

Single 2-input AND Gate

General Description

The ET74AUP1G08 is a single 2-input AND Gate 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.

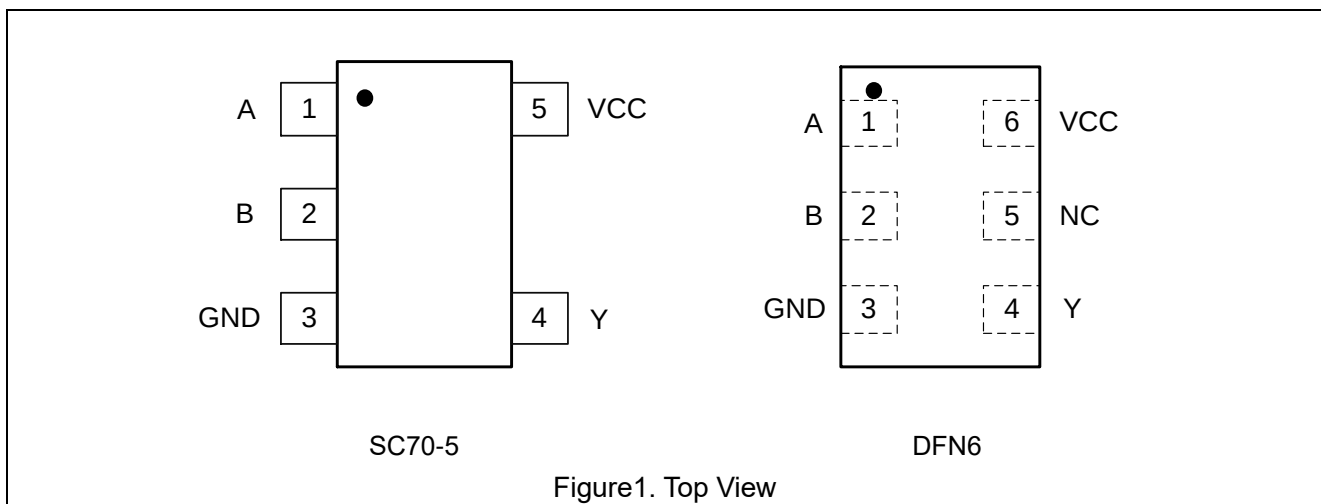
Features

- Designed for 0.8V to 3.6V VCC Operation
- Low static power consumption; $I_{CC} = 0.7\mu A$ (maximum)
- 4mA Balanced Output Sink and Source Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- These Devices are Pb-Free and are RoHS Compliant

Device Information

Part No.	Package	Packing Option	MSL
ET74AUP1G08	SC70-5 (1.3mm×2.1mm)	Tape and Reel, 3K	1
ET74AUP1G08Y	DFN6 (1.0mm×1.5mm)	Tape and Reel, 3K	1
ET74AUP1G08N	DFN6 (1.0mm×1.0mm)	Tape and Reel, 10K	1

Pin Configuration

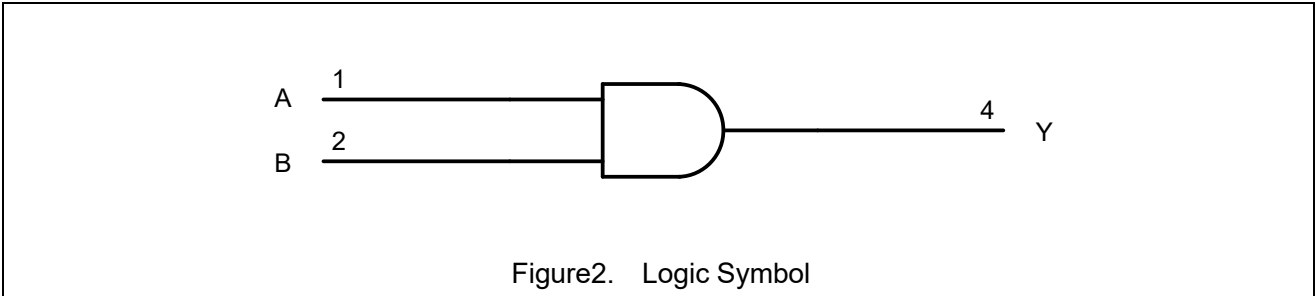


ET74AUP1G08

Pin Function

Pin No.		Pin Name	Function
SC70-5	DFN6		
1	1	A	Input A
2	2	B	Input B
3	3	GND	Ground
4	4	Y	Output
/	5	NC	No Connect
5	6	VCC	Supply Voltage

Block Diagram



Functional Description

Function Table

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

ET74AUP1G08

Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V _{CC}	DC Supply Voltage		-0.5 to 4.6	V
V _I	DC Input Voltage ⁽¹⁾		-0.5 ≤ V _I ≤ +4.6	V
V _O	DC Output Voltage Output in Higher or Low State		-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 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. IO absolute maximum rating must be observed.

Note2. Tested to EIA/JESD22-A114-A.

Note3. Tested to JESD22-C101-A.

Note4. Tested to EIA/JESD78.

Thermal Characteristics

Symbol	Package	Ratings	Value	Unit
R _{θJA}	SC70-5	Thermal Characteristics, Thermal Resistance, Junction-to-Air	300	°C/W
	DFN6(1×1.5)		440	
	DFN6(1×1)		440	
R _{θJB}	SC70-5	Thermal Characteristics, Thermal Resistance, Junction-to-board	75	°C/W
	DFN6(1×1.5)		270	
	DFN6(1×1)		285	
P _D	SC70-5	Power Dissipation in Still Air at 85°C	215	mW
	DFN6(1×1.5)		260	
	DFN6(1×1)		150	

ET74AUP1G08

Recommended Operating Conditions

Symbol	Parameter		Min	Max	Unit
V _{CC}	DC Supply Voltage Operating		0.8	3.6	V
V _{IN}	DC Input Voltage		0	3.6	V
V _{OUT}	DC Output Voltage (High or Low State)		0	3.6	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.

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		0.8	0.75V _{CC}			0.75V _{CC}		V
			0.9 to 1.95	0.7V _{CC}			0.7V _{CC}		
			2.3 to 2.7	1.6			1.6		
			3.0 to 3.6	2.0			2.0		
V _{IL}	Low-Level Input Voltage		0.8			0.25V _{CC}		0.25V _{CC}	V
			0.9 to 1.95			0.3V _{CC}		0.3V _{CC}	
			2.3 to 2.7			0.7		0.7	
			3.0 to 3.6			0.9		0.9	
V _{OH}	High-Level Output Voltage	I _{OH} =-20uA	0.8 to 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 to 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 _{IN} = V _{CC} or GND	0 to 3.6			±0.1		±0.2	uA

ET74AUP1G08

I_{OFF}	Power Off Leakage Current	$V_{IN}=3.6V$ or $V_{OUT}=3.6V$	0			± 0.2		± 0.5	μA
I_{CC}	Quiescent Supply Current	$V_{IN} = 3.6V$ or GND	3.6			± 0.2		± 0.7	μA

AC Electrical Characteristics

$t_r = t_f = 2.5ns$

Symbol	Parameter	Condition	$V_{CC}(V)$	$T_A = 25^{\circ}C$			$-40^{\circ}C \leq T_A \leq 125^{\circ}C$		Unit
				Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation Delay (Figure3 And 4)	$C_L = 5pF^{(5)}$	0.8	13.2	29	90.1	11.9	220	ns
			1.2	5.0	7.6	14.3	4.6	14.4	
			1.5	3.4	4.8	8.9	3	9.6	
			1.8	2.7	3.6	6.9	2.3	7.6	
			2.5	1.9	2.4	5.1	1.6	5.6	
			3.3	1.5	1.9	4.4	1.3	4.8	
		$C_L = 10pF^{(5)}$	0.8	14.3	31.3	97.9	12.8	239	ns
			1.2	5.4	8.3	15.3	5.0	15.3	
			1.5	3.7	5.2	9.5	3.2	10.2	
			1.8	2.9	3.9	7.4	2.5	8.1	
			2.5	2.0	2.6	5.4	1.7	6.0	
			3.3	1.6	2.0	4.6	1.3	5.1	
		$C_L = 15pF^{(5)}$	0.8	15.3	32.5	106	13.8	259	ns
			1.2	5.8	8.9	16.3	5.3	16.3	
			1.5	4.0	5.6	10.1	3.5	10.9	
			1.8	3.1	4.2	7.8	2.6	8.6	
			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	19.3	
			1.5	4.8	6.9	12.0	4.2	12.9	
			1.8	3.7	5.1	9.2	3.2	10.2	
			2.5	2.6	3.5	6.7	2.2	7.5	
			3.3	2.0	2.2	5.6	1.7	6.3	

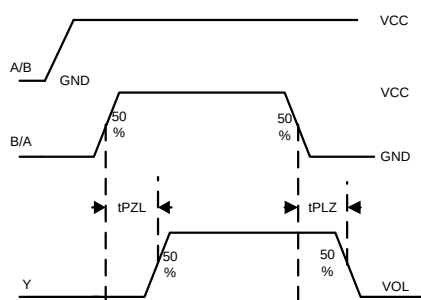
Note5. C_L includes probe and jig capacitance.

ET74AUP1G08

Capacitance Characteristics

Symbol	Parameter	Condition	Typical	Unit
C_{IN}	Input Capacitance	$V_{CC} = 3.6V$, $V_I = 0V$ or V_{CC}	2	pF
C_O	output capacitance	$V_{CC} = 0V$, $V_{OUT} = GND$	3	pF
C_{PD}	Power Dissipation Capacitance ⁽⁶⁾	1 MHz, $V_I = 0V$ to V_{CC}	$V_{CC} = 0.8V$	pF
			$V_{CC} = 1.2V$	
			$V_{CC} = 1.5V$	
			$V_{CC} = 1.8V$	
			$V_{CC} = 2.5V$	
			$V_{CC} = 3.3V$	

Note6. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation: $I_{CC(OPR)} = C_{PD} \times V_{CC} \times f_{in} + I_{CC} \times C_{PD}$ is used to determine the no-load dynamic power consumption; $P_D = C_{PD} \times V_{CC}^2 \times f_{in} + I_{CC} \times V_{CC} \times Fig.$



PROPAGATION DELAYS

$t_R = t_F = 2.5 \text{ ns}$, 10% to 90%;

$f = 1 \text{ MHz}$; $t_W = 500 \text{ ns}$

Figure 3. Switching Waveforms

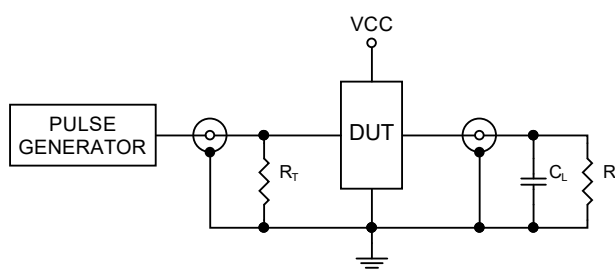
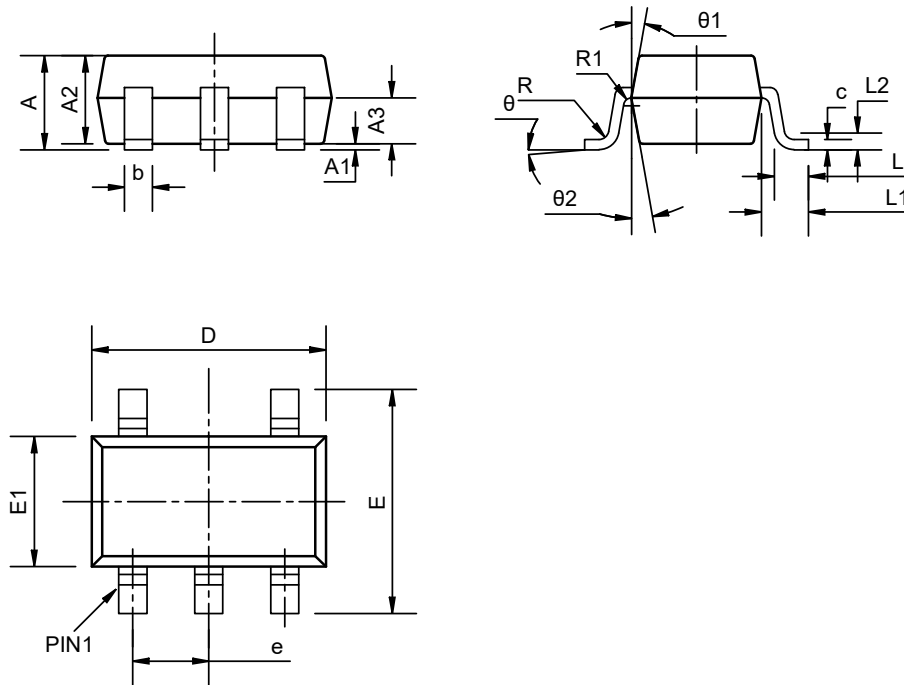


Figure4. Test Circuit $R_T = 50\Omega$ (typ)

ET74AUP1G08

Package Dimension

SC70-5

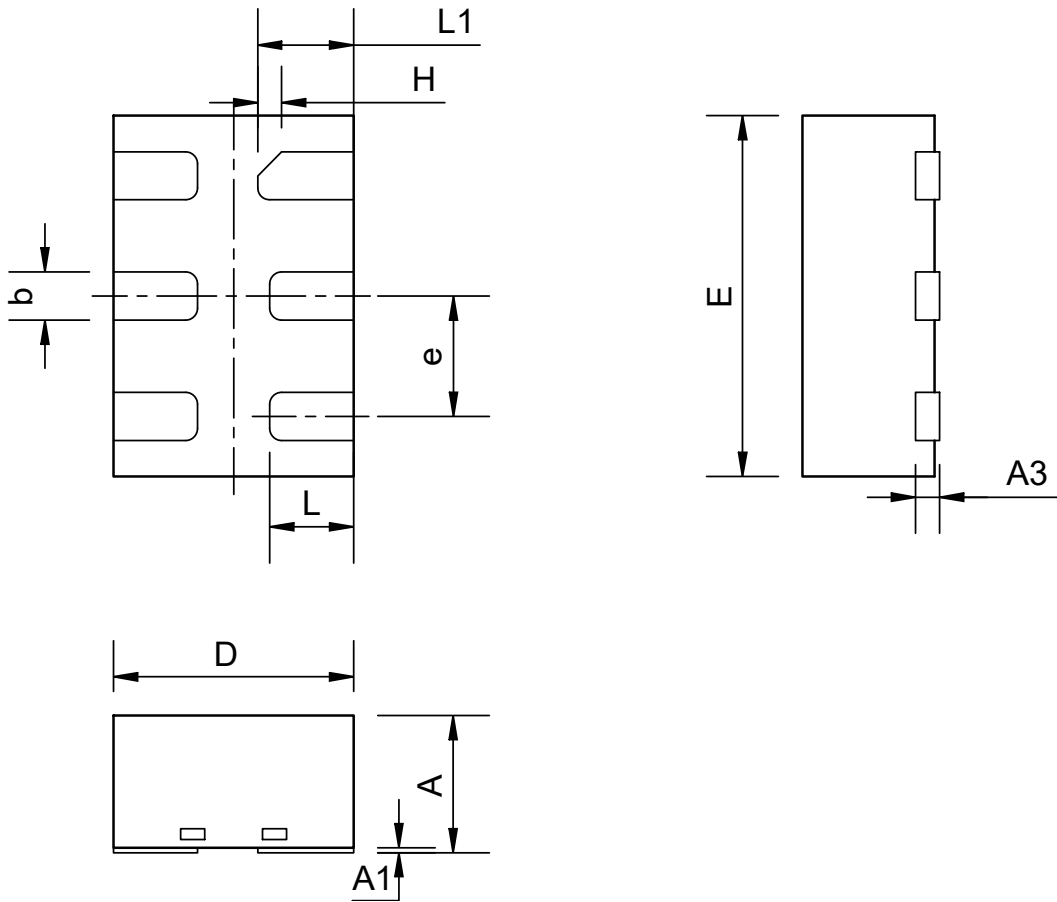


COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.85	--	1.05
A1	0	--	0.10
A2	0.80	0.90	1.00
A3	0.47	0.52	0.57
b	0.23	--	0.33
c	0.12	--	0.18
D	2.02	2.07	2.12
E	2.20	2.30	2.40
E1	1.25	1.30	1.35
e	0.60	0.65	0.70
L	0.28	0.33	0.38
L1	0.50REF		
L2	0.15BSC		
R	0.10	--	--
R1	0.10	--	0.25
θ	0°	--	8°
θ_1	6°	9°	12°
θ_2	6°	9°	12°

ET74AUP1G08

DFN6(1.0×1.5)

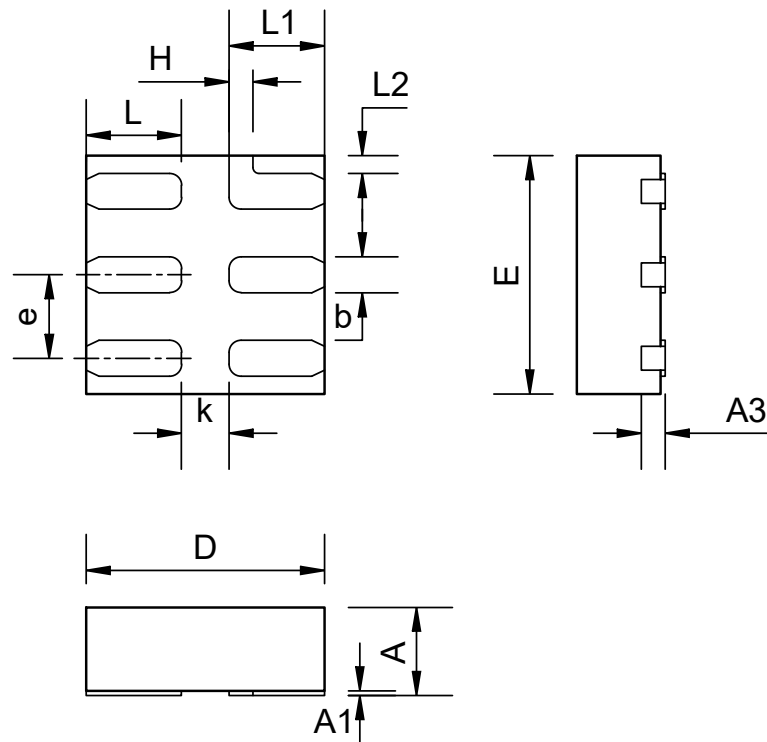


COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.50	--	0.60
A1	0	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	0.40	0.50	0.60
H	0.10REF		
L	0.30	0.35	0.40
L1	0.35	0.40	0.45

ET74AUP1G08

DFN6(1×1)



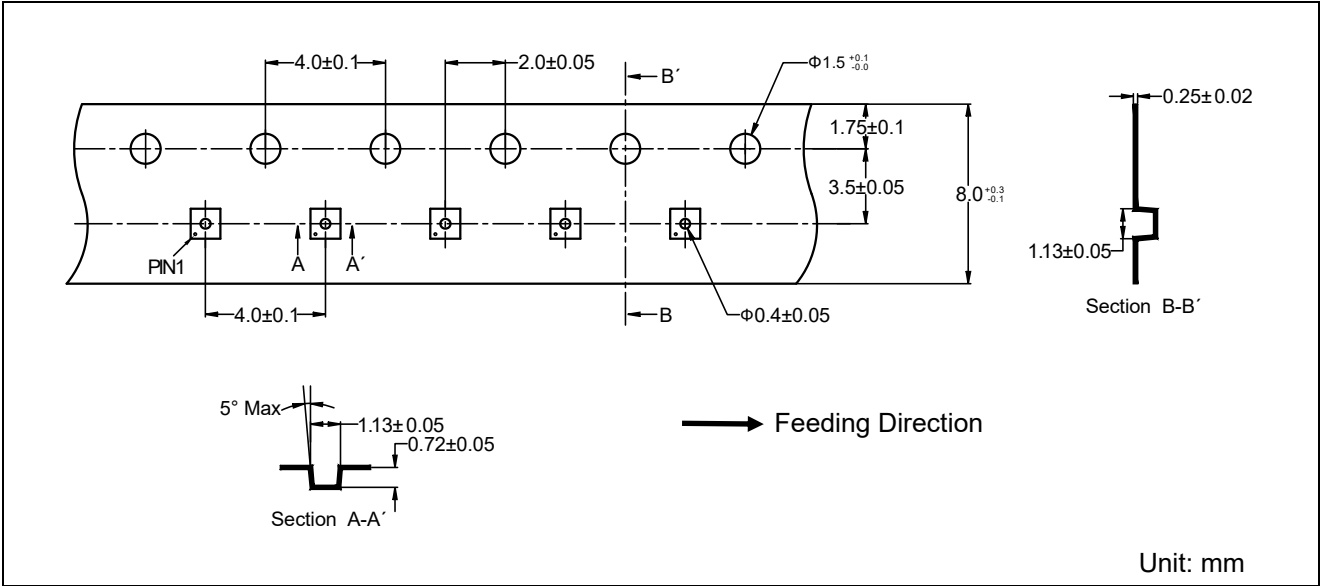
COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.34	0.37	0.40
A1	0	0.02	0.05
A3	0.10REF		
b	0.10	0.15	0.20
D	0.95	1.00	1.05
E	0.95	1.00	1.05
e	0.30	0.35	0.40
H	0.10REF		
K	0.15	--	--
L	0.35	0.40	0.45
L1	0.35	0.40	0.45
L2	0.075REF		

ET74AUP1G08

Tape Information

DFN6 (1×1)



Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2022-04-18	Initial Version	Shi LiangJun	Shi LiangJun	Liu Jia Ying
1.1	2022-09-08	Update Typeset	Shibo	Shi LiangJun	Liu Jia Ying
1.2	2022-10-14	Update format and Thermal Characteristics	Wuhan	Shi LiangJun	Liu Jia Ying
1.3	2023-11-29	Update ESD/ Tape picture	Shibo	Shibo	Liu Jy
1.4	2025-05-27	Add Packing Option	Yang xiaoxu	Yang xiaoxu	Liu jiaying