General Description

The EC5911 is wideband, low-noise, low-distortion operational amplifier, that offer rail-to-rail output and single-supply operation down to 2.5V. They draw 2.8mA of quiescent supply current, as well as low input voltage-noise density (13nV/ Hz) and low input current-noise density (400fA/ Hz). These features make the devices an ideal choice for applications that require low distortion and low noise.The EC5911 has output which swing rail-to-rail and their input common-mode voltage range includes ground and offer wide bandwidth to 200MHz (G=+1) .They are specified over the extended industrial temperature range (-45 C ~ 125 C).The single EC5911 is available in space-saving, SOT23-5 and SOP-8 packages.

Features

- Single-Supply Operation from +2.5V ~ +5.5V
- Rail-to-Rail Input / Output
- Gain-Bandwidth Product: 200MHz (Typ.)
- Low Input Bias Current: 10pA (Typ.)
- Low Offset Voltage: 5mV (Max.)
- Quiescent Current: 2.8mA (Typ.)
- Operating Temperature: -40°C ~ +125°C
- Available in SOT23-5 and SOP8 Packages

Applications

- Portable Equipment
- Mobile Communications
- Smoke Detector
- Sensor interface
- Medical Instrumentation
- Handheld Test Equipment
- imaging / video

Pin Assignments

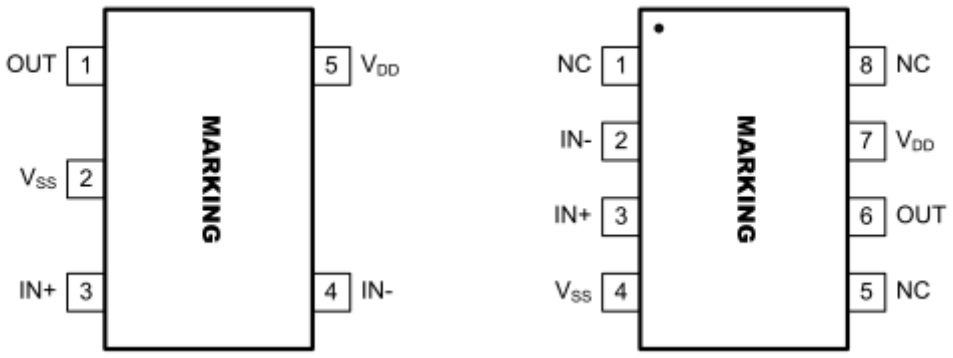
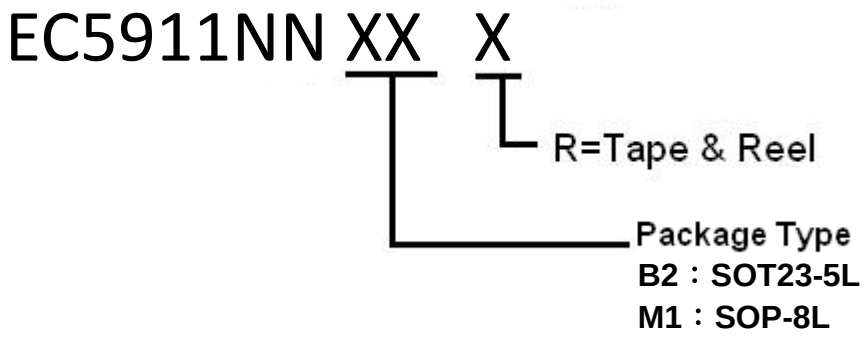


Figure 1. Pin Assignment Diagram (SOT23-5 and SOP8 Package)

Ordering Information



Part Number	Package	Marking	Marking Information
EC5911NNB2R	SOT23-5L	911YW	1. Y：Year code(D=2013;E=2014;F=2015…) 2. W：Week Code(The big character of A~Z is for the week of 1~26, and small a~z is for the week of 27~52.
EC5911NNM1R	SOP-8L	EC5911 LLLLL YYWWT	1. LLLLL：Last five Number of Lot No 2. YY：Year Code 3. WW：Week Code 4. T：Internal Tracking Code

Absolute Maximum Ratings

Condition	Min	Max
Power Supply Voltage (V_{DD} to Vss)	-0.5V	+7V
Analog Input Voltage (IN+ or IN-)	Vss-0.5V	V_{DD}+0.5V
PDB Input Voltage	Vss-0.5V	+7V
Operating Temperature Range	-40°C	+125°C
Junction Temperature	+150°C	
Storage Temperature Range	-65°C	+150°C
Lead Temperature (soldering, 10sec)	+300°C	
Package Thermal Resistance (T_A=+25°C)		
SOT23-5, θ_{JA}	190°C	
SOP8, θ_{JA}	130°C	

Note: Stress greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions outside those indicated in the operational sections of this specification are not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Electrical Characteristic

(V_{DD} = +5V, Vss = 0V, V_{CM} = 0V, V_{OUT} = V_{DD}/2, R_L=100K tied to V_{DD}/2, SHDNB = V_{DD}, T_A = -40°C to +125°C, unless otherwise noted. Typical values are at T_A =+25°C.) (Notes 1,2)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Supply-Voltage Range	V_{DD}	Guaranteed by the PSRR test	2.5	-	5.5	V
Quiescent Supply Current (per Amplifier)		V_{DD} = 5V	-	2.8	3.3	mA
Input Offset Voltage	V_{OS}	T_A=25°C	-	±1	-	mV
		T_A=-40°C~+85°C	-	±8	-	
		T_A=-40°C~+125°C	-	-	±10	
Input Offset Voltage Tempco	$\Delta V_{OS}/\Delta T$		-	±2	-	µV/°C
Input Bias Current	I_B	(Note 3)	-	±10	±100	pA
Input Offset Current	I_{OS}	(Note 3)	-	±10	±100	pA
Input Common-Mode Voltage Range	V_{CM}	Guaranteed by the T_A = 25°C CMRR test, T_A = -40°C ~ +125°C	-0.1	-	V_{DD}+0.1.5	V
Common-Mode Rejection Ratio	CMRR	Vss-0.1V≤V_{CM}≤V_{DD}+0.1V T_A = 25°C	-	75	-	dB
		Vss≤V_{CM}≤5V_{DD} T_A = 25°C	72	90	-	
		Vss-0.1V≤V_{CM}≤V_{DD}+0.1V T_A = -40°C ~ +125°C	-	68	-	
Power-Supply Rejection Ratio	PSRR	V_{DD} = +2.5V to +5.5V	75	90	-	dB
Open-Loop Voltage Gain	A_V	R_L = 10kΩ to V_{DD}/2 V_{OUT} = 100mV to V_{DD}-125mV	90	100	-	dB
		R_L = 1kΩ to V_{DD}/2 V_{OUT} = 200mV to V_{DD}-250mV	80	95	-	
		R_L = 500Ω to V_{DD}/2 V_{OUT} = 350mV to V_{DD}-500mV	70	80	-	
Output Voltage Swing	V_{OUT}	|V_{IN+}-V_{IN-}| ≥ 10mV V_{DD}-V_{OH}	-	10	30	mV
		R_L = 10kΩ to V_{DD}/2 V_{OL}-V_{SS}	-	10	35	
		|V_{IN+}-V_{IN-}| ≥ 10mV V_{DD}-V_{OH}	-	80	50	
		R_L = 1kΩ to V_{DD}/2 V_{OL}-V_{SS}	-	30	50	
		|V_{IN+}-V_{IN-}| ≥ 10mV V_{DD}-V_{OH}	-	100	140	
		R_L = 500Ω to V_{DD}/2 V_{OL}-V_{SS}	-	100	140	
Output Short-Circuit Current	I_{SC}	Sinking or Sourcing	-	±100	-	mA
Gain Bandwidth Product	GBW	A_V = +1V/V	-	200	-	MHz
Slew Rate	SR	A_V = +1V/V	-	125	-	V/µs

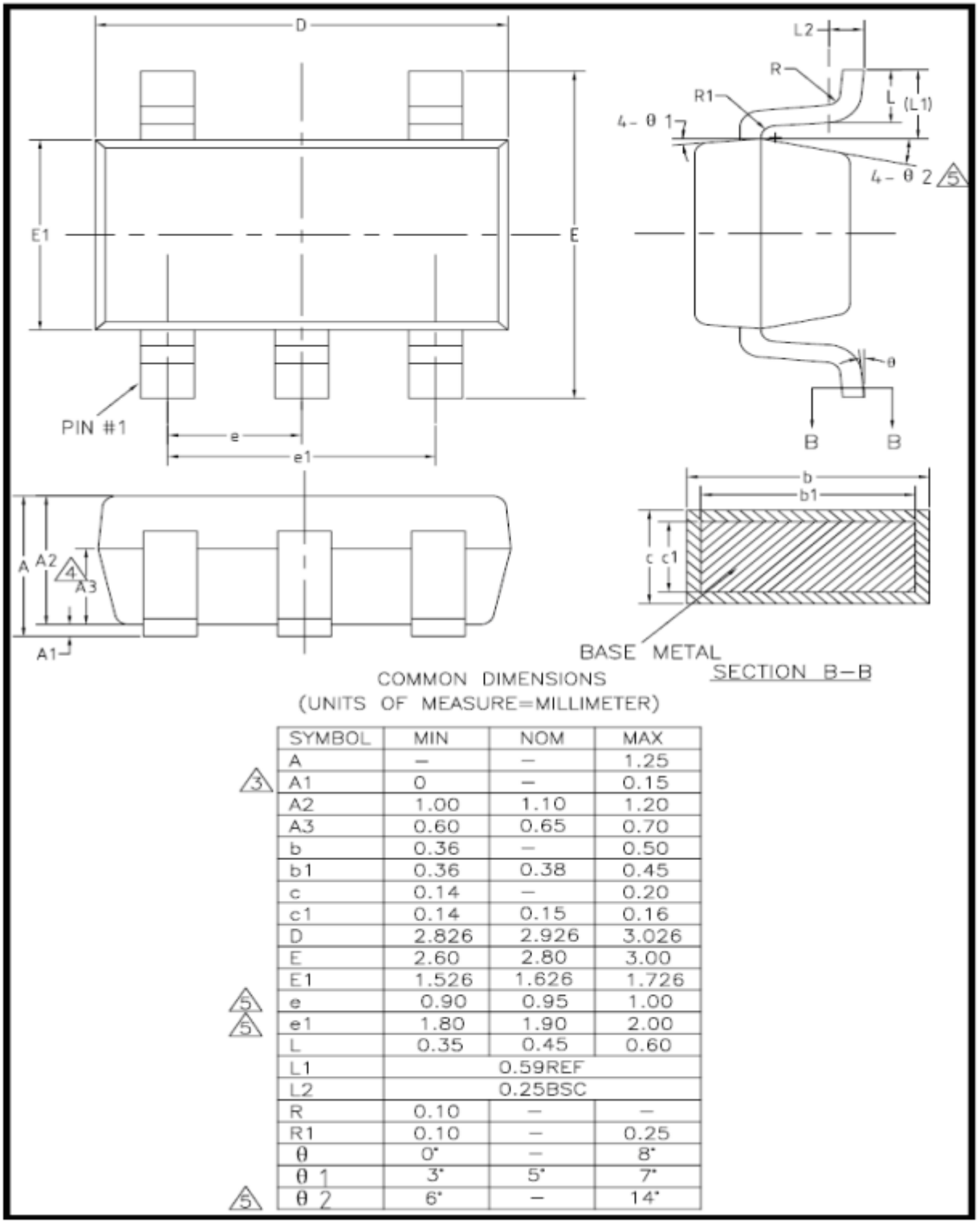
Electrical Characteristic

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Differential Phase error (NTSC)	DP	G=2,R_L=150Ω	-	0.03	-	deg
Differential Gain error (NTSC)	DG	G=2,R_L=150Ω	-	0.09	-	dB
Settling Time	t_S	To 0.01%, V_{OUT} = 2V step A_V = +1V/V	-	52	-	μs
Over Load Recovery Time		V_{IN} × Gain=V_S	-	2	-	μs
Input Voltage Noise Density	e_n	f = 1kHz	-	15	-	nV/√Hz
		f = 30kHz	-	13	-	
Input Current Noise Density	i_n	f = 1kHz	-	400	-	fA/√Hz
Total Harmonic Distortion plus Noise	THD+N	f_C=5MHZ,V_{OUT}=2Vp-p,G=+2	-	-60	-	dB

Note 1: All devices are 100% production tested at T_A = +25°C; all specifications over the automotive temperature range is guaranteed by design, not production tested.
Note 2: Parameter is guaranteed by design.
Note 3: Peak-to-peak input noise voltage is defined as six times rms value of input noise voltage.

Package Information

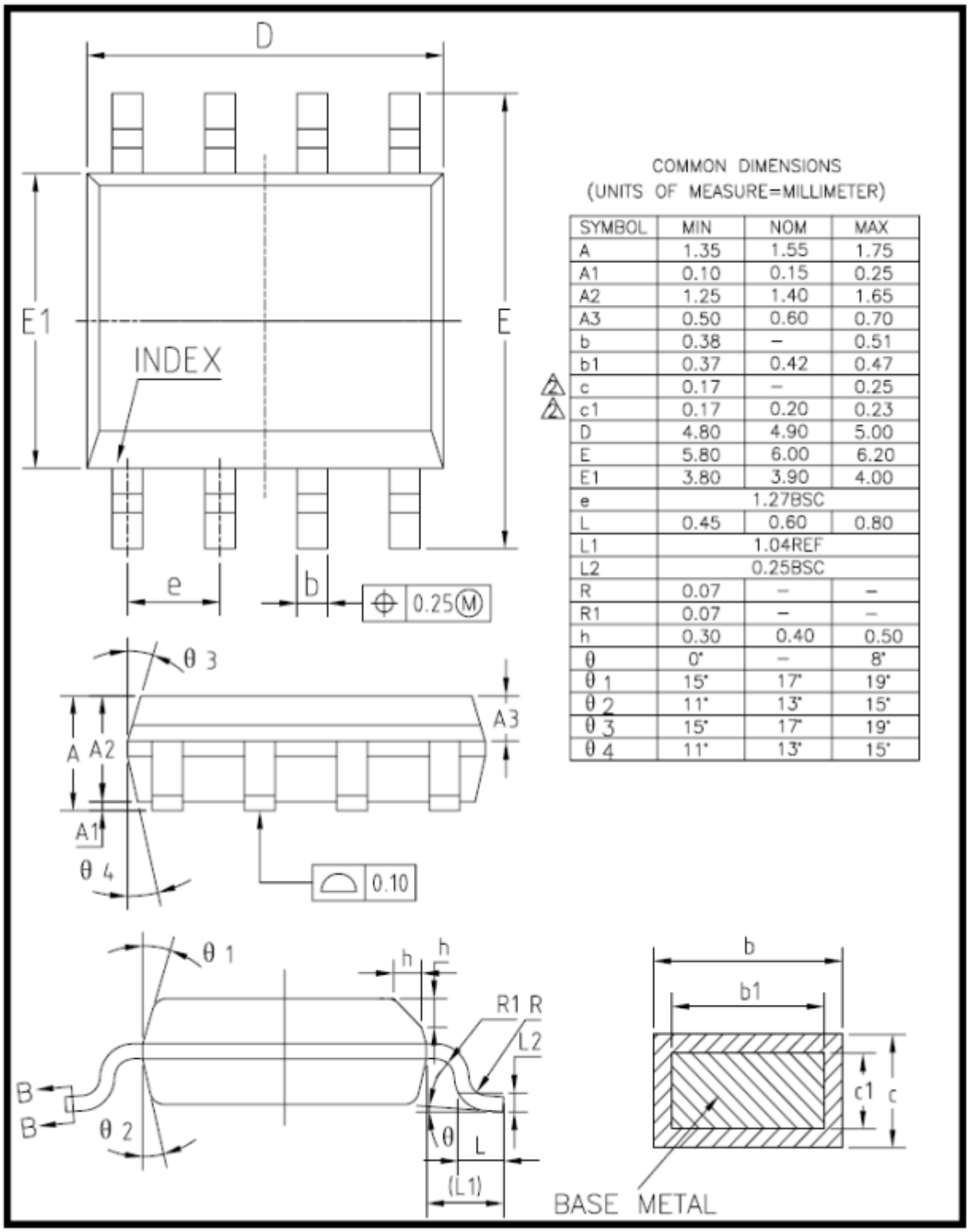
SOP23-5



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

	SYMBOL	MIN	NOM	MAX
	A	–	–	1.25
3	A1	0	–	0.15
	A2	1.00	1.10	1.20
	A3	0.60	0.65	0.70
	b	0.36	–	0.50
	b1	0.36	0.38	0.45
	c	0.14	–	0.20
	c1	0.14	0.15	0.16
	D	2.826	2.926	3.026
	E	2.60	2.80	3.00
	E1	1.526	1.626	1.726
5	e	0.90	0.95	1.00
5	e1	1.80	1.90	2.00
	L	0.35	0.45	0.60
	L1		0.59REF	
	L2		0.25BSC	
	R	0.10	–	–
	R1	0.10	–	0.25
	θ	0°	–	8°
	θ 1	3°	5°	7°
5	θ 2	6°	–	14°

SOP8



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	1.35	1.55	1.75
A1	0.10	0.15	0.25
A2	1.25	1.40	1.65
A3	0.50	0.60	0.70
b	0.38	–	0.51
b1	0.37	0.42	0.47
⚠2 c	0.17	–	0.25
⚠2 c1	0.17	0.20	0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e		1.27BSC	
L	0.45	0.60	0.80
L1		1.04REF	
L2		0.25BSC	
R	0.07	–	–
R1	0.07	–	–
h	0.30	0.40	0.50
θ	0°	–	8°
θ 1	15°	17°	19°
θ 2	11°	13°	15°
θ 3	15°	17°	19°
θ 4	11°	13°	15°