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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

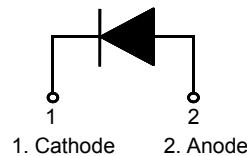
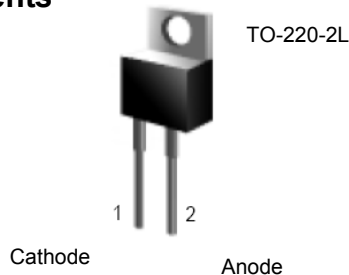
- Automotive DCDC converter
- Automotive On Board Charger
- Switching Power Supply
- Power Switching Circuits

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

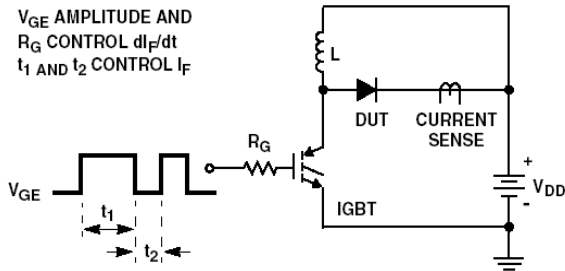
Electrical Characteristics T_C = 25°C unless otherwise noted

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

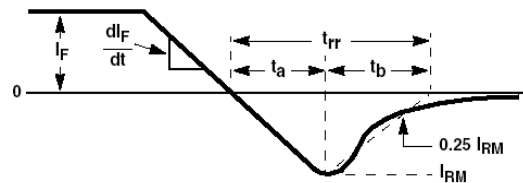
Notes:

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

Test Circuit and Waveforms

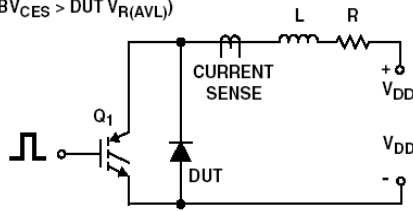


t_{rr} TEST CIRCUIT

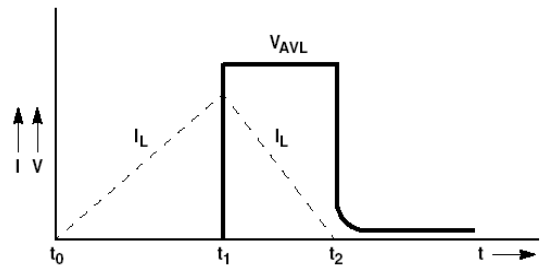


t_{rr} WAVEFORMS AND DEFINITIONS

I_{MAX} = 1A
L = 40mH
R < 0.1Ω
E_{AVL} = 1/2LI² [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]
Q₁ = 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

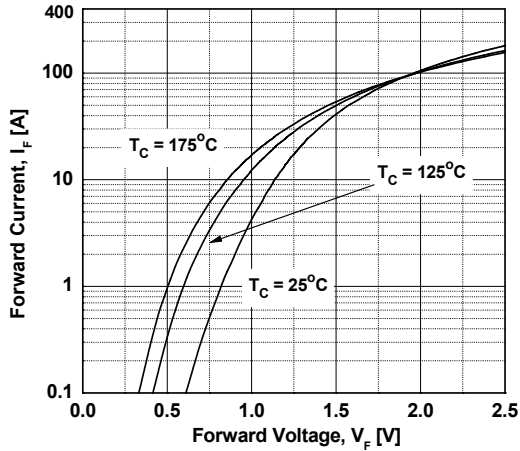


Figure 3. Typical Junction Capacitance

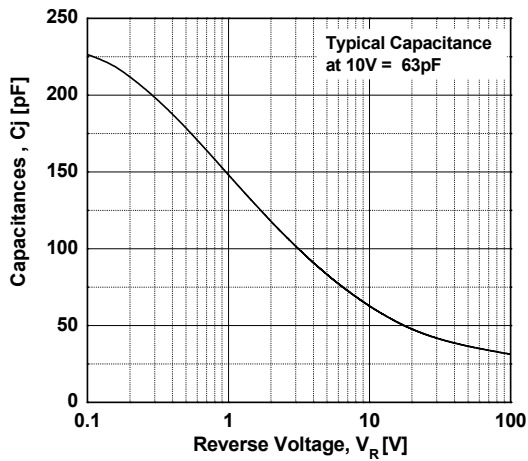


Figure 5. Typical Reverse Recovery Current vs. di/dt

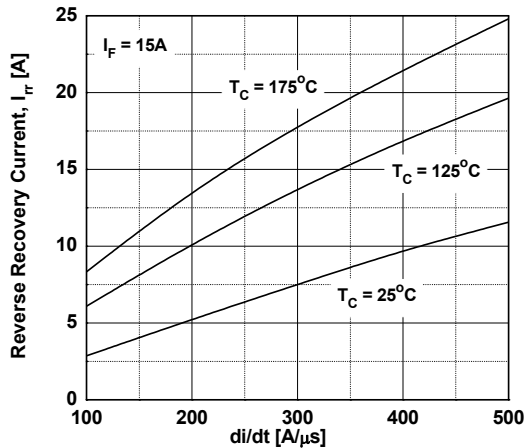


Figure 2. Typical Reverse Current vs. Reverse Voltage

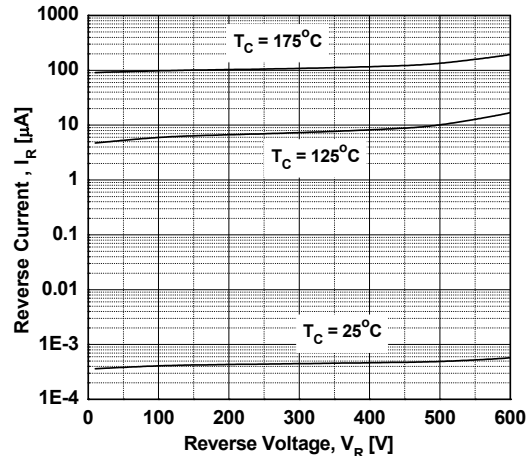


Figure 4. Typical Reverse Recovery Time vs. di/dt

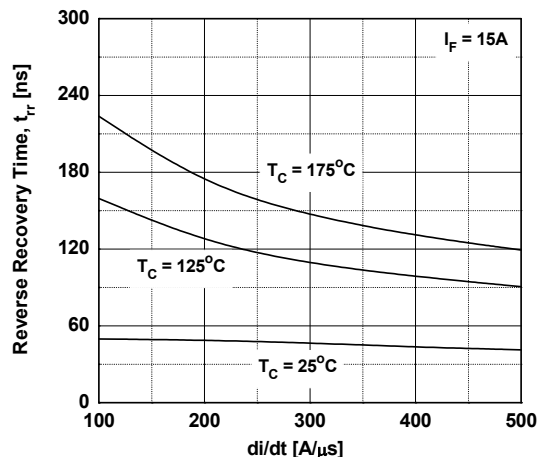
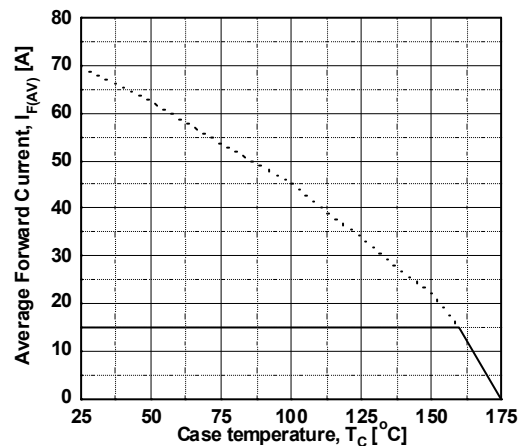


Figure 6. Forward Current Derating Curve



Typical Performance Characteristics (Continued)

Figure 7. Reverse Recovery Charge

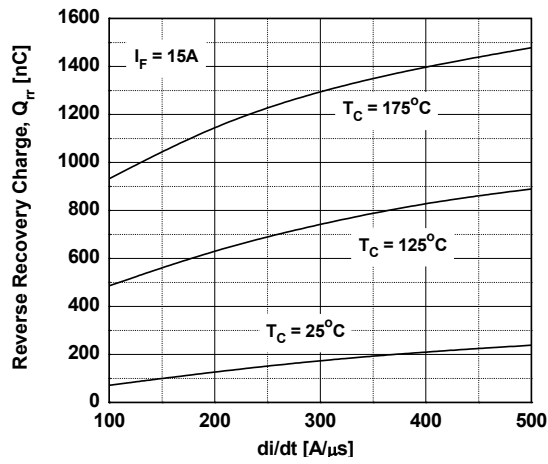
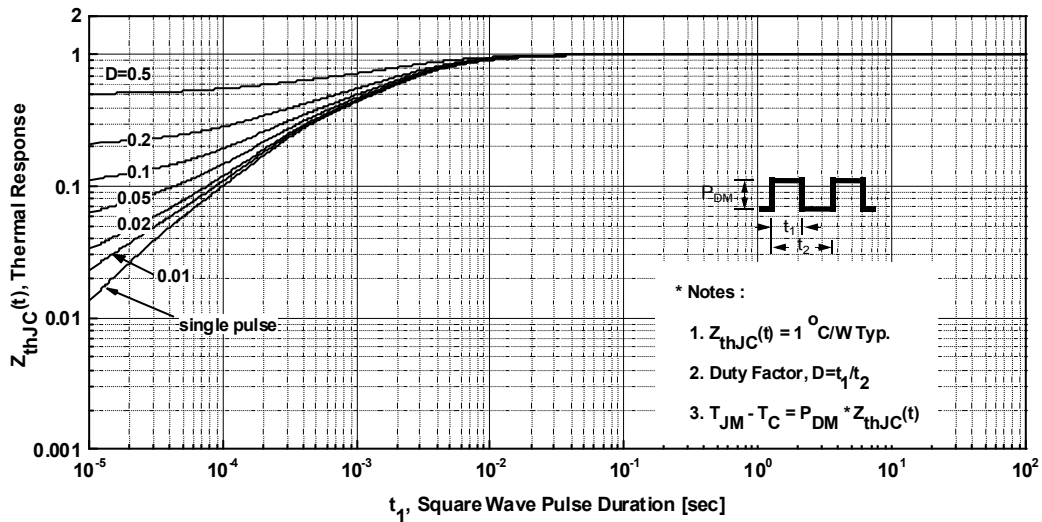
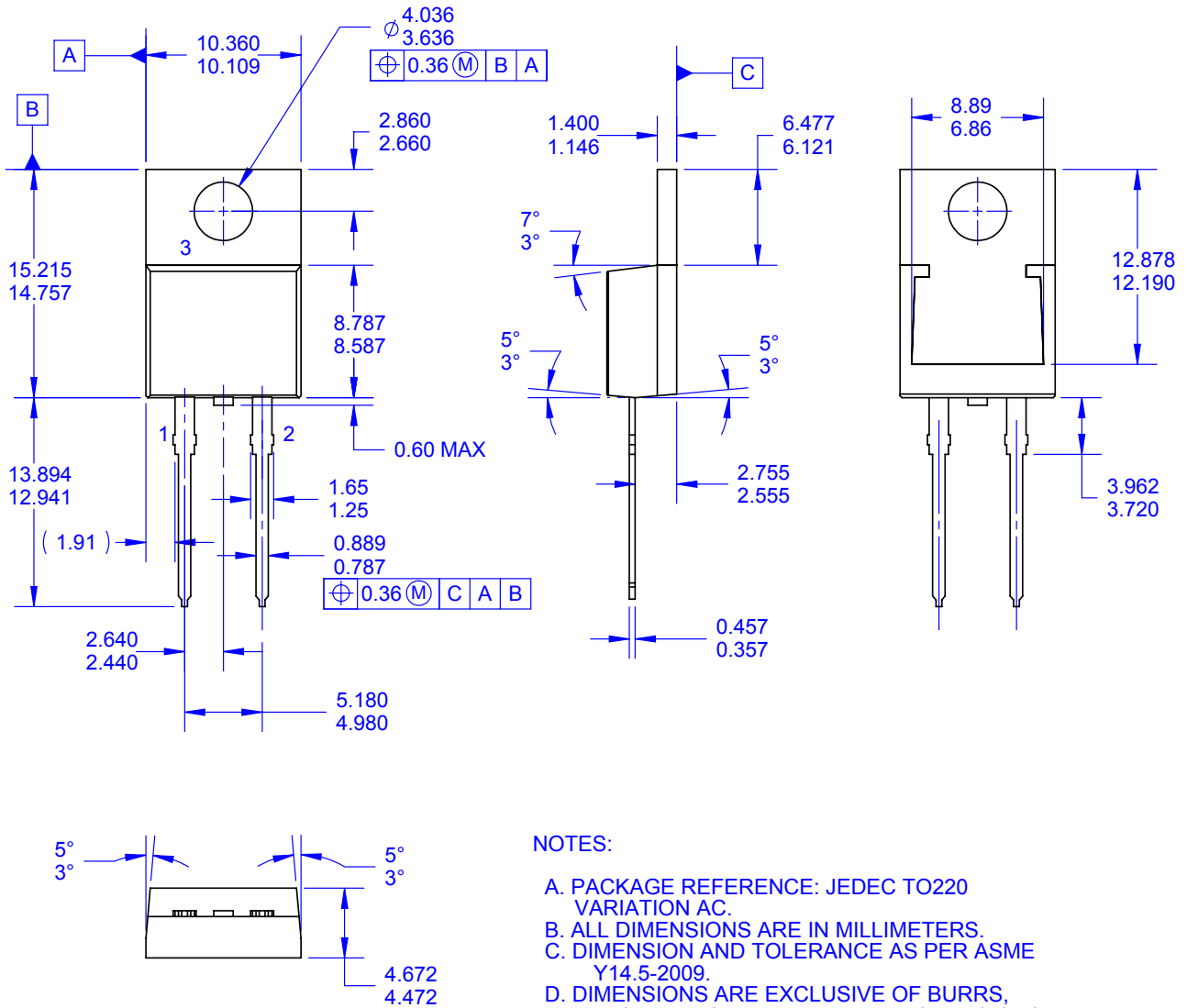


Figure 8. Transient Thermal Response Curve



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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