

Dual Inverter with Schmitt-Trigger Inputs

General Description

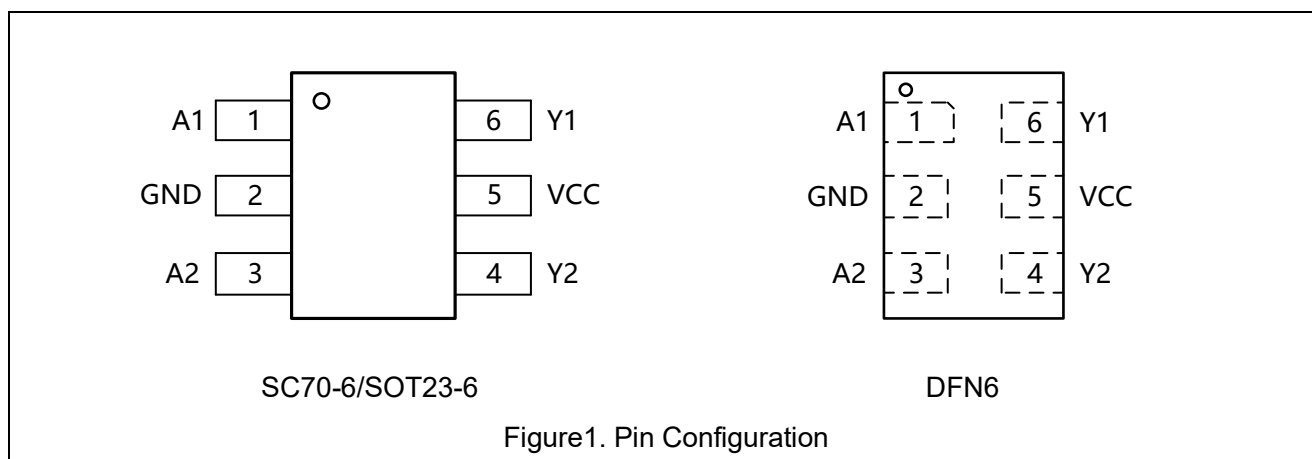
The ET74AUP2G14 is a high-performance dual inverter with Schmitt-Trigger inputs operating from a 0.8V to 3.6V supply. This device is fabricated with advanced CMOS technology to achieve ultra-high speed with high output drive.

Features

- Designed for 0.8V to 3.6V V_{CC} Operation
- Over-voltage Tolerant Inputs Accept Voltages to 3.6V
- $\pm 4\text{mA}$ 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: $\pm 4000\text{V}$ Pass (JEDEC JS-001)
 - CDM: $\pm 1000\text{V}$ Pass (JEDEC JS-002)
- Latch-up Performance Exceeds $\pm 100\text{mA}$ per JEDEC JESD78F
- Device Information Part No. and Package Information

Part No.	Package	Packing Option	MSL
ET74AUP2G14	SC70-6 (1.3mm $\times$ 2.1mm)	Tape and Reel, 3K/Reel	1
ET74AUP2G14T	SOT23-6 (1.6mm $\times$ 2.9mm)	Tape and Reel, 3K/Reel	3
ET74AUP2G14Y	DFN6 (1.0mm $\times$ 1.5mm)	Tape and Reel, 3K/Reel	1

Pin Configuration



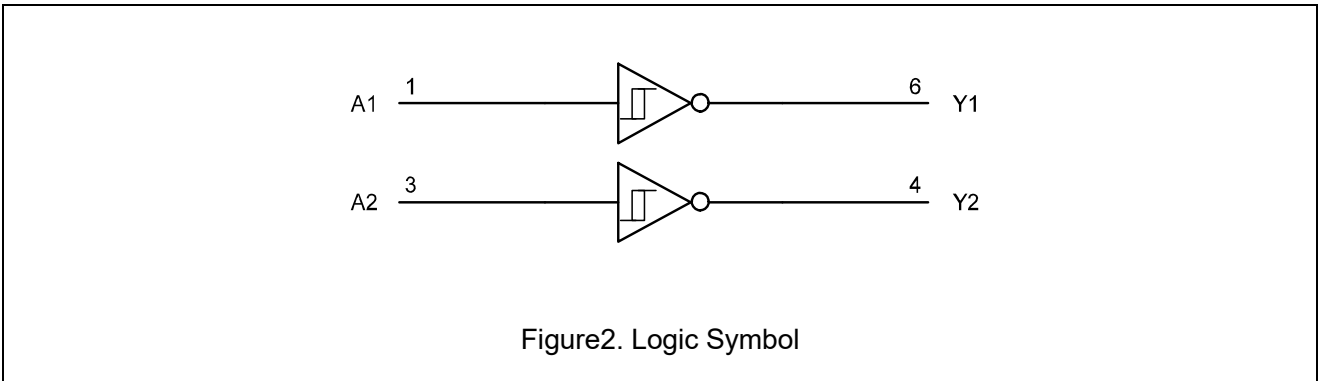
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Pin Function

SC70-6/ SOT23-6/ DFN6

Pin No.	Pin Name	Function
1	A1	Input CH1
2	GND	Ground
3	A2	Input CH2
4	Y2	Output CH2
5	VCC	Supply Voltage
6	Y1	Output CH1

Block Diagram



Functional Table

Input A	Output Y
L	H
H	L

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Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V_{CC}	DC Supply Voltage		-0.5 to 4.6	V
V_I	DC Input Voltage		$-0.5 \leq V_I \leq 4.6$	V
V_O	DC Output Voltage Output in Higher or Low State ⁽¹⁾		-0.5 to 4.6	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		± 20	mA
I_{CC}	DC Supply Current per Supply Pin		50	mA
I_{GND}	DC Ground Current per Supply Pin		-50	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 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
$R_{\theta JA}$	SC70-6	Thermal Characteristics, Thermal Resistance, Junction-to-Air	280	°C/W
	SOT23-6		180	
	DFN6(1.0mm × 1.5mm)		440	
P_D	SC70-6	Power Dissipation in Still Air at 85°C	230	mW
	SOT23-6		360	
	DFN6(1.0mm × 1.5mm)		150	

Recommended Operating Conditions

Symbol	Parameter		Min	Max	Unit
V_{CC}	DC Supply Voltage Operating		0.8	3.6	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	85	°C
t_r, t_f	Input Rise and Fall Time	$V_{CC} = 0.8V$ to 3.6V	0	20	ns/V

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied.

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Electrical Characteristics

DC Electrical Characteristics

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25°C			-40°C ≤ T _A ≤ 85°C		Unit
				Min	Typ	Max	Min	Max	
V _{IH}	High-Level Input Voltage		0.8	0.75V _{CC}			0.75V _{CC}		V
			0.9~1.95	0.7V _{CC}			0.7V _{CC}		
			2.3~2.7	1.6			1.6		
			3.0~3.6	2.0			2.0		
V _{IL}	Low-Level Input Voltage		0.8			0.25V _{CC}		0.25V _{CC}	V
			0.9~1.95			0.3V _{CC}		0.3V _{CC}	
			2.3~2.7			0.7		0.7	
			3.0~3.6			0.9		0.9	
V _{OH}	High-Level Output Voltage	I _{OH} = -20uA	0.8~3.6	V _{CC} - 0.1			V _{CC} - 0.1		V
		I _{OH} = -1.1mA	1.1	0.82	1.02		0.77		
		I _{OH} = -1.7mA	1.4	1.11	1.32		1.03		
		I _{OH} = -1.9mA	1.65	1.32	1.58		1.30		
		I _{OH} = -2.3mA	2.3	2.05	2.24		1.97		
		I _{OH} = -3.1mA		1.9	2.22		1.85		
		I _{OH} = -2.7mA	3.0	2.72	2.95		2.67		
		I _{OH} = -4.0mA		2.6	2.92		2.55		
V _{OL}	Low-Level Output Voltage	I _{OL} = 20uA	0.8~3.6			0.1		0.1	V
		I _{OL} = 1.1mA	1.1		0.11	0.33		0.33	
		I _{OL} = 1.7mA	1.4		0.12	0.31		0.37	
		I _{OL} = 1.9mA	1.65		0.11	0.31		0.35	
		I _{OL} = 2.3mA	2.3		0.14	0.31		0.33	
		I _{OL} = 3.1mA			0.19	0.44		0.45	
		I _{OL} = 2.7mA	3.0		0.11	0.31		0.33	
		I _{OL} = 4.0mA			0.16	0.44		0.45	
I _{IN}	Input Leakage Current	V _I = V _{CC} or GND	0~3.6			±0.1		±0.2	uA
I _{OFF}	Power Off Leakage Current	V _I = 3.6V or V _O = 3.6V	0			±0.2		±0.5	uA
I _{CC}	Quiescent Supply Current	V _I = 3.6V or GND	3.6			±0.2		±0.7	uA

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AC Electrical Characteristics

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

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25°C			-40°C ≤ T _A ≤ 85°C		Unit
				Min	Typ	Max	Min	Max	
t _{PLH} t _{PHL}	Propagation Delay (Figure3 and 4)	C _L = 15pF ⁽⁵⁾	0.8	15.3	32.5	106	13.8	259	ns
			1.2	5.8	8.9	16.3	5.3	19.3	
			1.5	4.0	5.6	10.1	3.5	13.9	
			1.8	3.1	4.2	7.8	2.6	10.6	
			2.5	2.1	2.8	5.8	1.8	6.4	
			3.3	1.7	2.2	4.9	1.4	5.4	
		C _L = 30pF ⁽⁵⁾	0.8	18.3	37.5	130	16.6	323	ns
			1.2	7.0	10.7	19.3	6.4	22.3	
			1.5	4.8	6.9	12.0	4.2	15.9	
			1.8	3.7	5.1	9.2	3.2	12.0	
			2.5	2.6	3.5	6.7	2.2	7.5	
			3.3	2.0	2.2	5.6	1.7	6.3	

Note5: C_L includes probe and jig capacitance.

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Capacitance Characteristics

Symbol	Parameter	Condition		Typ	Unit
C _I	Input Capacitance	V _{CC} = 3.6V, V _I = 0V or V _{CC}		2	pF
C _O	Output Capacitance	V _{CC} = 0V, V _O = GND		3	pF
C _{PD}	Power Dissipation Capacitance ⁽⁶⁾	1MHz, V _I = 0V to V _{CC}	V _{CC} = 0.8V	7.6	pF
			V _{CC} = 1.2V	8.1	
			V _{CC} = 1.5V	8.5	
			V _{CC} = 1.8V	8.6	
			V _{CC} = 2.5V	9.0	
			V _{CC} = 3.3V	9.6	

Note6: C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

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

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

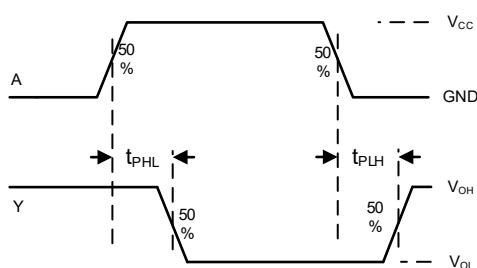


Figure3. Switching Waveform

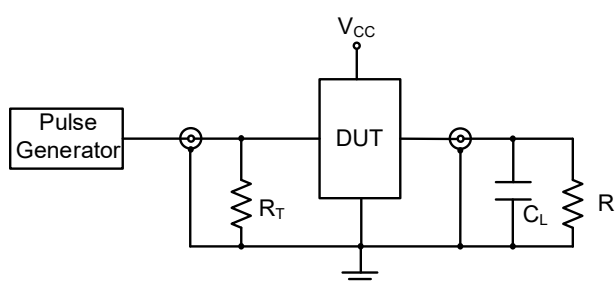
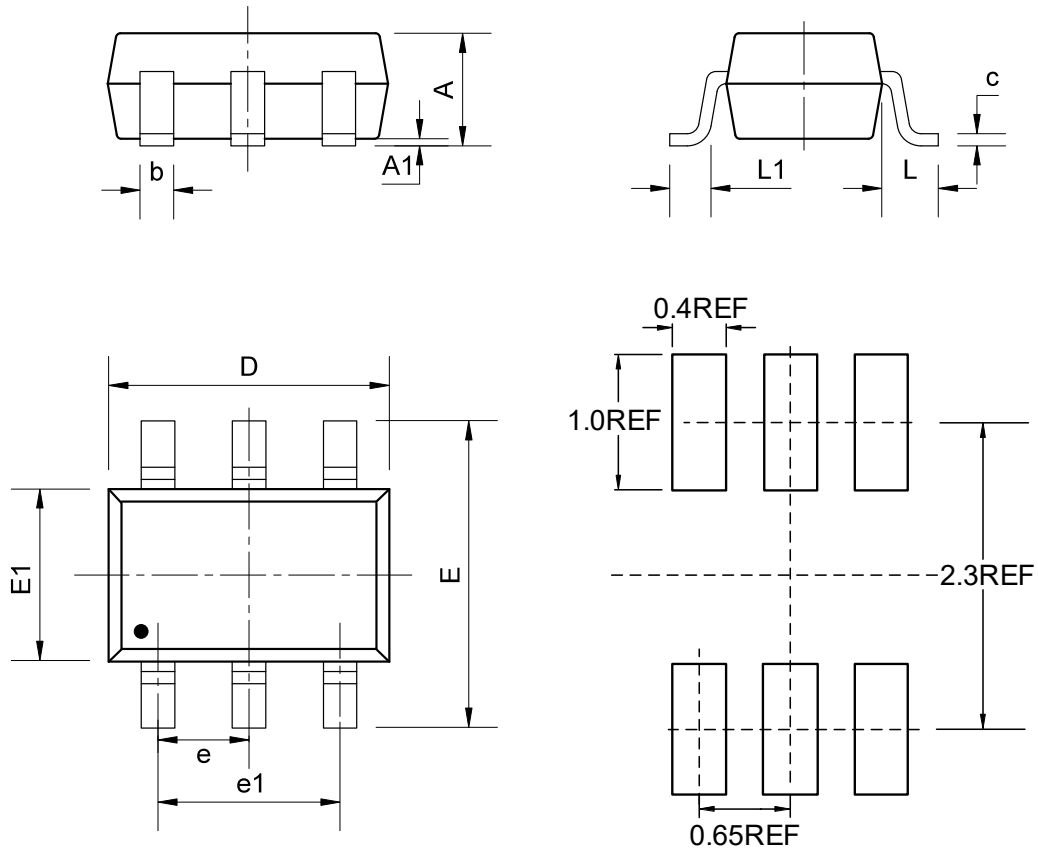


Figure4. Test Circuit

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Package Dimension

SC70-6 (1.3mm × 2.1mm)



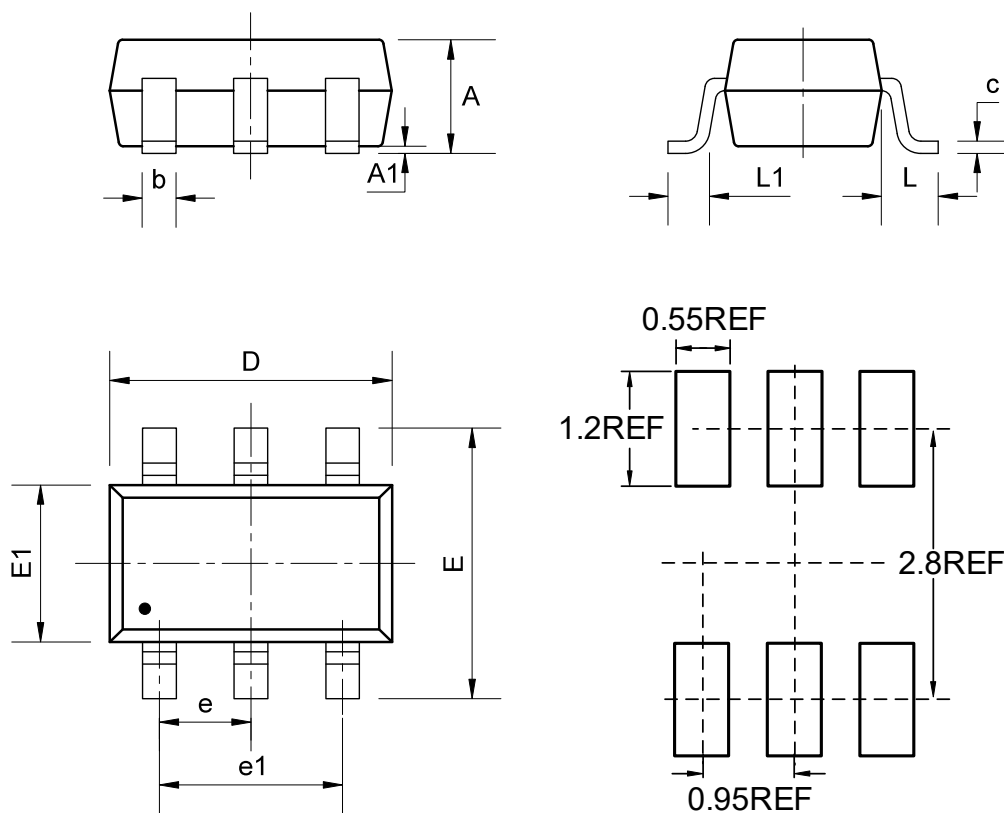
COMMON DIMENSIONS

(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		

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SOT23-6 (1.6mm × 2.9mm)



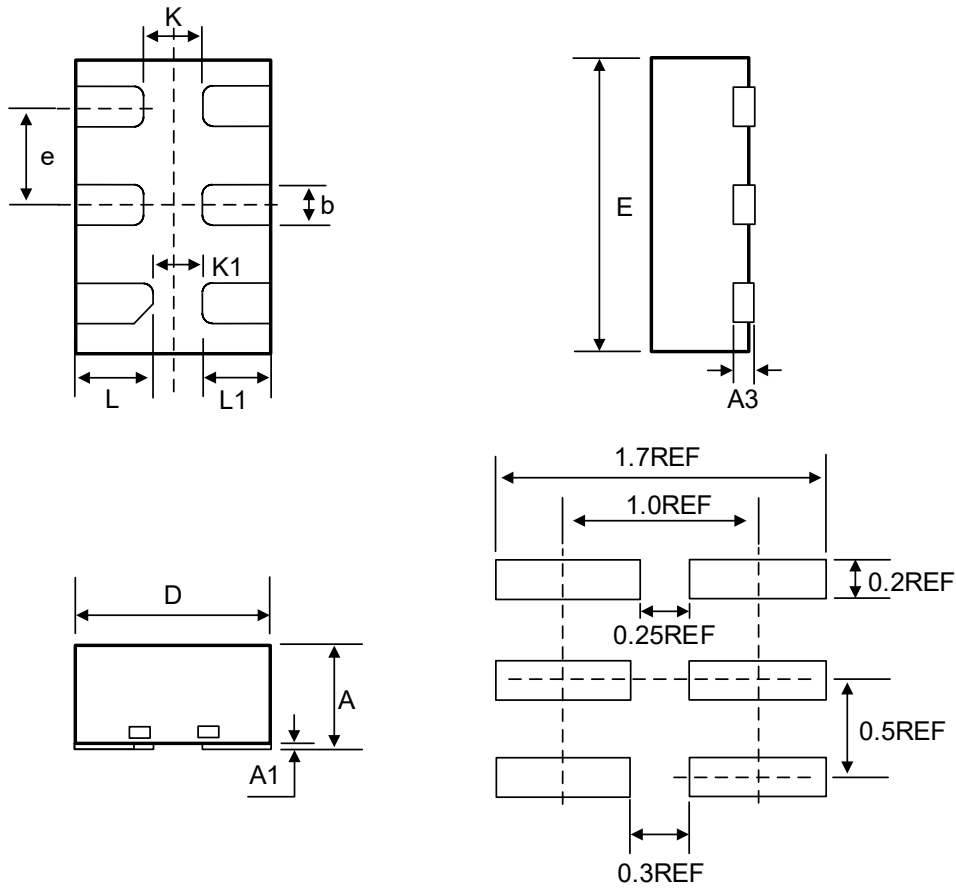
COMMON DIMENSIONS

(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

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DFN6 (1.0mm × 1.5mm)



COMMON DIMENSIONS

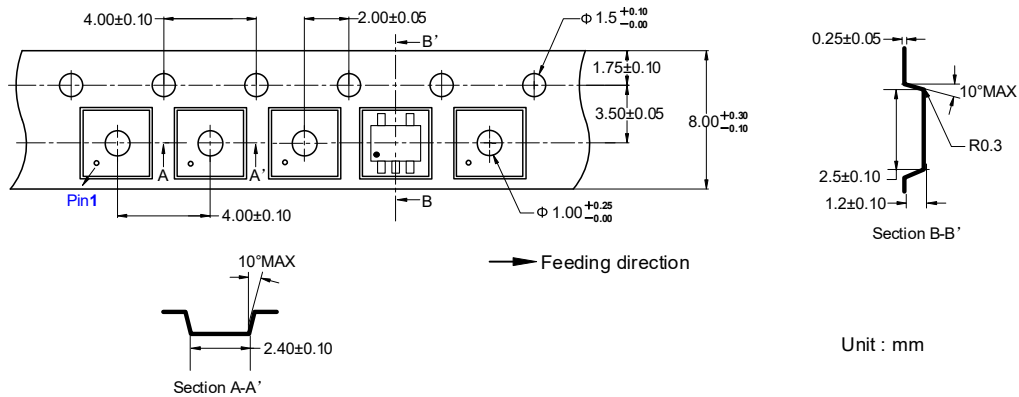
(Unit: mm)

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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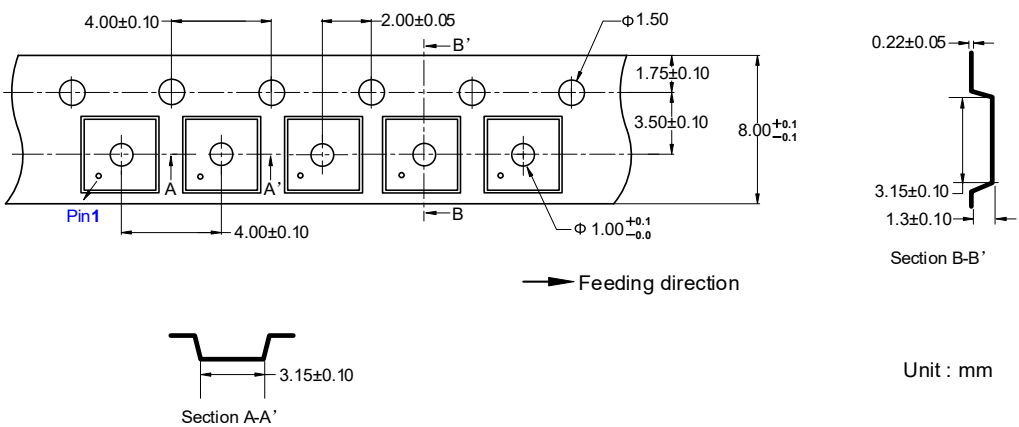
Tape Information

SC70-6 (1.3mm x 2.1mm)



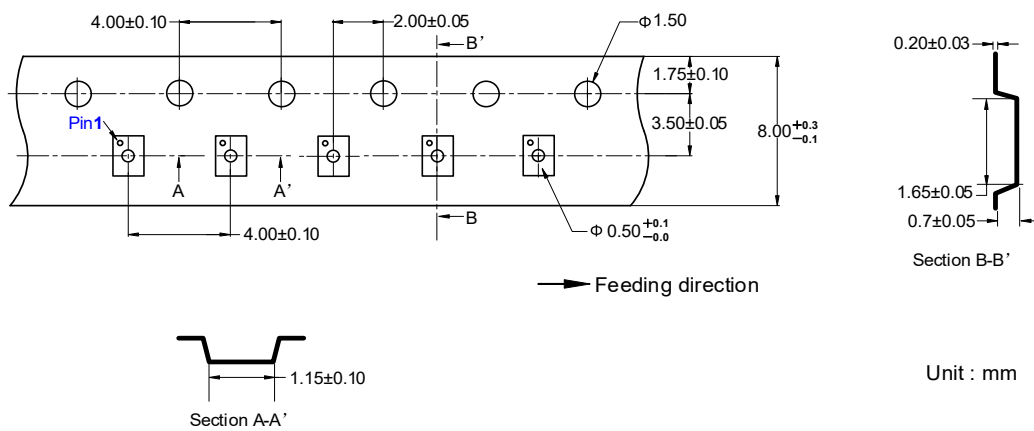
Unit : mm

SOT23-6 (1.6mm × 2.9mm)



Unit : mm

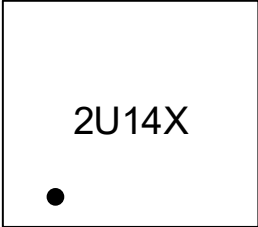
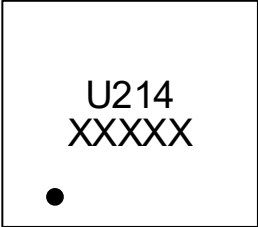
DFN6 (1.0mm × 1.5mm)



Unit : mm

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Marking Information

	
ET74AUP2G14 2U14 = Part Number X = Tracking Number	ET74AUP2G14T U214 = Part Number XXXXX = Tracking Number

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2023-11-28	Initial Version	Shi bo	Lu han	Liu jiaying
1.1	2023-11-29	Update Typeset /ESD	Shi bo	Shi bo	Shi bo
1.2	2025-06-04	Add Packing Option	Yang xiaoxu	Yang xiaoxu	Liu jiaying
1.3	2025-11-04	Update AC Table	Wang anran	Yang xiaoxu	Liu jiaying
1.3.a	2025-12-12	Update Format, Add Tape and Marking	Xu tao	Yang xiaoxu	Liu jiaying