

High Supply Voltage 220MHz Unity-Gain Stable Operational Amplifier

The ISL55001 is high speed, low power, low cost monolithic operational amplifier. The ISL55001 is unity-gain stable and feature a 300V/ μ s slew rate and 220MHz bandwidth while requiring only 9mA of supply current.

The power supply operating range of the ISL55001 is from ± 15 V down to ± 2.5 V. For single-supply operation, the ISL55001 operates from 30V down to 5V.

The ISL55001 also features an extremely wide output voltage swing of -12.75V/+13.4V with $V_S = \pm 15$ V and $R_L = 1k\Omega$.

At a gain of +1, the ISL55001 has a -3dB bandwidth of 220MHz with a phase margin of 50°. Because of its conventional voltage-feedback topology, the ISL55001 allows 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 ISL55001 an ideal choice for price-sensitive applications requiring low power and high speed.

The ISL55001 is available in an 8 Ld SO package and specified for operation over the full -40°C to +85°C temperature range.

Ordering Information

PART NUMBER (Note)	PART MARKING	PACKAGE (Pb-free)	PKG. DWG. #
ISL55001IBZ	55001 IBZ	8 Ld SO	MDP0027
ISL55001IBZ-T7*	55001 IBZ	8 Ld SO Tape and Reel	MDP0027
ISL55001IBZ-T13*	55001 IBZ	8 Ld SO Tape and Reel	MDP0027

*Please refer to TB347 for details on reel specifications.

NOTE: These Intersil Pb-free plastic packaged products employ special Pb-free material sets; molding compounds/die attach materials and 100% matte tin plate PLUS ANNEAL - e3 termination finish, which is 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

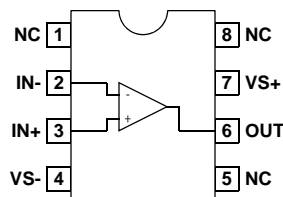
- 220MHz -3dB bandwidth
- Unity-gain stable
- Low supply current: 9mA @ $V_S = \pm 15$ V
- Wide supply range: ± 2.5 V to ± 15 V dual-supply and 5V to 30V single-supply
- High slew rate: 300V/ μ s
- Fast settling: 75ns to 0.1% for a 10V step
- Wide output voltage swing: -12.75V/+13.6V with $V_S = \pm 15$ V, $R_L = 1k\Omega$
- Low cost, enhanced replacement for the EL2044
- Pb-free (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 Amplifier

Pinout

ISL55001
(8 LD SO)
TOP VIEW



Absolute Maximum Ratings ($T_A = +25^{\circ}\text{C}$)

Supply Voltage (V_S)	$\pm 16.5\text{V}$ or 33V
Input Voltage (V_{IN})	$\pm V_S$
Differential Input Voltage (dV_{IN})	$\pm 10\text{V}$
ESD Rating	
Human Body Model	$.3\text{kV}$
Machine Model	$.250\text{V}$

Thermal Information

Continuous Output Current	60mA
Power Dissipation (P_D)	See Curves
Operating Temperature Range (T_A)	-40°C to $+85^{\circ}\text{C}$
Operating Junction Temperature (T_J)	$+150^{\circ}\text{C}$
Storage Temperature (T_{ST})	-65°C to $+150^{\circ}\text{C}$
Pb-free reflow profile	see link below
	http://www.intersil.com/pbfree/Pb-FreeReflow.asp

CAUTION: Do not operate at or near the maximum ratings listed for extended periods of time. Exposure to such conditions may adversely impact product reliability and result in failures not covered by warranty.

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 $V_S = \pm 15\text{V}$, $R_L = 1\text{k}\Omega$, $T_A = +25^{\circ}\text{C}$, unless otherwise specified.

PARAMETER	DESCRIPTION	CONDITION	MIN	TYP	MAX	UNIT
V_{OS}	Input Offset Voltage			0.06	3	mV
TCV_{OS}	Average Offset Voltage Drift			18		$\mu\text{V}/^{\circ}\text{C}$
I_B	Input Bias Current			1.72	3.5	μA
I_{OS}	Input Offset Current			0.27	1.5	μA
$TC-I_{OS}$	Average Offset Current Drift (Note 1)			0.8		$\text{nA}/^{\circ}\text{C}$
A_{VOL}	Open-loop Gain	$V_{OUT} = \pm 10\text{V}$, $R_L = 1\text{k}\Omega$	10	17		kV/V
PSRR	Power Supply Rejection Ratio	$V_S = \pm 5\text{V}$ to $\pm 15\text{V}$	75	90		dB
CMRR	Common-mode Rejection Ratio	$V_{CM} = \pm 10\text{V}$, $V_{OUT} = 0\text{V}$	70	90		dB
CMIR	Common-mode Input Range	$V_S = \pm 15\text{V}$		± 14		V
V_{OUT}	Output Voltage Swing	V_{O+} , $R_L = 1\text{k}\Omega$	13.25	13.5		V
		V_{O-} , $R_L = 1\text{k}\Omega$	-12.6	-12.8		V
		V_{O+} , $R_L = 150\Omega$	10.7	11.5		V
		V_{O-} , $R_L = 150\Omega$	-8.8	-9.9		V
I_{SC}	Output Short Circuit Current		120	145		mA
I_S	Supply Current	No load		8.3	9.25	mA
R_{IN}	Input Resistance		2.0	2.75		$\text{M}\Omega$
C_{IN}	Input Capacitance	$A_V = +1$		1		pF
R_{OUT}	Output Resistance	$A_V = +1$		50		$\text{m}\Omega$
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 $V_S = \pm 15\text{V}$, $A_V = +1$, $R_L = 1\text{k}\Omega$, unless otherwise specified.

PARAMETER	DESCRIPTION	CONDITION	MIN	TYP	MAX	UNIT
BW	-3dB Bandwidth ($V_{OUT} = 0.4V_{P-P}$)	$A_V = +1$		220		MHz
		$A_V = -1$		55		MHz
		$A_V = +2$		53		MHz
		$A_V = +5$		17		MHz
GBWP	Gain Bandwidth Product			70		MHz

AC Electrical Specifications $V_S = \pm 15V$, $A_V = +1$, $R_L = 1k\Omega$, unless otherwise specified. (Continued)

PARAMETER	DESCRIPTION	CONDITION	MIN	TYP	MAX	UNIT
PM	Phase Margin	$R_L = 1k\Omega$, $C_L = 5pF$		55		°
SR	Slew Rate (Note 2)	$R_L = 100\Omega$	250	280		V/ μs
FPBW	Full-power Bandwidth (Note 3)	$V_S = \pm 15V$		9.5		MHz
t_S	Settling to +0.1% ($A_V = +1$)	$V_S = \pm 15V$, 10V step		75		ns
dG	Differential Gain (Note 4)	NTSC/PAL		0.01		%
dP	Differential Phase	NTSC/PAL		0.05		°
eN	Input Noise Voltage	10kHz		12		nV/ \sqrt{Hz}
iN	Input Noise Current	10kHz		1.5		pA/ \sqrt{Hz}

NOTES:

- Slew rate is measured on rising edge.
- For $V_S = \pm 15V$, $V_{OUT} = 10V_{P-P}$ for $V_S = \pm 5V$, $V_{OUT} = 5V_{P-P}$. Full-power bandwidth is based on slew rate measurement using $FPBW = SR / (2\pi \cdot V_{PEAK})$.
- Video performance measured at $V_S = \pm 15V$, $A_V = +2$ with two times normal video level across $R_L = 150\Omega$. This corresponds to standard video levels across a back-terminated 75 Ω load. For other values or R_L , see "Typical Performance Curves" on page 3.

Typical Performance Curves

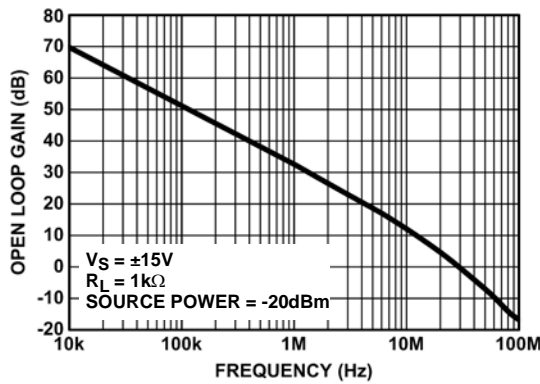


FIGURE 1. OPEN-LOOP GAIN vs FREQUENCY

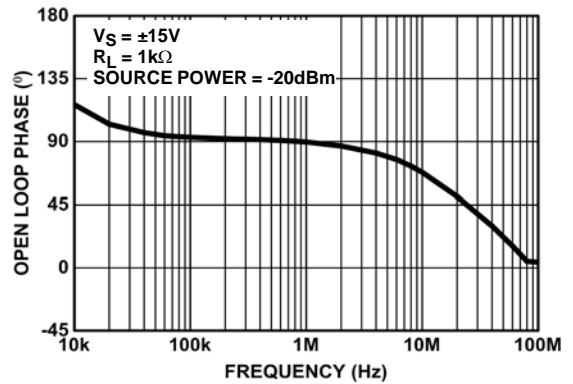


FIGURE 2. OPEN-LOOP PHASE vs FREQUENCY

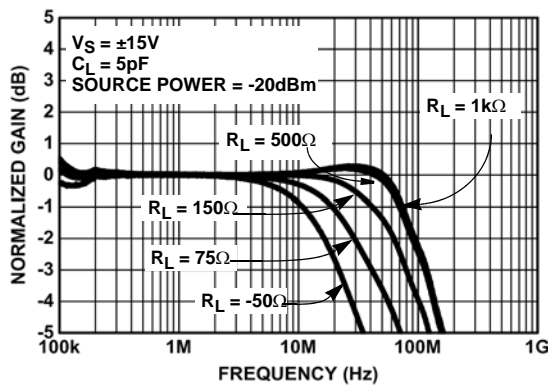


FIGURE 3. FREQUENCY RESPONSE FOR VARIOUS R_{LOAD} ($A_V = +1$)

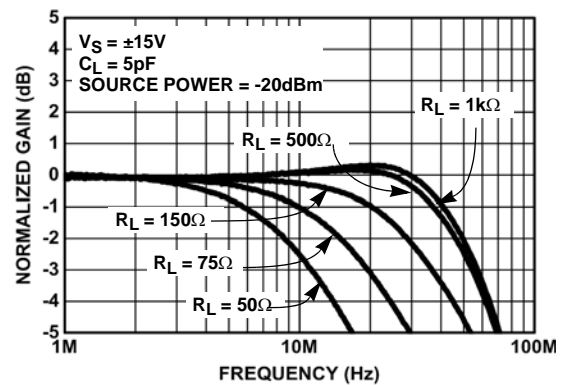
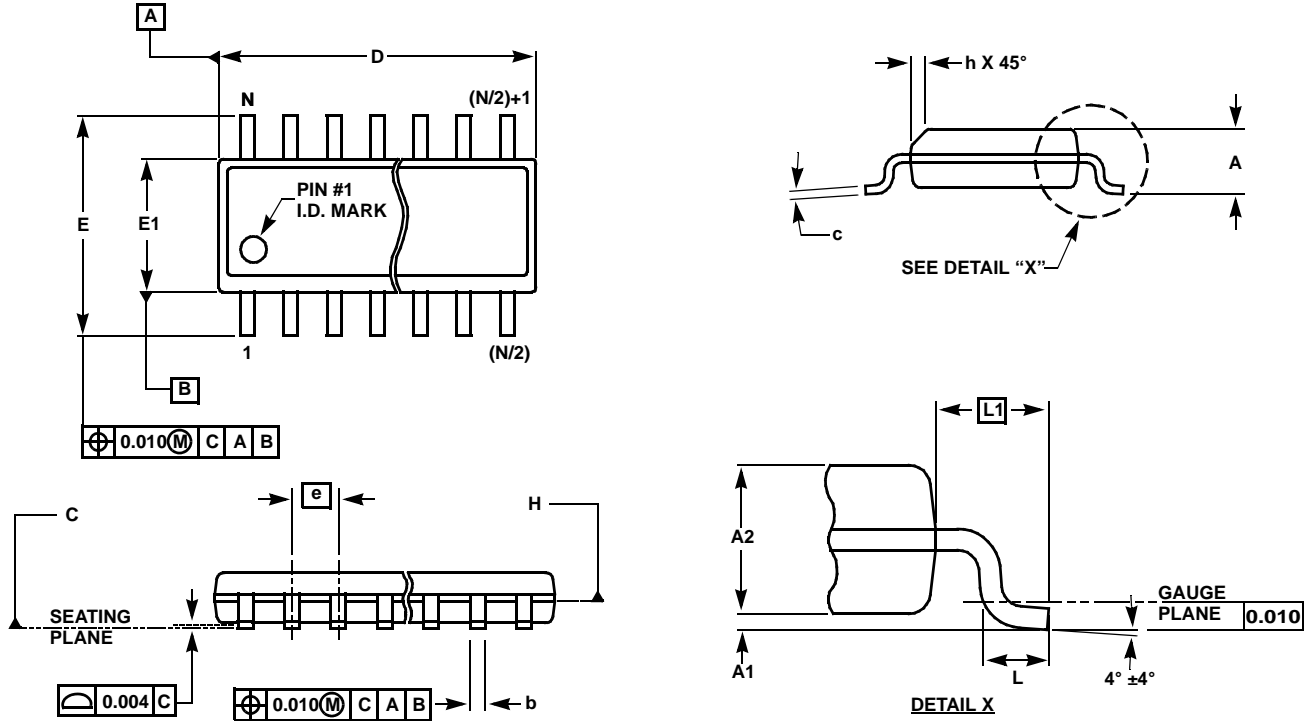


FIGURE 4. FREQUENCY RESPONSE FOR VARIOUS R_{LOAD} ($A_V = +2$)

Small Outline Package Family (SO)



MDP0027

SMALL OUTLINE PACKAGE FAMILY (SO)

SYMBOL	INCHES							TOLERANCE	NOTES
	SO-8	SO-14	SO16 (0.150")	SO16 (0.300") (SOL-16)	SO20 (SOL-20)	SO24 (SOL-24)	SO28 (SOL-28)		
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	-

Rev. M 2/07

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