

# 15 A, 600 V, Ultrafast Diode

## RUR1S1560S9A

### Description

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

### Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

### ABSOLUTE MAXIMUM RATINGS

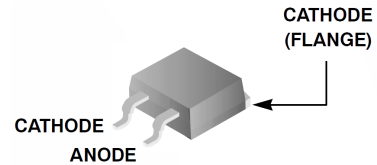
( $T_C = 25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Value	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
Repetitive Peak Surge Current (20 kHz Square Wave)	$I_{FRM}$	30	A
Nonrepetitive Peak Surge Current (Halfwave 1 Phase 60 Hz)	$I_{FSM}$	200	A
Power Dissipation	$P_D$	100	W
Avalanche Energy (1 A, 40 mH)	$E_{AVL}$	20	mJ
Operating and Storage Temperature	$T_J, T_{STG}$	-55 to 175	$^\circ\text{C}$
Maximum Temperature for Soldering Leads at 0.063 in (1.6 mm) from Case for 10 s, Package Body for 10 s, see Techbrief TB334	$T_L$ $T_{pkg}$	300 260	$^\circ\text{C}$ $^\circ\text{C}$

### THERMAL SPECIFICATIONS

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

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

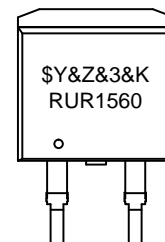


D<sup>2</sup>PAK2 (TO-263-2L)  
CASE 418BK

### SYMBOL



### MARKING DIAGRAM



\$Y = Logo  
&Z = Assembly Plant Code  
&3 = Date Code  
&K = Lot Run Traceability Code  
RUR1560 = Specific Device Code

### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

# RUR1S1560S9A

## ELECTRICAL CHARACTERISTICS

( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
$V_F$	Instantaneous Forward Voltage (Pulse width = 300 $\mu\text{s}$ , Duty cycle = 2%)	$I_F = 15 \text{ A}$	–	–	1.5	V
		$I_F = 15 \text{ A}, T_C = 150^\circ\text{C}$	–	–	1.2	
$I_R$	Instantaneous Reverse Current	$V_R = 600 \text{ V}$	–	–	100	$\mu\text{A}$
		$V_R = 600 \text{ V}, T_C = 150^\circ\text{C}$	–	–	500	
$t_{rr}$	Reverse Recovery Time (see Package Dimensions section), summation of $t_a + t_b$	$I_F = 1 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	–	–	55	ns
		$I_F = 15 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	–	–	60	
$t_a$	Time to Reach Peak Reverse Current (see Package Dimensions section)	$I_F = 1 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	–	20	–	ns
		$I_F = 15 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	–	30	–	
$t_b$	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 Package Dimensions section).	$I_F = 1 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	–	15	–	ns
		$I_F = 15 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	–	17	–	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## ORDERING INFORMATION

Part Number	Top Mark	Package	Shipping <sup>†</sup>
RUR1S1560S9A	RUR1560	D <sup>2</sup> PAK2 (TO–263–2L) (Pb–Free)	800 Units/ Tape & Reel

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

TYPICAL PERFORMANCE CHARACTERISTICS

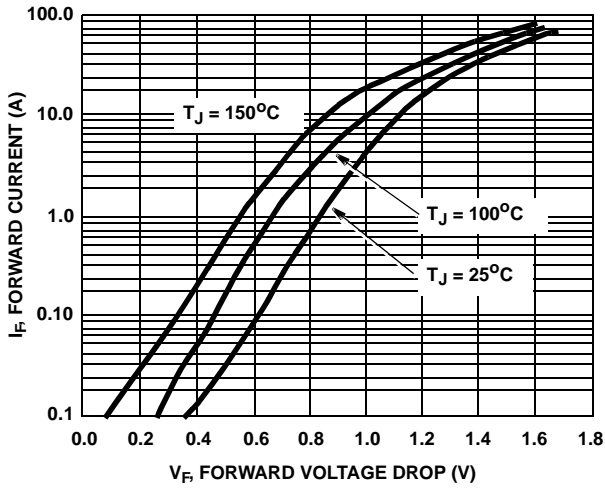


Figure 1. Forward Voltage vs. Forward Current

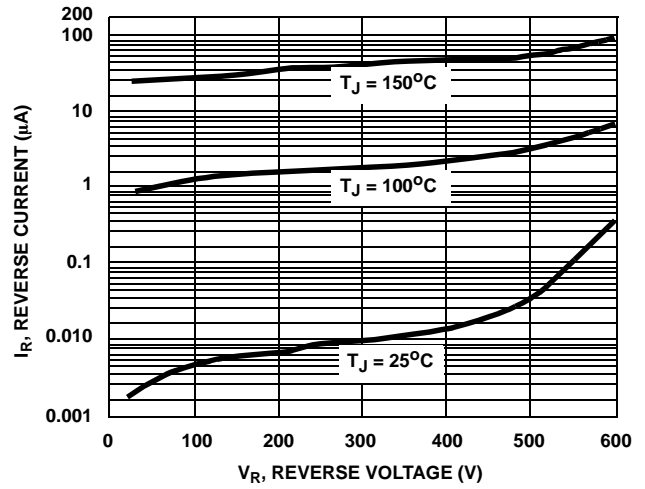


Figure 2. Reverse Voltage vs. Reverse Current

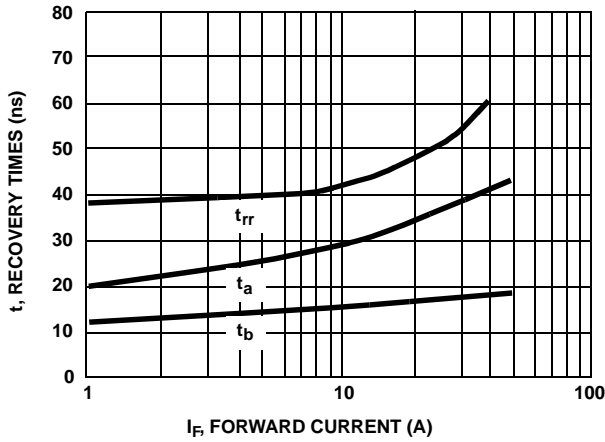


Figure 3. Typical  $t_{rr}$ ,  $t_a$  and  $t_b$  Curves vs. Forward Current

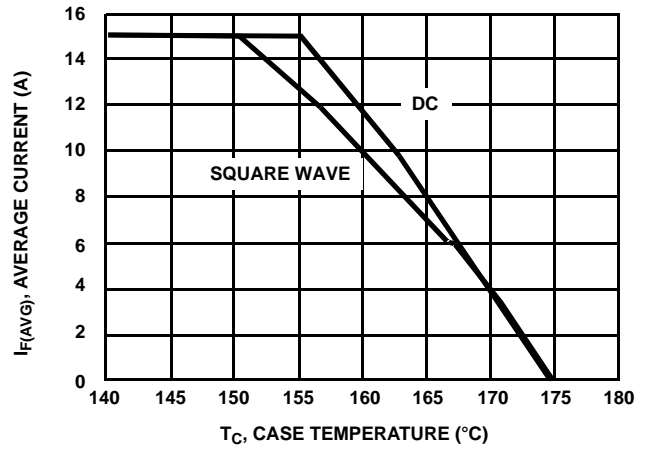


Figure 4. Typical Current Derating Curve vs. Case Temperature

TEST CIRCUITS AND WAVEFORMS

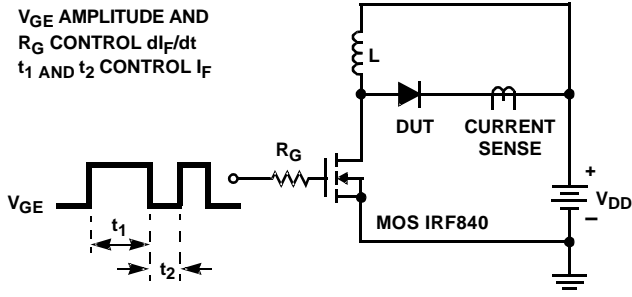


Figure 5.  $t_{rr}$  Test Circuit

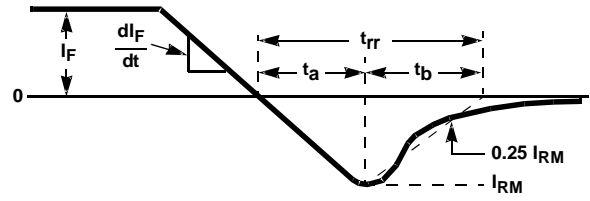


Figure 6.  $t_{rr}$  Waveforms and Definitions

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

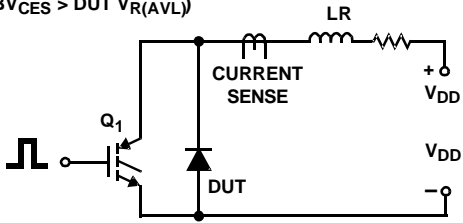


Figure 7. Avalanche Energy Test Circuit

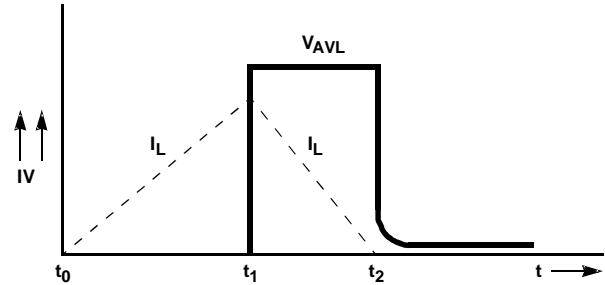


Figure 8. Avalanche Current and Voltage Waveforms

# MECHANICAL CASE OUTLINE

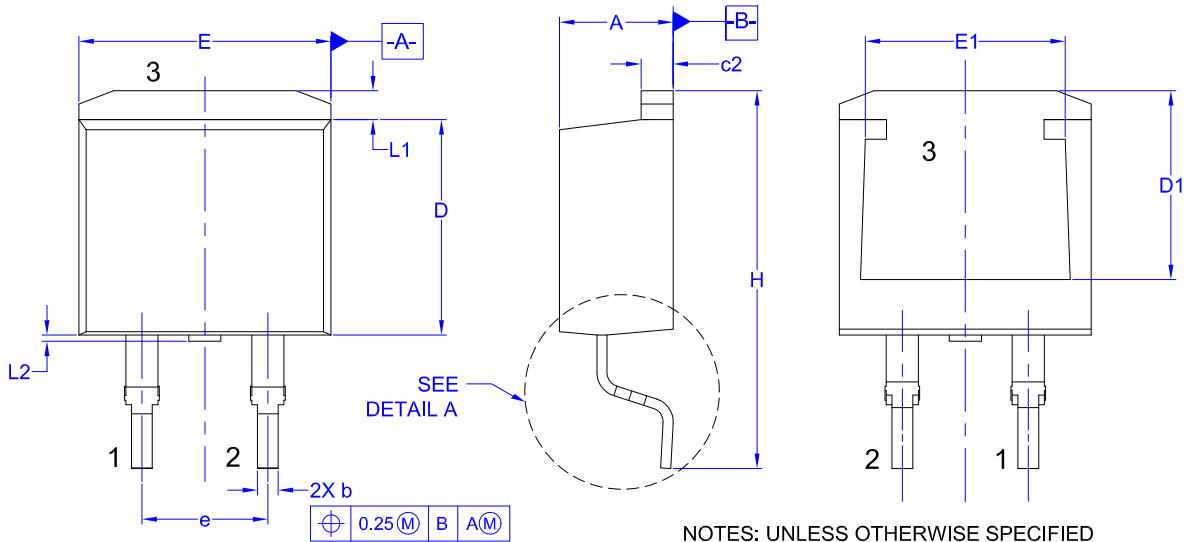
## PACKAGE DIMENSIONS

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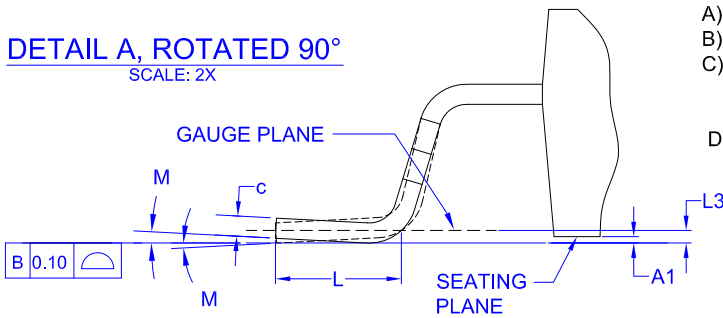


### D<sup>2</sup>PAK2 (TO-263-2L) CASE 418BK ISSUE O

DATE 02 AUG 2018

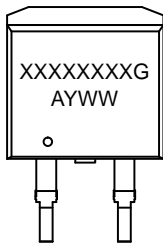


**DETAIL A, ROTATED 90°**  
SCALE: 2X



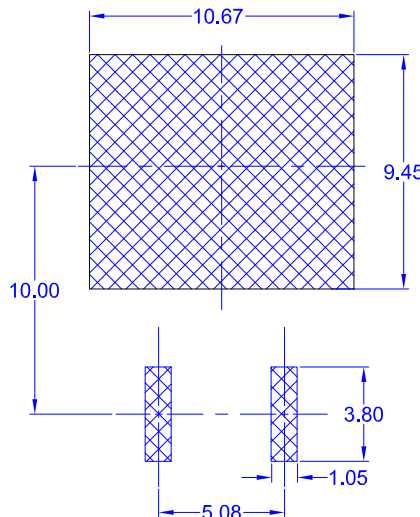
- NOTES: UNLESS OTHERWISE SPECIFIED
- A) ALL DIMENSIONS ARE IN MILLIMETERS.
  - B) REFERENCE JEDEC, TO-263, VARIATION AB.
  - C) DIMENSIONING AND TOLERANCING PER DIMENSIONING AND TOLERANCING PER ASME Y14.5 - 2009.
  - D) LANDPATTERN RECOMMENDATION PER IPC TO254P1524X482-3N

#### GENERIC MARKING DIAGRAM\*



- XXX = Specific Device Code
- A = Assembly Location
- Y = Year
- WW = Work Week
- G = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



LAND PATTERN RECOMMENDATION  
UNLESS NOTED, ALL DIMS TYPICAL

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.06	4.57	4.83
A1	0.00	0.10	0.25
b	0.51	0.81	0.99
c	0.30	0.407	0.74
c2	1.14	1.30	1.65
D	8.38	8.69	9.65
D1	7.30	7.80	8.30
E	9.65	10.16	10.67
E1	8.00	8.62	9.00
e	5.08 BSC		
H	14.60	15.35	15.88
L	1.78	2.54	2.79
L1	0.90	1.29	1.68
L2	0.00	0.15	0.25
L3	0.25 BSC		
M	0°	4°	8°

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