74LVC257A
Quad 2-Input Multiplexer with 3-State Outputs

GENERAL DESCRIPTION

The 74LVC257A is a quad 2-input multiplexer with 3-state outputs. This device accepts a wide supply voltage range from 1.2V to 3.6V.

Both 3.3V and 5V devices can drive inputs, enabling this device to operate as a translator in a mixed 3.3V and 5V system environment. All inputs support Schmitt-Trigger action, which allows the circuit to tolerate slower input rise and fall times.

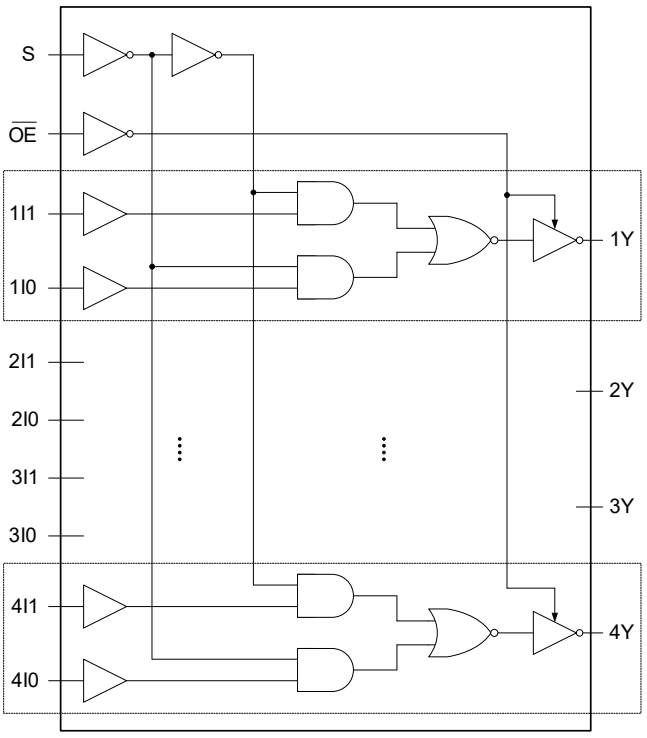
The output enable input ($\overline{OE}$) is active-low. When $\overline{OE}$ is held high, the 1Y to 4Y outputs are in high-impedance state no matter what the conditions of the inputs are. When $\overline{OE}$ is held low, four bits of data are selected from one of two sources that are determined by the state of the common data selection input (S), and are routed to the four outputs. The four outputs present the true (non-inverting) selected data. The S input can also be used as a function generator.

The 74LVC257A is available in Green TQFN-3.5×4-16L, SOIC-16 and TSSOP-16 packages. It operates over a temperature range of -40℃ to +125℃.

FEATURES

- **Wide Supply Voltage Range: 1.2V to 3.6V**
- **Inputs Accept Voltages Higher than the Supply Voltage and up to 5.5V**
- **CMOS Low Power Dissipation**
- **Direct Interface with TTL Levels**
- **-40℃ to +125℃ Operating Temperature Range**
- **Available in Green TQFN-3.5×4-16L, SOIC-16 and TSSOP-16 Packages**

LOGIC DIAGRAM



FUNCTION TABLE

CONTROL INPUTS		INPUTS		OUTPUT
$\overline{OE}$	S	nI0	nI1	nY
H	*X*	*X*	*X*	Z
L	H	*X*	L	L
L	H	*X*	H	H
L	L	L	*X*	L
L	L	H	*X*	H

H = High Voltage Level

L = Low Voltage Level

Z = High-Impedance State

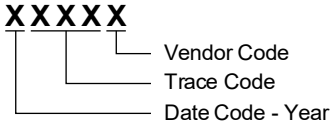
X = Don't Care

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
74LVC257A	TQFN-3.5×4-16L	-40℃ to +125℃	74LVC257AXTUU16G/TR	1NU XTUU16 XXXXX	Tape and Reel, 4000
	SOIC-16	-40℃ to +125℃	74LVC257AXS16G/TR	1NRXS16 XXXXX	Tape and Reel, 2500
	TSSOP-16	-40℃ to +125℃	74LVC257AXTS16G/TR	1NT XTS16 XXXXX	Tape and Reel, 4000

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor Code.



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage Range, V_{CC} ..... -0.5V to 6.5V
Input Voltage Range, V_I (1) ..... -0.5V to 6.5V
Output Voltage Range, V_O (1) .....-0.5V to V_{CC} + 0.5V
Input Clamp Current, I_{IK} (V_I < 0V) .....-50mA
Output Clamp Current, I_{OK} (V_O > V_{CC} or V_O < 0V)..... ±50mA
Continuous Output Current, I_O (V_O = 0V to V_{CC}) ..... ±50mA
Continuous Current through V_{CC} or GND..... ±100mA
Junction Temperature (2) .....+150℃
Storage Temperature Range .....-65℃ to +150℃
Lead Temperature (Soldering, 10s).....+260℃
ESD Susceptibility (3) (4)
HBM.....±4000V
CDM .....±1000V

NOTES:

1. The input and output voltage ratings may be exceeded if the input and output clamp current ratings are observed.

2. The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability.

3. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.

4. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range, V_{CC} ..... 1.65V to 3.6V
Data Retention Only, V_{CC} ..... 1.2V to 3.6V
Input Voltage Range, V_I..... 0V to 5.5V
Output Voltage Range, V_O.....0V to V_{CC}
Input Transition Rise or Fall Rate, Δt/ΔV
V_{CC} = 1.65V to 2.7V..... 20ns/V (MAX)
V_{CC} = 2.7V to 3.6V..... 10ns/V (MAX)
Operating Junction Temperature Range ..... -40℃ to +125℃

OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

ESD SENSITIVITY CAUTION

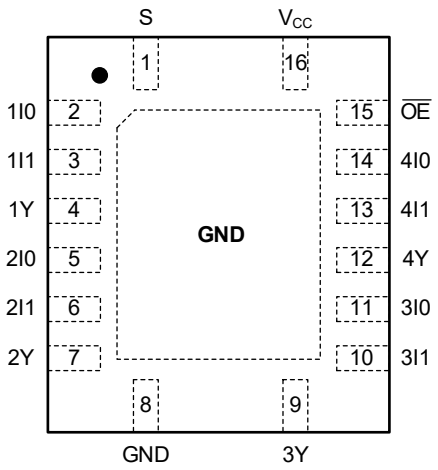
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

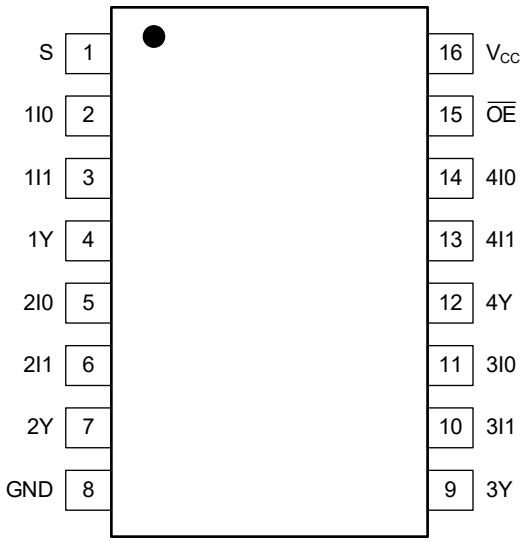
PIN CONFIGURATIONS

(TOP VIEW)



TQFN-3.5×4-16L

(TOP VIEW)



SOIC-16/TSSOP-16

PIN DESCRIPTION

PIN	NAME	FUNCTION
1	S	Common Data Selection Input.
2, 5, 11, 14	1I0, 2I0, 3I0, 4I0	Source 0 Data Inputs.
3, 6, 10, 13	1I1, 2I1, 3I1, 4I1	Source 1 Data Inputs.
4, 7, 9, 12	1Y, 2Y, 3Y, 4Y	Multiplexer Outputs with 3-State Mode.
8	GND	Ground.
15	$\overline{OE}$	Output Enable Input (Active-Low).
16	V_{CC}	Supply Voltage.
Exposed Pad	GND	TQFN-3.5×4-16L package only. This is not a supply pin. The exposed pad can be left floating or soldered to the ground.

ELECTRICAL CHARACTERISTICS

(Full = -40℃ to +125℃, all typical values are measured at V_{CC} = 3.3V and T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
High-Level Input Voltage	V_{IH}	V_{CC} = 1.2V	Full	1.08			V
		V_{CC} = 1.65V to 1.95V	Full	0.65 × V_{CC}			
		V_{CC} = 2.3V to 2.7V	Full	1.70			
		V_{CC} = 2.7V to 3.6V	Full	2.00			
Low-Level Input Voltage	V_{IL}	V_{CC} = 1.2V	Full			0.12	V
		V_{CC} = 1.65V to 1.95V	Full			0.35 × V_{CC}	
		V_{CC} = 2.3V to 2.7V	Full			0.70	
		V_{CC} = 2.7V to 3.6V	Full			0.80	
High-Level Output Voltage	V_{OH}	V_{CC} = 1.65V to 3.6V, I_{OH} = -100μA	Full	V_{CC} - 0.05	V_{CC} - 0.005		V
		V_{CC} = 1.65V, I_{OH} = -4mA	Full	1.45	1.56		
		V_{CC} = 2.3V, I_{OH} = -8mA	Full	2.05	2.18		
		V_{CC} = 2.7V, I_{OH} = -12mA	Full	2.40	2.54		
		V_{CC} = 3.0V, I_{OH} = -18mA	Full	2.55	2.78		
		V_{CC} = 3.0V, I_{OH} = -24mA	Full	2.45	2.70		
Low-Level Output Voltage	V_{OL}	V_{CC} = 1.65V to 3.6V, I_{OL} = 100μA	Full		0.005	0.05	V
		V_{CC} = 1.65V, I_{OL} = 4mA	Full		0.07	0.20	
		V_{CC} = 2.3V, I_{OL} = 8mA	Full		0.11	0.25	
		V_{CC} = 2.7V, I_{OL} = 12mA	Full		0.15	0.30	
		V_{CC} = 3.0V, I_{OL} = 24mA	Full		0.30	0.55	
Input Leakage Current	I_I	V_{CC} = 3.6V, V_I = 5.5V or GND	Full		±0.05	±2	μA
Off-State Output Current	I_{OZ}	V_{CC} = 3.6V, V_I = V_{IH} or V_{IL}, V_O = V_{CC} or GND	Full		±0.05	±10	μA
Supply Current	I_{CC}	V_{CC} = 3.6V, V_I = V_{CC} or GND, I_O = 0A	Full		0.05	10	μA
Additional Supply Current	ΔI_{CC}	Per input pin, V_{CC} = 2.7V to 3.6V, V_I = V_{CC} - 0.6V, I_O = 0A	Full		0.05	20	μA
Input Capacitance	C_I	V_{CC} = 0V to 3.6V, V_I = GND to V_{CC}	+25℃		5		pF

DYNAMIC CHARACTERISTICS

(See Figure 1 for test circuit. Full = -40℃ to +125℃, all typical values are measured at T_A = +25℃ and V_{CC} = 1.2V, 1.8V, 2.5V, 2.7V and 3.3V respectively, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		TEMP	MIN (1)	TYP	MAX (1)	UNITS
Propagation Delay (2)	t_{PD}	nI0, nI1 to nY, see Figure 2	V_{CC} = 1.2V	+25℃		10.5		ns
			V_{CC} = 1.65V to 1.95V	Full	0.5	6.5	13.0	
			V_{CC} = 2.3V to 2.7V	Full	0.5	4.0	7.4	
			V_{CC} = 2.7V	Full	0.5	4.0	6.8	
			V_{CC} = 3.0V to 3.6V	Full	0.5	3.5	6.3	
		S to nY, see Figure 2	V_{CC} = 1.2V	+25℃		12.0		ns
			V_{CC} = 1.65V to 1.95V	Full	0.5	7.0	14.8	
			V_{CC} = 2.3V to 2.7V	Full	0.5	4.5	8.3	
			V_{CC} = 2.7V	Full	0.5	4.0	7.4	
			V_{CC} = 3.0V to 3.6V	Full	0.5	4.0	6.8	
Enable Time (2)	t_{EN}	$\overline{OE}$ to nY, see Figure 3	V_{CC} = 1.2V	+25℃		10.0		ns
			V_{CC} = 1.65V to 1.95V	Full	0.5	6.0	13.0	
			V_{CC} = 2.3V to 2.7V	Full	0.5	4.0	7.5	
			V_{CC} = 2.7V	Full	0.5	4.0	7.0	
			V_{CC} = 3.0V to 3.6V	Full	0.5	3.5	6.3	
Disable Time (2)	t_{DIS}	$\overline{OE}$ to nY, see Figure 3	V_{CC} = 1.2V	+25℃		9.0		ns
			V_{CC} = 1.65V to 1.95V	Full	1.0	5.0	9.2	
			V_{CC} = 2.3V to 2.7V	Full	0.5	3.5	7.0	
			V_{CC} = 2.7V	Full	0.5	3.5	6.5	
			V_{CC} = 3.0V to 3.6V	Full	0.5	3.5	6.0	
Output Skew Time (3)	$t_{SK(O)}$	V_{CC} = 3.0V to 3.6V		Full		0.5	1.5	ns
Power Dissipation Capacitance (4)	C_{PD}	V_I = GND to V_{CC}	V_{CC} = 1.65V to 1.95V	+25℃		9.0		pF
			V_{CC} = 2.3V to 2.7V	+25℃		10.0		
			V_{CC} = 3.0V to 3.6V	+25℃		11.0		

NOTES:

1. Specified by design and characterization, not production tested.

2. t_{PD} is the same as t_{PLH} and t_{PHL}. t_{EN} is the same as t_{PZL} and t_{PZH}. t_{DIS} is the same as t_{PLZ} and t_{PHZ}.

3. It refers to the skew between any two outputs of the same package that switch in the same direction. The parameter is guaranteed by design.

4. C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$

where:

f_i = Input frequency in MHz.

f_o = Output frequency in MHz.

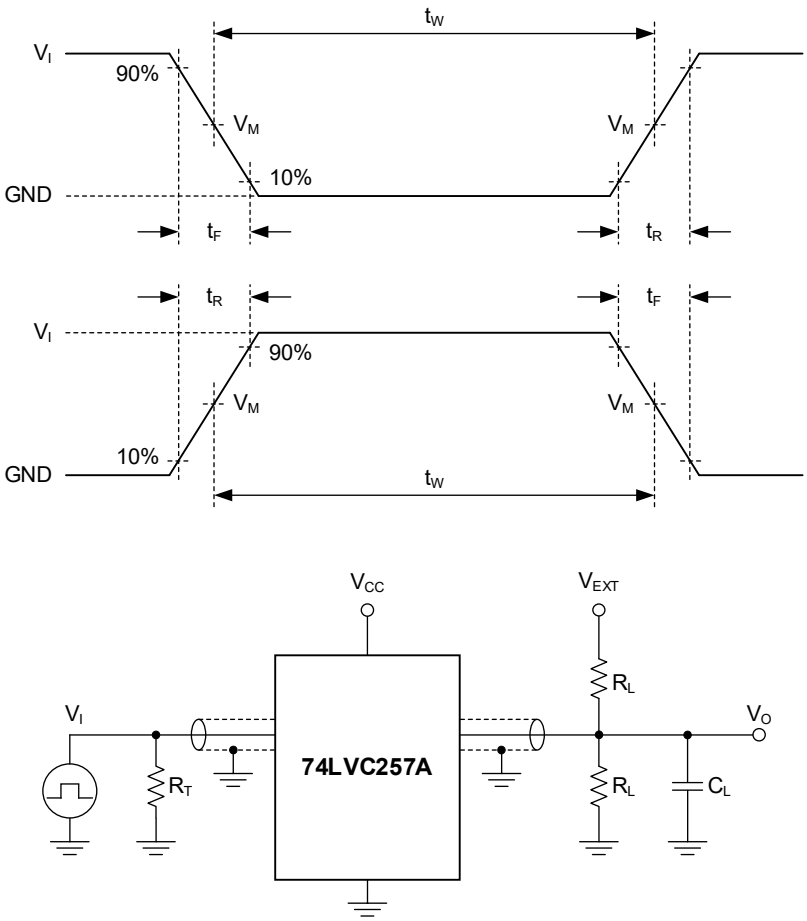
C_L = Output load capacitance in pF.

V_{CC} = Supply voltage in Volts.

N = Number of inputs switching.

$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = Sum of outputs.

TEST CIRCUIT



Test conditions are given in Table 1.

Definitions for test circuit:

R_L: Load resistance.

C_L: Load capacitance (includes jig and probe).

R_T: Termination resistance (equals to output impedance Z_O of the pulse generator).

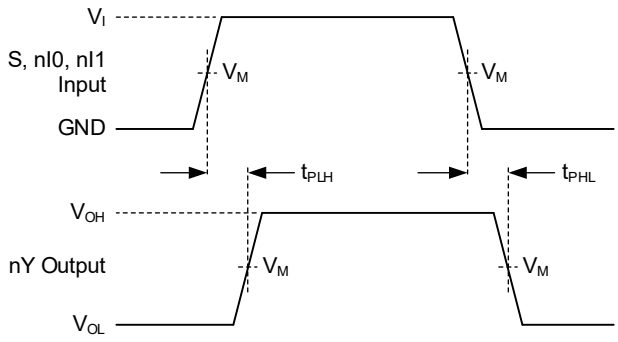
V_{EXT}: External voltage is used to measure switching time.

Figure 1. Test Circuit for Measuring Switching Times

Table 1. Test Conditions

SUPPLY VOLTAGE	INPUT		LOAD		V_{EXT}		
	V_I	t_R, t_F	C_L	R_L	t_{PLH}, t_{PHL}	t_{PLZ}, t_{PZL}	t_{PHZ}, t_{PZH}
1.2V	V_{CC}	≤ 2.0ns	30pF	1kΩ	Open	2 × V_{CC}	GND
1.65V to 1.95V	V_{CC}	≤ 2.0ns	30pF	1kΩ	Open	2 × V_{CC}	GND
2.3V to 2.7V	V_{CC}	≤ 2.0ns	30pF	500Ω	Open	2 × V_{CC}	GND
2.7V	2.7V	≤ 2.5ns	50pF	500Ω	Open	2 × V_{CC}	GND
3.0V to 3.6V	2.7V	≤ 2.5ns	50pF	500Ω	Open	2 × V_{CC}	GND

WAVEFORMS

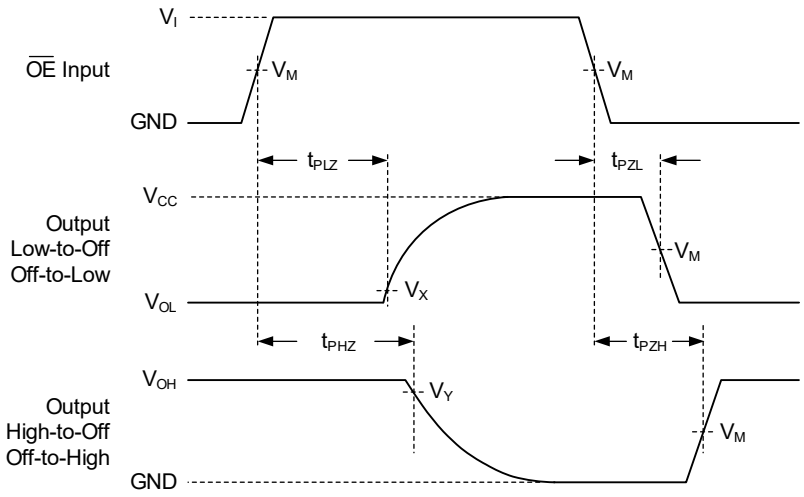


Test conditions are given in Table 1.

Measurement points are given in Table 2.

Logic levels: V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Figure 2. Data Inputs (nI0, nI1) and Common Data Selection Input (S) to Output (nY) Propagation Delay Times



Test conditions are given in Table 1.

Measurement points are given in Table 2.

Logic levels: V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Figure 3. Enable and Disable Times

Table 2. Measurement Points

SUPPLY VOLTAGE	INPUT		OUTPUT		
V_{CC}	V_I	V_M (1)	V_M	V_X	V_Y
1.2V	V_{CC}	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.15V	V_{OH} - 0.15V
1.65V to 1.95V	V_{CC}	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.15V	V_{OH} - 0.15V
2.3V to 2.7V	V_{CC}	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.15V	V_{OH} - 0.15V
2.7V	2.7V	1.5V	1.5V	V_{OL} + 0.3V	V_{OH} - 0.3V
3.0V to 3.6V	2.7V	1.5V	1.5V	V_{OL} + 0.3V	V_{OH} - 0.3V

NOTE:

1. The measurement points should be V_{IH} or V_{IL} when the input rising or falling time exceeds 2.5ns.

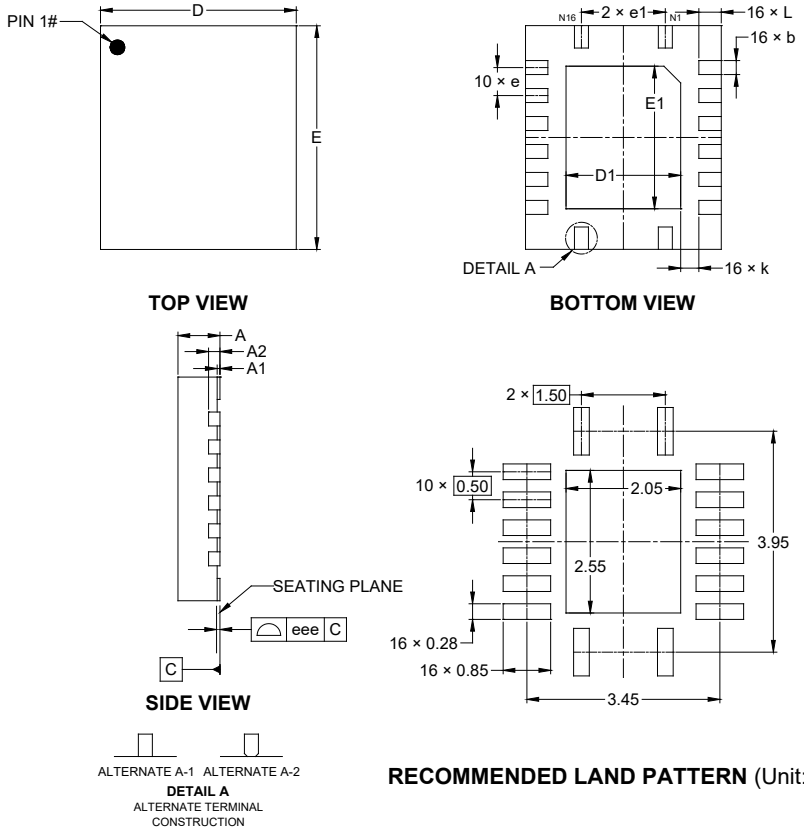
REVISION HISTORY

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Original to REV.A (JULY 2025)	Page
Changed from product preview to production data	All

PACKAGE OUTLINE DIMENSIONS

TQFN-3.5×4-16L

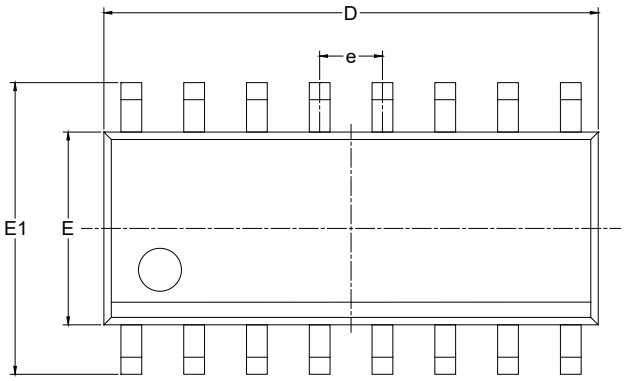


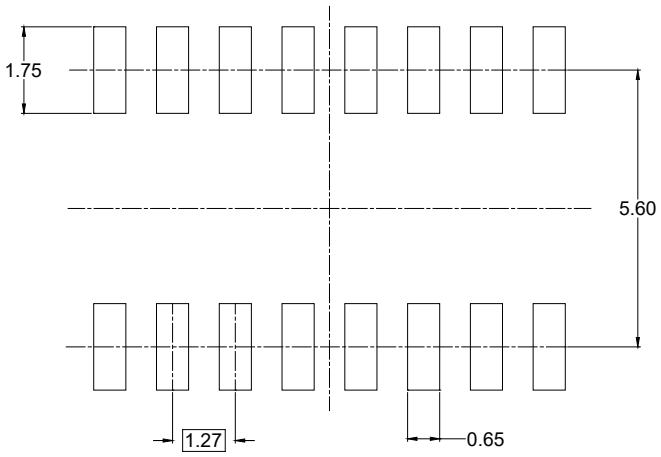
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.700	-	0.800
A1	0.000	-	0.050
A2	0.203 REF		
b	0.200	-	0.300
D	3.400	-	3.600
E	3.900	-	4.100
D1	1.950	-	2.150
E1	2.450	-	2.650
e	0.500 BSC		
e1	1.500 BSC		
k	0.325 REF		
L	0.300	-	0.500
eee	0.080		

NOTE: This drawing is subject to change without notice.

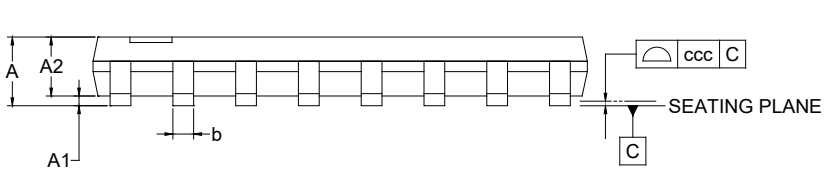
PACKAGE OUTLINE DIMENSIONS

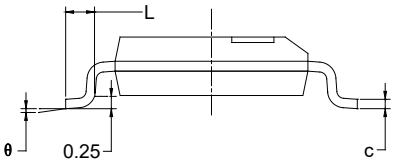
SOIC-16





RECOMMENDED LAND PATTERN (Unit: mm)



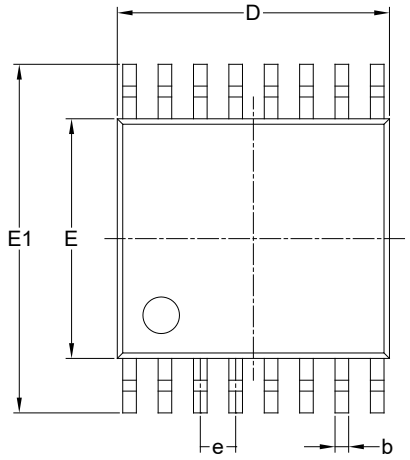


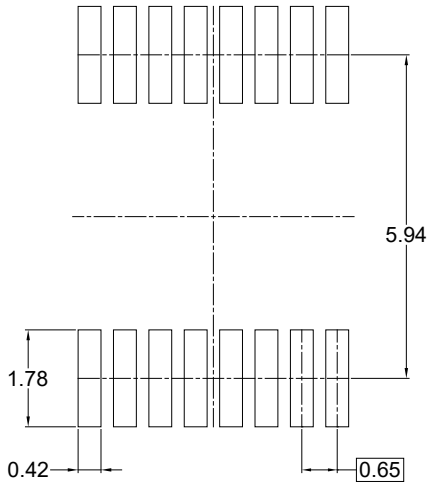
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.750
A1	0.100	-	0.250
A2	1.250	-	1.550
b	0.310	-	0.510
c	0.100	-	0.250
D	9.800	-	10.200
E	3.800	-	4.000
E1	5.800	-	6.200
e	1.270 BSC		
L	0.400	-	1.270
θ	0°	-	8°
ccc	0.100		

NOTES:
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MS-012.

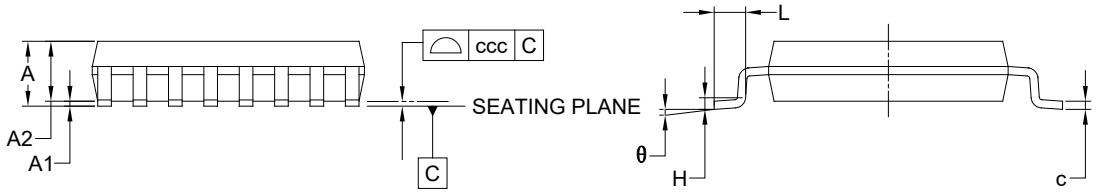
PACKAGE OUTLINE DIMENSIONS

TSSOP-16





RECOMMENDED LAND PATTERN (Unit: mm)

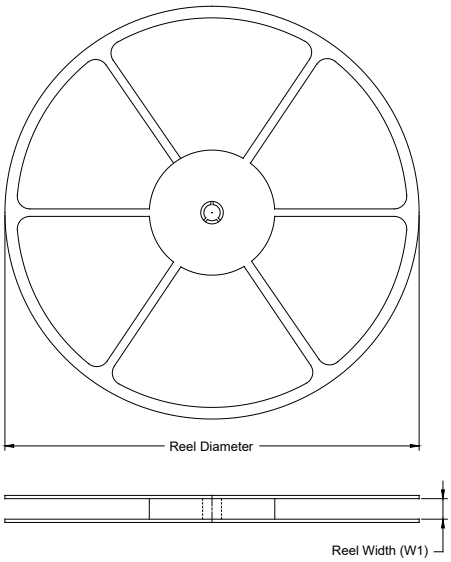


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.200
A1	0.050	-	0.150
A2	0.800	-	1.050
b	0.190	-	0.300
c	0.090	-	0.200
D	4.860	-	5.100
E	4.300	-	4.500
E1	6.200	-	6.600
e	0.650 BSC		
L	0.450	-	0.750
H	0.250 TYP		
θ	0°	-	8°
ccc	0.100		

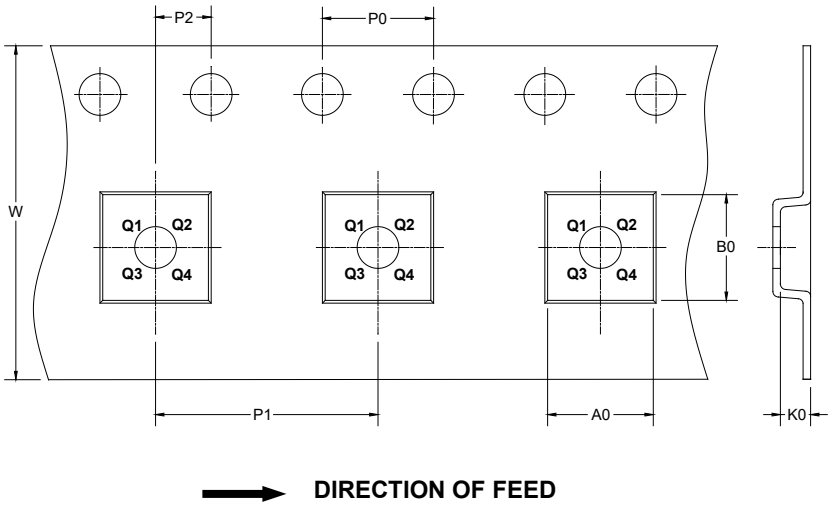
NOTES:
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-153.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



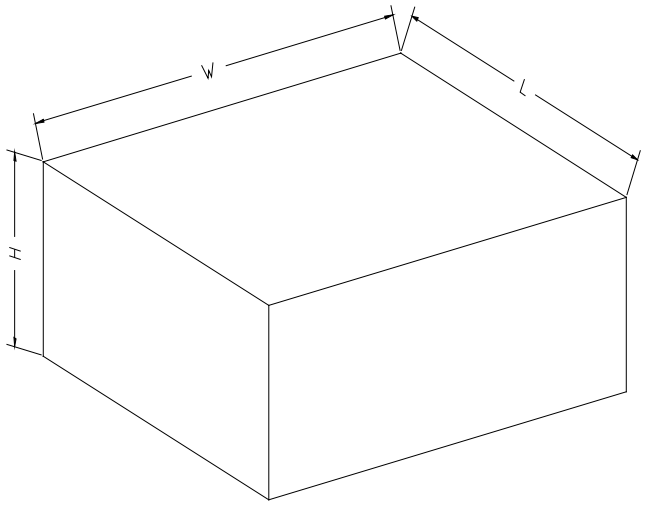
NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TQFN-3.5×4-16L	13"	12.4	3.75	4.25	1.05	4.0	8.0	2.0	12.0	Q1
SOIC-16	13"	16.4	6.50	10.30	2.10	4.0	8.0	2.0	16.0	Q1
TSSOP-16	13"	12.4	6.80	5.40	1.50	4.0	8.0	2.0	12.0	Q1

DD0001

CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
13″	386	280	370	5

DD0002