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FAIRCHILD SEMICONDUCTOR®

August 2014

RURP15100_F085
15A 1000V Ultrafast Rectifier

Features

- High Speed Switching (t_{rr}=200ns(Typ.) @ I_F=15A)
- Low Forward Voltage(V_F=1.8V(Max.) @ I_F=15A)
- Avalanche Energy Rated
- AEC-Q101 Compliant

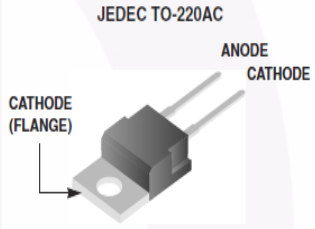
Applications

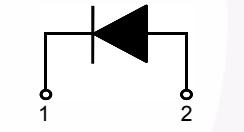
- Automotive DCDC converter
- Automotive On Board Charger
- Switching Power Supply
- Power Switching Circuits

15A, 1000V Ultrafast Rectifier

The RURP15100_F085 is an ultrafast diode with soft recovery characteristics (trr< 200ns). It has a low forward voltage drop and is of silicon nitride passivated, ion-implanted, epitaxial construction.
This device is intended for use as a freewheeling/ clamping diode and rectifier in a variety of automotive power supplies and other power switching automotive applications. Its low stored charge and ultrafast recovery with soft recovery characteristics minimizes ringing and electrical noise in many power switching circuits, thus reducing power loss in the switching transistor.

Pin Assignments





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	15	A
I_{FSM}	Non-repetitive Peak Surge Current	45	A
E_{AVL}	Avalanche Energy(1A,40mH)	20	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature	- 55 ~175	°C

Thermal Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	0.94	°C/W
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient	85	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Tube	Quantity
RURP15100	RURP15100_F085	TO-220AC	-	50

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Electrical Characteristics T_C = 25°C unless otherwise noted

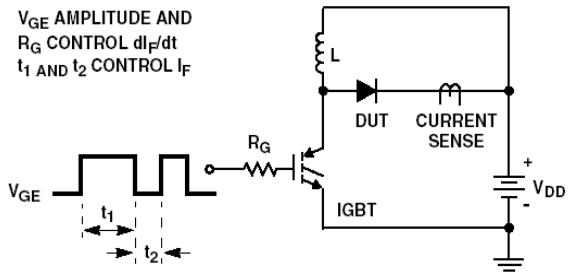
Symbol	Parameter	Conditions		Min.	Typ.	Max	Units
I_R	Instantaneous Reverse Current	V_R = 1000V	T_C = 25 °C	-	-	100	uA
			T_C = 175 °C	-	-	1000	uA
V_F[1]	Instantaneous Forward Voltage	I_F = 15A	T_C = 25 °C T_C = 175 °C	- -	1.35 1.14	1.8 1.6	V V
t_{rr}[2]	Reverse Recovery Time	I_F =1A, di/dt = 100A/μs, V_R=650V	T_C = 25 °C	-	126	260	ns
		I_F =15A, di/dt = 100A/μs, V_R=650V	T_C = 25 °C T_C = 175 °C	- -	200 720	450 -	ns ns
t_a t_b Q_{rr}	Reverse Recovery Time Reverse Recovery Charge	I_F =15A, di/dt = 100A/μs, V_R=650V	T_C = 25 °C	- - -	63 137 683	- - -	ns ns nC
W_{AVL}	Avalanche Energy	I_{AV}=1.0A, L=40mH		20	-	-	mJ

Notes:

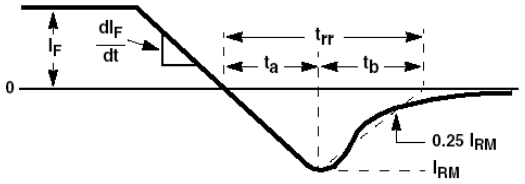
1. Pulse : Test Pulse width = 300μs, Duty Cycle = 2%

2.Guaranteed by design.

Test Circuit and Waveforms

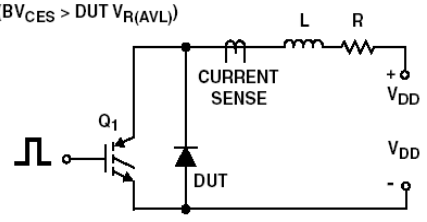


t_{rr} TEST CIRCUIT

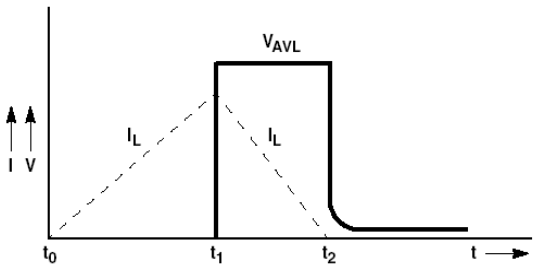


t_{rr} WAVEFORMS AND DEFINITIONS

I_{MAX} = 1A
L = 40mH
R < 0.1Ω
E_{AVL} = 1/2LI^2 [$V_{R(AVL)}$/($V_{R(AVL)}$ - V_{DD})]
Q_1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

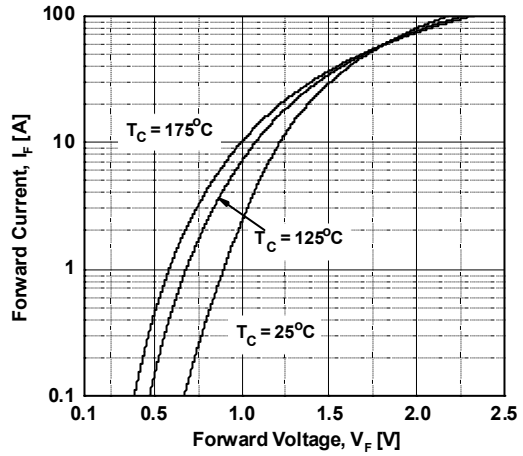


Figure 2. Typical Reverse Current vs. Reverse Voltage

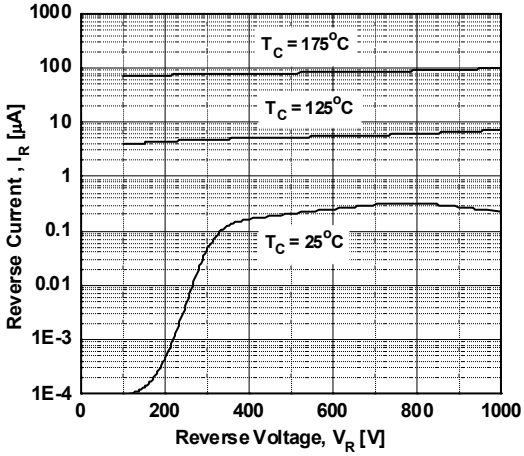


Figure 3.Typical Junction Capacitance

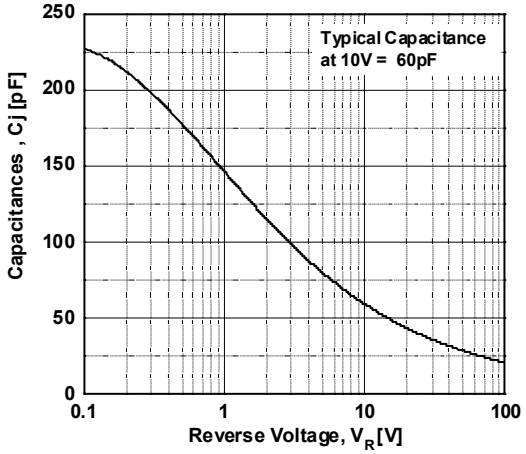


Figure 4. Typical Reverse Recovery Time vs. di/dt

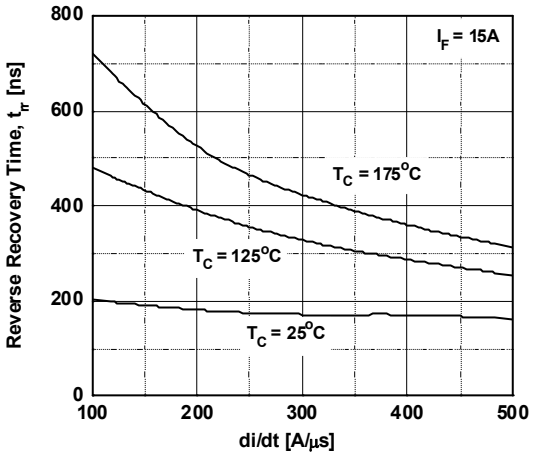


Figure 5. Typical Reverse Recovery Current vs. di/dt

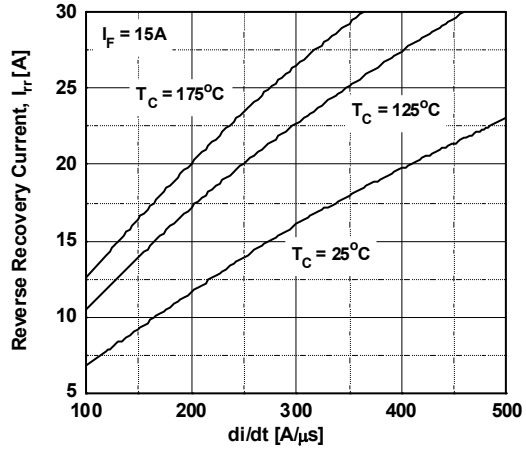
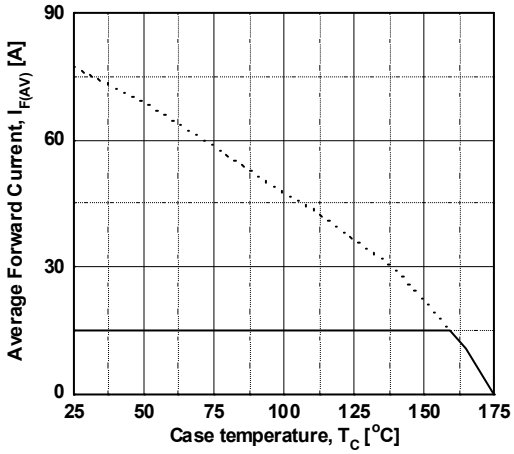


Figure 6. Forward Current Derating Curve



Typical Performance Characteristics (Continued)

Figure 7. Reverse Recovery Charge

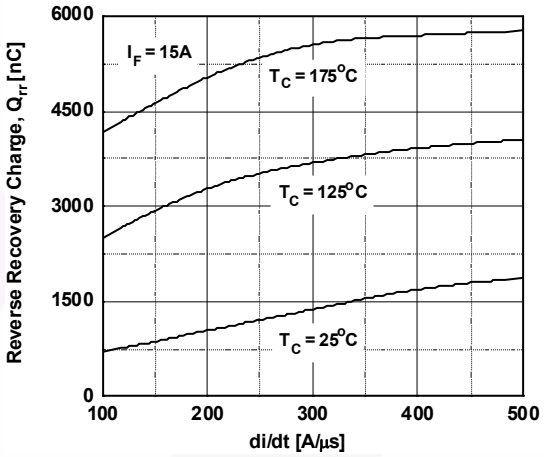
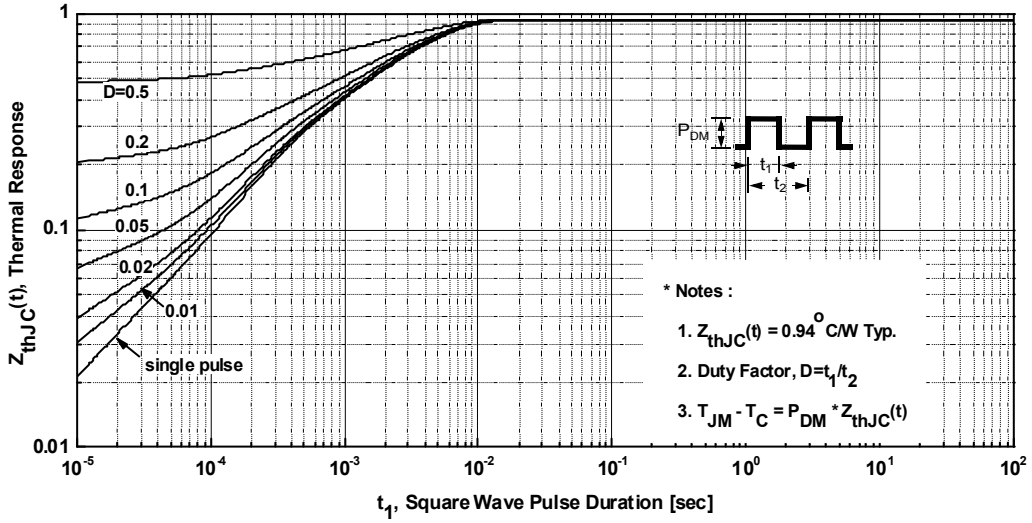
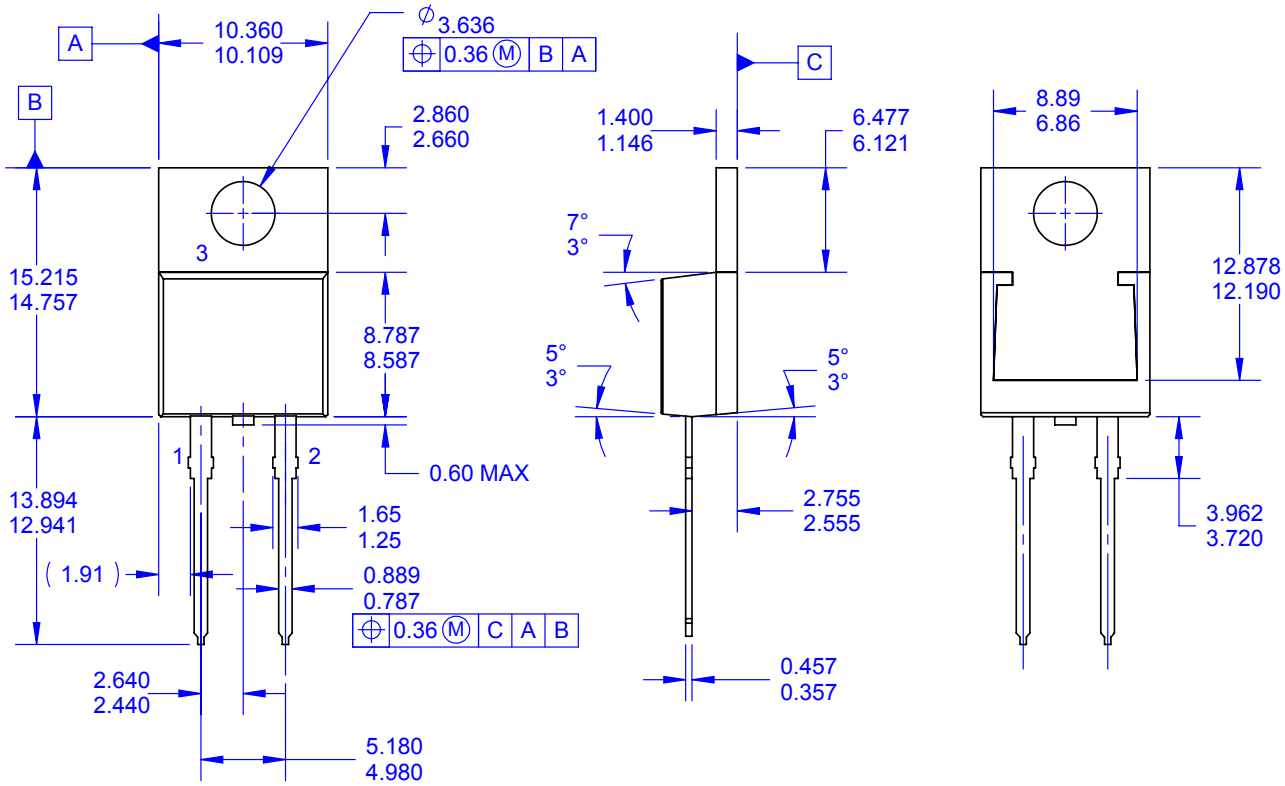


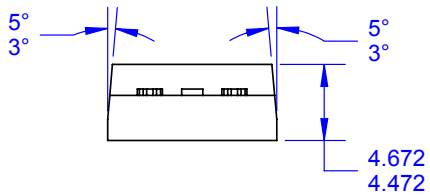
Figure 8. Transient Thermal Response Curve



Mechanical Dimensions

TO-220-2L





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A. PACKAGE REFERENCE: JEDEC TO220 VARIATION AC.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSION AND TOLERANCE AS PER ASME Y14.5-2009.
D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
E. DRAWING FILE NAME: TO220B02REV5
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Dimensions in Millimeters

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