QUAD/DUAL P-CHANNEL MATCHED PAIR MOSFET ARRAY

GENERAL DESCRIPTION

The ALD1107/ALD1117 are monolithic quad/dual P-channel enhancement mode matched MOSFET transistor arrays intended for a broad range of precision analog applications. The ALD1107/ALD1117 offer high input impedance and negative current temperature coefficient. The transistor pairs are matched for minimum offset voltage and differential thermal response, and they are designed for precision analog switching and amplifying applications in -2V to -10V systems where low input bias current, low input capacitance and fast switching speed are desired. These MOSFET devices feature very large (almost infinite) current gain in a low frequency, or near DC, operating environment. The ALD1107/ALD1117 are building blocks for differential amplifier input stages, transmission gates, multiplexer applications, current sources and many precision analog circuits.

FEATURES

- Low threshold voltage of -0.7V
- Low input capacitance
- Low Vos -- 2mV typical
- High input impedance -- $10^{14}\Omega$ typical
- Negative current (I_{DS}) temperature coefficient
- Enhancement-mode (normally off)
- DC current gain 10^9
- Low input and output leakage currents
- RoHS compliant

ORDERING INFORMATION ("L" suffix denotes lead-free (RoHS))

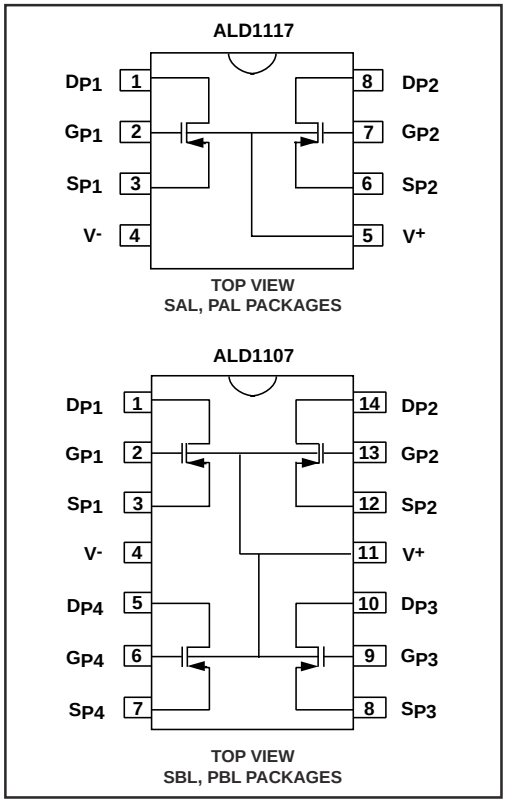
Operating Temperature Range*	
0°C to +70°C	0°C to +70°C
8-Pin SOIC Package	8-Pin Plastic Dip Package
ALD1117SAL	ALD1117PAL
14-Pin SOIC Package	14-Pin Plastic Dip Package
ALD1107SBL	ALD1107PBL

* Contact factory for high temperature versions.

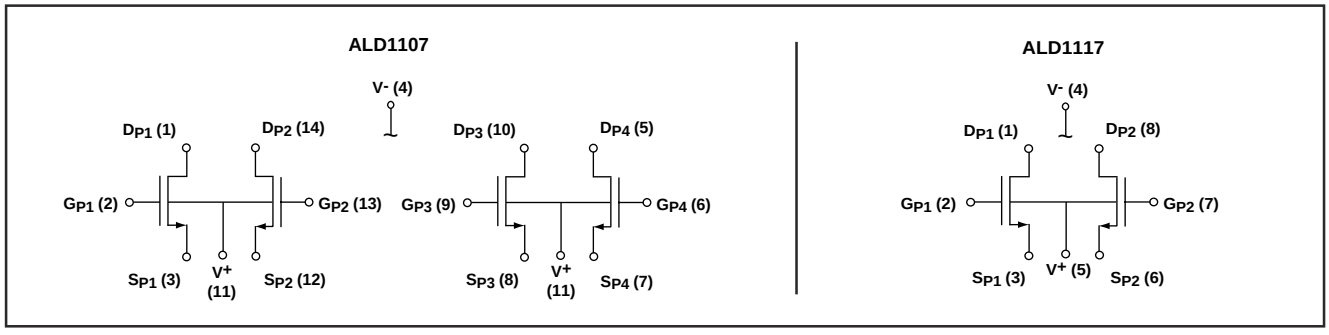
APPLICATIONS

- Precision current mirrors
- Precision current sources
- Voltage choppers
- Differential amplifier input stage
- Voltage comparator
- Data converters
- Sample and Hold
- Analog signal processing

PIN CONFIGURATION



BLOCK DIAGRAMS



ABSOLUTE MAXIMUM RATINGS

Drain-source voltage, V_{DS} ——— -10V
Gate-source voltage, V_{GS} ——— -10V
Power dissipation ——— 500mW
Operating temperature range SAL, PAL, SBL, PBL packages ——— 0°C to +70°C
Storage temperature range ——— -65°C to +150°C
Lead temperature, 10 seconds ——— +260°C

CAUTION: ESD Sensitive Device. Use static control procedures in ESD controlled environment.

OPERATING ELECTRICAL CHARACTERISTICS

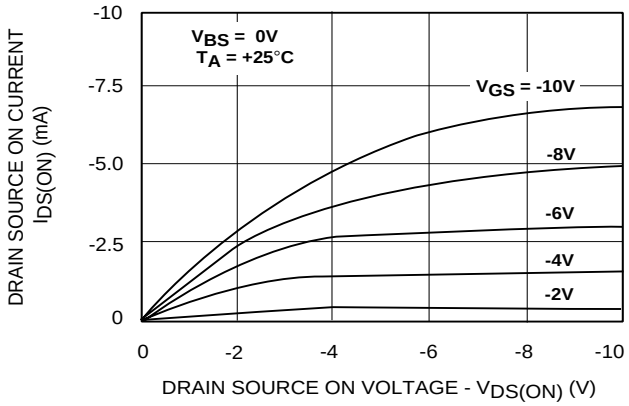
T_A = 25°C unless otherwise specified

Parameter	Symbol	ALD1107			ALD1117			Unit	Test Conditions
		Min	Typ	Max	Min	Typ	Max		
Gate Threshold Voltage	V_T	-0.4	-0.7	-1.2	-0.4	-0.7	-1.2	V	I_{DS} = -1.0μA V_{GS} = V_{DS}
Offset Voltage V_{GS1}-V_{GS2}	V_{OS}		2	10		2	10	mV	I_{DS} = -10μA V_{GS} = V_{DS}
Gate Threshold Temperature Drift [2]	TC_{VT}		-1.3			-1.3		mV/°C	
On Drain Current	$I_{DS(ON)}$	-1.3	-2		-1.3	-2		mA	V_{GS} = V_{DS} = -5V
Transconductance	G_{IS}	0.25	0.67		0.25	0.67		mmho	V_{DS} = -5V I_{DS} = -10mA
Mismatch	ΔG_{fs}		0.5			0.5		%	
Output Conductance	G_{OS}		40			40		μmho	V_{DS} = -5V I_{DS} = -10mA
Drain Source On Resistance	$R_{DS(ON)}$		1200	1800		1200	1800	Ω	V_{DS} = -0.1V V_{GS} = -5V
Drain Source On Resistence Mismatch	$\Delta_{DS(ON)}$		0.5			0.5		%	V_{DS} = -0.1V V_{GS} = -5V
Drain Source Breakdown Voltage	BV_{DSS}	-10			-10			V	I_{DS} = -1.0μA V_{GS} = 0V
Off Drain Current [1]	$I_{DS(OFF)}$		10	400 4		10	400 4	pA nA	V_{DS} = -10V V_{GS} = 0V T_A = 125°C
Gate Leakage Current	I_{GSS}		1	100 1		1	100 1	pA nA	V_{DS} = 0V V_{GS} = -10V T_A = 125°C
Input Capacitance [2]	C_{ISS}		1	3		1	3	pF	

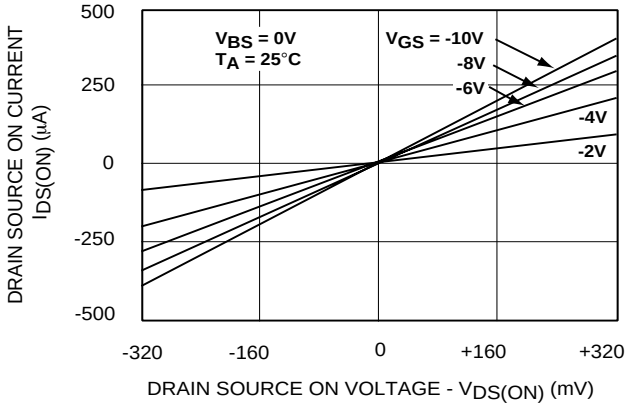
Notes: [1] Consists of junction leakage currents
[2] Sample tested parameters

TYPICAL PERFORMANCE CHARACTERISTICS

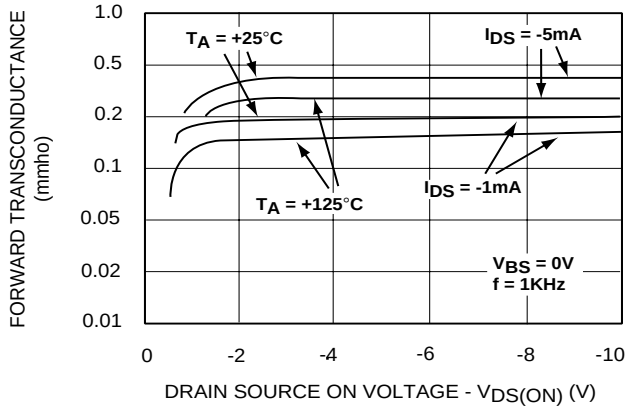
OUTPUT CHARACTERISTICS



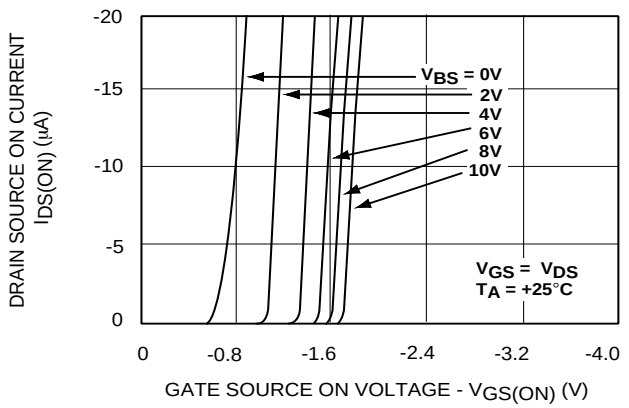
LOW VOLTAGE OUTPUT CHARACTERISTICS



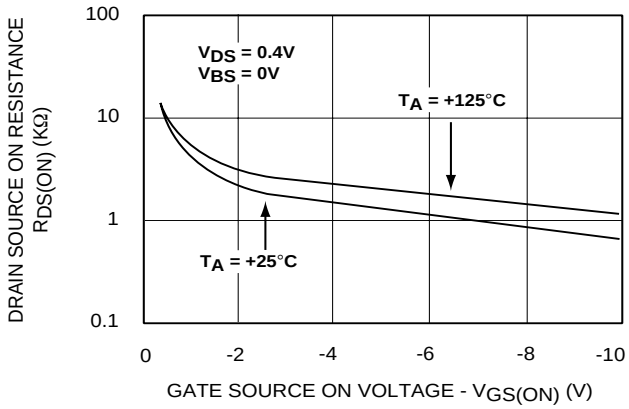
FORWARD TRANSCONDUCTANCE vs. DRAIN-SOURCE VOLTAGE



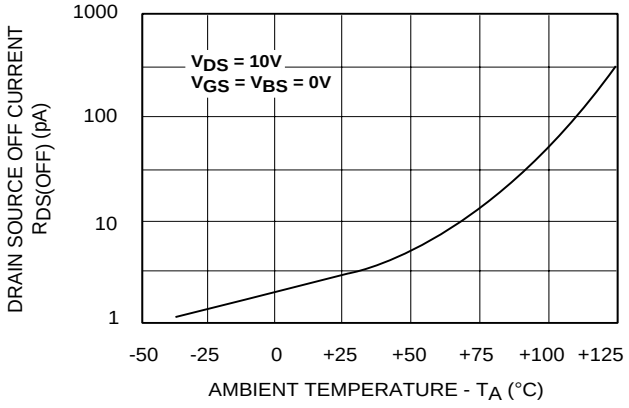
TRANSFER CHARACTERISTIC WITH SUBSTRATE BIAS



DRAIN SOURCE ON RESISTANCE vs. GATE-SOURCE VOLTAGE

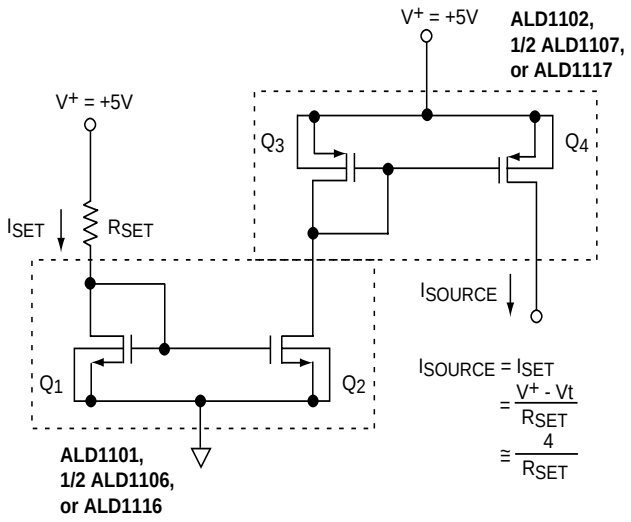


DRAIN SOURCE OFF CURRENT vs. AMBIENT TEMPERATURE



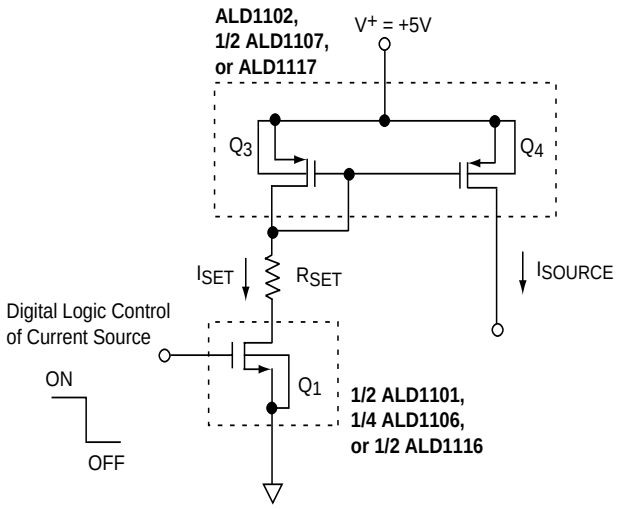
TYPICAL APPLICATIONS

CURRENT SOURCE MIRROR



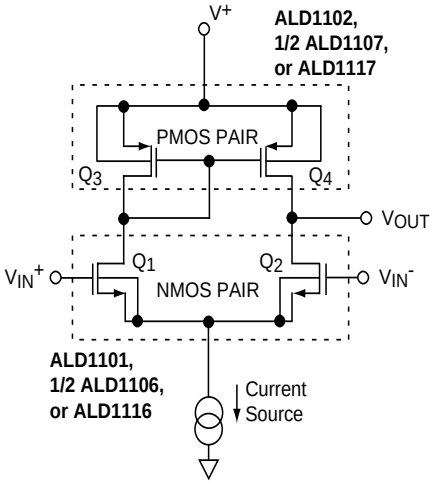
Q_1, Q_2: N-Channel MOSFET
Q_3, Q_4: P-Channel MOSFET

CURRENT SOURCE WITH GATE CONTROL



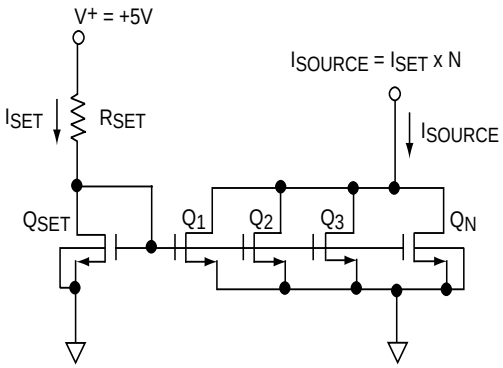
Q_1 : N-Channel MOSFET
Q_3, Q_4: P-Channel MOSFET

DIFFERENTIAL AMPLIFIER



Q_1, Q_2: N-Channel MOSFET
Q_3, Q_4: P-Channel MOSFET

CURRENT SOURCE MULTIPLICATION

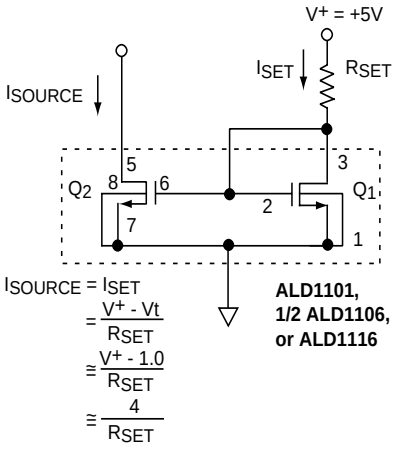


Q_{SET}, Q_1..Q_N: ALD1101, ALD1106, or ALD1116
N-Channel MOSFET

TYPICAL APPLICATIONS (cont.)

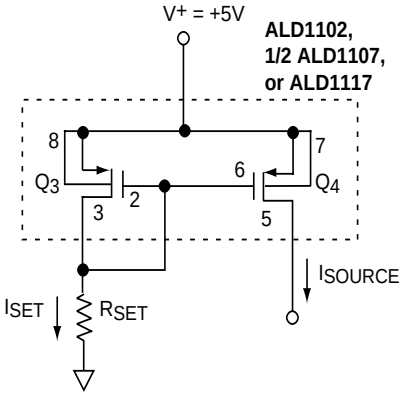
BASIC CURRENT SOURCES

N-CHANNEL CURRENT SOURCE



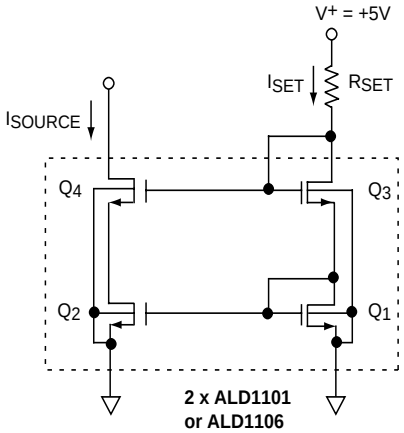
Q_1, Q_2: N-Channel MOSFET

P-CHANNEL CURRENT SOURCE

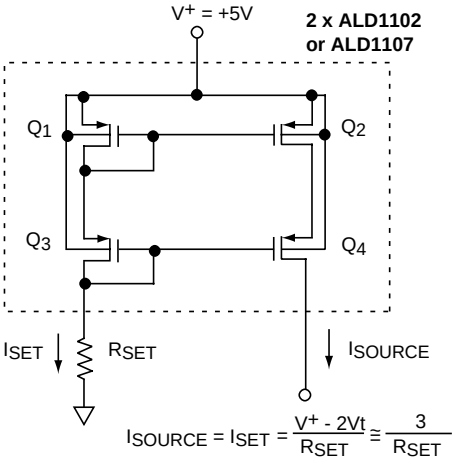


Q_3, Q_4: P-Channel MOSFET

CASCODE CURRENT SOURCES



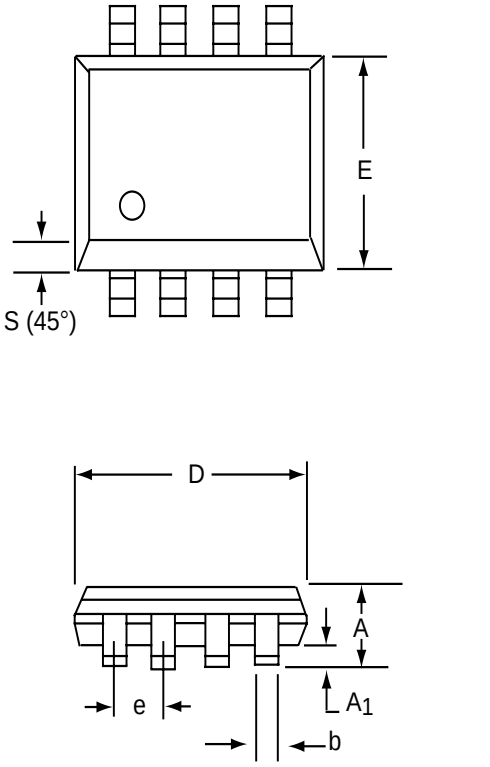
Q_1, Q_2, Q_3, Q_4: N-Channel MOSFET
(ALD1101 or ALD1103)



Q_1, Q_2, Q_3, Q_4: P-Channel MOSFET
(ALD1102 or ALD1103)

SOIC-8 PACKAGE DRAWING

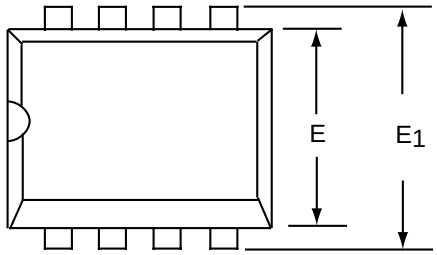
8 Pin Plastic SOIC Package

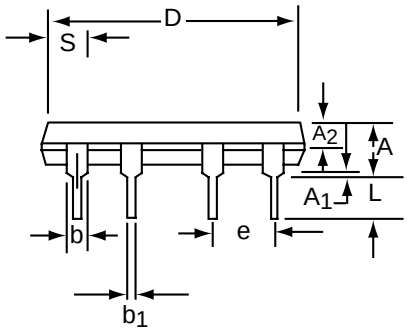


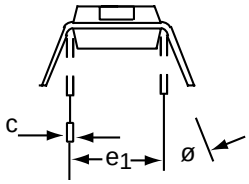
Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A_1	0.10	0.25	0.004	0.010
b	0.35	0.45	0.014	0.018
C	0.18	0.25	0.007	0.010
D-8	4.69	5.00	0.185	0.196
E	3.50	4.05	0.140	0.160
e	1.27 BSC		0.050 BSC	
H	5.70	6.30	0.224	0.248
L	0.60	0.937	0.024	0.037
Ø	0°	8°	0°	8°
S	0.25	0.50	0.010	0.020

PDIP-8 PACKAGE DRAWING

8 Pin Plastic DIP Package



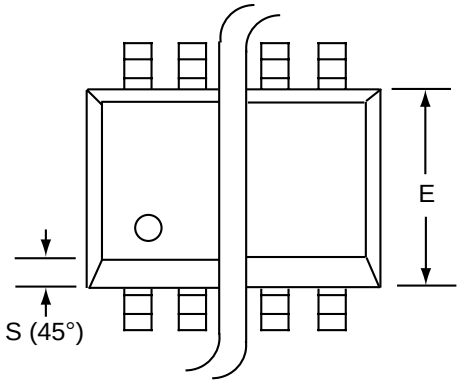


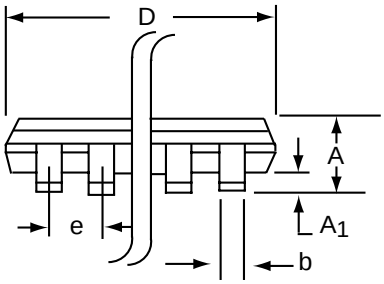


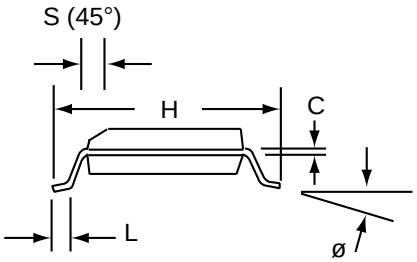
Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	3.81	5.08	0.105	0.200
A_1	0.38	1.27	0.015	0.050
A_2	1.27	2.03	0.050	0.080
b	0.89	1.65	0.035	0.065
b_1	0.38	0.51	0.015	0.020
c	0.20	0.30	0.008	0.012
D-8	9.40	11.68	0.370	0.460
E	5.59	7.11	0.220	0.280
E_1	7.62	8.26	0.300	0.325
e	2.29	2.79	0.090	0.110
e_1	7.37	7.87	0.290	0.310
L	2.79	3.81	0.110	0.150
S-8	1.02	2.03	0.040	0.080
ø	0°	15°	0°	15°

SOIC-14 PACKAGE DRAWING

14 Pin Plastic SOIC Package



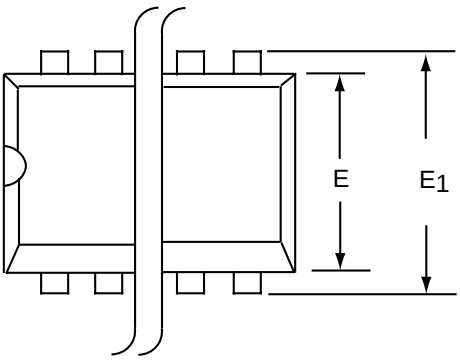


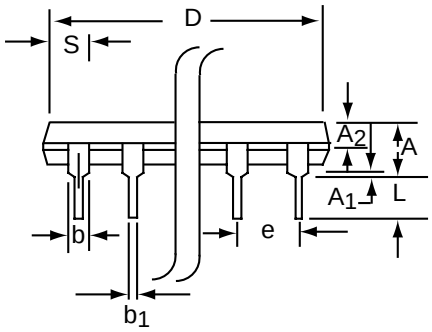


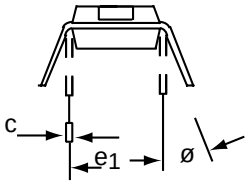
Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A_1	0.10	0.25	0.004	0.010
b	0.35	0.45	0.014	0.018
C	0.18	0.25	0.007	0.010
D-14	8.55	8.75	0.336	0.345
E	3.50	4.05	0.140	0.160
e	1.27 BSC		0.050 BSC	
H	5.70	6.30	0.224	0.248
L	0.60	0.937	0.024	0.037
ø	0°	8°	0°	8°
S	0.25	0.50	0.010	0.020

PDIP-14 PACKAGE DRAWING

14 Pin Plastic DIP Package







Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	3.81	5.08	0.105	0.200
A_1	0.38	1.27	0.015	0.050
A_2	1.27	2.03	0.050	0.080
b	0.89	1.65	0.035	0.065
b_1	0.38	0.51	0.015	0.020
c	0.20	0.30	0.008	0.012
D-14	17.27	19.30	0.680	0.760
E	5.59	7.11	0.220	0.280
E_1	7.62	8.26	0.300	0.325
e	2.29	2.79	0.090	0.110
e_1	7.37	7.87	0.290	0.310
L	2.79	3.81	0.110	0.150
S-14	1.02	2.03	0.040	0.080
ø	0°	15°	0°	15°

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