74LVC2G125
Dual Bus Buffer/Line Driver with 3-State Outputs

GENERAL DESCRIPTION

The 74LVC2G125 is a dual buffer/line driver with 3-state outputs and it is designed for 1.65V to 5.5V V_{CC} operation. The 3-state outputs are controlled by the output enable inputs ($1\overline{OE}$ and $2\overline{OE}$). When $n\overline{OE}$ is low, the device passes data from the nA input to the nY output. When $n\overline{OE}$ is high, all outputs are in the high-impedance state.

This device is highly suitable for partial power-down applications by using power-off leakage current (I_{OFF}) circuit. When the device is powered down, the outputs are disabled, and the current backflow can be prevented from passing through the device.

The 74LVC2G125 is available in Green VSSOP-8 and MSOP-8(S) packages. It operates over an operating temperature range of -40℃ to +125℃.

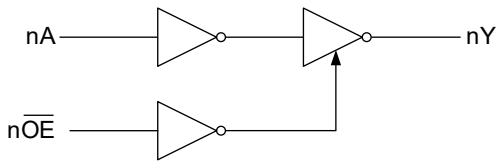
FEATURES

- **Wide Supply Voltage Range: 1.65V to 5.5V**
- **Inputs Accept Voltages up to 5.5V**
- **+32mA/-32mA Output Current at V_{CC} = 4.5V**
- **Propagation Delay: t_{PD} = 4.2ns (TYP) at V_{CC} = 3.3V**
- **Low Power Dissipation: I_{CC} = 2μA (MAX)**
- **Allow Down Translation to Supply Voltage**
- **Support Partial Power-Down Mode**
- **Outputs in High-Impedance State when V_{CC} = 0V**
- **-40℃ to +125℃ Operating Temperature Range**
- **Available in Green VSSOP-8 and MSOP-8(S) Packages**

APPLICATIONS

Industrial System
Medical Equipment
Computing: Server, PC and Notebook
Telecom Equipment

LOGIC DIAGRAM



FUNCTION TABLE

INPUT		OUTPUT
$n\overline{OE}$	nA	nY
L	H	H
L	L	L
H	*X*	Z

H = High Voltage Level

L = Low Voltage Level

Z = High-Impedance State

X = Don't Care

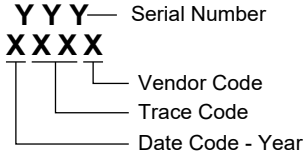
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
74LVC2G125	VSSOP-8	-40℃ to +125℃	74LVC2G125XVS8G/TR	0DM XXXX	Tape and Reel, 3000
	MSOP-8(S)	-40℃ to +125℃	74LVC2G125XSMS8G/TR	0DY XSMS8 XXXXX	Tape and Reel, 4000

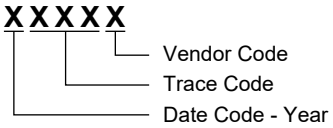
MARKING INFORMATION

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

VSSOP-8



MSOP-8(S)



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)
High-State or Low-State..... -0.5V to MIN(6.5V, V_{CC} + 0.5V)
High-Impedance or Power-Off State ..... -0.5V to 6.5V
Input Clamp Current, I_{IK} (V_I < 0V) .....-50mA
Output Clamp Current, I_{OK} (V_O < 0V) .....-50mA
Continuous Output Current, I_O .....±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.

DISCLAIMER

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

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range, V_{CC} ..... 1.65V to 5.5V
Input Voltage Range, V_I ..... 0V to 5.5V
Output Voltage Range, V_O
High-State or Low-State .....0V to V_{CC}
High-Impedance or Power-Off State..... 0V to 5.5V
Output Current, I_O..... ±32mA (MAX)
Input Transition Rise or Fall Rate, Δt/ΔV
V_{CC} = 1.8V ± 0.15V, 2.5V ± 0.2V..... 20ns/V (MAX)
V_{CC} = 3.3V ± 0.3V..... 10ns/V (MAX)
V_{CC} = 5.0V ± 0.5V..... 5ns/V (MAX)
Operating Temperature Range..... -40℃ to +125℃

OVERSTRESS CAUTION

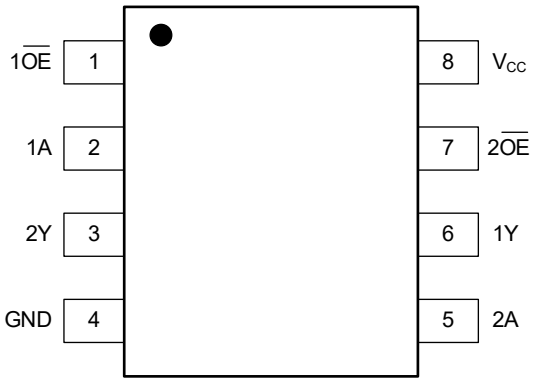
Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions 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.

PIN CONFIGURATIONS

(TOP VIEW)



VSSOP-8/MSOP-8(S)

PIN DESCRIPTION

PIN	NAME	FUNCTION
1, 7	1$\overline{OE}$, 2$\overline{OE}$	Output Enable Inputs (Active-Low).
2, 5	1A, 2A	Data Inputs.
6, 3	1Y, 2Y	Data Outputs.
4	GND	Ground.
8	V_{CC}	Supply Voltage.

ELECTRICAL CHARACTERISTICS

(Full = -40℃ to +125℃, all typical values are measured at T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
High-Level Input Voltage	V_{IH}	V_{CC} = 1.65V to 1.95V	Full	0.65 × V_{CC}			V
		V_{CC} = 2.3V to 2.7V	Full	1.7			
		V_{CC} = 3.0V to 3.6V	Full	2.0			
		V_{CC} = 4.5V to 5.5V	Full	0.70 × V_{CC}			
Low-Level Input Voltage	V_{IL}	V_{CC} = 1.65V to 1.95V	Full			0.35 × V_{CC}	V
		V_{CC} = 2.3V to 2.7V	Full			0.7	
		V_{CC} = 3.0V to 3.6V	Full			0.8	
		V_{CC} = 4.5V to 5.5V	Full			0.30 × V_{CC}	
High-Level Output Voltage	V_{OH}	V_{CC} = 1.65V to 5.5V, I_{OH} = -100μA	Full	V_{CC} - 0.1	V_{CC} - 0.01		V
		V_{CC} = 1.65V, I_{OH} = -4mA	Full	1.2	1.5		
		V_{CC} = 1.8V, I_{OH} = -8mA	Full	1.25	1.6		
		V_{CC} = 2.3V, I_{OH} = -8mA	Full	1.9	2.1		
		V_{CC} = 3.0V, I_{OH} = -16mA	Full	2.4	2.8		
		V_{CC} = 3.0V, I_{OH} = -24mA	Full	2.3	2.7		
		V_{CC} = 4.5V, I_{OH} = -32mA	Full	3.8	4.2		
Low-Level Output Voltage	V_{OL}	V_{CC} = 1.65V to 5.5V, I_{OL} = 100μA	Full		0.01	0.10	V
		V_{CC} = 1.65V, I_{OL} = 4mA	Full		0.10	0.45	
		V_{CC} = 1.8V, I_{OL} = 8mA	Full		0.15	0.55	
		V_{CC} = 2.3V, I_{OL} = 8mA	Full		0.12	0.30	
		V_{CC} = 3.0V, I_{OL} = 16mA	Full		0.20	0.40	
		V_{CC} = 3.0V, I_{OL} = 24mA	Full		0.30	0.55	
		V_{CC} = 4.5V, I_{OL} = 32mA	Full		0.35	0.75	
Input Leakage Current	I_I	nA or $n\overline{OE}$ inputs, V_{CC} = 0V to 5.5V, V_I = 5.5V or GND	Full		±0.1	±2	μA
Off-State Output Current	I_{OZ}	V_{CC} = 3.6V, V_O = 0V to 5.5V	Full		±0.1	±5	μA
Power-Off Leakage Current	I_{OFF}	V_{CC} = 0V, V_I or V_O = 5.5V	Full		±0.1	±5	μA
Supply Current	I_{CC}	V_{CC} = 1.65V to 5.5V, V_I = 5.5V or GND, I_O = 0A	Full		0.1	2	μA
Additional Supply Current	ΔI_{CC}	V_{CC} = 3.0V to 5.5V, one input at V_{CC} - 0.6V, other inputs at V_{CC} or GND	Full		0.1	10	μA
Input Capacitance	C_I	Data inputs, V_{CC} = 3.3V, V_I = V_{CC} or GND	+25℃		3.2		pF
		Control inputs, V_{CC} = 3.3V, V_I = V_{CC} or GND	+25℃		3.4		
Output Capacitance	C_O	V_{CC} = 3.3V, V_O = V_{CC} or GND	+25℃		5.4		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} = 1.8V, 2.5V, 3.3V and 5.0V respectively, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		TEMP	MIN (1)	TYP	MAX (1)	UNITS
Propagation Delay (2)	t_{PD}	nA to nY, see Figure 2	V_{CC} = 1.8V ± 0.15V	Full	1.0	8.3	19.2	ns
			V_{CC} = 2.5V ± 0.2V	Full	1.0	5.0	9.6	
			V_{CC} = 3.3V ± 0.3V	Full	1.0	4.2	7.7	
			V_{CC} = 5.0V ± 0.5V	Full	0.5	3.5	5.9	
Enable Time (2)	t_{EN}	$n\overline{OE}$ to nY, see Figure 3	V_{CC} = 1.8V ± 0.15V	Full	1.0	9.6	24.1	ns
			V_{CC} = 2.5V ± 0.2V	Full	1.0	5.8	11.1	
			V_{CC} = 3.3V ± 0.3V	Full	1.0	4.7	8.7	
			V_{CC} = 5.0V ± 0.5V	Full	0.5	3.9	6.5	
Disable Time (2)	t_{DIS}	$n\overline{OE}$ to nY, see Figure 3	V_{CC} = 1.8V ± 0.15V	Full	1.0	7.3	14.8	ns
			V_{CC} = 2.5V ± 0.2V	Full	0.5	4.4	7.8	
			V_{CC} = 3.3V ± 0.3V	Full	1.0	4.0	7.0	
			V_{CC} = 5.0V ± 0.5V	Full	0.5	3.2	5.2	
Power Dissipation Capacitance (3)	C_{PD}	Outputs enabled, f = 10MHz	V_{CC} = 1.8V	+25℃		15.0		pF
			V_{CC} = 2.5V	+25℃		15.0		
			V_{CC} = 3.3V	+25℃		15.0		
			V_{CC} = 5.0V	+25℃		15.0		
		Outputs disabled, f = 10MHz	V_{CC} = 1.8V	+25℃		0.3		
			V_{CC} = 2.5V	+25℃		0.3		
			V_{CC} = 3.3V	+25℃		0.3		
			V_{CC} = 5.0V	+25℃		0.4		

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_{PZH} and t_{PZL}. t_{DIS} is the same as t_{PLZ} and t_{PHZ}.

3. 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.

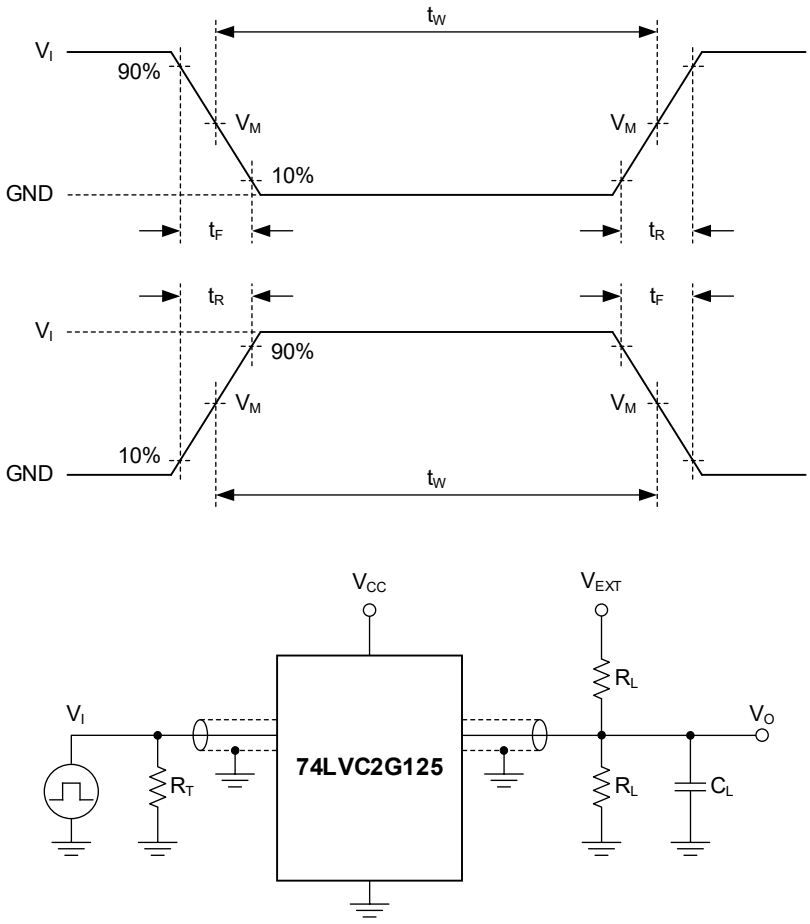
C_L = Output load capacitance in pF.

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).

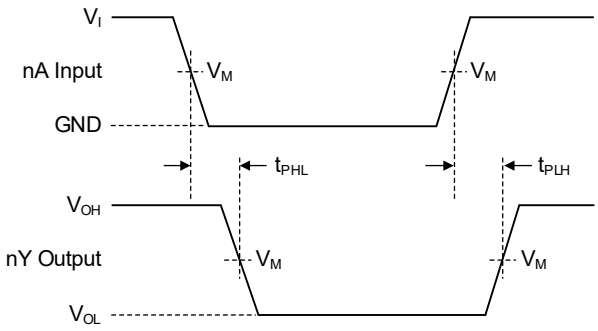
V_{EXT}: External voltage is used to measure switching time.

Figure 1. Test Circuit for Measuring Switching Times

Table 1. Test Conditions

SUPPLY VOLTAGE	INPUT		LOAD		V_{EXT}		
V_{CC}	V_I	t_R, t_F	C_L	R_L	t_{PLH}, t_{PHL}	t_{PLZ}, t_{PZL}	t_{PHZ}, t_{PZH}
1.8V ± 0.15V	V_{CC}	≤ 2.0ns	30pF	1kΩ	Open	2 × V_{CC}	GND
2.5V ± 0.2V	V_{CC}	≤ 2.0ns	30pF	500Ω	Open	2 × V_{CC}	GND
3.3V ± 0.3V	3V	≤ 2.5ns	50pF	500Ω	Open	6V	GND
5.0V ± 0.5V	V_{CC}	≤ 2.5ns	50pF	500Ω	Open	2 × V_{CC}	GND

WAVEFORMS

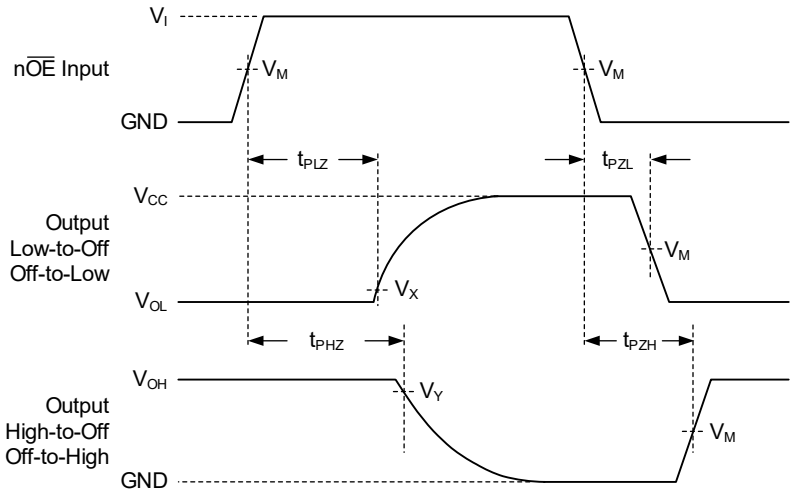


Test conditions are given in Table 1.

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. Input (nA) 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
1.8V ± 0.15V	V_{CC}	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.15V	V_{OH} - 0.15V
2.5V ± 0.2V	V_{CC}	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.15V	V_{OH} - 0.15V
3.3V ± 0.3V	3V	1.5V	1.5V	V_{OL} + 0.3V	V_{OH} - 0.3V
5.0V ± 0.5V	V_{CC}	0.5 × V_{CC}	0.5 × V_{CC}	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.

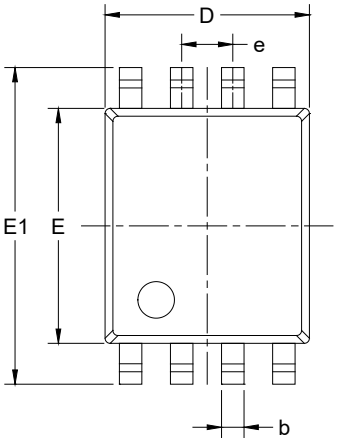
REVISION HISTORY

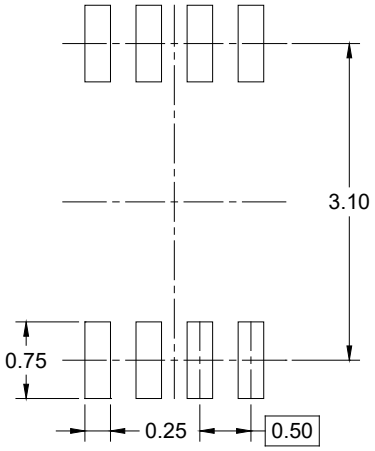
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Original (DECEMBER 2024) to REV.A	Page
Changed from product preview to production data	All

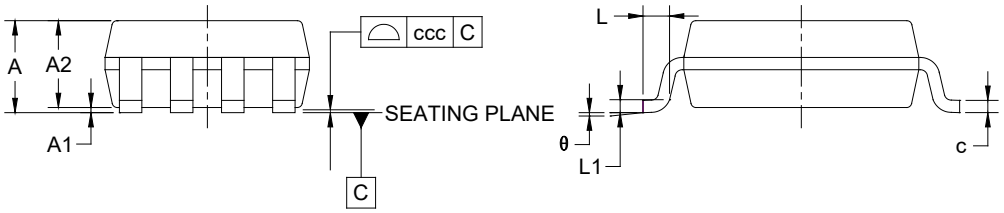
PACKAGE OUTLINE DIMENSIONS

VSSOP-8





RECOMMENDED LAND PATTERN (Unit: mm)

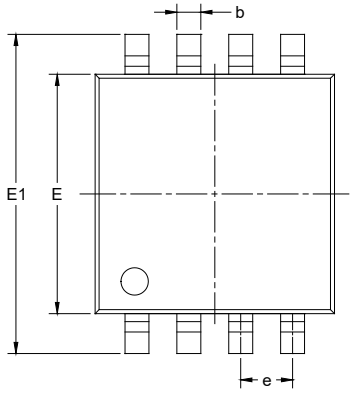


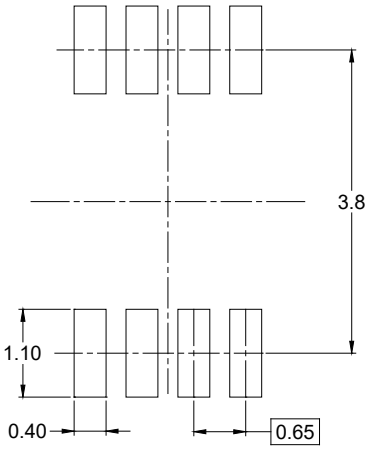
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.000
A1	0.000	-	0.150
A2	0.600		0.850
b	0.170	-	0.270
c	0.080		0.230
D	1.900	-	2.100
E	2.200	-	2.400
E1	3.000	-	3.200
e	0.500 BSC		
L	0.150	-	0.400
L1	0.120 BSC		
θ	0°	-	8°
ccc	0.100		

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-187 CA.

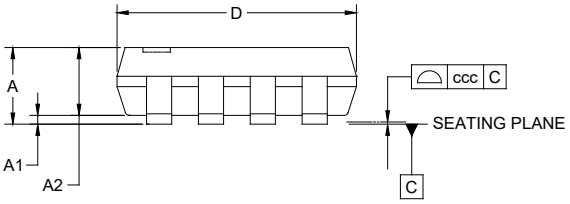
PACKAGE OUTLINE DIMENSIONS

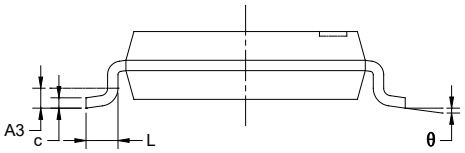
MSOP-8(S)





RECOMMENDED LAND PATTERN (Unit: mm)



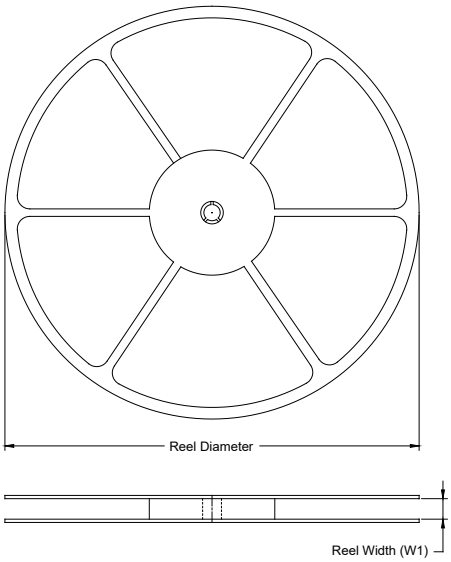


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.350
A1	0.000	-	0.150
A2	0.850 REF		
A3	0.250 REF		
b	0.150	-	0.380
c	0.080	-	0.180
D	2.750	-	3.150
E	2.600	-	3.100
E1	3.750	-	4.250
e	0.650 BSC		
L	0.200	-	0.600
θ	0°	-	8°
ccc	0.100		

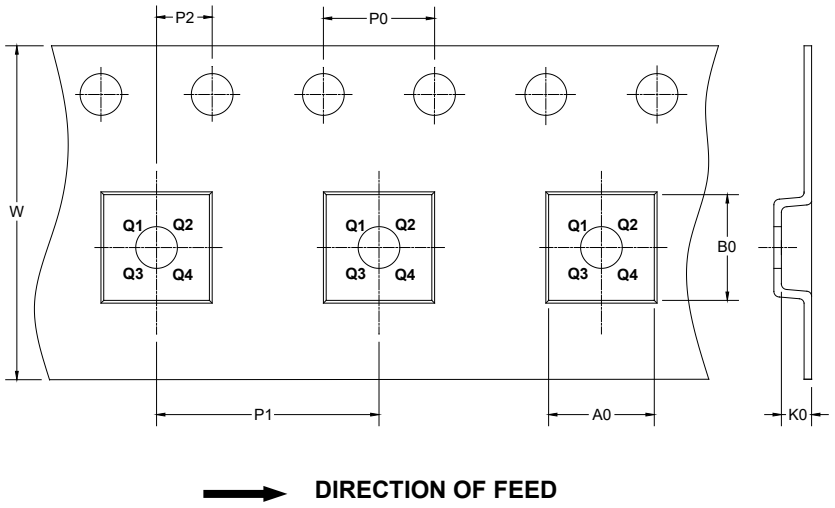
NOTES:
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-187.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



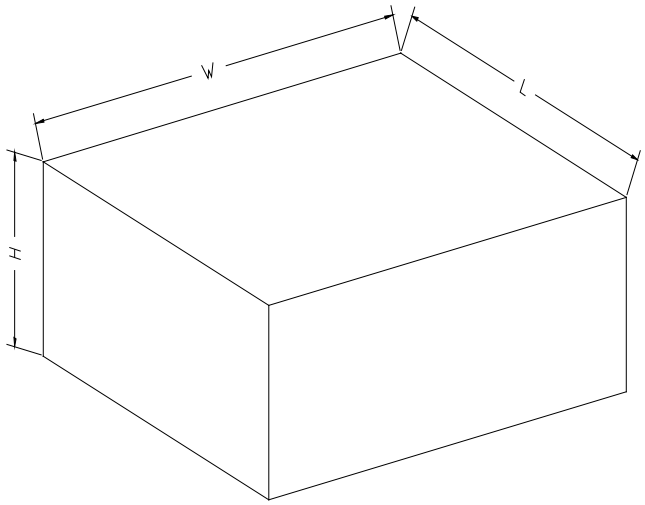
NOTE: The picture is only for reference. Please make the object as the standard.

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
VSSOP-8	7″	9.5	2.25	3.35	1.05	4.0	4.0	2.0	8.0	Q3
MSOP-8(S)	13"	12.4	3.35	4.45	1.45	4.0	4.0	2.0	12.0	Q3

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
7″ (Option)	368	227	224	8
7″	442	410	224	18
13″	386	280	370	5

DD0002