

Single 2-Input AND Gate

General Description

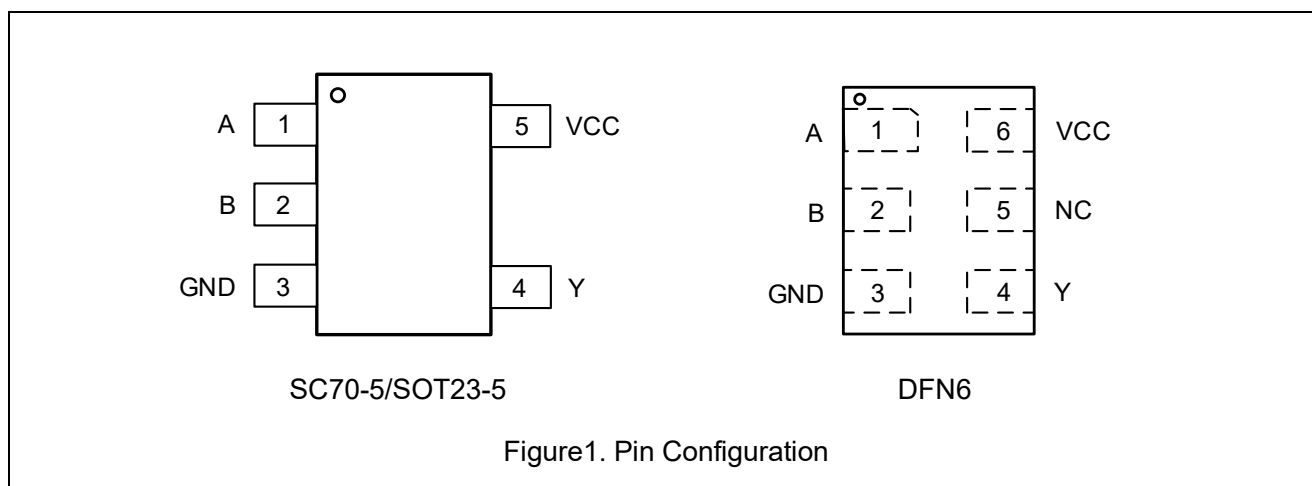
The ET74HCT1G08 device is a single 2-input positive-AND gate. The device performs the Boolean function $Y = A \cdot B$ or $Y = \overline{A + B}$ in positive logic. Low I_{CC} current allows this device to be used in power-sensitive or battery-powered applications.

Features

- Designed for 4.5V to 5.5V V_{CC} Operation
- Over-voltage Tolerant Inputs Accept Voltages to 5.5V
- $\pm 8\text{mA}$ Balanced Output Sink and Source Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- 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
- Part No. and Package Information

Part No.	Package	Packing Option	MSL
ET74HCT1G08	SC70-5 (1.3mm $\times$ 2.1mm)	Tape and Reel, 3K/Reel	3
ET74HCT1G08T	SOT23-5 (1.6mm $\times$ 2.9mm)	Tape and Reel, 3K/Reel	3
ET74HCT1G08Y	DFN6 (1.0mm $\times$ 1.5mm)	Tape and Reel, 3K/Reel	1

Pin Configuration



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Pin Function

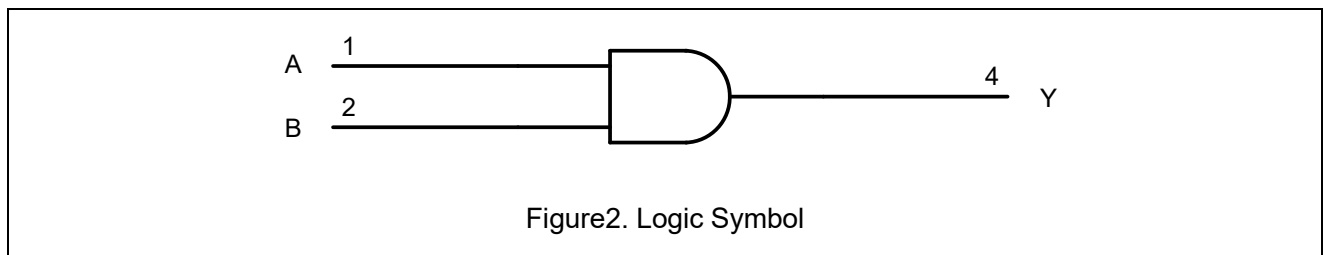
SC70-5/ SOT23-5

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

DFN6

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

Block Diagram



Function Table

Input		Output
A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

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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 ≤ V _I ≤ 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		-20	mA
I _{OK}	DC Output Diode Current, V _O < GND, V _O > V _{CC}		±20	mA
I _O	DC Output Sink Current		±25	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	Junction Temperature Under Bias		150	°C
V _{ESD}	ESD Classification	Human Body Model ⁽²⁾	±4000	V
		Charged Device Model ⁽³⁾	±1000	
I _{LU}	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 _{θJA}	SC70-5	Thermal Characteristics, Thermal Resistance, Junction-to-Air	300	°C/W
	SOT23-5		250	
	DFN6		440	
R _{θJB}	SC70-5	Thermal Characteristics, Thermal Resistance, Junction-to-board	75	°C/W
	SOT23-5		65	
	DFN6		270	
P _D	SC70-5	Power Dissipation in Still Air at 85°C	215	mW
	SOT23-5		260	
	DFN6		150	

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Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V _{CC}	Supply Voltage	4.5	5.5	V
V _I	Input Voltage	0	V _{CC}	V
V _O	Output Voltage	0	V _{CC}	V
I _{OH}	High-level Output Current		-8	mA
I _{OL}	Low-level Output Current		8	mA
Δt/Δv	Input Transition Rise and Fall Rate		20	ns/V
T _A	Operating Temperature Range	-40	125	°C

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

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		4.5	2			2		V
			5.5	2			2		
V _{IL}	Low-Level Input Voltage		4.5			0.8		0.8	V
			5.5			0.8		0.8	
V _{OH}	High-Level Output Voltage	I _{OH} = -50μA	4.5	4.4	4.5		4.4		V
		I _{OH} = -8mA	4.5	3.94			3.8		
V _{OL}	Low-Level Output Voltage	I _{OL} = 50μA	4.5			0.1		0.1	V
		I _{OL} = 8mA	4.5			0.36		0.44	
I _I	Input Current	V _I = 5.5V or GND	0~5.5			±0.1		±1	μA
I _{CC}	Supply Current	V _I = V _{CC} or GND, I _O = 0mA	5.5			1.0		10	μA
ΔI _{CC} ⁽⁵⁾	Change in Supply Current	One Input at 3.4V, Other Inputs at V _{CC} or GND	5.5			1.35		1.5	mA
C _I	Input Capacitance	V _I = V _{CC} or GND	5		4	10			pF

Note5: This is the increase in supply current for each input at one of the specified TTL voltage levels, rather than 0V or V_{CC}.

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AC Electrical Characteristics

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

Symbol	Parameter	Condition	$V_{CC}(\text{V})$	$T_A = 25^\circ\text{C}$			$-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$		Unit
				Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay (Figure 3)	$C_L = 15\text{pF}$	4.5		14	25		29	ns
t_{PHL}		$C_L = 50\text{pF}$	5.0		12				

Capacitance Characteristics

$V_{CC} = 5\text{V}$, $T_A = 25^\circ\text{C}$

Symbol	Parameter	Condition	Typ	Unit
C_{PD}	Power Dissipation Capacitance ⁽⁶⁾	No Load, $f = 1\text{MHz}$	18	pF

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.

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AC Test Circuit

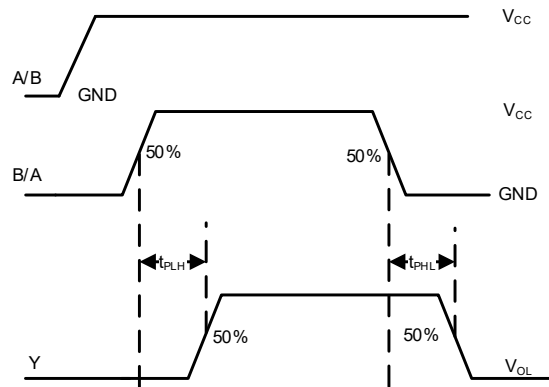


Figure3. Switching Waveform

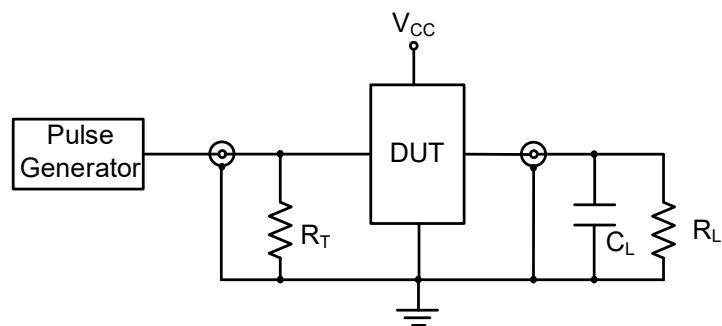
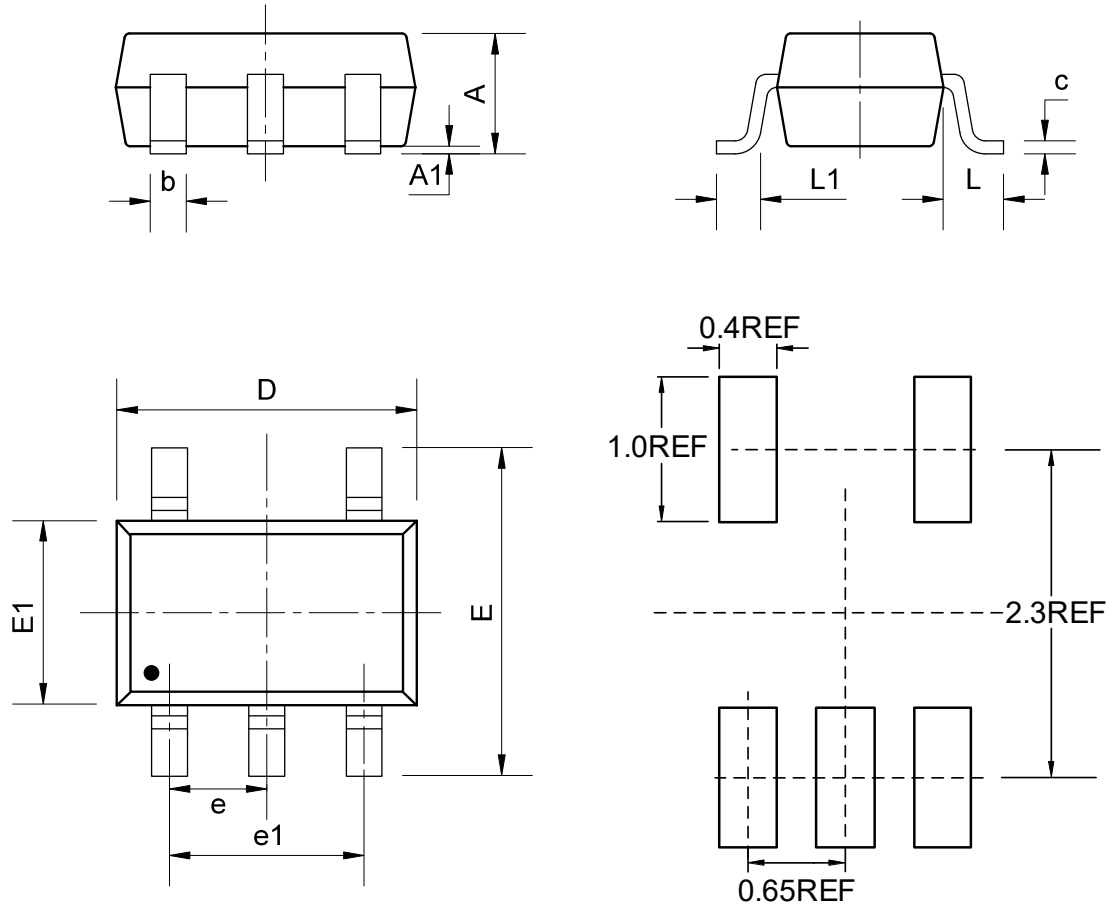


Figure4. Test Circuit

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Package Dimension

SC70-5 (1.3mm × 2.1mm)



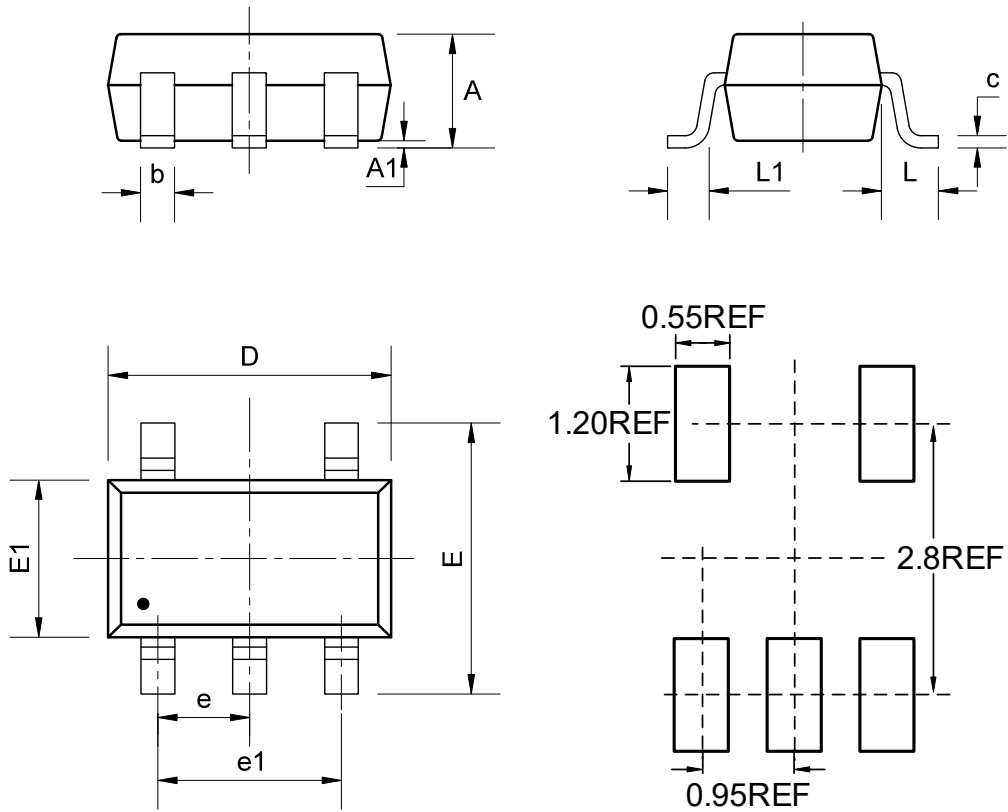
COMMON DIMENSIONS

(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		

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SOT23-5 (1.6mm × 2.9mm)



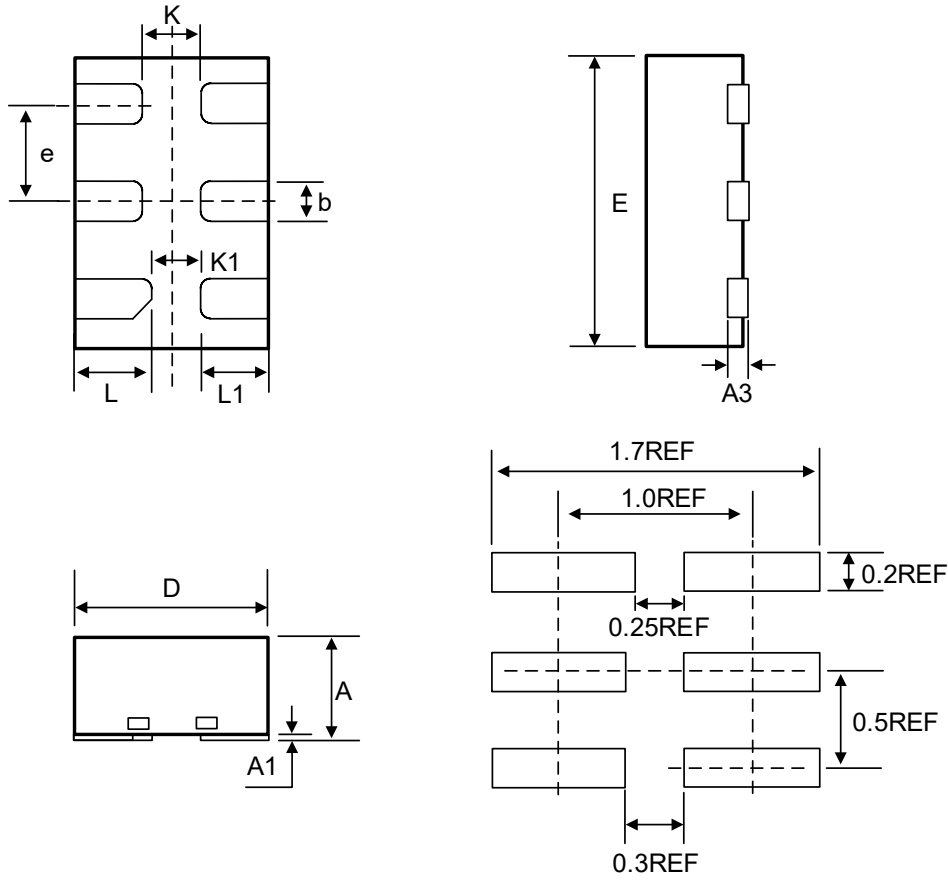
COMMON DIMENSIONS

(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

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DFN6 (1.0mm × 1.5mm)



COMMON DIMENSIONS

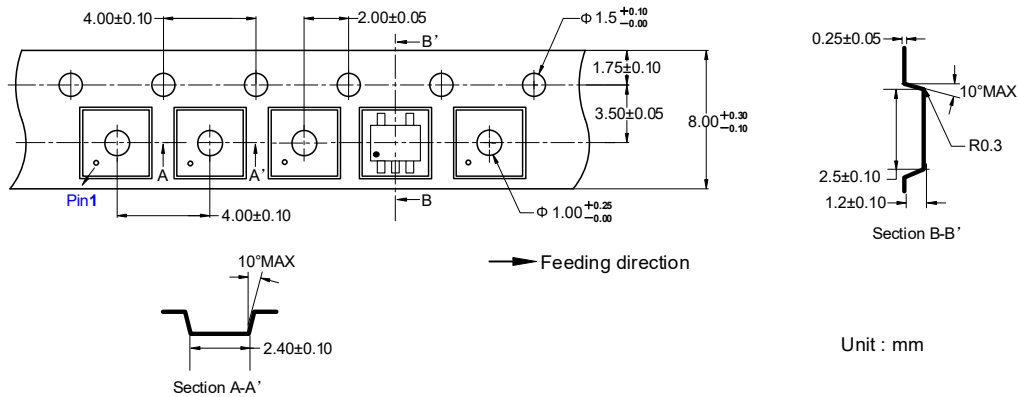
(Unit: mm)

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

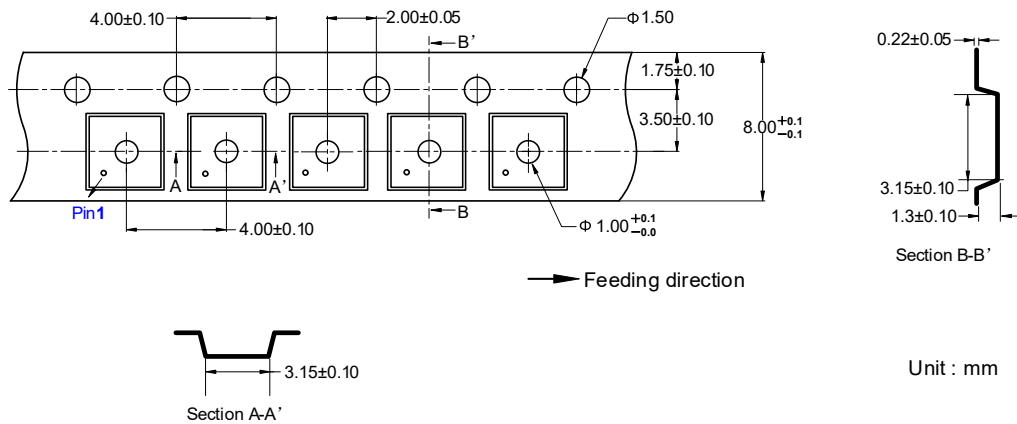
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Tape Information

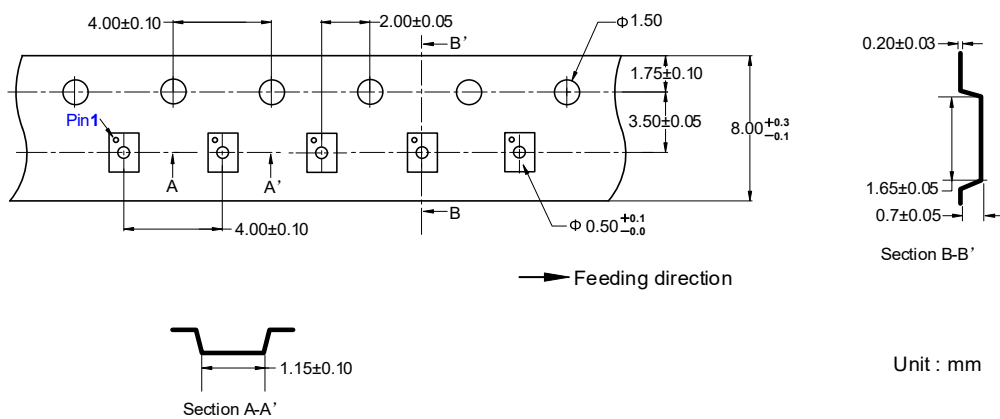
SC70-5 (1.3mm × 2.1mm)



SOT23-5 (1.6mm × 2.9mm)

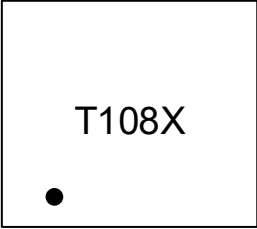
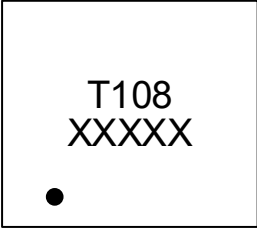


DFN6 (1.0mm × 1.5mm)



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Marking Information

	
ET74HCT1G08 T108 = Part Number X = Tracking Number	ET74HCT1G08T T108 = Part Number XXXXX = Tracking Number

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
0.0	2023-09-19	Preliminary Version	Wang anran	Tu guozhu	Liu jiaying
1.0	2025-09-02	Original Version	Peng junjie	Tu guozhu	Liu jiaying
1.1	2025-10-28	Add Tape Information	Wang anran	Yang xiaoxu	Liu jiaying
1.1.a	2025-12-25	Update Format	Xu tao	Yang xiaoxu	Liu jiaying