



ON Semiconductor®

ISL9R1560P2-F085 15A, 600V Stealth Rectifier

Features

- High Speed Switching (t_{rr} =30ns(Typ.) @ I_F =15A)
- Low Forward Voltage(V_F =2.2V(Max.) @ I_F =15A)
- Avalanche Energy Rated
- AEC-Q101 Qualified

Applications

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

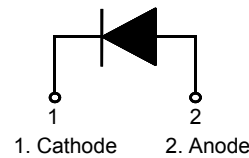
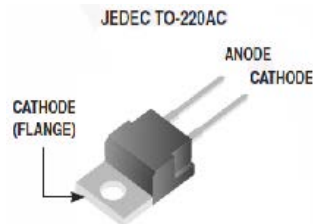
Max Ratings (600V, 15A)

The ISL9R1560P2-F085 is a Stealth™ diode with soft recovery characteristics ($t_{rr} < 30ns$). 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 freewheel/clamping diode in various automotive switching power supplies and other power switching applications.

Its low stored charge as well as Stealth™ and soft recovery characteristics minimize ringing and electrical noise while reduce the overall power loss.

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 (Halfwave 1 Phase 50Hz)	45	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	0.93	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient	62	$^\circ\text{C}/\text{W}$

Package Marking and Ordering Information

Device Marking	Device	Package	Tube	Quantity
ISL9R1560P2	ISL9R1560P2-F085	TO-220AC	-	50

ISL9R1560P2-F085 15A, 600V Stealth Rectifier

Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

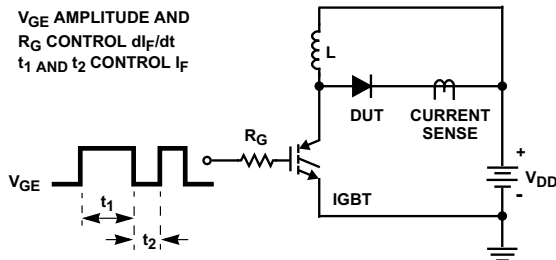
Symbol	Parameter	Conditions	Min.	Typ.	Max	Units	
I_R	Instantaneous Reverse Current	$V_R = 600\text{V}$	$T_C = 25^\circ\text{C}$	-	-	100	μA
			$T_C = 175^\circ\text{C}$	-	-	1000	μA
V_{FM}^1	Instantaneous Forward Voltage	$I_F = 15\text{A}$	$T_C = 25^\circ\text{C}$	-	1.65	2.2	V
			$T_C = 175^\circ\text{C}$	-	1.24	1.7	V
t_{rr}^2	Reverse Recovery Time	$I_F = 1\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_R = 390\text{V}$	$T_C = 25^\circ\text{C}$	-	22	30	ns
			$T_C = 175^\circ\text{C}$	-	127	-	ns
t_a	Reverse Recovery Time	$I_F = 15\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_R = 390\text{V}$	-	17	-	ns	
t_b	Reverse Recovery Time	$I_F = 15\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_R = 390\text{V}$	-	13	-	ns	
Q_{rr}	Reverse Recovery Charge	$I_F = 15\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_R = 390\text{V}$	-	48	-	nC	

Notes:

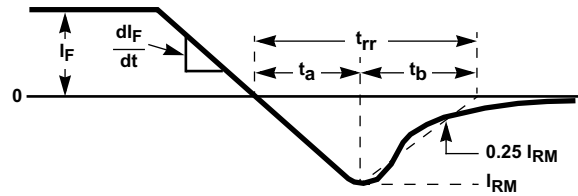
1. Pulse : Test Pulse width = $300\mu\text{s}$, Duty Cycle = 2%
2. Guaranteed by design

Test Circuit and Waveforms

t_{rr} Test Circuit

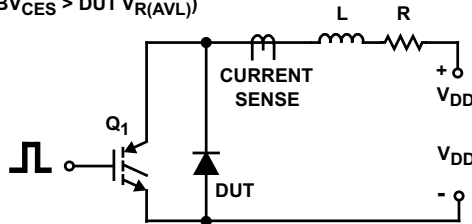


t_{rr} Waveforms and Definitions

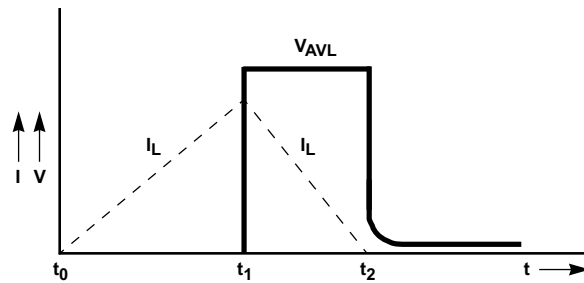


Avalanche Energy Test Circuit

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



Avalanche Current and Voltage Waveforms



Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

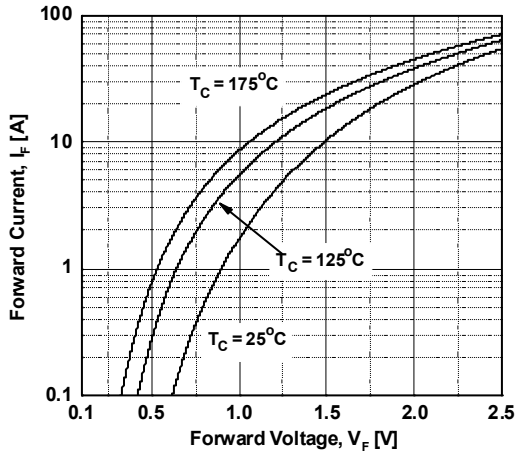


Figure 3. Typical Junction Capacitance

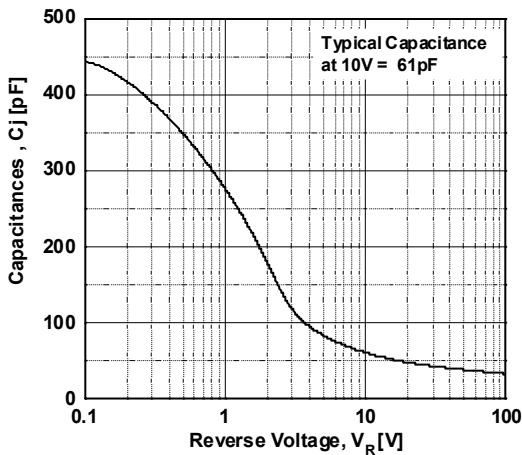


Figure 5. Typical Reverse Recovery Current vs. di/dt

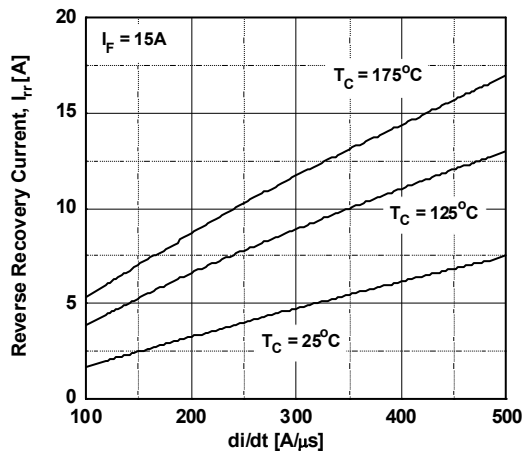


Figure 2. Typical Reverse Current vs. Reverse Voltage

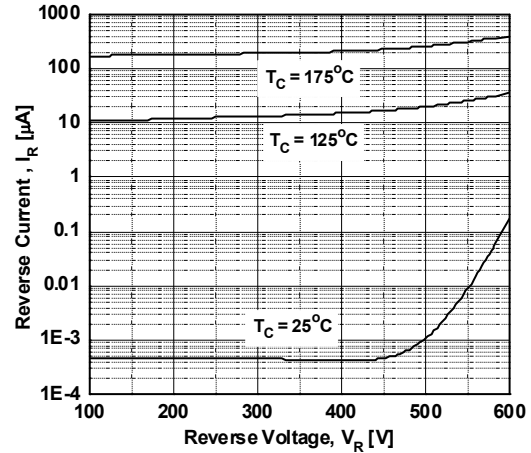


Figure 4. Typical Reverse Recovery Time vs. di/dt

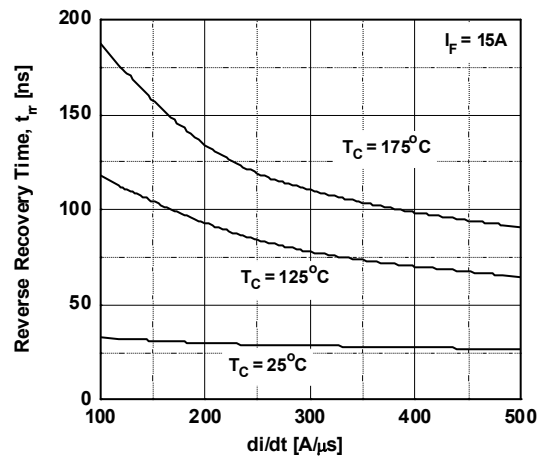
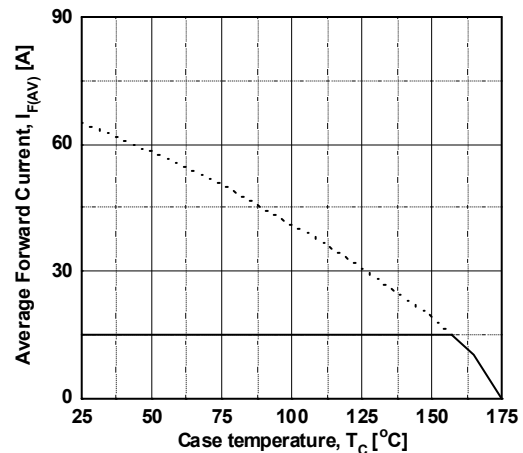


Figure 6. Forward Current Derating Curve



Typical Performance Characteristics (Continued)

Figure 7. Reverse Recovery Charge

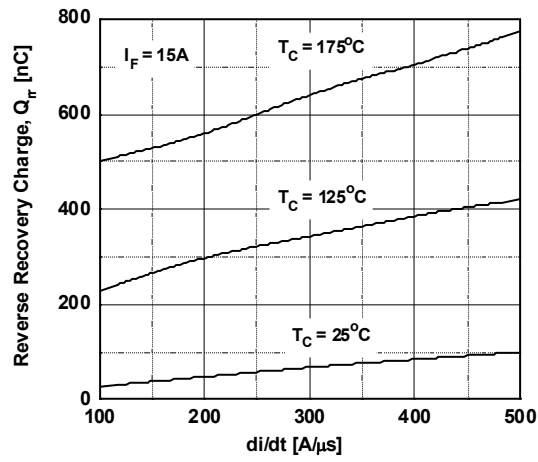
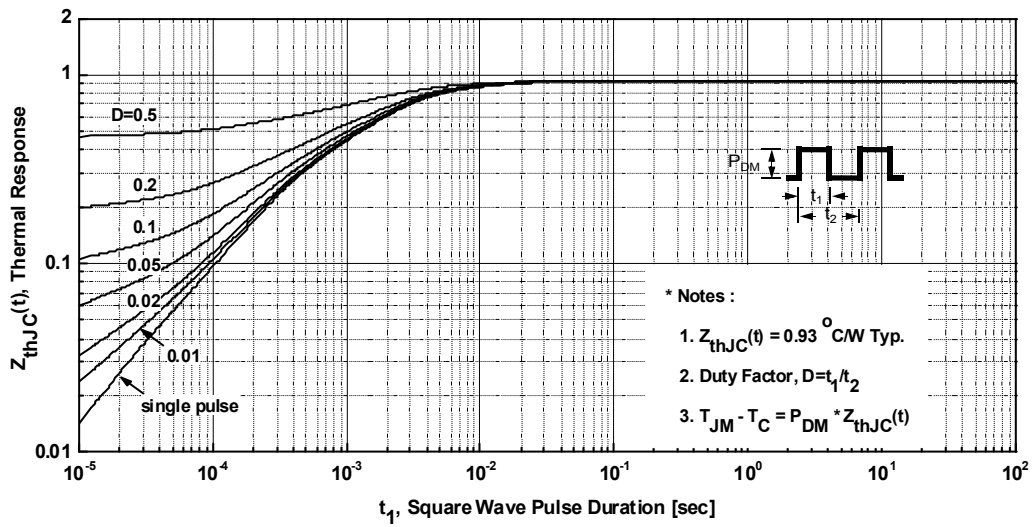
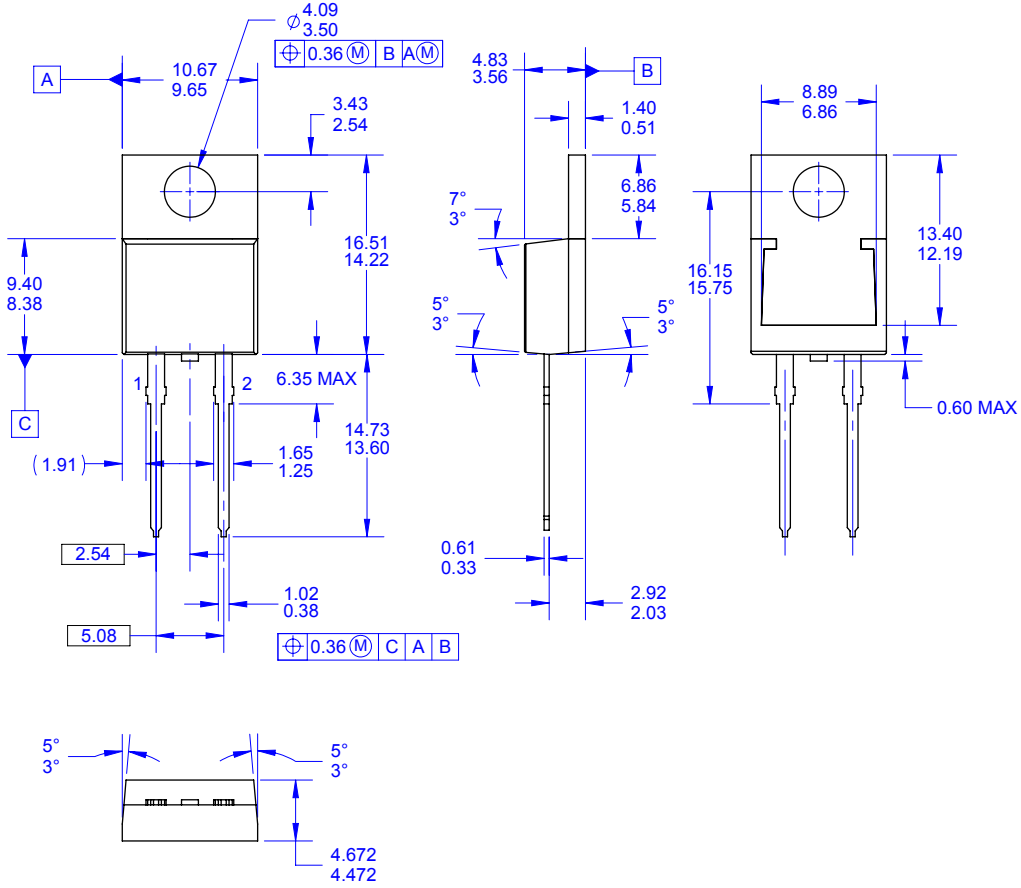


Figure 8. Transient Thermal Response Curve



Mechanical Dimensions


TO-220-2L



NOTES:

- A. PACKAGE REFERENCE: JEDEC TO220,ISSUE K, VARIATION AC,DATED APRIL 2002.
- 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: TO220A02REV04.

Dimensions in Millimeters

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