

# STEALTH™ Rectifier

**30 A, 600 V**

## ISL9R3060G2-F085

### Description

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.

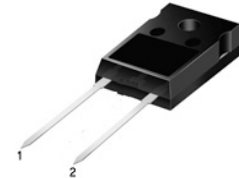
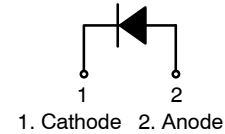
This device is intended for use as a free wheeling or boost diode in power supplies and other power switching applications. The low  $I_{RRM}$  and short  $t_a$  phase reduce loss in switching transistors. The soft recovery minimizes ringing, expanding the range of conditions under which the diode may 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.

### Features

- High Speed Switching ( $t_{rr} = 31$  ns(Typ.) @  $I_F = 30$  A)
- Low Forward Voltage ( $V_F = 2.4$  V(Max.) @  $I_F = 30$  A)
- Avalanche Energy Rated
- AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

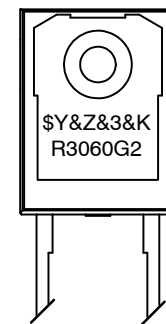
### Applications

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



TO-247-2LD  
CASE 340CL

### MARKING DIAGRAM



|         |                           |
|---------|---------------------------|
| \$Y     | = onsemi Logo             |
| &Z      | = Assembly Plant Code     |
| &3      | = Date Code (Year & Week) |
| &K      | = Lot Traceability Code   |
| R3060G2 | = Specific Device Code    |

### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

# ISL9R3060G2–F085

## 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 @ $T_C = 125^\circ\text{C}$ | 30          | A                |
| $I_{FSM}$      | Non-repetitive Peak Surge Current (Halfwave 1 Phase 60 Hz)    | 325         | A                |
| $E_{AVL}$      | Avalanche Energy (1 A, 40 mH)                                 | 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    | 0.58 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Maximum Thermal Resistance, Junction to Ambient | 45   | $^\circ\text{C}/\text{W}$ |

## PACKAGE MARKING AND ORDERING INFORMATION

| Device Marking | Device           | Package | Tube | Quantity |
|----------------|------------------|---------|------|----------|
| R3060G2        | ISL9R3060G2–F085 | TO-247  | –    | 30       |

## ELECTRICAL CHARACTERISTICS $T_C = 25^\circ\text{C}$ unless otherwise noted

| Symbol                       | Parameter                     | Conditions                                                       |                                                 | Min. | Typ.      | Max     | Units    |
|------------------------------|-------------------------------|------------------------------------------------------------------|-------------------------------------------------|------|-----------|---------|----------|
| I <sub>R</sub>               | Instantaneous Reverse Current | V <sub>R</sub> = 600 V                                           | T <sub>C</sub> = 25°C                           | –    | –         | 100     | μA       |
|                              |                               |                                                                  | T <sub>C</sub> = 175°C                          | –    | –         | 2       | mA       |
| V <sub>FM</sub> <sup>1</sup> | Instantaneous Forward Voltage | I <sub>F</sub> = 30 A                                            | T <sub>C</sub> = 25°C                           | –    | 2.0       | 2.4     | V        |
|                              |                               |                                                                  | T <sub>C</sub> = 175°C                          | –    | 1.5       | 2.2     | V        |
| t <sub>rr</sub> <sup>2</sup> | Reverse Recovery Time         | I <sub>F</sub> = 1 A, di/dt = 200 A/μs, V <sub>CC</sub> = 390 V  | T <sub>C</sub> = 25°C                           | –    | 23        | 35      | ns       |
|                              |                               | I <sub>F</sub> = 30 A, di/dt = 200 A/μs, V <sub>CC</sub> = 390 V | T <sub>C</sub> = 25°C<br>T <sub>C</sub> = 175°C | –    | 31<br>135 | 45<br>– | ns<br>ns |
| t <sub>a</sub>               | Reverse Recovery Time         | I <sub>F</sub> = 30 A, di/dt = 200 A/μs, V <sub>CC</sub> = 390 V | T <sub>C</sub> = 25°C                           | –    | 18        | –       | ns       |
| t <sub>b</sub>               | Reverse Recovery Charge       |                                                                  |                                                 | –    | 13        | –       | ns       |
| Q <sub>rr</sub>              |                               |                                                                  |                                                 | –    | 48        | –       | nC       |
| E <sub>AVL</sub>             | Avalanche Energy              | I <sub>AV</sub> = 1.0 A, L = 40 mH                               |                                                 | 20   | –         | –       | mJ       |

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

2. Guaranteed by design.

TEST CIRCUIT WAVEFORMS

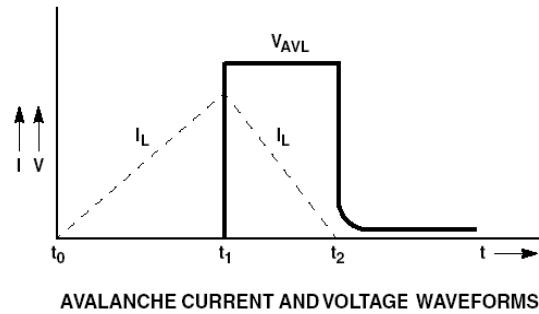
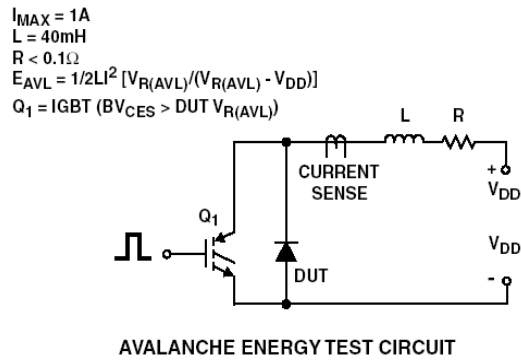
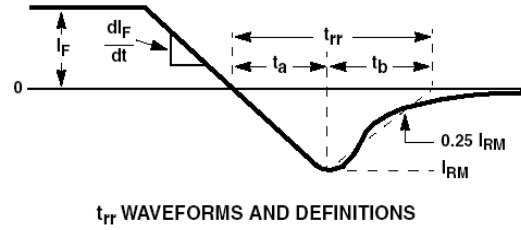
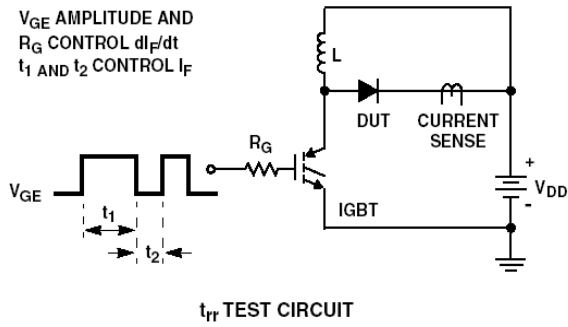


Figure 1. Test Circuit Waveforms

TYPICAL PERFORMANCE CHARACTERISTICS

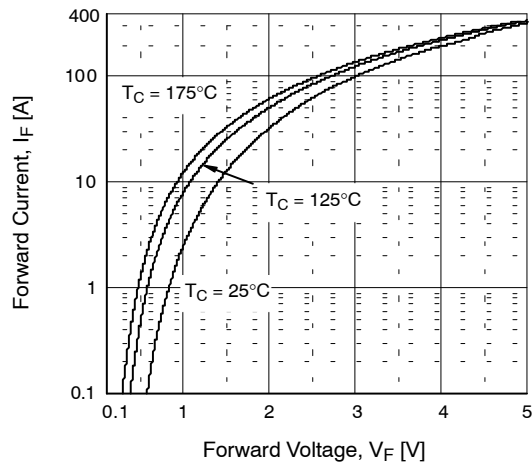


Figure 2. Typical Forward Voltage Drop vs. Forward Current

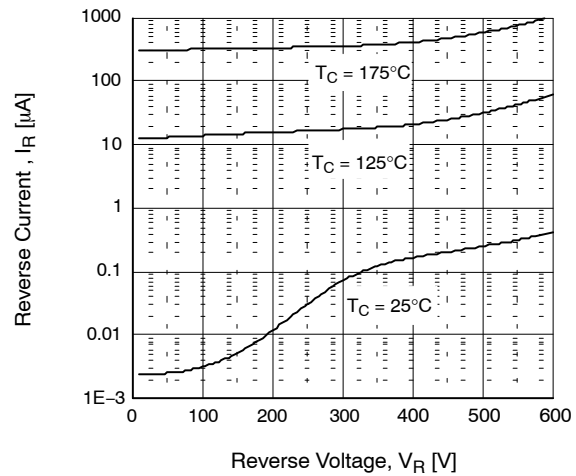


Figure 3. Typical Reverse Current vs. Reverse Voltage

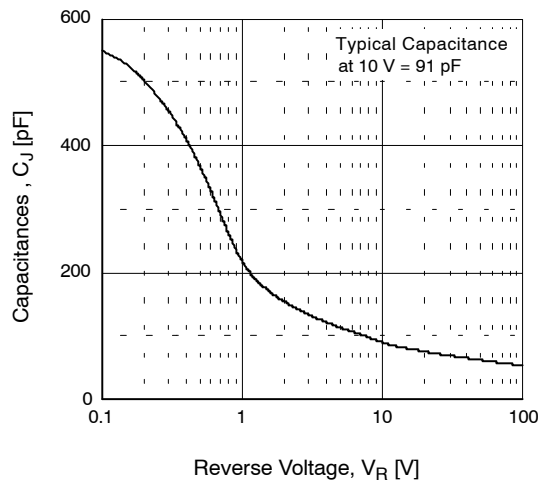


Figure 4. Typical Junction Capacitance

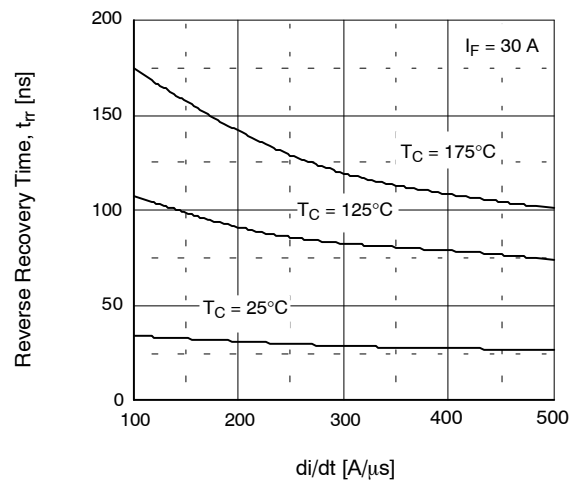


Figure 5. Typical Reverse Recovery Time vs. di/dt

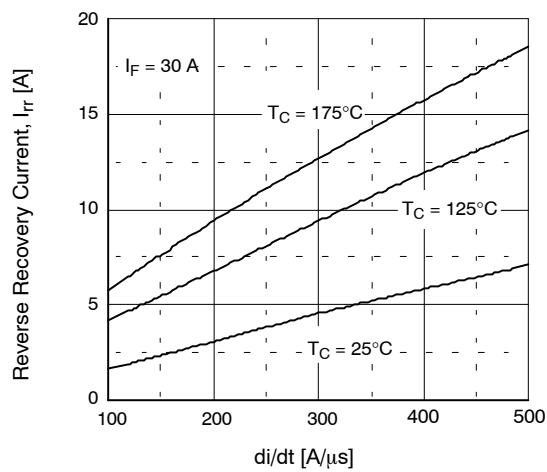


Figure 6. Typical Reverse Recovery Current vs. di/dt

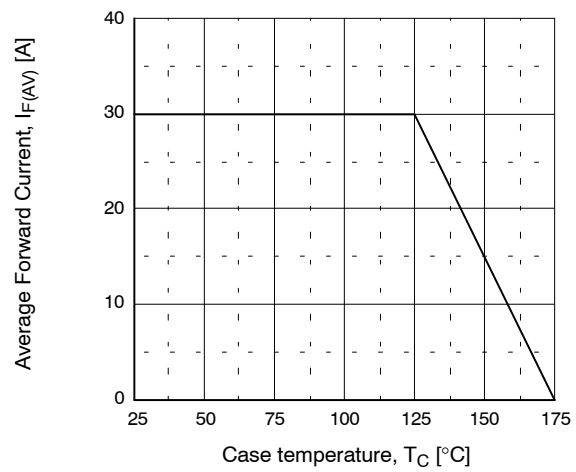


Figure 7. Forward Current Derating Curve

# ISL9R3060G2-F085

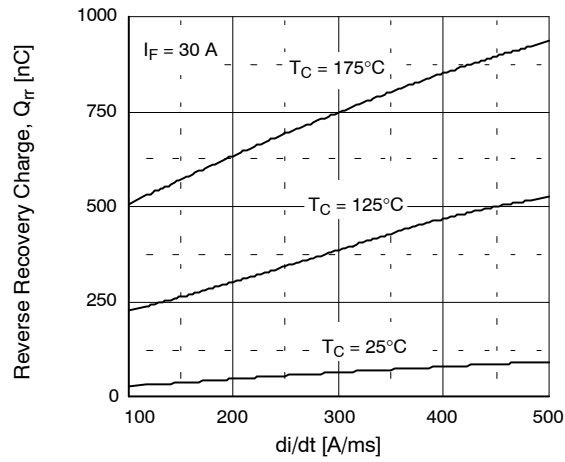


Figure 8. Reverse Recovery Charge

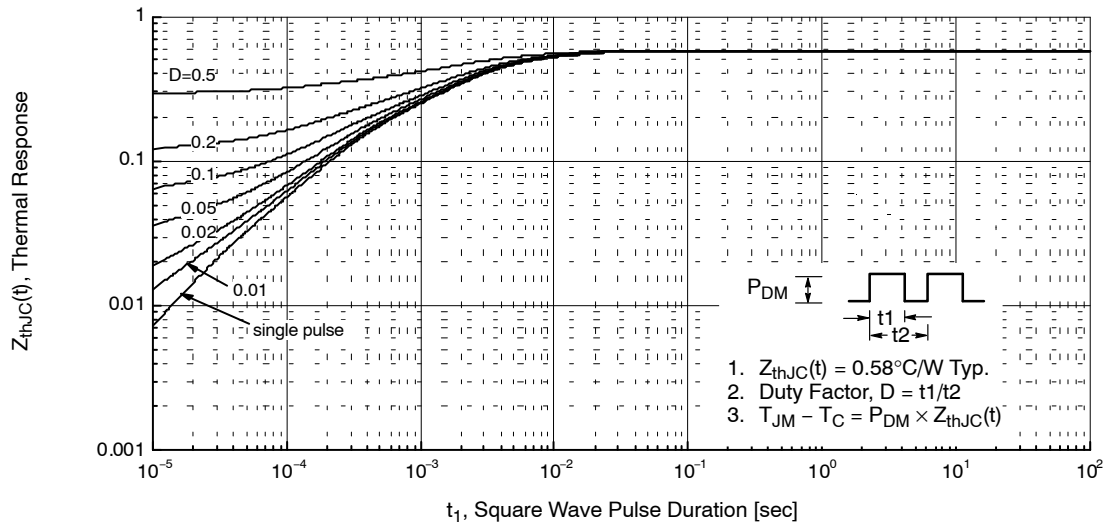
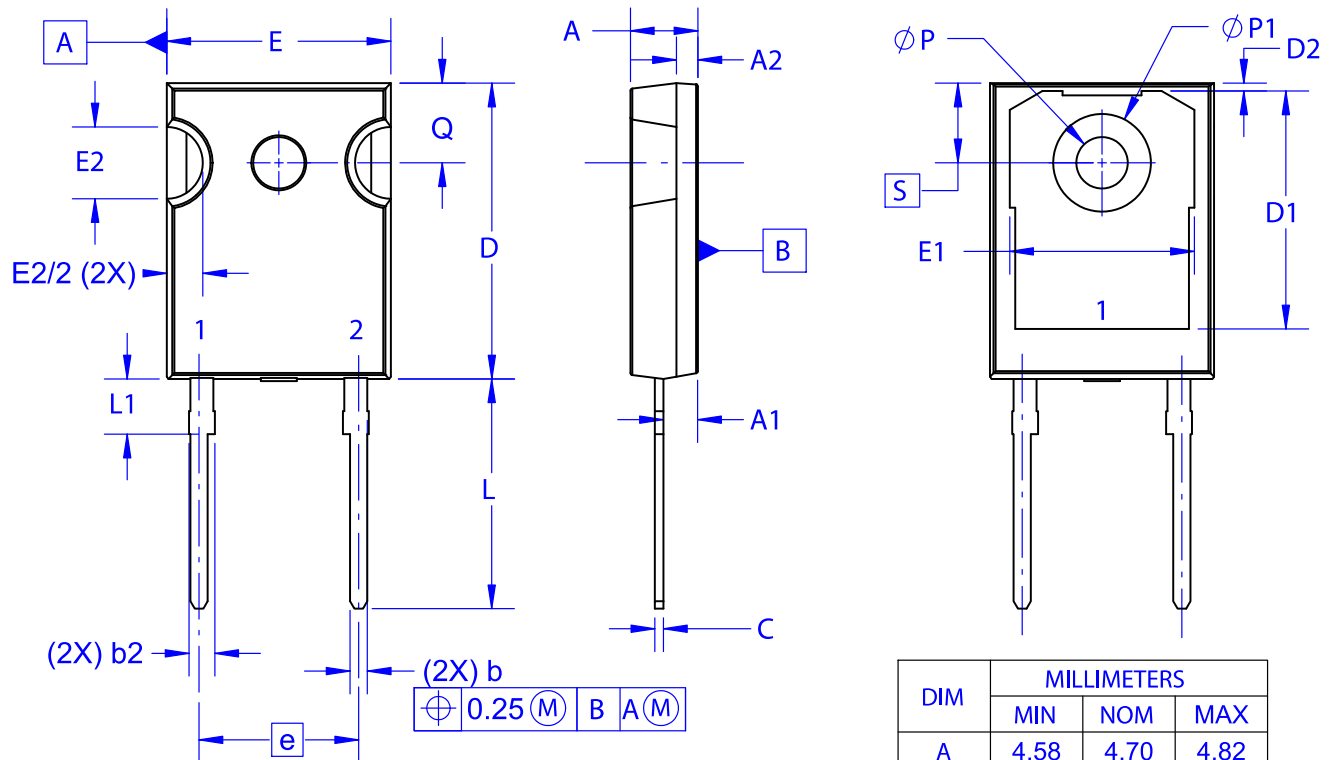


Figure 9. Transient Thermal Response Curve

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CASE 340CL  
ISSUE A

DATE 03 DEC 2019



NOTES: UNLESS OTHERWISE SPECIFIED.

- A. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DRAWING CONFORMS TO ASME Y14.5 - 2009.
- D. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.
- E. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.

GENERIC  
MARKING DIAGRAM\*



XXXX = Specific Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
ZZ = Assembly Lot Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

|                  |             |                                                                                                                                                                                     |
|------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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