

Low Power Single Operational Amplifier

Features

- Large DC voltage gain:80dB
- Operating Voltage : $V^+/V^-=\pm 1.0V$ to $\pm 3.5V$
- Low Output Saturation: $4V_{p-p}$ at single 5V supply
- Low input bias current: 100nA(Typ.)
- V Shield Plate between +input and -input
- Suitable Pin Arrangement for Application
- Mounted in Ultra Miniature 2.9×1.5mm(1/5 of SOP-8 package)

Applications

- Power supplies
- High-Impedance Sensor Amps
- High-Performance Audio Circuitry
- Data Acquisition
- Optoelectronics

General Description

HA2107 is a single operational amplifier of ultra miniaturesurface mount package.

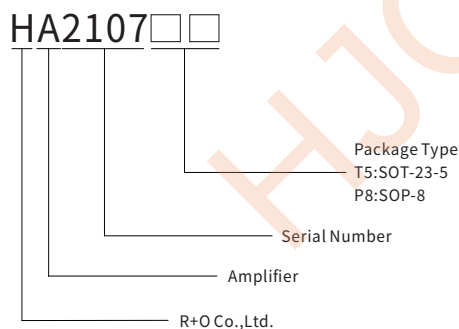
HA2107 has features of low operating supply voltage and low saturation output voltage. The HA2107 is suitable for small electronic equipments and hybrid circuits.

The HA2107 is available in SOP-8 and SOT-23-5 package.

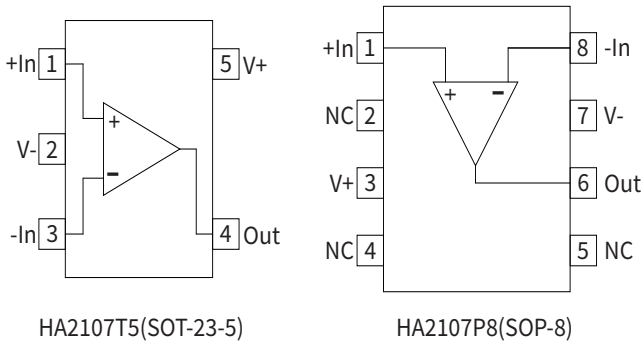
Reference News

Marking: 2107

Part Numbering



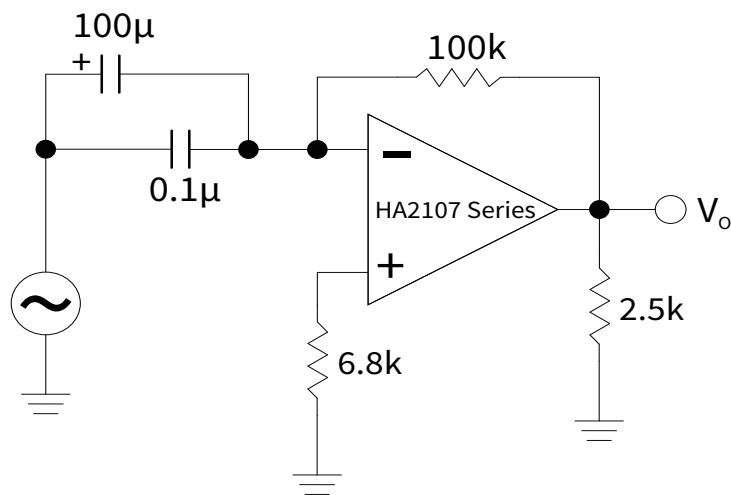
Pin Configuration



Ordering Information

Order Number	Package	Package Code	Unit Weight(g)	Reel(pcs)	Box(pcs)	Carton(pcs)	Delivery Mode	MSL
HA2107T5	SOT-23-5	R1	0.0146	3000	30000	120000	7"	3
HA2107P8	SOP-8	R3	0.077	4000	8000	80000	13"	3

● Test Circuit



● Absolute Maximum Ratings (T_A=25°C Unless otherwise specified.)

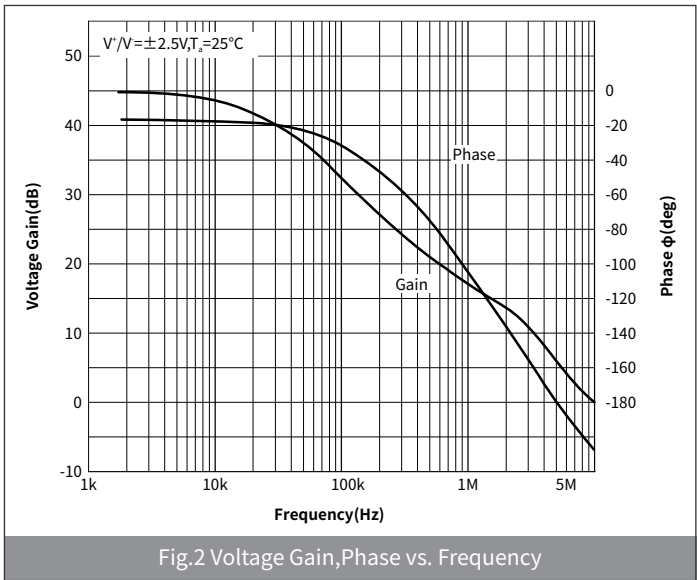
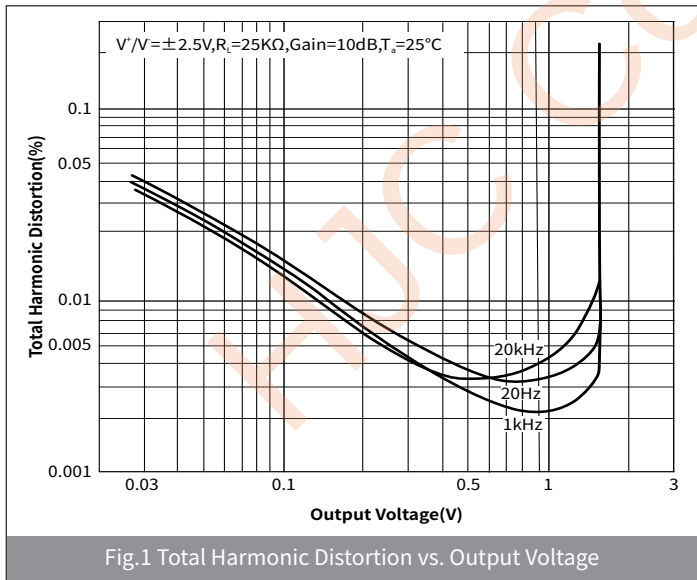
Parameter	Symbol	Value	Unit
Supply Voltage	V ⁺ /V ⁻	±3.5	V
Differential Input Voltage	V _{ID}	±7	V
Input Voltage	V _{IC}	±3.5	V
Power Dissipation	P _D	200	mW
Operating Temperature Range	T _{OPR}	-40 to 85	°C
Storage Temperature Range	T _{STG}	-40 to 125	°C

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime. Electrostatic discharge can also cause damage to chips, so it is suggested to take some preventive measures for integrated circuits. Failure to follow proper handling and installation can also cause damage. Precision HA2107 Series and other devices are more vulnerable to damage than ordinary devices in the case of tiny electrostatic, and small parameter changes may make the whole circuit performance substandard.

● **Electrical Characteristics** (Unless otherwise specified: $V^+/V = 2.5V, T_A = 25^{\circ}C$.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AC Characteristics						
Slew Rate	SR	$A_V = +1, V_{IN} = \pm 1 V_{P-P}$	--	3	--	V/ μs
DC Characteristics						
Input Offset Voltage	V_{OS}	$R_S = 10k\Omega$	--	1	6	mV
Input Bias Current	I_B	--	--	100	500	nA
Input Offset Current	I_{OS}	$I^+ - I^-$	--	5	200	nA
Power Supply Rejection Ratio	PSRR	$R_S \leq 10k\Omega$	60	70	--	dB
Input Characteristics						
Common-mode Input Voltage Range	V_{CMR}	--	± 1.5	--	--	V
Common Mode Rejection Ratio	CMRR	$R_S \leq 10k\Omega$	60	80	--	dB
Output Characteristics						
Supply Current	I_{CC}	$V^+ = 5V, R_L = \infty$	1	2	3	mA
Large signal voltage gain	A_{VOL}	$R_L = 10k\Omega, V_O = \pm 2V$	60	80	--	dB
Output voltage swing	V_{OM}	$R_L = 2.5k\Omega$	± 2.0	± 2.2	--	V

● **Typical Performance Characteristics**(Unless otherwise specified: $T_A = 25^{\circ}C$.)



● **Typical Performance Characteristics**(Unless otherwise specified: $T_A=25^{\circ}\text{C}$.)

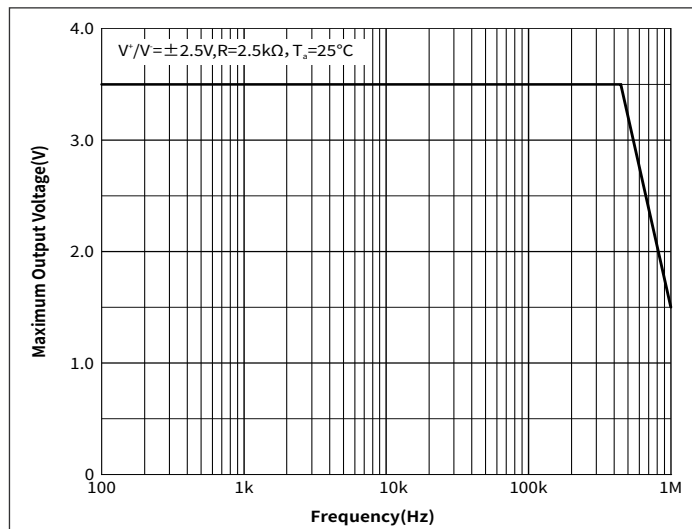


Fig.3 Maximum Output Voltage vs. Frequency

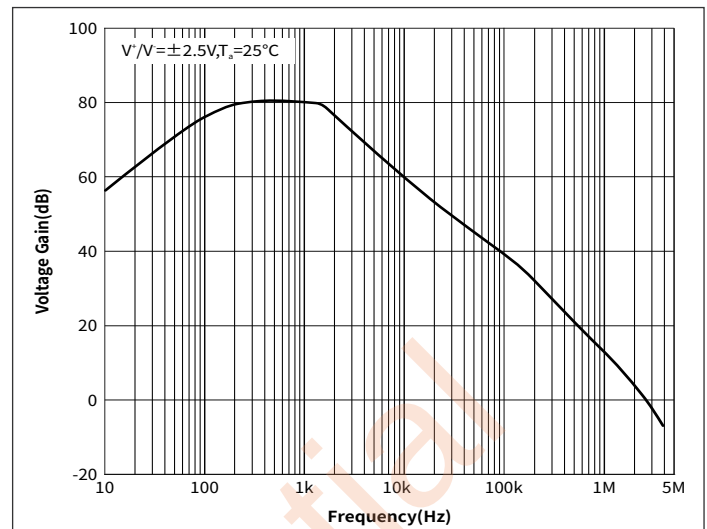


Fig.4 Voltage Gain vs. Frequency

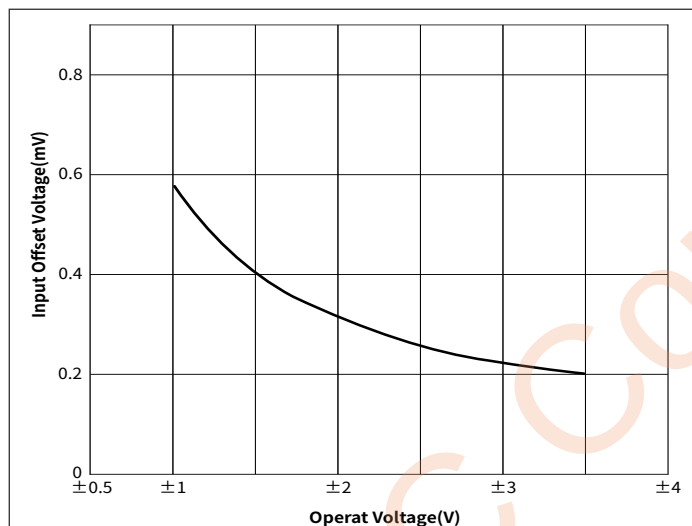


Fig.5 Input Offset Voltage vs. Operating Voltage

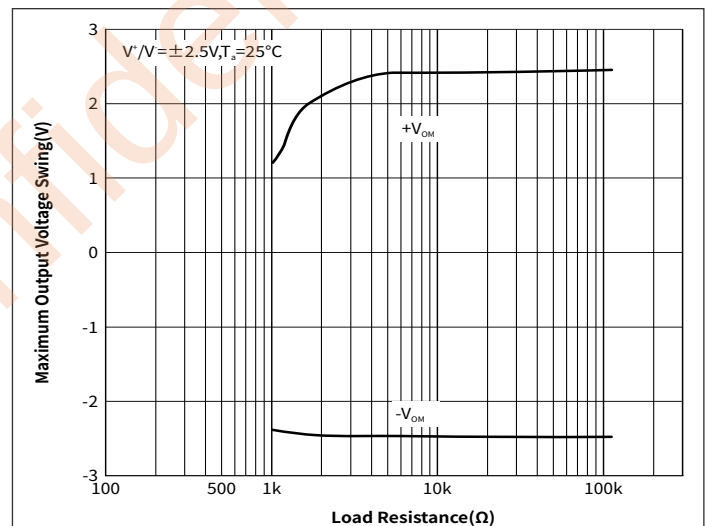


Fig.6 Maximum Output Voltage Swing vs. Load Resistance

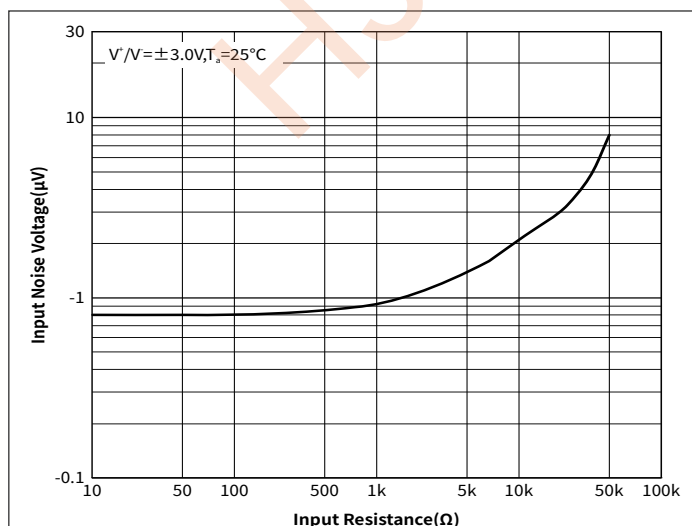


Fig.7 Input Noise Voltage vs. Input Resistance

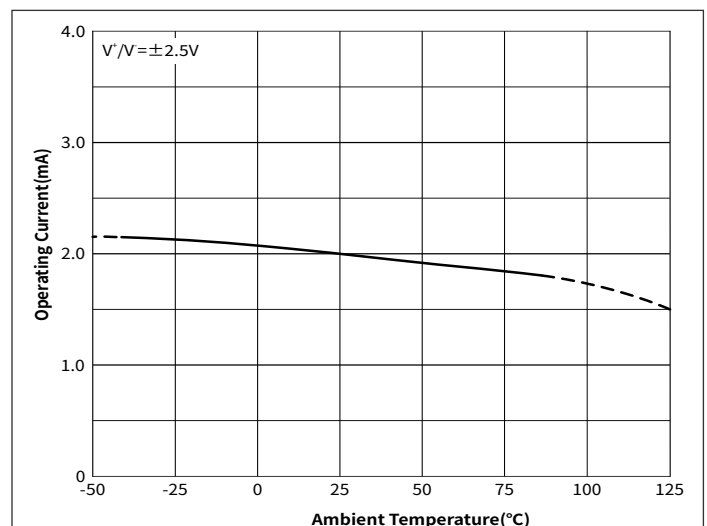


Fig.8 Operating Current vs. Ambient Temperature

● **Typical Performance Characteristics**(Unless otherwise specified: $T_A=25^{\circ}\text{C}$.)

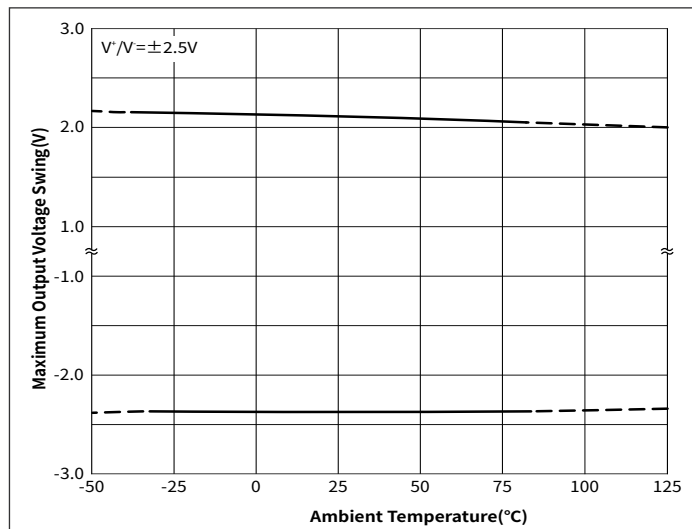


Fig.9 Maximum Output Voltage Swing vs. Ambient Temperature

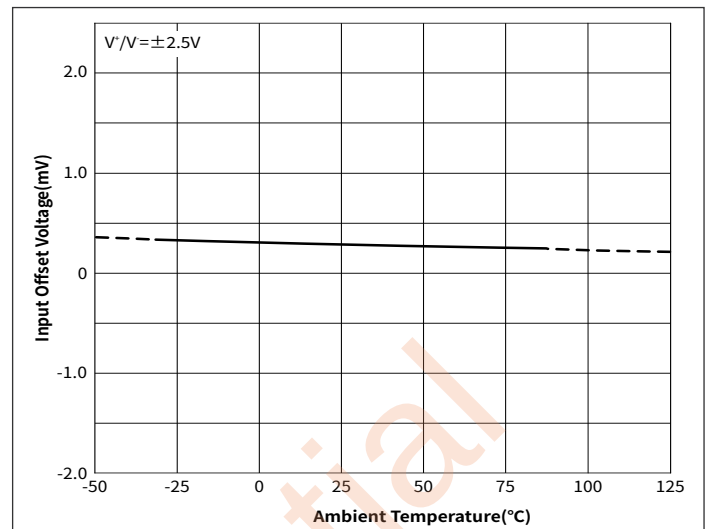


Fig.10 Input Offset Voltage vs. Ambient Temperature

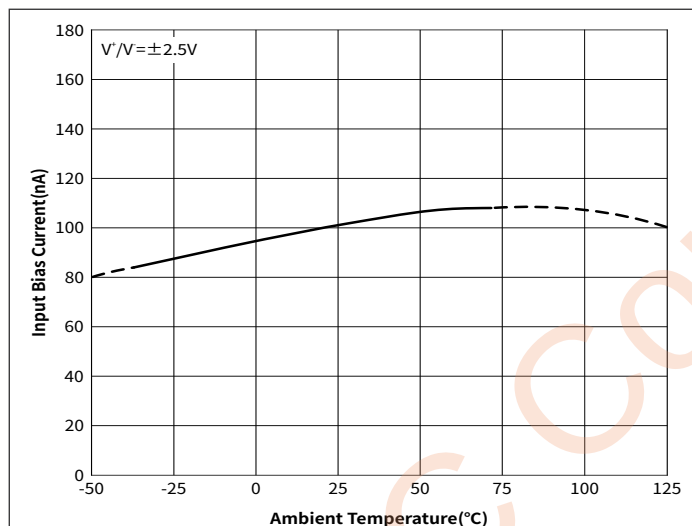


Fig.11 Input Bias Current vs. Ambient Temperature

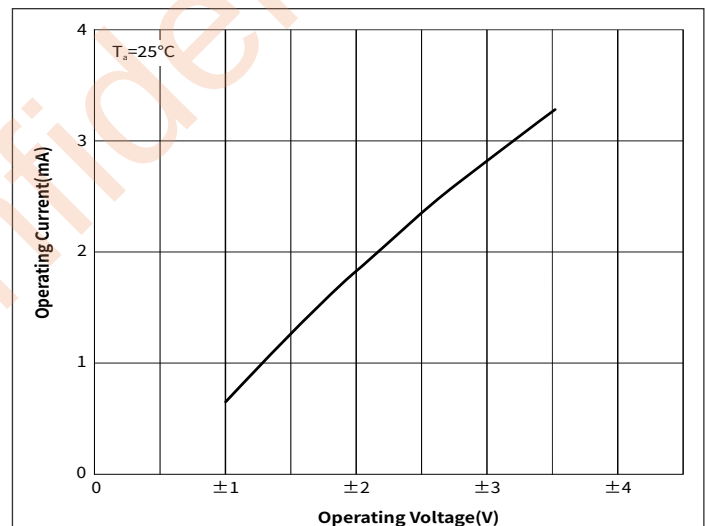


Fig.12 Operating Current vs. Operating Voltage

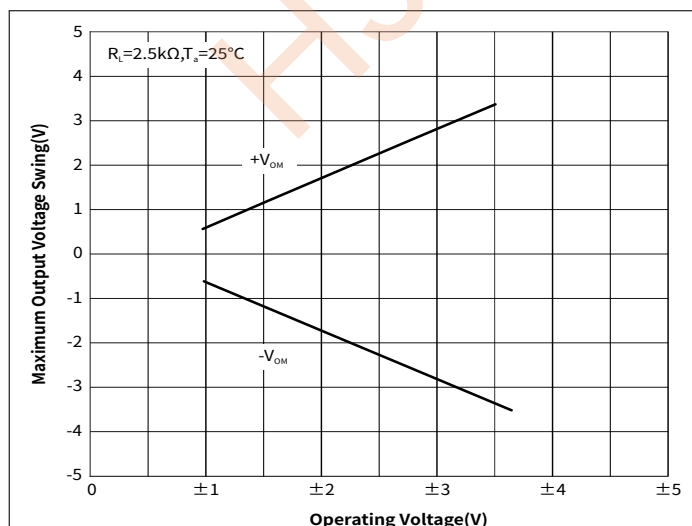


Fig.13 Maximum Output Voltage Swing vs. Operating Voltage

● Package Outline Dimensions (SOT-23-5)

Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.05	1.25	0.041	0.049
A1	0	0.13	0.000	0.005
A2	1.05	1.15	0.041	0.045
b	0.3	0.5	0.012	0.020
c	0.10	0.2	0.004	0.008
D	2.82	3.02	0.111	0.119
E	1.50	1.70	0.059	0.067
E1	2.65	2.95	0.104	0.116
e	0.95 BSC		0.037BSC	
e1	1.90 BSC		0.075 BSC	
L	0.3	0.60	0.012	0.024
θ	0	8°	0	8°

● Suggested Pad Layout

Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
X	0.85	0.85	0.033	0.033
Y	0.90	1.10	0.035	0.043
M	0.85	1.05	0.033	0.041
M1	1.80	2.0	0.071	0.079
N	2.3	2.5	0.091	0.098

● Package Outline Dimensions (SOP-8)

Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	5.70	6.30	0.224	0.248
B	5.13MAX.		0.202MAX.	
C	4.72	5.12	0.186	0.201
E	1.80MAX.		0.071MAX.	
F	0.31	0.51	0.0122	0.020
F1	1.27TYP.		0.050TYP.	
G	3.75	4.15	0.148	0.163
H	1.35	1.65	0.053	0.065
H1	0.1	0.25	0.004	0.010
L	0.3	0.7	0.012	0.028
L1	0.21TYP.		0.008TYP.	
θ	-	8°	-	8°

● Suggested Pad Layout

Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
a	2.90	3.10	0.114	0.122
J	5.10	5.30	0.201	0.209
K	1.17	1.37	0.046	0.054
X	2.10	2.30	0.083	0.091
X1	7.30	7.50	0.287	0.295
Y	0.50	0.70	0.020	0.028
Y1	3.71	3.91	0.146	0.154