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ON Semiconductor®

# RURP1560-F085 15A, 600V Ultrafast Rectifier

## Features

- High Speed Switching (  $t_{rr}=52\text{ns(Typ.)}$  @  $I_F=15\text{A}$  )
- Low Forward Voltage(  $V_F=1.5\text{V(Max.)}$  @  $I_F=15\text{A}$  )
- Avalanche Energy Rated
- AEC-Q101 Qualified

## Applications

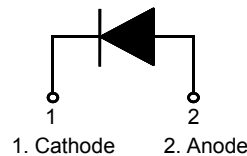
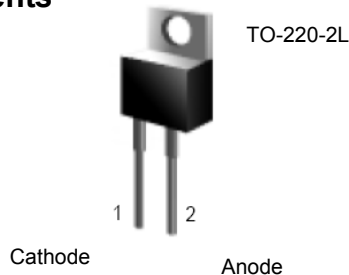
- Automotive DCDC converter
- Automotive On Board Charger
- Switching Power Supply
- Power Switching Circuits

## 15A, 600V Ultrafast Rectifier

The RURP1560-F085 is an ultrafast diode with soft recovery characteristics( $t_{rr} < 70\text{ns}$ ). It has a low forward voltage drop and is of planar, silicon nitride assivated, ion-implanted, epitaxial construction.

This device is intended for use as an energy steering / clamping diode and rectifier in a variety of switching power supplies and other power switching 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 $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units
$V_{RRM}$	Peak Repetitive Reverse Voltage	600	V
$V_{RWM}$	Working Peak Reverse Voltage	600	V
$V_R$	DC Blocking Voltage	600	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 25^\circ\text{C}$	15	A
$I_{FSM}$	Non-repetitive Peak Surge Current	200	A
$E_{AVL}$	Avalanche Energy (1A, 40mH)	20	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	1	$^\circ\text{C/W}$
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient	85	$^\circ\text{C/W}$

## Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
RURP1560	RURP1560-F085	TO-220-2L	-	-	50

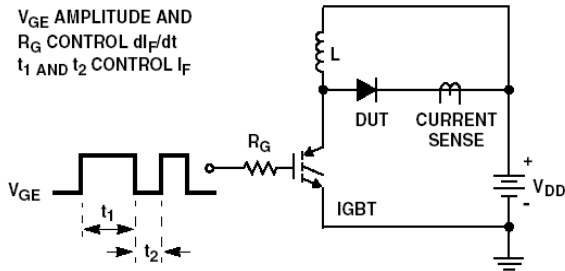
### Electrical Characteristics T<sub>C</sub> = 25°C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max	Units	
I <sub>R</sub>	Instantaneous Reverse Current	V <sub>R</sub> = 600V	T <sub>C</sub> = 25 °C	-	-	100	uA
			T <sub>C</sub> = 175 °C	-	-	1	mA
V <sub>FM</sub> <sup>1</sup>	Instantaneous Forward Voltage	I <sub>F</sub> = 15A	T <sub>C</sub> = 25 °C	-	1.24	1.5	V
			T <sub>C</sub> = 175 °C	-	1.0	1.2	V
t <sub>rr</sub> <sup>2</sup>	Reverse Recovery Time	I <sub>F</sub> = 1A, di/dt = 100A/μs, V <sub>CC</sub> = 390V	T <sub>C</sub> = 25 °C	-	32	55	ns
		I <sub>F</sub> = 15A, di/dt = 100A/μs, V <sub>CC</sub> = 390V	T <sub>C</sub> = 25 °C	-	52	70	ns
			T <sub>C</sub> = 175 °C	-	220	-	ns
t <sub>a</sub>	Reverse Recovery Time	I <sub>F</sub> = 15A, di/dt = 100A/μs, V <sub>CC</sub> = 390V	T <sub>C</sub> = 25 °C	-	28	-	ns
t <sub>b</sub>	Reverse Recovery Time			-	24	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge			-	73	-	nC
E <sub>AVL</sub>	Avalanche Energy	I <sub>AV</sub> = 1.0A, L = 40mH	20	-	-	mJ	

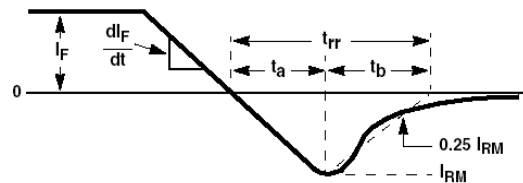
**Notes:**

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

### Test Circuit and Waveforms

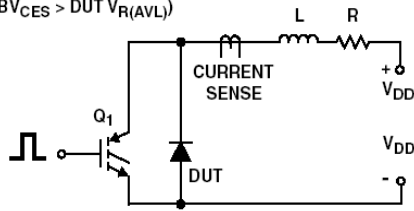


t<sub>rr</sub> TEST CIRCUIT

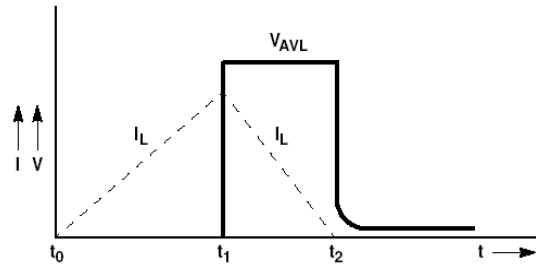


t<sub>rr</sub> WAVEFORMS AND DEFINITIONS

I<sub>MAX</sub> = 1A  
 L = 40mH  
 R < 0.1Ω  
 $E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$   
 Q<sub>1</sub> = IGBT (BV<sub>CES</sub> > DUT V<sub>R(AVL)</sub>)



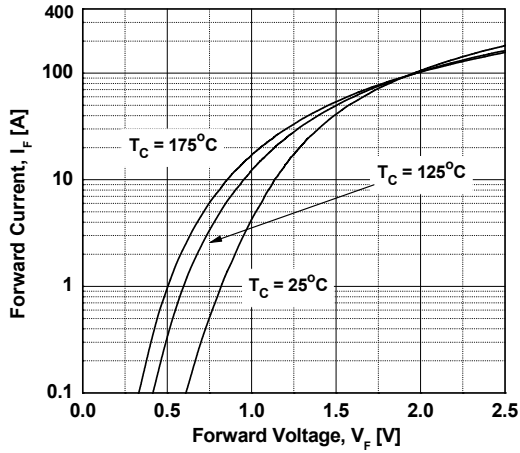
AVALANCHE ENERGY TEST CIRCUIT



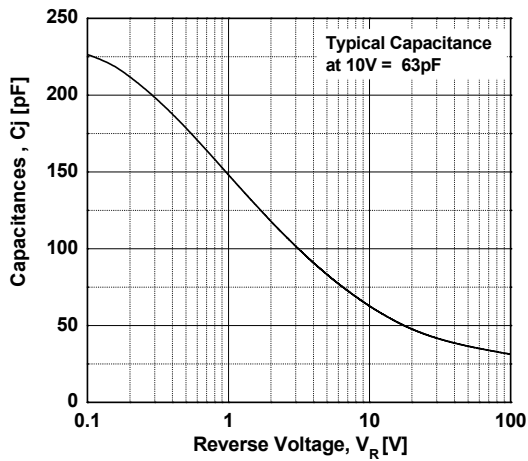
AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Typical Performance Characteristics

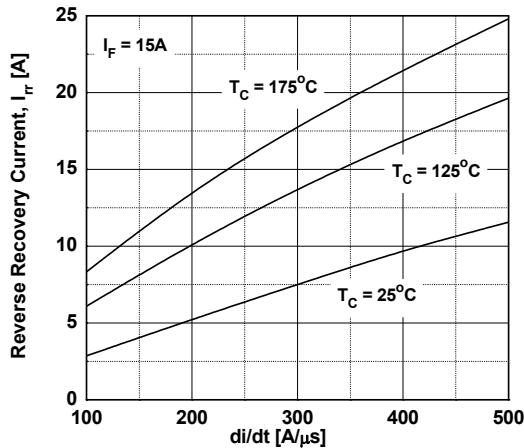
**Figure 1. Typical Forward Voltage Drop vs. Forward Current**



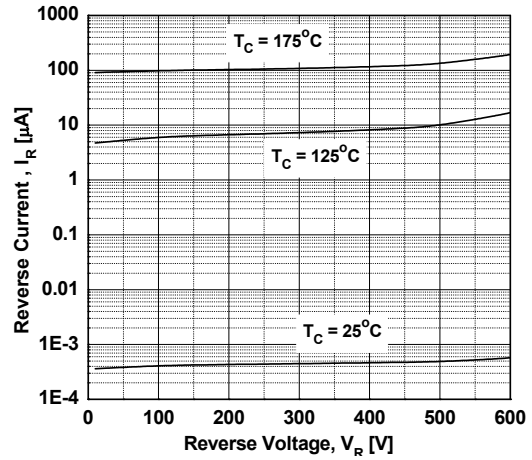
**Figure 3. Typical Junction Capacitance**



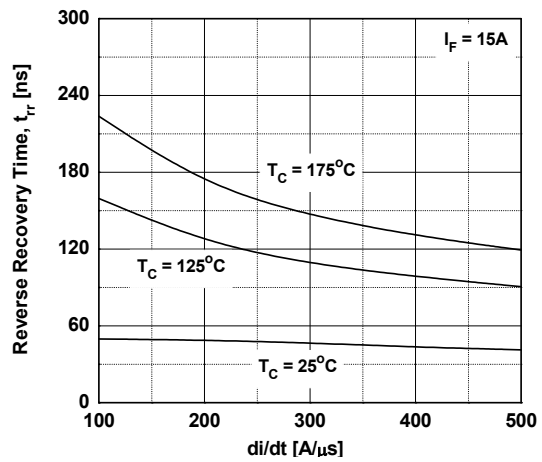
**Figure 5. Typical Reverse Recovery Current vs. di/dt**



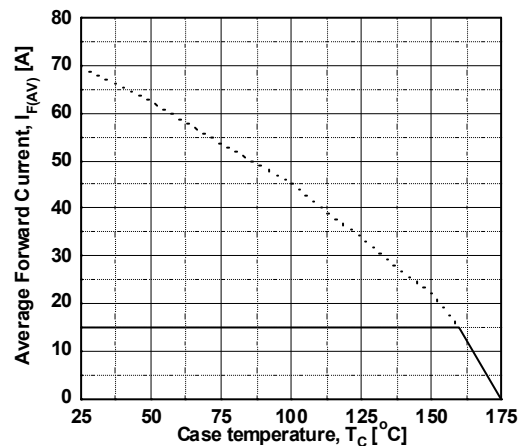
**Figure 2. Typical Reverse Current vs. Reverse Voltage**



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



**Figure 6. Forward Current Derating Curve**



Typical Performance Characteristics (Continued)

Figure 7. Reverse Recovery Charge

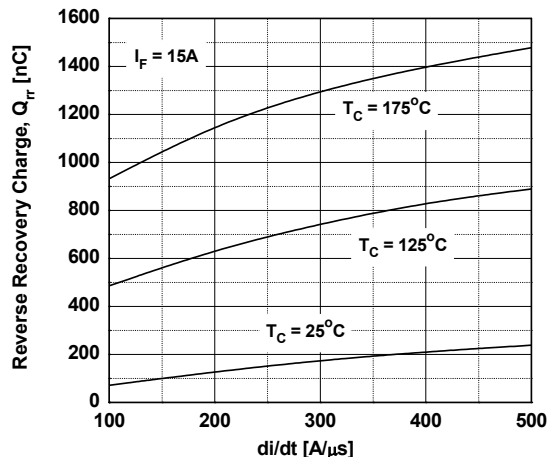
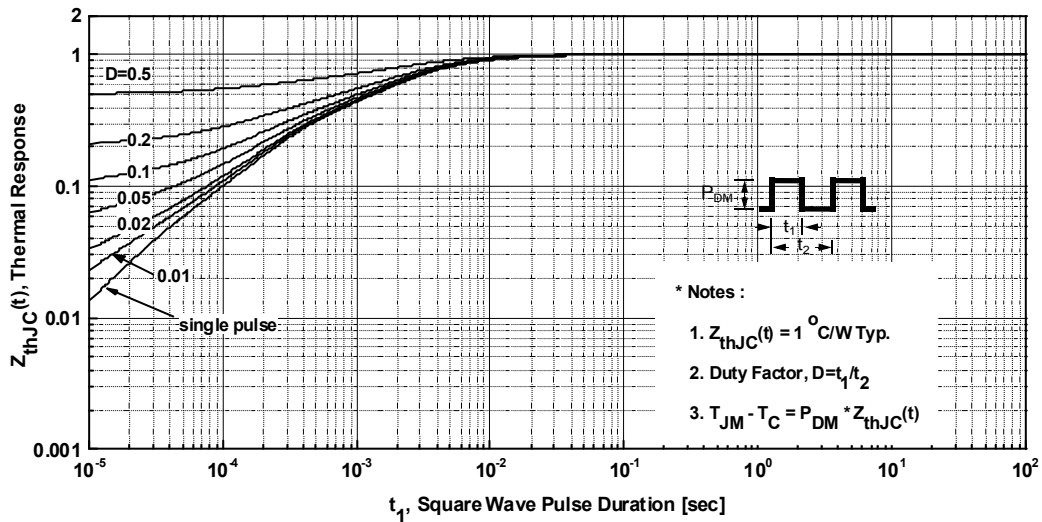
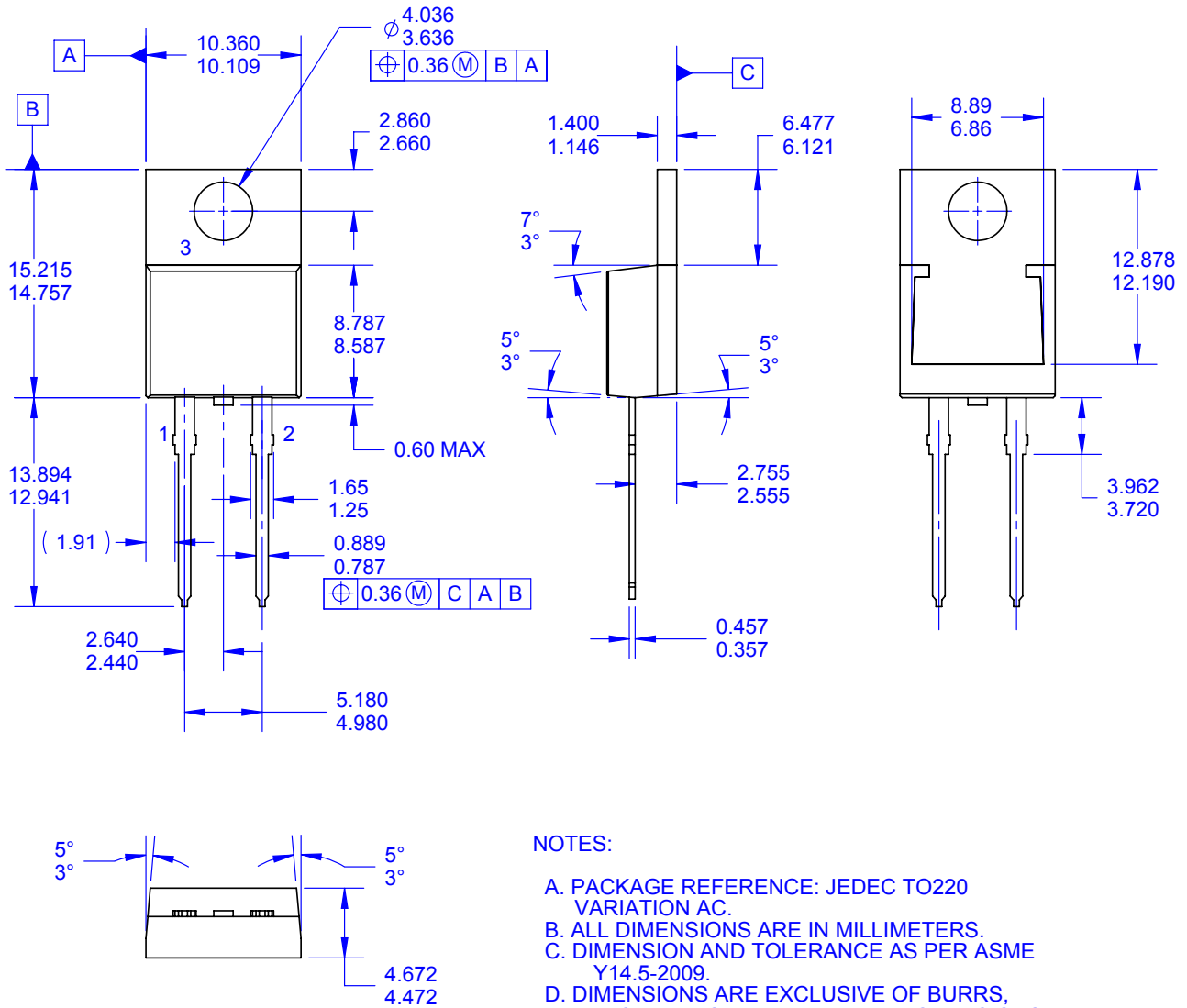


Figure 8. Transient Thermal Response Curve



**Mechanical Dimensions**



**NOTES:**

- 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

Dimensions in Millimeters

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