



SV7331

8KV ESD Protected, Wide-Supply, High-Bandwidth,
Dual 4:1 Analog Switch

v0.93

SAVITECH Corporation

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8KV ESD Protected, Wide Supply, High-Bandwidth, Dual 4:1 Analog Switch

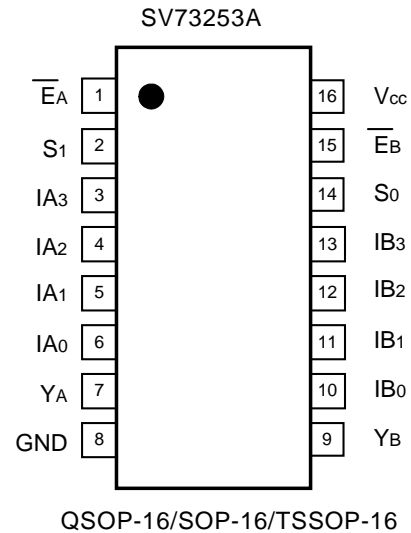
Features

- Ultra Wide Operation Voltage: +1.65V to +5.5V
- Rail to rail analog signal level
- Low In-to-Out Ron: 3.5
- Robust ESD Protection: 8KV HBM, 400V MM
- Super-low quiescent current: 0.1uA (typ)
- Loss-less transmission
- Almost no propagation delay
- Built in undershoot clamping diodes
- CMOS/TTL compatible control inputs
- PI5V331 pin compatible
- Green & Pb-free packages:
QSOP-16, SOP-16 and TSSOP-16

Description

The SV7331 is an ultra-low Ron, low-power, high-bandwidth, high-speed rail to rail dual 4:1 analog switch. It is pin compatible with PI5V331 analog switch. With its built in undershoot clamping diodes on all control inputs and switch inputs that results in robust and reliable switching and protection.

Pin Connection



Function Table

$\overline{E_A}$	$\overline{E_B}$	S ₁	S ₂	Y _A	Y _B	Function
H	X	X	X	Hi-Z	X	Disable A
X	H	X	X	X	Hi-Z	Disable B
L	L	L	L	IA ₀	IB ₀	S ₁₋₀ = 0
L	L	L	H	IA ₁	IB ₁	S ₁₋₀ = 1
L	L	H	L	IA ₂	IB ₂	S ₁₋₀ = 2
L	L	H	H	IA ₃	IB ₃	S ₁₋₀ = 3

Note:

H = Logic High

L = Logic Low

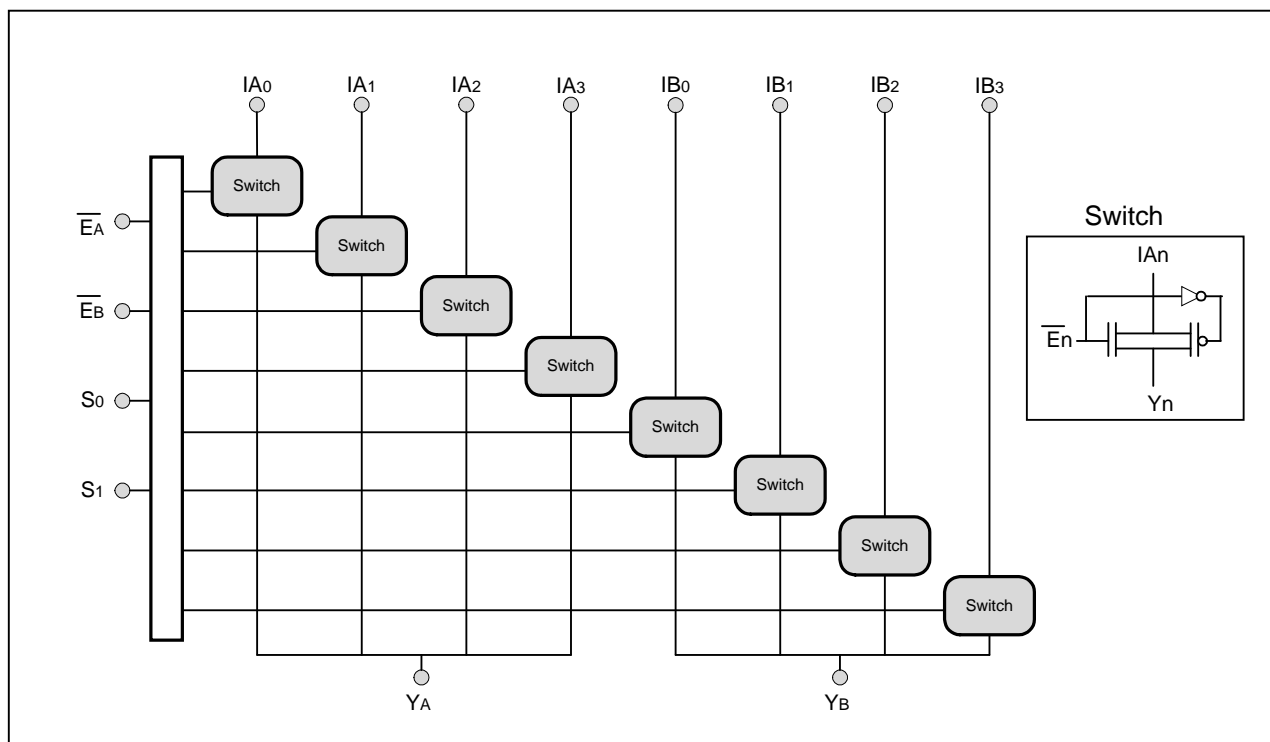
Ordering Information

Ordering Code	Operation Range	Package	Packing
SV7331-16QP-TR2	-40°C ~ +85°C	QSOP-16	Tape & Reel, 2500pcs
SV7331-16SP-TR2	-40°C ~ +85°C	SOP-16	Tape & Reel, 2500pcs
SV7331-16TP-TR3	-40°C ~ +85°C	TSSOP-16	Tape & Reel, 3000pcs

Pin Description

PIN	DESCRIPTION
IA _N , IB _N	Data Inputs
S ₀ , S ₁	Select Inputs
Y _A , Y _B	Data outputs
$\overline{E_A}$, $\overline{E_B}$	Enable Inputs
GND	Ground
V _{CC}	Power Supply

Block Diagram



Absolute Maximum Ratings

Parameter	Value	Unit
V_{CC} to GND, Supply Voltage,	7	V
Input Voltage	GND - 0.3 to $(V_{CC}) + 0.3$	V
Storage Temperature Range	-65 to +150	°C
Continuous current through V_{DD} or GND	100	mA
ESD Susceptibility: HBM	8000	V
ESD Susceptibility: MM	400	V

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Caution

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SAVITECH recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

DC Electrical Characteristics

($T_A = -40^{\circ}\text{C}$ to 85°C , $V_{CC} = +5\text{V} \pm 10\%$)

PARAMETER	Description	Test Conditions	MIN	TYP	MAX	UNITS
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level	$0.6 \cdot V_{CC}$		$V_{CC} + 0.3$	V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW level	$V_{SS} - 0.3$		$0.4 \cdot V_{CC}$	V
I_{IH}	Input HIGH Current	$V_{CC} = \text{Max}$, $V_{IN} = V_{CC}$			± 1	μA
I_{IL}	Input LOW Current	$V_{CC} = \text{Max}$, $V_{IN} = \text{GND}$			± 1	μA
I_{OZH}	High Impedance Output Current	0 I_n , Y_n V_{CC}			-1	μA
V_{IK}	Clamp Diode Voltage	$V_{CC} = \text{Min.}$, $V_{IN} = -18\text{mA}$		-0.78		V
BW	-3dB Bandwidth	Signal = 0dBm		500		MHz
R_{ON}	Switch On-Resistance	$V_{CC} = 2.7\text{V}$, $V_{IN} = 0\text{V}$, $I_{ON} = 48\text{mA}$		4.5	5.5	
		$V_{CC} = 2.7\text{V}$, $V_{IN} = 2.7\text{V}$, $I_{ON} = -48\text{mA}$		13	15	
		$V_{CC} = 3.6\text{V}$, $V_{IN} = 0\text{V}$, $I_{ON} = 48\text{mA}$		4.0	4.7	
		$V_{CC} = 3.6\text{V}$, $V_{IN} = 3.6\text{V}$, $I_{ON} = -48\text{mA}$		11	12	
		$V_{CC} = 4.5\text{V}$, $V_{IN} = 0\text{V}$, $I_{ON} = 48\text{mA}$		3.5	4.5	
		$V_{CC} = 4.5\text{V}$, $V_{IN} = 4.5\text{V}$, $I_{ON} = -48\text{mA}$		10	11	
		$V_{CC} = 5.5\text{V}$, $V_{IN} = 0\text{V}$, $I_{ON} = 48\text{mA}$		3.2	4.0	
		$V_{CC} = 5.5\text{V}$, $V_{IN} = 5.5\text{V}$, $I_{ON} = -48\text{mA}$		8.5	9.5	
I_{CC}	Quiescent Power Supply Current	$V_{CC} = 1.65\text{V} \sim 5.5\text{V}$, $V_{IN} = \text{GND}$ or V_{CC}		0.04	1	μA

Notes:

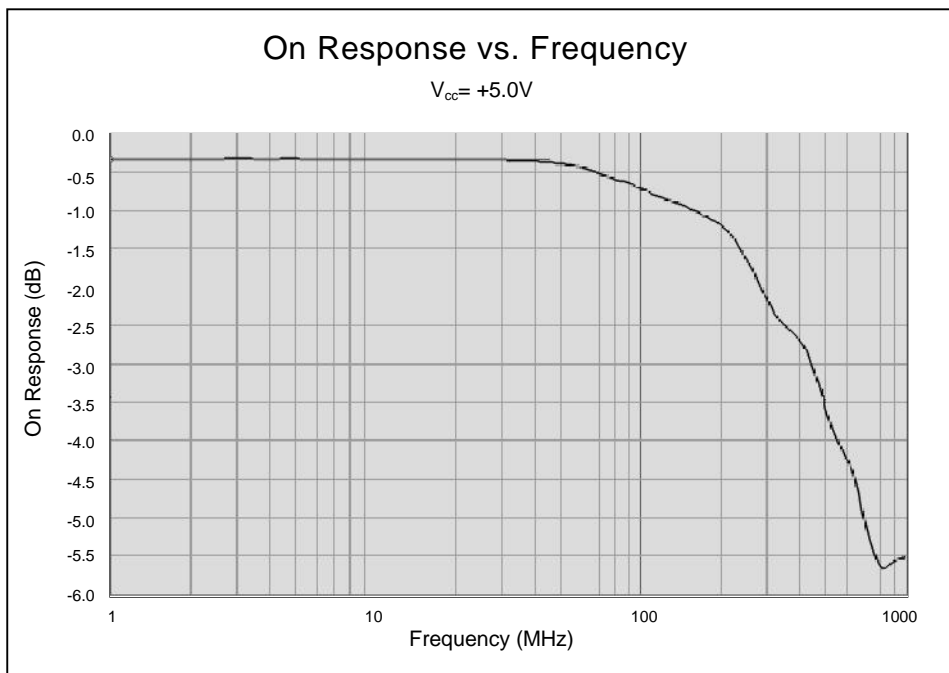
- For max. or min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- $V_{CC} = +1.65$ to $+5.5\text{V}$, $T_A = 25^{\circ}\text{C}$ ambient and maximum loading.
- Measured by the voltage drop between I_n and Y_n pin at indicated current through the Switch On-Resistance is determined by the lower of the voltages on the two (I_n , Y_n) pins.

Switching Characteristics

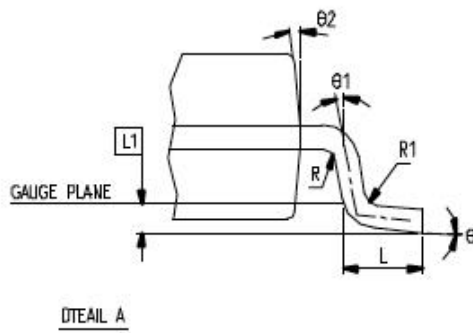
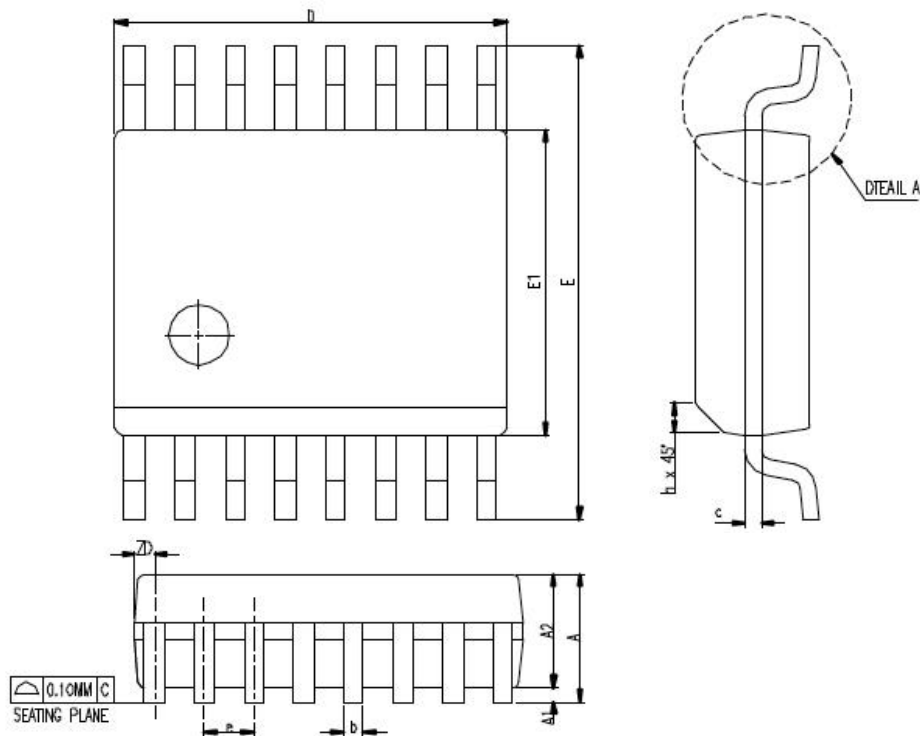
PARAMETER	Description	Test Conditions	MIN	TYP	MAX	UNITS
t_{IY}	Propagation Delay I_n to Y_n	$C_L = 20\text{pF}$ $R_L = 500$		0.25		ns
t_{SY}	Bus select time, S to Y_n			3.2		ns
t_{PHZ} , t_{PLZ}	Bus enable time, \bar{E} to Y_n			6.8		ns
t_{PHZ} , t_{PLZ}	Bus disable time, \bar{E}_N to Y			5.5		ns

Notes:

- For max. or min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Guaranteed by design.
- The switch contributes no propagation delay other than the RC delay of the On-Resistance of the switch and the load capacitance. The time constant for the switch alone is of the order of 0.25ns for 20pF load. Since this time constant is much smaller than the rise/fall times of typical driving signals, it adds very little propagation delay to the system. Propagation delay of the switch when used in a system is determined by the driving circuit on the driving side of the switch and its interactions with the load on the driven side.



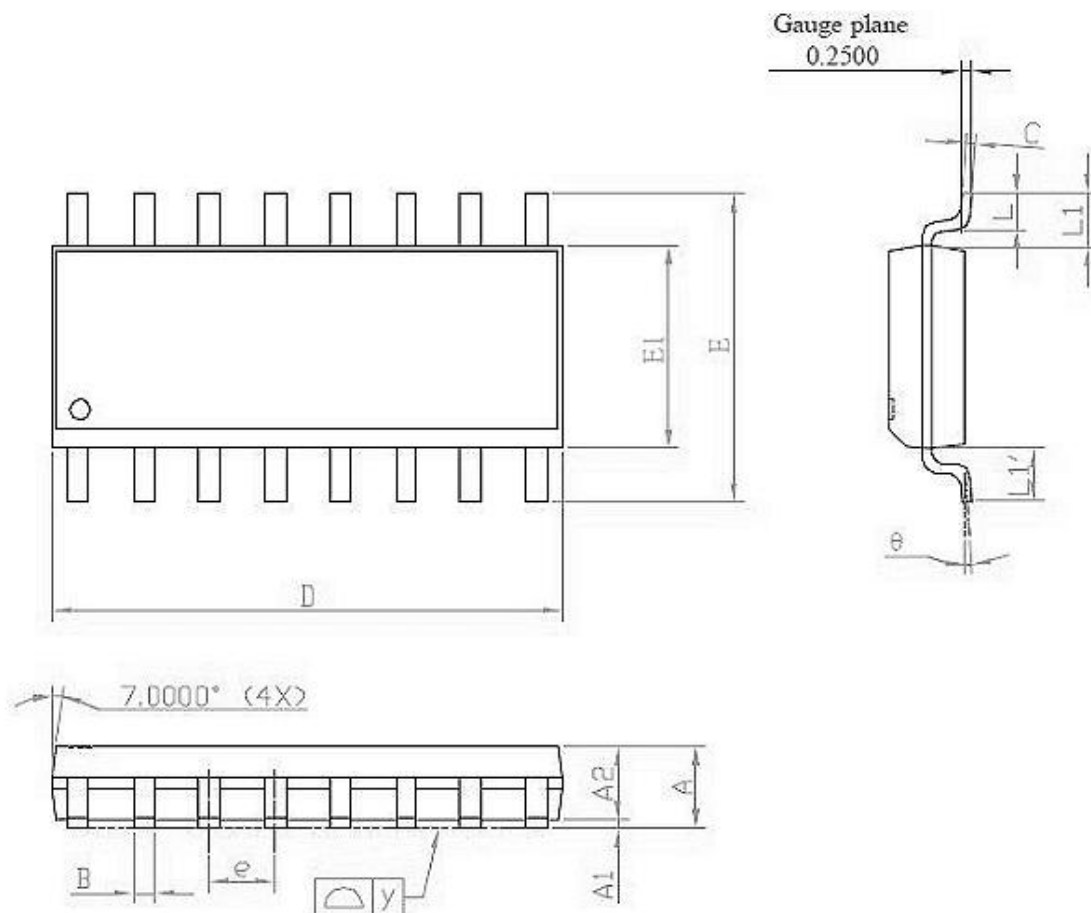
QSOP-16 MECHANICAL DATA



- Note:
1. Dimension 0 does not include mold protrusions or gate burrs
 2. Mold protrusions and gate burrs shall not exceed 0.006 inch per side.

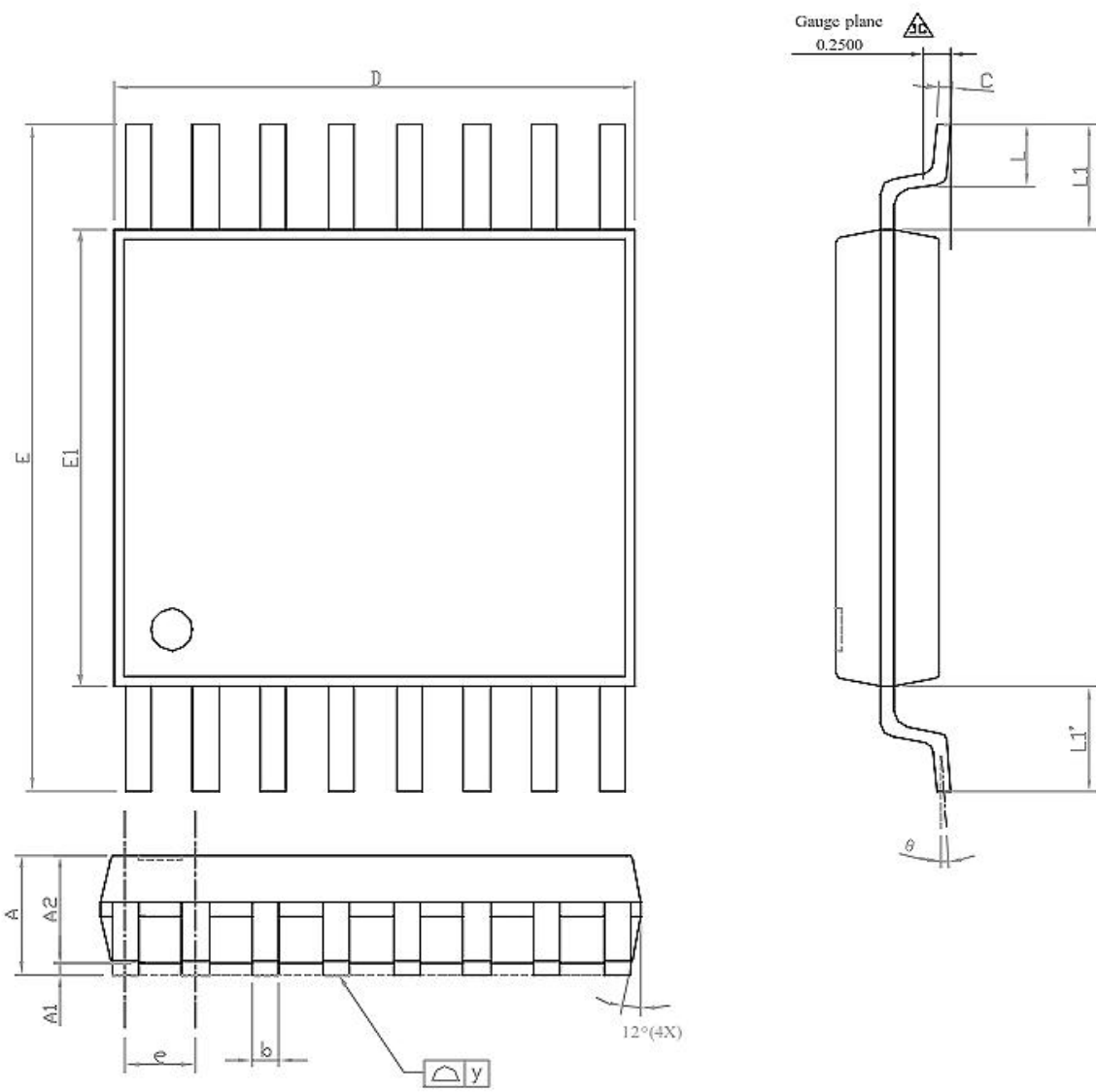
Symbol	Dimension in MM			Dimension in Inch		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.35	1.63	1.75	0.053	0.064	0.069
A1	0.10	0.15	0.25	0.004	0.006	0.010
A2			1.50			0.059
b	0.20		0.30	0.008		0.012
c	0.18		0.25	0.007		0.010
e	0.650 BASIC			0.025 BASEC		
D	4.80	4.90	5.00	0.189	0.193	0.197
E	5.79	5.99	6.20	0.228	0.236	0.244
E1	3.81	3.961	3.99	0.150	0.154	0.157
L	0.41	0.635	1.27	0.016	0.025	0.050
h	0.25		0.50	0.010		0.020
L1	0.254 BASIC			0.010 BASIC		
ZD	0.229 REF			0.009 REF		
R1	0.20		0.33	0.008		0.013
R	0.20			0.008		
Θ	0*		8*	0*		8*
$\Theta 1$	0*			0*		
$\Theta 2$	5*	10*	15*	5*	10*	15*
JEDEC	MO-137 (AB)					

SOP-16 MECHANICAL DATA



Symbol	Dimension in MM			Dimension in Inch		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.35	1.60	1.75	0.053	0.063	0.069
A1	0.10		0.25	0.004		0.010
A2		1.45			0.057	
B	0.33		0.51	0.013		0.020
C	0.19		0.25	0.007		0.010
D	9.80		10.00	0.386		0.394
E1	3.80	3.90	4.00	0.150		0.157
e		1.27				
E	5.80	6.00	6.20	0.228		0.244
L	0.40		1.27	0.016		0.050
y			0.10			0.004
Θ	0°		8°	0°		8°
L1-L1'			0.12			0.005
L1	1.04REF			0.041REF		

TSSOP-16 MECHANICAL DATA



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	—	—	1.20	—	—	0.048
A1	0.05	—	0.15	0.002	—	0.006
A2	0.80	1.00	1.05	0.031	0.039	0.041
b	0.19	—	0.30	0.007	—	0.012
C	0.09	—	0.20	0.004	—	0.008
D	4.90	5.00	5.10	0.193	0.197	0.201
E	6.20	6.40	6.60	0.244	0.252	0.260
E1	4.30	4.40	4.50	0.169	0.173	0.177
e	—	0.65	—	—	0.026	—
L	0.45	0.60	0.75	0.018	0.024	0.030
y	—	—	0.10	—	—	0.004
θ	0°	—	8°	0°	—	8°
L1-L1'	—	—	0.12	—	—	0.005
L1	1.00REF			0.039REF		

- NOTE
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS
 2. TOLERANCE ±0.1 mm UNLESS OTHERWISE SPECIFIED
 3. COPLANARITY : 0.1 mm
 4. LEAD BURR LESS THAN 5mil
 5. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
 6. FOLLOWED TO JEDEC MO-153



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