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FAIRCHILD SEMICONDUCTOR®

November 2013

ISL9R3060G2_F085
30A, 600V Stealth Rectifier

Features

- High Speed Switching (t_{rr}=31ns(Typ.) @ I_F=30A)
- Low Forward Voltage(V_F=2.4V(Max.) @ I_F=30A)
- Avalanche Energy Rated
- AEC-Q101 Qualified

Applications

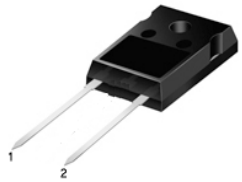
- Automotive DCDC converter
- Automotive On Board Charger
- Switching Power Supply
- Power Switching Circuits

30A, 600V Stealth Rectifier

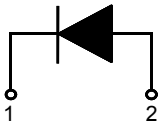
The ISL9R3060G2_F085 is Stealth™diode optimized for low loss performance in high frequency hard switched applications. The Stealth™ family exhibits low reverse recovery current (I_{RRM}) and exceptionally soft recovery under typical operating conditions.

This device is intended for use as a free wheeling or boost diode in power supplies and other power switching applications. The low I_{RRM} and short t_a phase reduce loss in switching transistors. The soft recovery minimizes ringing, expanding the range of conditions under which the diode may be operated without the use of additional snubber circuitry. Consider using the Stealth™ diode with an SMPS IGBT to provide the most efficient and highest power density design at lower cost.

Pin Assignments



TO-247-2L
1. Cathode 2. Anode



1. Cathode 2. Anode

Absolute Maximum Ratings T_C = 25°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°C	30	A
I_{FSM}	Non-repetitive Peak Surge Current (Halfwave 1 Phase 50Hz)	90	A
E_{AVL}	Avalanche Energy (1A, 40mH)	20	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature	- 55 to +175	°C

Thermal Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	0.58	°C/W
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient	45	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Tube	Quantity
ISL9R3060G2	ISL9R3060G2_F085	TO-247	-	30

Electrical Characteristics T_C = 25°C unless otherwise noted

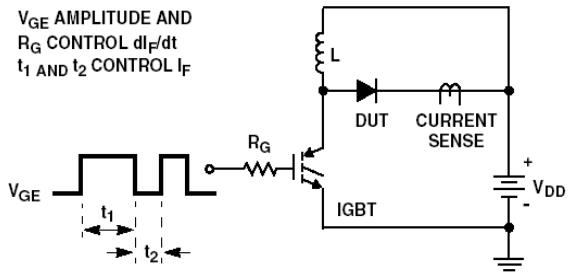
Symbol	Parameter	Conditions		Min.	Typ.	Max	Units
I_R	Instantaneous Reverse Current	V_R = 600V	T_C = 25 °C	-	-	100	uA
			T_C = 175 °C	-	-	2	mA
V_{FM}[1]	Instantaneous Forward Voltage	I_F = 30A	T_C = 25 °C T_C = 175 °C	- -	2.0 1.5	2.4 2.2	V V
t_{rr}[2]	Reverse Recovery Time	I_F =1A, di/dt = 200A/μs, V_{CC}= 390V	T_C = 25 °C	-	23	35	ns
		I_F =30A, di/dt = 200A/μs, V_{CC}= 390V	T_C = 25 °C T_C = 175 °C	- -	31 135	45 -	ns ns
t_a t_b Q_{rr}	Reverse Recovery Time Reverse Recovery Charge	I_F =30A, di/dt = 200A/μs, V_{CC}= 390V	T_C = 25 °C	- - -	18 13 48	- - -	ns ns nC
E_{AVL}	Avalanche Energy	I_{AV}=1.0A, L = 40mH		20	-	-	mJ

Notes:

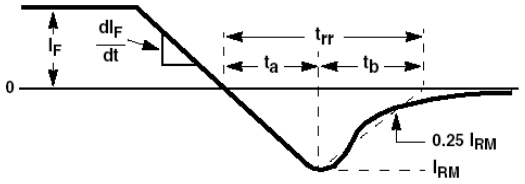
1. Pulse : Test Pulse width = 300μs, Duty Cycle = 2%

2. Guaranteed by design

Test Circuit and Waveforms

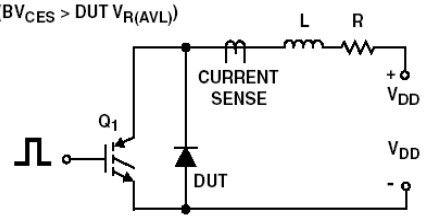


t_{rr} TEST CIRCUIT

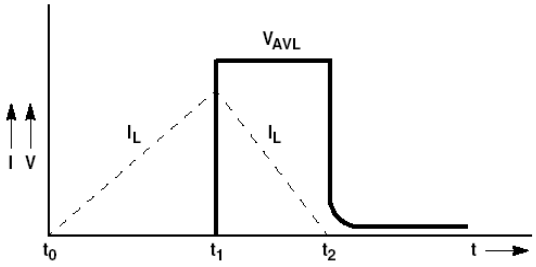


t_{rr} WAVEFORMS AND DEFINITIONS

I_{MAX} = 1A
L = 40mH
R < 0.1Ω
E_{AVL} = 1/2LI^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

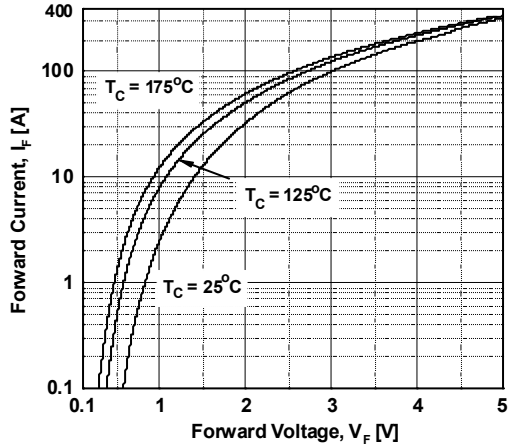


Figure 2. Typical Reverse Current vs. Reverse Voltage

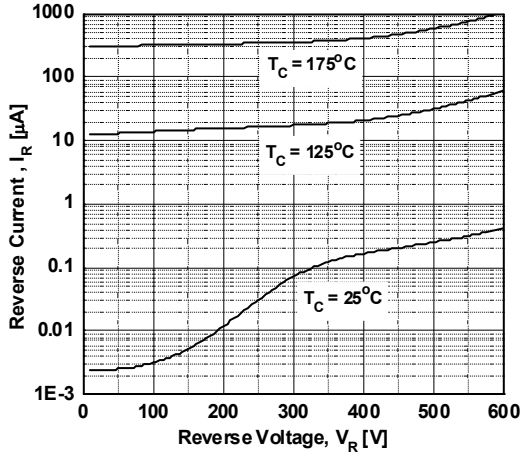


Figure 3.Typical Junction Capacitance

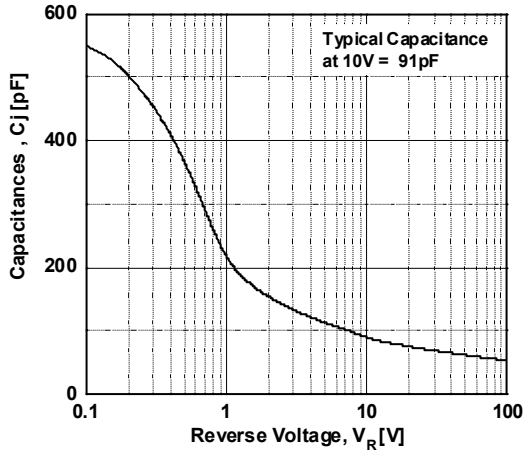


Figure 4. Typical Reverse Recovery Time vs. di/dt

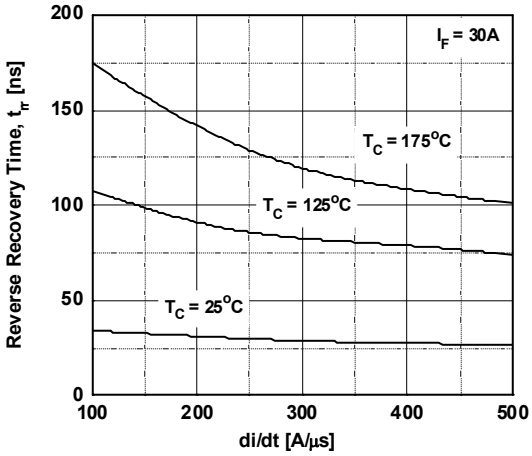


Figure 5. Typical Reverse Recovery Current vs. di/dt

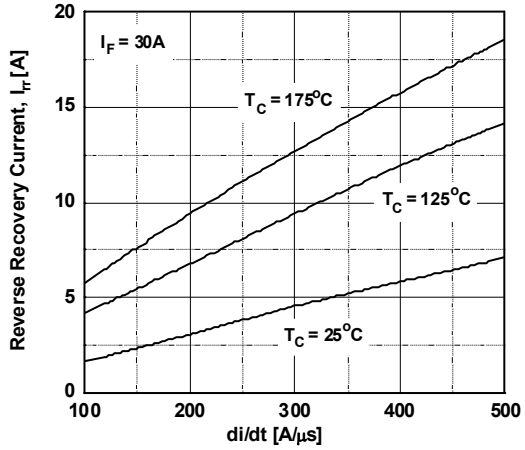
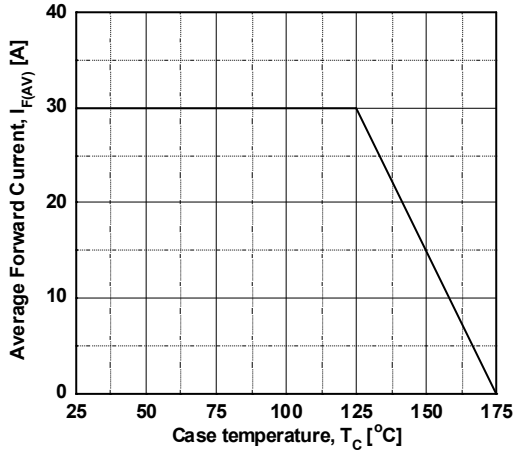


Figure 6. Forward Current Derating Curve



Typical Performance Characteristics (Continued)

Figure 7. Reverse Recovery Charge

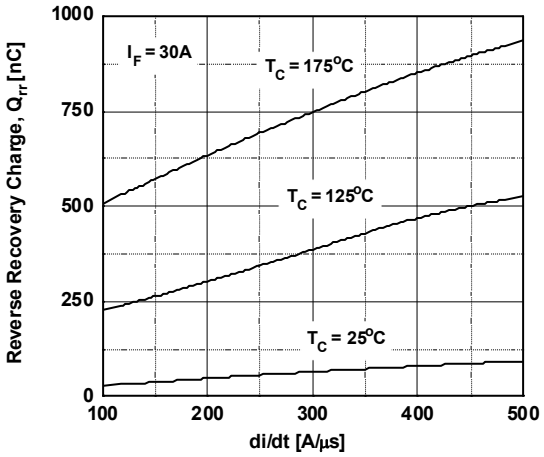
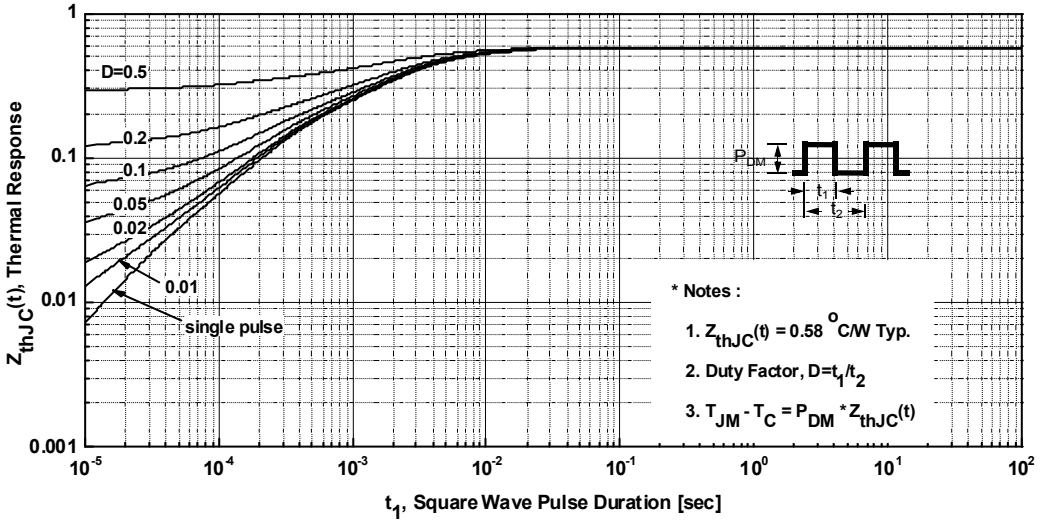
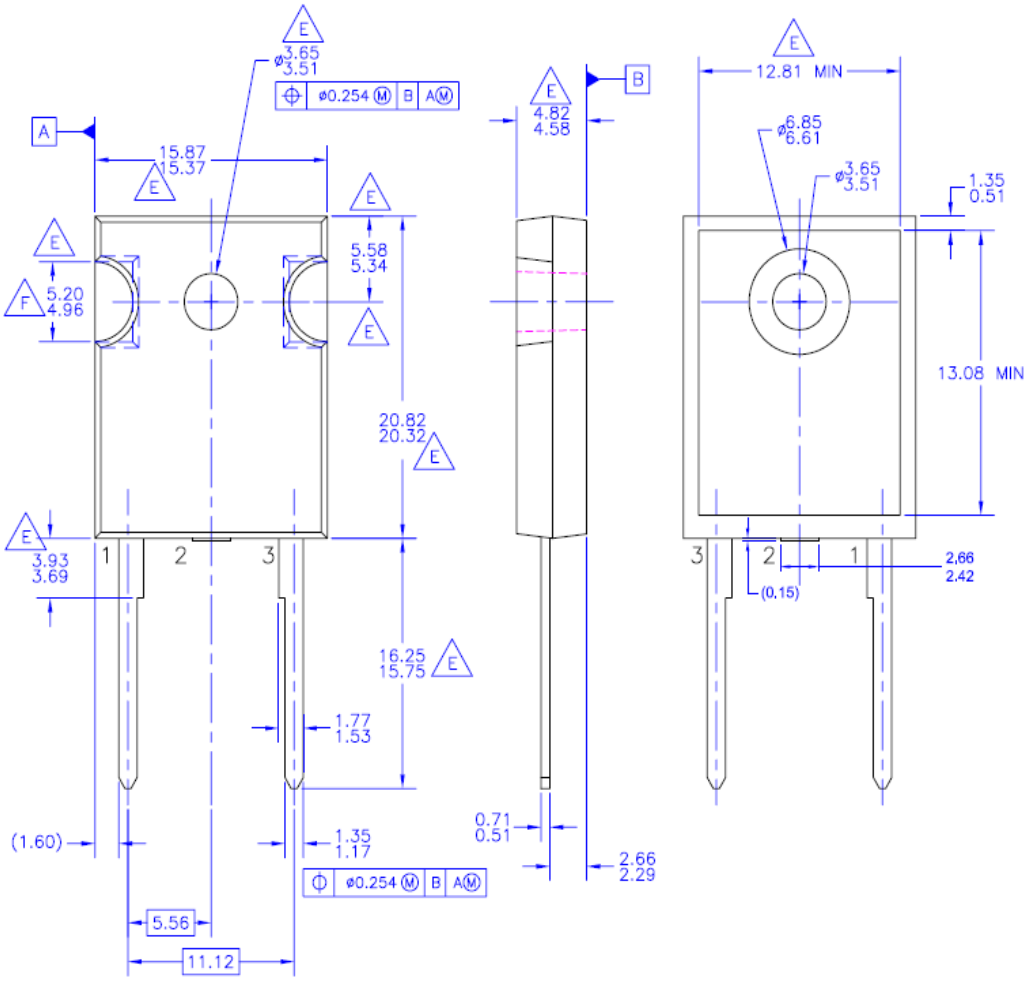


Figure 8. Transient Thermal Response Curve



Mechanical Dimensions

TO-247-2L



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