

## Single 2-Input NOR Gate

### General Description

The ET74AHC1G02 is a high performance single 2-input NOR Gate operating from a 2V to 5.5V supply. This device is fabricated with advanced CMOS technology to achieve ultra-high speed with high output drive.

### Features

- Designed for 2V to 5.5V  $V_{CC}$  Operation
- Over-voltage Tolerant Inputs Accept Voltages to 5.5V
- $\pm 8\text{mA}$  Sink and Source Output Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- These Devices are Pb-Free and RoHS Compliant
- ESD Protection Complies with JEDEC22 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
ET74AHC1G02	SC70-5 (1.3mm × 2.1mm)	Tape and Reel, 3K/Reel	1
ET74AHC1G02T	SOT23-5 (1.6mm × 2.9mm)	Tape and Reel, 3K/Reel	3
ET74AHC1G02Y	DFN6 (1.0mm × 1.5mm)	Tape and Reel, 3K/Reel	1

### Pin Configuration

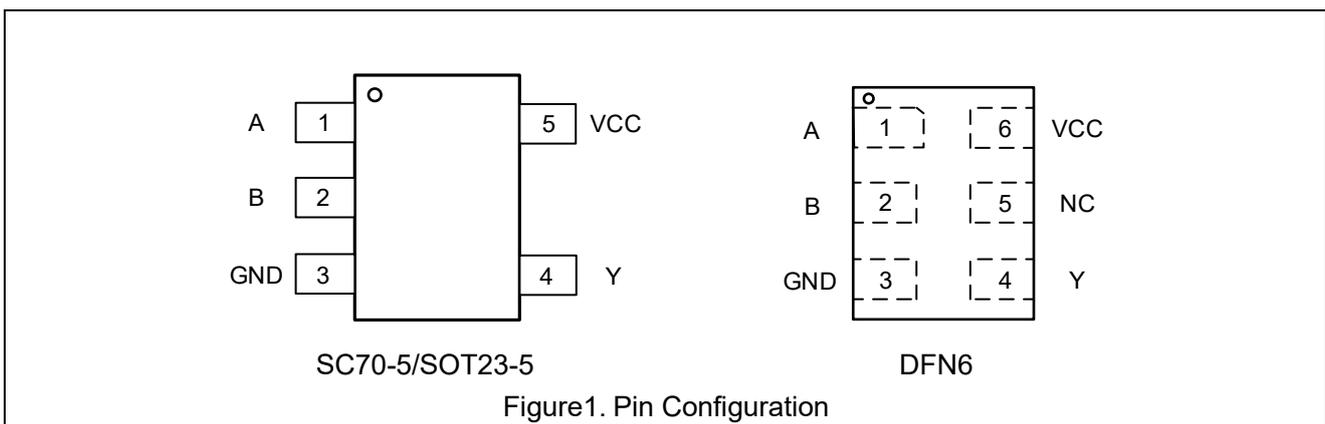


Figure1. Pin Configuration

# ET74AHC1G02

## Pin Function

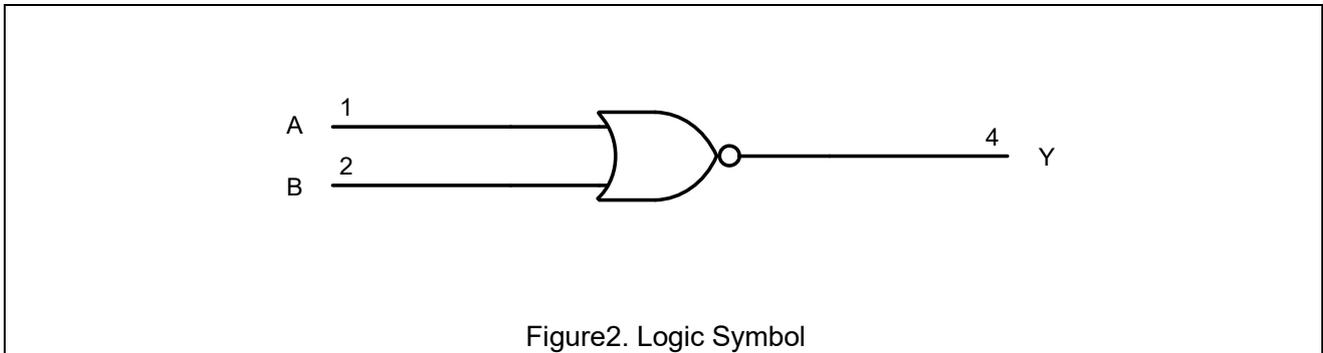
SC70-5/ SOT23-5

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

DFN6

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

## Block Diagram



## Function Table

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

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## Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V <sub>CC</sub>	DC Supply Voltage(V <sub>CC</sub> Pin)		-0.5 to 7.0	V
V <sub>I</sub>	DC Input Voltage <sup>(1)</sup>		-0.5 ≤ V <sub>I</sub> ≤ 7.0	V
V <sub>O</sub>	DC Output Voltage Output in Higher or Low State		-0.5 to V <sub>CC</sub> + 0.5	V
I <sub>IK</sub>	DC Input Diode Current, V <sub>I</sub> < GND		-50	mA
I <sub>OK</sub>	DC Output Diode Current, V <sub>O</sub> < GND, V <sub>O</sub> > V <sub>CC</sub>		±50	mA
I <sub>O</sub>	DC Output Sink Current		±50	mA
I <sub>CC</sub>	DC Supply Current Per Supply Pin		100	mA
I <sub>GND</sub>	DC Ground Current Per Supply Pin		-100	mA
T <sub>STG</sub>	Storage Temperature Range		-65 to 150	°C
T <sub>L</sub>	Lead Temperature, Soldering 10 Seconds		260	°C
T <sub>J</sub>	Max Junction Temperature		150	°C
V <sub>ESD</sub>	ESD Classification	Human Body Model <sup>(2)</sup>	±4000	V
		Charged Device Model <sup>(3)</sup>	±1000	
I <sub>LU</sub>	Latch Up Current Above V <sub>CC</sub> and GND at 125°C <sup>(4)</sup>		±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<sub>O</sub> 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 <sub>θJA</sub>	SC70-5	Thermal Characteristics, Thermal Resistance, Junction-to-Air	300	°C/W
	SOT23-5		250	
	DFN6		440	
P <sub>D</sub>	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 <sub>CC</sub>	DC Supply Voltage	2	5.5	V
V <sub>I</sub>	DC Input Voltage	0	V <sub>CC</sub>	V
V <sub>O</sub>	DC Output Voltage(High or Low State)	0	V <sub>CC</sub>	V
T <sub>A</sub>	Operating Temperature Range	-40	125	°C

## Electrical Characteristics

### DC Electrical Characteristics

Symbol	Parameter	Condition	V <sub>CC</sub> (V)	T <sub>A</sub> = 25°C			-40°C ≤ T <sub>A</sub> ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
V <sub>IH</sub>	High-Level Input Voltage		2.0	1.5			1.5		V
			3.0	2.1			2.1		
			5.5	3.85			3.85		
V <sub>IL</sub>	Low-Level Input Voltage		2.0			0.5		0.5	V
			3.0			0.9		0.9	
			5.5			1.65		1.65	
V <sub>OH</sub>	High-Level Output Voltage	I <sub>OH</sub> = -50uA	2~5.5	V <sub>CC</sub> - 0.1	V <sub>CC</sub>		V <sub>CC</sub> - 0.1		V
		I <sub>OH</sub> = -4mA	3	2.58			2.4		
		I <sub>OH</sub> = -8mA	4.5	3.54			3.7		
V <sub>OL</sub>	Low-Level Output Voltage	I <sub>OL</sub> = 50uA	2~5.5			0.1		0.1	V
		I <sub>OL</sub> = 4mA	3			0.36		0.55	
		I <sub>OL</sub> = 8mA	4.5			0.36		0.55	
I <sub>IN</sub>	Input Leakage Current	V <sub>I</sub> = 5.5V or GND	0~5.5			0.1		2.0	uA
I <sub>OFF</sub>	Power Off Leakage Current	V <sub>I</sub> = 5.5V or V <sub>O</sub> = 5.5V	0			1		10	μA
I <sub>CC</sub>	Quiescent Supply Current	V <sub>I</sub> = 5.5V or GND	5.5			1		40	uA

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.

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## 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	
$t_{PLH}$ $t_{PHL}$	Propagation Delay (Figure3 and 4)	$C_L = 15\text{pF}$	3~3.6		4.9	8.4	1	10.9	ns
		$C_L = 50\text{pF}$	3~3.6		6.9	13.4	1	16.4	
		$C_L = 15\text{pF}$	4.5~5.5		4	6	1	7.5	
		$C_L = 50\text{pF}$	4.5~5.5		5.5	8	1	10	

## Capacitance Characteristics

Symbol	Parameter	Condition	Typ	Unit
$C_{IN}$	Input Capacitance	$V_{CC} = 5.5V, V_I = 0V \text{ or } V_{CC}$	5	pF
$C_{PD}$	Power Dissipation Capacitance (5)	10MHz, $V_{CC} = 3.3V, V_I = 0V \text{ or } V_{CC}$	26	pF
		10MHz, $V_{CC} = 5.5V, V_I = 0V \text{ or } V_{CC}$	30	

**Note5:**  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ).

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

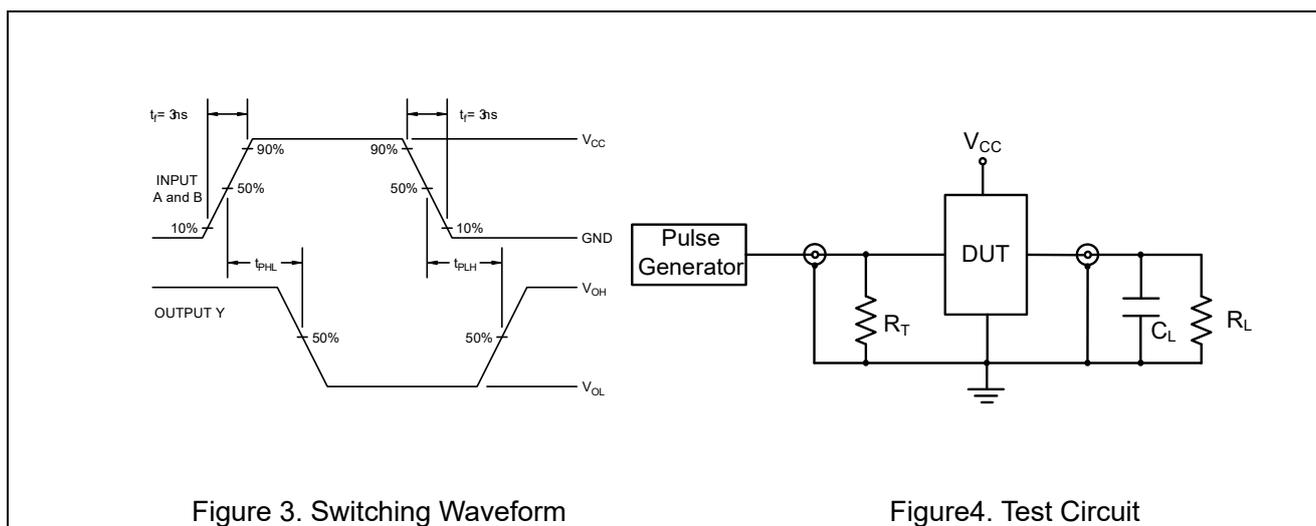


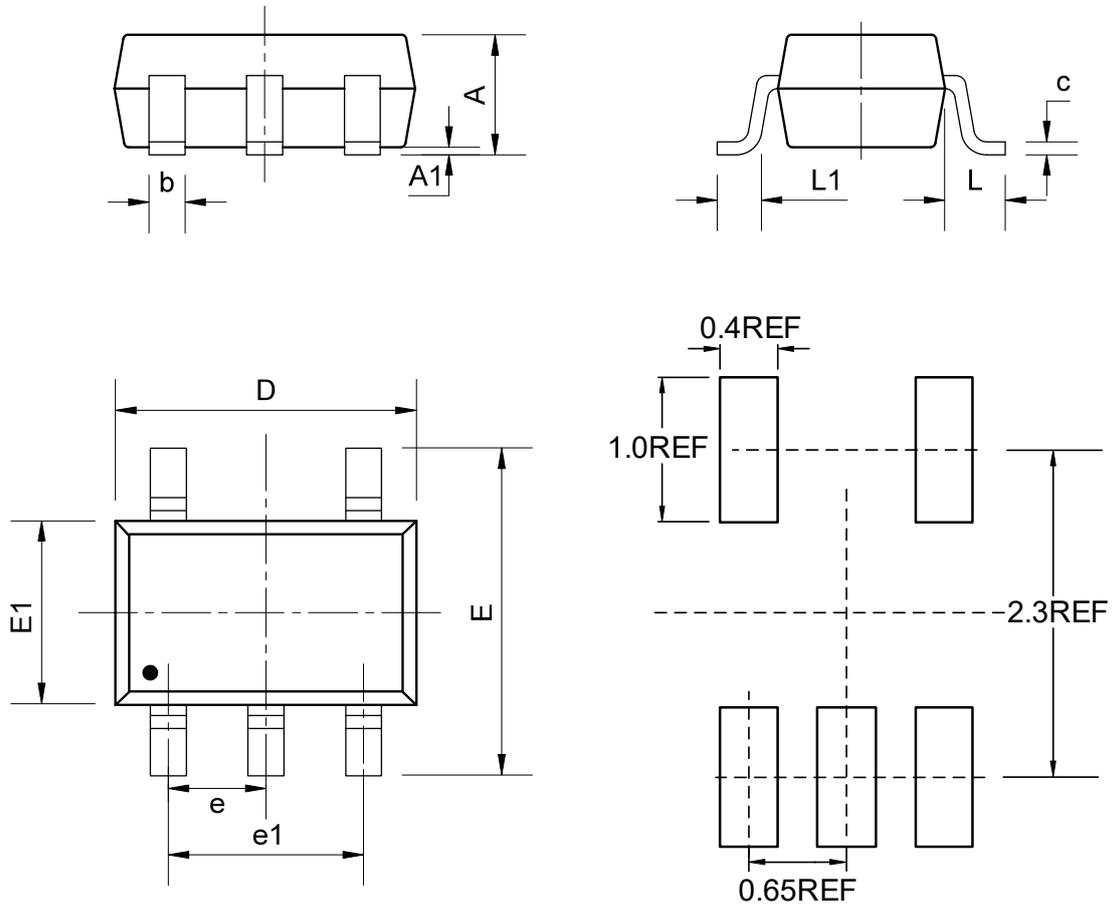
Figure 3. Switching Waveform

Figure4. Test Circuit

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## Package Dimension

SC70-5 (1.3mm × 2.1mm)



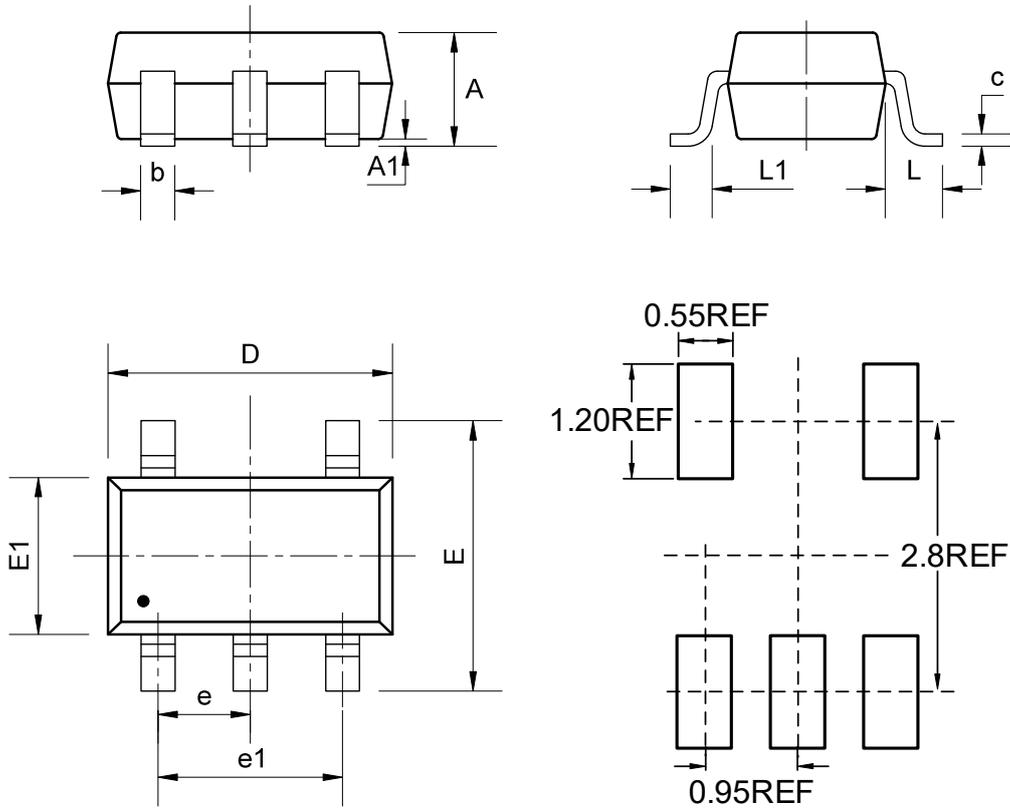
### COMMON DIMENSIONS

(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)



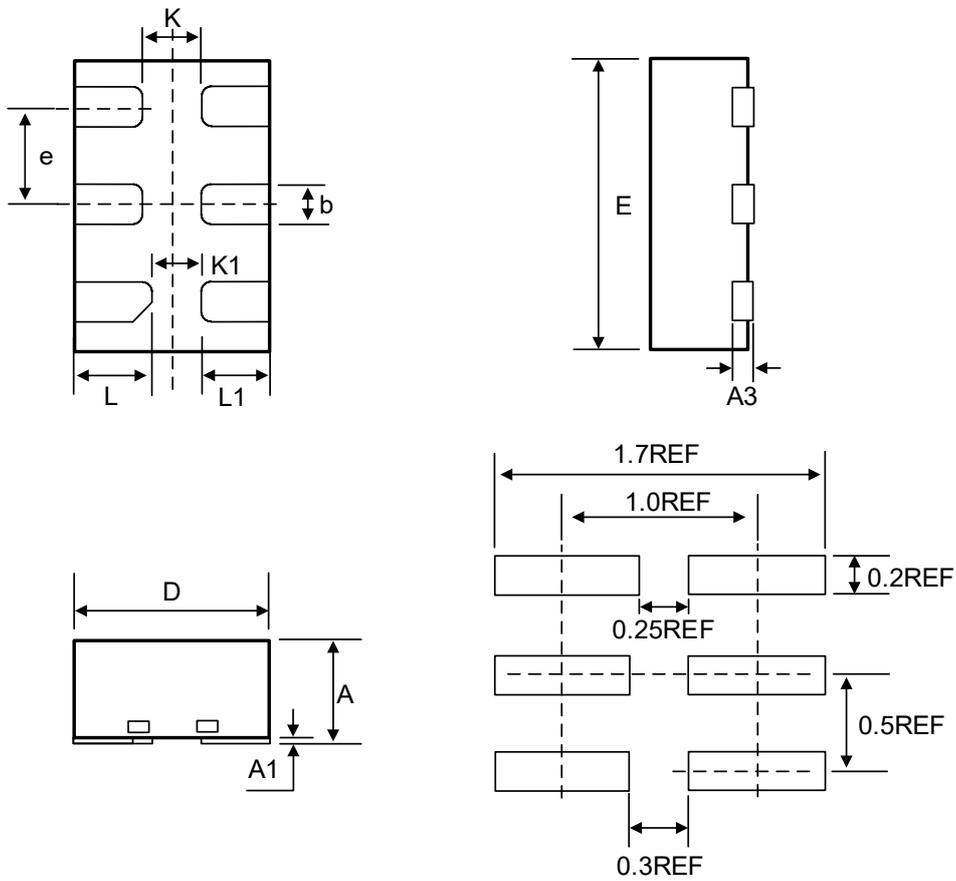
## COMMON DIMENSIONS

(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

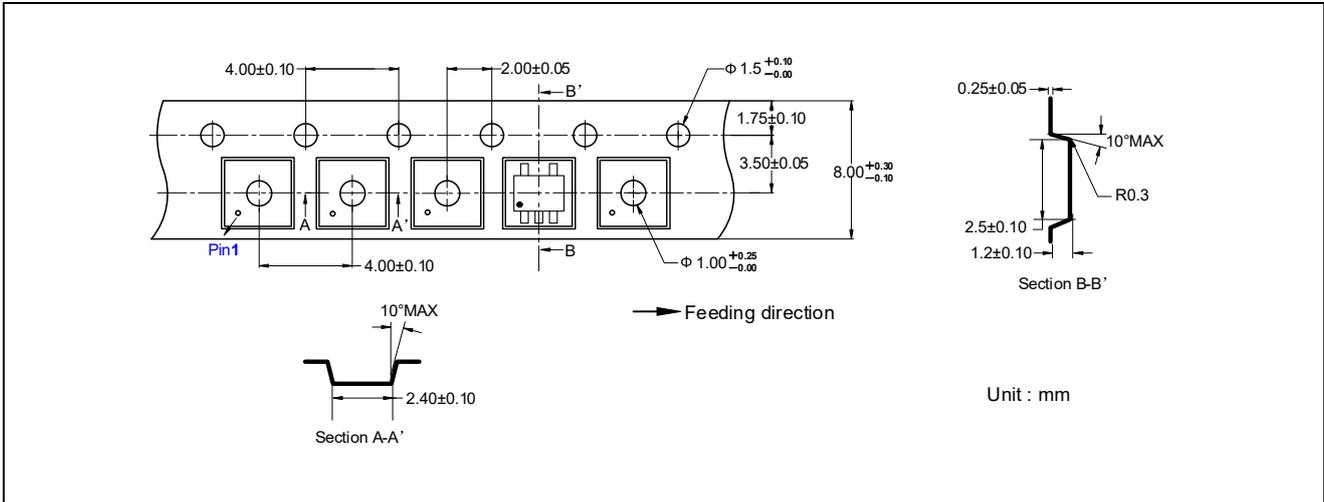
(Unit: mm)

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

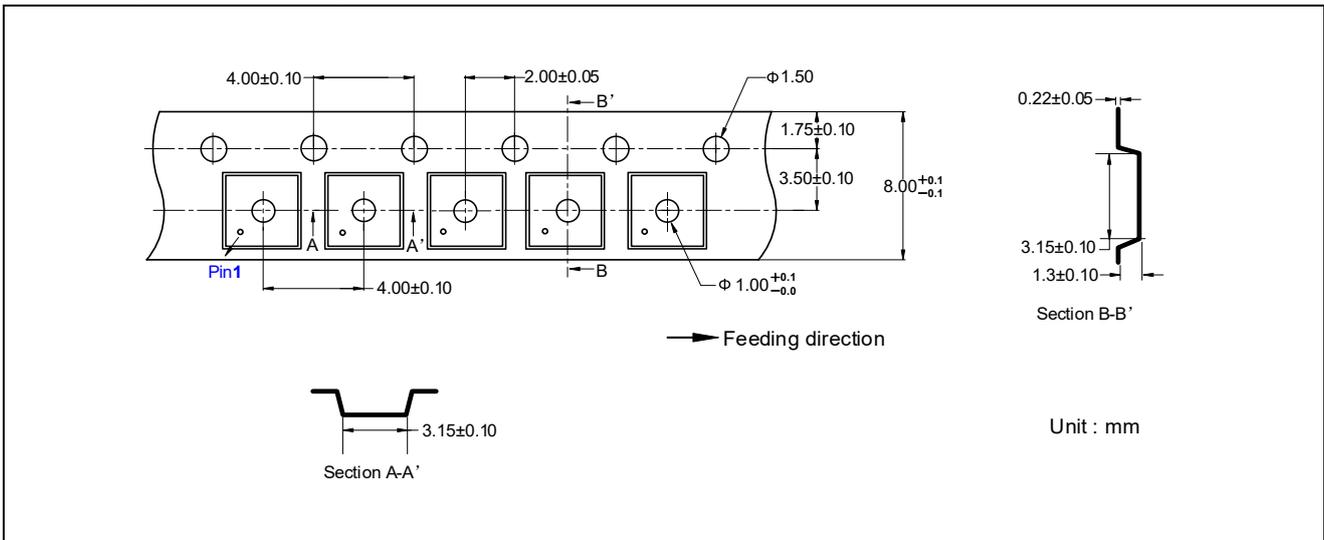
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## Tape Information

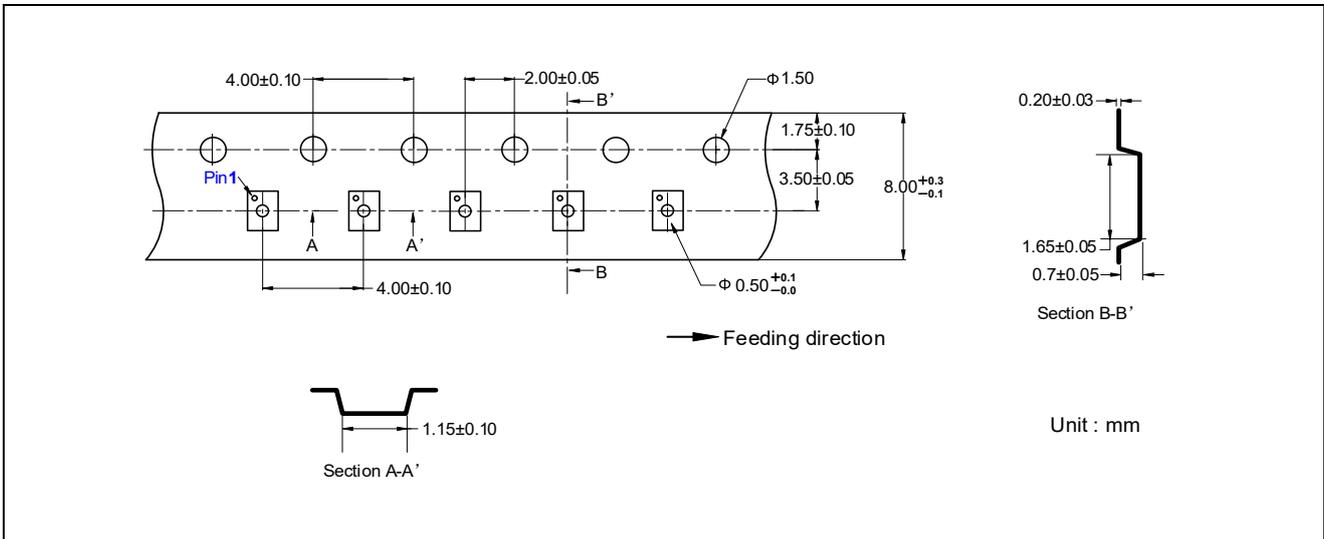
SC70-5 (1.3mm × 2.1mm)



SOT23-5 (1.6mm × 2.9mm)



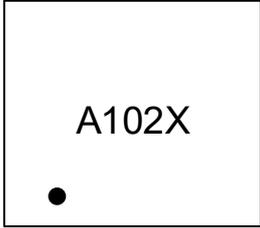
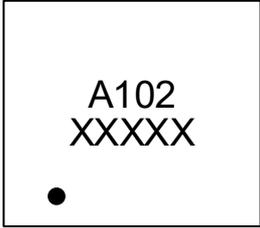
DFN6 (1.0mm × 1.5mm)



# ET74AHC1G02

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## Marking Information

	
ET74AHC1G02 A102 = Part Number X = Tracking Number	ET74AHC1G02T A102 = Part Number XXXXX = Tracking Number

## Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2025-09-02	Original Version	Wang anran	Yang xiaoxu	Liu jiaying