Ultrafast Rectifier
80 A, 1000 V

RURG80100-F085

Description

The RURG80100−F085 is an ultrafast diode with low forward voltage drop and soft recovery characteristics. Its low voltage drop and ultrafast soft recovery minimize conduction loss and electrical noise in power switching circuit. Meanwhile, the robust design and high quality manufacture process make it a reliable device for heavy duty automotive applications.

This device is intended to be used in a variety of automotive power−train applications for purposes like freewheeling, clamping, rectification, bootstrap and snubber, etc. It's also an ideal device for non−automotive applications which requires a higher reliability performance.

Features

- Ultrafast and Soft Recovery
- Low Forward Voltage (V_F = 1.56 V (Typ.) @ I_F = 80 A)
- High Speed Switching (t_{rr} = 242 ns (Typ.) @ I_F = 80 A)
- Avalanche Energy Rated
- AEC−Q101 Qualified and PPAP Capable
- This is a Pb−Free Device

Applications

- EV and HEV On−Board Charger
- Stationary Charger
- Other Automotive Applications
- General Power Supply Requiring Higher Reliability

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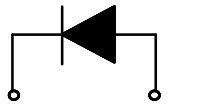

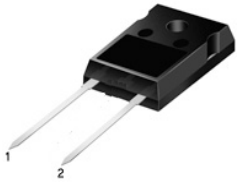

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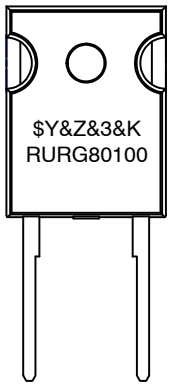
CASE 340CL

MARKING DIAGRAM



RURG80100	= Specific Device Code
$Y	= ON Semiconductor Logo
&Z	= Assembly Plant Code
&3	= Data Code (Year & Week)
&K	= Lot

ORDERING INFORMATION

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

ABSOLUTE MAXIMUM RATINGS T_C = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{RRM}	Peak Repetitive Reverse Voltage	1000	V
V_{RWM}	Working Peak Reverse Voltage	1000	V
V_R	DC Blocking Voltage	1000	V
$I_{F(AV)}$	Average Rectified Forward Current @ T_C = 25°C	80	A
I_{FSM}	Non−repetitive Peak Surge Current (Halfwave 1 Phase 50 Hz)	240	A
E_{AVL}	Avalanche Energy (1.6 A, 40 mH)	50	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature	−55 to +175	°C

THERMAL CHARACTERISTICS T_C = 25°C unless otherwise noted

Symbol	Parameter	Max.	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	0.3	°C/W
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient	45	°C/W

PACKAGE MARKING AND ORDERING INFORMATION

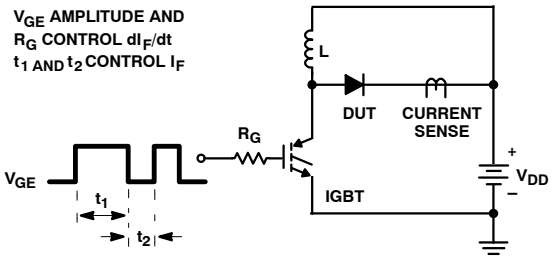
Device Marking	Device	Package	Pacing Type	Qty per Tube
RURG80100	RURG80100−F085	TO−247	−	30

ELECTRICAL CHARACTERISTICS T_C = 25°C unless otherwise noted

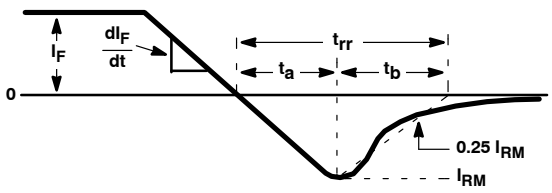
Symbol	Parameter	Conditions		Min.	Typ.	Max	Units
I_R	Instantaneous Reverse Current	V_R = 1000 V	T_C = 25°C	−	−	250	μA
			T_C = 175°C	−	−	1.5	mA
V_{FM} (Note 1)	Instantaneous Forward Voltage	I_F = 80 A	T_C = 25°C T_C = 175°C	− −	1.56 1.35	2.0 1.7	V V
t_{rr} (Note 2)	Reverse Recovery Time	I_F =1 A, di/dt = 100 A/μs, V_{CC}= 650 V	T_C = 25°C	−	122	158	ns
		I_F = 80 A, di/dt = 100 A/μs, V_{CC}= 650 V	T_C = 25°C T_C = 175°C	− −	242 979	314 −	ns ns
t_a t_b Q_{rr}	Reverse Recovery Time Reverse Recovery Charge	I_F = 80 A, di/dt = 100 A/μs, V_{CC}= 650 V	T_C = 25°C	− − −	74 168 751	− − −	ns ns nC

1. Pulse: Test Pulse width = 300 μs, Duty Cycle = 2%.
2. Guaranteed by design.

TEST CIRCUIT AND WAVEFORMS

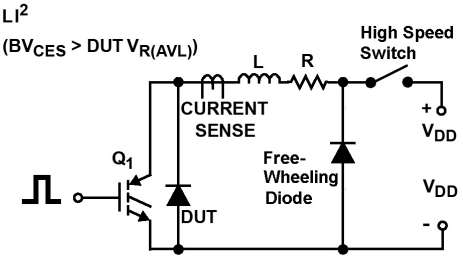


t_{rr} Test Circuit

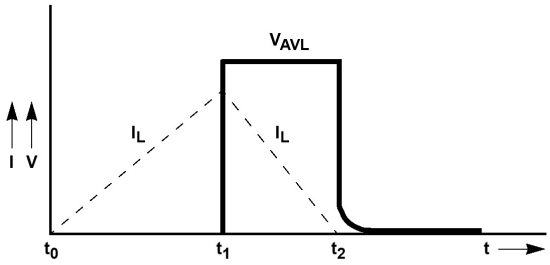


t_{rr} Waveforms and Definitions

I = 1.6 A
L = 40mH
R < 0.1Ω
$E_{AVL} = 1/2\,LI^2$
Q_1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)



Avalanche Energy Test Circuit



Avalanche Current and Voltage Waveforms

Figure 1. Test Circuit and Waveforms

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

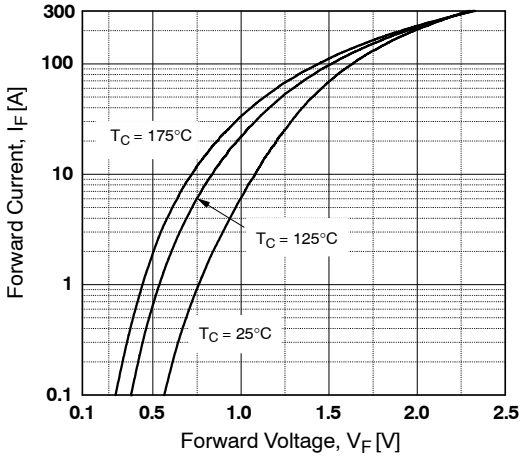


Figure 2. Typical Forward Voltage Drop vs. Forward Current

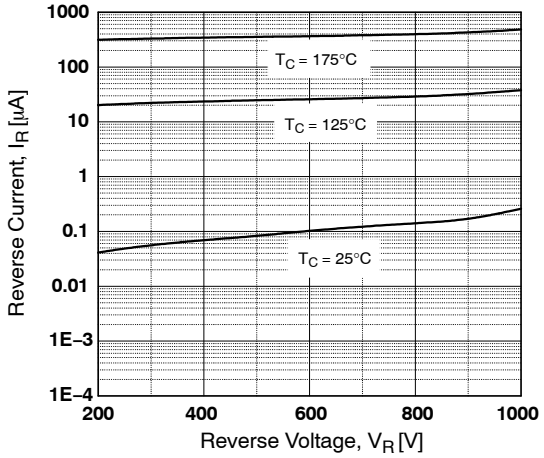


Figure 3. Typical Reverse Current vs. Reverse Voltage

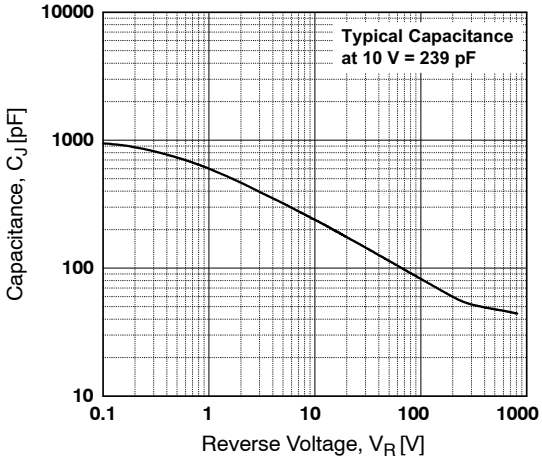


Figure 4. Typical Junction Capacitance

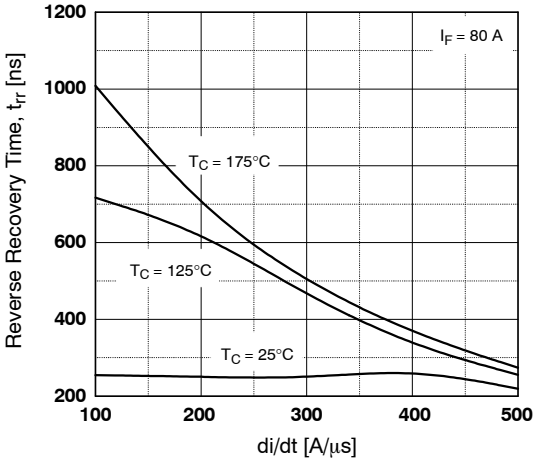


Figure 5. Typical Reverse Recovery Time vs. di/dt

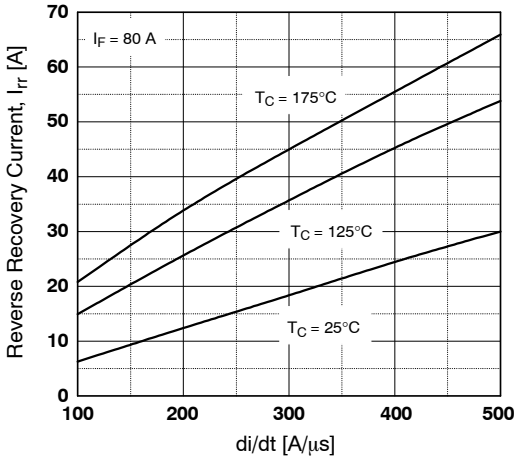


Figure 6. Typical Reverse Recovery Current vs. di/dt

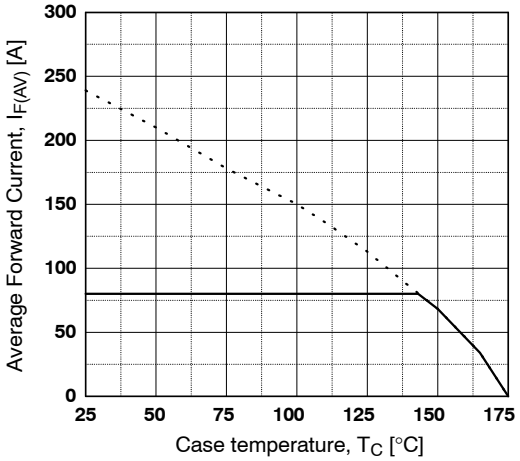


Figure 7. Forward Current Derating Curve

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

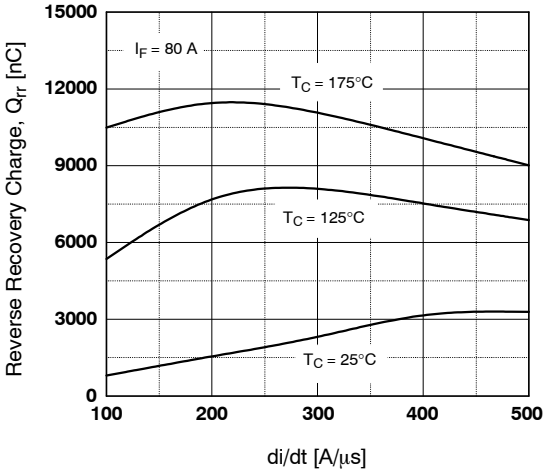


Figure 8. Reverse Recovery Charge

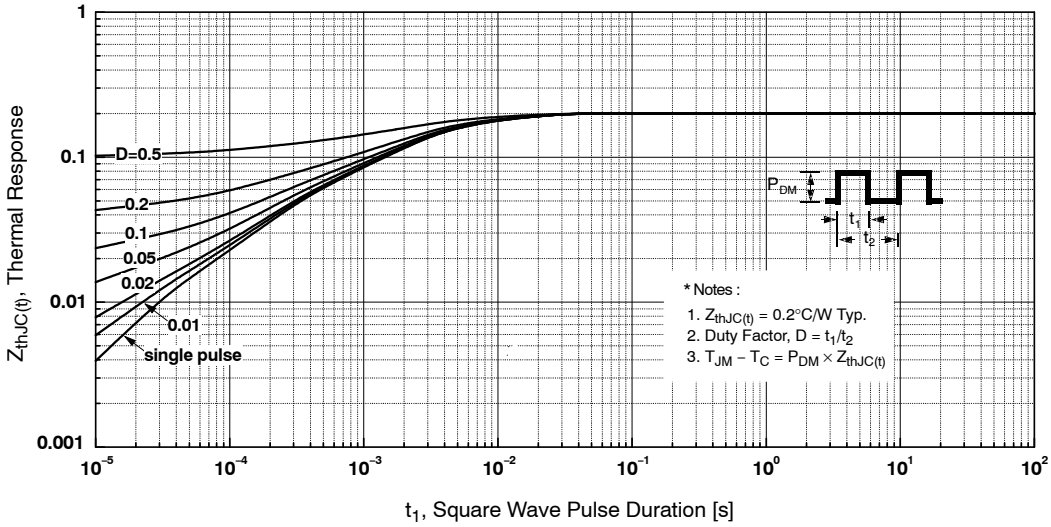


Figure 9. Transient Thermal Response Curve

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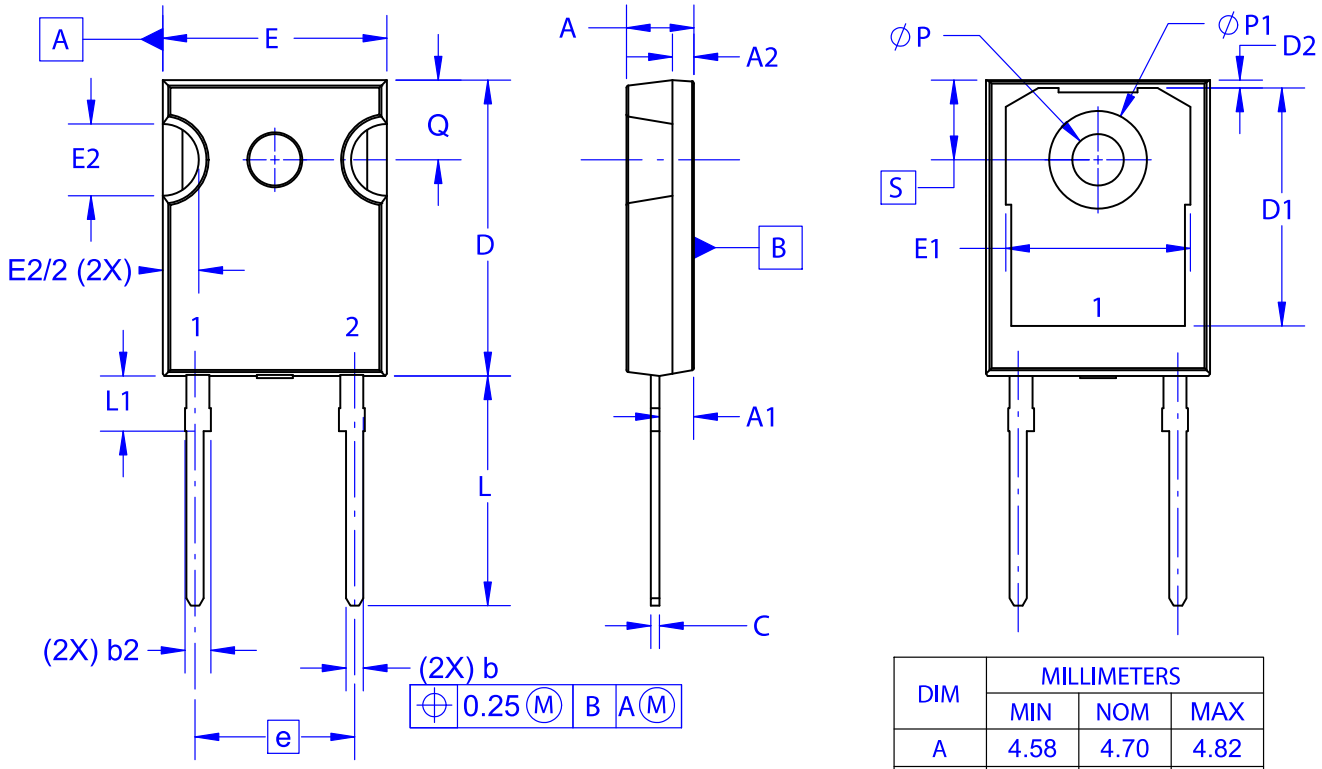
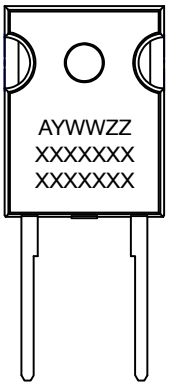


NOTES: UNLESS OTHERWISE SPECIFIED.

A. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C. DRAWING CONFORMS TO ASME Y14.5 - 2009.
D. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.
E. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.29	2.40	2.66
A2	1.30	1.50	1.70
b	1.17	1.26	1.35
b2	1.53	1.65	1.77
c	0.51	0.61	0.71
D	20.32	20.57	20.82
D1	16.37	16.57	16.77
D2	0.51	0.93	1.35
E	15.37	15.62	15.87
E1	12.81	~	~
E2	4.96	5.08	5.20
e	~	11.12	~
L	15.75	16.00	16.25
L1	3.69	3.81	3.93
ØP	3.51	3.58	3.65
ØP1	6.61	6.73	6.85
Q	5.34	5.46	5.58
S	5.34	5.46	5.58

GENERIC MARKING DIAGRAM*



XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
ZZ = Assembly Lot Code

*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.

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