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## 15 A, 600 V, Ultrafast Diode

The RUR1S1560S 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.

### Ordering Information

PART NUMBER	PACKAGE	BRAND
RUR1S1560S	TO-263-3L	RUR1560

NOTE: When ordering, use the entire part number. Add the suffix 9A to obtain the TO-263 variant in tape and reel, i.e. RUR1S1560S9A.

### Symbol



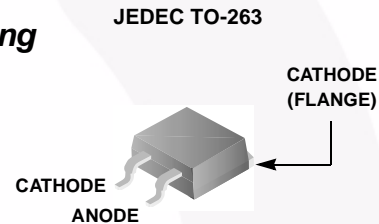
### Features

- 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 Supplies
- Power Switching Circuits
- General Purpose

### Packaging



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

SYMBOL	PARAMETER	RUR1S1560S	UNIT
$V_{RRM}$	Peak Repetitive Reverse Voltage	600	V
$V_{RWM}$	Working Peak Reverse Voltage	600	V
$V_R$	DC Blocking Voltage	600	V
$I_{F(AV)}$	Average Rectified Forward Current	15	A
$I_{FRM}$	Repetitive Peak Surge Current (20 kHz Square Wave)	30	A
$I_{FSM}$	Nonrepetitive Peak Surge Current (Halfwave 1 Phase 60 Hz)	200	A
$P_D$	Power Dissipation	100	W
$E_{AVL}$	Avalanche Energy (1 A, 40 mH)	20	mJ
$T_J, T_{STG}$	Operating and Storage Temperature	-55 to 175	$^\circ\text{C}$
$T_L$	Maximum Temperature for Soldering	300	$^\circ\text{C}$
$T_{pkg}$	Leads at 0.063 in (1.6 mm) from Case for 10 s Package Body for 10s, See Techbrief TB334	260	$^\circ\text{C}$
<b>THERMAL SPECIFICATIONS</b>			
$R_{\theta JC}$	Thermal Resistance Junction to Case	1.5	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	60	$^\circ\text{C}/\text{W}$

#### NOTES:

**CAUTION:** Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

# RUR1S1560S

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

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
$V_F$	$I_F = 15 \text{ A}$	-	-	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	$\mu\text{A}$
$t_{rr}$	$I_F = 1 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	-	-	55	ns
	$I_F = 15 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	-	-	60	ns
$t_a$	$I_F = 1 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	-	20	-	ns
	$I_F = 15 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	-	30	-	ns
$t_b$	$I_F = 1 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	-	15	-	ns
	$I_F = 15 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	-	17	-	ns

### 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).

$pw$  = pulse width.

$D$  = duty cycle.



Typical Performance Curves

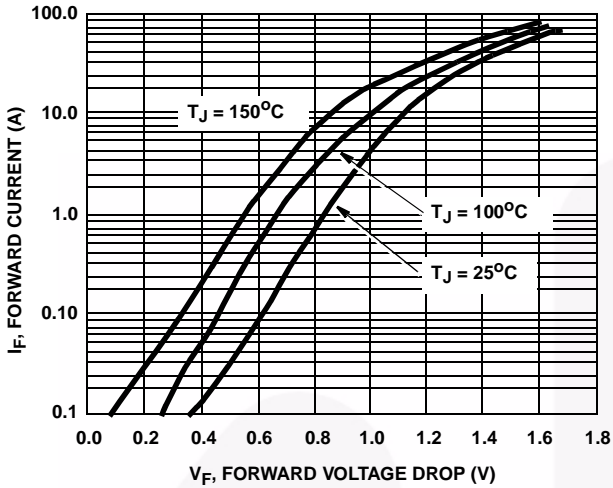


FIGURE 1. FORWARD VOLTAGE vs FORWARD CURRENT CHARACTERISTIC

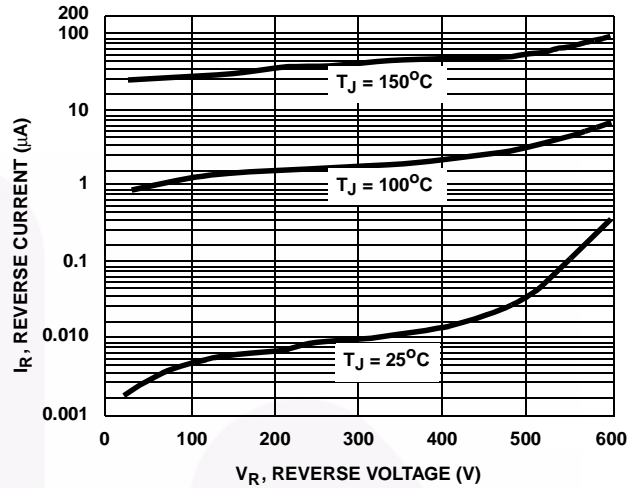


FIGURE 2. REVERSE VOLTAGE vs REVERSE CURRENT CHARACTERISTIC

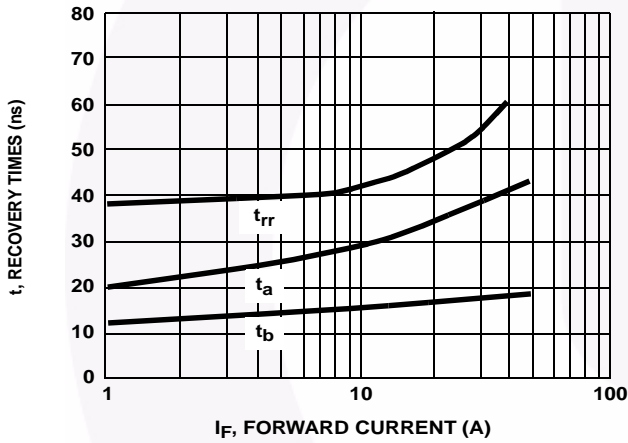


FIGURE 3. 5. TYPICAL  $t_{RR}$ ,  $t_A$  AND  $t_B$  CURVES vs FORWARD CURRENT

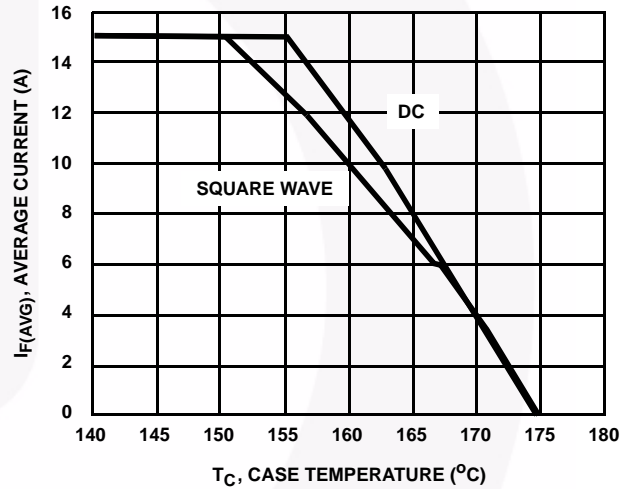


FIGURE 4. 6. TYPICAL CURRENT DERATING CURVE vs CASE TEMPERATURE

Test Circuits and Waveforms

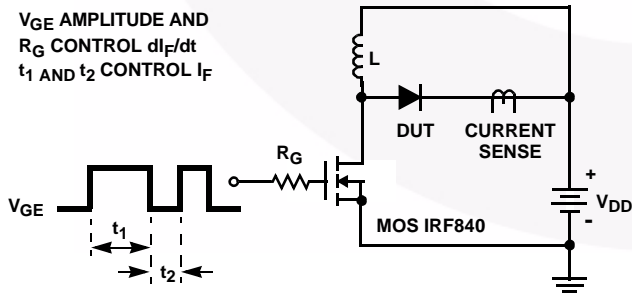


FIGURE 5.  $t_{rr}$  TEST CIRCUIT

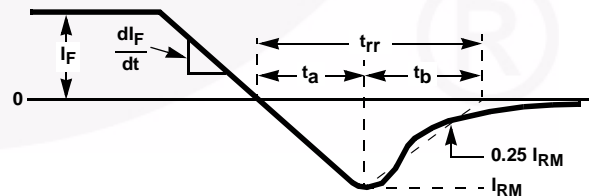


FIGURE 6.  $t_{rr}$  WAVEFORMS AND DEFINITIONS

Test Circuits and Waveforms (Continued)

$I = 1A$   
 $L = 40mH$   
 $R < 0.1\Omega$   
 $V_{DD} = 50V$   
 $E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$   
 $Q_1 = IGBT (BV_{CES} > DUT V_{R(AVL)})$

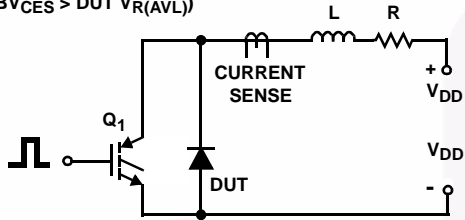


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

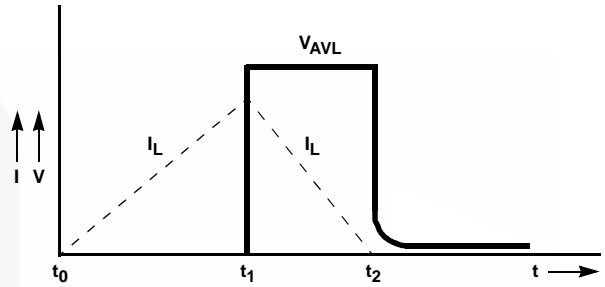
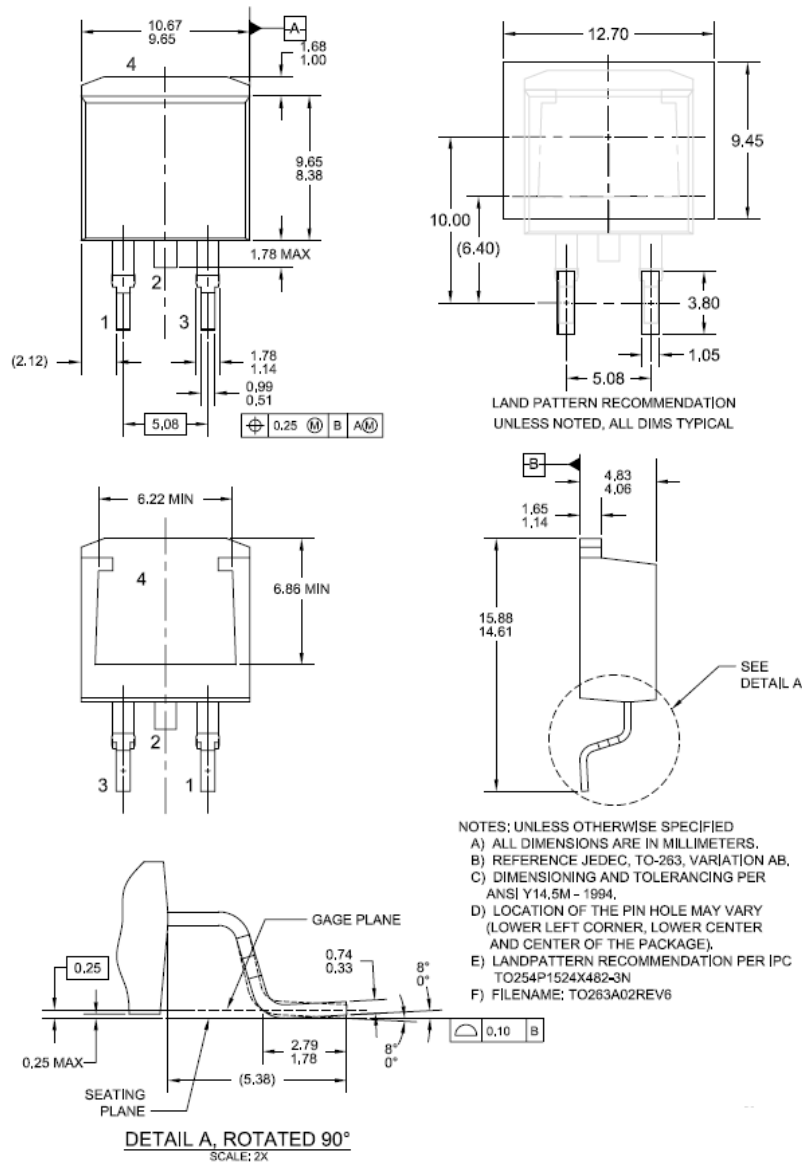


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS



**Mechanical Dimensions**



**Figure 9. TO-263 2L (D<sup>2</sup>-PAK) - 2LD, TO263, SURFACE MOUNT**

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