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## 15 A, 600 V, Ultrafast Diode

The RURP1560 is an ultrafast diode with low forward voltage drop. This device is intended for use as freewheeling and clamping diodes in a variety of switching power supplies and other power switching applications. It is specially suited for use in switching power supplies and industrial application.

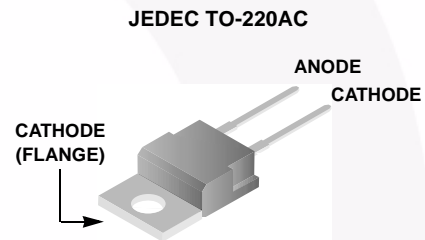
### Features

- Ultrafast Recovery  $t_{rr} = 60$  ns (@  $I_F = 15$  A)
- Max Forward Voltage,  $V_F = 1.5$  V (@  $T_C = 25^\circ\text{C}$ )
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

### Applications

- Switching Power Supply
- Power Switching Circuits
- General Purpose

### Packaging



### Ordering Information

PART NUMBER	PACKAGE	BRAND
RURP1560	TO-220AC-2L	RURP1560

NOTE: When ordering, use the entire part number

### Symbol



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

	RURP1560	UNIT
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 .....	$I_{F(AV)}$ 15	A
( $T_C = 145^\circ\text{C}$ )		
Repetitive Peak Surge Current .....	$I_{FRM}$ 30	A
(Square Wave 20kHz)		
Nonrepetitive Peak Surge Current .....	$I_{FSM}$ 200	A
(Halfwave 1 Phase 60Hz)		
Maximum Power Dissipation .....	$P_D$ 100	W
Avalanche Energy (See Figures 7 and 8) .....	$E_{AVL}$ 20	mJ
Operating and Storage Temperature .....	$T_{STG}, T_J$ -55 to 175	$^\circ\text{C}$

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

SYMBOL	TEST CONDITION	RURP1560			UNIT
		MIN	TYP	MAX	
$V_F$	$I_F = 15\text{ A}$	-	-	1.5	V
	$I_F = 15\text{ A}, T_C = 150^{\circ}\text{C}$	-	-	1.2	V
$I_R$	$V_R = 600\text{ V}$	-	-	100	$\mu\text{A}$
	$V_R = 600\text{ V}, T_C = 150^{\circ}\text{C}$	-	-	500	$\mu\text{A}$
$t_{rr}$	$I_F = 1\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$	-	-	55	ns
	$I_F = 15\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$	-	-	60	ns
$t_a$	$I_F = 15\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$	-	30	-	ns
$t_b$	$I_F = 15\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$	-	20	-	ns
$R_{\theta JC}$		-	-	1.5	$^{\circ}\text{C}/\text{W}$

**DEFINITIONS**

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

$I_R$  = Instantaneous reverse current.

$T_{rr}$  = Reverse recovery time 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.

pw = pulse width.

D = duty cycle.

**Typical Performance Curves**

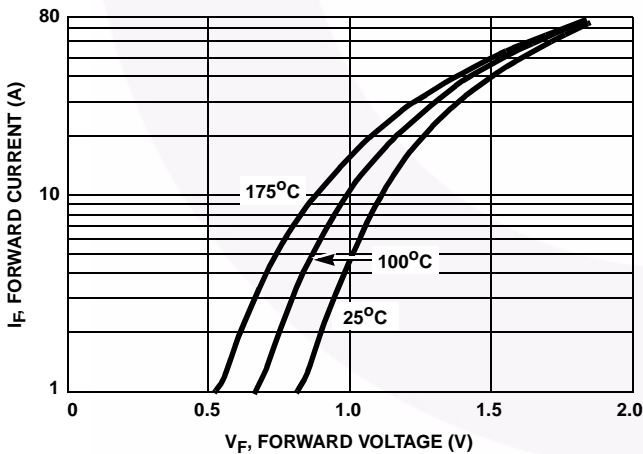


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

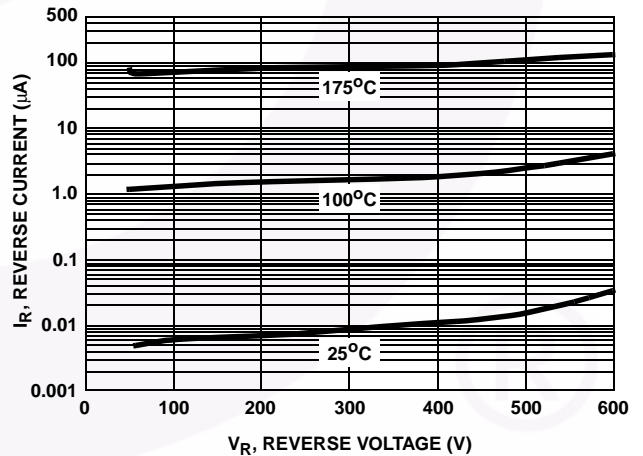


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

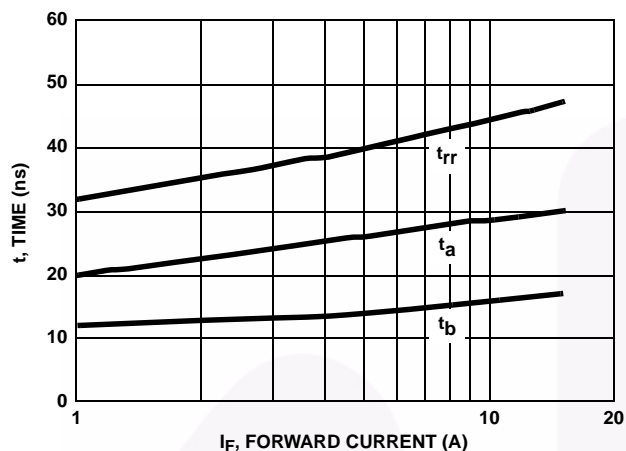


FIGURE 3.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

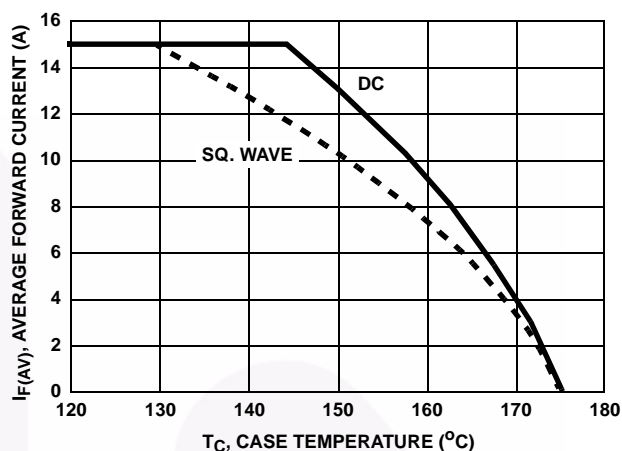


FIGURE 4. CURRENT DERATING CURVE

Test Circuits and Waveforms

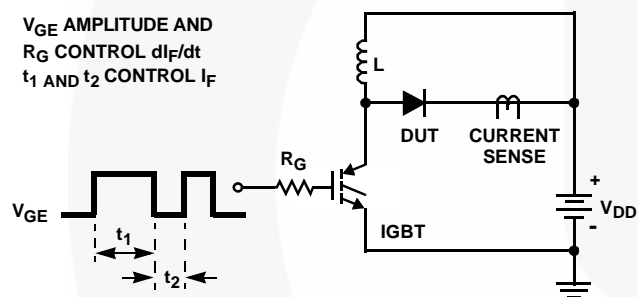


FIGURE 5.  $t_{rr}$  TEST CIRCUIT

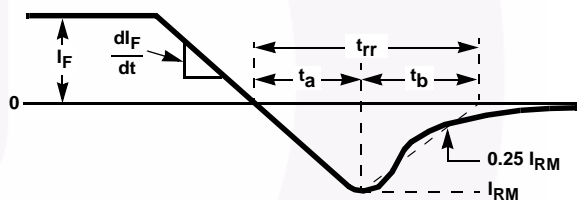


FIGURE 6.  $t_{rr}$  WAVEFORMS AND DEFINITIONS

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

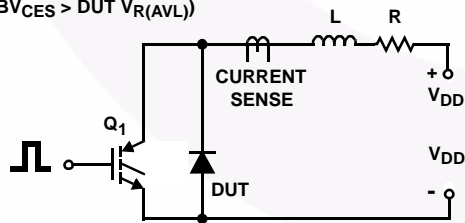


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

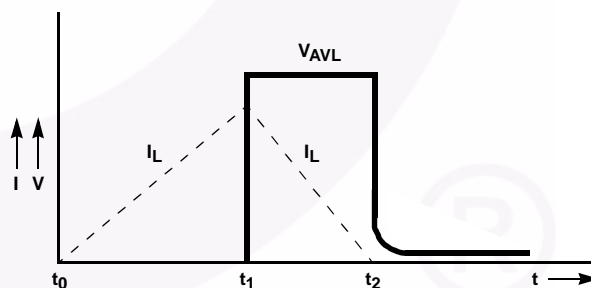
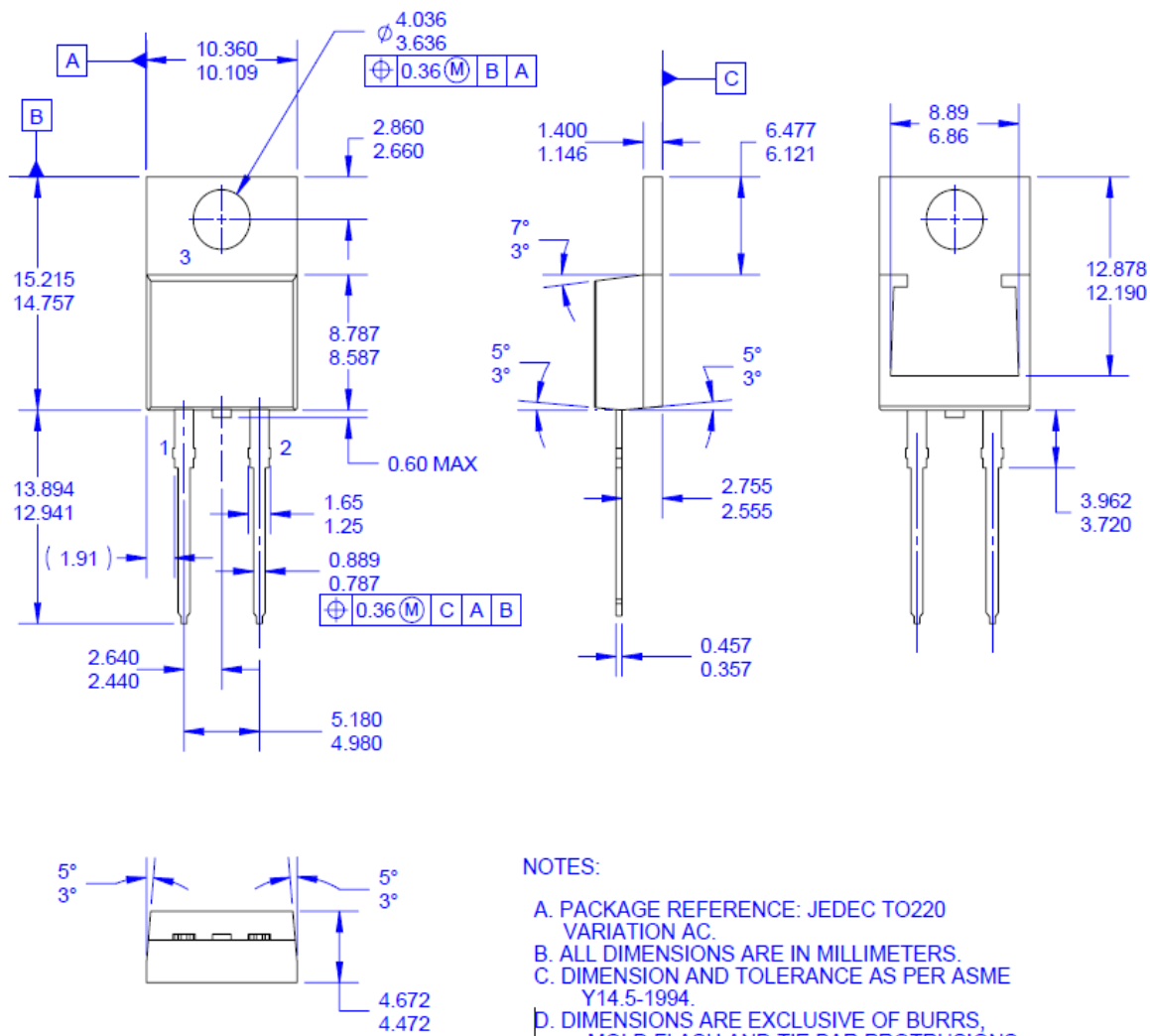


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

**Mechanical Dimensions**



- NOTES:
- A. PACKAGE REFERENCE: JEDEC TO220 VARIATION AC.
  - B. ALL DIMENSIONS ARE IN MILLIMETERS.
  - C. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
  - D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
  - E. THIS PACKAGE IS FSSZ INTERNAL PRODUCTION AND INTENDED FOR DELTA CUSTOMER ONLY.
  - F. DRAWING FILE NAME: TO220B02REV4

**Figure 9. TO-220 2L - TO-220, MOLDED, 2LD**

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| AX-CAP®*   | FRFET®  | PowerXS™  | <b>SYSTEM GENERAL</b> ®*  |
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