode ( $t_{rr} < 55\text{ns}$ ) with soft recovery characteristics. It has a low forward voltage drop and is of planar, silicon nitride passivated, ion-implanted, epitaxial construction.

This device is intended for use as an energy steering/clamping diode and rectifier in a variety of switching power supplies and other power switching applications. Its low stored charge and ultrafast recovery with soft recovery characteristics minimize ringing and electrical noise in many power switching circuits, thus reducing power loss in the switching transistor.

Formerly developmental type TA09903.

## Ordering Information

PART NUMBER	PACKAGE	BRAND
RURP3060	TO-220AC	RURP3060

NOTE: When ordering, use the entire part number.

## Symbol



## Features

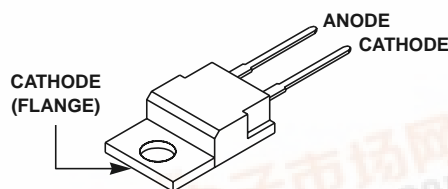
- Ultrafast with Soft Recovery . . . . .  $< 55\text{ns}$
- Operating Temperature . . . . .  $175^{\circ}\text{C}$
- Reverse Voltage . . . . .  $600\text{V}$
- Avalanche Energy Rated
- Planar Construction

## Applications

- Switching Power Supply
- Power Switching Circuits
- General Purpose

## Packaging

JEDEC TO-220AC



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

	RURP3060	UNITS
Peak Repetitive Reverse Voltage . . . . . $V_{RRM}$	600	V
Working Peak Reverse Voltage . . . . . $V_{RWM}$	600	V
DC Blocking Voltage . . . . . $V_R$	600	V
Average Rectified Forward Current ( $T_C = 130^{\circ}\text{C}$ ) . . . . . $I_{F(AV)}$	30	A
Repetitive Peak Surge Current . . . . . $I_{FRM}$ (Square Wave, 20kHz)	70	A
Nonrepetitive Peak Surge Current . . . . . $I_{FSM}$ (Halfwave 1 Phase 60Hz)	325	A
Maximum Power Dissipation . . . . . $P_D$	125	W
Avalanche Energy (See Figures 7 and 8) . . . . . $E_{AVL}$	20	mJ
Operating and Storage Temperature . . . . . $T_{STG}, T_J$	-55 to 175	$^{\circ}\text{C}$

## RURP3060

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

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
$V_F$	$I_F = 30\text{A}$	-	-	1.5	V
	$I_F = 30\text{A}$ , $T_C = 150^\circ\text{C}$	-	-	1.3	V
$I_R$	$V_R = 600\text{V}$	-	-	250	$\mu\text{A}$
	$V_R = 600\text{V}$ , $T_C = 150^\circ\text{C}$	-	-	1	mA
$t_{rr}$	$I_F = 1\text{A}$ , $dI_F/dt = 100\text{A}/\mu\text{s}$	-	-	55	ns
	$I_F = 30\text{A}$ , $dI_F/dt = 100\text{A}/\mu\text{s}$	-	-	60	ns
$t_a$	$I_F = 30\text{A}$ , $dI_F/dt = 100\text{A}/\mu\text{s}$	-	30	-	ns
$t_b$	$I_F = 30\text{A}$ , $dI_F/dt = 100\text{A}/\mu\text{s}$	-	20	-	ns
$R_{\theta JC}$		-	-	1.2	$^\circ\text{C}/\text{W}$

#### DEFINITIONS

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

$I_R$  = Instantaneous reverse current.

$t_{rr}$  = Reverse recovery time at  $dI_F/dt = 100\text{A}/\mu\text{s}$  (See Figure 6), summation of  $t_a + t_b$ .

$t_a$  = Time to reach peak reverse current at  $dI_F/dt = 100\text{A}/\mu\text{s}$  (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).

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

$p_w$  = Pulse width.

$D$  = Duty cycle.

### Typical Performance Curves

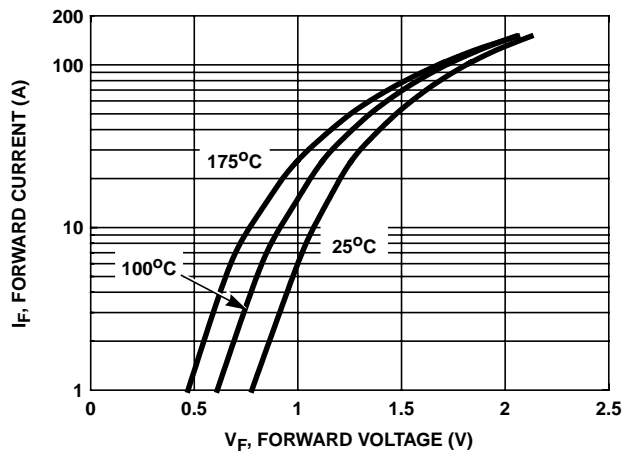


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

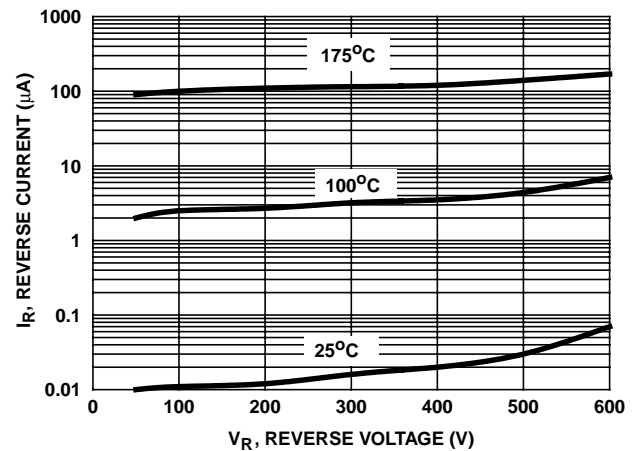


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

### Typical Performance Curves (Continued)

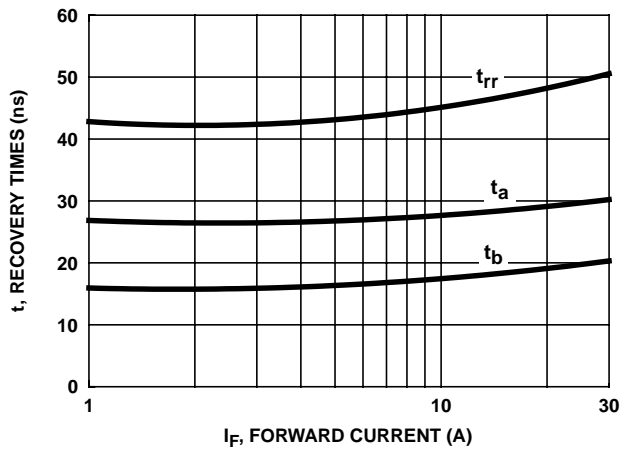
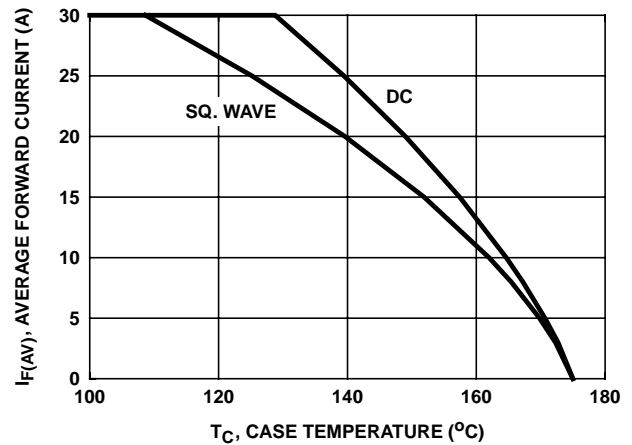
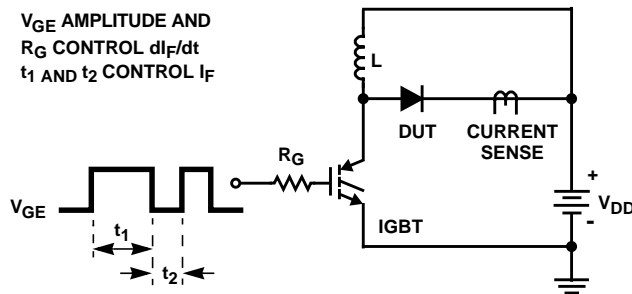
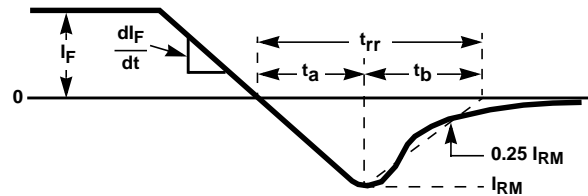
FIGURE 3.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

FIGURE 4. CURRENT DERATING CURVE

### Test Circuits and Waveforms

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

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

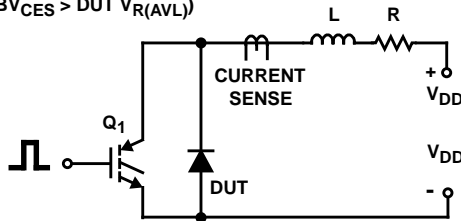


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

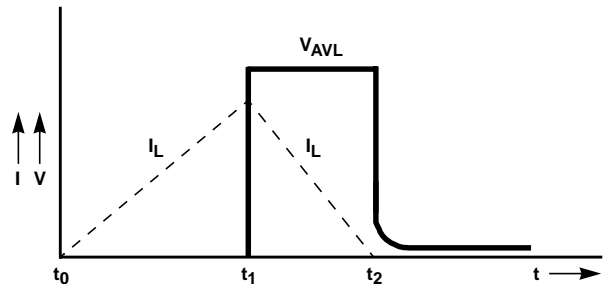


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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