LTA6741, LTA6742, LTA6743

100 ns High-Speed Comparator with Push-Pull Outputs

General Description

The LTA6741, LTA6742 and LTA6743 are single- and dual-channel comparators with push-pull outputs and a typical propagation delay of 100 ns. The devices operate from 2.7 V to 5.5 V and feature rail-to-rail inputs and outputs, making them suitable for low-voltage, power-sensitive applications requiring fast response. The output current-limiting feature provides short-circuit protection under specified operating conditions.

The LTA6741/LTA6743 (single) is available in SOT23-5L package. The LTA6742 (dual) is offered in SOIC-8L and MSOP-8L packages. All devices are specified over the extended industrial temperature range of -40°C to +125°C.

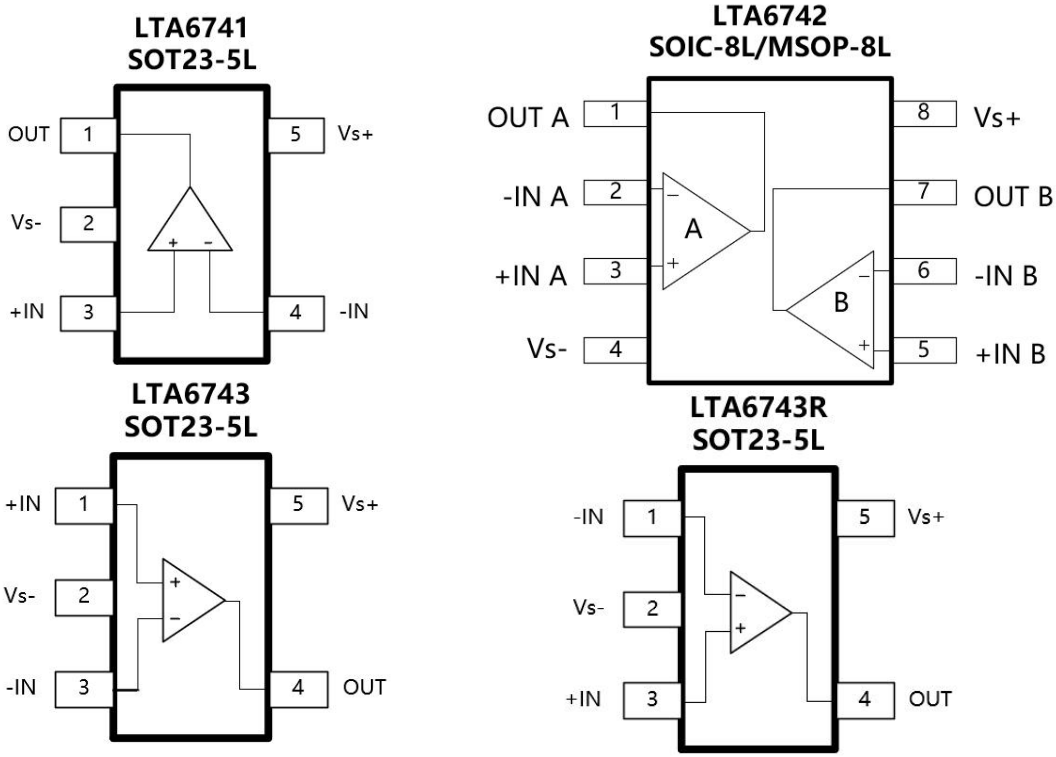
Features and Benefits

- Fast 100 ns typical propagation delay (100 mV overdrive)
- Rail-to-Rail I/O
- Supply voltage: 2.7V to 5.5V
- Small packages: available in SOT23-5L, SOIC-8L, MSOP-8L
- Low supply current (per channel): 13µA

Applications

- High-speed instrumentation
- Clock and data signal restoration
- Pulse spectroscopy
- High-speed line receivers
- Threshold detection
- Peak and zero-crossing detectors
- High-speed trigger circuitry
- Pulse-width modulators
- Current/voltage-controlled oscillators
- Automatic test equipment (ATE)
- Wireless Base Stations

Pin Description (Top View)



Pin Function

Package Pin				Symbol	Function
LTA6741	LTA6742	LTA6743			
SOT23-5L	SOIC-8L/MSOP-8L	SOT23-5L	SOT23-5L(R)		
1	1	4	4	OUT A	Output, channel A
4	2	3	1	-IN A	Inverting input, channel A
3	3	1	3	+IN A	Noninverting input, channel A
2	4	2	2	V_{S-}	Negative (lowest) power supply
/	5	/	/	+IN B	Noninverting input, channel B
/	6	/	/	-IN B	Inverting input, channel B
/	7	/	/	OUT B	Output, channel B
5	8	5	5	V_{S+}	Positive (highest) power supply

Ordering Information

Package Type	Part Number	Quantity
SOT23-5L	LTA6741XT5/R6	Tape and Reel, 3 000
SOIC-8L	LTA6742XS8/R8	Tape and Reel, 4 000
MSOP-8L	LTA6742XV8/R6	Tape and Reel, 3 000
SOT23-5L	LTA6743XT5/R6	Tape and Reel, 3 000
SOT23-5L	LTA6743RXT5/R6	Tape and Reel, 3 000

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_S	Supply voltage	2.7	5.5	V
T_A	Operating temperature	-40	+125	℃

Absolute Maximum Ratings

PARAMETER		MIN	MAX	UNIT
Voltage	Supply		6.5	V
	Signal input terminal	(V_{S-})-0.3	(V_{S+}) + 0.3	V
Temperature	Operating, T_A	-40	125	℃
	Storage, Tstg	-65	150	℃

ESD Ratings

Parameter	Level	Unit
Human body model (HBM), per ANSI/ESDA/JEDEC JS-001	2 000	V
Charged device model (CDM), per ANSI/ESDA/JEDEC JS-002	2 000	

Electrical Characteristics

At T_A = 25°C and V_S = 2.7 V to 5.5 V, unless otherwise noted.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFFSET VOLTAGE						
Input offset voltage	V_{OS}	V_{CM}=0 V, I_O=0 mA		3		mV
Input offset voltage vs temperature	dV_{OS}/dT	T_A = -40°C to +125°C		2		µV/ °C
Input offset voltage vs power supply	PSRR	V_S = 2.7 V to 5.5 V		500		µV/ V
Input hysteresis	Hyst			6		mV
INPUT BIAS CURRENT						
Input bias current	I_B	V_{CM} = V_{S+} /2		5		pA
		T_A= —40 to +125 °C		800		
Input offset current	I_{OS}	V_{CM} = V_{S+} /2		10		pA
		T_A= —40 to +125 °C		800		
INPUT VOLTAGE RANGE						
Common-mode voltage range	V_{CM}		(Vs-)-0.2		(Vs+) +0.2	V
Common-mode rejection ratio	CMRR	V_{CM}=-0.2V to (V_{S+}) +0.2V	64	77		dB
		V_{CM}=-0.2V to (V_{S+}) +0.2V, T_A=-40°C to +125°C		72		
OUTPUT						
Voltage output swing from rail	V_{OH}, V_{OL}	I_{OUT}=±1mA		40	60	mV
Output short-circuit current	I_{SC}	Sink current		-44		mA
		Source current		46		
POWER SUPPLY						
Specified voltage	V_S		2.7		5.5	V
Quiescent current (per channel)	I_Q	V_S=5V, V_O=High		13		µA
TEMPERATURE RANGE						
Operating range	T_A		-40		125	°C
Thermal Resistance	θ_{JA}	SOT23-5L		190		°C/W
		SOIC-8L		125		
		MSOP-8L		216		
TIME						
Propagation delay time, High to low	$T_{(pd-)}$	Input overdrive = 20 mV, C_L= 15 pF		170		ns
		Input overdrive = 100 mV, C_L=15 pF		80		

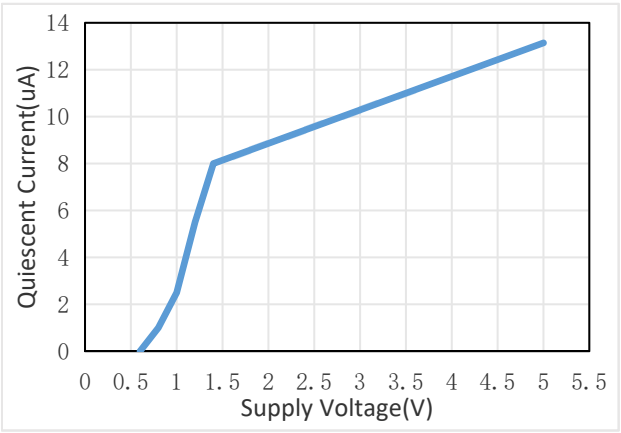
Electrical Characteristics (Cont.)

At T_A = 25°C and V_S = 2.7 V to 5.5 V, unless otherwise noted.

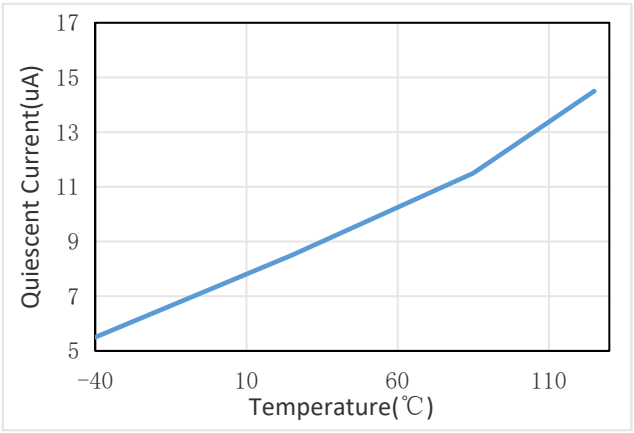
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Propagation delay time, Low to high	$T_{(pd+)}$	Input overdrive = 20 mV, C_L= 15 pF		190		ns
		Input overdrive = 100 mV, C_L=15 pF		100		
Rise time	t_R	Input overdrive = 20 mV, C_L= 15 pF		15		ns
		Input overdrive = 100 mV, C_L=15 pF		15		
Fall time	t_F	Input overdrive = 20 mV, C_L= 15 pF		16		ns
		Input overdrive = 100 mV, C_L=15 pF		16		

Typical Performance Characteristics

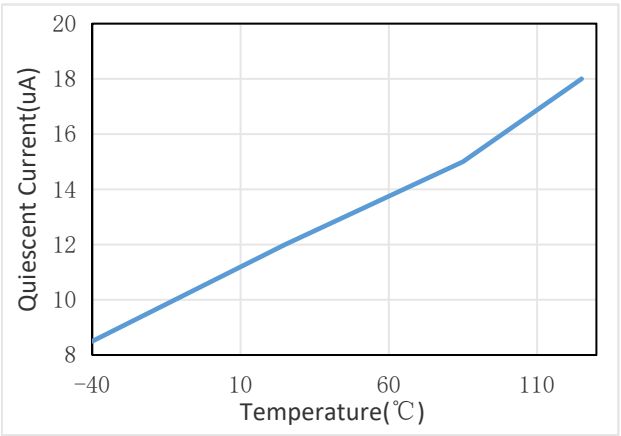
At T_A = 25°C and V_S = 2.7 V to 5.5 V, unless otherwise noted.



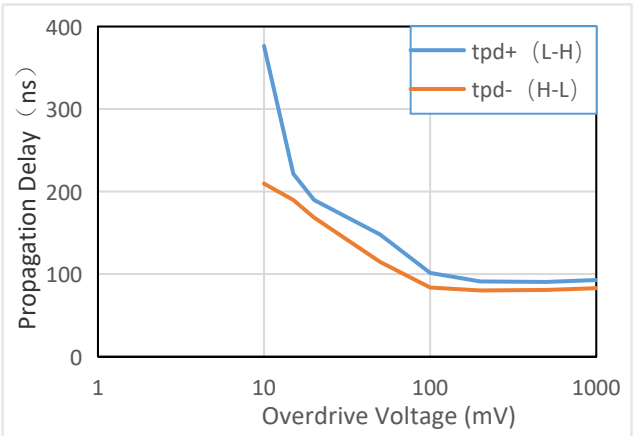
Supply Current vs. Supply Voltage



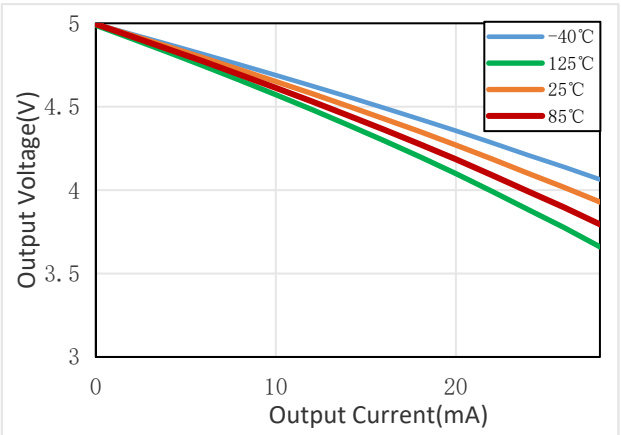
Supply Current vs. Temperature (V_S=2.7V)



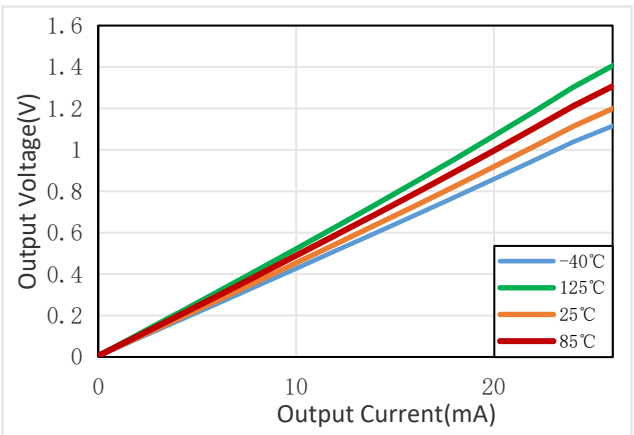
Supply Current vs. Temperature (V_S=5V)



Propagation Delay vs. Overdrive Voltage



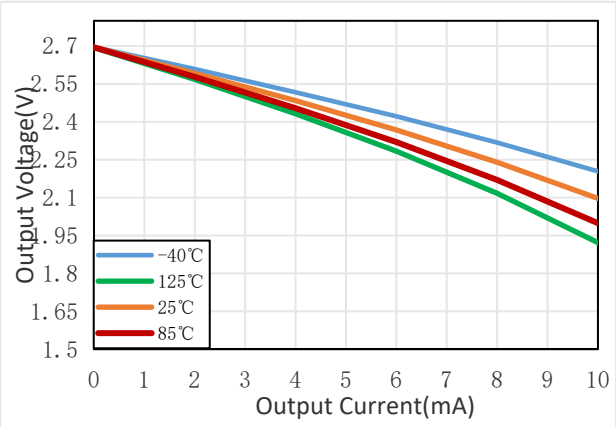
Output Voltage vs. Output Current
(Sourcing, V_S=5V)



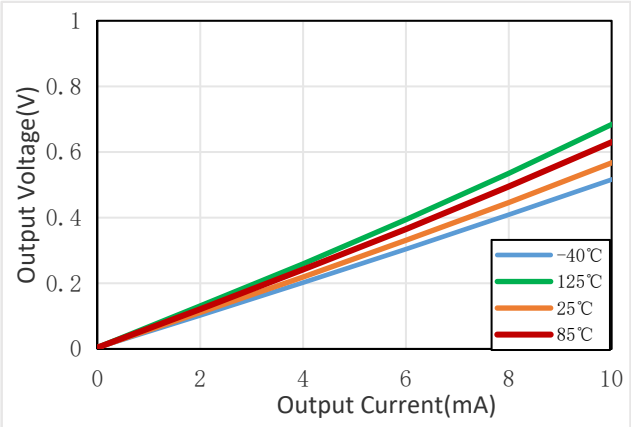
Output Voltage vs. Output Current
(Sinking, V_S=5V)

Typical Performance Characteristics (Cont.)

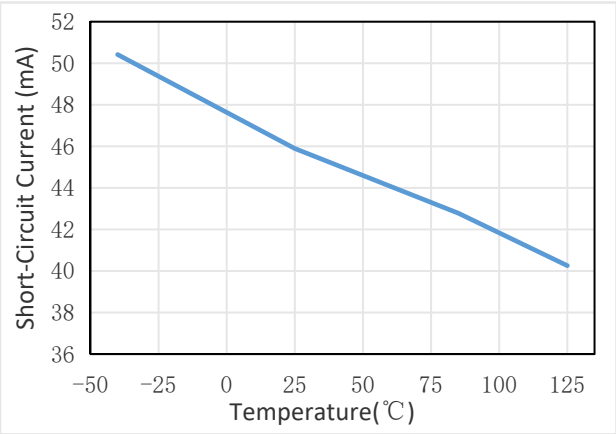
At T_A = 25°C and V_S = 2.7 V to 5.5 V, unless otherwise noted.



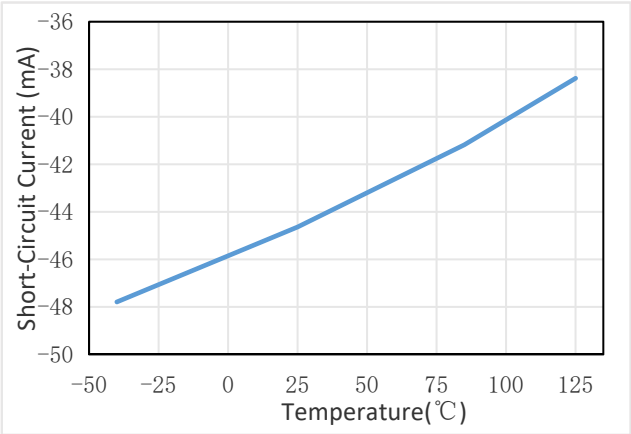
Output Voltage vs. Output Current
(Sourcing, V_S=2.7V)



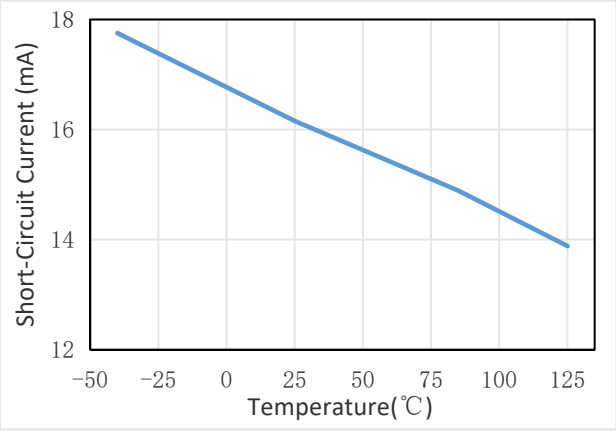
Output Voltage vs. Output Current
(Sinking, V_S=2.7V)



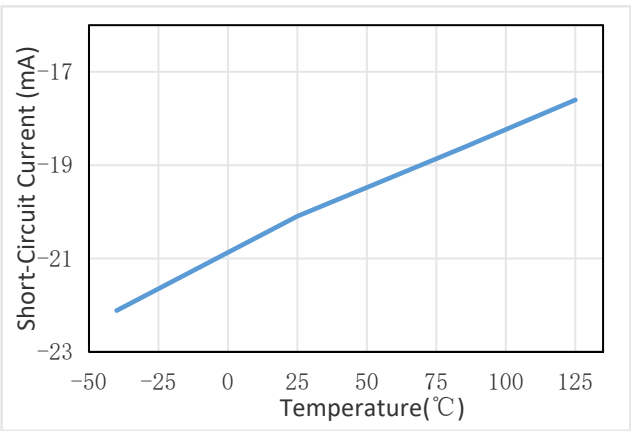
Short-Circuit Current vs. Temperature
(Sourcing, V_S=5V)



Short-Circuit Current vs. Temperature
(Sinking, V_S=5V)



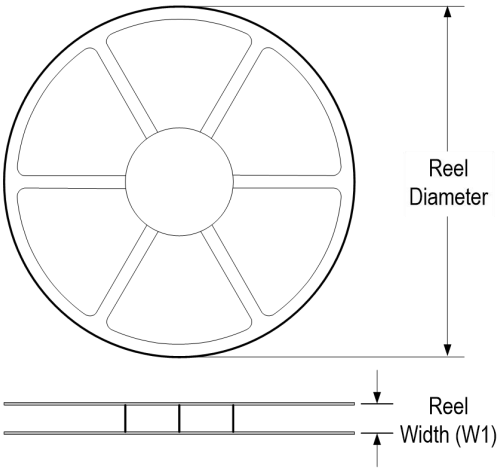
Short-Circuit Current vs. Temperature
(Sourcing, V_S=2.7V)



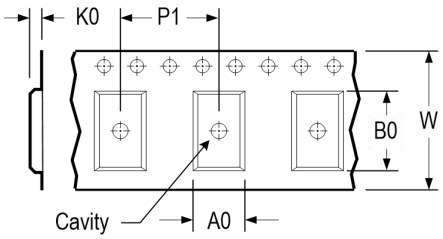
Short-Circuit Current vs. Temperature
(Sinking, V_S=2.7V)

Tape and Reel Information

REEL DIMENSIONS

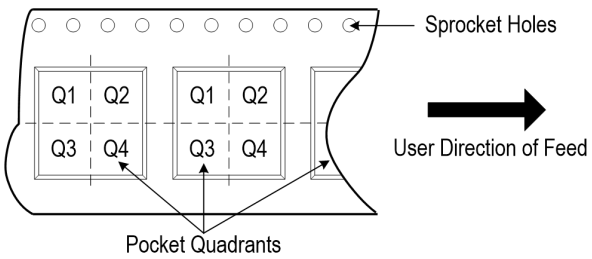


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIETATION IN TAPE

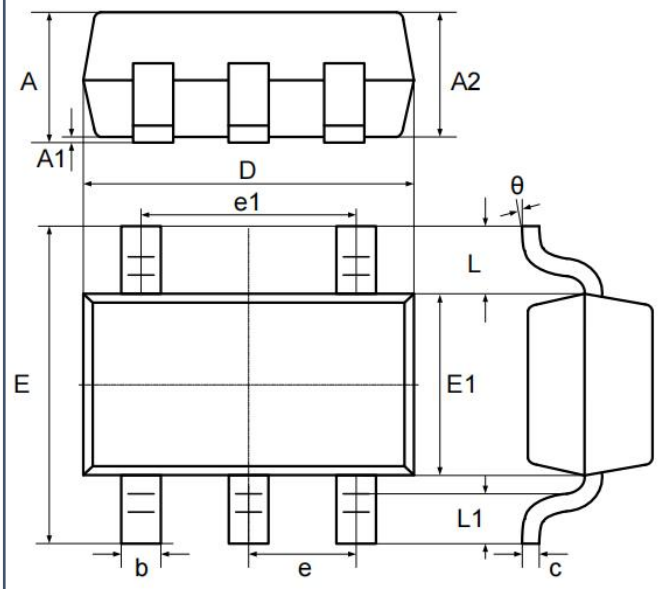


* All dimensions are nominal

Device	Package Type	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin 1 Quadrant
LTA6741XT5/R6	SOT23	5	3 000	178	9.5	3.3	3.2	1.5	4.0	8.0	Q3
LTA6742XS8/R8	SOIC	8	4 000	330	12.5	6.6	5.3	2.0	8.0	12.0	Q1
LTA6742XV8/R6	MSOP	8	3 000	330	12.5	5.0	3.5	2.0	8.0	12.0	Q1
LTA6743XT5/R6	SOT23	5	3 000	178	9.5	3.3	3.2	1.5	4.0	8.0	Q3
LTA6743RXT5/R6	SOT23	5	3 000	178	9.5	3.3	3.2	1.5	4.0	8.0	Q3

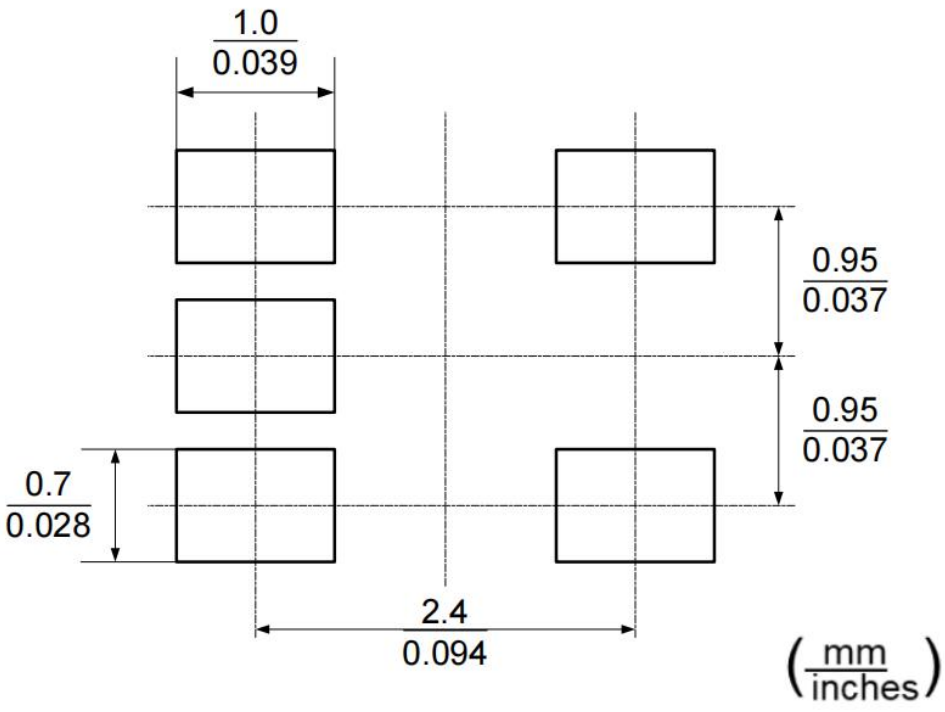
Package Dimension

DIMENSIONS, SOT23-5L



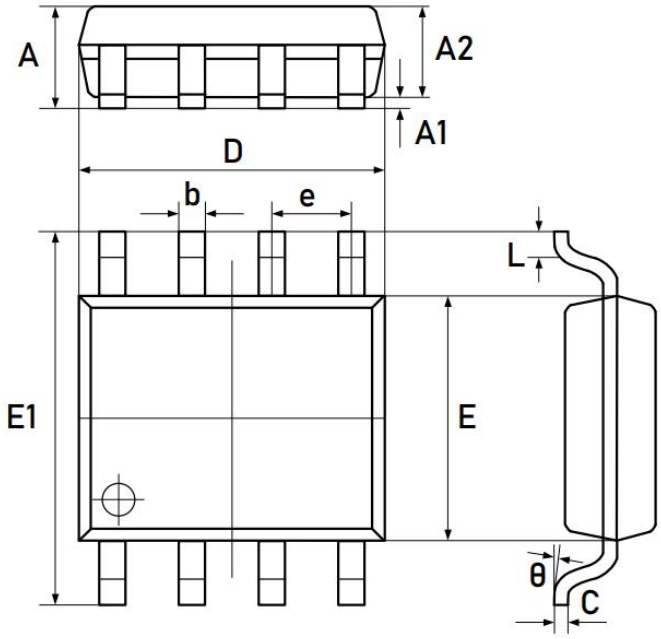
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	-	1.25	-	0.049
A1	0.04	0.10	0.002	0.004
A2	1.00	1.20	0.039	0.047
b	0.33	0.41	0.013	0.016
c	0.15	0.19	0.006	0.007
D	2.820	3.02	0.111	0.119
E1	1.50	1.70	0.059	0.067
E	2.60	3.00	0.102	0.118
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.60 REF		0.024 REF	
L1	0.30	0.60	0.012	0.024
θ	0°	8°	0°	8°

RECOMMENDED SOLDERING FOOTPRINT, SOT23-5L



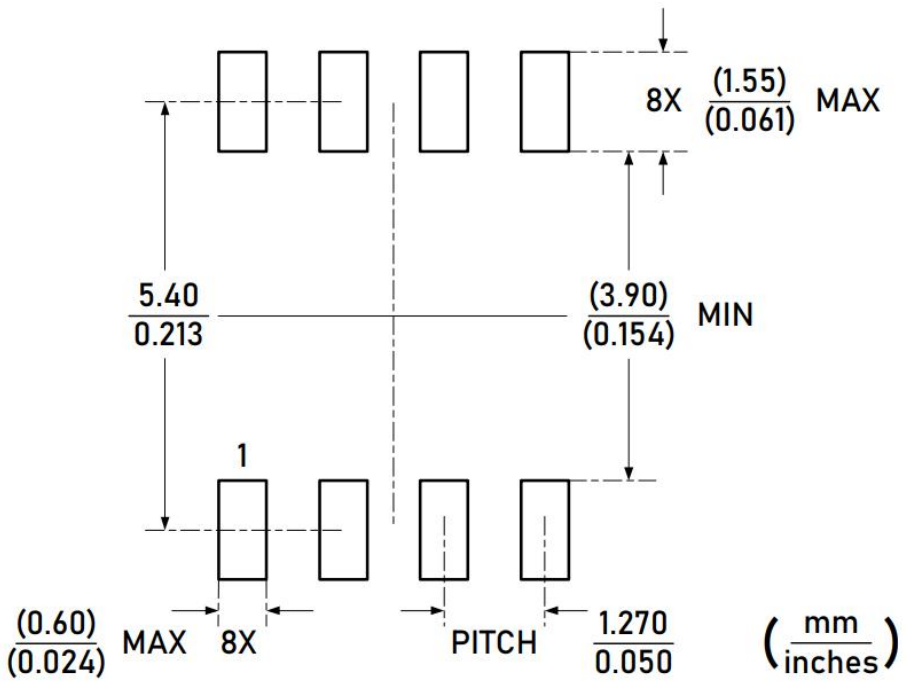
Package Dimension (Cont.)

DIMENSIONS, SOIC-8L



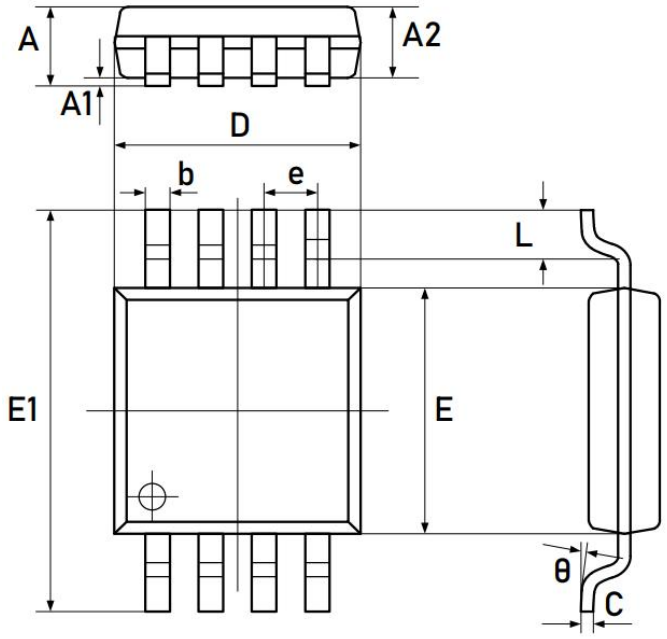
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.370	1.670	0.054	0.066
A1	0.070	0.170	0.003	0.007
A2	1.300	1.500	0.051	0.059
b	0.306	0.506	0.012	0.020
C	0.203 TYP.		0.008 TYP.	
D	4.700	5.100	0.185	0.201
E	3.820	4.020	0.150	0.158
E1	5.800	6.200	0.228	0.244
e	1.270 TYP.		0.050 TYP.	
L	0.450	0.750	0.018	0.030
θ	0°	8°	0°	8°

RECOMMENDED SOLDERING FOOTPRINT, SOIC-8L



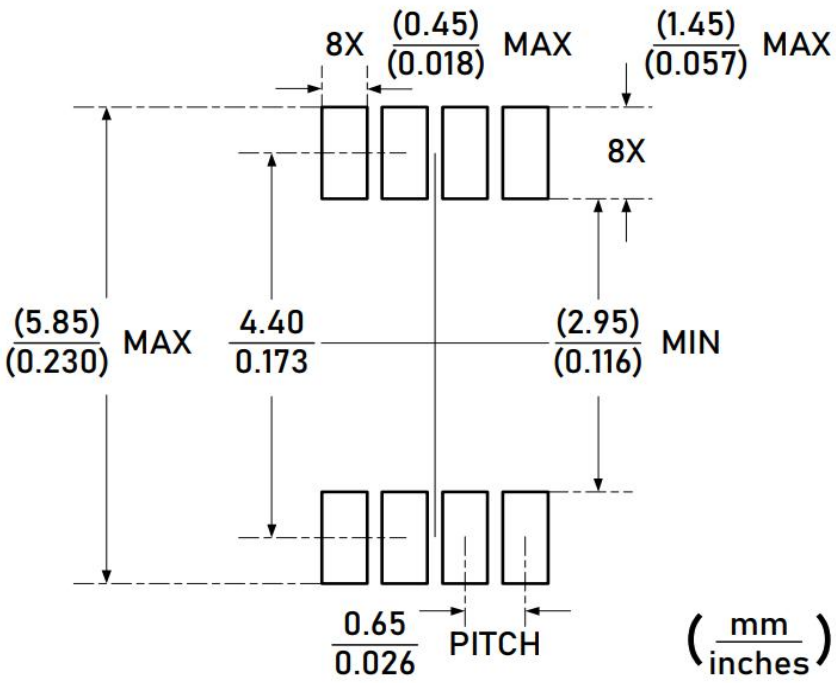
Package Dimension (Cont.)

DIMENSIONS, MSOP-8L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.100	0.031	0.043
A1	0.050	0.150	0.002	0.006
A2	0.750	0.950	0.030	0.037
b	0.290	0.380	0.011	0.015
C	0.150	0.200	0.006	0.008
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.700	5.100	0.185	0.201
e	0.650 TYP.		0.026 TYP.	
L	0.400	0.700	0.016	0.028
θ	0°	8°	0°	8°

RECOMMENDED SOLDERING FOOTPRINT, MSOP-8L



Important Notice

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