

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

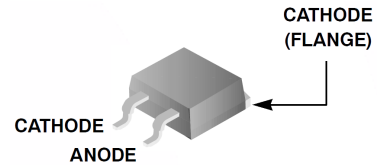
($T_C = 25^\circ\text{C}$ unless otherwise specified)

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	$^\circ\text{C/W}$
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.

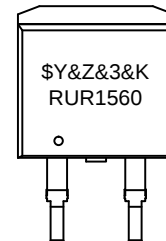


D²PAK2 (TO-263-2L)
CASE 418BK

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

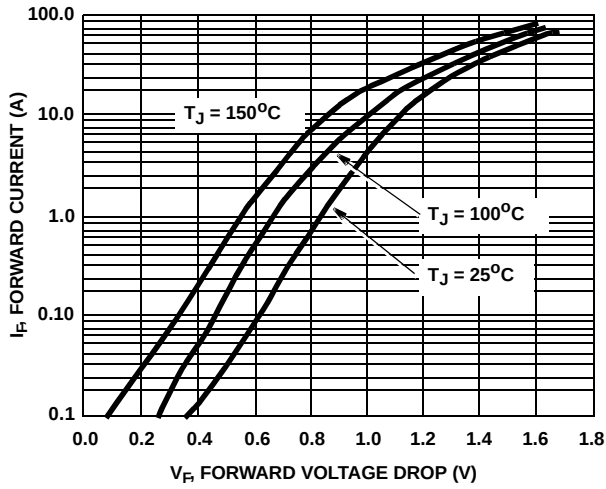


Figure 1. Forward Voltage vs. Forward Current

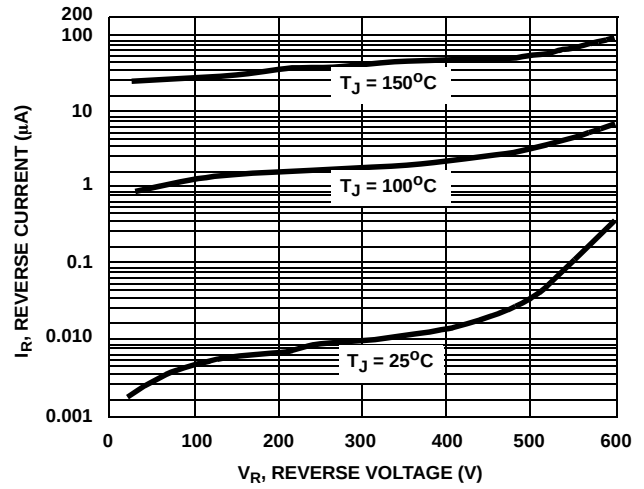


Figure 2. Reverse Voltage vs. Reverse Current

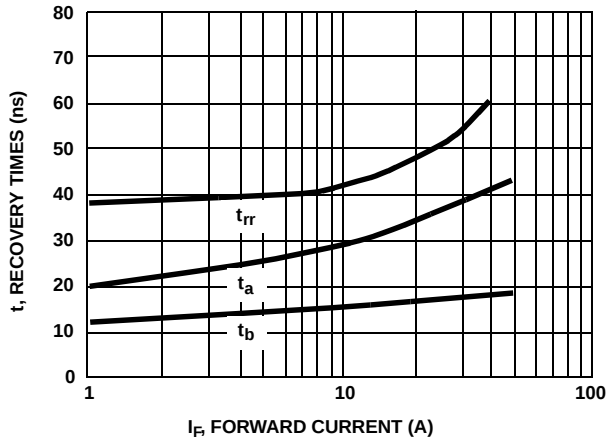


Figure 3. Typical t_{rr} , t_a and t_b Curves vs. Forward Current

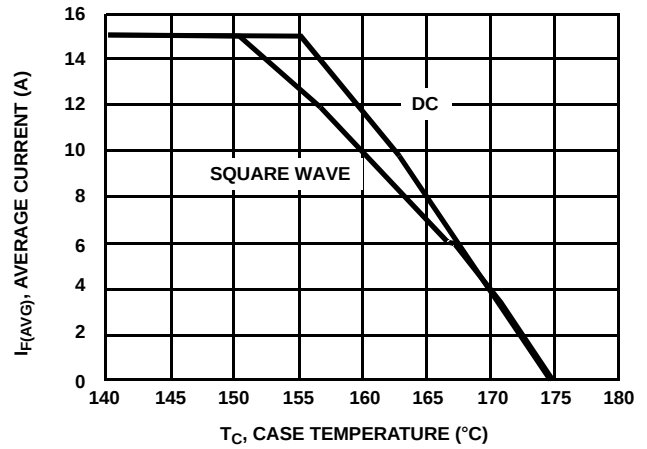


Figure 4. Typical Current Derating Curve vs. Case Temperature

TEST CIRCUITS AND WAVEFORMS

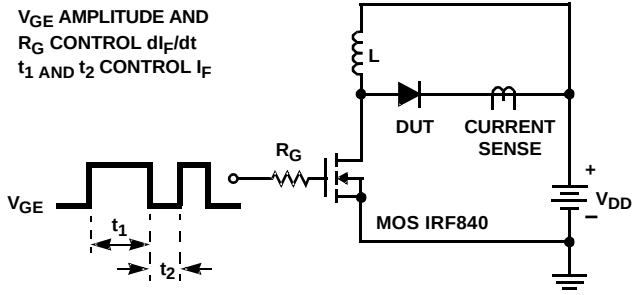


Figure 5. t_{rr} Test Circuit

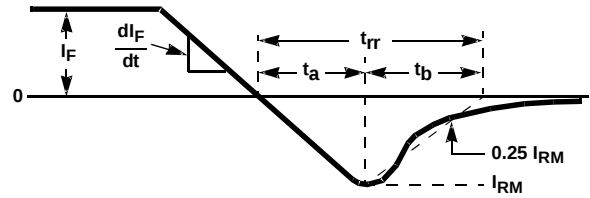


Figure 6. t_{rr} Waveforms and Definitions

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

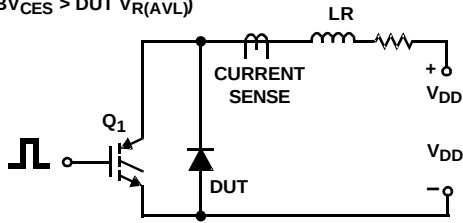


Figure 7. Avalanche Energy Test Circuit

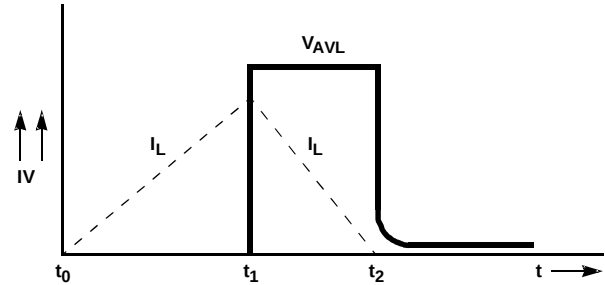
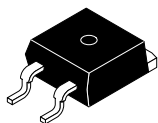


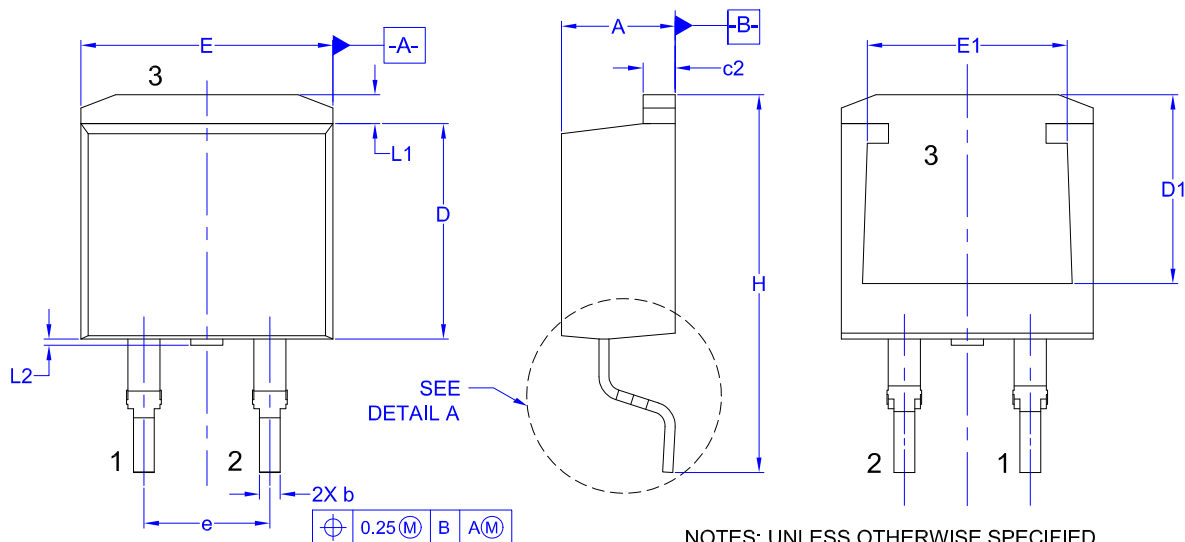
Figure 8. Avalanche Current and Voltage Waveforms

MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

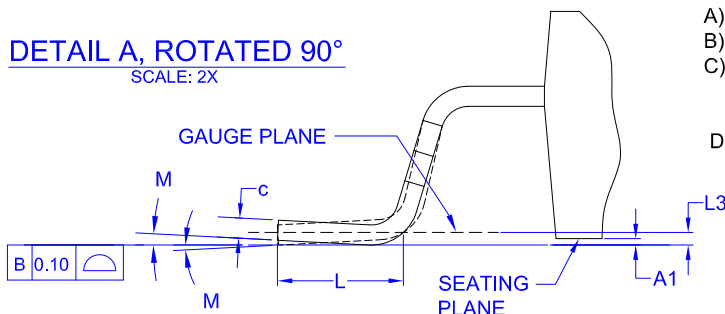


D²PAK2 (TO-263-2L)
CASE 418BK
ISSUE O

DATE 02 AUG 2018



DETAIL A, ROTATED 90°
SCALE: 2X



NOTES: UNLESS OTHERWISE SPECIFIED

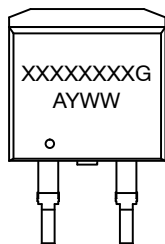
A) ALL DIMENSIONS ARE IN MILLIMETERS.

B) REFERENCE JEDEC, TO-263, VARIATION AB.

C) DIMENSIONING AND TOLERANCING PER
DIMENSIONING AND TOLERANCING PER
ASME Y14.5 - 2009.

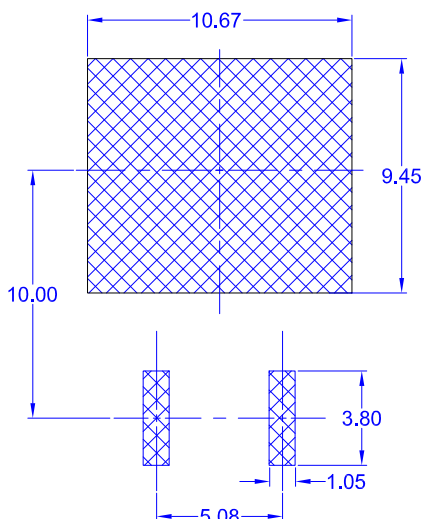
D) LANDPATTERN RECOMMENDATION PER IPC
TO254P1524X482-3N

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°

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DESCRIPTION: D²PAK2 (TO-263-2L)

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