

Single 3-Input Positive-NAND Gate

General Description

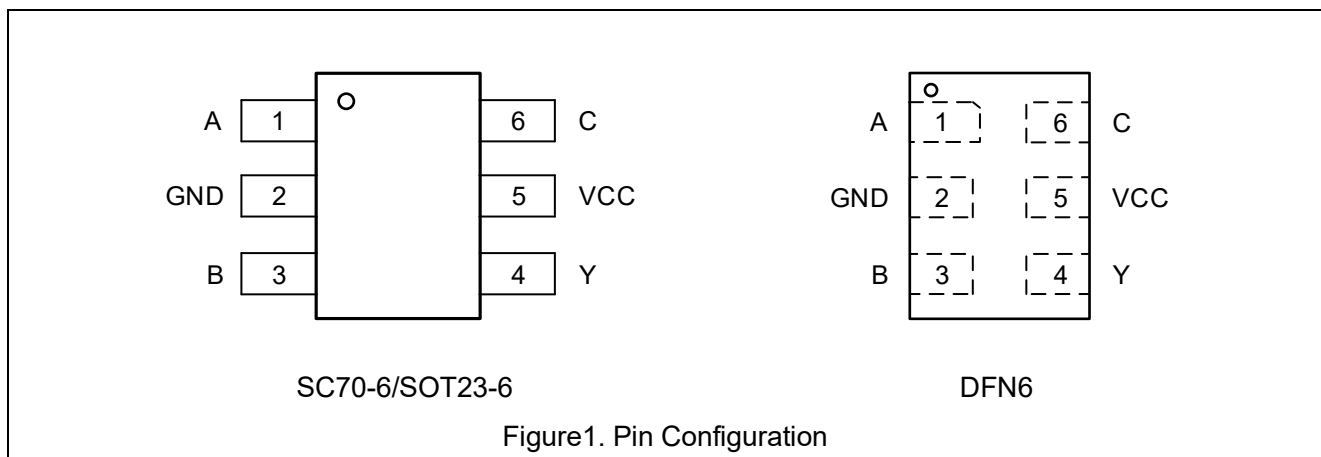
The ET74LVC1G10 is a single 3-input positive-NAND gate operating from a 1.65V to 5.5V supply. This device is fabricated with advanced CMOS technology to achieve ultra-high speed with high output drive.

Features

- Designed for 1.65V to 5.5V V_{CC} Operation
- Over-voltage Tolerant Inputs Accept Voltages to 5.5V
- $\pm 32\text{mA}$ Balanced Output Sink and Source Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- These Devices are Pb-Free and RoHS Compliant
- ESD Protection Complies with JESD22 Standard
 - HBM: $\pm 2000\text{V}$ Pass (JEDEC JS-001)
 - CDM: $\pm 1000\text{V}$ Pass (JEDEC JS-002)
- Latch-up Performance Exceeds $\pm 100\text{mA}$ per JEDEC JESD78F
- Part No. and Package Information

Part No.	Package	Packing Option	MSL
ET74LVC1G10	SC70-6 (1.3mm $\times$ 2.1mm)	Tape and Reel, 3K/Reel	1
ET74LVC1G10T	SOT23-6 (1.6mm $\times$ 2.9mm)	Tape and Reel, 3K/Reel	3
ET74LVC1G10Y	DFN6 (1.0 mm $\times$ 1.5 mm)	Tape and Reel, 3K/Reel	1

Pin Configuration



ET74LVC1G10

Pin Function

SC70-6/SOT23-6/DFN6

Pin No.	Pin Name	Function
1	A	Input A
2	GND	Ground
3	B	Input B
4	Y	Output Y
5	VCC	Supply Voltage
6	C	Input C

Block Diagram

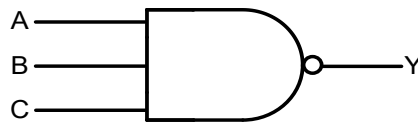


Figure2. Logic Symbol

Functional Table

Input			Output
A	B	C	Y
H	H	H	L
L	X	X	H
X	L	X	H
X	X	L	H

H = HIGH voltage level;

L = LOW voltage level;

X = Don't care.

ET74LVC1G10

Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V _{CC}	DC Supply Voltage (VCC Pin)		-0.5 to 6.5	V
I _{IK}	DC Input Diode Current, V _I < GND		-50	mA
V _I	DC Input Voltage ⁽¹⁾		-0.5 ≤ V _I ≤ 6.5	V
I _{OK}	DC Output Diode Current, V _O < GND		±50	mA
V _O	DC Output Voltage Output in Higher or Low State		-0.5 to V _{CC} + 0.5	V
I _O	DC Output Sink Current, V _O = 0V to V _{CC}		±50	mA
I _{CC}	DC Supply Current per Supply Pin		100	mA
I _{GND}	DC Ground Current per Supply Pin		-100	mA
T _J	Max Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-65 to 150	°C
V _{ESD}	ESD Classification	Human Body Model ⁽²⁾	±2000	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 the Maximum Ratings 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 _{θJA}	SC70-6	Thermal Characteristics, Thermal Resistance, Junction-to-Air	280	°C/W
	SOT23-6		180	
	DFN6		440	
P _D	SC70-6	Power Dissipation in Still Air at 85°C	230	mW
	SOT23-6		360	
	DFN6		150	

Recommended Operating Conditions

Symbol	Parameter		Min	Max	Unit
V _{CC}	DC Supply Voltage Operating		1.65	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} = 1.65V to 2.7V		20	ns/V
		V _{CC} = 2.7V to 5.5V		10	

ET74LVC1G10

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		1.65~1.95	0.65V _{CC}			0.65V _{CC}		V
			2.3~2.7	1.7			1.7		
			2.7~3.6	2.0			2.0		
			4.5~5.5	0.7V _{CC}			0.7V _{CC}		
V _{IL}	Low-Level Input Voltage		1.65~1.95			0.35V _{CC}		0.35V _{CC}	V
			2.3~2.7			0.7		0.7	
			2.7~3.6			0.8		0.8	
			4.5~5.5			0.3V _{CC}		0.3V _{CC}	
V _{OH}	High-Level Output Voltage	I _{OH} = -100uA	1.65~5.5	V _{CC} - 0.1			V _{CC} - 0.1		V
		I _{OH} = -4mA	1.65	1.2			0.95		
		I _{OH} = -8mA	2.3	1.9			1.7		
		I _{OH} = -12mA	2.7	2.2			1.9		
		I _{OH} = -24mA	3.0	2.3			2.0		
		I _{OH} = -32mA	4.5	3.8			3.4		
V _{OL}	Low-Level Output Voltage	I _{OL} = 100uA	1.65~5.5			0.1		0.1	V
		I _{OL} = 4mA	1.65			0.45		0.70	
		I _{OL} = 8mA	2.3			0.3		0.45	
		I _{OL} = 12mA	2.7			0.4		0.60	
		I _{OL} = 24mA	3.0			0.55		0.80	
		I _{OL} = 32mA	4.5			0.55		0.80	
I _I	Input Leakage Current	V _I = 5.5V or GND	0~5.5		±0.1	±1.0		±1.0	uA
I _{OFF}	Power Off Leakage Current	V _I = 5.5V or V _O = 5.5V	0		±0.1	±2.0		±2.0	uA
I _{CC}	Quiescent Supply Current	V _I = 5.5V or GND	1.65~5.5		0.1	4		4	uA
ΔI _{CC}	Additional Supply Current	Per Pin: V _I = V _{CC} - 0.6V; I _O = 0mA	2.3~5.5		5	500		500	uA

ET74LVC1G10

AC Electrical Characteristics

$t_r = t_f = 3\text{ns}$

Symbol	Parameter	Condition	V_{CC} (V)	$T_A = 25^\circ\text{C}$			$-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$		Unit
				Min	Typ	Max	Min	Max	
t_{PD}	Propagation Delay (Figure3 and 4)	$R_L = 1\text{k}\Omega$; $C_L = 30\text{pF}$	1.65~1.95	1.5	9.4	17	1.5	21	ns
		$R_L = 500\Omega$; $C_L = 30\text{pF}$	2.3~2.7	1.0	5.8	10.5	1.0	13.6	
		$R_L = 500\Omega$; $C_L = 50\text{pF}$	2.7	1.0	5.2	9.8	1.0	11.2	
		$R_L = 500\Omega$; $C_L = 50\text{pF}$	3.0~3.6	1.0	4.8	8.2	1.0	9.9	
		$R_L = 500\Omega$; $C_L = 50\text{pF}$	4.5~5.5	1.0	3.6	6.6	1.0	7.8	

Capacitance Characteristics

Symbol	Parameter	Condition	Typ	Unit
C_{IN}	Input Capacitance	$V_{CC} = 5.5\text{V}$, $V_I = 0\text{V}$ or V_{CC}	3.5	pF
C_{PD}	Power Dissipation Capacitance ⁽⁵⁾	10MHz, $V_{CC} = 3.3\text{V}$, $V_I = 0\text{V}$ or V_{CC}	16	pF

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;

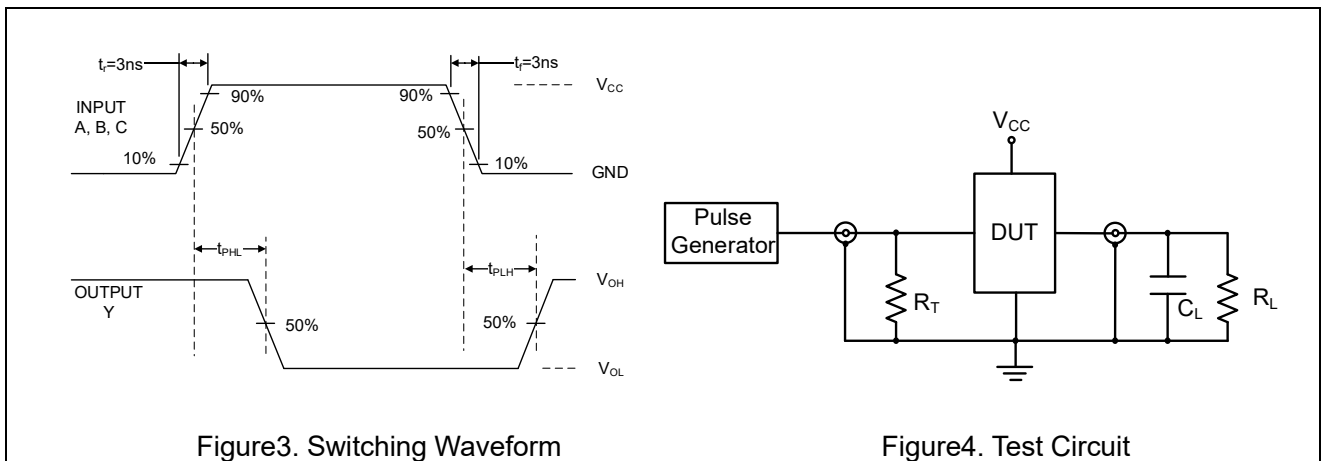
C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

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

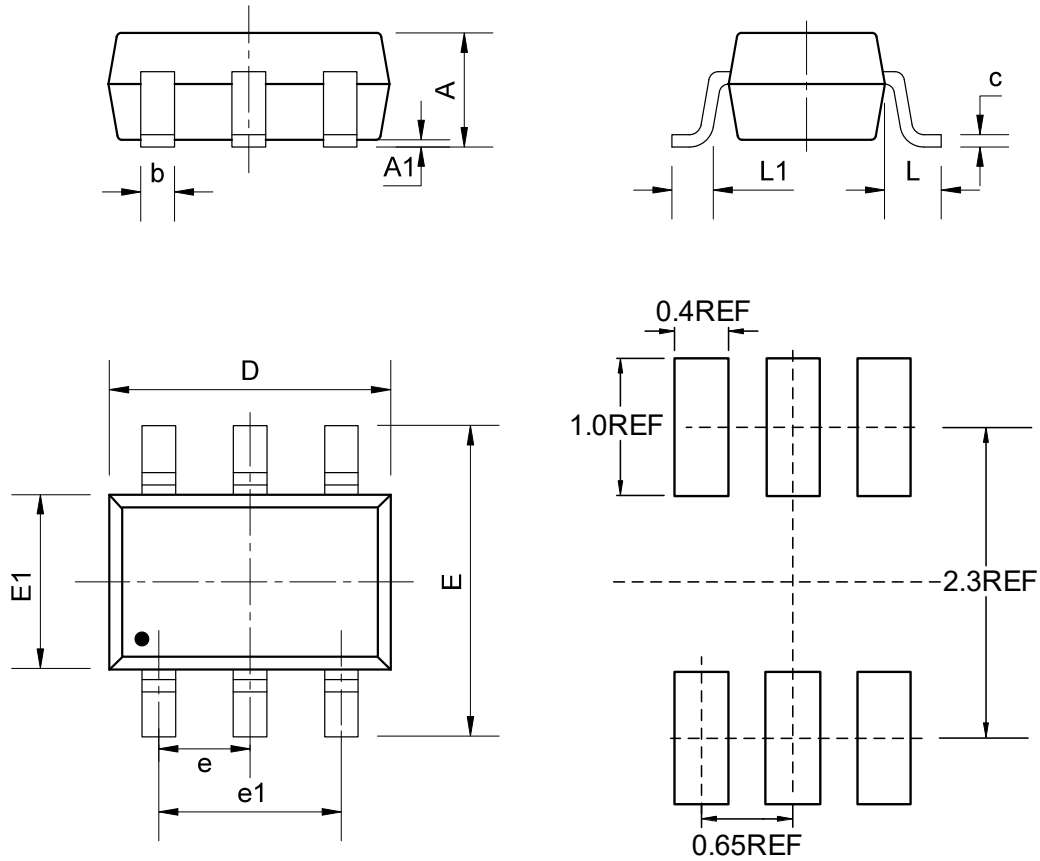
AC Test Circuit



ET74LVC1G10

Package Dimension

SC70-6 (1.3mm × 2.1mm)



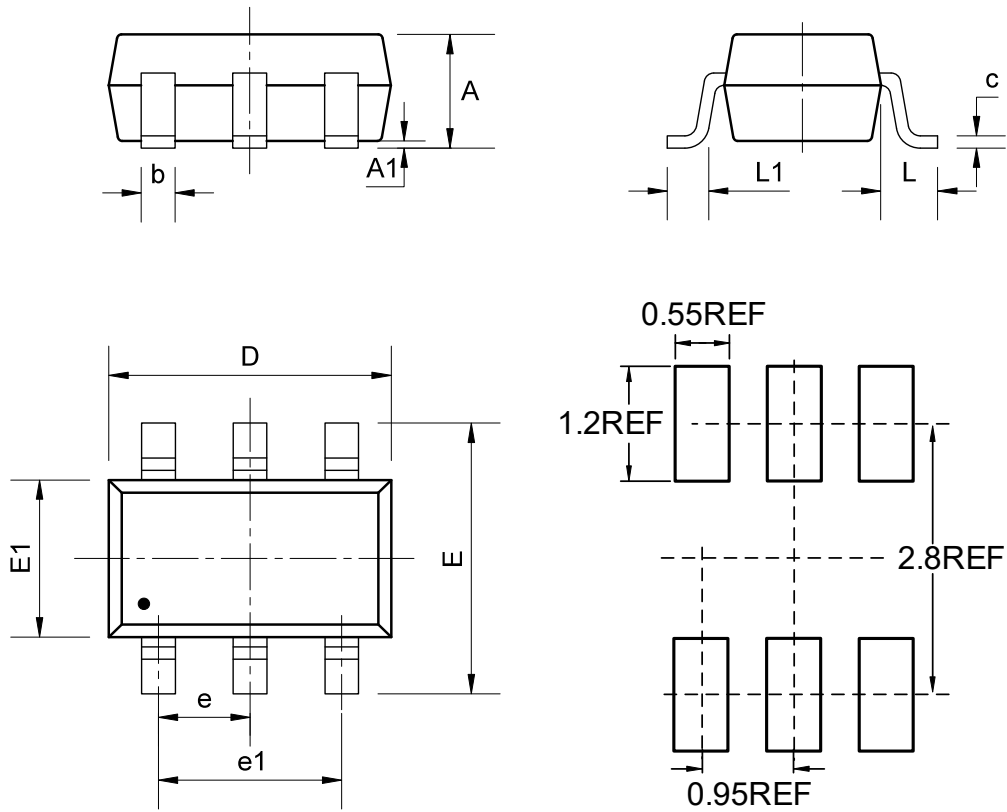
COMMON DIMENSIONS

(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		

ET74LVC1G10

SOT23-6(1.6mm × 2.9mm)



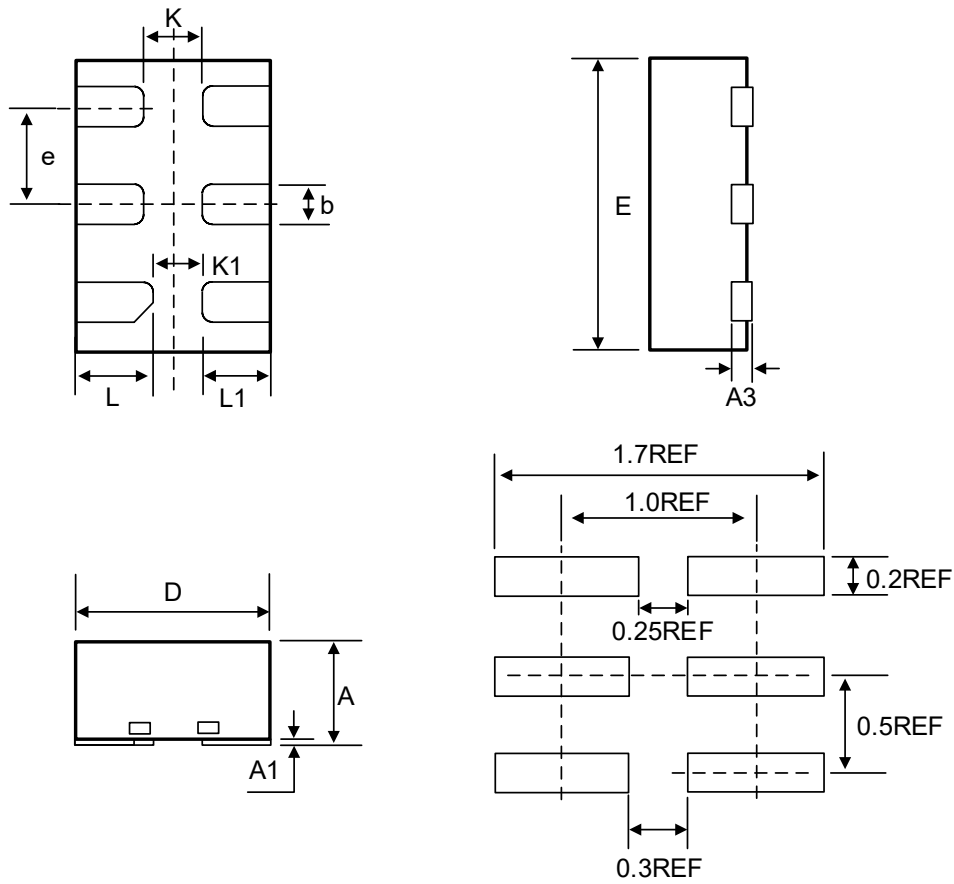
COMMON DIMENSIONS

(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

ET74LVC1G10

DFN6(1.0mm × 1.5mm)



COMMON DIMENSIONS

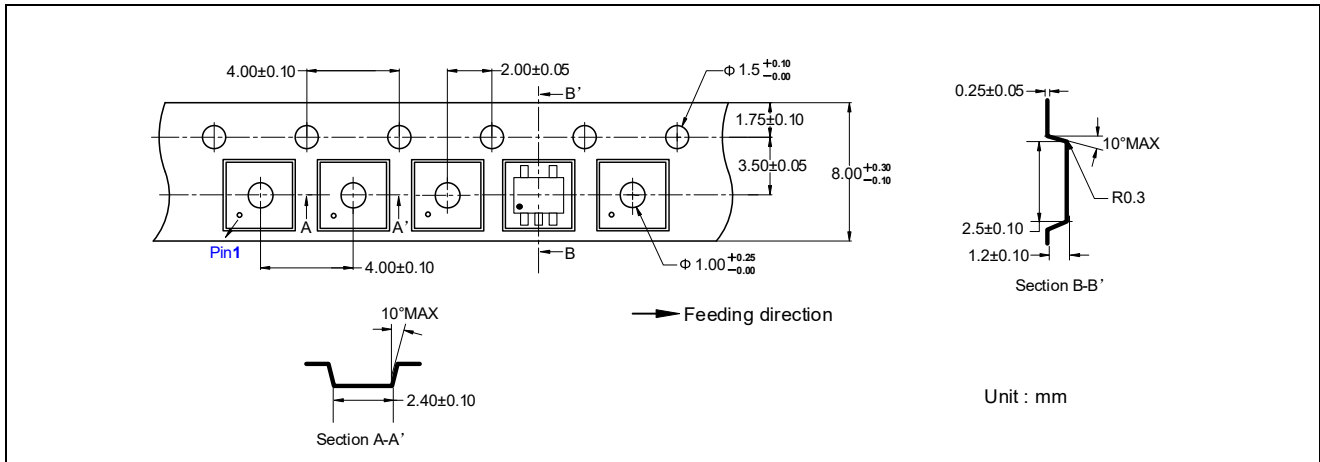
(Unit: mm)

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

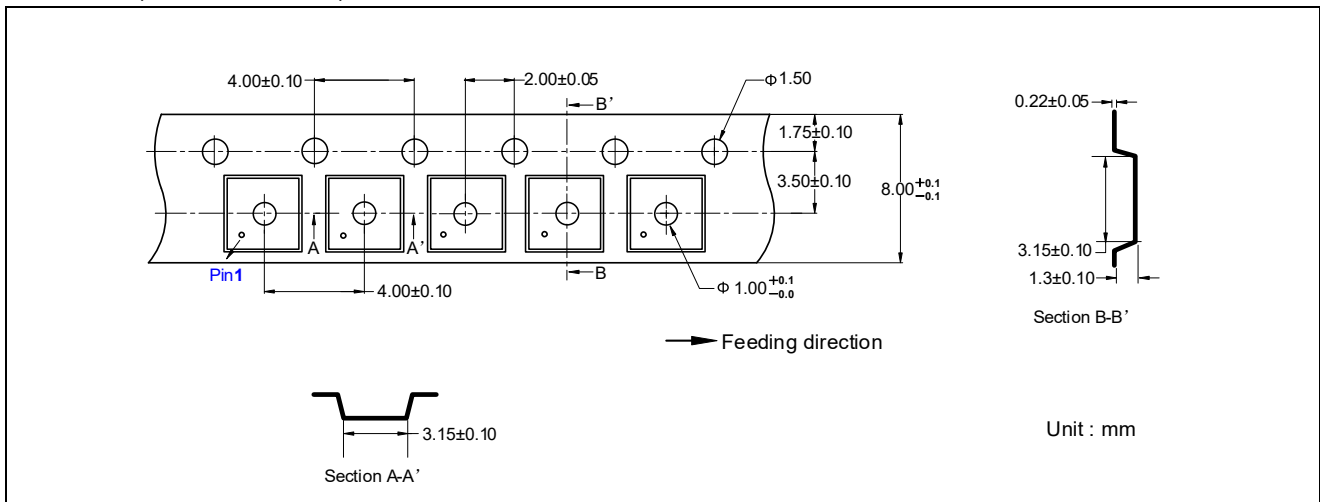
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Tape Information

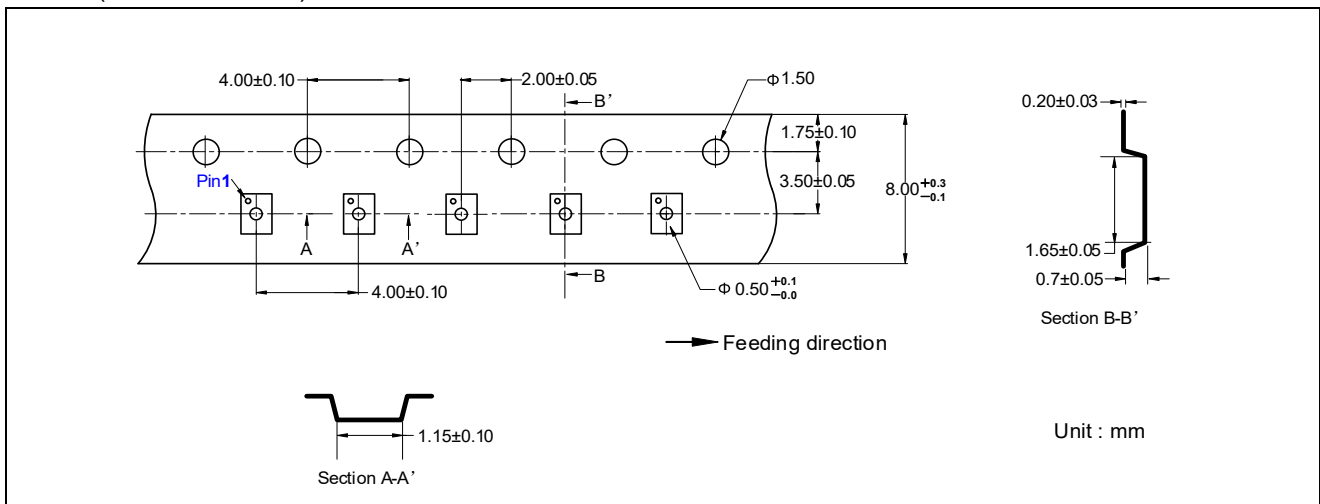
SC70-6 (1.3mm × 2.1mm)



SOT23-6 (1.6mm × 2.9mm)

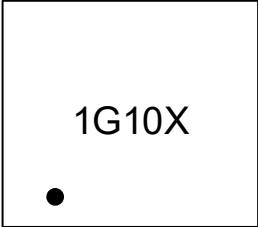
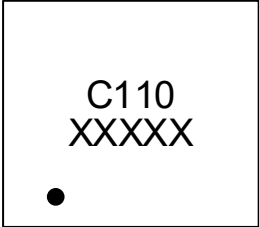
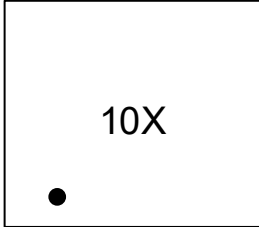


DFN6 (1.0mm × 1.5mm)



ET74LVC1G10

Marking Information

		
ET74LVC1G10 1G10 = Part Number X = Tracking Number	ET74LVC1G10T C110 = Part Number XXXXX = Tracking Number	ET74LVC1G10Y 10 = Part Number X = Tracking Number

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2025-11-05	Official Version	Xu tao	Yang xiaoxu	Liu jiaying
1.1	2025-12-21	Update EC Table, Format and Package	Xu tao	Yang xiaoxu	Liu jiaying