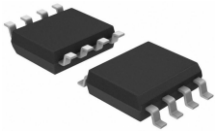
Low Power Dissipation, Low Offset, CMOS, Rail-to-Rail Input and Output Operational Amplifier

PRODUCT DESCRIPTION

The MS8117S/MS8127 is single/dual-channel operational amplifier and featured by low power dissipation, rail-to-rail input and output, low input offset voltage and low current noise. The specific characteristics could be expressed as follows: The MS8117S/MS8127 can operates in single power supply from 1.8V to 5V or dual power supply; Low power dissipation and low noise features make the MS8117S/MS8127 used in mobile devices; Rail-to-rail feature makes it used in the buffer of CMOS, ADCs, DACs, ASICs or the system with low power dissipation and wide output swing.

SOT23-5



SOP8

MSOP8

FEATURES

- Low Offset Voltage: 50μV (Typ)
- Low Input Bias Current: 10pA (Max@25°C)
- Single Power Supply: 1.8V to 5V
- Low Noise: 24nV/√Hz
- Micro Power Dissipation: 40μA (single amp)
- No Phase Reversal
- Stable Unit Gain

APPLICATIONS

- Battery-powered Device
- Multi-order Filter
- ADC Front Driving
- DAC Driving/Level Shift
- Low Power Dissipation, ASIC Input and Output Amplifier

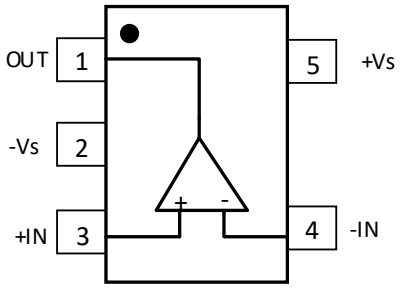
PRODUCT SPECIFICATION

Part Number	Package	Marking
MS8117S	SOT23-5	8117S
*MS8127	SOP8	MS8127
MS8127M	MSOP8	MS8127M

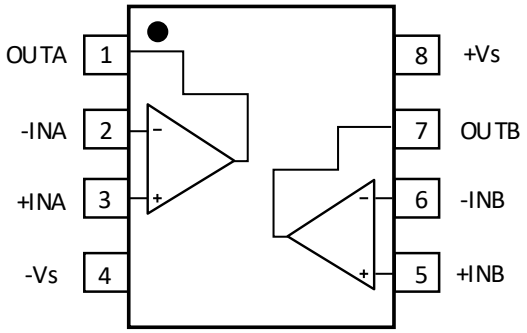
* The package is not available temporarily. If necessary, please contact Hangzhou Ruimeng Sales Department Center.

PIN CONFIGURATION

MS8117S



MS8127/MS8127M



PIN DESCRIPTION

Pin	Name	Type	Description
MS8117S			
1	OUT	O	Channel Output
2	-Vs	-	Negative Power Supply
3	+IN	I	Positive Input
4	-IN	I	Negative Input
5	+Vs	-	Positive Power Supply
MS8127/MS8127M			
1	OUTA	O	Channel A Output
2	-INA	I	Negative Input (Channel A)
3	+INA	I	Positive Input (Channel A)
4	-Vs	-	Negative Power Supply
5	+INB	I	Positive Input (Channel B)
6	-INB	I	Negative Input (Channel B)
7	OUTB	O	Channel B Output
8	+Vs	-	Positive Power Supply

ABSOLUTE MAXIMUM RATINGS

Any exceeding absolute maximum rating application causes permanent damage to device. Because long-time absolute operation state affects device reliability. Absolute ratings just conclude from a series of extreme tests. It doesn't represent chip can operate normally in these extreme conditions.

Parameter	Symbol	Ratings	Unit
Power Supply	Vs	6	V
Input Voltage		$-V_S$-0.3 ~ +Vs+0.3	V
Differential Input Voltage		±6	V
Junction Temperature		-65 ~ 150	°C
Operating Temperature	T_A	-40 ~ 85	°C
Storage Temperature	T_{stg}	-60 ~ 150	°C
Lead Temperature (10s)		260	°C

ELECTRICAL CHARACTERISTICS(5V)

Unless otherwise noted, V_{CC}=5V, V_{CM} =2.5V, T_A=25°C.

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Input Characteristics						
Input Offset Voltage	V_{OS}	-0.3V < V_{CM} < +5.3V@25°C		50	300	μV
		-0.3V < V_{CM} < +5.3V, -40°C ≤ T_A ≤ 85°C			300	
Input Bias Current	I_B	@25°C		2	10	pA
		-40°C ≤ T_A ≤ 85°C			110	pA
Input Offset Current	I_{OS}	@25°C		1	5	pA
		-40°C ≤ T_A ≤ 85°C			50	pA
Common-mode Rejection Ratio	CMRR	0V ≤ V_{CM} ≤ 5.0V		75		dB
		-40°C ≤ T_A ≤ 85°C	68			
Large Signal Gain	A_{VO}	R_L=10kΩ,V_O=0.5V ~ 4.5V	85	90		dB
Input Offset Voltage Drift	$\Delta V_{OS}/\Delta T$	-40°C ≤ T_A ≤ 85°C		5	10	μV/°C
Input Capacitance	C_{DIFF}			1.9		pF
	C_{CM}			2.5		pF
Output Characteristics						
Output High Voltage	V_{OH}	I_L=1mA	4.95	4.98		V
		-40°C ≤ T_A ≤ 85°C	4.9			
		I_L=10mA		4.7		V
		-40°C ≤ T_A ≤ 85°C	4.50			
Output Low Voltage	V_{OL}	I_L=1mA		20	30	V
		-40°C ≤ T_A ≤ 85°C			50	
		I_L=10mA		190	275	V
		-40°C ≤ T_A ≤ 85°C			335	
Short-circuit Current	I_{SC}			±70		mA
Closed-loop Output Impedance	Z_{OUT}	f=10kHz,AV=1		15		Ω

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Power Supply						
Power Supply Rejection Ratio	PSRR	2.2V < V_{CM} < 5V	67	80		dB
		-40°C ≤ T_A ≤ 85°C	64			dB
Static Current	I_{SY}	V_O=V_{CC}/2		45		μA
		-40°C ≤ T_A ≤ 85°C			50	
Dynamic Characteristics						
Gain Bandwidth Product	GBP			0.55		MHz
Slew Rate	SR			0.4		V/μs
Setup Time 0.1%	t_s	G=±1,2Vstep C_L=20pF, R_L=1kΩ		23		μs
Phase Margin	Φ_o	R_L=100kΩ, R_L=10kΩ, C_L=20pF		65		Deg
Noise Characteristics						
Peak-to-Peak Noise				2.3	3.5	μV
Voltage Noise Density	e_n	f=1kHz		35		$nV/\sqrt{Hz}$
		f=10kHz		31		$nV/\sqrt{Hz}$
Current Noise Density	i_n	f=1kHz		0.05		$pA/\sqrt{Hz}$

ELECTRICAL CHARACTERISTICS(1.8V)

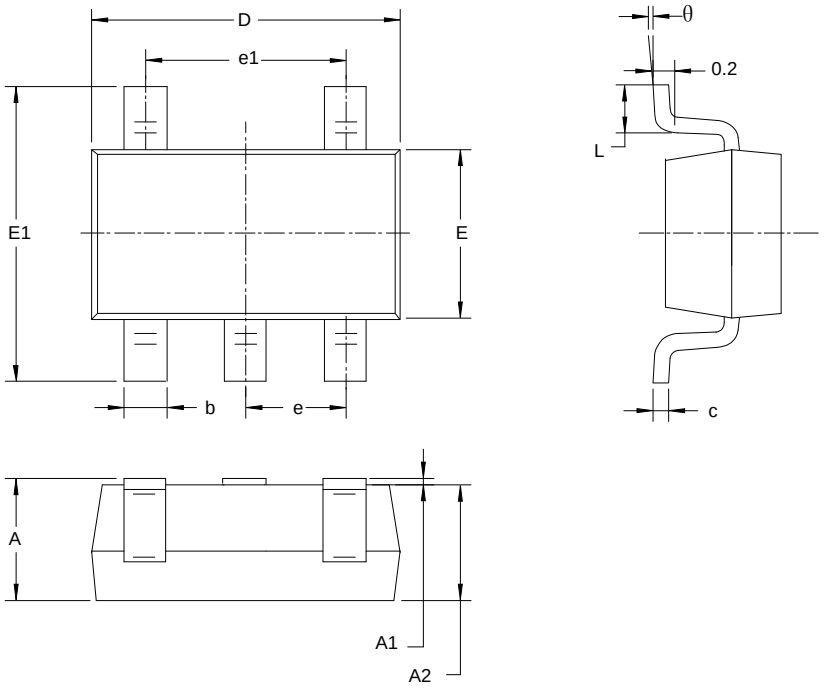
Unless otherwise noted, V_{CC}=1.8V, V_{CM} =0.9V, T_A=25°C.

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Input Characteristics						
Input Offset Voltage	V_{OS}	-0.3V < V_{CM} < +2.0V@25°C		50	300	μV
		-0.3V < V_{CM} < +2.0V, -40°C ≤ T_A ≤ 85°C			300	
Input Bias Current	I_B	@25°C		2	10	pA
		-40°C ≤ T_A ≤ 85°C			110	pA
Input Offset Current	I_{OS}	@25°C		1	5	pA
		-40°C ≤ T_A ≤ 85°C			50	pA
Common-mode Rejection Ratio	CMRR	0V ≤ V_{CM} ≤ 1.8V	58	75		dB
		-40°C ≤ T_A ≤ 85°C	55			
Large Signal Gain	A_{VO}	R_L=10kΩ,V_O=0.5V ~ 1.7V	85	90		dB
Input Offset Voltage Drift	$\Delta V_{OS}/\Delta T$	-40°C ≤ T_A ≤ 85°C		5	10	μV/°C
Input Capacitance	C_{DIFF}			2.1		pF
	C_{CM}			3.8		pF
Output Characteristics						
Output High Voltage	V_{OH}	I_L=1mA	1.65	1.73		V
		-40°C ≤ T_A ≤ 85°C	1.6			
Output Low Voltage	V_{OL}	I_L=1mA		44	60	mV
		-40°C ≤ T_A ≤ 85°C			80	
Short-circuit Current	I_{SC}			±70		mA
Closed-loop Output Impedance	Z_{OUT}	f=10kHz, A_V=1		15		Ω

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Power Supply						
Power Supply Rejection Ratio	PSRR	0.9V ≤ V_{CM} ≤1.8V	67	80		dB
		-40°C ≤ T_A ≤ 85°C	64			dB
Static Current	I_{SY}	V_O=V_{CC}/2		45		μA
		-40°C ≤ T_A ≤ 85°C			50	
Dynamic Characteristics						
Gain Bandwidth Product	GBP			0.45		MHz
Slew Rate	SR			0.4		V/μs
Setup Time 0.1%	t_s	G=±1,2Vstep C_L=20pF, R_L=1kΩ		6.5		μs
Phase Margin	Φ_o	R_L=100kΩ, R_L=10kΩ, C_L=20pF		65		Deg
Noise Characteristics						
Peak-to-Peak Noise				2.3	3.5	μV
Voltage Noise Density	e_n	f=1kHz		35		$nV/\sqrt{Hz}$
		f=10kHz		31		$nV/\sqrt{Hz}$
Current Noise Density	i_n	f=1kHz		0.05		$pA/\sqrt{Hz}$

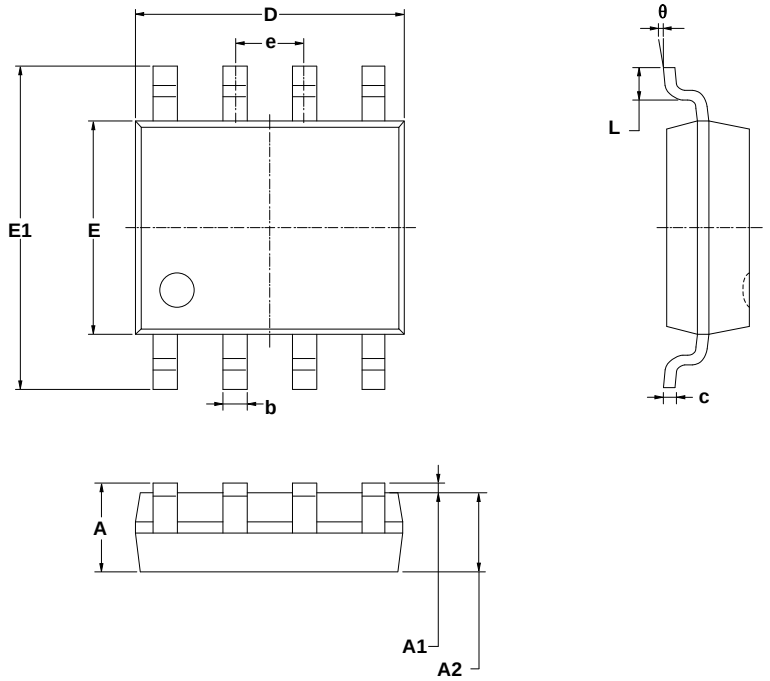
PACKAGE OUTLINE DIMENSIONS

SOT23-5



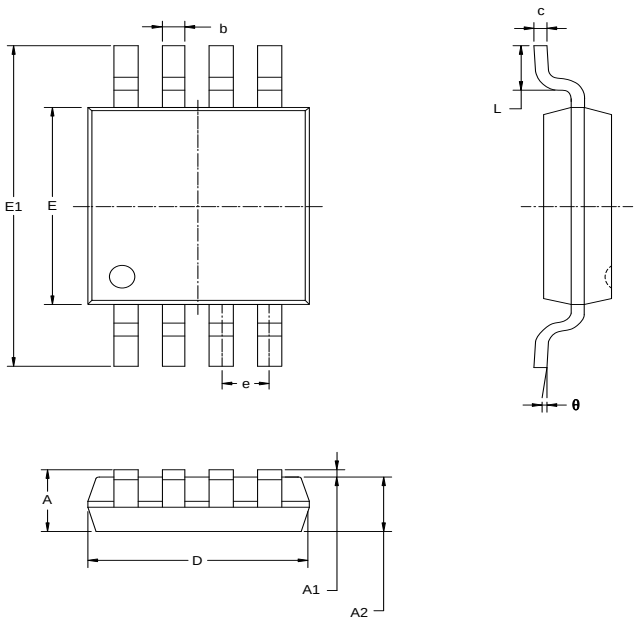
Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0º	8 º	0 º	8 º

SOP8



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	1.27 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0 º	8 º	0 º	8 º

MSOP8



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650BSC		0.026BSC	
L	0.400	0.800	0.016	0.031
θ	0º	6º	0º	6º

MARKING and PACKAGING SPECIFICATION

1. Marking Drawing Description

Product Name : MS8117S, MS8127, MS8127M

Product Code : XXXX, XXXXXX

2. Marking Drawing Demand

Laser printing, contents in the middle, font type Arial.

3. Packaging Specification

Device	Package	Piece/Reel	Reel/Box	Piece /Box	Box/Carton	Piece/Carton
MS8117S	SOT23-5	3000	10	30000	4	120000
MS8127	SOP8	2500	1	2500	8	20000
MS8127M	MSOP8	3000	1	3000	8	24000

STATEMENT

- All Revision Rights of Datasheets Reserved for Ruimeng. Don't release additional notice.

  Customer should get latest version information and verify the integrity before placing order.
- When using Ruimeng products to design and produce, purchaser has the responsibility to observe safety standard and adopt corresponding precautions, in order to avoid personal injury and property loss caused by potential failure risk.
- The process of improving product is endless. And our company would sincerely provide more excellent product for customer.

MOS CIRCUIT OPERATION PRECAUTIONS

Static electricity can be generated in many places. The following precautions can be taken to effectively prevent the damage of MOS circuit caused by electrostatic discharge:

1. The operator shall ground through the anti-static wristband.
2. The equipment shell must be grounded.
3. The tools used in the assembly process must be grounded.
4. Must use conductor packaging or anti-static materials packaging or transportation.

+86-571-89966911

Rm701, No.9 Building, No. 1 WeiYe Road, Puyan Street, Binjiang District, Hangzhou, Zhejiang

http:// www.relmon.com