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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.

Features

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

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

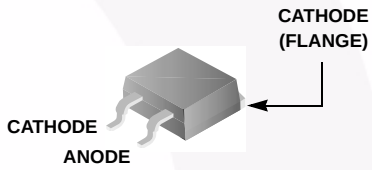
Ordering Information

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.

Packaging

JEDEC TO-263



Symbol

Absolute Maximum Ratings T_C = 25°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	°C
T_L T_{pkg}	Maximum Temperature for Soldering Leads at 0.063 in (1.6 mm) from Case for 10 s Package Body for 10s, See Techbrief TB334	300 260	°C °C
THERMAL SPECIFICATIONS			
$R_{\theta JC}$	Thermal Resistance Junction to Case	1.5	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	60	°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.*

Electrical Specifications $T_C = 25^oC$, Unless Otherwise Specified

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
V_F	I_F = 15 A	-	-	1.5	V
	I_F = 15 A, $T_C = 150^oC$	-	-	1.2	V
I_R	V_R = 600 V	-	-	100	µA
	V_R = 600 V, $T_C = 150^oC$	-	-	500	µA
t_{rr}	I_F = 1 A, dI_F/dt = 100 A/µs, V_R = 30 V	-	-	55	ns
	I_F = 15 A, dI_F/dt = 100 A/µs, V_R = 30 V	-	-	60	ns
t_a	I_F = 1 A, dI_F/dt = 100 A/µs, V_R = 30 V	-	20	-	ns
	I_F = 15 A, dI_F/dt = 100 A/µs, V_R = 30 V	-	30	-	ns
t_b	I_F = 1 A, dI_F/dt = 100 A/µs, V_R = 30 V	-	15	-	ns
	I_F = 15 A, dI_F/dt = 100 A/µs, V_R = 30 V	-	17	-	ns

DEFINITIONS

V_F = Instantaneous forward voltage (pw = 300µs, 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

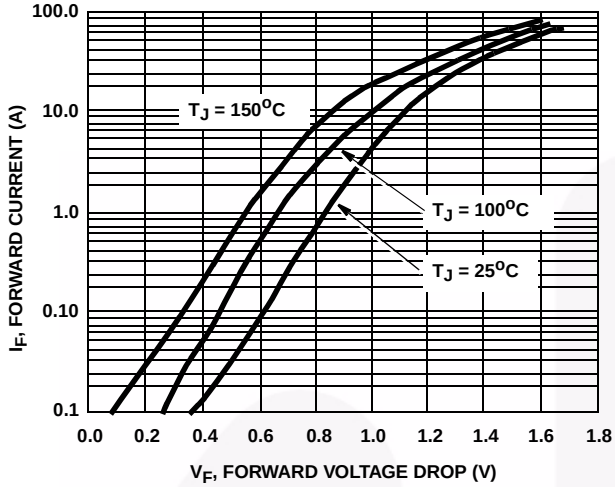


FIGURE 1. FORWARD VOLTAGE vs FORWARD CURRENT CHARACTERISTIC

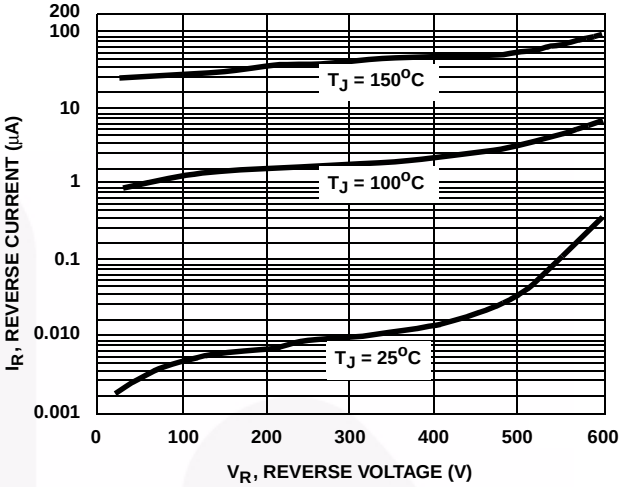


FIGURE 2. REVERSE VOLTAGE vs REVERSE CURRENT CHARACTERISTIC

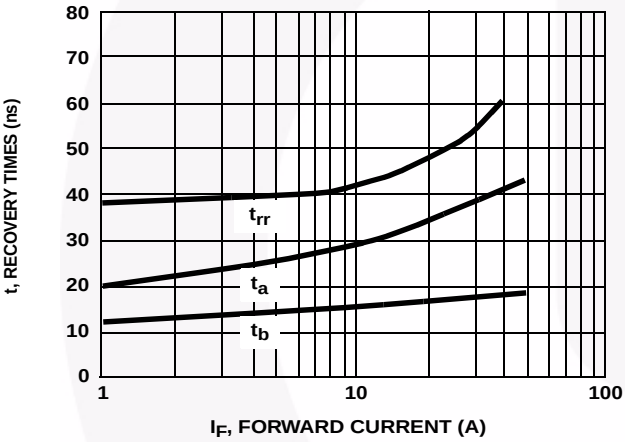


FIGURE 3. 5. TYPICAL t_{RR}, t_A AND t_B CURVES vs FORWARD CURRENT

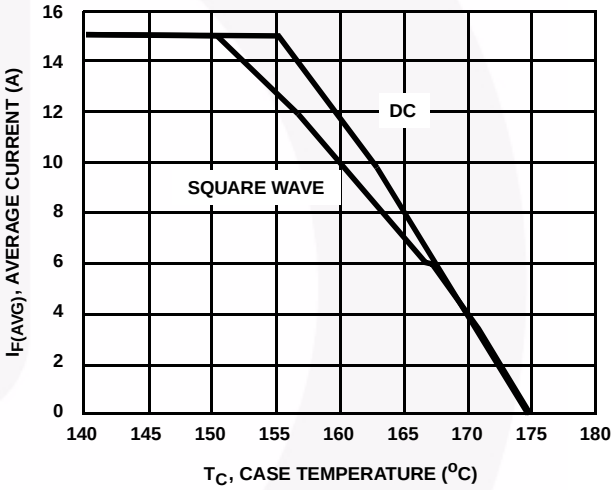


FIGURE 4. 6. TYPICAL CURRENT DERATING CURVE vs CASE TEMPERATURE

Test Circuits and Waveforms

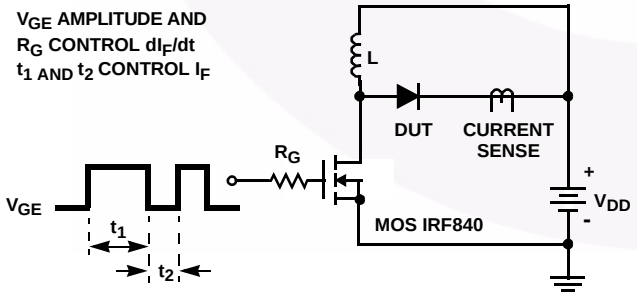


FIGURE 5. t_{rr} TEST CIRCUIT

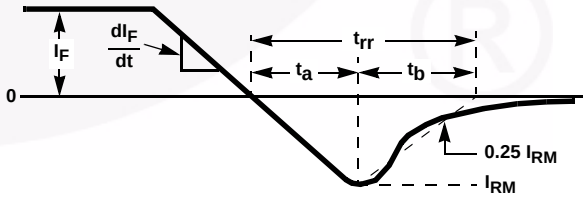


FIGURE 6. t_{rr} WAVEFORMS AND DEFINITIONS

Test Circuits and Waveforms (Continued)

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

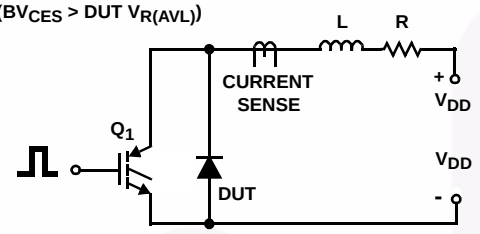


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

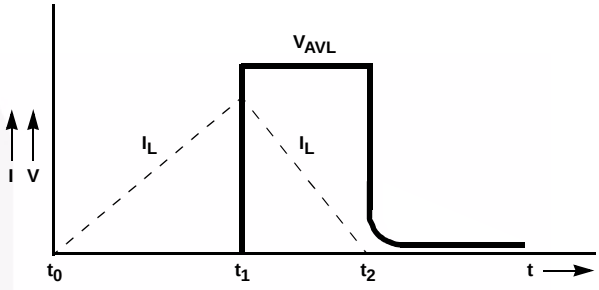


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Mechanical Dimensions

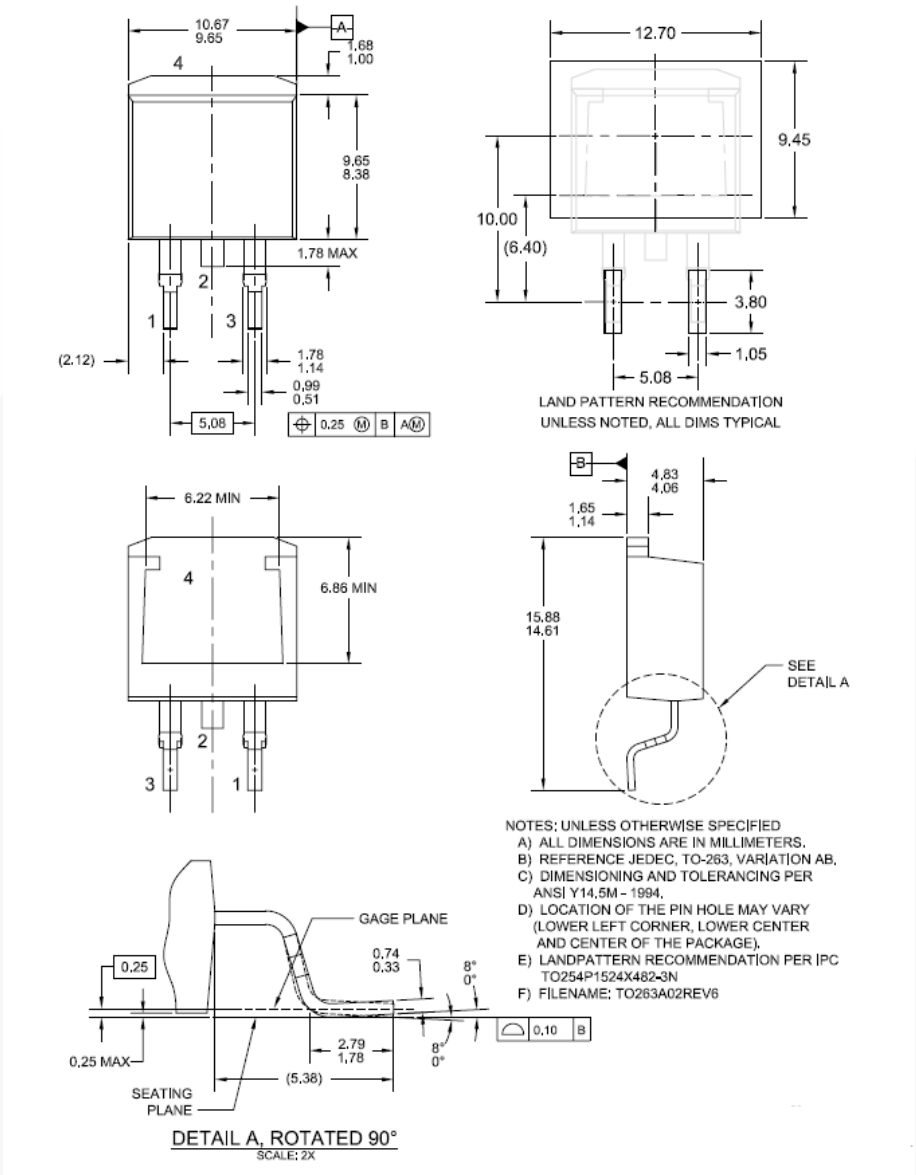


Figure 9. TO-263 2L (D²-PAK) - 2LD,TO263, SURFACE MOUNT

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