CN2611, CN2612, CN2614
1.2MHz, 35uA, Single/Dual/Quad Rail-to-Rail Input and Output CMOS Operational Amplifier

Features

- Rail-to-Rail Input and Output
- Unit Gain Stable
- Low Offset Voltage: 0.5mV
- Supply Voltage Range: 2.2V to 5.5V
- Gain Bandwidth Product: 1.2MHz
- Slew Rate: 0.7V/us
- Micro Power: 0.035mA/Amplifier Typical Supply Current
- Thermal Shutdown Protection Circuitry
- High Gain, CMRR, PSRR
- Small Packaging: Available in Green SOT/SOP/DFN/MSOP/TSOP Packages

Applications

- Active Filters
- Photodiode Amplifier
- Piezoelectric Sensors
- Test Equipment
- Medical Instrumentation
- Audio Output
- Portable Systems
- Smoke Detectors
- Notebook PC
- Mobile Communication
- Sensor Interface
- Battery Equipment
- DSP Interface
- ASIC Input
- A/D Output Amplifier

Descriptions

The CN2611, CN2612, CN2614 families of products are rail-to-rail input and output operational amplifier offering low cost and high performance. They have a wide input common-mode voltage range and output voltage swing, running at single supply voltage from 2.2V to 5.5V.

The op-amps provide 1.2 MHz bandwidth at a low current consumption of 35uA per amplifier, offering excellent overall performance. The op-amps exhibit low noise and distortion, low offset and high output current capability, making this device an excellent choice for sensor interface, active filter, low voltage or battery-operated systems.

The CN2611, CN2612, CN2614 families of products are offered in Green SOT/SOP/DFN/MSOP/TSOP packages, and are specified over the extended -40℃ to +125℃ temperature range.

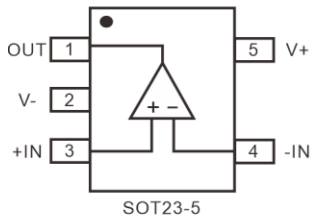
Device Information (1)

PART NUMBER	PACKAGE	BODY SIZE(NOM)
CN2611	SOT23-5	2.90mm×1.60mm
	SOT23-6	2.90mm×1.60mm
	SOIC-8 (SOP8)	4.90mm×3.90mm
	MSOP-8	3.00mm×3.00mm
CN2612	SOIC-8 (SOP8)	4.90mm×3.90mm
	MSOP-8	3.00mm×3.00mm
	TSSOP-8	3.00mm×4.40mm
	MSOP-10	3.00mm×3.00mm
	TDFN2×2-8L	2.00mm×2.00mm
	TDFN3×3-8L	3.00mm×3.00mm
CN2614	SOIC-14 (SOP14)	8.65mm×3.90mm
	TSSOP-14	5.00mm×4.40mm
	TDFN3×2-14L	3.00mm×2.00mm

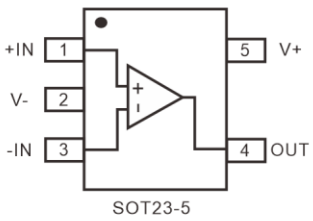
(1) For all available packages, see the orderable addendum at the end of the data sheet.

Pin Configuration and Functions (Top View)

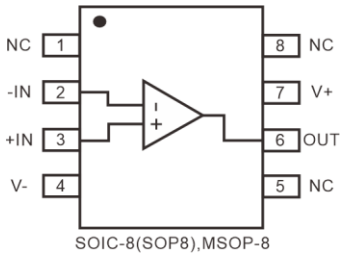
CN2611



CN2611B



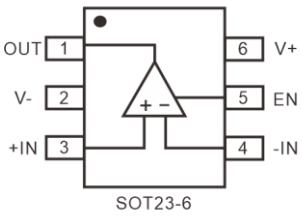
CN2611



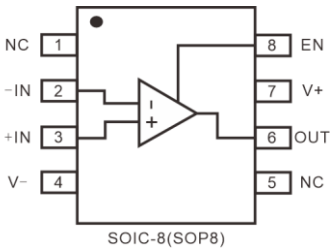
Pin Description

NAME	PIN			I/O	DESCRIPTION
	CN2611	CN2611B	CN2611		
	SOT23-5	SOT23-5	SOIC-8(SOP8)/MSOP8		
-IN	4	3	2	I	Negative (inverting) input
+IN	3	1	3	I	Positive (noninverting) input
NC	-	-	1,5,8	-	No internal connection (can be left floating)
OUT	1	4	6	O	Output
V-	2	2	4	-	Negative (lowest) power supply
V+	5	5	7	-	Positive (highest) power supply

CN2611S



CN2611S

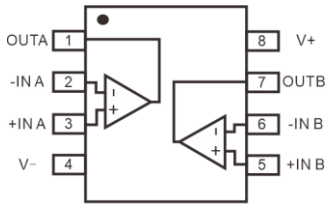


Pin Description

NAME	PIN		I/O	DESCRIPTION
	CN2611S			
	SOT23-5	SOIC-8(SOP8)		
-IN	4	2	I	Negative (inverting) input
+IN	3	3	I	Positive (noninverting) input
OUT	1	1,5,8	O	No internal connection (can be left floating)
EN	5	6	I	Enable pin, this pin turns the regulator on or off. Low=disabled, high = normal operation (pin must be driven)
NC	-	1,5	-	No internal connection (can be left floating)
V-	2	4	-	Negative (lowest) power supply
V+	6	7	-	Positive (highest) power supply

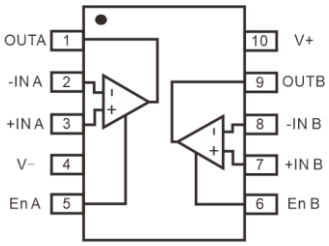
Pin Configuration and Functions (Top View)

CN2612



SOIC-8(SOP8),MSOP-8,
TSSOP-8,TDFN2×2-8L,
TDFN3×3-8L

CN2612S



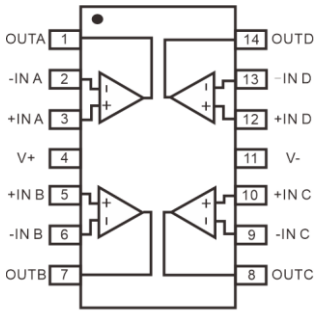
MSOP-10

Pin Description

NAME	PIN		I/O	DESCRIPTION
	CN2612	CN2612S		
	SOIC-8(SOP8), MSOP8, TSSOP-8,TDFN2×2-8L, TDFN3×3-8L	MSOP10		
-INA	2	2	I	Inverting input, channel A
+INA	3	3	I	Noninverting input, channel A
-INB	6	8	I	Inverting input, channel B
+INB	5	7	I	Noninverting input, channel B
OUTA	1	1	O	Output, channel A
OUTB	7	9	O	Output, channel B
EnA	-	5	I	Enable pin, channel A. This pin turns the regulator on or off. Low = disabled, high = normal operation (pin must be driven)
EnB	-	6	I	Enable pin, channel A. This pin turns the regulator on or off. Low = disabled, high = normal operation (pin must be driven)
V-	4	4	-	Negative (lowest) power supply
V+	8	10	-	Positive (highest) power supply

Pin Configuration and Functions (Top View)

CN2614



SOIC-14(SOP14),TSSOP-14
TDFN3×2-14L

Pin Description

NAME	PIN	I/O	DESCRIPTION
	CN2614		
	SOIC-14(SOP14), TSSOP-14, TDFN3×2-14L,		
-INA	2	I	Inverting input, channel A
+INA	3	I	Noninverting input, channel A
-INB	6	I	Inverting input, channel B
+INB	5	I	Noninverting input, channel B
-INC	9	I	Inverting input, channel C
+INC	10	I	Noninverting input, channel C
-IND	13	I	Inverting input, channel D
+IND	12	I	Noninverting input, channel D
OUTA	1	O	Output, channel A
OUTB	7	O	Output, channel B
OUTC	8	O	Output, channel C
OUTD	14	O	Output, channel D
V-	11	-	Negative (lowest) power supply
V+	4	-	Positive (highest) power supply

SPECIFICATIONS

Absolute Maximum Ratings

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

		MIN	MAX	UNIT
Voltage	Supply, Vs=(V+) - (V-)		6	V
	Signal input pin (2)	(V-)-0.5	(V+) +0.5	
	Signal output pin (3)	(V-)-0.5	(V+) +0.5	
Current	Signal input pin (2)	-10	10	mA
	Signal output pin (3)	-70	70	mA
	Output short-circuit (4)	Continuous		
Temperature	Operating range, TA	-40	125	℃
	Junction, TJ		150	
	Storage, Tstg	-65	150	

(1) Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.

(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.

(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 ±70mA or less.

(4) Short-circuit to ground, one amplifier per package.

ESD Ratings

			VALUE	UNIT
V(ESD)	Electrostatic discharge	Human-body model (HBM)	±8000	V
		Charged Device Model(CDM)	±2000	

Recommended Operating Conditions

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

		MIN	NOM	MAX	UNIT
Supply voltage，Vs= (V+) - (V-）	Single-supply	2.2		5.5	V
	Dual-supply	±1.1		±2.75	

Thermal Information: CN2611

THERMAL METRIC(1)		CN2611				UNIT
		5PINS		8PINS		
		SOT23-5	SOT23-6	SOIC-8	MSOP8	
$R_{\Theta JA}$	Junction-to-ambient thermal resistance	273.8	187.3	116	165	℃/W
$R_{\Theta JC(top)}$	Junction-to-case(top) thermal resistance	126.8	126.5	60	53	℃/W
$R_{\Theta JB}$	Junction-to-board thermal resistance	85.9	32.6	56	87	℃/W
Ψ_{JT}	Junction-to-top characterization parameter	10.9	24.1	12.8	4.9	℃/W
Ψ_{JB}	Junction-to-board characterization parameter	84.9	32.1	98.3	85	℃/W
$R_{\Theta JC(bot)}$	Junction-to-case(bottom) thermal resistance	N/A	N/A	N/A	N/A	℃/W

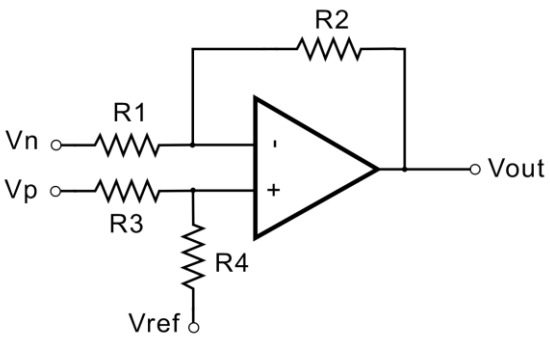
Thermal Information: CN2612

THERMAL METRIC(1)		CN2612						UNIT
		8PINS						
		SOIC-8	MSOP-8	TSSOP-8	MSOP-10	TDFN2×2-8L	TDFN33×2-8L	
$R_{\Theta JA}$	Junction-to-ambient thermal resistance	116	165	200.7	169.5	80.1	66.9	℃/W
$R_{\Theta JC(top)}$	Junction-to-case(top) thermal resistance	60	53	95.4	84.1	100	54.5	℃/W
$R_{\Theta JB}$	Junction-to-board thermal resistance	56	87	128.6	113	45	40.4	℃/W
Ψ_{JT}	Junction-to-top characterization parameter	12.8	4.9	27.2	15.8	6.8	1.9	℃/W
Ψ_{JB}	Junction-to-board characterization parameter	98.3	85	127.2	111.6	45.2	40.4	℃/W
$R_{\Theta JC(bot)}$	Junction-to-case(bottom) thermal resistance	N/A	N/A	N/A	N/A	N/A	N/A	℃/W

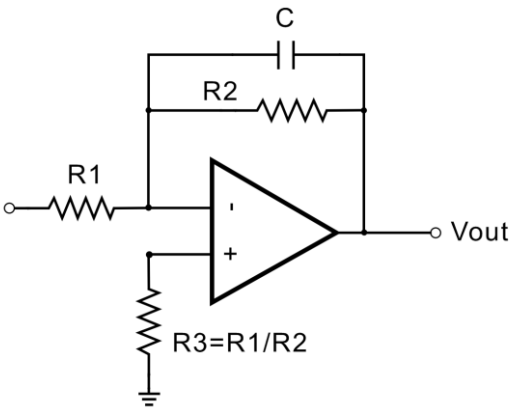
Thermal Information: CN2614

THERMAL METRIC(1)		CN2614		UNIT
		14PINS		
		SOIC-14	TSSOP-14	
$R_{\Theta JA}$	Junction-to-ambient thermal resistance	83.8	120.8	℃/W
$R_{\Theta JC(top)}$	Junction-to-case(top) thermal resistance	70.7	34.3	℃/W
$R_{\Theta JB}$	Junction-to-board thermal resistance	59.5	62.8	℃/W
Ψ_{JT}	Junction-to-top characterization parameter	11.6	1	℃/W
Ψ_{JB}	Junction-to-board characterization parameter	37.7	56.5	℃/W
$R_{\Theta JC(bot)}$	Junction-to-case(bottom) thermal resistance	N/A	N/A	℃/W

Typical Application Circuit



Difference Amplifier



Low Pass Active Filter

Ordering Informatio

Order Part Number	Top Marking	Pb-Free	T_A	Package	
CN2611ST5	CN2611ST5	Yes	-40 to +125°C	SOT23-5	Tape & Reel, 3000
CN2611BST5	CN2611BST5	Yes	-40 to +125°C	SOT23-5	Tape & Reel, 3000
CN2611SST6	CN2611SST6	Yes	-40 to +125°C	SOT23-6	Tape & Reel, 3000
CN2611SP8	CN2611SP8	Yes	-40 to +125°C	SOIC-8	Tape & Reel, 4000
CN2611SSP8	CN2611SSP8	Yes	-40 to +125°C	SOIC-8	Tape & Reel, 4000
CN2612SP8	CN2612SP8	Yes	-40 to +125°C	SOIC-8	Tape & Reel, 4000
CN2612TP8	CN2612TP8	Yes	-40 to +125°C	TSSOP8	Tape & Reel, 4000
CN2612SMP10	CN2612SMP10	Yes	-40 to +125°C	MSOP-10	Tape & Reel, 4000
CN2612MP8	CN2612MP8	Yes	-40 to +125°C	MSOP-8	Tape & Reel, 4000
CN2612DN8	CN2612DN8	Yes	-40 to +125°C	TDFN-8	Tape & Reel, 5000
CN2614SP14	CN2614SP14	Yes	-40 to +125°C	SOP-14	Tape & Reel, 4000
CN2614TP14	CN2614TP14	Yes	-40 to +125°C	TSSOP-14	Tape & Reel, 4000

Electrical Characteristics: VS = +5V

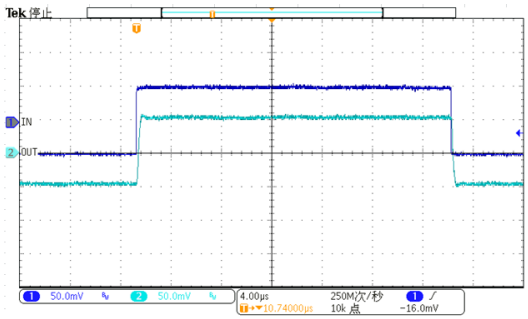
(At V_S = 5V, T_A = +25℃, R_L = 100kΩ connected to V_S/2, unless otherwise noted)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
DYNAMIC PERFORMANCE					
Gain-Bandwidth Product (GBP)	RL = 100kΩ		1.2		MHz
Slew Rate	2Vpp Step, AV = 1		0.7		V/us
Settling Time to 0.1% (Ts)	0.2Vpp Step, AV = 1		1		us
Overload Recovery Time	Gain=100X, VIN=250p		6		us
DC PERFORMANCE					
Input Offset Voltage (VOS)	VCM = 2.5V	-1.5	0.5	1.5	mV
Input Offset Voltage Drift	RL = 100kΩ, VOUT = 0.15V to			5	uV/deg
Large Signal Voltage Gain (AVO)	4.85V		110		dB
INPUT CHARACTERISTICS					
Input Common Mode Voltage Range (VCM)	VCM = -0.1V to VCC +0.1V	-0.1		5.6	V
Common Mode Rejection Ratio (CMRR)	VCM = -0.1V to VCC +0.1V		100		dB
OUTPUT CHARACTERISTICS					
Output Voltage Swing from Rail	RL=100K		0.001		V
	RL=10K		0.01		V
Output Current (IOUT)			30		mA
POWER SUPPLY					
Operating Voltage Range	IOUT = 0mA	2.2		5.5	V
Quiescent Current (per Amplifier)	VS = 5V,		35		uA
Power Supply Rejection Ratio (PSRR)	VCM = (-VS) + 0.5V		85		dB
NOISE/DISTORTION PERFORMANCE					
Voltage Noise Density (en)	f=1kHz		50		nV/rtHz
	f=10kHz		45		nV/rtHz
Total Harmonic Distortion (THD)	10kHz,G=+1,RL=100K		0.0007		%

Note 1: Stresses listed as the above "Absolute Maximum Ratings" may cause permanent damage to the device. These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability.

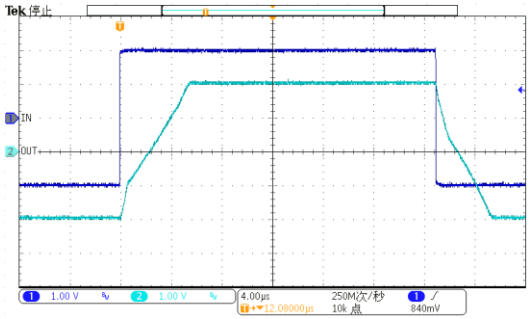
Typical Performance Characteristics

At TA = +25C, Vs=+-2.5V, RL = 100kΩ connected to GND, unless otherwise noted.



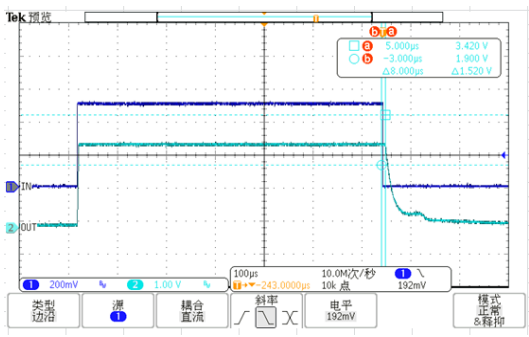
Small Signal Response

V+=2.5V,V-=-2.5V，G=1, CL=100pF, RL=100kOhm to GND



Large Signal Response

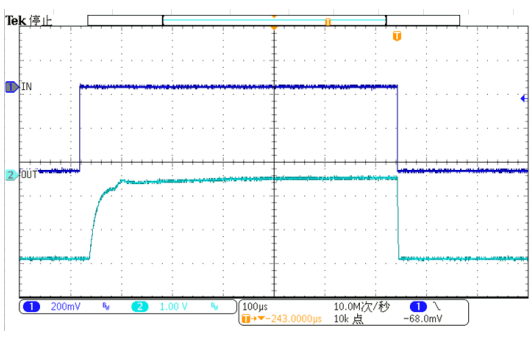
V+=2.5V,V-=-2.5V，G=1, CL=100pF, RL=100kOhm to GND



Positive Overload Recovery

V+=2.5V, V-=-2.5V, CL=100pF, RL=100kOhm to GND

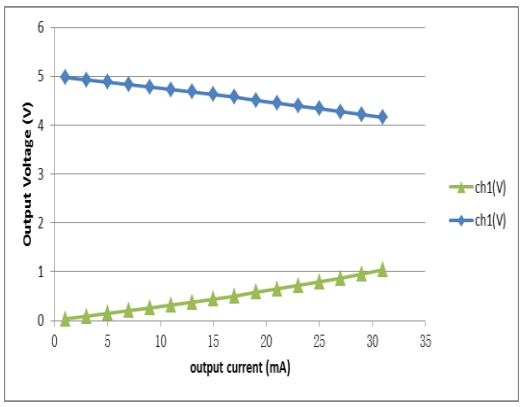
G=100



Negative Overload Recovery

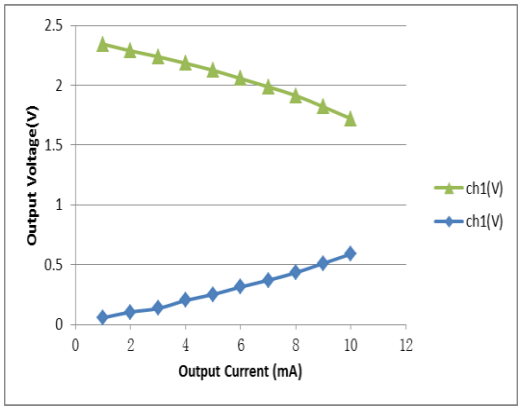
V+=2.5V, V-=-2.5V, CL=100pF, RL=100kOhm to GND,

G=100



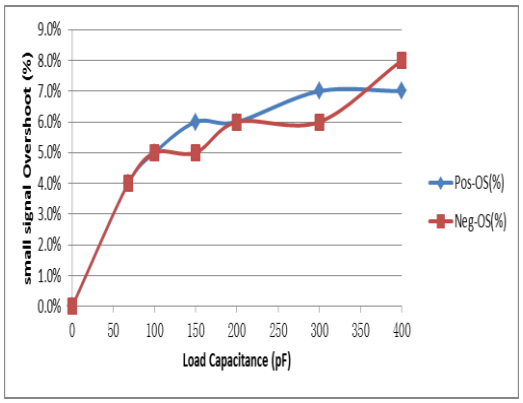
Output Voltage Swing vs Output Current

V+=2.5V, V-=-2.5V, CL=100pF, RL=100kOhm to GND



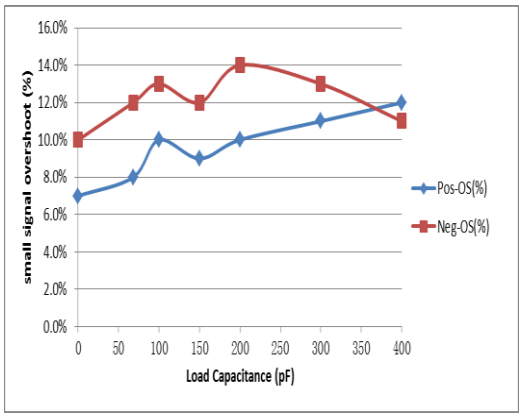
Output Voltage Swing vs Output Current

V+=1.2V, V-=-1.2V, CL=100pF, RL=100kOhm to GND



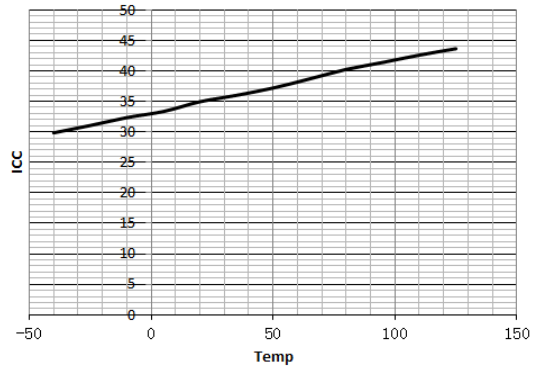
Overshoot (OS) vs Load Capacitance

V+=2.5V ,V-=-2.5V, RL=100kOhm to GND



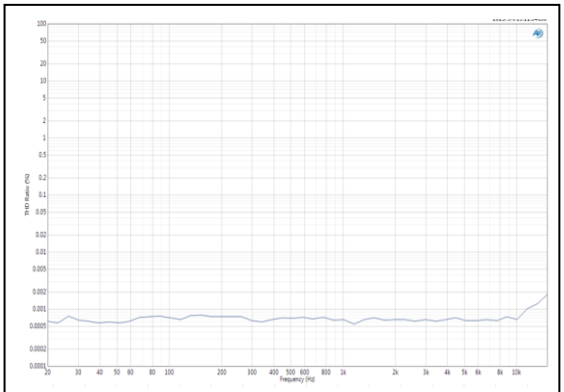
Overshoot (OS) vs Load Capacitance

V+=1.2V ,V-=-1.2V, RL=100kOhm to GND



ICC vs Temp

V+=2.5V ,V-=-2.5V, CL=100pf RL=100kOhm to GND



THD vs Frequency

V+=2.5V ,V-=-2.5V, Vin=1Vpp, CL=100pf RL=100kOhm to GND

Power Supply Layout and Bypass

The CN855X OPA's power supply pin (VDD for single-supply) should have a local bypass capacitor (i.e., 0.01μF to 0.1μF) within 2mm for good high frequency performance. It can also use a bulk capacitor (i.e., 1μF or larger) within 100mm to provide large, slow currents. This bulk capacitor can be shared with other analog parts. Ground layout improves performance by decreasing the amount of stray capacitance and noise at the OPA's inputs and outputs. To decrease stray capacitance, minimize PC board lengths and resistor leads, and place external components as close to the op amps' pins as possible.

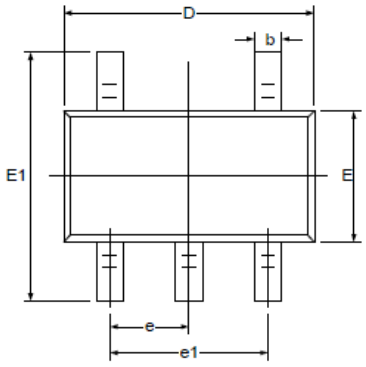
Proper Board Layout

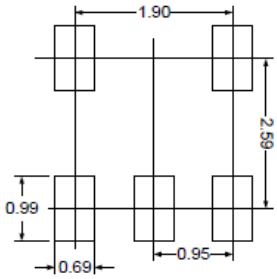
To ensure optimum performance at the PCB level, care must be taken in the design of the board layout. To avoid leakage currents, the surface of the board should be kept clean and free of moisture. Coating the surface creates a barrier to moisture accumulation and helps reduce parasitic resistance on the board. Keeping supply traces short and properly bypassing the power supplies minimizes power supply disturbances due to output current variation, such as when driving an ac signal into a heavy load. Bypass capacitors should be connected as closely as possible to the device supply pins. Stray capacitances are a concern at the outputs and the inputs of the amplifier. It is recommended that signal traces be kept at least 5mm from supply lines to minimize coupling.

A variation in temperature across the PCB can cause a mismatch in the feedback voltages at solder joints and other points where dissimilar metals are in contact, resulting in thermal voltage errors. To minimize these thermocouple effects, orient resistors so heat sources warm both ends equally. Input signal paths should contain matching numbers and types of components, where possible to match the number and type of thermocouple junctions. For example, dummy components such as zero value resistors can be used to match real resistors in the opposite input path. Matching components should be located in close proximity and should be oriented in the same manner. Ensure leads are of equal length so that thermal conduction is in equilibrium. Keep heat sources on the PCB as far away from amplifier input circuitry as is practical.

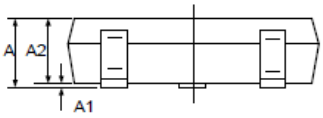
The use of a ground plane is highly recommended. A ground plane reduces EMI noise and also helps to maintain a constant temperature across the circuit board.

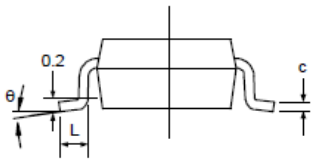
Package Outline And Physical Dimensions: SOT23-5





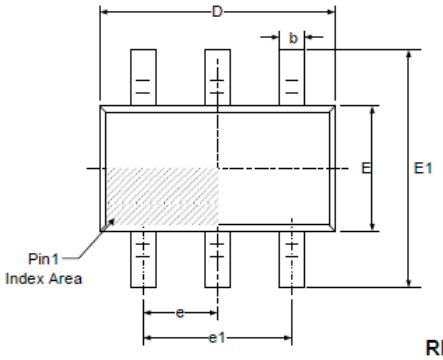
RECOMMENDED LAND PATTERN (Unit: mm)

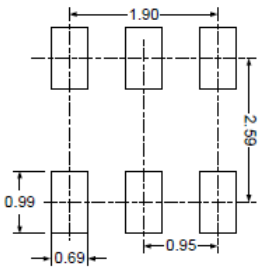




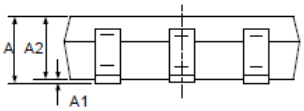
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

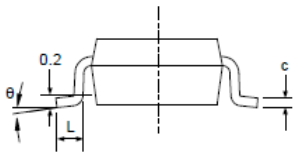
Package Outline And Physical Dimensions: SOT23-6





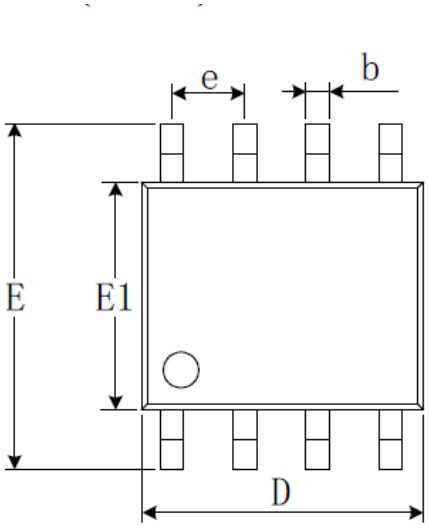
RECOMMENDED LAND PATTERN (Unit: mm)

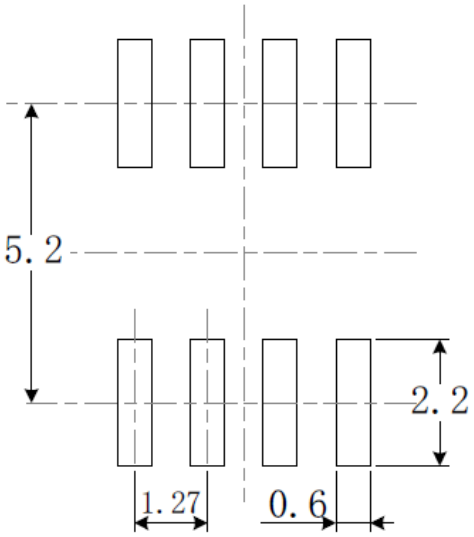




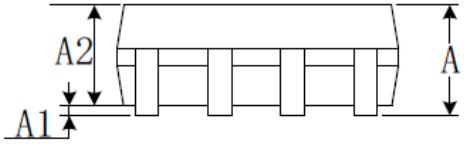
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

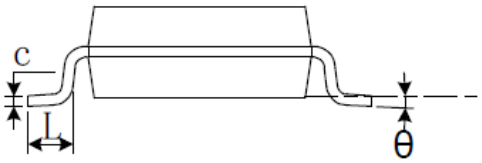
Package Outline And Physical Dimensions: SOIC-8





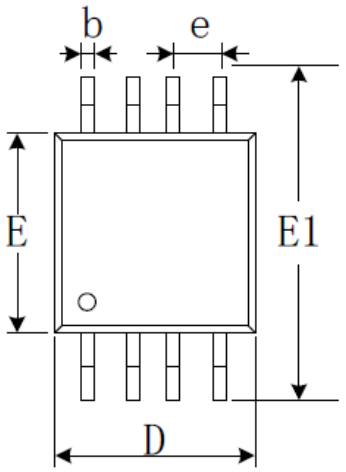
RECOMMENDED LAND PATTERN (Unit: mm)

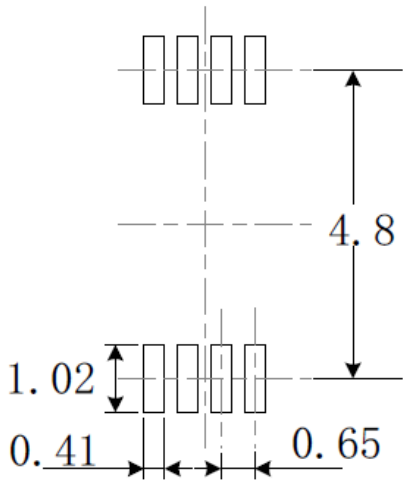




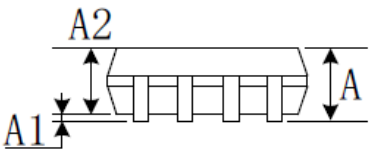
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270(BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

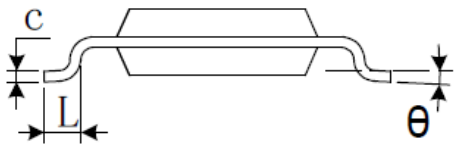
Package Outline And Physical Dimensions: MSOP-8





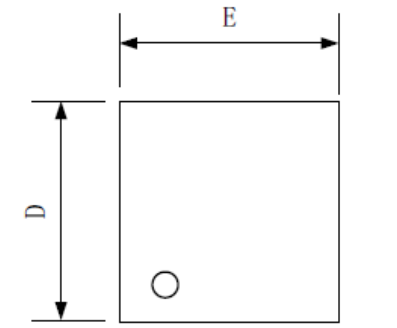
RECOMMENDED LAND PATTERN (Unit: mm)



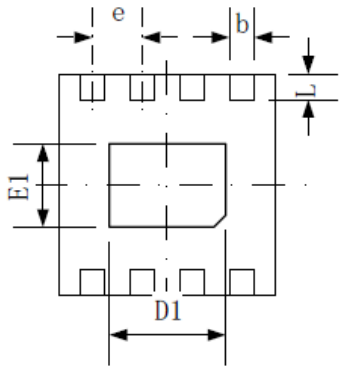


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.650(BSC)		0.026(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

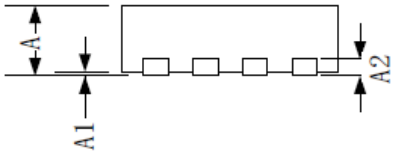
Package Outline And Physical Dimensions: TDFN -2x2-8L



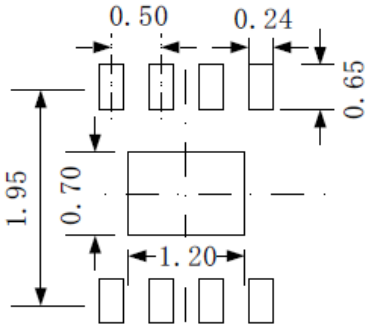
TOP VIEW



BOTTOM VIEW



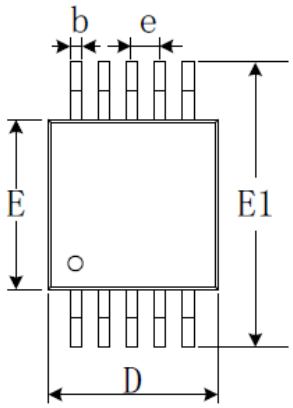
SIDE VIEW

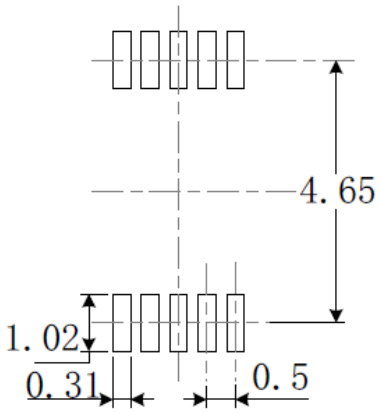


RECOMMENDED LAND PATTERN (Unit: mm)

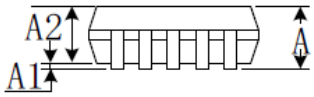
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203(TYP)		0.008(TYP)	
b	0.180	0.300	0.007	0.012
D	1.900	2.100	0.075	0.083
D1	1.100	1.300	0.043	0.051
E	1.900	2.100	0.075	0.083
E1	0.600	0.800	0.024	0.031
e	0.500(TYP)		0.020(TYP)	
L	0.250	0.450	0.010	0.018

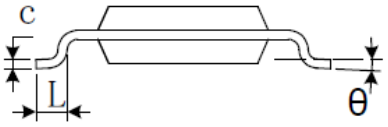
Package Outline And Physical Dimensions: MSOP-10





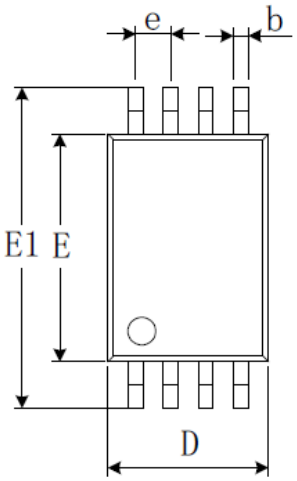
RECOMMENDED LAND PATTERN (Unit: mm)

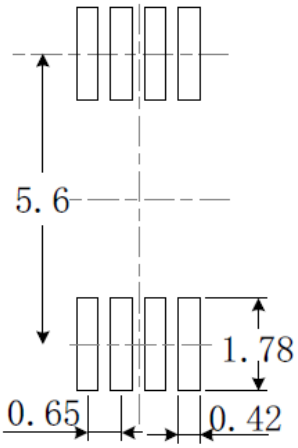




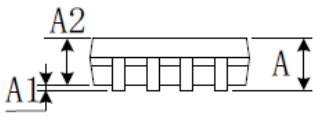
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.180	0.280	0.007	0.011
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.50(BSC)		0.020(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

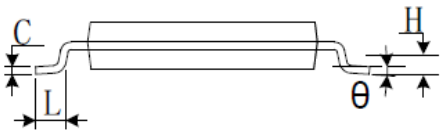
Package Outline And Physical Dimensions: TSSOP-8





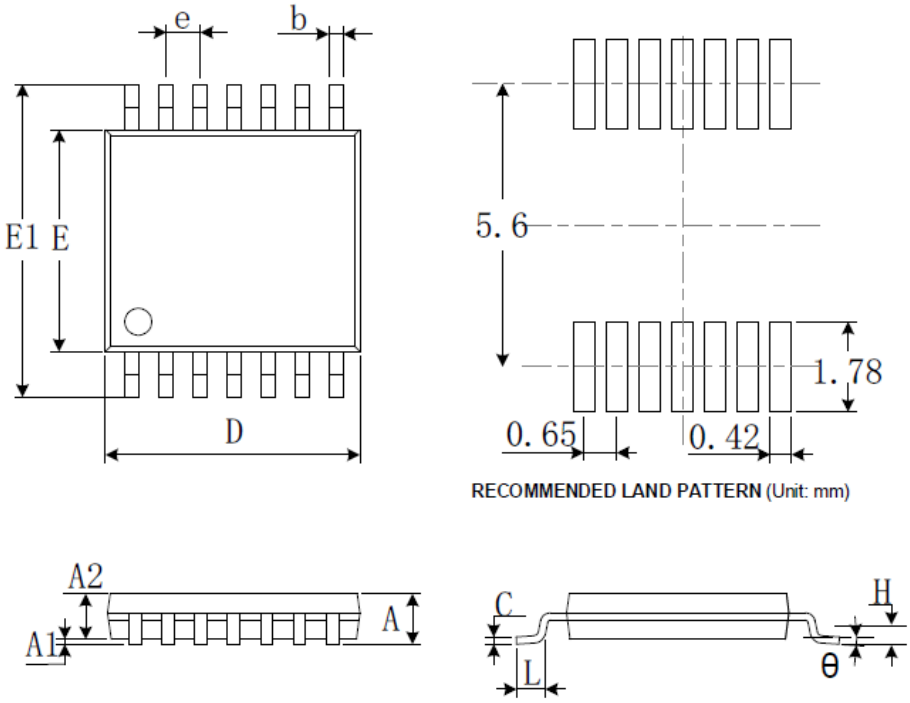
RECOMMENDED LAND PATTERN (Unit: mm)





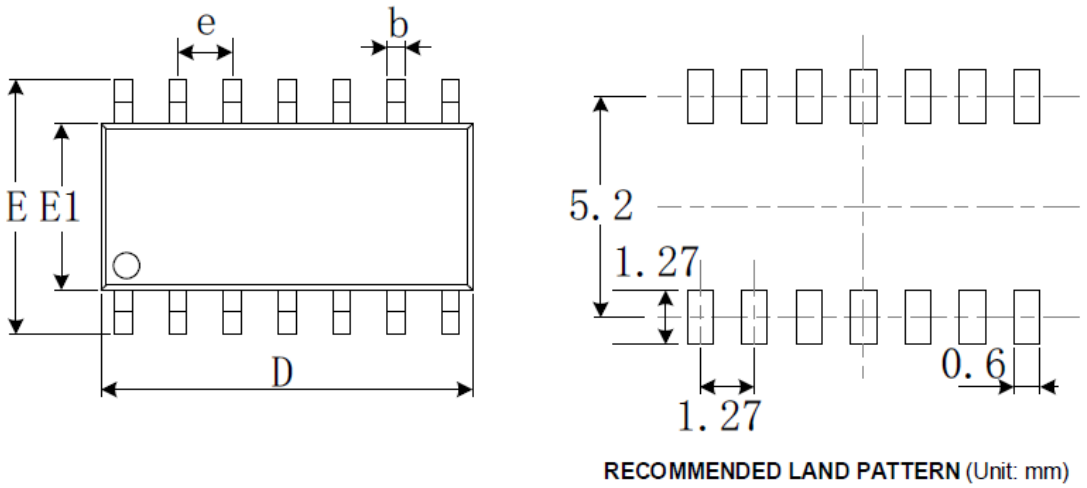
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	2.900	3.100	0.114	0.122
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650(BSC)		0.026(BSC)	
L	0.500	0.700	0.020	0.028
H	0.25(TYP)		0.01(TYP)	
θ	1°	7°	1°	7°

Package Outline And Physical Dimensions: TSSOP-14

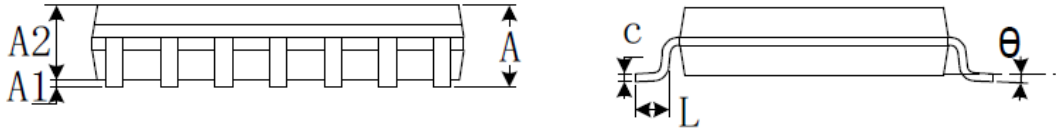


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	4.860	5.100	0.191	0.201
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650(BSC)		0.026(BSC)	
L	0.500	0.700	0.020	0.028
H	0.25(TYP)		0.01(TYP)	
θ	1°	7°	1°	7°

Package Outline And Physical Dimensions: SOP-14

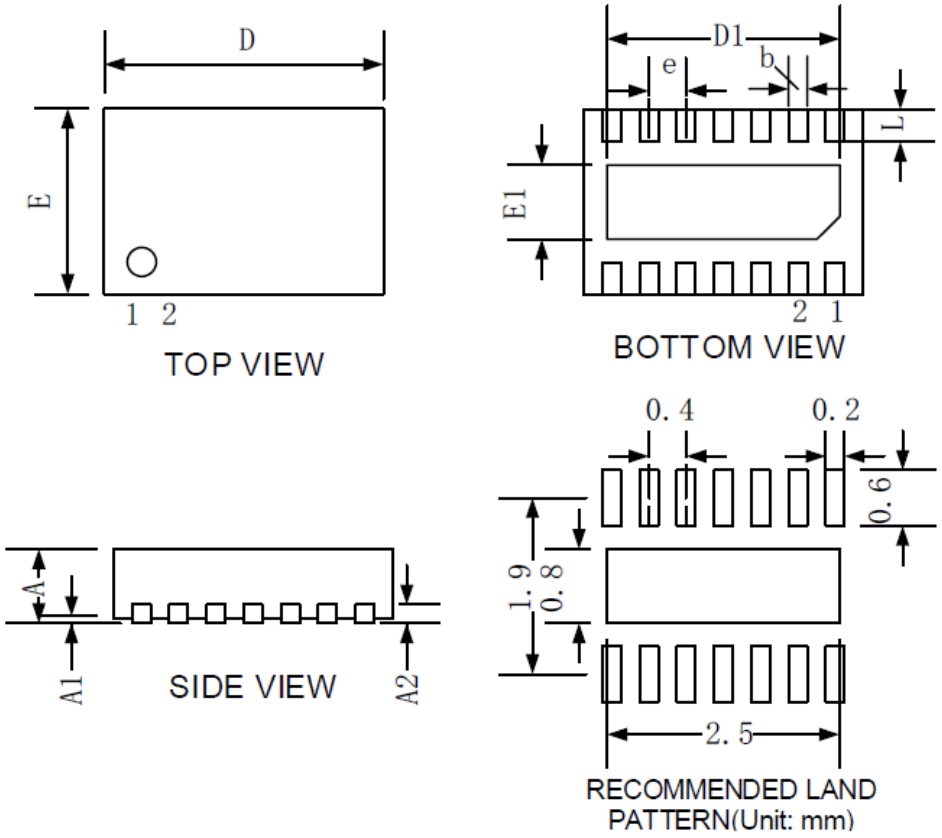


RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.310	0.510	0.012	0.020
c	0.100	0.250	0.004	0.010
D	8.450	8.850	0.333	0.348
e	1.270(BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Package Outline And Physical Dimensions: TDFN-3x2-14L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.200		0.008	
b	0.150	0.250	0.006	0.010
D	2.900	3.100	0.114	0.122
D1	2.400	2.600	0.094	0.102
E	1.900	2.100	0.075	0.083
E1	0.700	0.900	0.028	0.035
e	0.400 TYP		0.016 TYP	
L	0.300	0.400	0.012	0.016