High Supply Voltage 200MHz Unity-Gain Stable Operational Amplifier

The ISL55002 is a high speed, low power, low cost monolithic operational amplifier. The ISL55002 is unity-gain stable and features a 300V/µs slew rate and 200MHz bandwidth while requiring only 8.5mA of supply current per amplifier.

The power supply operating range of the ISL55002 is from ±15V down to ±2.5V. For single-supply operation, the ISL55002 operates from 30V down to 5V.

The ISL55002 also features an extremely wide output voltage swing of -12.75V/+13.4V with V_S = ±15V and R_L = 1kΩ.

At a gain of +1, the ISL55002 has a -3dB bandwidth of 200MHz with a phase margin of 55°. Because of its conventional voltage-feedback topology, the ISL55002 allow the use of reactive or non-linear elements in its feedback network. This versatility combined with low cost and 140mA of output-current drive makes the ISL55002 an ideal choice for price-sensitive applications requiring low power and high speed.

The ISL55002 is available in an 8 Ld SO package and is specified for operation over the full -40°C to +85°C temperature range.

Ordering Information

PART NUMBER	PART MARKING	TAPE & REEL	PACKAGE	PKG. DWG. #
ISL55002IB	55002IB	-	8 Ld SO	MDP0027
ISL55002IB-T7	55002IB	7”	8 Ld SO	MDP0027
ISL55002IB-T13	55002IB	13”	8 Ld SO	MDP0027
ISL55002IBZ (See Note)	55002IBZ	-	8 Ld SO (Pb-Free)	MDP0027
ISL55002IBZ-T7 (See Note)	55002IBZ	7”	8 Ld SO (Pb-Free)	MDP0027
ISL55002IBZ-T13 (See Note)	55002IBZ	13”	8 Ld SO (Pb-Free)	MDP0027

NOTE: Intersil Pb-free plus anneal products employ special Pb-free material sets; molding compounds/die attach materials and 100% matte tin plate termination finish, which are RoHS compliant and compatible with both SnPb and Pb-free soldering operations. Intersil Pb-free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J STD-020.

Features

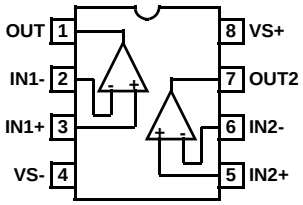
- 200MHz -3dB bandwidth
- Unity-gain stable
- Low supply current: 8.5mA per amplifier
- Wide supply range: ±2.5V to ±15V dual-supply and 5V to 30V single-supply
- High slew rate: 300V/µs
- Fast settling: 75ns to 0.1% for a 10V step
- Wide output voltage swing: -12.75V/+13.4V with V_S = ±15V, R_L = 1kΩ
- Enhanced replacement for EL2244
- Pb-free plus anneal available (RoHS compliant)

Applications

- Video amplifiers
- Single-supply amplifiers
- Active filters/integrators
- High speed sample-and-hold
- High speed signal processing
- ADC/DAC buffers
- Pulse/RF amplifiers
- Pin diode receivers
- Log amplifiers
- Photo multiplier amplifiers
- Difference amplifiers

Pinout

ISL55002
(8 LD SO)
TOP VIEW



Absolute Maximum Ratings (T_A = 25°C)

Supply Voltage (V_S) . . . . . ±16.5V or 33V
Input Voltage (V_{IN}) . . . . . .±V_S
Differential Input Voltage (dV_{IN}) . . . . . .±10V
Continuous Output Current 60mA

Power Dissipation (P_D) . . . . . See Curves
Operating Temperature Range (T_A) . . . . . .-40°C to +85°C
Operating Junction Temperature (T_J) . . . . . .+150°C
Storage Temperature (T_{ST}) . . . . . .-65°C to +150°C

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

IMPORTANT NOTE: All parameters having Min/Max specifications are guaranteed. Typical values are for information purposes only. Unless otherwise noted, all tests are at the specified temperature and are pulsed tests, therefore: $T_J = T_C = T_A$

DC Electrical Specifications

V_S = ±15V, A_V = +1, R_L = 1kΩ, T_A = 25°C, unless otherwise specified.

PARAMETER	DESCRIPTION	CONDITION	MIN	TYP	MAX	UNIT
V_{OS}	Input Offset Voltage	V_S = ±15V		1.2	5	mV
TCV_{OS}	Average Offset Voltage Drift (Note 1)	-40°C to +85°C		17		µV/°C
I_B	Input Bias Current	V_S = ±15V		0.6	3.5	µA
I_{OS}	Input Offset Current	V_S = ±15V		0.2	2	µA
TCI_{OS}	Average Offset Current Drift (Note 1)			0.2		nA/°C
A_{VOL}	Open-loop Gain	V_S = ±15V, V_{OUT} = ±10V, R_L = 1kΩ	12000	21000		V/V
PSRR	Power Supply Rejection Ratio	V_S = ±5V to ±15V	75	100		dB
CMRR	Common-mode Rejection Ratio	V_{CM} = ±10V, V_{OUT} = 0V	75	90		dB
CMIR	Common-mode Input Range	V_S = ±15V		13		V
V_{OUT}	Output Voltage Swing	V_O+, R_L = 1kΩ	13.25	13.4		V
		V_O-, R_L = 1kΩ	-12.6	-12.75		V
		V_O+, R_L = 150Ω	9.6	10.7		V
		V_O-, R_L = 150Ω	-8.3	-9.4		V
I_{SC}	Output Short Circuit Current		80	140		mA
I_S	Supply Current (per amplifier)	V_S = ±15V, no load		8.5	9.25	mA
R_{IN}	Input Resistance		2.0	3.2		MΩ
C_{IN}	Input Capacitance	A_V = +1		1		pF
R_{OUT}	Output Resistance	A_V = +1		50		mΩ
PSOR	Power Supply Operating Range	Dual supply	±2.25		±15	V
		Single supply	4.5		30	V

NOTE:

1. Measured from T_{MIN} to T_{MAX}.

AC Electrical Specifications

V_S = ±15V, A_V = +1, R_L = 1kΩ, T_A = 25°C, unless otherwise specified.

PARAMETER	DESCRIPTION	CONDITION	MIN	TYP	MAX	UNIT
BW	-3dB Bandwidth (V_{OUT} = 0.4V_{PP})	V_S = ±15V, A_V = +1		200		MHz
		V_S = ±15V, A_V = -1		50		MHz
		V_S = ±15V, A_V = +2		50		MHz
		V_S = ±15V, A_V = +5		17		MHz
GBWP	Gain Bandwidth Product	V_S = ±15V		70		MHz
PM	Phase Margin	R_L = 1kΩ, C_L = 5pF		55		°
SR	Slew Rate (Note 1)		260	300		V/µs

AC Electrical Specifications

V_S = ±15V, A_V = +1, R_L = 1kΩ, T_A = 25°C, unless otherwise specified. **(Continued)**

PARAMETER	DESCRIPTION	CONDITION	MIN	TYP	MAX	UNIT
FPBW	Full-power Bandwidth (Note 2)	V_S = ±15V		9.5		MHz
t_S	Settling to +0.1% (A_V = +1)	V_S = ±15V, 10V step		75		ns
dG	Differential Gain (Note 3)	NTSC/PAL		0.01		%
dP	Differential Phase	NTSC/PAL		0.05		°
eN	Input Noise Voltage	10kHz		12		nV/√Hz
iN	Input Noise Current	10kHz		1.5		pA/√Hz

NOTES:

1. Slew rate is measured on rising edge.
2. For V_S = ±15V, V_{OUT} = $10V_{PP}$, for V_S = ±5V, V_{OUT} = $5V_{PP}$. Full-power bandwidth is based on slew rate measurement using FPBW = SR/(2π * V_{PEAK}).
3. Video performance measured at V_S = ±15V, A_V = +2 with two times normal video level across R_L = 150Ω. This corresponds to standard video levels across a back-terminated 75Ω load. For other values or R_L, see curves.

Typical Performance Curves

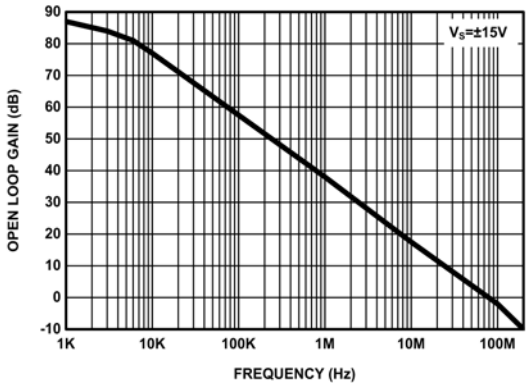


FIGURE 1. OPEN-LOOP GAIN vs FREQUENCY

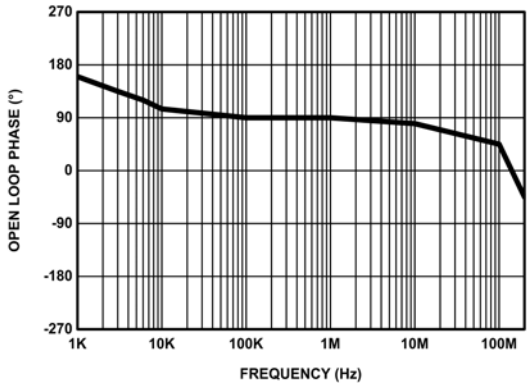


FIGURE 2. OPEN-LOOP PHASE vs FREQUENCY

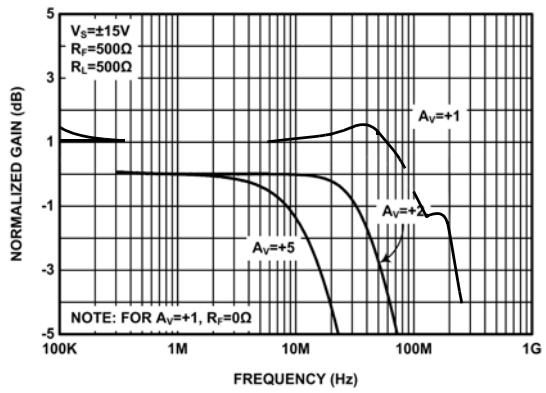


FIGURE 3. GAIN vs FREQUENCY FOR VARIOUS NON-INVERTING GAIN SETTINGS

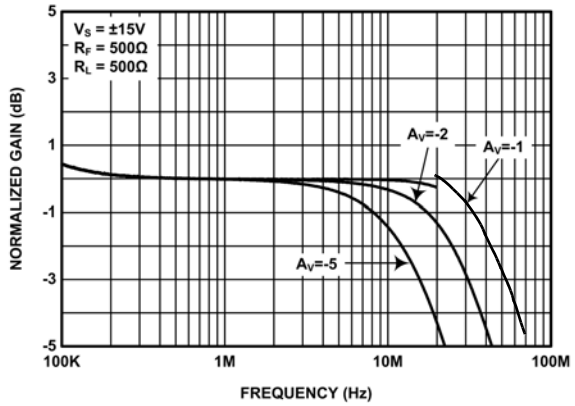
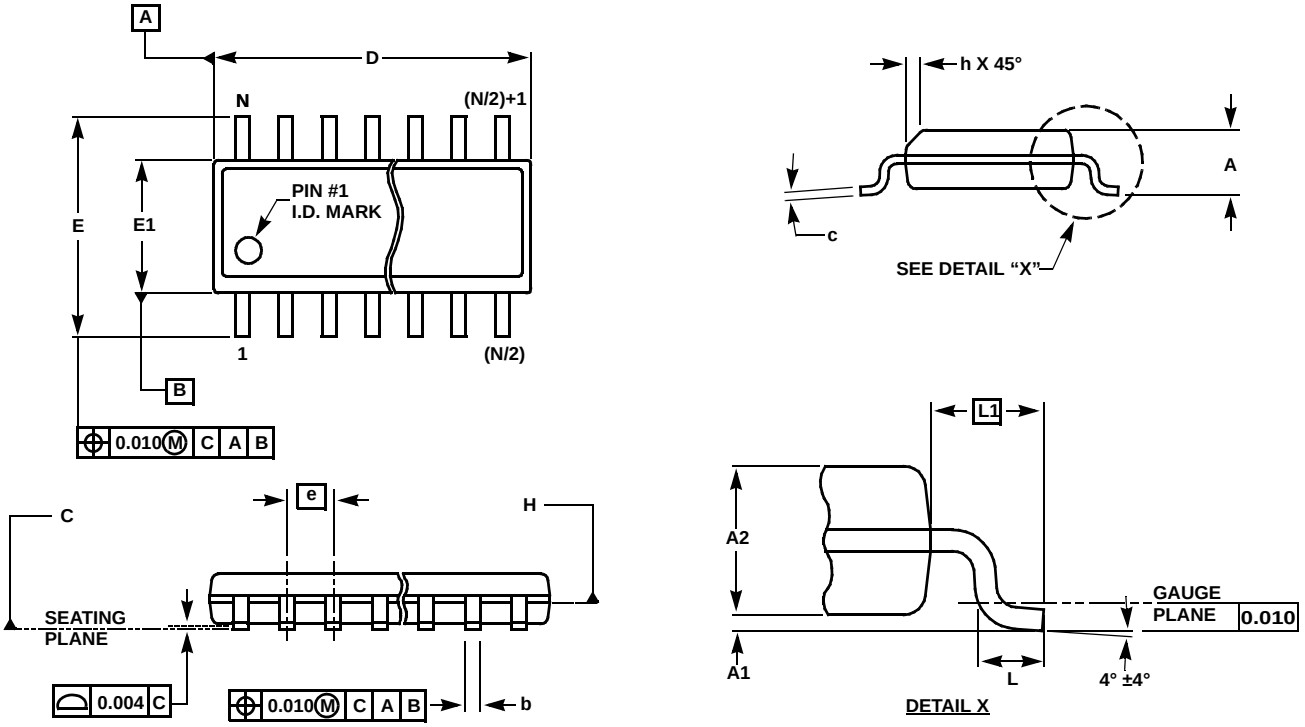


FIGURE 4. GAIN vs FREQUENCY FOR VARIOUS INVERTING GAIN SETTINGS

Small Outline Package Family (SO)



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SMALL OUTLINE PACKAGE FAMILY (SO)

SYMBOL	SO-8	SO-14	SO16 (0.150")	SO16 (0.300") (SOL-16)	SO20 (SOL-20)	SO24 (SOL-24)	SO28 (SOL-28)	TOLERANCE	NOTES
A	0.068	0.068	0.068	0.104	0.104	0.104	0.104	MAX	-
A1	0.006	0.006	0.006	0.007	0.007	0.007	0.007	±0.003	-
A2	0.057	0.057	0.057	0.092	0.092	0.092	0.092	±0.002	-
b	0.017	0.017	0.017	0.017	0.017	0.017	0.017	±0.003	-
c	0.009	0.009	0.009	0.011	0.011	0.011	0.011	±0.001	-
D	0.193	0.341	0.390	0.406	0.504	0.606	0.704	±0.004	1, 3
E	0.236	0.236	0.236	0.406	0.406	0.406	0.406	±0.008	-
E1	0.154	0.154	0.154	0.295	0.295	0.295	0.295	±0.004	2, 3
e	0.050	0.050	0.050	0.050	0.050	0.050	0.050	Basic	-
L	0.025	0.025	0.025	0.030	0.030	0.030	0.030	±0.009	-
L1	0.041	0.041	0.041	0.056	0.056	0.056	0.056	Basic	-
h	0.013	0.013	0.013	0.020	0.020	0.020	0.020	Reference	-
N	8	14	16	16	20	24	28	Reference	-

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NOTES:

1. Plastic or metal protrusions of 0.006" maximum per side are not included.
2. Plastic interlead protrusions of 0.010" maximum per side are not included.
3. Dimensions "D" and "E1" are measured at Datum Plane "H".
4. Dimensioning and tolerancing per ASME Y14.5M-1994