LMV721/LMV722/LMV724

10MHz, RRIO, CMOS, Op Amps

Description

The LMV721, LMV722, LMV724 families of products offer low voltage operation and rail-to-rail input and output, as well as excellent speed/power consumption ratio, providing an excellent bandwidth(10MHz) and slew rate (8.5V/us). The operational amplifiers are unity gain stable and feature an ultra-low input bias current.

The LMV721, LMV722, LMV724 has lower offset voltage, which is guaranteed not upper than 0.5mV at 25℃ with V_S = 5V, V_{CM} = Vs/2.

The LMV721, LMV722, LMV724 families of operational amplifiers under single supplies of 2.1V to 5.5V or dual power supplies of ±1.05V to ±2.75V. The devices are ideal for sensor interfaces, active filters and portable applications.

Features

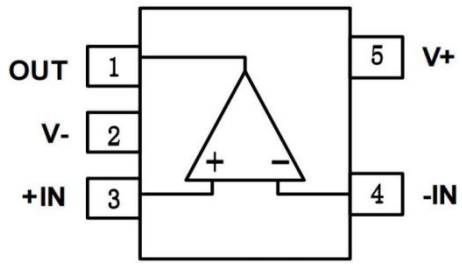
- High gain bandwidth: 10MHz
- Excellent slew rate: 8.5V/us
- Rail-to-rail input and output
- Lower offset voltage: ±3mV Max
- Input voltage range: -0.2V to 5.7V with V_S=5.5V
- Supply range: 2.1V to 5.5V
- Operating range: -40℃ to 125℃
- Packages: SOT-23-5/SOP-8/SOP-14

Applications

- Sensors
- Active Filters
- Test Equipment
- Driving A/D Converters
- Photodiode Amplification

Pin Configuration

LM721-CM



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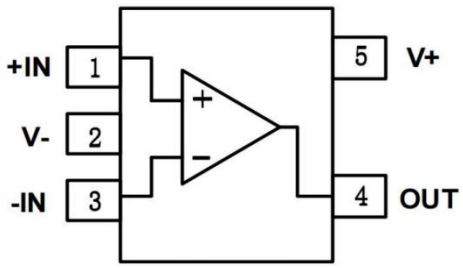
LM721B-CM



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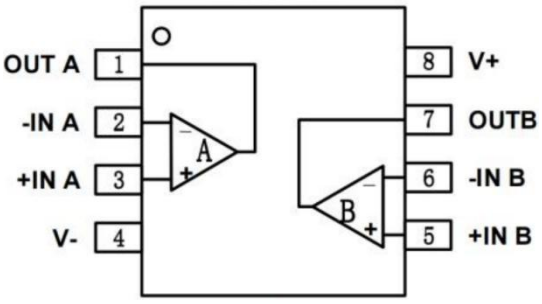
LM722-P8



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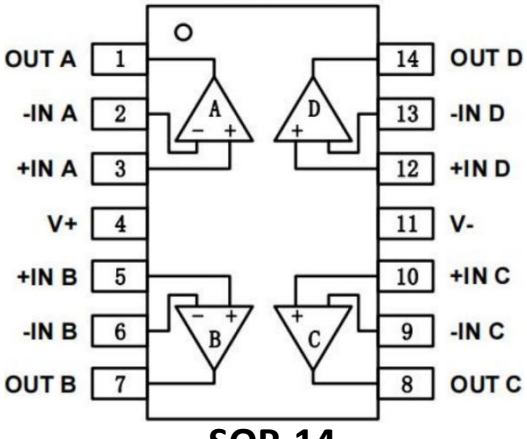
LM724-P14



SOP-14

Ordering Information

Type	Marking	Package
LMV721-CM	LMV721	SOT-23-5
LMV721B-CM	-	SOT-23-5
LM722-P8	LMV722	SOP-8
LM724-P14	LMV724	SOP-14

Absolute Maximum Ratings

Over operating free-air temperature range(unless otherwise noted)(1)

Parameter	Symbol	Min	Max	Unit
Supply Voltage,V_S = (V+) - (V-)	V_S		7	V
Signal Input Voltage(2)	V_{IN}	(V-)-0.5	(V+)+0.5	V
Signal Output Voltage(3)	V_{OUT}	(V-)-0.5	(V+)+0.5	V
Signal Input Current	I_{IN}	-10	10	mA
Signal Output Current	I_{OUT}	-150	150	mA
Maximum Junction Temperature	T_J		150	℃
Storage Temperature Range	T_{STG}	-65	150	℃

Note 1: 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.

Note 2: Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.5V beyond the supply rails should be current-limited to 10mA or less.

Note 3: Output terminals are diode-clamped to the power-supply rails. Output signals that can swing more than 0.5V beyond the supply rails should be current-limited to ±150mA or less.

ESD Ratings

Parameter		Symbol	Value	Unit
Electrostatic Discharge	Human-body model (HBM)	$V_{(ESD)}$	±4500	V

Recommended Operating Conditions

Over operating free-air temperature range(unless otherwise noted)

Parameter		Symbol	Min	Typ	Max	Unit
Supply Voltage,V_S = (V+) - (V-)	Signal-supply	V_S	2.1		5.5	V
	Dual-supply		1.05		2.75	V
Operating Temperature Range		T_A	-40	25	125	℃

Electrical Characteristics(T_A=25℃ VCC=2.7V unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Power Supply						
Operating Voltage Range	V_S		2.1		5.5	V
Quiescent Current/Amplifier	I_Q	V_S=5V,IN+=V-,IN-=OUT		0.4		mA
Power-Supply Rejection Ration	PSRR	V_S=2.5V~5.5V,V_{CM}=(V-)+0.5V	75			dB
Turn-on Time	t_{ON}			12		μs
Input						
Input Offset Voltage	V_{OS}	V_{CM}=V_S/2,LMV721	-3	±0.2	3	mV
		V_{CM}=V_S/2,LMV722	-3	±0.2	3	
		V_{CM}=V_S/2,LMV724	-3	±0.3	3	
Input Offset Voltage Average Drift	ΔV_{OS}	T_A=-40℃~125℃		±2.6		μV/℃
Input Bias Current	I_B		-10	±1	10	pA
Input Offset Current	I_{OS}		-10	±1	10	pA
Common-Mode Voltage Range	V_{CM}	V_S=5.5V	-0.2		5.7	V
Common-Mode Rejection Ration	CMRR	V_S=5.5V,V_{CM}=-0.2V~4V	70			dB
		V_S=5.5V,V_{CM}=-0.2V~5.7V	65			
Output						
Open-Loop Voltage Gain	A_{OL}	R_L=2KΩ,V_{OUT}=0.15V~4.85V	86			dB
		R_L=10KΩ,V_{OUT}=0.05V~4.95V	96			
Output Swing From Rail		R_L=2KΩ		50		mV
		R_L=10KΩ		10		
Output Current Source	I_{OUT}			140		mA
Frequency Response						
Slew Rate	SR			8.5		V/μs
Gain-Bandwidth Product	GBP			10		MHz
Phase Margin	PM			62		°
Setting Time,0.1%	ts			0.5		μs
Overload Recovery Time		V_{IN}*Gain≥V_S		3.2		μs
Noise						
Input Voltage Noise Density	en	f=1KHz		9.5		nV/√Hz
		f=10KHz		6.5		nV/√Hz

Typical Characteristics

At T_A=25℃, V_S=5V, R_L=10KΩ connected to V_S/2. V_{OUT}=V_S/2, unless otherwise noted.

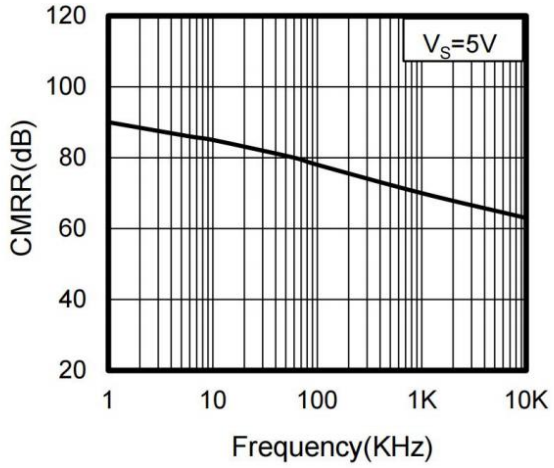


Figure 1. Common-Mode Rejection Ratio vs Frequency

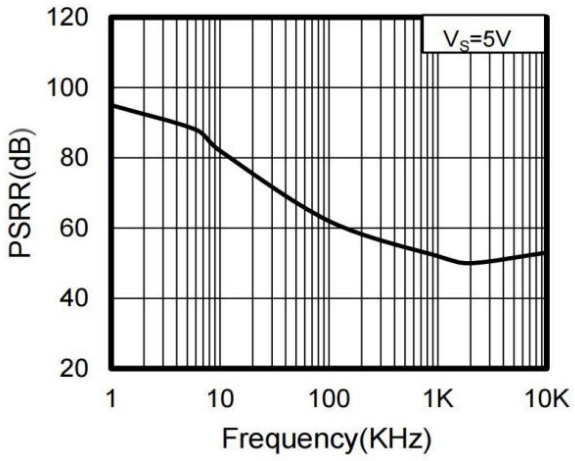


Figure 2. Power-Supply Rejection Ratio vs Frequency

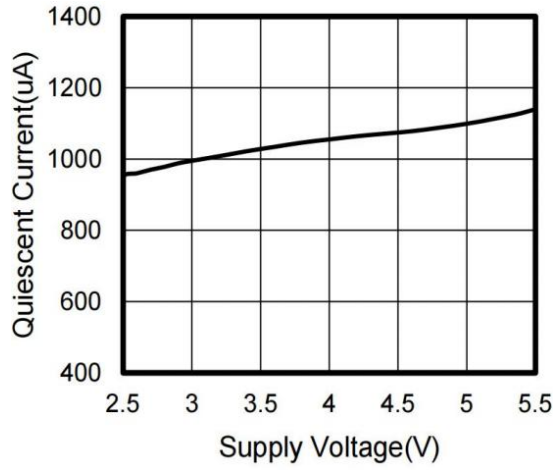


Figure 3. Quiescent Current vs Supply Voltage

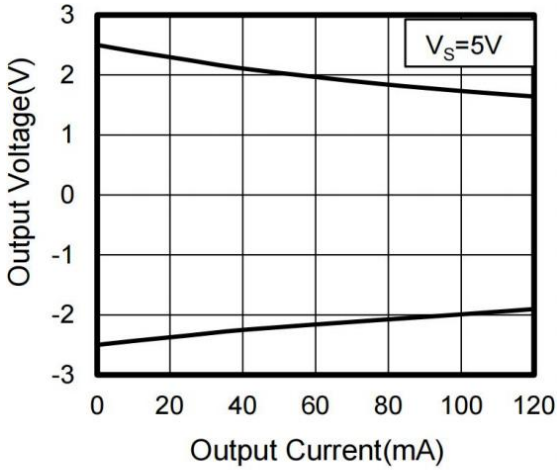


Figure 4. Output Voltage vs Output Current

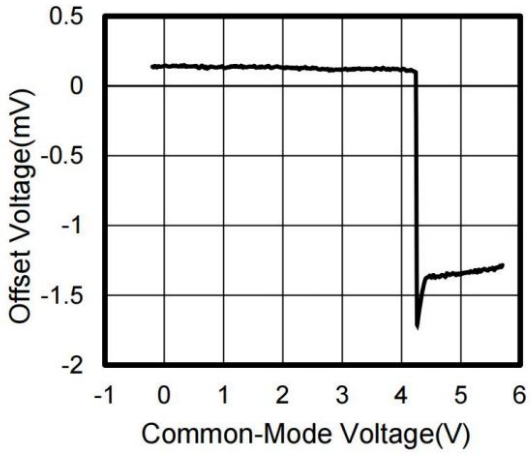


Figure 5. Offset Voltage vs Common-Mode Voltage

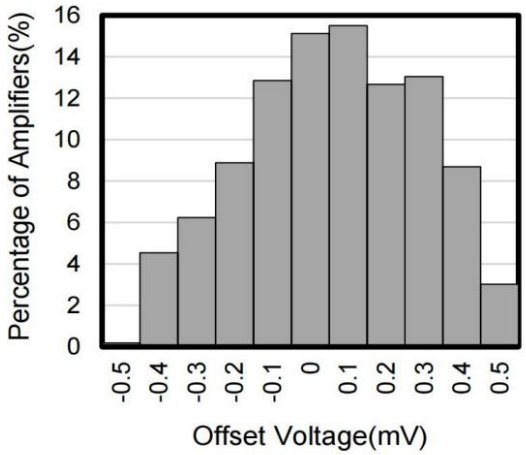


Figure 6. Offset Voltage Production Distribution

Layout

Layout Guideline

Attention to good layout practices is always recommended. Keep traces short. When possible, use a PCB ground plane with surface-mount components placed as close to the device pins as possible.
Place a 0.1uF capacitor closely across the supply pins.
These guidelines should be applied throughout the analog circuit to improve performance and provide benefits such as reducing the EMI susceptibility.

Layout Example

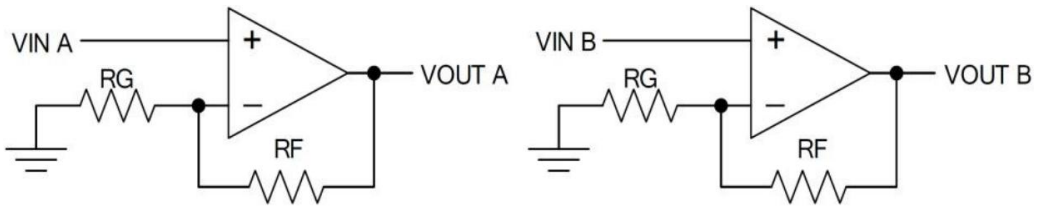


Figure 7. Schematic Representation

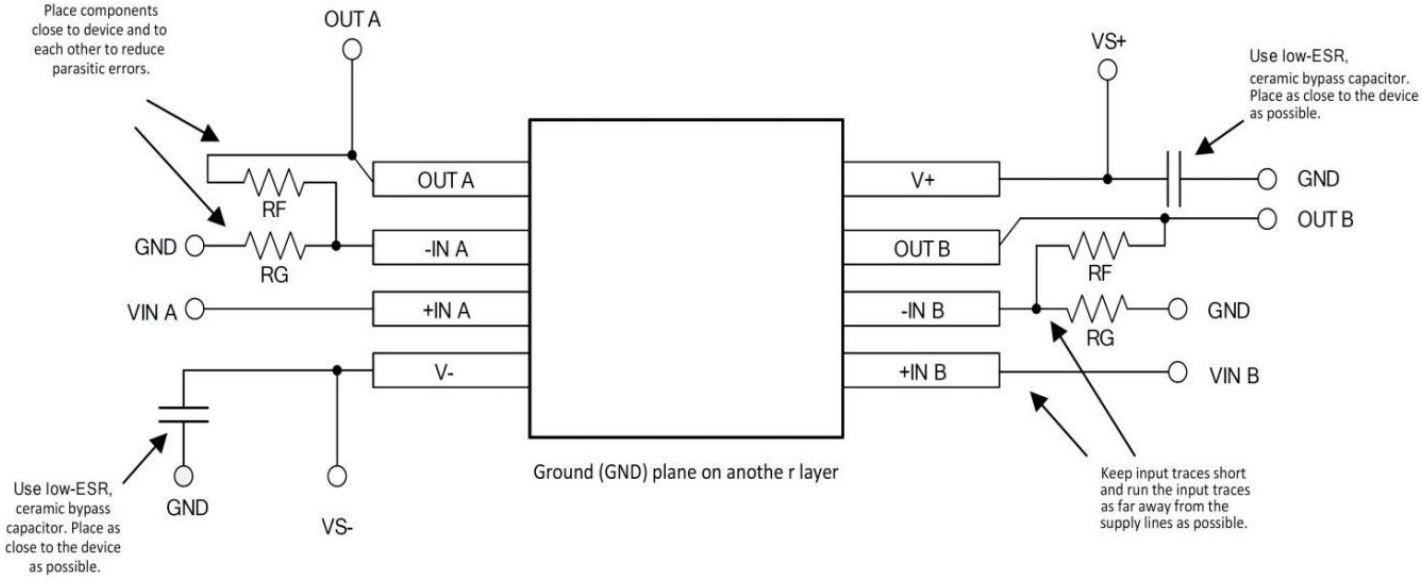
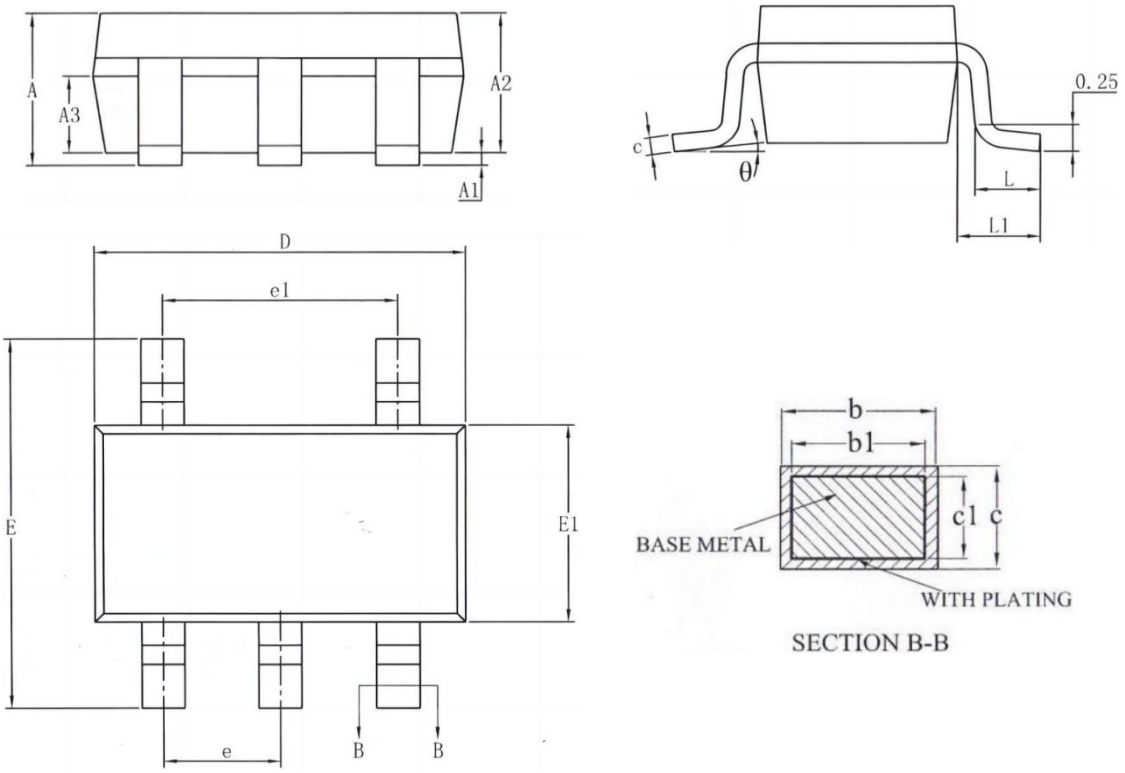


Figure 8. Layout Example

Package Information

SOT-23-5

Dimensions in mm

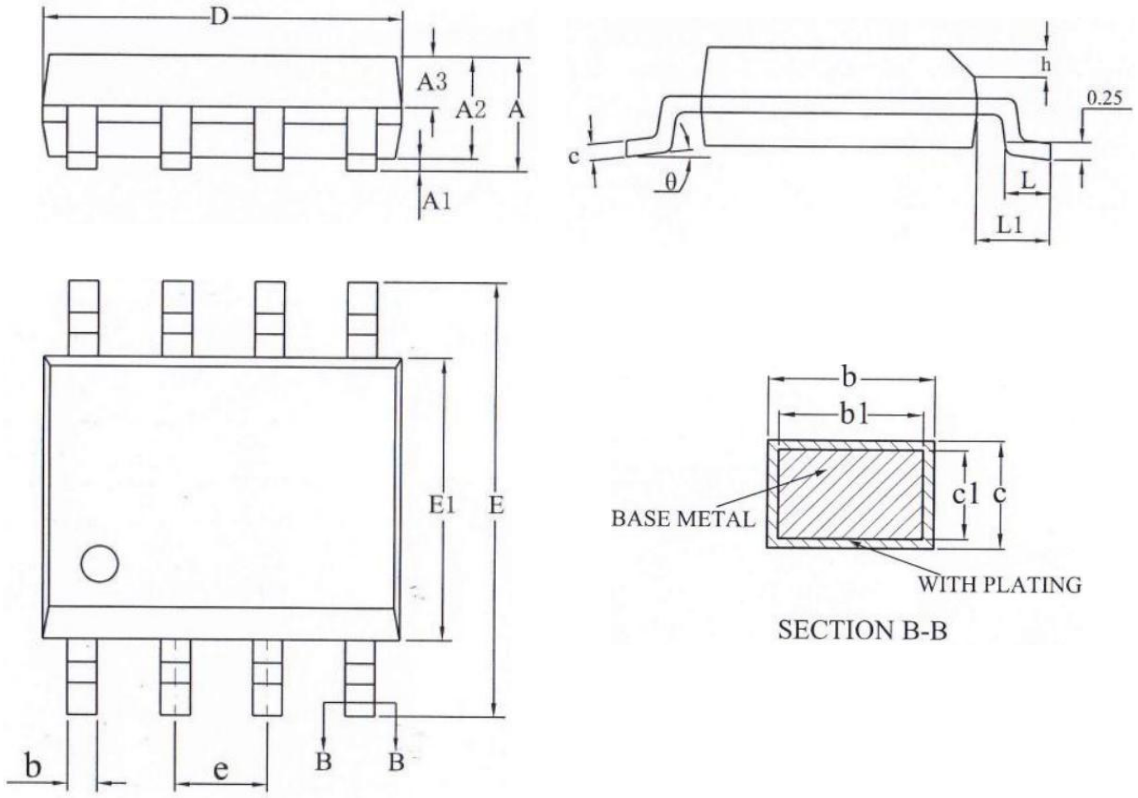


Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	Min	Nom	Max		Min	Nom	Max
A	-	-	1.25	D	2.82	2.92	3.02
A1	0.04	-	0.10	E	2.60	2.80	3.00
A2	1.00	1.10	1.20	E1	1.50	1.60	1.70
A3	0.60	0.65	0.70	e	0.95 BSC		
b	0.33	-	0.41	e1	1.90 BSC		
b1	0.32	0.35	0.38	L	0.30	-	0.60
c	0.15	-	0.19	L1	0.60 REF		
c1	0.14	0.15	0.16	θ	0°	-	8°

Package Information

SOP-8

Dimensions in mm

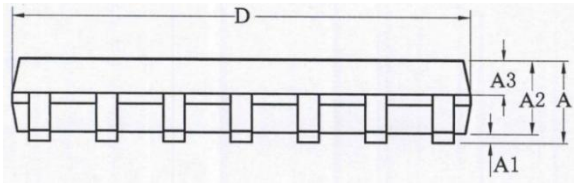


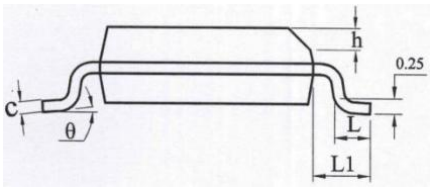
Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	Min	Nom	Max		Min	Nom	Max
A	-	-	1.75	D	4.80	4.90	5.00
A1	0.10	-	0.225	E	5.80	6.00	6.20
A2	1.30	1.40	1.50	E1	3.80	3.90	4.00
A3	0.60	0.65	0.70	e	1.27 BSC		
b	0.39	-	0.47	h	0.25	-	0.50
b1	0.38	0.41	0.44	L	0.50	-	0.80
c	0.20	-	0.24	L1	1.05 REF		
c1	0.19	0.20	0.21	θ	0°	-	8°

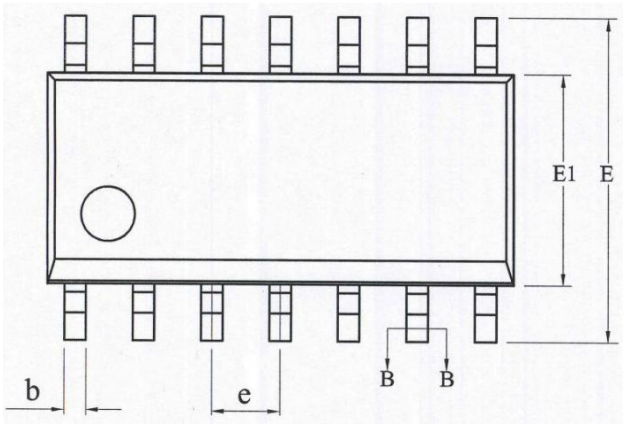
Package Information

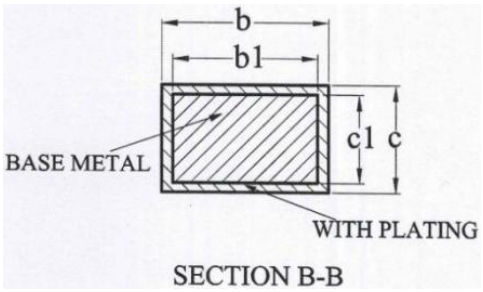
SOP-14

Dimensions in mm









Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	Min	Nom	Max		Min	Nom	Max
A	-	-	1.75	D	8.55	8.65	8.75
A1	0.10	-	0.225	E	5.80	6.00	6.20
A2	1.30	1.40	1.50	E1	3.80	3.90	4.00
A3	0.60	0.65	0.70	e	1.27 (BSC)		
b	0.39	-	0.47	h	0.25	-	0.50
b1	0.38	0.41	0.44	L	0.50	-	0.80
c	0.20	-	0.24	L1	1.05 (REF)		
c1	0.19	0.20	0.21	θ	0°	-	8°

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