44V, 15V/μs, 3.5MHz, Operational Amplifier

General Description

The ET85932 is a newest high supply voltage amplifier with low offset, low power and stable high frequency response. They incorporate ETEK's proprietary and patented design techniques to achieve very good AC performance with 3.5MHz bandwidth, 15V/μs slew rate and low distortion while drawing only typical 700μA of quiescent current per amplifier.

The input common-mode voltage range extends to $-V_S$, and the outputs swing rail-to-rail. The ET85932 can be used as plug-in replacements for many commercially available op-amps to reduce power and improve input/output range and performance.

The combination of features makes the ET85932 ideal choices for industrial control, motor control and portable audio amplification, sound ports, and other consumer audio.

ET85932 is specified for the extended industrial/automotive temperature range (-40°C to +125°C). It is available in SOP8/MSOP8/SSOP8 packages.

Features

- Supply Voltage: 3V to 44V
- Low Supply Current: Maximum 1000μA per channel
- Differential Input Voltage Range to Supply Rail, can Work as Comparator
- Input Rail to $-V_S$, Rail to Rail Output
- Fast Response: 3.5 MHz Bandwidth, 15V/μs Slew Rate, 100ns Overload Recovery
- Low Offset Voltage:
  - ±2mV Maximum at 25°C
  - ±2.5mV Maximum at -40°C to 85°C
  - ±3mV Maximum at -40°C to 125°C
- Very Low THD+N: 0.0005% at Gain = 1, 1kHz
- 2KV HBM, 1KV CDM, 150mA Latch Up
- -40°C to 125°C Operation Temperature Range

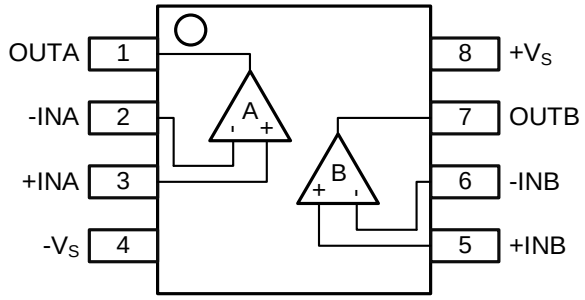
Applications

- Sensor Interface
- Motor Control
- Industrial Control
- Audio

Device information

Part No.	Package	Tape / Reel
ET85932M	SOP8	Tape and Reel
ET85932U	MSOP8	Tape and Reel
ET85932S	SSOP8	Tape and Reel

Pin Configuration



ET85932M/U/S(SOP8/MSOP8/SSOP8)
Top View

Pin Function

Pin Number	Symbol	Descriptions
1	OUTA	Output
2	-INA	Inverting input
3	+INA	Non-inverting input
4	$-V_S$	Negative supply
5	+INB	Non-inverting input
6	-INB	Inverting input
7	OUTB	Output
8	$+V_S$	Positive supply

Absolute Maximum Ratings

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.

Parameter	Rating	Unit
Supply Voltage (+V_S) - (-V_S)	44	V
Input Voltage	(-V_S)-0.3V to (+V_S)+0.3	V
Differential Input Voltage	(+V_S) - (-V_S)	V
Input Current: +IN, -IN(1)	±10	mA
Output Short-Circuit Duration(2)	Infinite	
Maximum Junction Temperature	150	°C
Operating Temperature Range	-40 to 125	°C
Storage Temperature Range	-65 to 150	°C
Lead Temperature (Soldering, 10 sec)	260	°C

Note1: The inputs are protected by ESD protection diodes to each power supply. If the input extends more than 300mV beyond the power supply, the input current should be limited to less than 10mA.

Note2: A heat sink may be required to keep the junction temperature below the absolute maximum. This depends on the power supply voltage and how many amplifiers are shorted. Thermal resistance varies with the amount of PC board metal connected to the package. The specified values are for short traces connected to the leads.

ESD Rating

Symbol	Parameter	Condition	Minimum Level	Unit
HBM	Human Body Model ESD	ANSI/ESDA/JEDEC JS-001	2	kV
CDM	Charged Device Model ESD	ANSI/ESDA/JEDEC JS-002	1	kV

Recommended Operating Conditions

Parameter	MIN	MAX	Unit
Supply Voltage (V_S)	3	44	V
Operating Temperature (T_A)	-40	125	°C

Electrical Characteristics

All test condition is V_S = 30V, T_A = 25°C, R_L = 10kΩ to V_S/2, unless otherwise noted.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Power Supply							
V_S	Supply Voltage Range			3		44	V
I_Q	Quiescent Current per Amplifier	V_S = 30V			700	1000	μA
		V_S = 30V, T_A = -40°C to 125°C				1200	
		V_S = 5V			600	850	
		V_S = 5V, T_A = -40°C to 125°C				1000	
PSRR	Power Supply Rejection Ratio	V_S = 3V to 36V		95	120		dB
		V_S = 3V to 36V, T_A = -40°C to 125°C		90			
Input Characteristics							
V_{OS}	Input offset voltage	V_S = 30V, V_{CM} = 0V to 28V		-2	0.1	2	mV
			-40°C to 85°C	-2.5		2.5	
			-40°C to 125°C	-3		3	
		V_S = 30V, V_{CM} = 28.5V		-3		3	
			-40°C to 125°C	-4		4	
		V_S = 5V, V_{CM} = 2.5V		-2	0.1	2	
			-40°C to 125°C	-3		3	
dV_{OS}/dT	V_{OS} vs temperature	T_A = -40°C to 125°C			2		μV/°C
I_B	Input Bias Current				25		pA
		T_A = -40°C to 85°C			80		
		T_A = -40°C to 125°C			1000		
I_{OS}	Input Offset Current				25		pA
I_{IN}	Different Input Current	V_S = 36V, V_{ID} = 36V			10		nA
			-40°C to 125°C		100		
C_{IN}	Input Capacitance	Differential Mode			5		pF
		Common Mode			2.5		
A_{OL}	Open-loop Voltage Gain			105	120		dB
		T_A = -40°C to 85°C		100			
V_{CM}	Common-mode Input voltage range	No phase reversal, rail-to-rail input		(-V_S)		(+V_S)-1.5	V
CMRR	Common-mode rejection ratio	V_{CM} = 0V to 28V		105	130		dB
		V_{CM} = 0V to 28V, T_A = -40°C to 125°C		100			

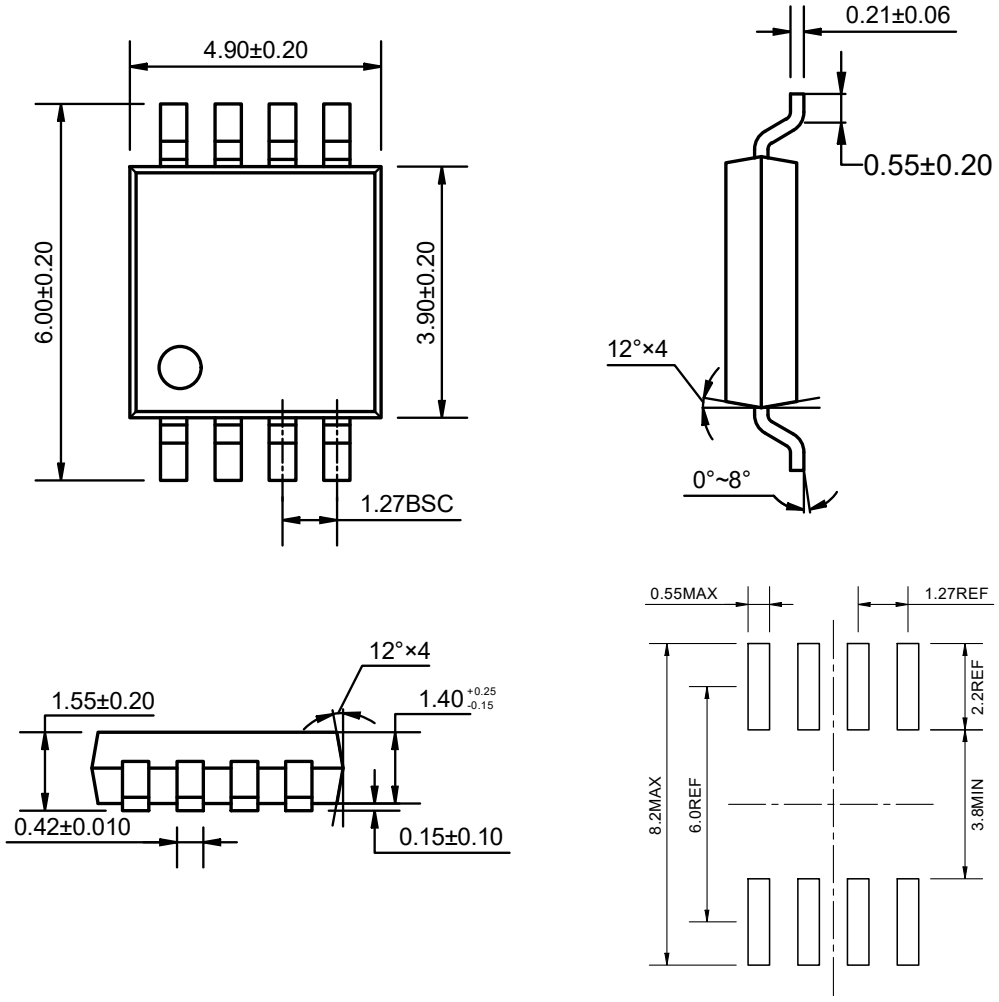
Electrical Characteristics (Continued)

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Output Characteristics							
V_{OH}	Output Swing from Positive Rail	R_{LOAD} = 10kΩ to V_S/2			200	300	mV
			-40°C to 125°C			450	mV
		R_{LOAD} = 2kΩ to V_S/2			1.1	1.4	V
			-40°C to 125°C			2	V
V_{OL}	Output Swing from Negative Rail	R_{LOAD} = 10kΩ to V_S/2			200	300	mV
			-40°C to 125°C			450	mV
		R_{LOAD} = 2kΩ to V_S/2			0.8	1	V
			-40°C to 125°C			1.6	V
I_{SC}	Output Short-Circuit Current			25	32		mA
		T_A = -40°C to 85°C		20			
		T_A = -40°C to 125°C		15			
AC Specifications							
GBP	Gain-Bandwidth Product				3.5		MHz
SR	Slew Rate	G = 1, 10V step			15		V/μs
		Open Loop		9	15		
			-40°C to 85°C	7			
			-40°C to 125°C	6			
t_{OR}	Overload Recovery				100		ns
t_S	Settling Time, 0.1%[(3)]	G = -1, 10V step			0.8		μs
	Settling Time, 0.01%[(3)]				1		
PM	Phase Margin	V_S = 36V, R_L=10K, C_L=100pF			60		°
GM	Gain Margin[(3)]	V_S = 36V, R_L=10K, C_L=100pF			15		dB
Noise Performance							
E_N	Input Voltage Noise	f = 0.1Hz to 10Hz			1.7		μV_{RMS}
e_N	Input Voltage Noise Density	f = 1kHz			30		nV/√Hz
i_N	Input Current Noise[(3)]	f = 1kHz			2		fA/√Hz
THD+N	Total Harmonic Distortion and Noise	f = 1kHz, G =1, R_L = 10kΩ, V_{OUT} = 6V_{RMS}			0.0005		%

Note3: Guaranteed by design.

Package Dimension

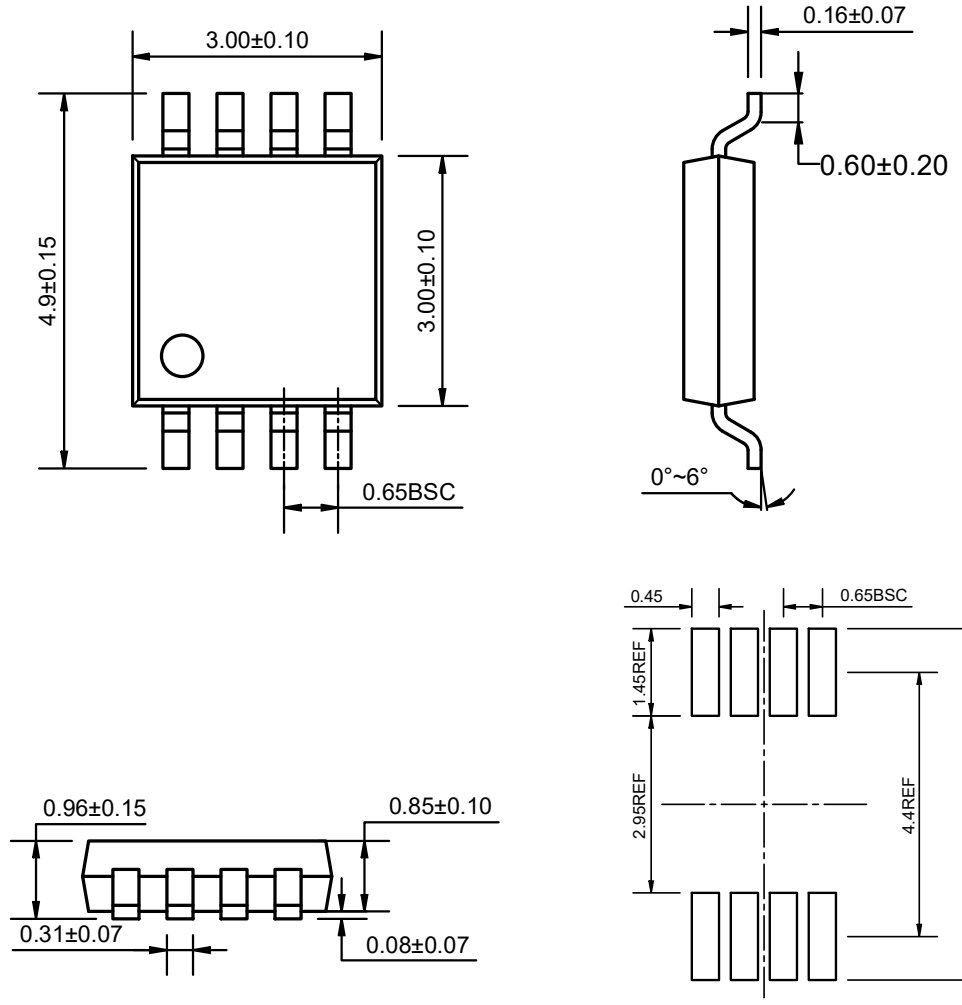
SOP8



Recommended Land Pattern

Unit: mm

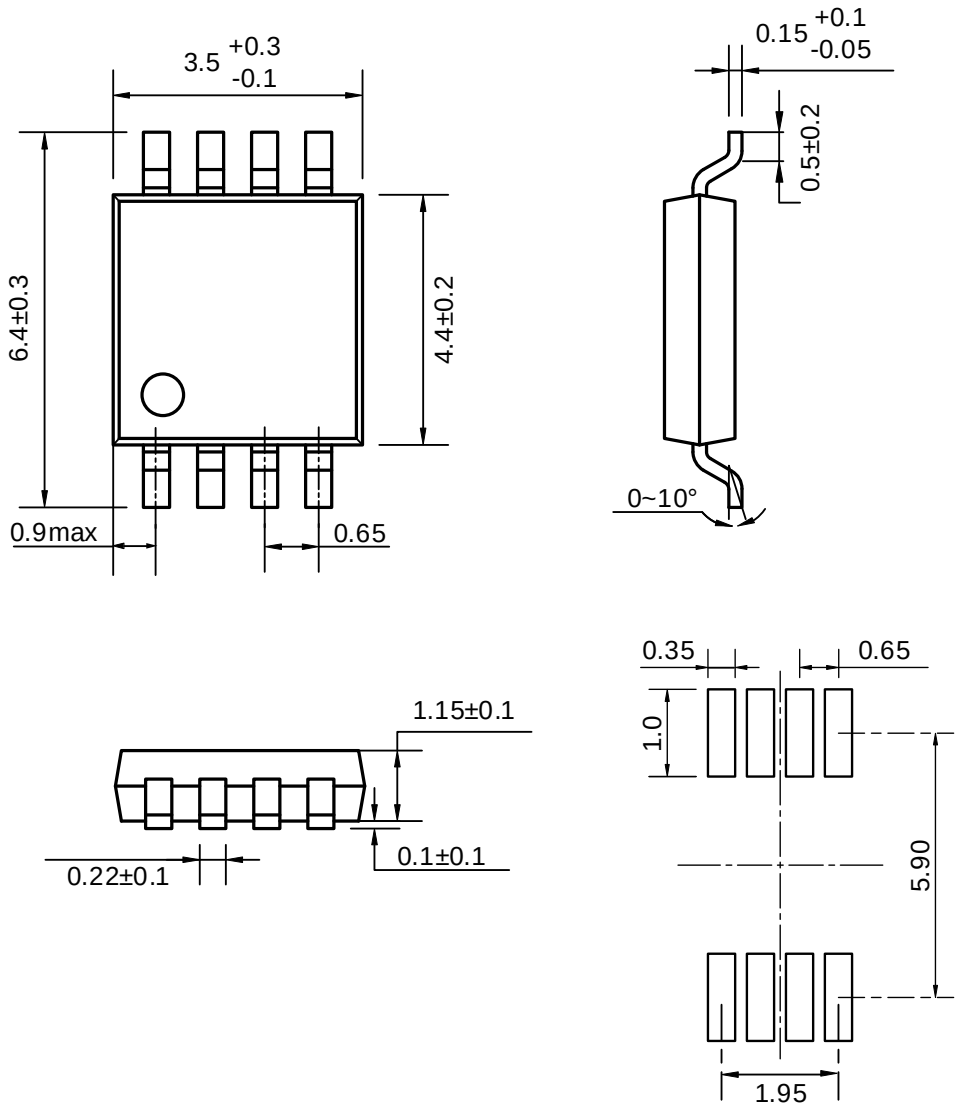
MSOP8



Recommended Land Pattern

Unit: mm

SSOP8



Recommended Land Pattern

Unit: mm

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
0.0	2024-7-5	Original Version	Huyt	Chenh	Liujy