

1.1MHz Rail-To-Rail I/O CMOS Operational Amplifier

■ Description

The LN8541 (single) is rail-to-rail input and output voltage feedback amplifier offering low cost. It has a wide input common-mode voltage range and output voltage swing, and takes the minimum operating supply voltage down to 2.1V and the maximum recommended supply voltage is 5.5V. All are specified over the extended -40°C to $+125^{\circ}\text{C}$ temperature range.

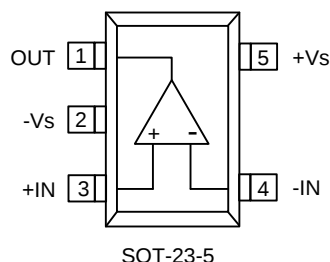
The LN8541 provides 1.1MHz bandwidth at a low current consumption of 42 μA per amplifier. Very low input bias currents of 0.5pA, enable LN8541 to be used for integrators, photodiode amplifiers, and piezoelectric sensors. Rail-to-rail inputs and outputs are useful to designers buffering ASIC in single-supply systems.

Applications for this amplifier include safety monitoring, portable equipment, battery and power supply control, and signal conditioning and interfacing for transducers in very low power systems.

■ Applications

- ASIC input or output amplifiers
- Audio Output
- Handheld devices
- Mobile phones
- Notebook
- PCMCIA card
- Battery-powered devices

■ Pin Configuration



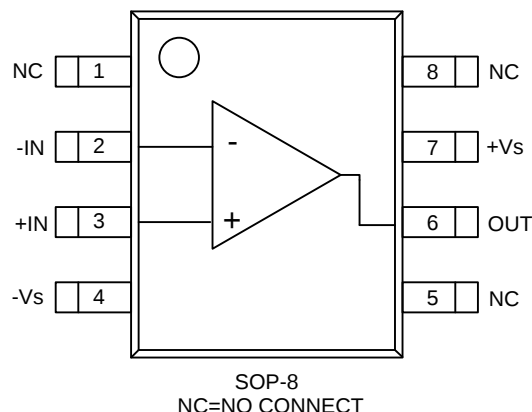
Ordering Information: LN8541PR

■ Features

- Low cost
- Rail-to-Rail input / output
- Unity-gain stable
- Slew rate: 0.52 (V/ μs)
- Minimum power supply rejection ratio: 72dB
- Minimum common mode rejection ratio: 76dB
- Offset voltage: typically 0.8mV, 3.5mV maximum
- Gain bandwidth product: 1.1MHz
- Very low input bias current: 0.5pA
- Operating voltage range: 2.1V to 5.5V
- Input voltage range: 0.1V to +5.6 V ($V_S = 5.5\text{V}$)
- Quiescent current: 42 μA

■ Package

- SOP-8
- SOT-23-5



Ordering Information: LN8541M

■ Absolute Maximum Rating

Parameter	Symbol	Maximum Rating	Unit
Supply voltage	V_{DD}	7.5	V
Common-mode input voltage	V_{CM}	$(-V_S)-0.5$ to $(+V_S)+0.5$	V
Storage temperature	Tstg	-55—150	°C
Junction temperature	—	150	°C
ESD susceptibility	HBM	4000	V
	MM	400	V

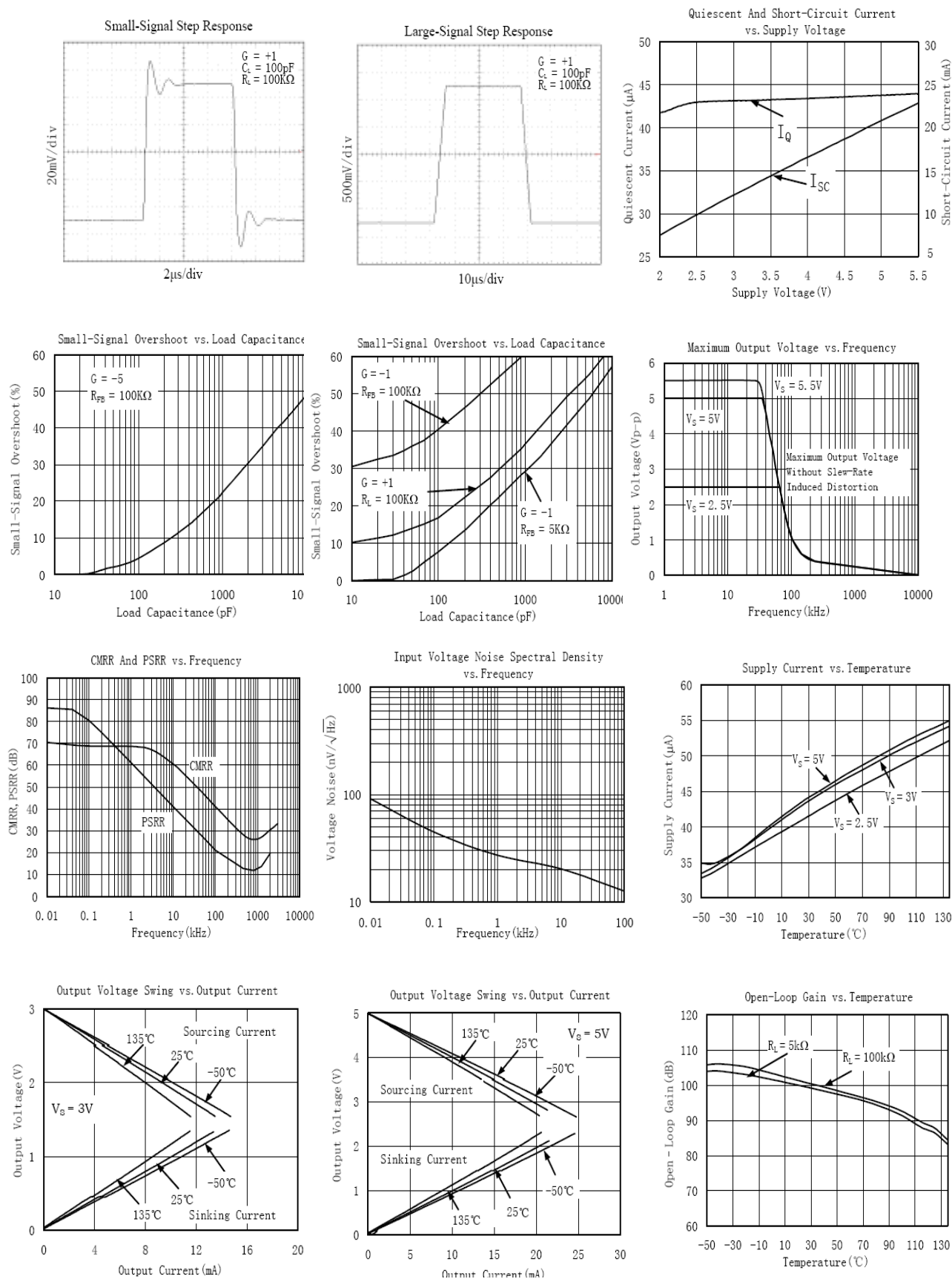
■ ELECTRICAL SPECIFICATIONS

$V_S=+5V$ $R_L=100K\Omega$ $V_{OUT}=V_S/2$

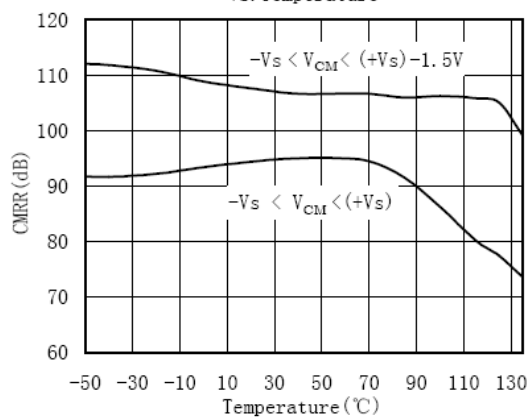
($T_A = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
V_{OS}	Input offset voltage			± 0.8	± 5.4	mV
I_B	Input bias current			0.5		pA
I_{OS}	Input offset current			0.5		pA
V_{CM}	Common-Mode voltage range	$V_S=5.5V$	-0.1		5.6	V
CMRR	Common-Mode rejection ratio	$V_S=5.5V, V_{CM}=-0.1V-4V$	72	88		dB
		$V_S=5.5V, V_{CM}=-0.1V-5.6V$	57	78		dB
A_{OL}	Open-Loop voltage gain	$R_L=5K, V_O=0.1V-4.9V$	78	90		dB
		$R_L=100K, V_O=0.035V-4.965V$	82	94		dB
$\Delta V_{OS}/\Delta T$	Input offset voltage drift			2.7		$\mu V/^\circ\text{C}$
V_{SW}	Output voltage swing from rail	$R_L=100K$		0.008		V
I_{OUT}	Output current		18	23		mA
VDD	Operating voltage range		2.1		5.5	
PSRR	Power supply rejection ratio	$V_S=+2.5V$ to $+5.5V$, $V_{CM}=(-V_S)+0.5V$	70	92		
I_Q	Quiescent current	$I_{OUT}=0$		42	60	μA
GBP	Gain-bandwidth product	$CL=100pF$		1.1		MHz
SR	Slew rate			0.052		V/ μs

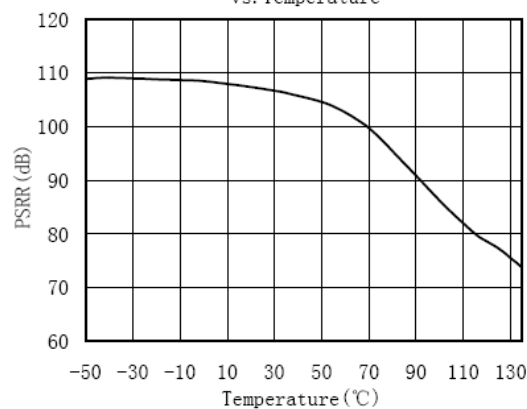
Typical Operating Characteristics



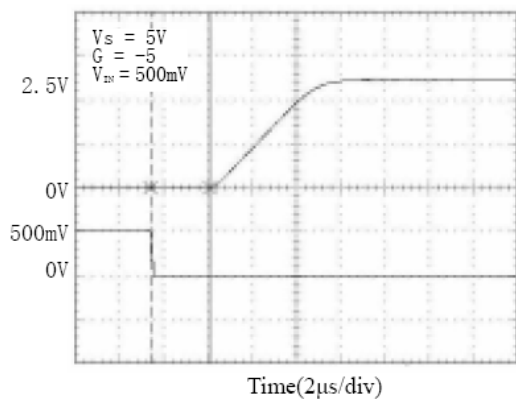
Common-Mode Rejection Ratio
vs. Temperature



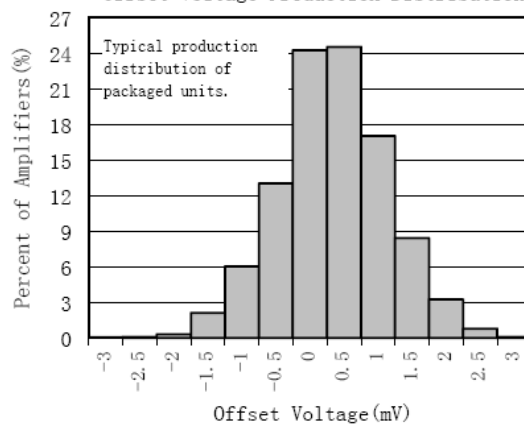
Power-Supply Rejection Ratio
vs. Temperature



Overload Recovery Time

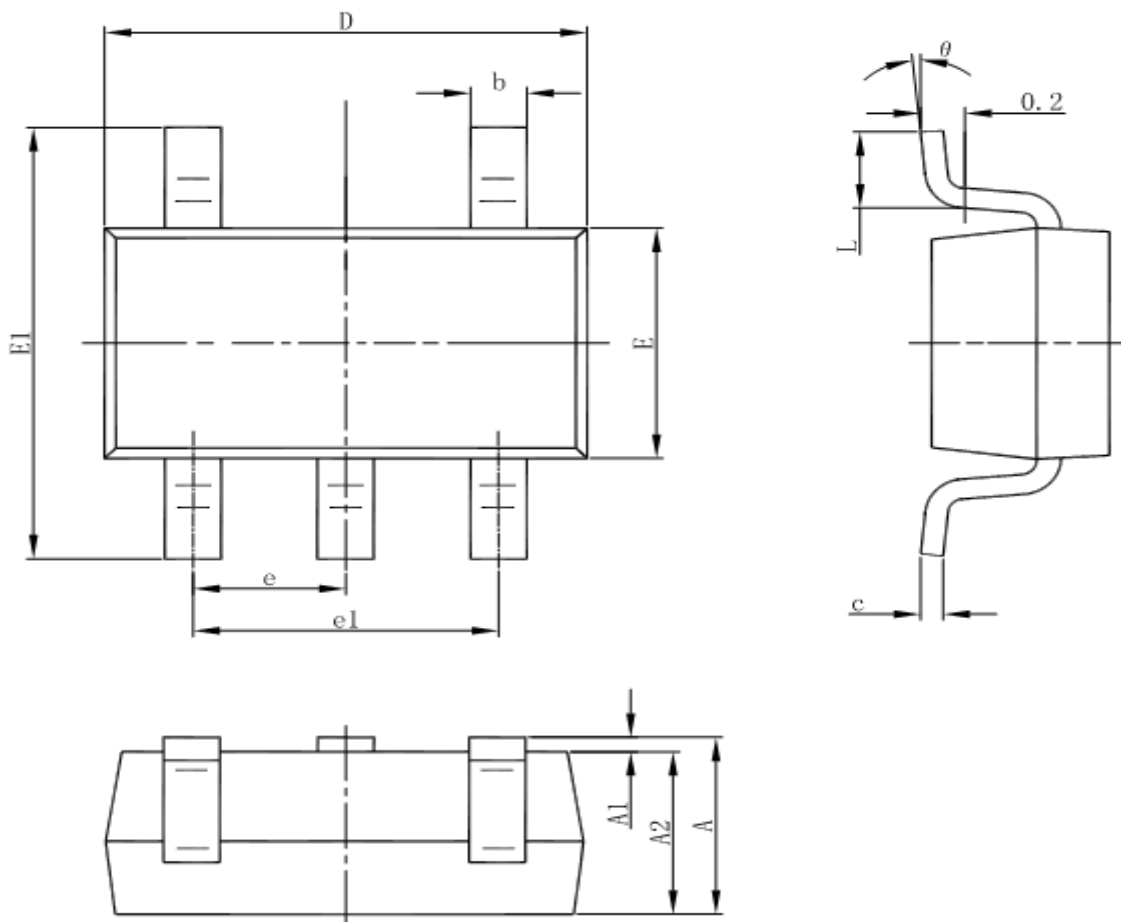


Offset Voltage Production Distribution



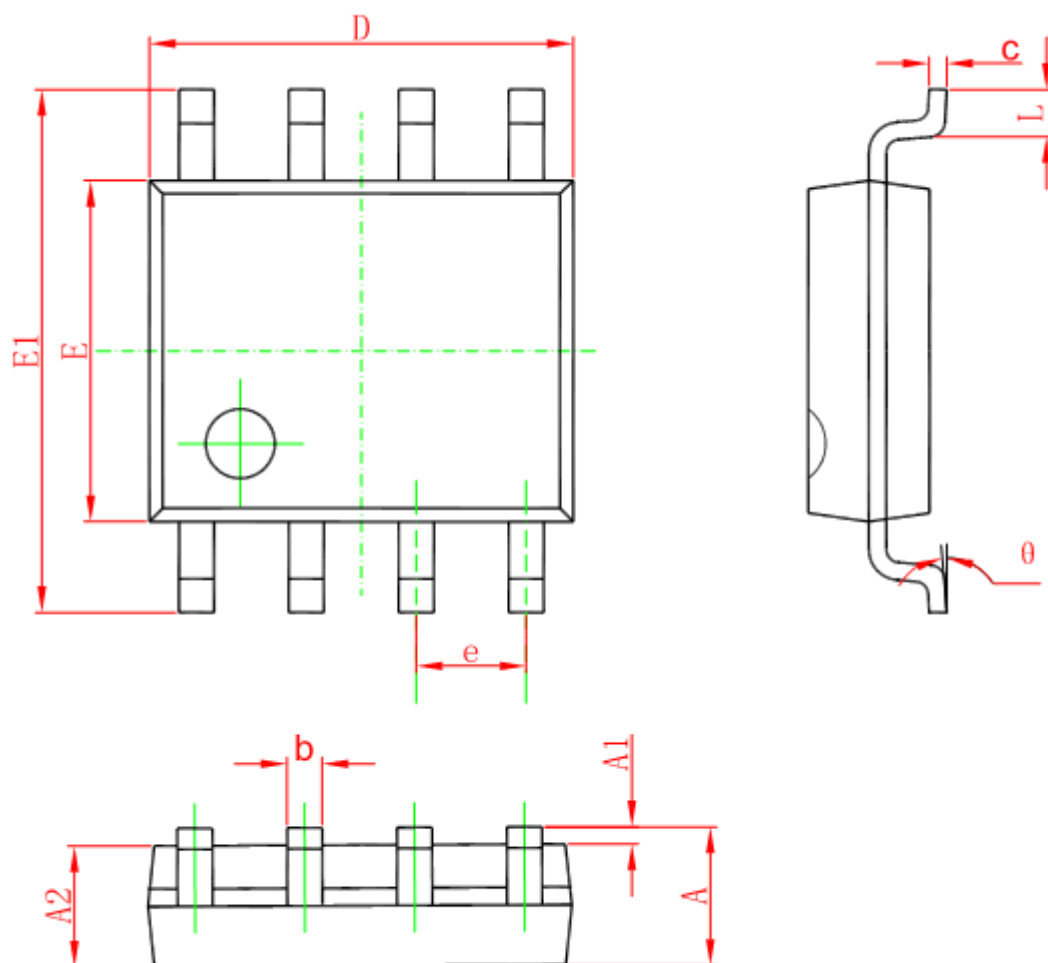
■ Package Information

● SOT-23-5



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

● SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°