

芯伯乐®
X I N B O L E

Product Specification

XBLW LM741

General-purpose single operational amplifier

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Descriptions

The LM741 is a high performance monolithic operational amplifier constructed on a single silicon chip. It is intended for a wide range of analog applications.

The high gain and wide range of operating voltages provide superior performances in integrators, summing amplifiers and general feedback applications. The internal compensation network (6 dB/octave) ensures stability in closed-loop circuits.

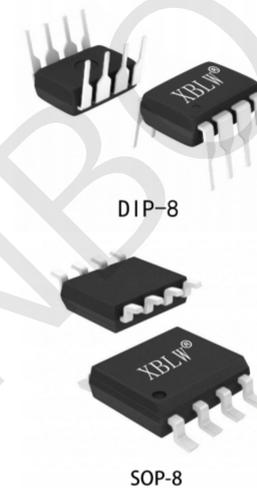
The LM741 is available in the SOP-8 and DIP-8 package.

Features

- Large input voltage range
- No latch-up
- High gain
- Short-circuit protection
- No frequency compensation required

Applications

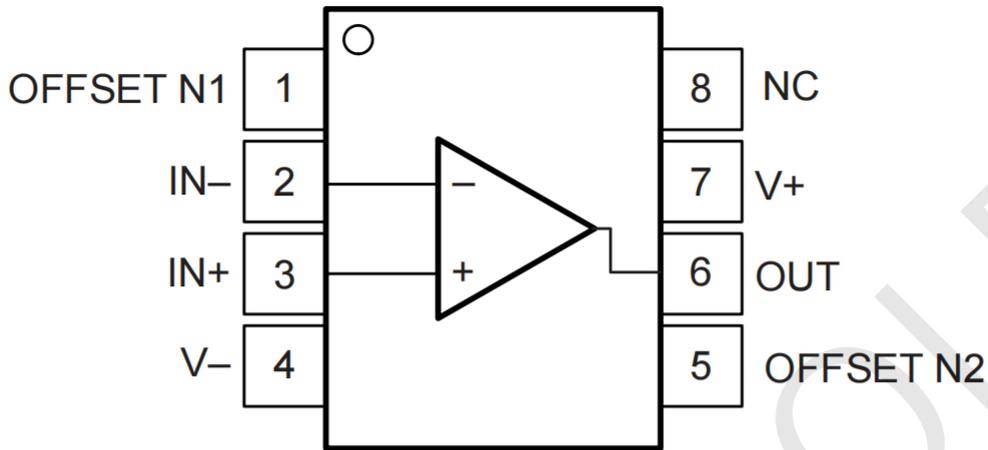
- Comparators
- Multivibrators
- DC Amplifiers
- Summing Amplifiers
- Integrator or Differentiators
- Active Filters



Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW LM741N	DIP-8	LM741N	Tube	2000Pcs/Box
XBLW LM741DTR	SOP-8	LM741	Tape	2500Pcs/Reel

Pin Configurations



Note: The PIN1 and PIN5 of this low-cost version XBLW LM741 do not require resistors.
If you need to use the OFFSET function, please use XBLW UA741C.

Function Block

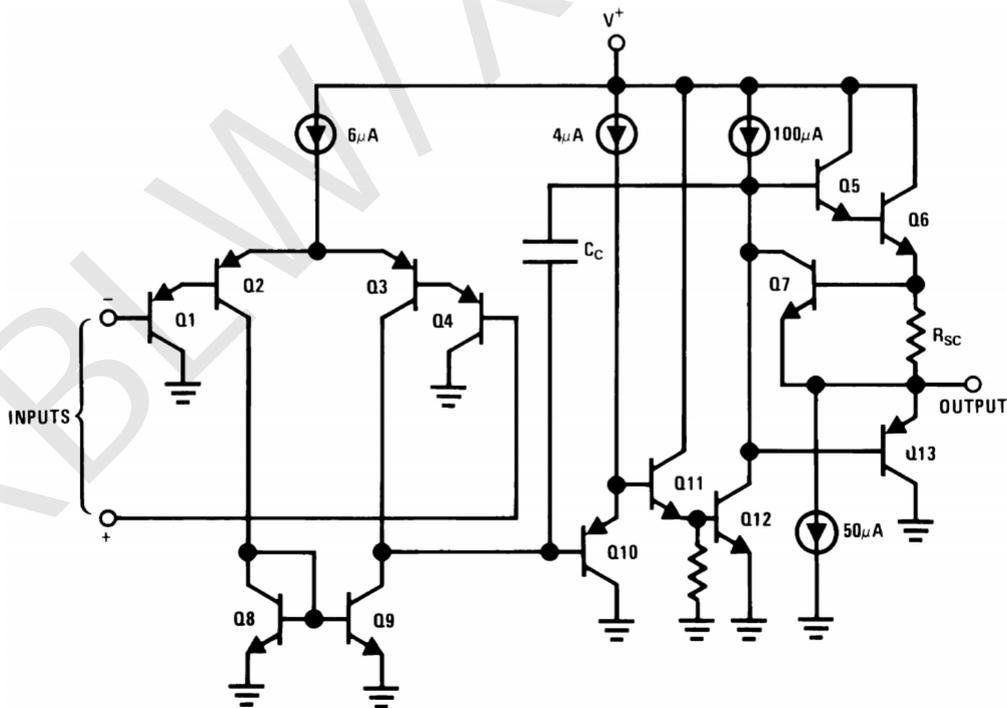


Figure 1 Function Block Diagram of LM741

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CC}	Supply voltage	± 22	V
V_{id}	Differential input voltage	± 30	
V_i	Input voltage	± 15	
	Output short-circuit duration	Infinite	
R_{thja}	Thermal resistance junction to ambient		$^{\circ}\text{C}/\text{W}$
	DIP8 SO8	85 125	
R_{thjc}	Thermal resistance junction to case		
	DIP8 SO8	41 40	
ESD	HBM: human body mode ⁽¹⁾		V
	DIP package SOP package	500 400	
	MM: machine model ⁽²⁾	100	
	CDM: charged device model ⁽³⁾	1.5	kV
T_{stg}	Storage temperature range	-65 to +150	$^{\circ}\text{C}$

- Human body model: a 100 pF capacitor is charged to the specified voltage, then discharged through a 1.5k Ω resistor between two pins of the device. This is done for all couples of connected pin combinations while the other pins are floating.
- Machine model: a 200 pF capacitor is charged to the specified voltage, then discharged directly between two pins of the device with no external series resistor (internal resistor < 5 Ω). This is done for all couples of connected pin combinations while the other pins are floating.
- Charged device model: all pins and the package are charged together to the specified voltage and then discharged directly to the ground through only one pin. This is done for all pins.

Operating Conditions

Symbol	Parameter	Value	Unit
V_{CC}	Supply voltage	5 to 40	V
V_{icm}	Common mode input voltage range	± 12	
T_{oper}	Operating free air temperature range	-40 to +85	$^{\circ}\text{C}$

Electrical Characteristics

TA = 25°C, unless otherwise noted, VCC = ±15 V, Tamb = 25 °C

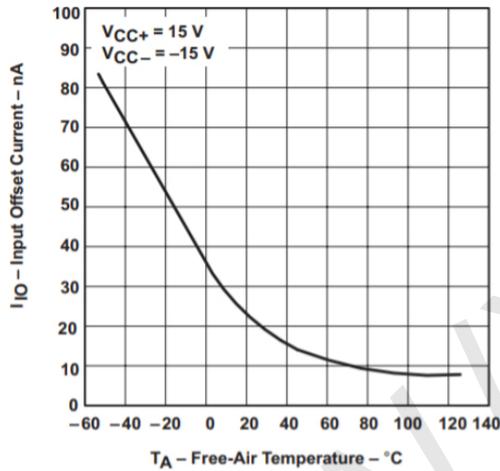
Symbol	Parameter	Min.	Typ.	Max.	Unit
V _{io}	Input offset voltage (R _S ≤ 10 kΩ) T _{amb} = +25 °C T _{min} ≤ T _{amb} ≤ T _{max}		1	5 6	mV
I _{io}	Input offset current T _{amb} = +25 °C T _{min} ≤ T _{amb} ≤ T _{max}		2	30 70	nA
I _{ib}	Input bias current T _{amb} = +25 °C T _{min} ≤ T _{amb} ≤ T _{max}		10	100 200	
A _{vd}	Large signal voltage gain (V _O = ±10 V, R _L = 2 kΩ) T _{amb} = +25 °C T _{min} ≤ T _{amb} ≤ T _{max}	50 25	200		V/mV
SVR	Supply voltage rejection ratio (R _S ≤ 10 kΩ) T _{amb} = +25 °C T _{min} ≤ T _{amb} ≤ T _{max}	77 77	90		dB
I _{cc}	Supply current, no load T _{amb} = +25 °C T _{min} ≤ T _{amb} ≤ T _{max}		1.7	2.8 3.3	mA
V _{icm}	Input common mode voltage range T _{amb} = +25 °C T _{min} ≤ T _{amb} ≤ T _{max}	±12 ±12			V
CMR	Common mode rejection ratio (R _S ≤ 10 kΩ) T _{amb} = +25 °C T _{min} ≤ T _{amb} ≤ T _{max}	70 70	90		dB
I _{os}	Output short circuit current	10	25	40	mA
±V _{opp}	Output voltage swing T _{amb} = +25 °C T _{min} ≤ T _{amb} ≤ T _{max}	R _L = 10 kΩ 12 R _L = 2 kΩ 10 R _L = 10 kΩ 12 R _L = 2 kΩ 10	14 13		V
SR	Slew rate V _i = ±10 V, R _L = 2 kΩ, C _L = 100 pF, unity gain	0.25	0.5		V/μs
t _r	Rise time V _i = ±20 mV, R _L = 2 kΩ, C _L = 100 pF, unity gain		0.3		μs
K _{ov}	Overshoot V _i = 20 mV, R _L = 2 kΩ, C _L = 100 pF, unity gain		5		%
R _i	Input resistance	0.3	2		MΩ

Electrical Characteristics

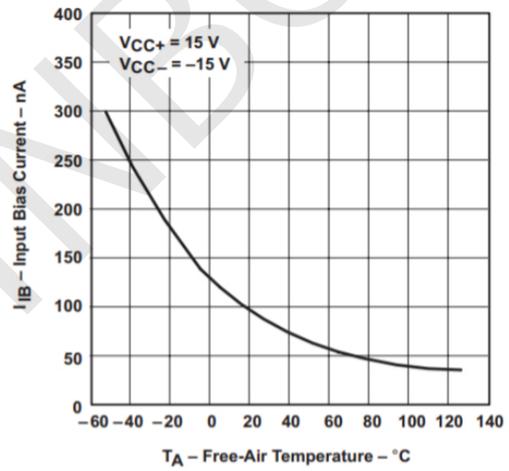
TA = 25°C, unless otherwise noted, VCC = ±15 V, Tamb = 25 °C

Symbol	Parameter	Min.	Typ.	Max.	Unit
GBP	Gain bandwidth product Vi = 10 mV, RL = 2 kΩ, CL = 100 pF, f = 100 kHz	0.7	1		MHz
THD	Total harmonic distortion f = 1 kHz, AV = 20 dB, RL = 2 kΩ, VO = 2 Vpp, CL = 100 pF, Tamb = +25° C		0.06		%
en	Equivalent input noise voltage f = 1 kHz, RS = 100 Ω		23		$\frac{nV}{\sqrt{Hz}}$
∅ m	Phase margin		50		Degree

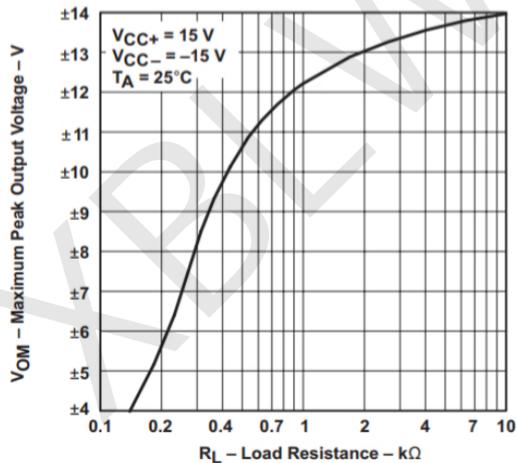
Typical Characteristics



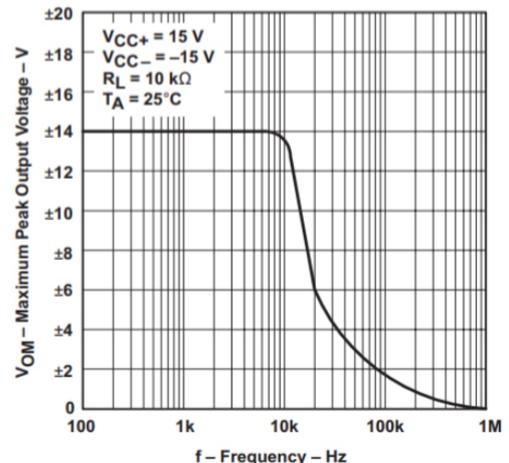
Input Offset Current vs Free-Air Temperature



Input Bias Current vs Free-Air Temperature

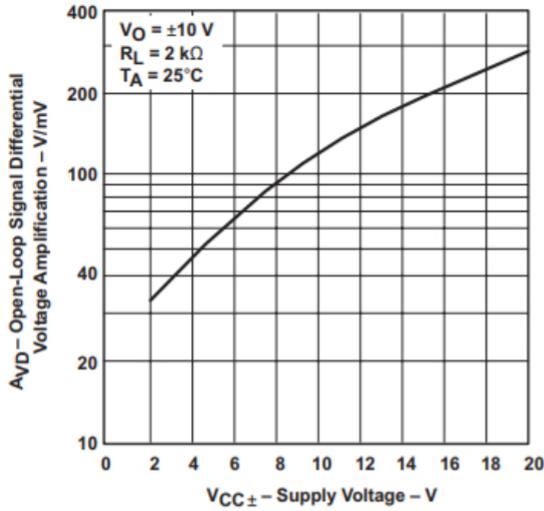


Maximum Output Voltage vs Load Resistance

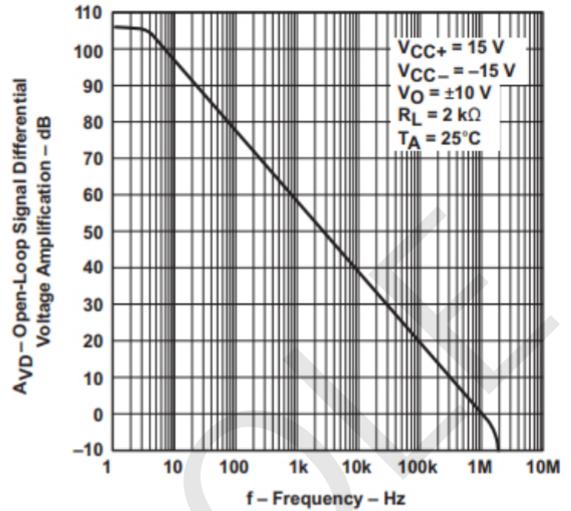


Maximum Peak Output Voltage vs Frequency

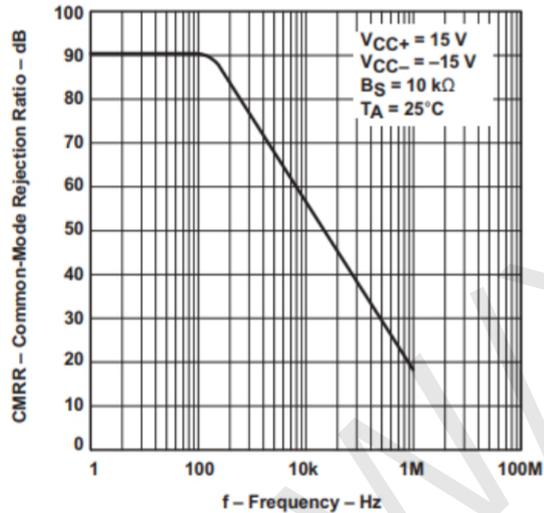
Typical Characteristics



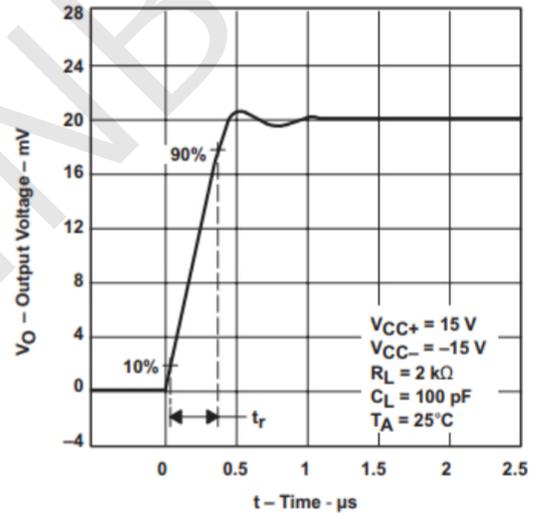
Open-Loop Signal Differential Voltage Amplification vs Supply Voltage



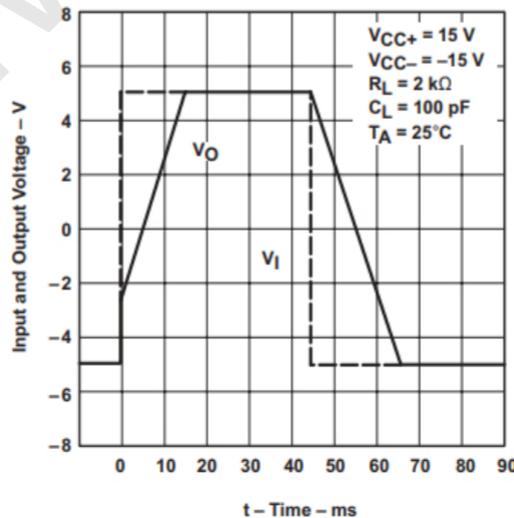
Open-Loop Large-Signal Differential Voltage Amplification vs Frequency



Common-Mode Rejection Ratio vs Frequency



Output Voltage vs Elapsed Time

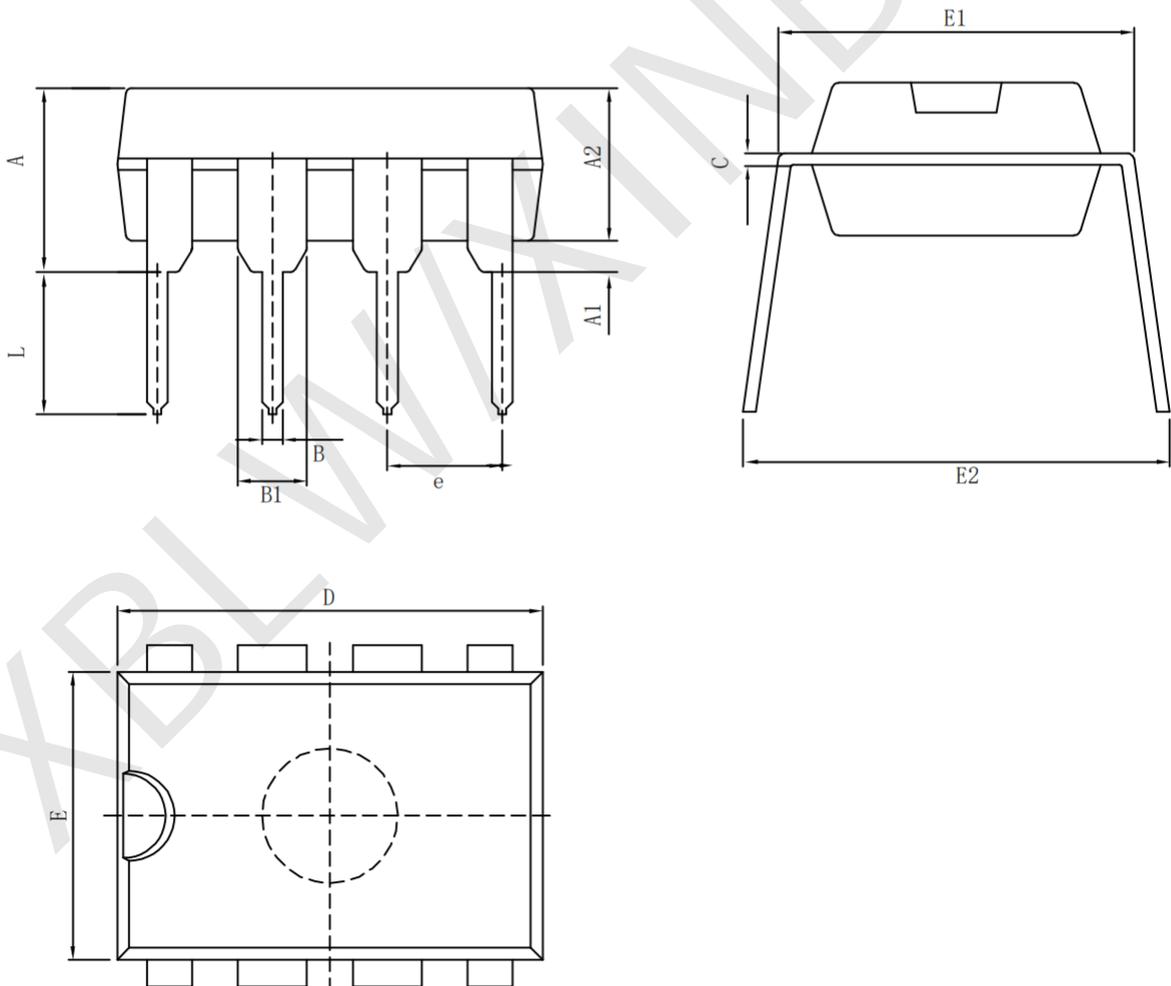


Voltage-Follower Large-Signal Pulse Response

Package Information

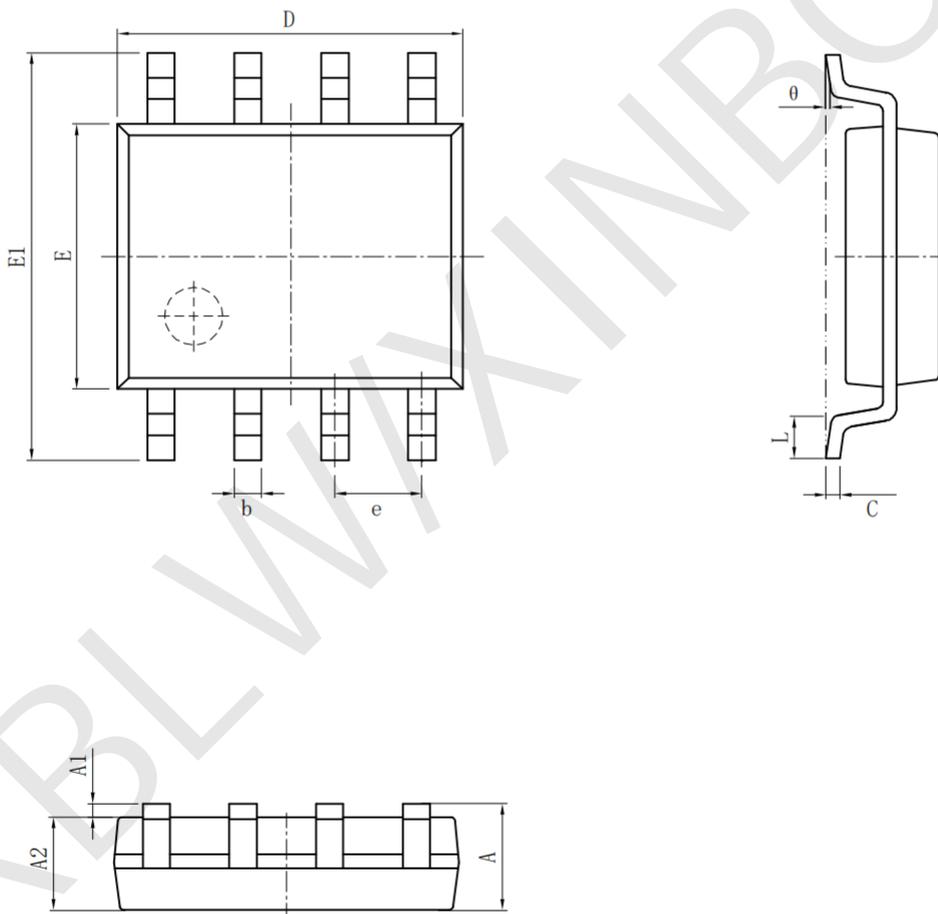
- DIP-8

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Inches	
	Min (mm)	Max (mm)		Min (in)	Max (in)
A	3.710	4.310	A	0.146	0.170
A1	0.510		A1	0.020	
A2	3.200	3.600	A2	0.126	0.142
B	0.380	0.570	B	0.015	0.022
B1	1.524 (BSC)		B1	0.060 (BSC)	
C	0.204	0.360	C	0.008	0.014
D	9.000	9.400	D	0.354	0.370
E	6.200	6.600	E	0.244	0.260
E1	7.320	7.920	E1	0.288	0.312
e	2.540 (BSC)		e	0.100 (BSC)	
L	3.000	3.600	L	0.118	0.142
E2	8.400	9.000	E2	0.331	0.354



• SOP-8

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Inches	
	Min (mm)	Max (mm)		Min (in)	Max (in)
A	1.350	1.750	A	0.053	0.069
A1	0.100	0.250	A1	0.004	0.010
A2	1.350	1.550	A2	0.053	0.061
b	0.330	0.510	b	0.013	0.020
c	0.170	0.250	c	0.006	0.010
D	4.700	5.100	D	0.185	0.200
E	3.800	4.000	E	0.150	0.157
E1	5.800	6.200	E1	0.228	0.224
e	1.270 (BSC)		e	0.050 (BSC)	
L	0.400	1.270	L	0.016	0.050
θ	0°	8°	θ	0°	8°



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