Data Sheet | November 2000 | File Number 4911.1

8A, 600V Stealth™ Diode

The ISL9R860P2 is a Stealth diode optimized for low loss performance in high frequency 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.

Formerly developmental type TA49409.

Ordering Information

PART NUMBER	PACKAGE	BRAND
ISL9R860P2	TO-220AC	R860P2

NOTE: When ordering, use the entire part number.

Symbol

Features

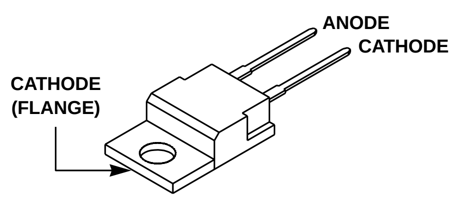
- Soft Recovery . . . . t_b / t_a > 2.5
- Fast Recovery . . . . t_{rr} < 25ns
- Operating Temperature. . . . . .175^{o}C
- Reverse Voltage 600V
- Avalanche Energy Rated

Applications

- Switch Mode Power Supplies
- PFC Boost Diode
- UPS Free Wheeling Diode
- Motor Drive FWD
- SMPS FWD
- Snubber Diode

Packaging

JEDEC TO-220AC



Absolute Maximum Ratings $T_C = 25^oC$, Unless Otherwise Specified

		ISL9R860P2	UNITS
Peak Repetitive Reverse Voltage	V_{RRM}	600	V
Working Peak Reverse Voltage	V_{RWM}	600	V
DC Blocking Voltage	V_R	600	V
Average Rectified Forward Current	$I_{F(AV)}$	8	A
Repetitive Peak Surge Current (Square Wave, 20kHz)	I_{FRM}	16	A
Nonrepetitive Peak Surge Current (Halfwave 1 Phase 60Hz)	I_{FSM}	100	A
Maximum Power Dissipation	P_D	85	W
Avalanche Energy (1A, 40mH)	E_{AVL}	20	mJ
Operating and Storage Temperature	T_{STG}, T_J	-55 to 175	^{o}C

Electrical Specifications $T_C = 25^oC$, Unless Otherwise Specified

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
V_F	$I_F = 8A$	-	2.0	2.4	V
	$I_F = 8A$, $T_C = 125^oC$	-	1.6	2.0	V
I_R	$V_R = 600V$	-	-	100	μA
	$V_R = 600V$, $T_C = 125^oC$	-	-	1.0	mA
t_{rr}	$I_F = 1A$, $dI_F/dt = 100A/\mu s$, $V_R = 30V$	-	18	25	ns
	$I_F = 8A$, $dI_F/dt = 100A/\mu s$, $V_R = 30V$	-	21	30	ns
t_{rr}	$I_F = 8A$, $dI_F/dt = 200A/\mu s$, $V_R = 390V$, $T_C = 25^oC$	-	28	-	ns
I_{RRM}		-	3.2	-	A
Q_{RR}		-	50	-	nC
t_{rr}	$I_F = 8A$, $dI_F/dt = 200A/\mu s$, $V_R = 390V$, $T_C = 125^oC$	-	77	-	ns
S		-	3.7	-	
I_{RRM}		-	3.4	-	A
Q_{RR}		-	150	-	nC
t_{rr}	$I_F = 8A$, $dI_F/dt = 600A/\mu s$, $V_R = 390V$, $T_C = 125^oC$	-	53	-	ns
S		-	2.5	-	
I_{RRM}		-	6.5	-	A
Q_{RR}		-	195	-	nC
dI_M/dt		-	500	-	A/μs
C_J	$V_R = 10V$, $I_F = 0A$	-	30	-	pF
$R_{\theta JC}$		-	-	1.75	$^oC/W$

DEFINITIONS

D = Duty cycle.

V_F = Instantaneous forward voltage (pw = 300μs, D = 2%).

I_R = Instantaneous reverse current.

t_{rr} = Reverse recovery time ($t_a + t_b$).

S = Softness factor (t_b / t_a).

I_{RRM} = Maximum reverse recovery current.

Q_{RR} = Reverse recovery charge.

dI_M/dt = Maximum di/dt during t_b.

C_J = Junction Capacitance.

$R_{\theta JC}$ = Thermal resistance junction to case.

pw = pulse width.

Typical Performance Curves

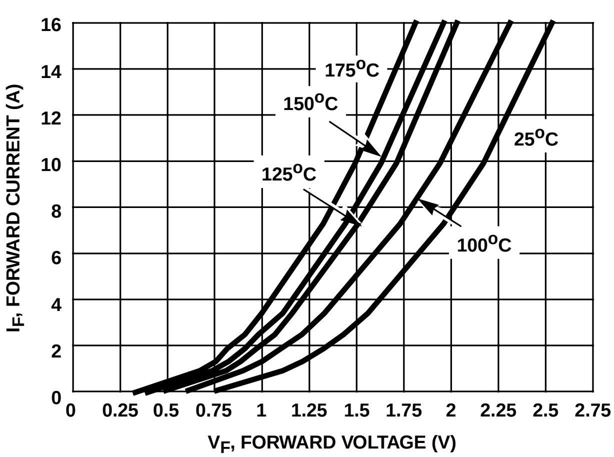


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

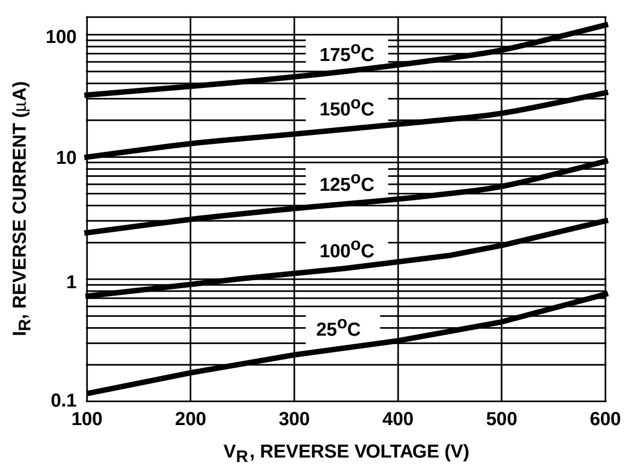


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

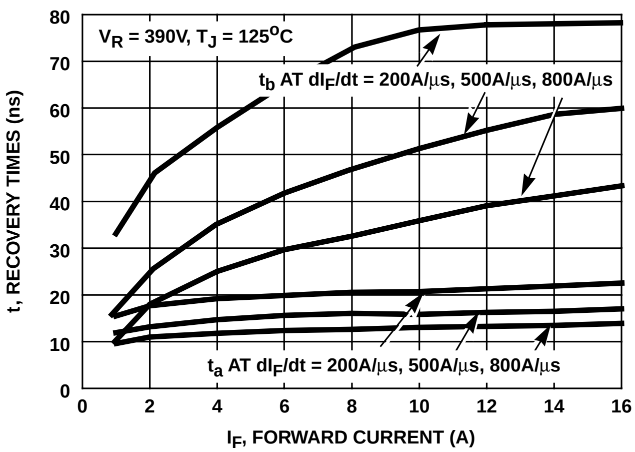


FIGURE 3. t_a AND t_b CURVES vs FORWARD CURRENT

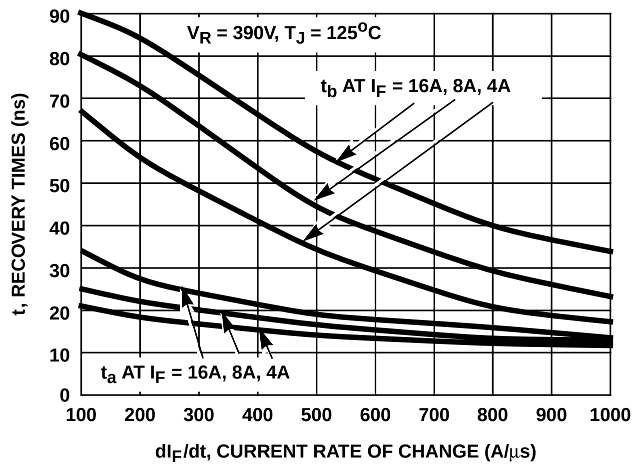


FIGURE 4. t_a AND t_b CURVES vs dI_F/dt

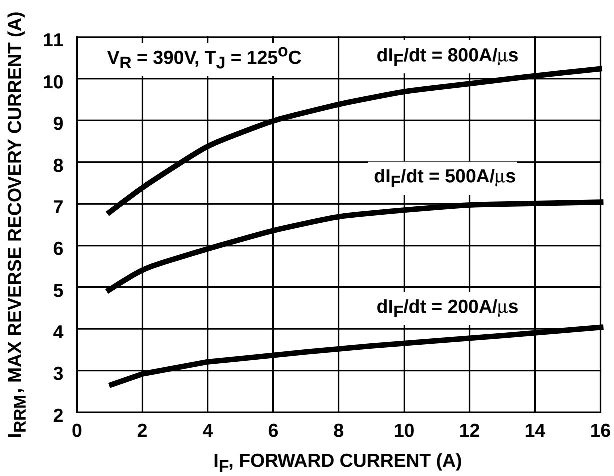


FIGURE 5. MAXIMUM REVERSE RECOVERY CURRENT vs FORWARD CURRENT

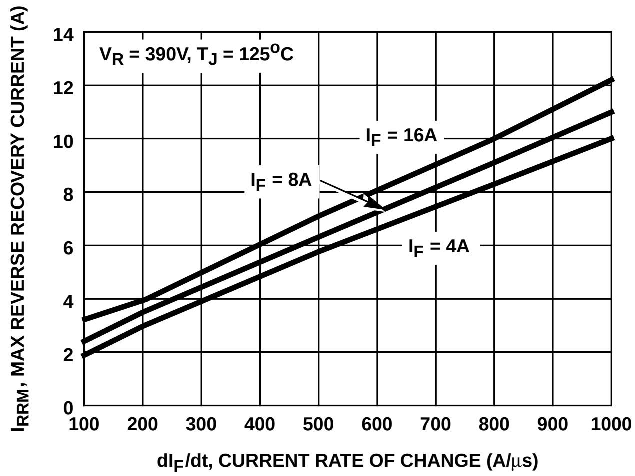


FIGURE 6. MAXIMUM REVERSE RECOVERY CURRENT vs dI_F/dt

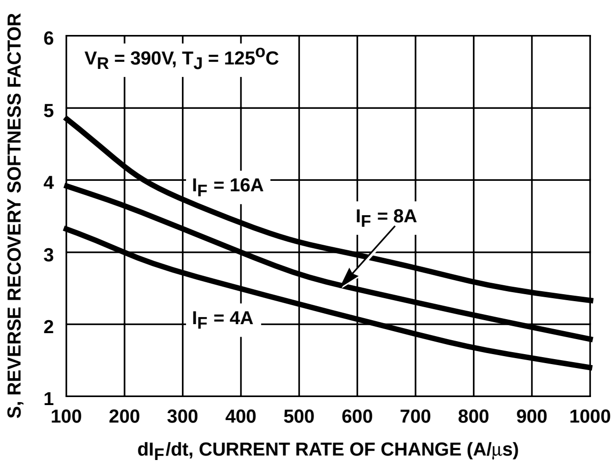


FIGURE 7. REVERSE RECOVERY SOFTNESS FACTOR vs dI_F/dt

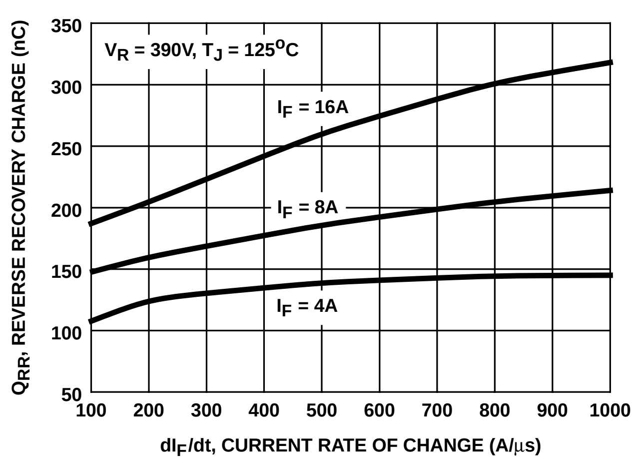


FIGURE 8. REVERSE RECOVERY CHARGE vs dI_F/dt

Typical Performance Curves (Continued)

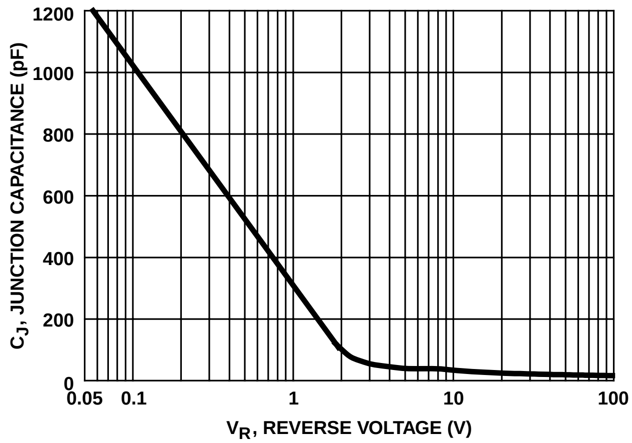


FIGURE 9. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

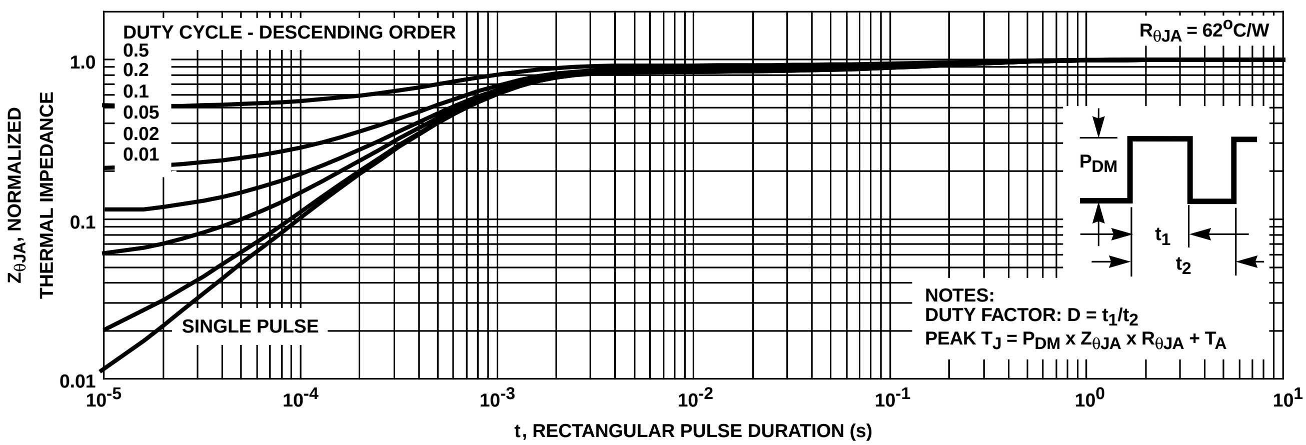


FIGURE 10. NORMALIZED MAXIMUM TRANSIENT THERMAL IMPEDANCE

Test Circuits and Waveforms

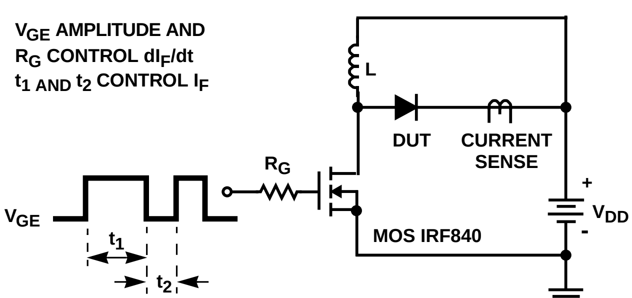


FIGURE 11. t_{rr} TEST CIRCUIT

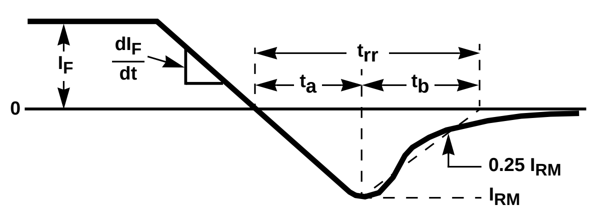


FIGURE 12. t_{rr} WAVEFORMS AND DEFINITIONS

Test Circuits and Waveforms (Continued)

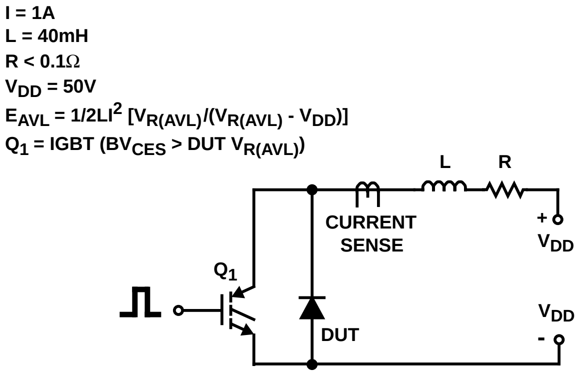


FIGURE 13. AVALANCHE ENERGY TEST CIRCUIT

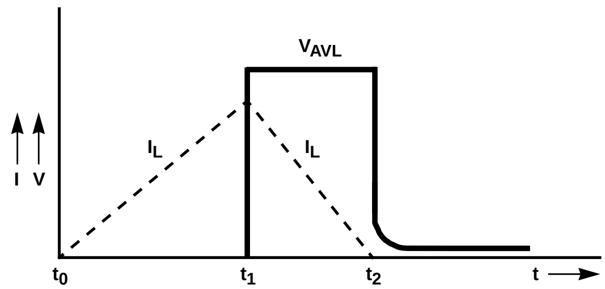
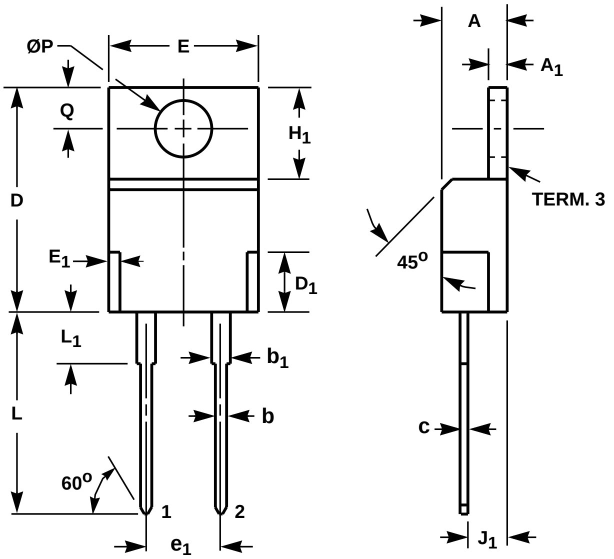


FIGURE 14. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

TO-220AC

2 LEAD JEDEC TO-220AC PLASTIC PACKAGE (FOR RECTIFIERS ONLY)



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.170	0.180	4.32	4.57	-
A_1	0.048	0.052	1.22	1.32	-
b	0.030	0.034	0.77	0.86	3, 4
b_1	0.045	0.055	1.15	1.39	2, 3
c	0.014	0.019	0.36	0.48	2, 3, 4
D	0.590	0.610	14.99	15.49	-
D_1	-	0.160	-	4.06	-
E	0.395	0.410	10.04	10.41	-
E_1	-	0.030	-	0.76	-
e_1	0.200 BSC		5.08 BSC		5
H_1	0.235	0.255	5.97	6.47	-
J_1	0.100	0.110	2.54	2.79	6
L	0.530	0.550	13.47	13.97	-
L_1	0.130	0.150	3.31	3.81	2
ØP	0.149	0.153	3.79	3.88	-
Q	0.102	0.112	2.60	2.84	-

NOTES:

1. These dimensions are within allowable dimensions of Rev. J of JEDEC TO-220AC outline dated 3-24-87.
2. Lead dimension and finish uncontrolled in L_1.
3. Lead dimension (without solder).
4. Add typically 0.002 inches (0.05mm) for solder coating.
5. Position of lead to be measured 0.250 inches (6.35mm) from bottom of dimension D.
6. Position of lead to be measured 0.100 inches (2.54mm) from bottom of dimension D.
7. Controlling dimension: Inch.
8. Revision 3 dated 7-97.

Sales Office Headquarters

NORTH AMERICA
Intersil Corporation
P. O. Box 883, Mail Stop 53-204
Melbourne, FL 32902
TEL: (321) 724-7000
FAX: (321) 724-7240

EUROPE
Intersil SA
Mercure Center
100, Rue de la Fusee
1130 Brussels, Belgium
TEL: (32) 2.724.2111
FAX: (32) 2.724.22.05

ASIA
Intersil Ltd.
8F-2, 96, Sec. 1, Chien-kuo North,
Taipei, Taiwan 104
Republic of China
TEL: 886-2-2515-8508
FAX: 886-2-2515-8369