

# 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 ( $V_F = 1.56 \text{ V (Typ.) @ } I_F = 80 \text{ A}$ )
- High Speed Switching ( $t_{rr} = 242 \text{ ns (Typ.) @ } I_F = 80 \text{ A}$ )
- Avalanche Energy Rated
- AEC-Q101 Qualified and PPAP Capable
- This is a Pb-Free Device

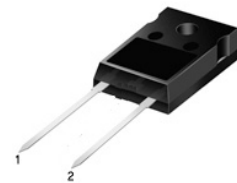
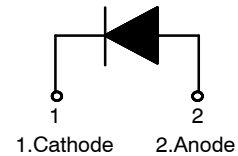
#### Applications

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



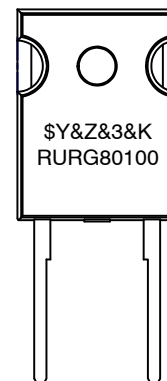
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TO-247-2LD  
CASE 340CL

#### 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.

# RURG80100-F085

## ABSOLUTE MAXIMUM RATINGS $T_C = 25^\circ\text{C}$ 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 @ $T_C = 25^\circ\text{C}$	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	$^\circ\text{C}$

## THERMAL CHARACTERISTICS $T_C = 25^\circ\text{C}$ unless otherwise noted

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

## PACKAGE MARKING AND ORDERING INFORMATION

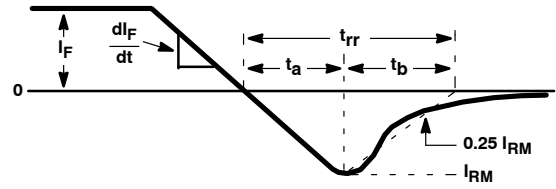
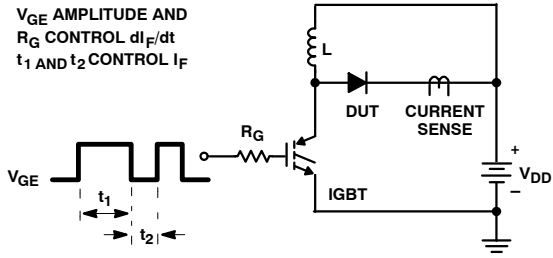
Device Marking	Device	Package	Pacing Type	Qty per Tube
RURG80100	RURG80100-F085	TO-247	-	30

## ELECTRICAL CHARACTERISTICS $T_C = 25^\circ\text{C}$ unless otherwise noted

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

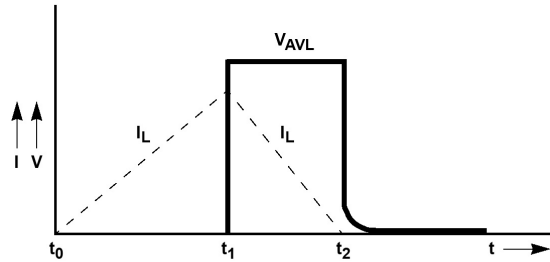
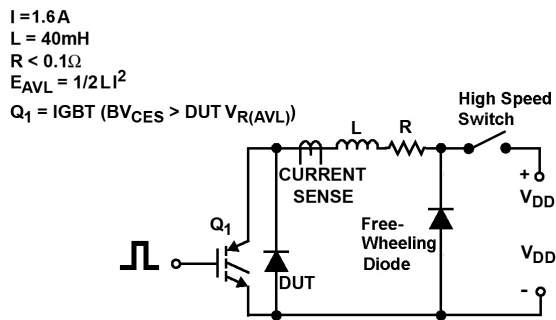
1. Pulse: Test Pulse width = 300  $\mu\text{s}$ , Duty Cycle = 2%.
2. Guaranteed by design.

TEST CIRCUIT AND WAVEFORMS



$t_{rr}$  Test Circuit

$t_{rr}$  Waveforms and Definitions



Avalanche Energy Test Circuit

Avalanche Current and Voltage Waveforms

Figure 1. Test Circuit and Waveforms

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

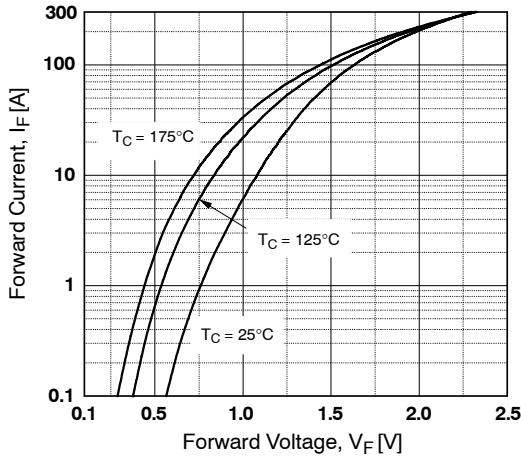


Figure 2. Typical Forward Voltage Drop vs. Forward Current

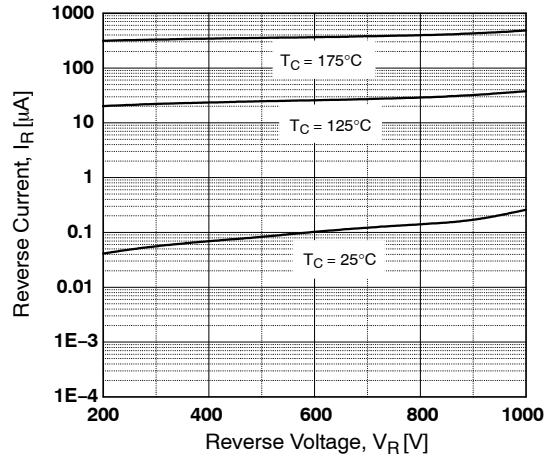


Figure 3. Typical Reverse Current vs. Reverse Voltage

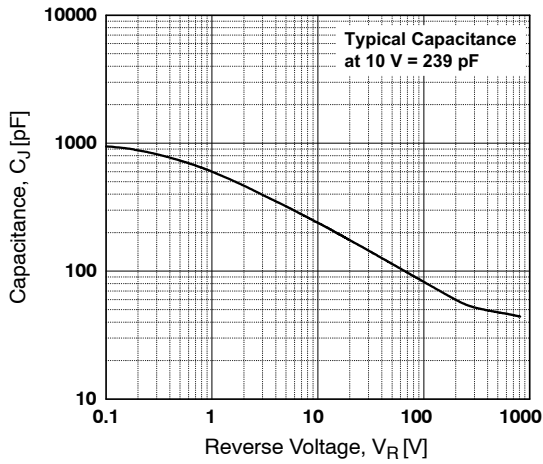


Figure 4. Typical Junction Capacitance

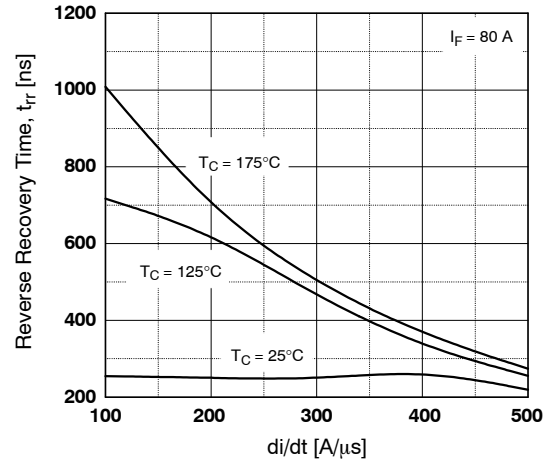


Figure 5. Typical Reverse Recovery Time vs. di/dt

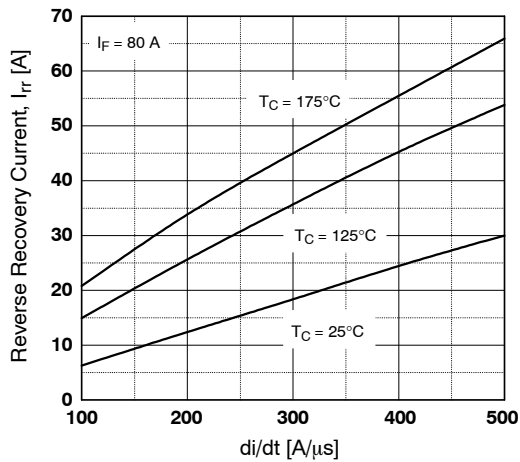


Figure 6. Typical Reverse Recovery Current vs. di/dt

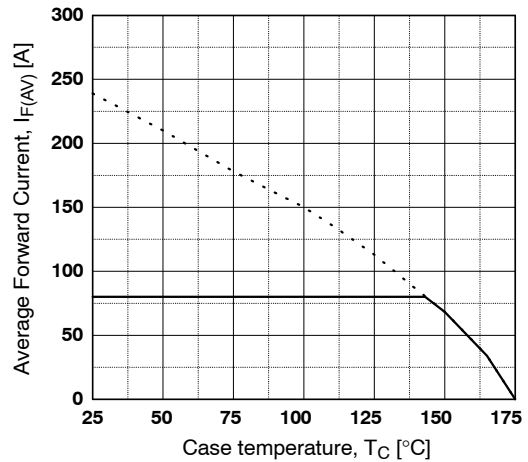


Figure 7. Forward Current Derating Curve

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

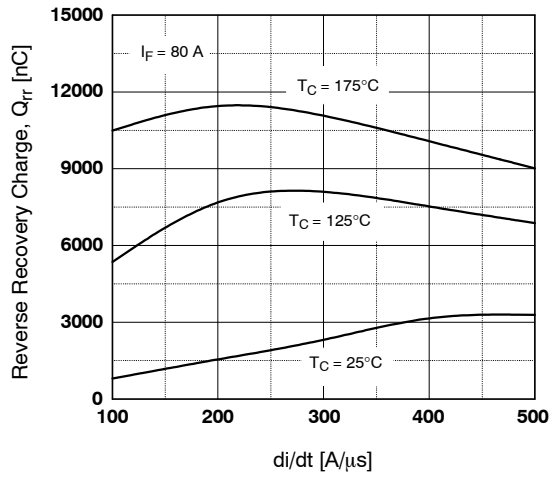


Figure 8. Reverse Recovery Charge

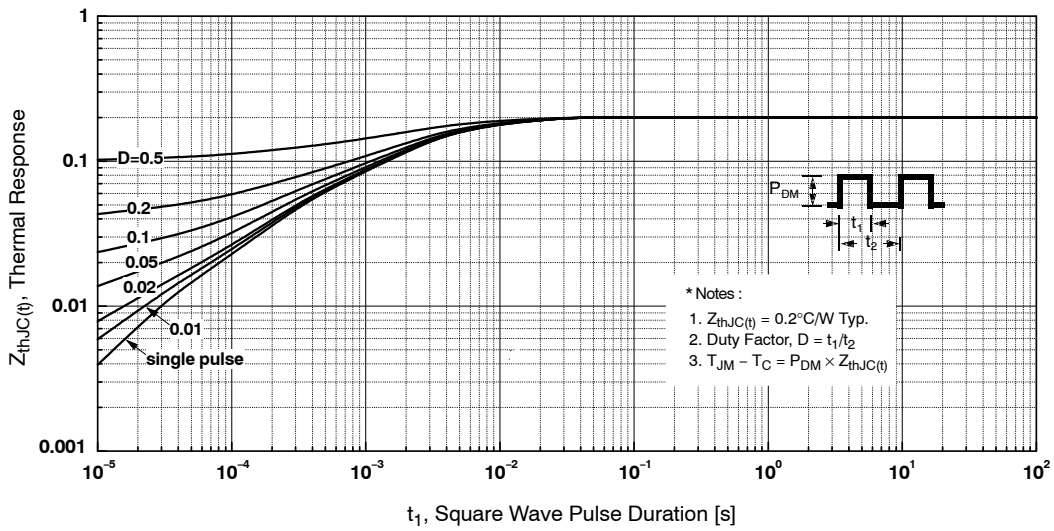


Figure 9. Transient Thermal Response Curve

# MECHANICAL CASE OUTLINE

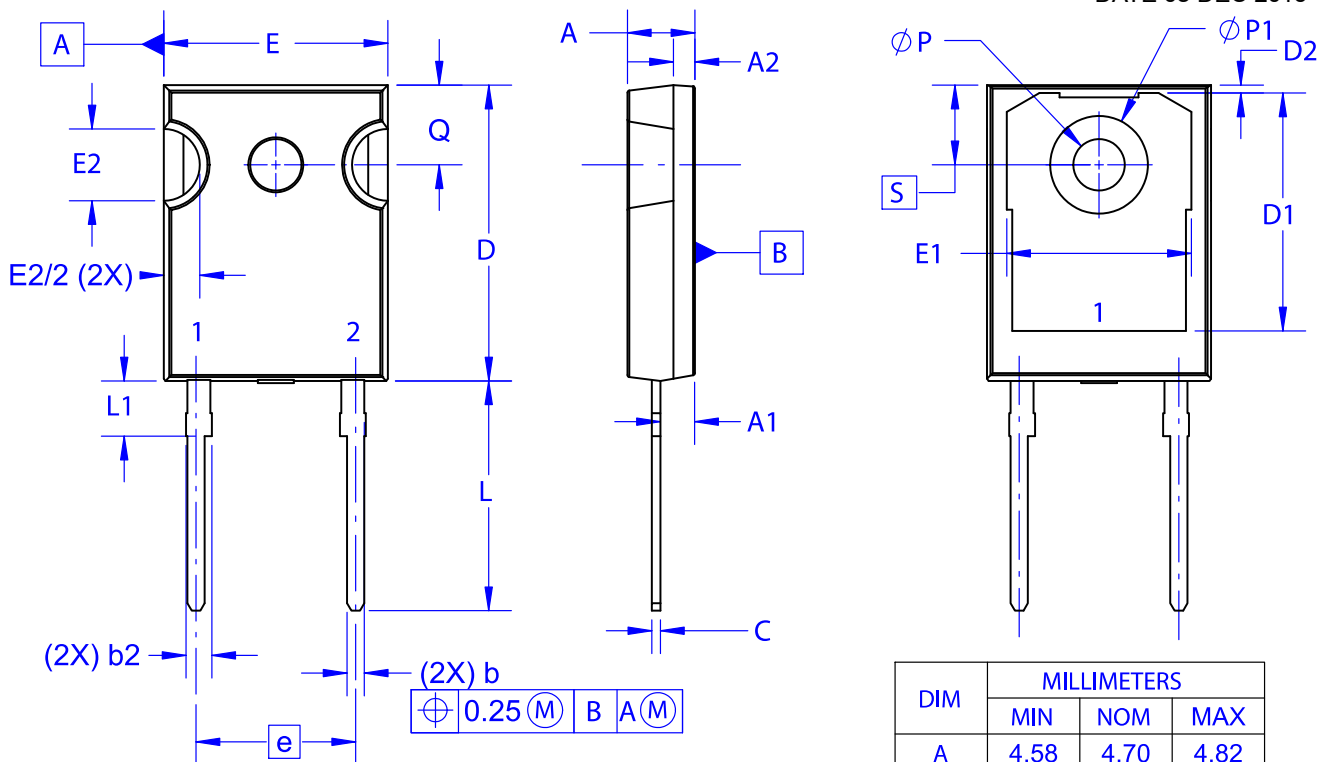
## PACKAGE DIMENSIONS

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TO-247-2LD  
CASE 340CL  
ISSUE A

DATE 03 DEC 2019

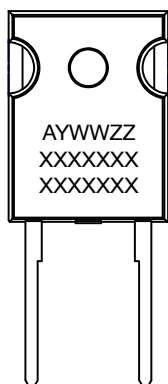


⊕ 0.25 (M) B A (M)

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.

### 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.

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
∅P	3.51	3.58	3.65
∅P1	6.61	6.73	6.85
Q	5.34	5.46	5.58
S	5.34	5.46	5.58

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