

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.

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

Ordering Information

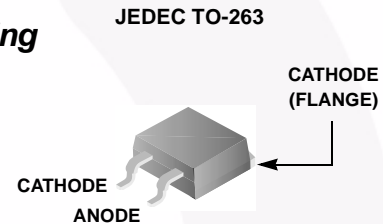
PART NUMBER	PACKAGE	BRAND
RUR1S1560S	TO-263-3L	RUR1560

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



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	$^\circ\text{C}$
THERMAL SPECIFICATIONS			
$R_{\theta JC}$	Thermal Resistance Junction to Case	1.5	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	60	$^\circ\text{C/W}$

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	μA
	$V_R = 600\text{ V}, T_C = 150^\circ\text{C}$	-	-	500	μA
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

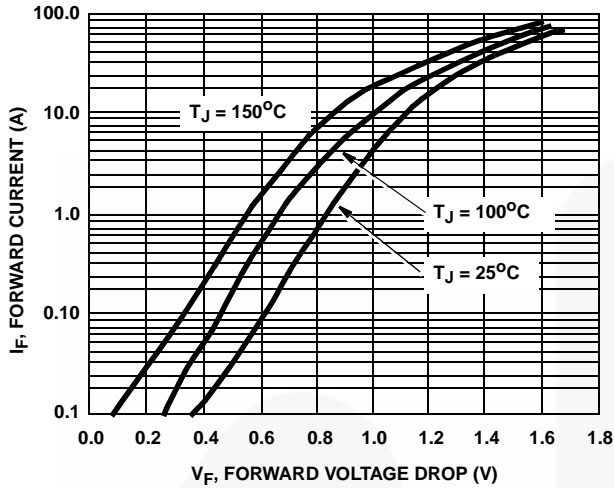


FIGURE 1. FORWARD VOLTAGE vs FORWARD CURRENT CHARACTERISTIC

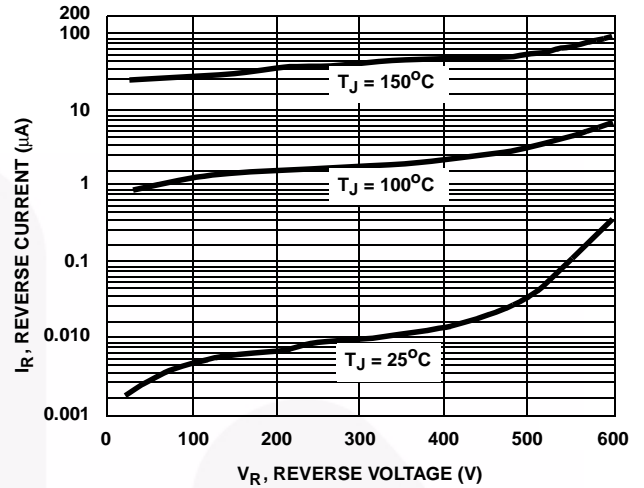


FIGURE 2. REVERSE VOLTAGE vs REVERSE CURRENT CHARACTERISTIC

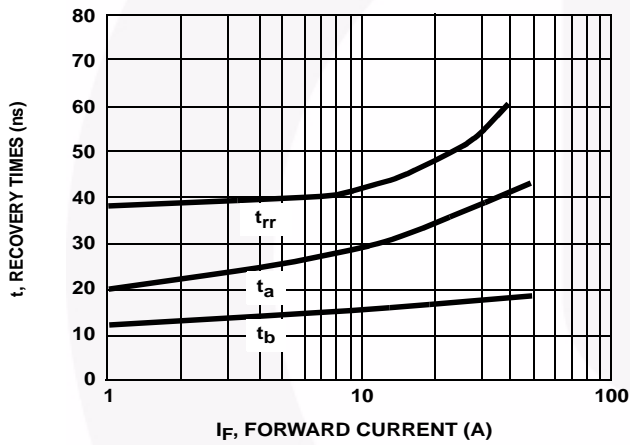


FIGURE 3. 5. TYPICAL t_{RR} , t_A AND t_B CURVES vs FORWARD CURRENT

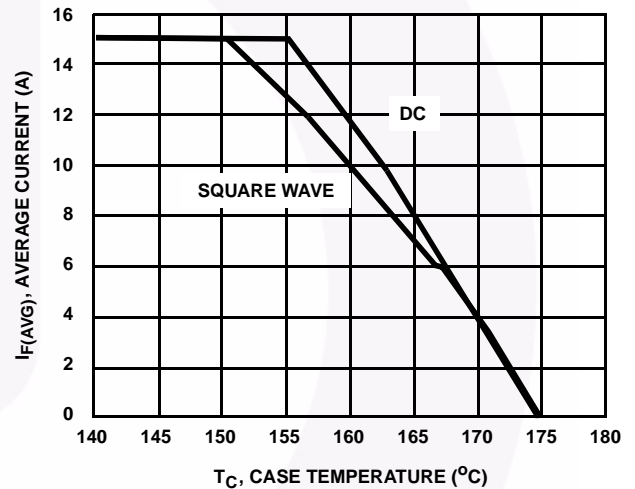


FIGURE 4. 6. TYPICAL CURRENT DERATING CURVE vs CASE TEMPERATURE

Test Circuits and Waveforms

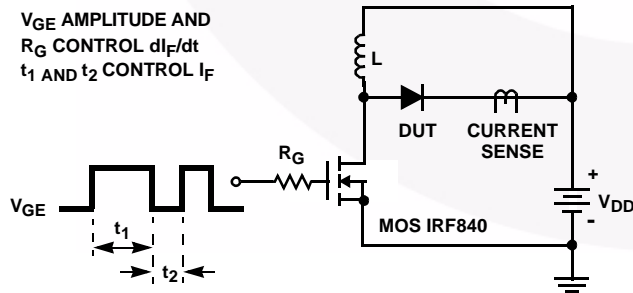


FIGURE 5. t_{rr} TEST CIRCUIT

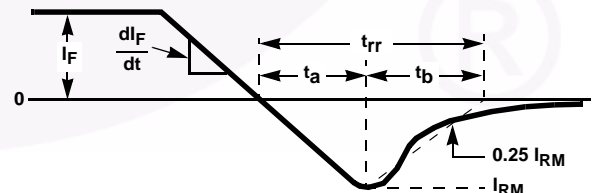


FIGURE 6. t_{rr} WAVEFORMS AND DEFINITIONS

Test Circuits and Waveforms (Continued)

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

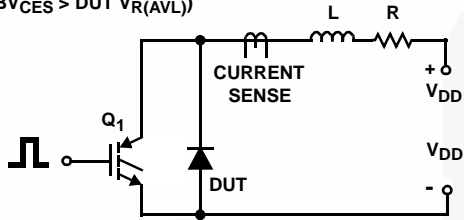


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

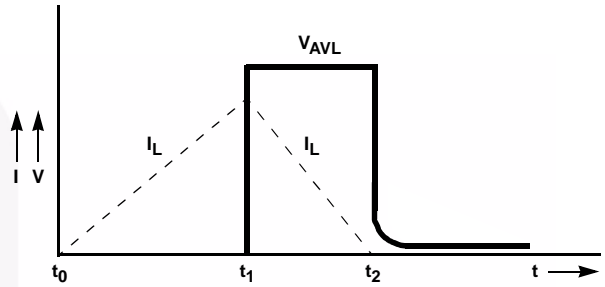


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Mechanical Dimensions

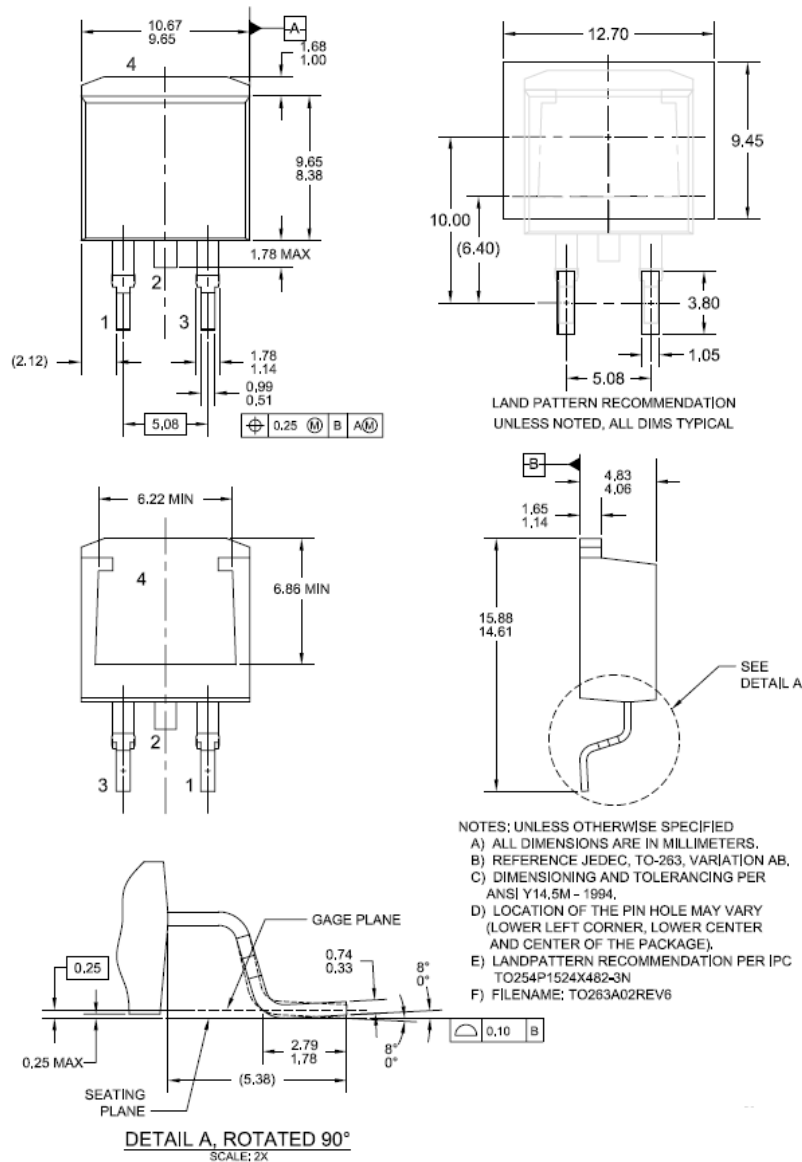


Figure 9. TO-263 2L (D²-PAK) - 2LD, TO263, SURFACE MOUNT

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Rev. I66