Single Bus Buffer Gate with 3-State Output

General Description

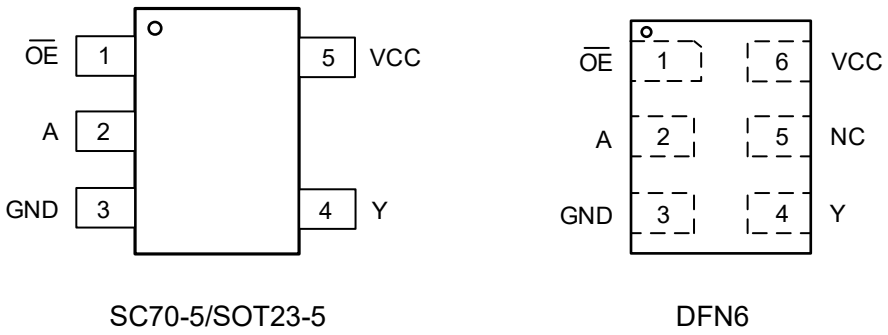
The ET74LV1T125 device is a single bus buffer gate/line driver with 3-state output. The output is disabled when the output-enable ($\overline{OE}$) input is high. When $\overline{OE}$ is low, data is passed from the A input to the Y output.

Features

- Designed for 1.6V to 5.5V V_{CC} Operation
- Over-voltage Tolerant Inputs Accept Voltages to 5.5V
- ±8mA Balanced Output Sink and Source Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- These Devices are Pb-Free and RoHS Compliant
- 3-State OE Input is Active-Low
- ESD Protection Exceeds JESD22
  -- HBM: ±4000V Pass (JEDEC JS-001)
  -- CDM: ±1000V Pass (JEDEC JS-002)
- Latch-up Performance Exceeds ±100mA per JEDEC JESD78F
- Part No. and Package Information

Part No.	Package	Packing Option	MSL
ET74LV1T125	SC70-5 (1.3mm × 2.1mm)	Tape and Reel, 3K/Reel	1
ET74LV1T125T	SOT23-5 (1.6mm × 2.9mm)	Tape and Reel, 3K/Reel	3
ET74LV1T125Y	DFN6 (1.0mm × 1.5mm)	Tape and Reel, 3K/Reel	1

Pin Configuration



SC70-5/SOT23-5 DFN6

Figure1. Pin Configuration

Pin Function

SC70-5/ SOT23-5

Pin No.	Pin Name	Function
1	$\overline{OE}$	Enable Input
2	A	Input
3	GND	Ground
4	Y	Output
5	VCC	Supply Voltage

DFN6

Pin No.	Pin Name	Function
1	$\overline{OE}$	Enable Input
2	A	Input
3	GND	Ground
4	Y	Output
5	NC	No Connect
6	VCC	Supply Voltage

Block Diagram

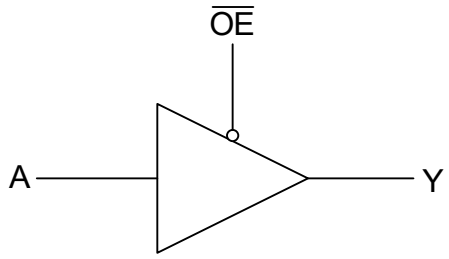


Figure2. Logic Symbol

Function Table

Input		Output
$\overline{OE}$	A	Y
L	L	L
L	H	H
H	X	Z

Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V_{CC}	DC Supply Voltage (VCC Pin)		-0.5 to 7.0	V
V_I	DC Input Voltage (1)		$-0.5 \le V_I \le 7.0$	V
V_O	DC Output Voltage Output in Higher or Low State		-0.5 to $V_{CC} + 0.5$	V
I_{IK}	DC Input Diode Current, V_I < GND		-50	mA
I_{OK}	DC Output Diode Current, V_O < GND, V_O > V_{CC}		±50	mA
I_O	DC Output Sink Current		±50	mA
I_{CC}	DC Supply Current Per Supply Pin		100	mA
I_{GND}	DC Ground Current Per Supply Pin		-100	mA
T_{STG}	Storage Temperature Range		-65 to 150	°C
T_L	Lead Temperature, Soldering 10 Seconds		260	°C
T_J	Max Junction Temperature		150	°C
V_{ESD}	ESD Classification	Human Body Model (2)	±4000	V
		Charged Device Model (3)	±1000	
I_{LU}	Max Latch Up Current Above V_{CC} and GND at 125°C (4)		±100	mA

Stresses exceeding those listed in this table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Note1: I_O absolute maximum rating must be observed.

Note2: HBM tested per JEDEC JS-001;

Note3: CDM tested per JEDEC JS-002;

Note4: Latch Up Current Maximum Rating tested per JEDEC JESD78F.

Thermal Characteristics

Symbol	Package	Ratings	Value	Unit
$R_{\theta JA}$	SC70-5	Thermal Characteristics, Thermal Resistance, Junction-to-Air	300	°C/W
	SOT23-5		250	
	DFN6		440	
P_D	SC70-5	Power Dissipation in Still Air at 85°C	215	mW
	SOT23-5		260	
	DFN6		150	

Recommended Operating Conditions

Symbol	Parameter		Min	Max	Unit
V_{CC}	DC Supply Voltage Operating		1.6	5.5	V
V_I	DC Input Voltage		0	V_{CC}	V
V_O	DC Output Voltage (High or Low State)		0	V_{CC}	V
T_A	Operating Temperature Range		-40	125	°C
t_r, t_f	Input Rise and Fall Time	V_{CC} = 1.8V to 5.5V	0	20	ns/V

Electrical Characteristics

DC Electrical Characteristics

Symbol	Parameter	Condition	V_{CC}(V)	T_A = 25°C			-40°C ≤ T_A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
V_{IH}	High-level Input Voltage		1.65~1.8	0.94			1.0		V
			2.0	0.99			1.03		
			2.25~2.5	1.135			1.18		
			2.75	1.21			1.23		
			3.0~3.3	1.35			1.37		
			3.6	1.47			1.48		
			4.5~5.0	2.02			2.03		
			5.5	2.10			2.11		
V_{IL}	Low-level Input Voltage		1.65~2.0			0.45		0.40	V
			2.25~2.75			0.75		0.71	
			3.0~3.6			0.80		0.65	
			4.5~5.5			0.80		0.80	
V_{OH}	High-level Output Voltage	I_{OH} = -20μA	1.65~5.5	V_{CC} - 0.1	V_{CC}		V_{CC} - 0.1		V
		I_{OH} = -2mA	1.65	1.28			1.21		
		I_{OH} = -2mA	1.8	1.5			1.45		
		I_{OH} = -2.3mA	2.3	2.0			2.0		
		I_{OH} = -3mA	2.3	2.0			1.93		
		I_{OH} = -3mA	2.5	2.25			2.15		
		I_{OH} = -3mA	3.0	2.78			2.7		
		I_{OH} = -5.5mA	3.0	2.6			2.49		
		I_{OH} = -5.5mA	3.3	2.9			2.8		
		I_{OH} = -4mA	4.5	4.2			4.1		
		I_{OH} = -8mA	4.5	4.1			3.95		
		I_{OH} = -8mA	5.5	4.6			4.5		
V_{OL}	Low-level Output Voltage	I_{OL} = 20μA	1.65~5.5			0.1		0.1	V
		I_{OL} = 2mA	1.65			0.2		0.25	
		I_{OL} = 2.3mA	2.3			0.1		0.15	
		I_{OL} = 3mA	2.3			0.15		0.2	
		I_{OL} = 3mA	3.0			0.1		0.15	
		I_{OL} = 5.5mA	3.0			0.2		0.252	
		I_{OL} = 4mA	4.5			0.15		0.2	
		I_{OL} = 8mA	4.5			0.3		0.35	

DC Electrical Characteristics (Continued)

Symbol	Parameter	Condition	V_{CC}(V)	T_A = 25°C			-40°C ≤ T_A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
I_I	Input Leakage Current	V_I = 5.5V or GND	0~5.5			±0.1		±1.0	μA
I_{OZ}	OFF-state output current					±0.25		±2.5	μA
I_{CC}	Quiescent Supply Current	V_I = 5.5V or GND	5.5			1.0		10	μA
ΔI_{CC}	Additional Supply Current	Per Input Pin; V_I = 0.3V or 1.1V; I_O = 0mA; Other Pins at V_{CC} or GND	1.8			10		10	μA
		Per Input Pin; V_I = 0.3V or 3.4V; I_O = 0mA; Other Pins at V_{CC} or GND	5.5			1.35		1.5	mA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

AC Electrical Characteristics

Symbol	Parameter	Condition	V_{CC}(V)	T_A = 25°C			-40°C ≤ T_A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation Delay (Figure3 & 4)	C_L = 15pF	1.8		13.3	16.5		18.5	ns
		C_L = 30pF	1.8		14.2	17.7		18.7	
		C_L = 15pF	2.5		8.4	10.4		12	
		C_L = 30pF	2.5		9.1	11.3		13	
		C_L = 15pF	3.3		6.7	8.3		9.4	
		C_L = 30pF	3.3		7.3	8.9		10.2	
		C_L = 15pF	5.0		5.6	6.5		7.3	
		C_L = 30pF	5.0		6	7		7.9	
t_{PZL} t_{PZH}	Output Enable Time (Figure5)	C_L = 15pF	1.8		13.3	16.5		18.5	ns
		C_L = 30pF	1.8		14.2	17.7		20.2	
		C_L = 15pF	2.5		9.9	11.9		13.5	
		C_L = 30pF	2.5		10.7	12.8		14.5	
		C_L = 15pF	3.3		6.8	8.3		9.4	
		C_L = 30pF	3.3		7.5	8.9		10.2	
		C_L = 15pF	5.0		5.8	6.7		7.6	
		C_L = 30pF	5.0		6.2	7.2		8.3	
t_{PLZ} t_{PHZ}	Output Disable Time (Figure5)	C_L = 15pF	1.8		15.1	18.1		20.1	ns
		C_L = 30pF	1.8		18.2	21.1		23.1	
		C_L = 15pF	2.5		12	13.5		15.1	
		C_L = 30pF	2.5		13.9	15.5		17.1	
		C_L = 15pF	3.3		9.9	11.1		12.1	
		C_L = 30pF	3.3		11.4	12.6		13.6	
		C_L = 15pF	5.0		7.5	8.5		9	
		C_L = 30pF	5.0		8.4	9.4		10	

Capacitance Characteristics

Symbol	Parameter	Condition	Typ	Unit
C_{IN}	Input Capacitance	V_{CC} = 5.5V, V_I = 0V or V_{CC}	5	pF
C_{PD}	Power Dissipation Capacitance (5)	10MHz, V_{CC} = 3.3V, V_I = 0V or V_{CC}	15	pF
		10MHz, V_{CC} = 5.5V, V_I = 0V or V_{CC}	15	

Note5: 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 V;

N = number of inputs switching;

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

AC Test Circuit

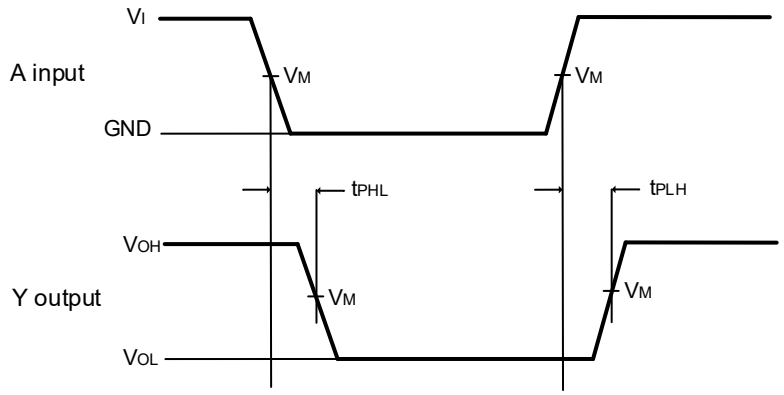
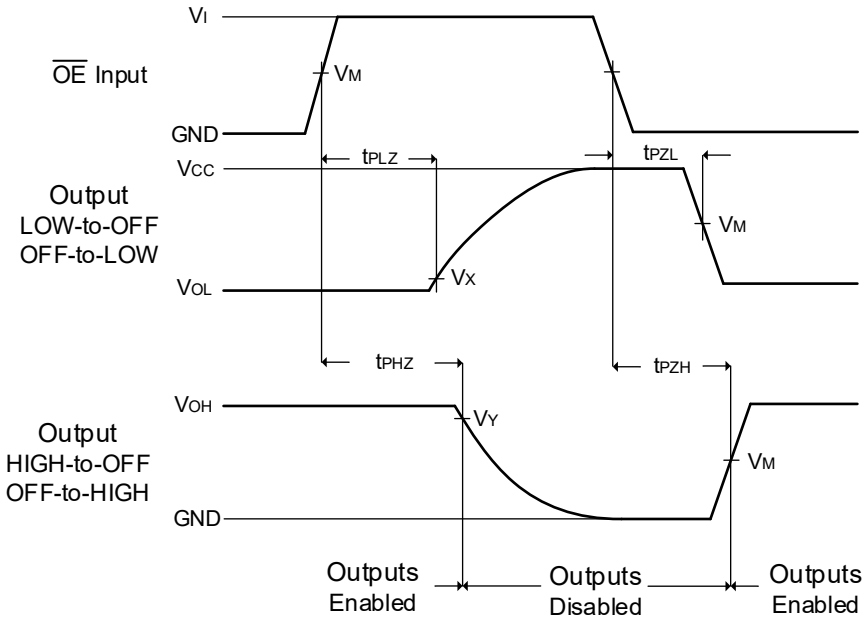


Figure3. Input A to output Y propagation delay times



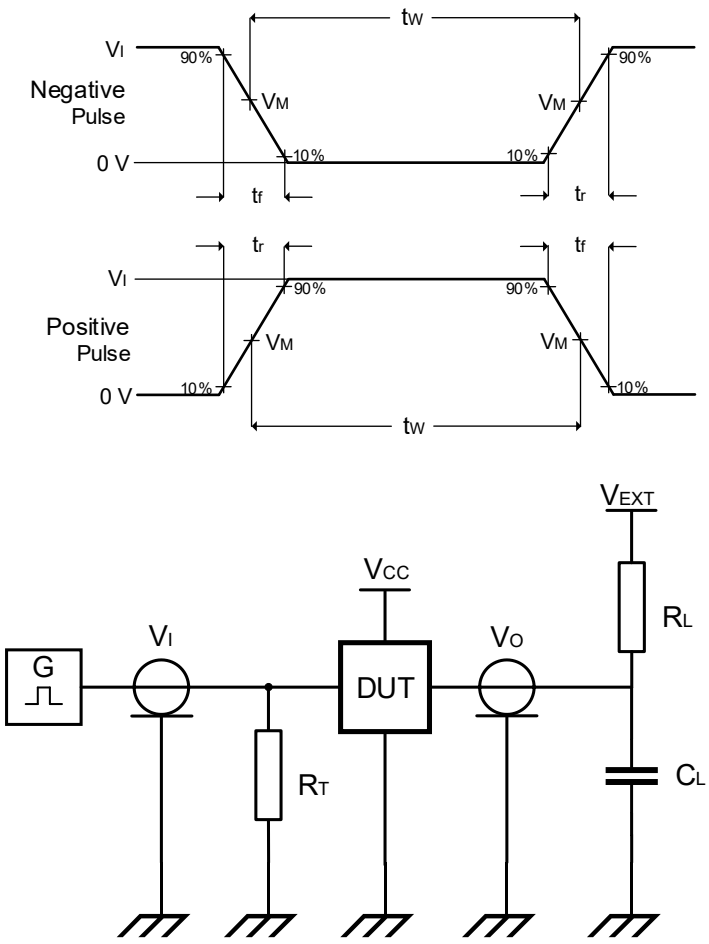
Measurement points are given in Table1.

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

Figure4. 3-state enable and disable times

Table 1. Measurement Points

Input	Output		
V_M	V_M	V_X	V_Y
0.5 × V_I	0.5 × V_{CC}	V_{OL} + 0.3V	V_{OH} - 0.3V



Measurement points are given in Table2.

Definitions test circuit:

R_L = Load resistance;

C_L = Load capacitance including jig and probe capacitance;

R_T = Termination resistance should be equal to output impedance Z_O of the pulse generator;

V_{EXT} = External voltage for measuring switching times.

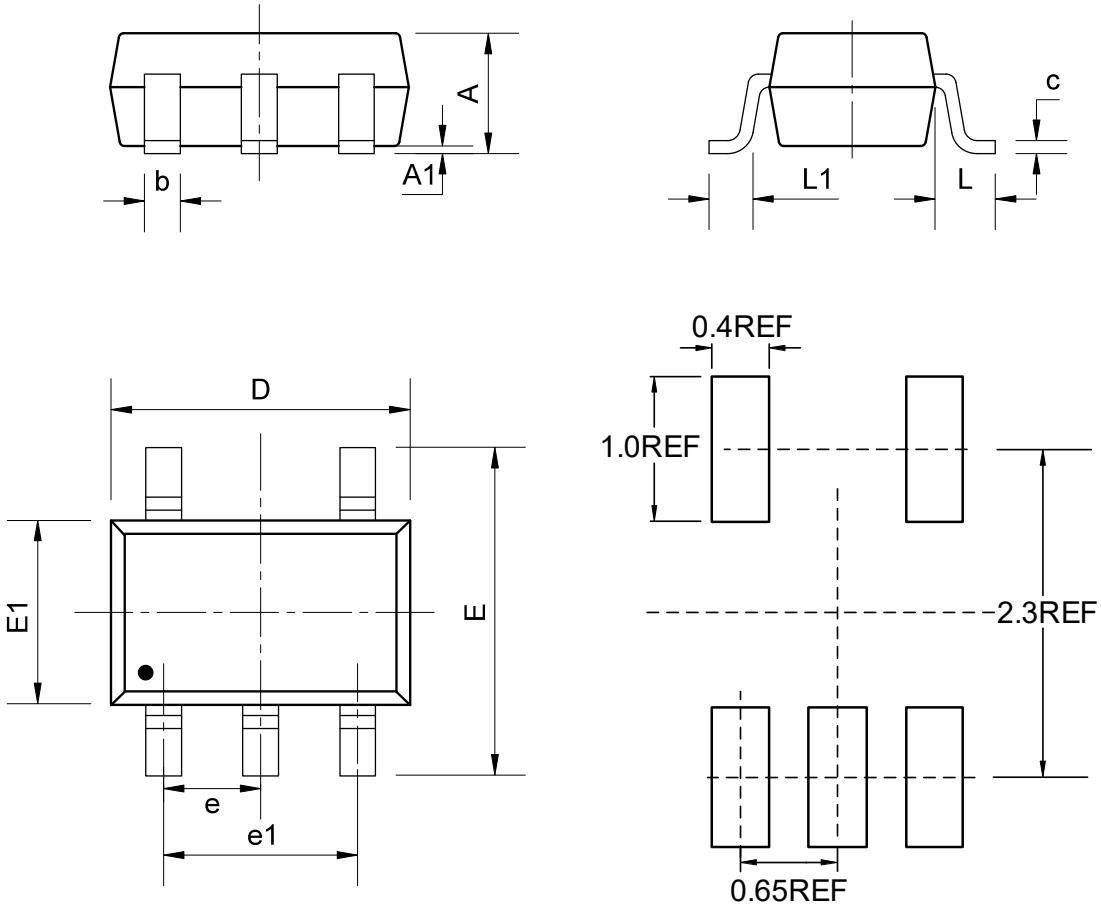
Figure5. Test Circuit for Measuring Switching Times

Table2. Test Data

Supply Voltage	**Input**			**Load**		**V_{EXT}**		
V_{CC}	**V_I**	**$t_r = t_f$**	**f_{max}**	**C_L**	**R_L**	**t_{PLH}, t_{PHL}**	**t_{PLH}, t_{PHL}**	**t_{PLH}, t_{PHL}**
1.8V	V_{CC}	≤ 3ns	15MHz	15pF, 30pF	1kΩ	Open	GND	V_{CC}
2.5V	V_{CC}	≤ 3ns	25MHz	15pF, 30pF	1kΩ	Open	GND	V_{CC}
3.3V	3V	≤ 3ns	50MHz	15pF, 30pF	1kΩ	Open	GND	V_{CC}
5.0V	3V	≤ 3ns	50MHz	15pF, 30pF	1kΩ	Open	GND	V_{CC}

Package Dimension

SC70-5 (1.3mm × 2.1mm)

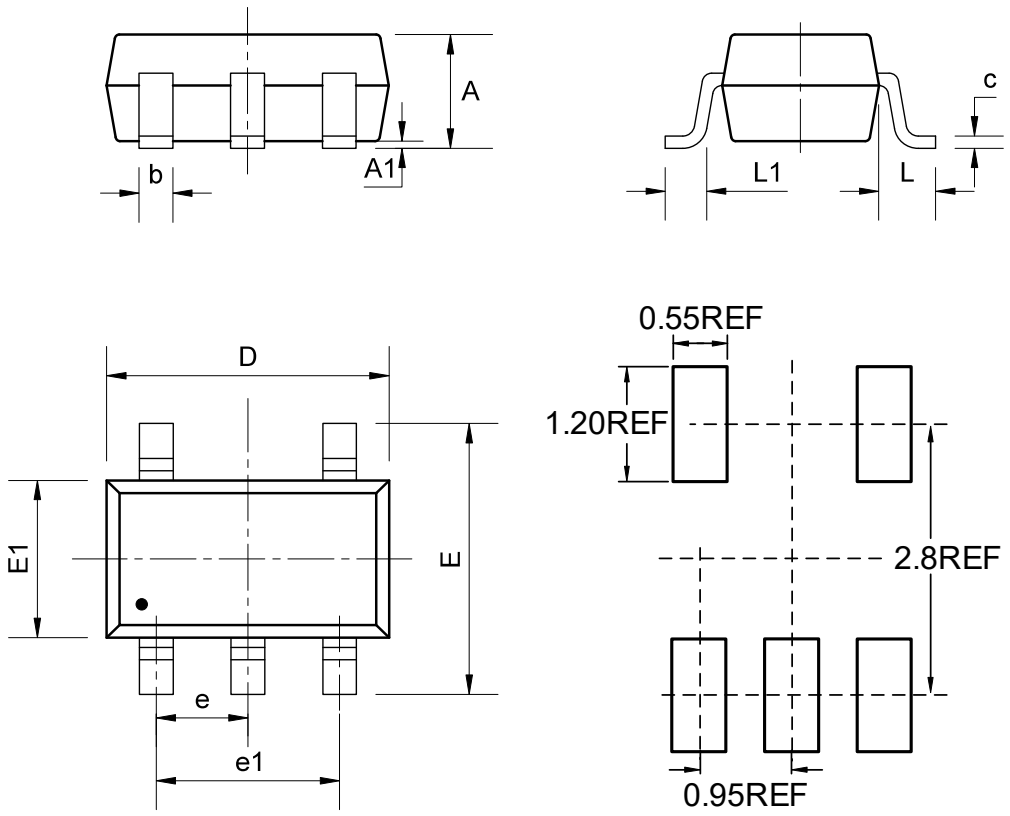


COMMON DIMENSIONS

(Unit: mm)

SYMBOL	MIN	NOM	MAX
A	-	-	1.10
A1	0.00	-	0.15
b	0.15	-	0.35
c	0.08	-	0.20
D	2.00	2.10	2.30
e	0.65BSC		
e1	1.30BSC		
E	2.15	2.30	2.50
E1	1.15	1.30	1.45
L	0.50REF		
L1	0.33REF		

SOT23-5 (1.6mm × 2.9mm)

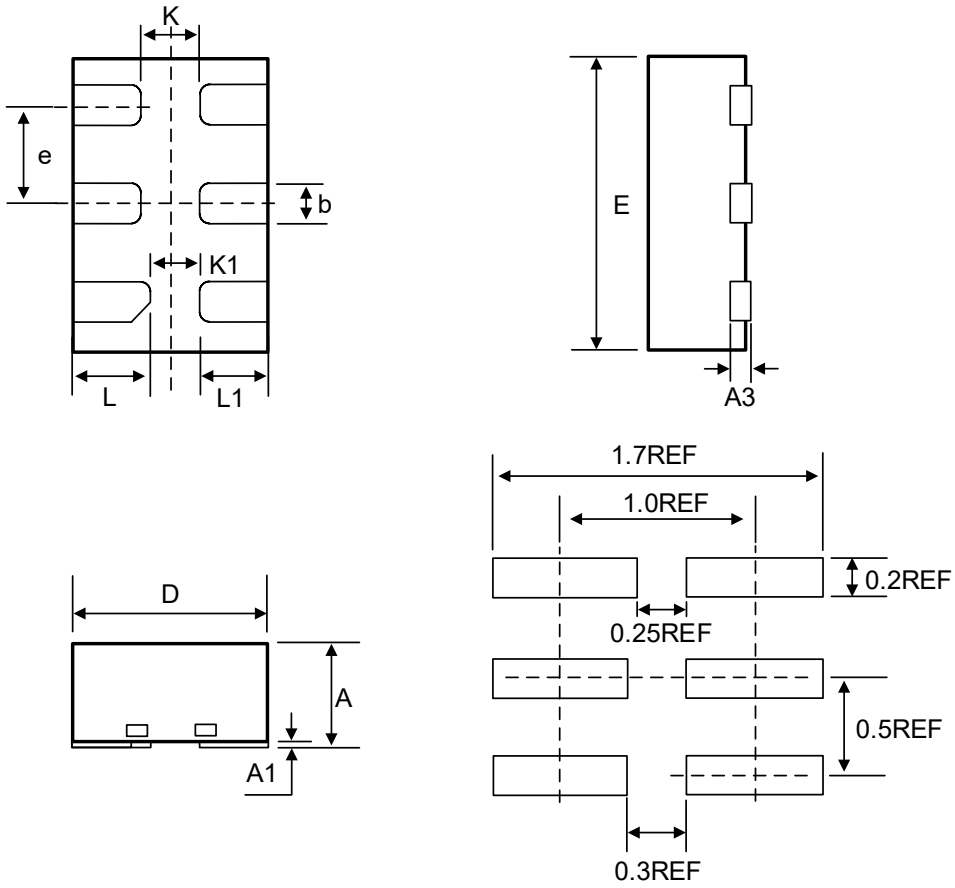


COMMON DIMENSIONS

(Unit: mm)

SYMBOL	MIN	NOM	MAX
A	-	-	1.45
A1	0.00	-	0.15
b	0.28	0.35	0.50
c	0.08	0.15	0.22
D	2.75	2.9	3.05
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
E	2.60	2.80	3.00
E1	1.45	1.6	1.75
L	0.60REF		
L1	0.30	0.45	0.60

DFN6 (1.0mm × 1.5mm)



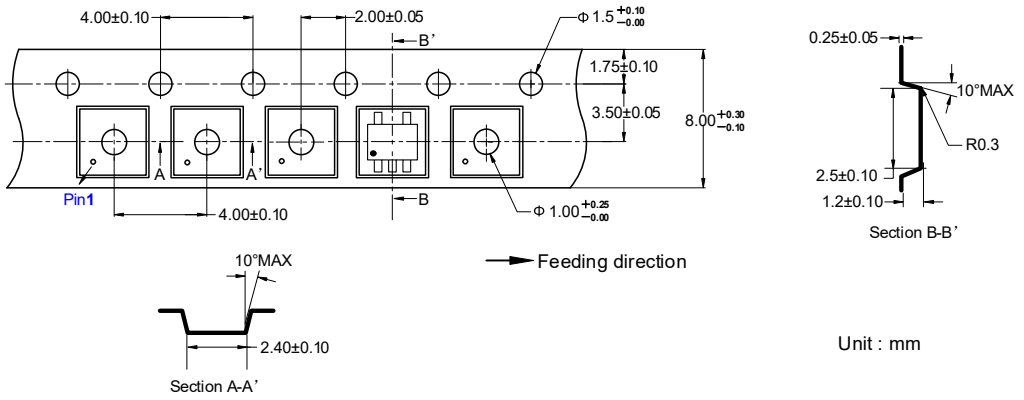
COMMON DIMENSIONS

(Unit: mm)

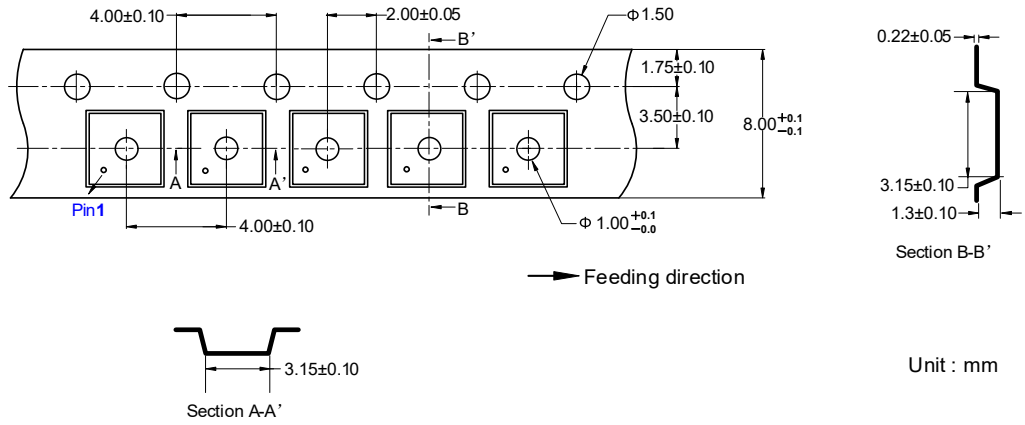
SYMBOL	MIN	NOM	MAX
A	0.50	--	0.60
A1	0.00	0.02	0.05
A3		0.10REF	
b	0.15	0.20	0.25
D	0.90	1.00	1.10
E	1.40	1.50	1.60
e		0.50BSC	
K		0.30REF	
K1		0.25REF	
L	0.35	0.40	0.45
L1	0.30	0.35	0.40

Tape Information

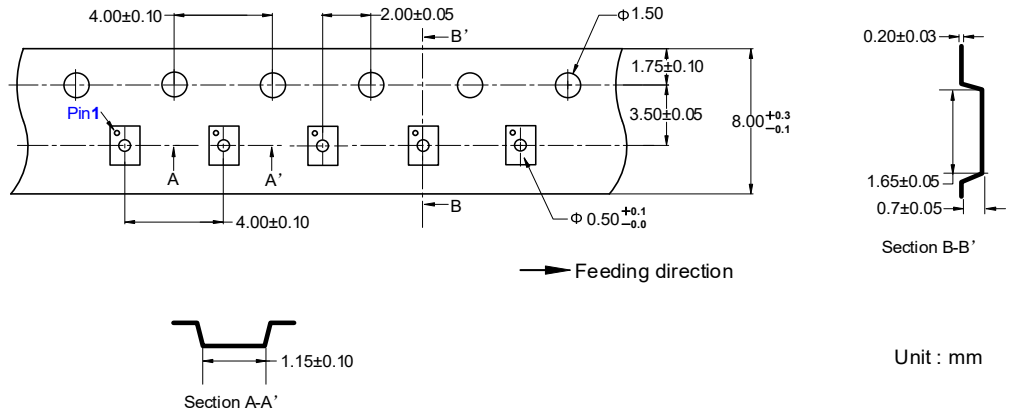
SC70-5 (1.3mm × 2.1mm)



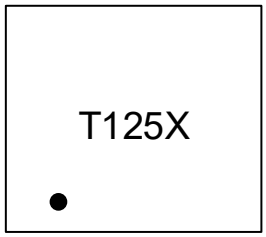
SOT23-5 (1.6mm × 2.9mm)



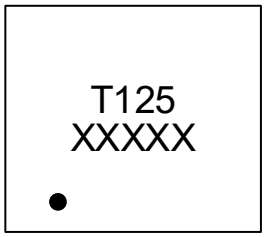
DFN6 (1.0mm × 1.5mm)



Marking Information



ET74LV1T125
T125 = Part Number
X = Tracking Number



ET74LV1T125T
T125 = Part Number
XXXXX = Tracking Number

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2025-11-03	Official Version	Wang anran	Yang xiaoxu	Liu jiaying
1.0.a	2026-03-20	Update Title	Xu tao	Yang xiaoxu	Liu jiaying