

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 $t_{rr} = 60$ 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
- These Devices are Pb-Free and are RoHS Compliant

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

ABSOLUTE MAXIMUM RATINGS

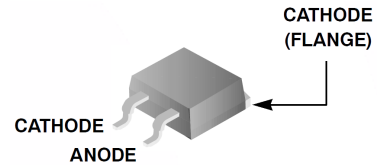
($T_C = 25^\circ\text{C}$ unless otherwise specified)

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

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.

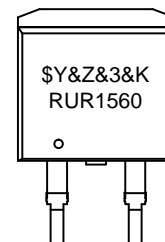


D²PAK2 (TO-263-2L)
CASE 418BK

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 μs , 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	μA
		$V_R = 600\text{ V}, T_C = 150^\circ\text{C}$	-	-	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 [†]
RUR1S1560S9A	RUR1560	D ² PAK2 (TO-263-2L) (Pb-Free)	800 Units/ Tape & Reel

[†]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

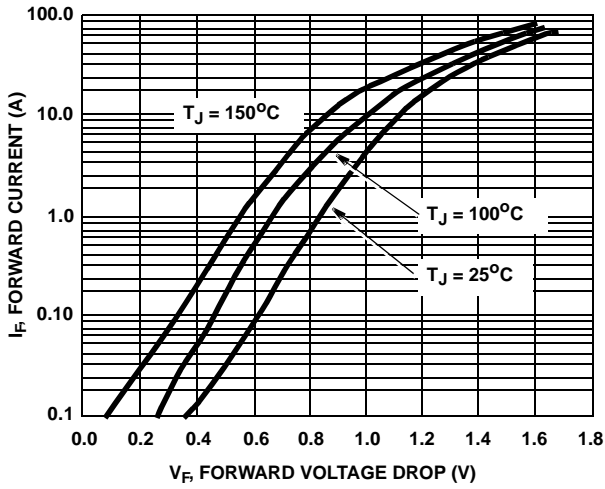


Figure 1. Forward Voltage vs. Forward Current

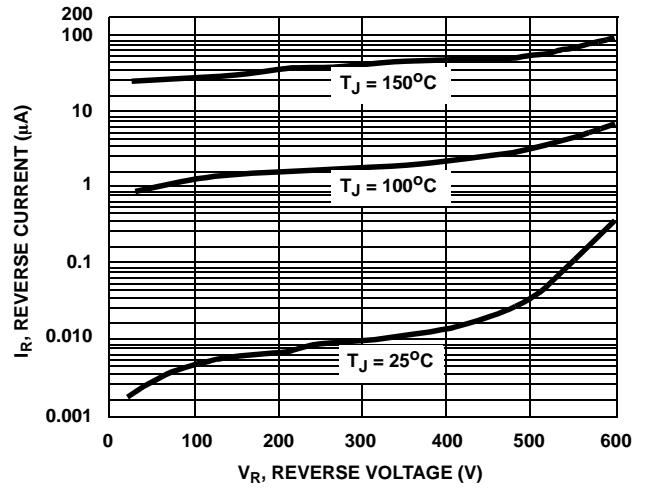


Figure 2. Reverse Voltage vs. Reverse Current

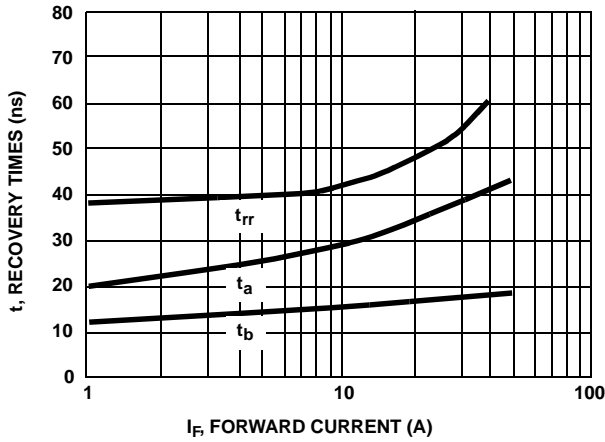


Figure 3. Typical t_{rr} , t_a and t_b Curves vs. Forward Current

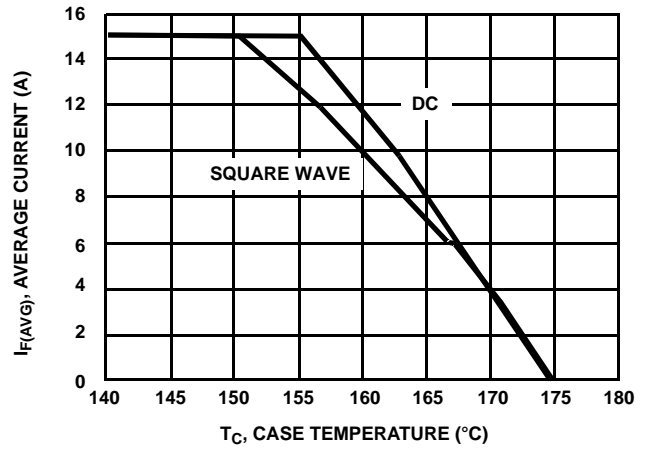


Figure 4. Typical Current Derating Curve vs. Case Temperature

TEST CIRCUITS AND WAVEFORMS

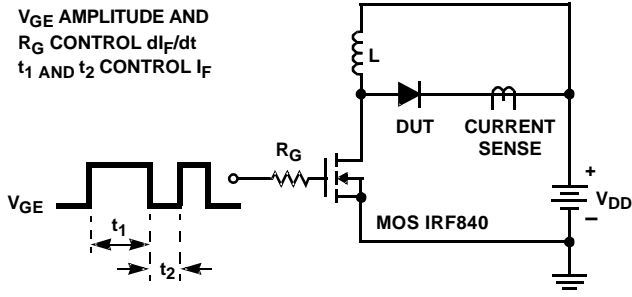


Figure 5. t_{rr} Test Circuit

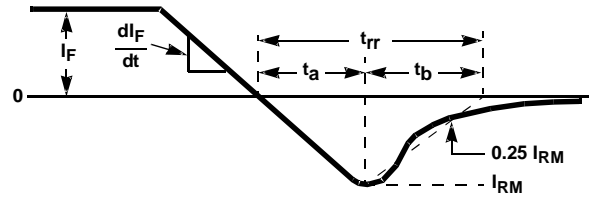


Figure 6. t_{rr} Waveforms and Definitions

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

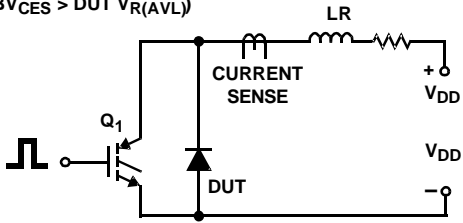


Figure 7. Avalanche Energy Test Circuit

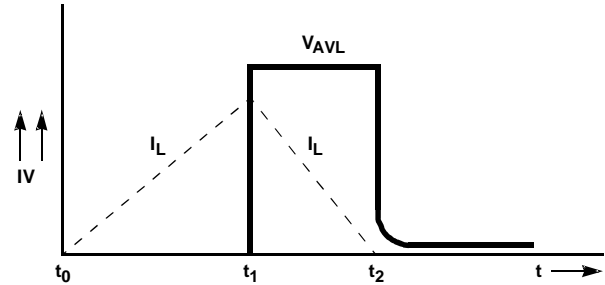


Figure 8. Avalanche Current and Voltage Waveforms

MECHANICAL CASE OUTLINE

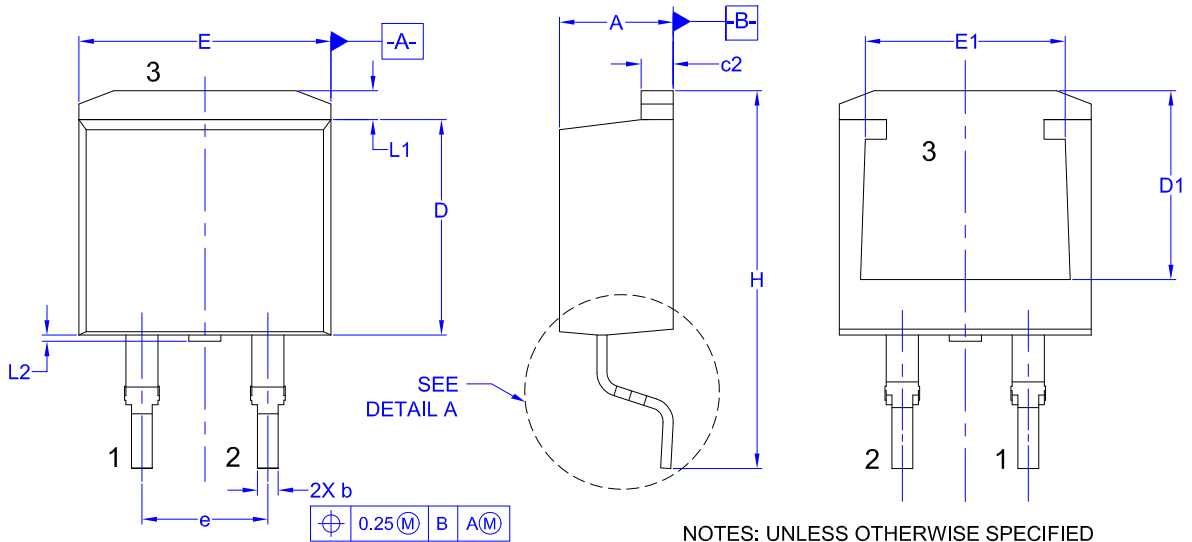
PACKAGE DIMENSIONS

ON Semiconductor®

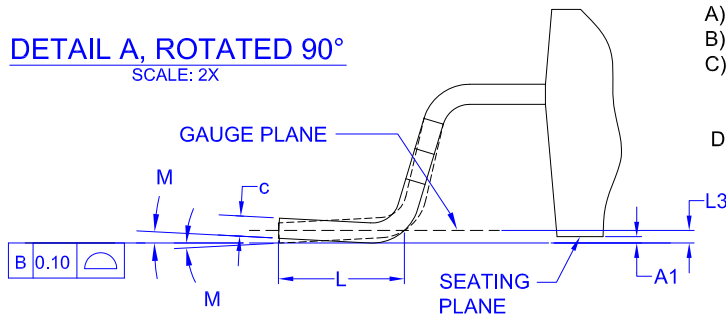


D²PAK2 (TO-263-2L) CASE 418BK ISSUE O

DATE 02 AUG 2018

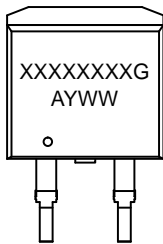


DETAIL A, ROTATED 90°
SCALE: 2X



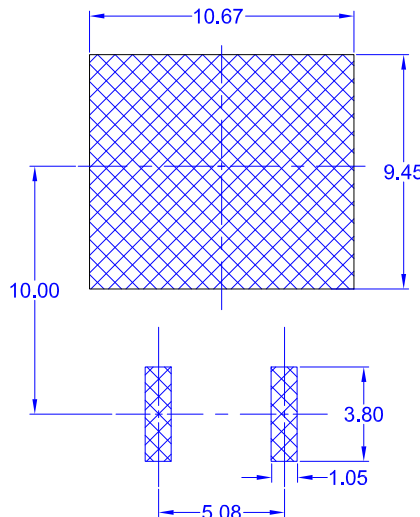
- NOTES: UNLESS OTHERWISE SPECIFIED
- A) ALL DIMENSIONS ARE IN MILLIMETERS.
 - B) REFERENCE JEDEC, TO-263, VARIATION AB.
 - C) DIMENSIONING AND TOLERANCING PER DIMENSIONING AND TOLERANCING PER ASME Y14.5 - 2009.
 - D) LANDPATTERN RECOMMENDATION PER IPC TO254P1524X482-3N

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°

DOCUMENT NUMBER:	98AON93788G	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	D²PAK2 (TO-263-2L)	PAGE 1 OF 1

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Email Requests to: orderlit@onsemi.com

onsemi Website: www.onsemi.com

TECHNICAL SUPPORT

North American Technical Support:
Voice Mail: 1 800-282-9855 Toll Free USA/Canada
Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative