PJ76358

DUAL OPERATIONAL AMPLIFIERS
In a SOP-8P and TSSOP-8P Package

GENERAL DESCRIPTION

The PJ76358 consists of two independent, high-gain, internally frequency-compensated operational amplifiers, which were designed specifically to operate from a single power supply over a wide range of voltages. The device operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

Its application areas include transducer amplifiers, dc gain blocks and all the conventional operational amplifier circuits.

Available Package : SOP-8P and TSSOP-8P.

FEATURES

- Wide Supply Voltage Range : 3 V to 36 V
- Low Supply Current Drain essentially Independent of Supply Voltage
- Low Input Biasing Current
- Low Input Offset Current and Offset Voltage
- Input Common-mode Voltage Range includes the Ground
- Differential Input Voltage Range Equal to the Power Supply Voltage
- DC voltage gain 100 V/mV (Typ.)
- Internal Frequency Compensation

APPLICATIONS

- Transducer amplifiers
- DC gain blocks
- Conventional op-amp circuits in single power supply systems

ORDERING INFORMATION

ORDER NUMBER	Marking ID	Package	Description
PJ76358P_R2	PJ76358 PYMDNN	SOP-8P	Halogen free RoHS compliant in T/R, 4,000 pcs/Reel
PJ76358B_R2	A1 YM DNN	TSSOP-8P	Halogen free RoHS compliant in T/R, 5,000 pcs/Reel

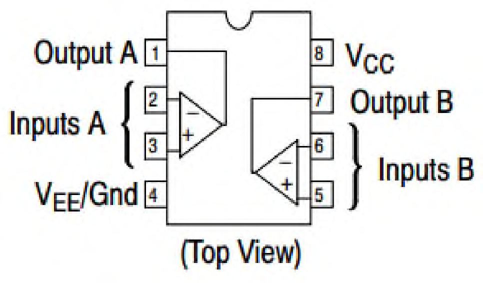
Note 1

1. Panjit can meet RoHS 2.0/REACH requirement. So most package types Panjit offers only states halogen free, instead of lead free.

MARKING INFORMATION

Marking ID	Package	Definition
PJ76358 PYMDNN	SOP-8P	PJ76358: Product code P: Package code Y: Year code M: Month code D: Day code NN: Serial No.
A1 YM DNN	TSSOP-8P	A1: Product code Y: Year code M: Month code D: Day code NN: Serial No.

PIN CONFIGURATION



SOP-8P and TSSOP-8P (TOP VIEW)

FUNCTIONAL PIN DESCRIPTION

TERMINAL		DESCRIPTION
NUMBER	NAME	
1	Output A	Output A
2	Input A-	Inverting Input A
3	Input A+	Non-Inverting Input A
4	VEE/Gnd	Ground
5	Input B+	Non-Inverting Input B
6	Input B-	Inverting Input B
7	Output B	Output B
8	VCC	Power supply

ABSOLUTE MAXIMUM RATINGS

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

PARAMETER		MIN	MAX	Unit
Supply Voltage	V_{CC}	-0.3	45	V
Differential Input Voltage	V_{IND}		36	V
Input Voltage	V_{IN}	-0.3	45	V
Input Current (V_{IN} < -0.3 V)	I_{IN}		50	mA
Maximum Output Current	I_{OUT}		100	mA
Maximum Operating junction temperature	T_J	-40	125	°C
Storage temperature range	T_{STG}	-65	150	°C
Lead Temperature (Soldering, 10 seconds)			260	°C
ESD Protection (HBM)			700	V

(1) Stresses beyond those listed under ***absolute maximum ratings*** may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under ***recommended operating conditions*** is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) All voltage values, unless otherwise noted, are with respect to the midpoint between V_{CC+} and V_{CC-}.

(3) For supply voltages less than ±22 V, the absolute maximum input voltage is equal to the supply voltage.

(4) Differential voltages are at Input+ with respect to Input–.

(5) The output may be shorted to ground or either power supply

RECOMMENDED OPERATING CONDITIONS

PARAMETER		MIN	TYP	MAX	UNIT
V_{CC}	Supply Voltage	3		36	V
T_A	Operating Ambient temperature	-40		85	°C

ELECTRICAL CHARACTERISTICS

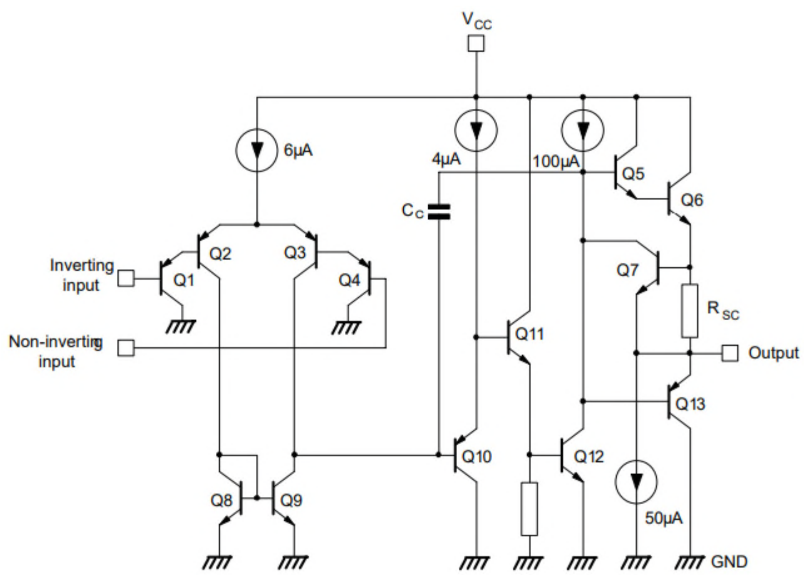
Test Condition : V_{CC} = 5.0 V, unless otherwise specified, all limits are 100% test at T_A = 25°C. (1)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{IO}	Input Offset Voltage	V_{CC} = 5 V to MAX, V_{IC} = $V_{ICR(min)}$, V_O = 1.4 V, T_A = 25°C		3	7	mV
		V_{CC} = 5 V to 30 V, V_{IC} = $V_{ICR(min)}$, V_O = 1.4 V, T_A = -40 to 85°C			9	mV
αV_{IO}	Average Temperature Coefficient of Input Offset Voltage	T_A = -40 to 85°C		7		uV/°C
I_{IO}	Input Offset Current	V_O = 1.4 V, T_A = 25°C		2	50	nA
		V_O = 1.4 V, T_A = -40 to 85°C			150	nA
αI_{IO}	Average Temperature Coefficient of Input Offset Current	T_A = -40 to 85°C		10		pA/°C
I_{IB}	Input Bias Current	V_O = 1.4 V, T_A = 25°C		-20	-250	nA
		V_O = 1.4 V, T_A = -40 to 85°C			-500	nA
V_{ICR}	Common-mode Input Voltage Range(1)	V_{CC} = 5 V to MAX, T_A = 25°C	0		V_{CC}–1.5	V
		V_{CC} = 5 V to MAX, T_A = -40 to 85°C	0		V_{CC}–2.0	V
V_{OH}	High-level Output Voltage	V_{CC} = MAX, R_L = 2 kΩ, T_A = -40 to 85°C	26			V
		V_{CC} = MAX, R_L = 10 kΩ, T_A = -40 to 85°C	27	28		V
V_{OL}	Low-level Output Voltage	R_L = 10 kΩ, T_A = -40 to 85°C		5	20	mV
A_{VD}	Large-Signal Differential Voltage Amplification	V_{CC} = 15V, V_O=1V to 11V, $R_L \geq$ 2 kΩ, T_A = 25°C	25	100		V/mV
		V_{CC} = 15V, V_O=1V to 11V, $R_L \geq$ 2 kΩ, T_A = -40 to 85°C	15			V/mV
CMRR	Common-mode Rejection Ratio	V_{CC} = 5 V to MAX, V_{IC} = $V_{ICR(min)}$ T_A = 25°C	65	80		dB
k_{SVR}	Supply Voltage RejectionRatio (ΔVcc / ΔV_{IO})	V_{CC} = 5 V to MAX, T_A = 25°C	65	100		dB
VoA/VoB	Crosstalk Attenuation	f =1 kHz to 20 kHz, T_A = 25°C		120		dB
I_{OUT}	Output Current	V_{CC} = 15 V, V_{ID} = 1 V, V_O = 0 V T_A = 25°C	-30	-50		mA
		V_{CC} = 15 V, V_{ID} = 1 V, V_O = 0 V T_A = -40 to 85°C	-20			mA

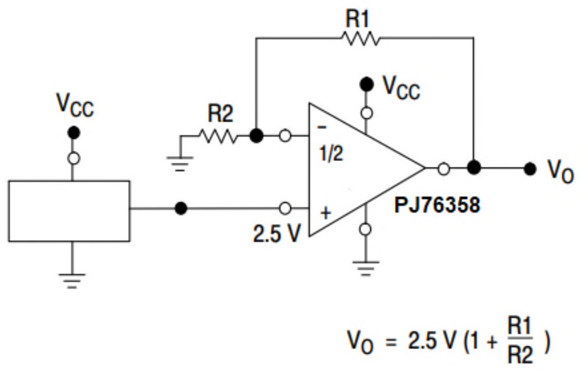
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
I_{OUT}	Output Current	V_{CC} = 15 V, V_{ID} = 1 V, V_O = 15 V T_A = 25°C	15	35		mA
		V_{CC} = 15 V, V_{ID} = 1 V, V_O = 15 V T_A = -40 to 85°C	7			mA
		V_{CC} = 15 V, V_{ID} = 1 V, V_O = 2 V T_A = 25°C	15	28		mA
		V_{ID} = -1 V, V_O = 200 mV, T_A = 25°C	12	50		uA
I_{OS}	Short-Circuit Output Current	V_{ID} = -1 V, V_O = 15 V, T_A = 25°C		50	70	mA
I_{CC}	Supply Current (Four Amplifiers)	V_O = 2.5 V, No Load T_A = -40 to 85°C		0.7	1.2	mA
		VCC = MAX, V_O = 0.5 x V_{CC}, No Load, T_A = -40 to 85°C		1	2	mA
SR	Slew Rate	V_{CC} = 15 V, V_{IN} = 0.5 to 3 V, R_L = 2kΩ, C_L = 100pF, unity gain T_A = 25°C		0.7		V/uS
GBW	Gain Bandwidth	V_{CC} = 30 V, V_{IN} = 10 mV, f = 100kHz, R_L = 2kΩ, C_L = 100pF, T_A = 25°C		700		kHz
THD	Total Harmonic Distortion	F= 1 kHz, A_V = 20 dB, R_L = 2kΩ, C_L = 100pF, V_O = 2 Vpp T_A = 25°C		0.04		%

(1) ***All characteristics are measured under the open-loop conditions with zero common-mode input voltage, unless otherwise specified. MAX V_{CC} for testing purposes is 36 V, Vcc(max) = 45 V. Full range is -40 °C to +125 °C.***

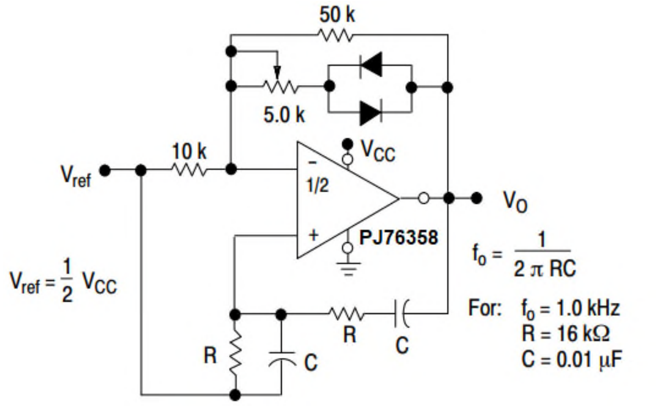
BLOCK DIAGRAM



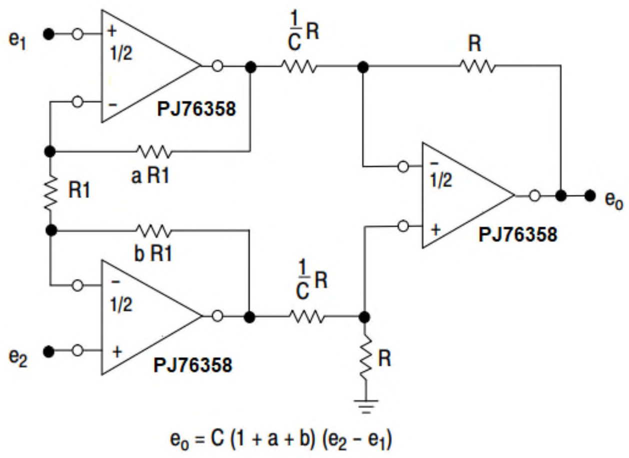
TYPICAL APPLICATIONS



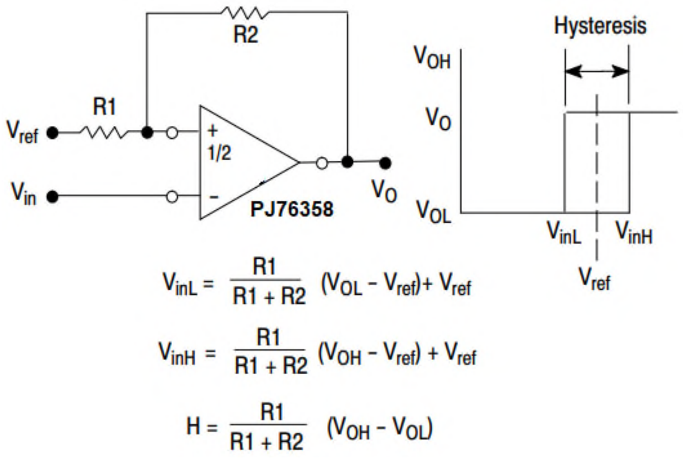
Voltage Reference



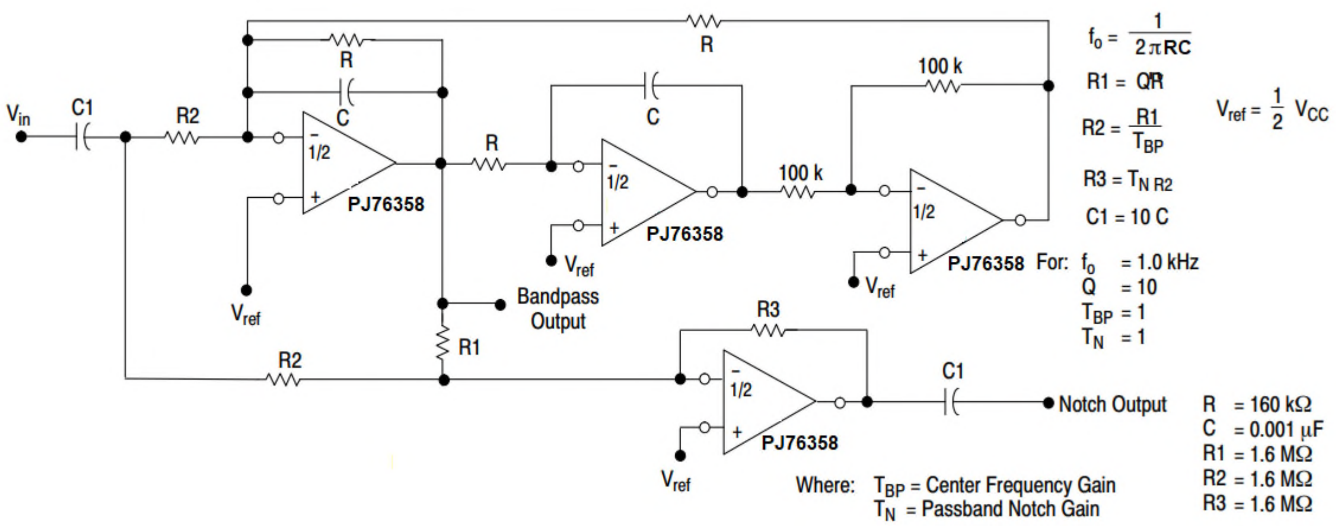
Wien Bridge Oscillator



High Impedance Differential Amplifier



Comparator with Hysteresis



Bi-Quad Filter

TYPICAL PERFORMANCE CHARACTERISTICS

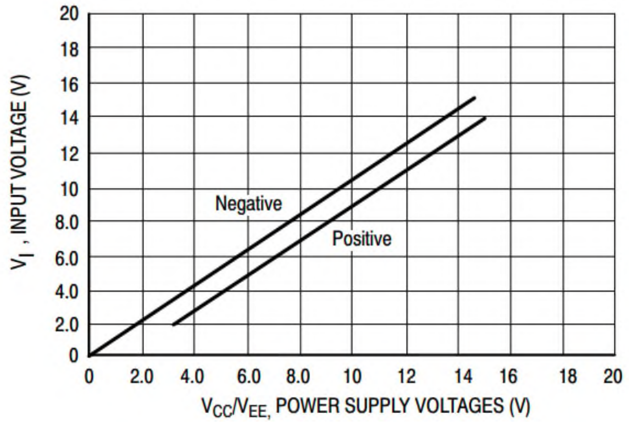


Figure-1. Input Voltage Range

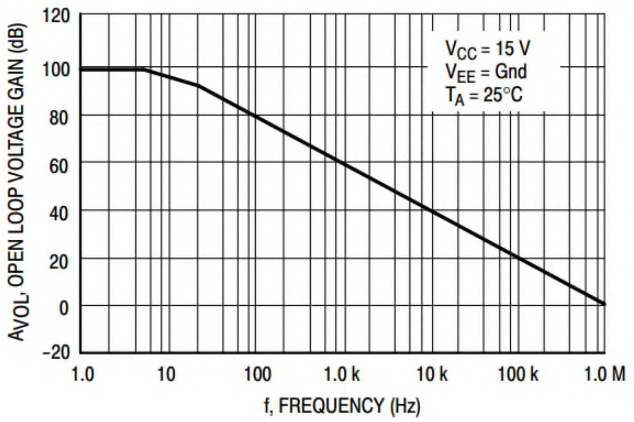


Figure-2. Large−Signal Open Loop Voltage Gain

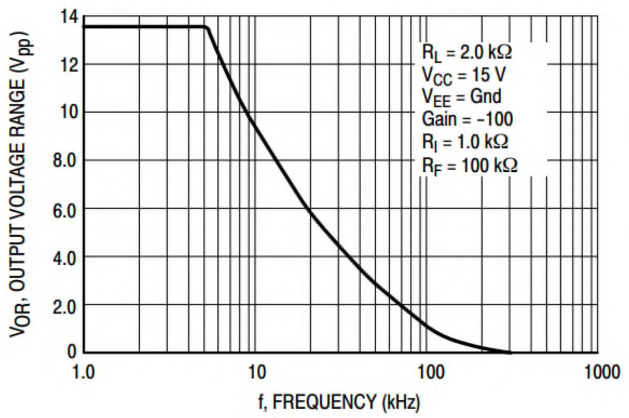


Figure-3. Large−Signal Frequency Response

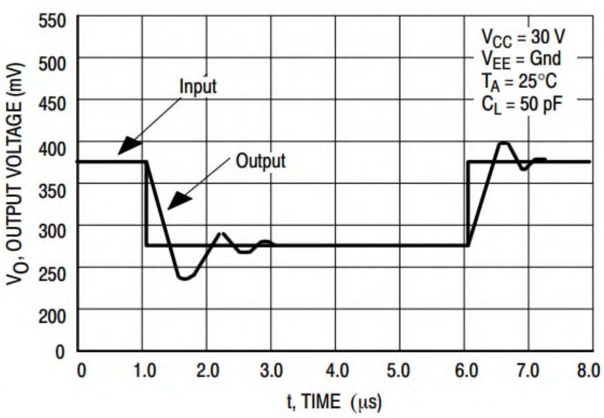


Figure-4. Small Signal Voltage Follower Pulse Response (Noninverting)

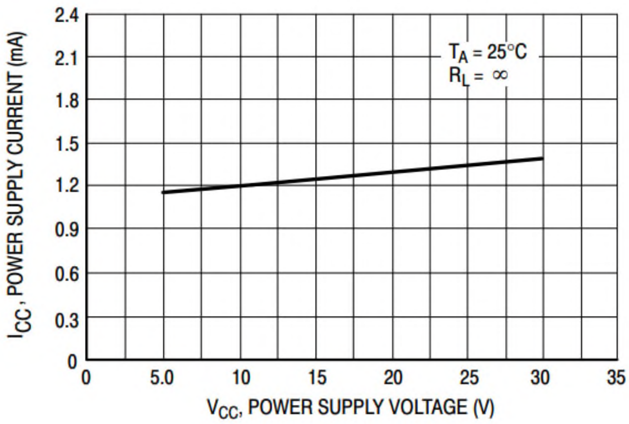


Figure-5. Power Supply Current versus Power Supply Voltage

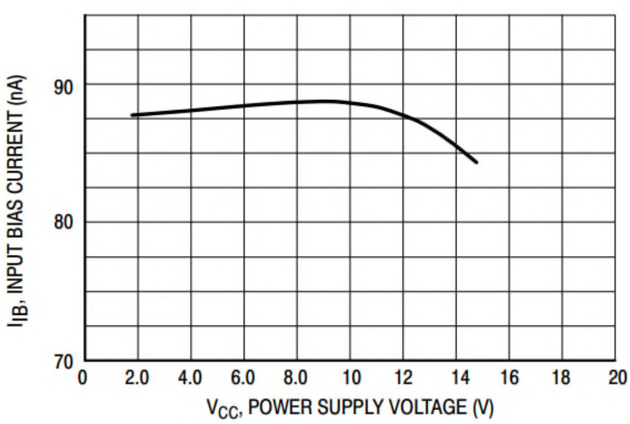
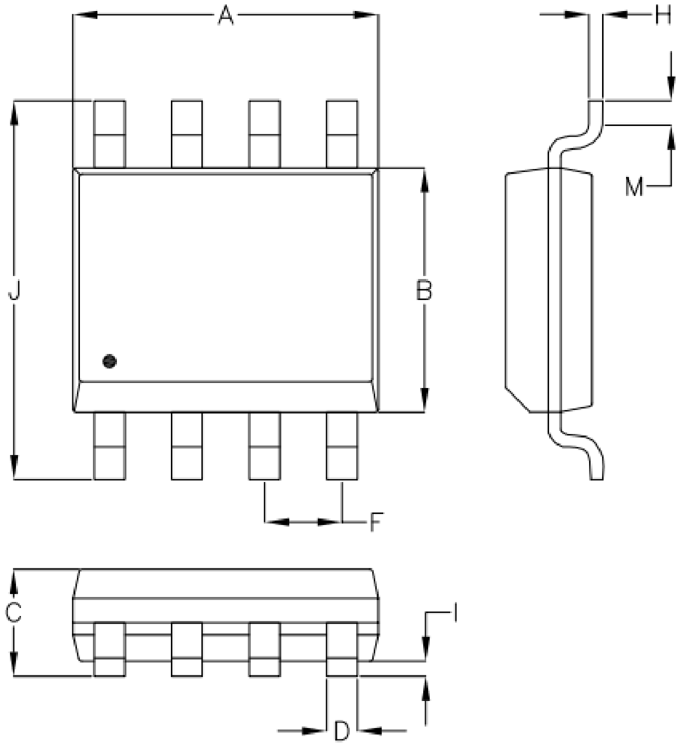


Figure-6. Input Bias Current versus Supply Voltage

PACKAGE OUTLINE DIMENSION (SOP-8P)

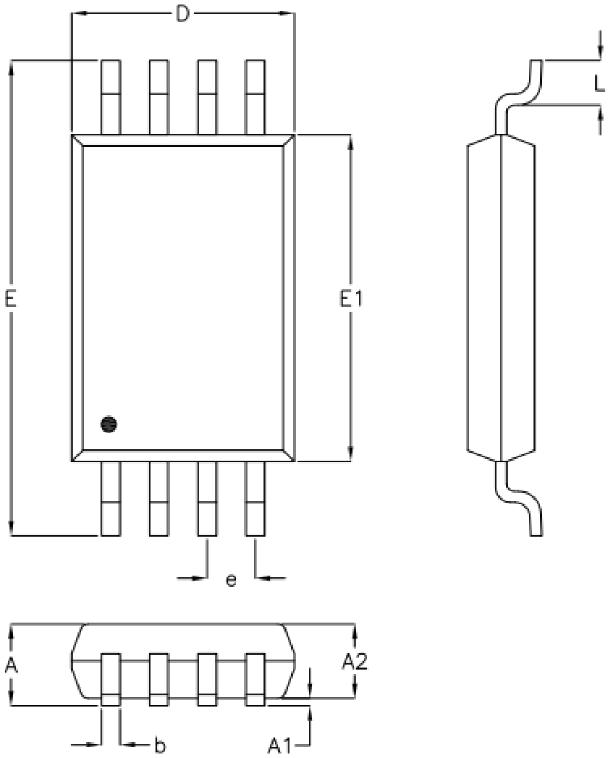
SOP-8P Unit (mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.801	5.004	0.189	0.197
B	3.810	3.988	0.150	0.157
C	1.346	1.753	0.053	0.069
D	0.330	0.508	0.013	0.020
F	1.194	1.346	0.047	0.053
H	0.170	0.254	0.007	0.010
I	0.050	0.254	0.002	0.010
J	5.791	6.200	0.228	0.244
M	0.400	1.270	0.016	0.050

PACKAGE OUTLINE DIMENSION (TSSOP-8P)

TSSOP-8P Unit (mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.000	1.200	0.039	0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
D	2.900	3.100	0.114	0.122
e	0.650		0.026	
E	6.300	6.500	0.248	0.256
E1	4.300	4.500	0.169	0.177
L	0.450	0.750	0.018	0.030

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