# DUAL OPERATIONAL AMPLIFIER

IL4560

GENERAL DESCRIPTION

The IL4560 integrated circuit is a high-gain, wide bandwidth, dual operational amplifier capable of driving 20 V peak-to-peak into 400 Ω loads. The IL4560 combines many of the features of the IL4558 as well as providing the capability of wider bandwidth, and higher slew rate make the IL4560 ideal for active filters, data and telecommunications, and many instrumentation applications.

FEATURES

- Operating Voltage   (±4 V ~ ±18 V)
- Wide Gain Bandwidth Product (10 MHz typ.)
- Slew Rate   (4 V/µs typ.)
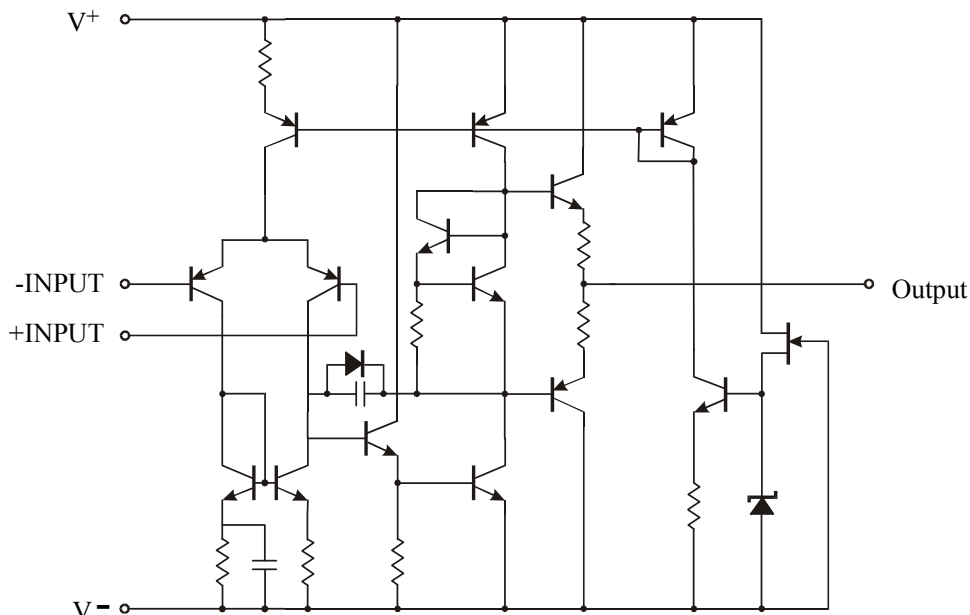- Bipolar Technology

N SUFFIX
PLASTIC

8
1

D SUFFIX
SOIC

8
1
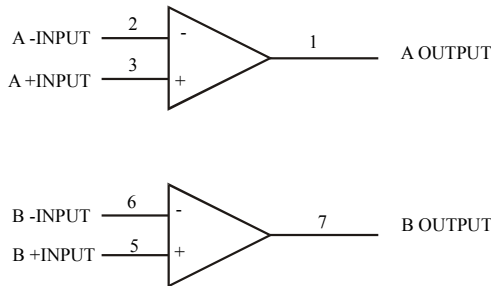
ORDERING INFORMATION
IL4560N Plastic
IL4560D   SOIC
T_A = -40° to 85° C
for all packages.

BLOCK DIAGRAM

A -INPUT — 2 —
A +INPUT — 3 —
1 — A OUTPUT

B -INPUT — 6 —
B +INPUT — 5 —
7 — B OUTPUT

PIN ASSIGNMENT

OUT 1	1 ●	8	V_{CC}
IN1(-)	2	7	OUT 2
IN1(+)	3	6	IN2(-)
GND	4	5	IN2(+)
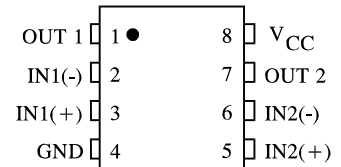
EQUIVALENT CIRCUIT (1/2 Show)

V^+

-INPUT

+INPUT

Output

V^-

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Symbol	Parameter	Ratings	Unit
V^+/V^-	Supply Voltage	±18	V
V_{ID}	Differential Input Voltage	30	V
V_{IC}	Input Voltage	±15*	V
Topr	Operation Temperature Range	-40 ~ +85	°C
Tstg	Storage Temperature Range	-60 ~ +125	°C

* For supply voltage less then ±15 V, the absolute maximum input voltage is equal to the supply voltage.

ELECTRICAL CHARACTERISTICS (Ta=25°C, V^+/V^- = ±15)

| Symbol	Parameter	Test Condition	Min	Max	Unit
V_{IO}	Input Offset Voltage	$R_S \leq 10$ kΩ	-	6	mV
I_{IO}	Input Offset Current		-	200	nA
I_B	Input Bias Current		-	500	nA
R_{IN}	Input Resistance		0.3	-	MΩ
A_V	Large Signal Voltage Gain	$R_L \geq 2$ kΩ, $V_O = \pm 10$ V	86	-	dB
V_{OM1}	Maximum Output Voltage Swing 1	$R_L \geq 2$ kΩ	±12	-	V
V_{OM2}	Maximum Output Voltage Swing 2	$I_O = 25$ mA	±10	-	V
V_{ICM}	Input Common Mode Voltage Range		±12	-	V
CMR	Common Mode Rejection Ratio	$R_S \leq 10$ kΩ	70	-	dB
SVR	Supply Voltage Rejection Ratio	$R_S \leq 10$ kΩ	76.5	-	dB
I_{CC}	Operating Current		-	5.7	mA
SR	Slew Rate	$R_L \geq 2$ kΩ	3	5	V/μs

■ **TYPICAL CHARACTERISTICS**

Open Loop Voltage Gain vs. Frequency

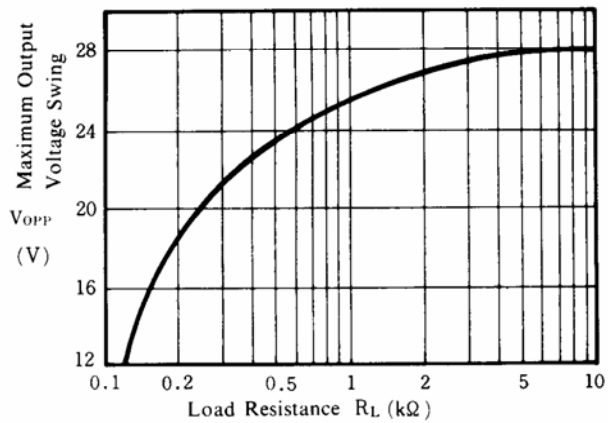$(V^+/V^- = \pm 15V,\ R_L = 2k\Omega,\ Ta = 25^{\circ}C)$
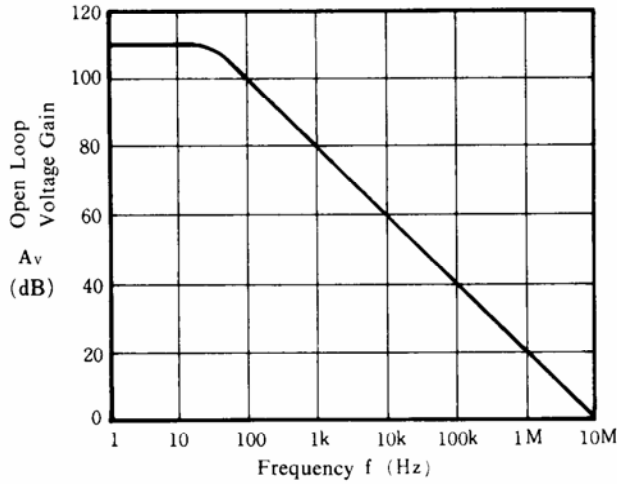
Maximum Output Voltage Swing vs. Frequency

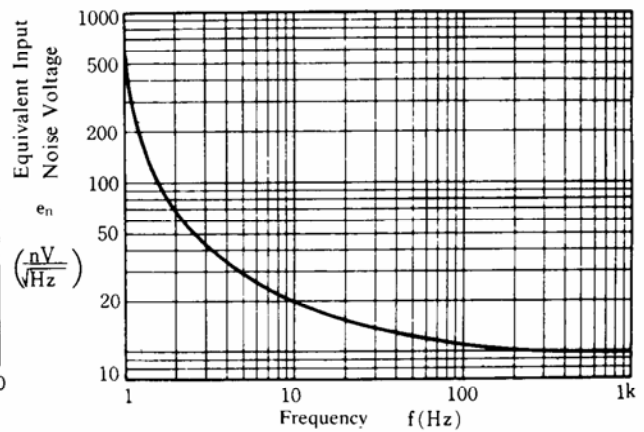$(V^+/V^- = \pm 15V,\ Ta = 25^{\circ}C)$
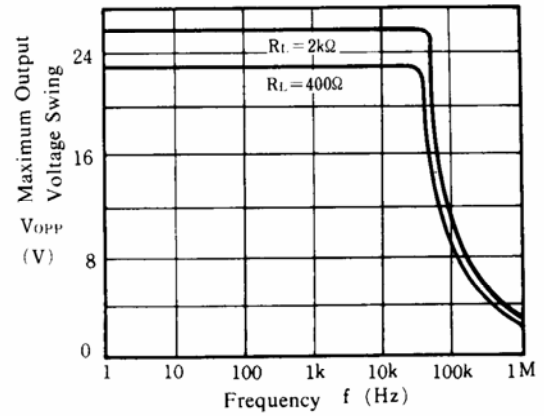
Maximum Output Voltage Swing vs. Load Resistance
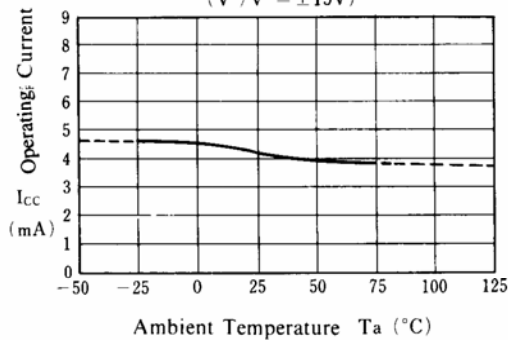
$(V^+/V^- = \pm 15V,\ Ta = 25^{\circ}C)$

Equivalent Input Noise Voltage vs. Frequency

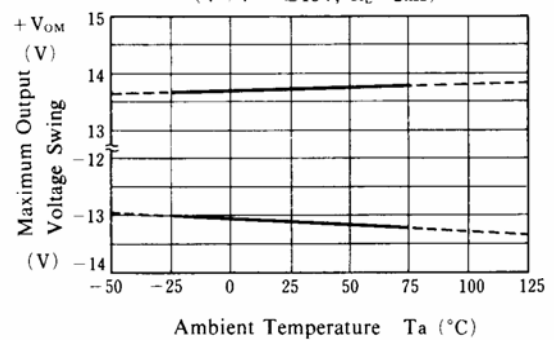$(V^+/V^- = \pm 15V,\ Rs = 50\Omega,\ Av = 60dB,\ Ta = 25^{\circ}C)$

Operating Current vs. Temperature

$(V^+/V^- = \pm 15V)$

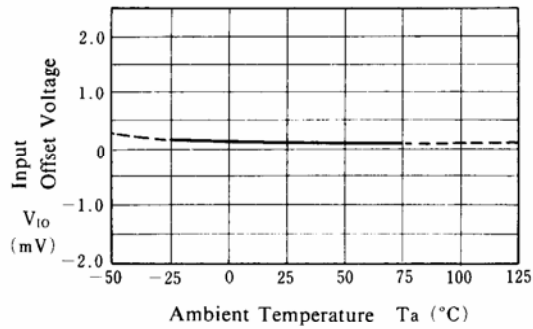### Maximum Output Voltage Swing vs. Temperature

$(V^+/V^- = \pm 15V,\ R_L = 2k\Omega)$

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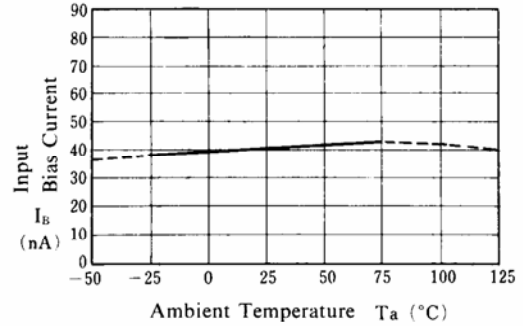## ■ TYPICAL CHARACTERISTICS

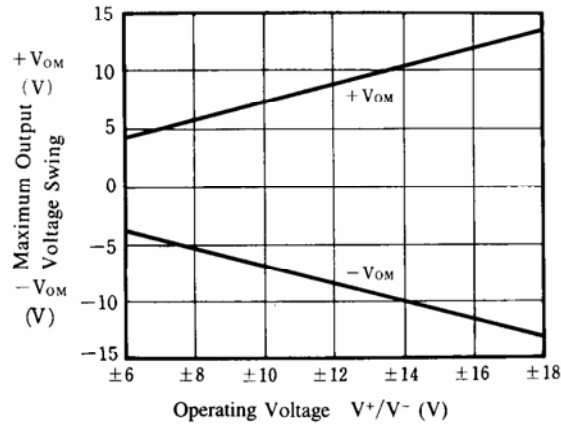### Input Offset Voltage vs. Temperature

$(V^+/V^- = \pm 15V)$

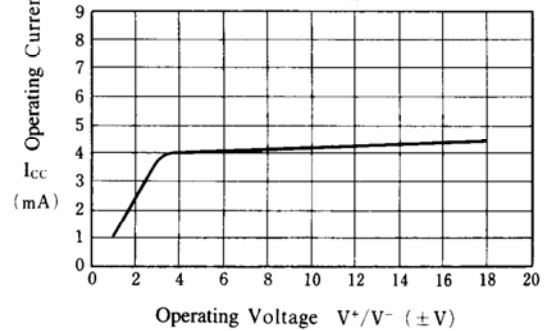### Input Bias Current vs. Temperature

$(V^+/V^- = \pm 15V)$

Maximum Output Voltage Swing vs. Supply Voltage
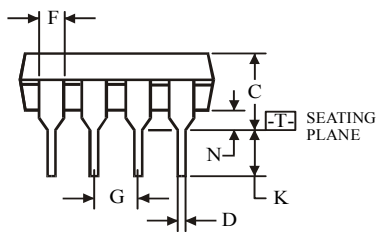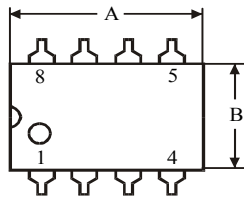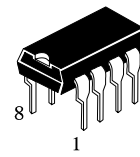
$(R_L = 400\Omega,\ Ta = 25°C)$

Operating Current vs. Operating Voltage

$(Ta = 25°C)$

N SUFFIX PLASTIC DIP
(MS – 001BA)

	Dimension, mm	
Symbol	**MIN**	**MAX**
A	8.51	10.16
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

⊕ 0.25 (0.010) Ⓜ T

NOTES:

1. Dimensions "A", "B" do not include mold flash or protrusions.

   Maximum mold flash or protrusions 0.25 mm (0.010) per side.

D SUFFIX SOIC
(MS - 012AA)
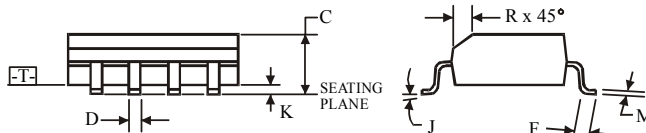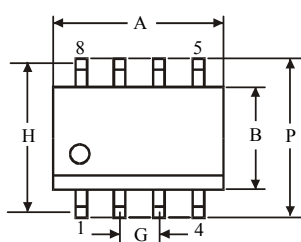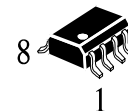
	Dimension, mm	
Symbol	**MIN**	**MAX**
A	4.8	5
B	3.8	4
C	1.35	1.75
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	5.72	
J	0°	8°
K	0.1	0.25
M	0.19	0.25
P	5.8	6.2
R	0.25	0.5

⊕ 0.25 (0.010) Ⓜ T CⓂ

NOTES:

1. Dimensions A and B do not include mold flash or protrusion.

2. Maximum mold flash or protrusion 0.15 mm (0.006) per side
   for A; for B‑0.25 mm (0.010) per side.

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