

Single ULP Buffer with 3-State Output

General Description

The ET74AUP1G125 is a single Buffer with 3-State output from ultra-low power series, which can operate 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.

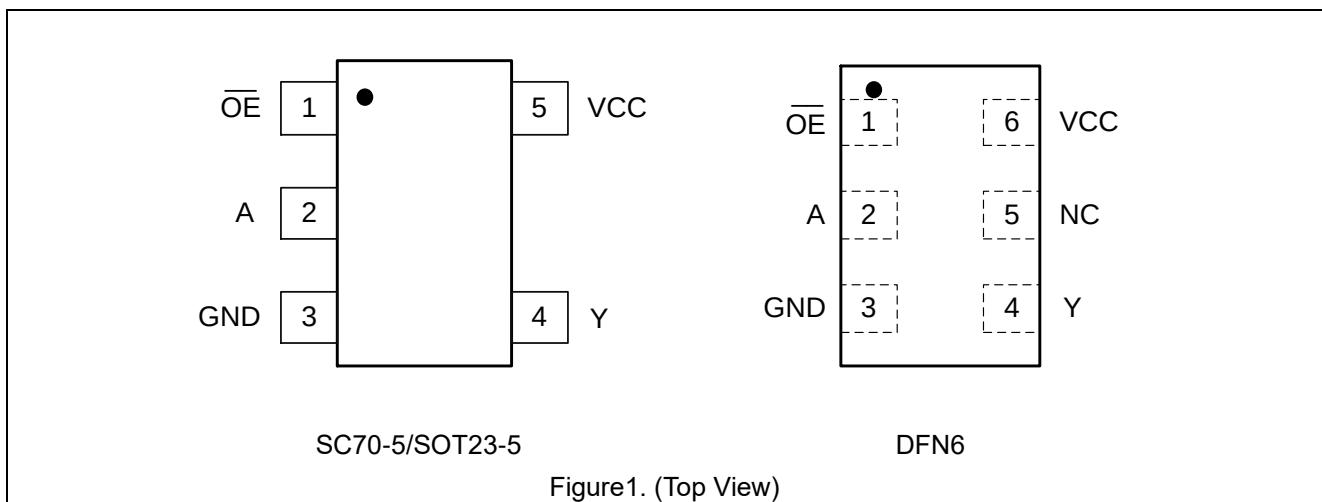
Features

- Designed for 0.8V to 3.6V VCC Operation
- Low static power consumption; ICC = 0.7μA (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
ET74AUP1G125	SC70-5 (1.3mm×2.1mm)	Tape and Reel, 3K	1
ET74AUP1G125T	SOT23-5 (1.6mm×2.9mm)	Tape and Reel, 3K	3
ET74AUP1G125Y	DFN6 (1.0mm×1.5mm)	Tape and Reel, 3K	1

Pin Configuration

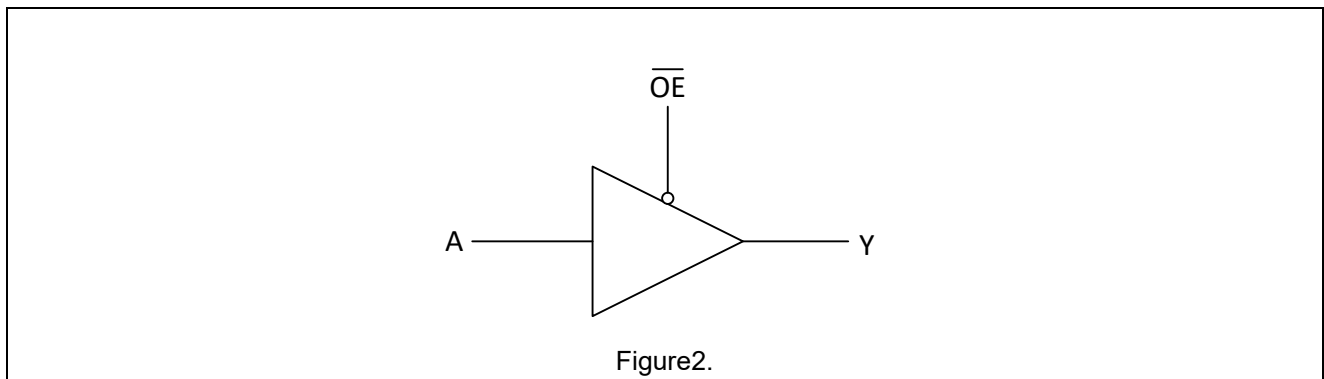


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Pin Function

Pin No.		Pin Name	Function
SC70-5	DFN6		
1	1	$\overline{\text{OE}}$	Enable input
2	2	A	Input
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
$\overline{\text{OE}}$	A	Y
L	L	L
L	H	H
H	X	Z

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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 ≤ V _I ≤ +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.

Notes:

1. IO absolute maximum rating must be observed.
2. Tested to EIA/JESD22-A114-A.
3. Tested to JESD22-C101-A.
4. 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
	SOT23-5		250	
	DFN6(1×1.5)		440	
P _D	SC70-5	Power Dissipation in Still Air at 85°C	215	mW
	SOT23-5		260	
	DFN6(1×1.5)		150	

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.

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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 _{IN} = V _{CC} or GND	0~3.6			±0.1		±0.2	uA
I _{OFF}	Power Off Leakage Current	V _{IN} = 3.6V or V _{OUT} = 3.6V	0			±0.2		±0.5	uA
I _{CC}	Quiescent Supply Current	V _{IN} = 3.6V or GND	3.6			±0.2		±0.7	uA
Δ I _{CC}	Additional Quiescent Supply Current	V _{IN} = 2.7V	3.3			60		90	uA

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AC Electrical Characteristics

$t_r = t_f = 2.5\text{ns}$

Symbol	Parameter	Condition	$V_{CC}(\text{V})$	$T_A = 25^\circ\text{C}$			$-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$		Unit
				Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation Delay (Figure3 And 4)	$C_L = 5\text{ pF}^{(5)}$	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	
		$C_L = 10\text{ pF}^{(5)}$	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	
		$C_L = 15\text{ pF}^{(5)}$	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	
		$C_L = 30\text{ pF}^{(5)}$	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.

Capacitance Characteristics

Symbol	Parameter	Condition		Typical	Unit
C_{IN}	Input Capacitance	$V_{CC} = 3.6\text{V}$, $V_I = 0\text{ V}$ or V_{CC}		2	pF
C_O	output capacitance	$V_{CC} = 0\text{V}$, $V_{OUT} = \text{GND}$		3	pF
C_{PD}	Power Dissipation Capacitance ⁽⁶⁾	1 MHz, $V_I = 0\text{ V}$ to V_{CC}	$V_{CC} = 0.8\text{V}$	7.6	pF
			$V_{CC} = 1.2\text{V}$	8.1	
			$V_{CC} = 1.5\text{V}$	8.5	
			$V_{CC} = 1.8\text{V}$	8.6	
			$V_{CC} = 2.5\text{V}$	9.0	
			$V_{CC} = 3.3\text{ V}$	9.6	

Note6. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the

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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;
 $P_D = C_{PD} \times V_{CC}^2 \times f_{in} + I_{CC} \times V_{CC} \times Fig.$

AC Test Circuit

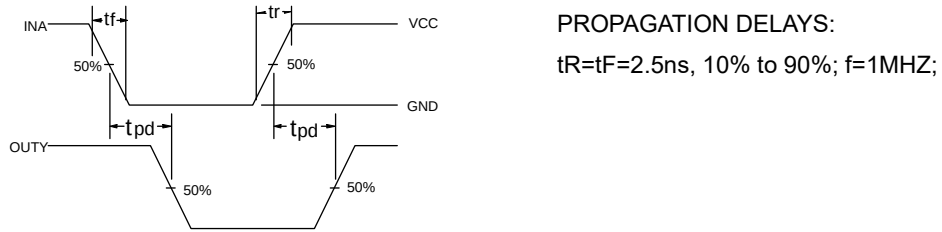


Figure3. Switch Waveform

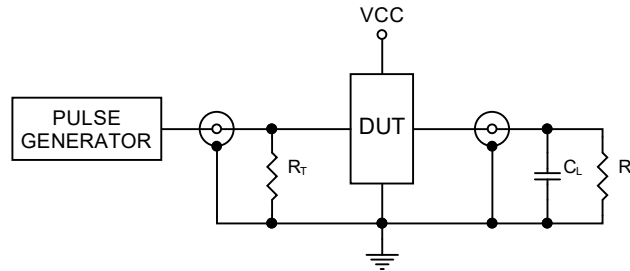


Figure4. Test Circuit $R_T = 50\Omega(\text{typ})$

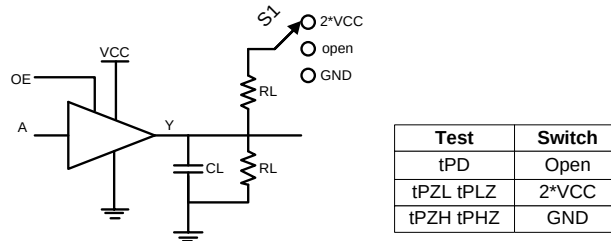


Figure5. Output Enable/Disable Time Test Circuit

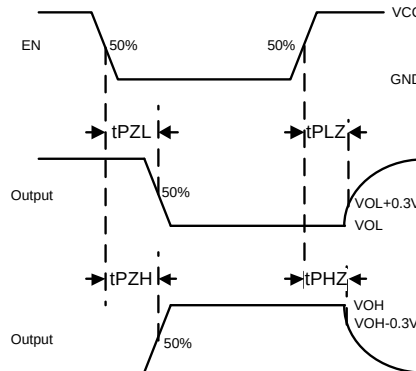
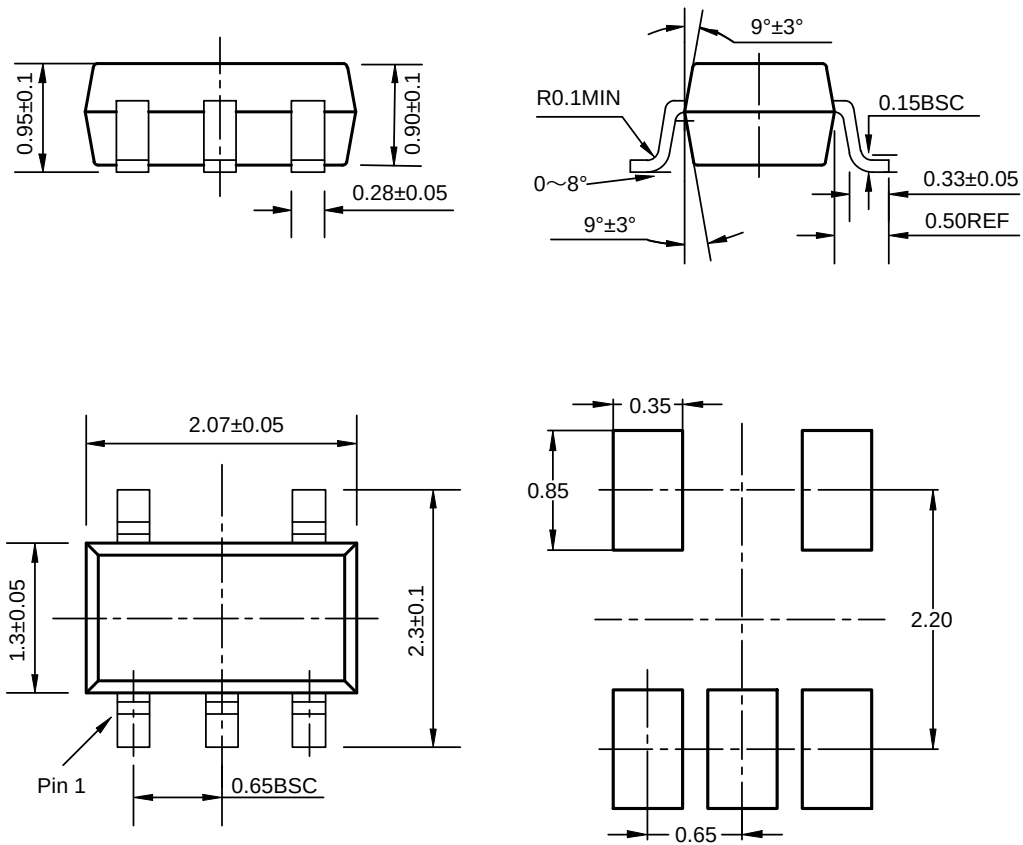


Figure6. Output Enable/Disable Waveform

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Package Dimension

SC70-5

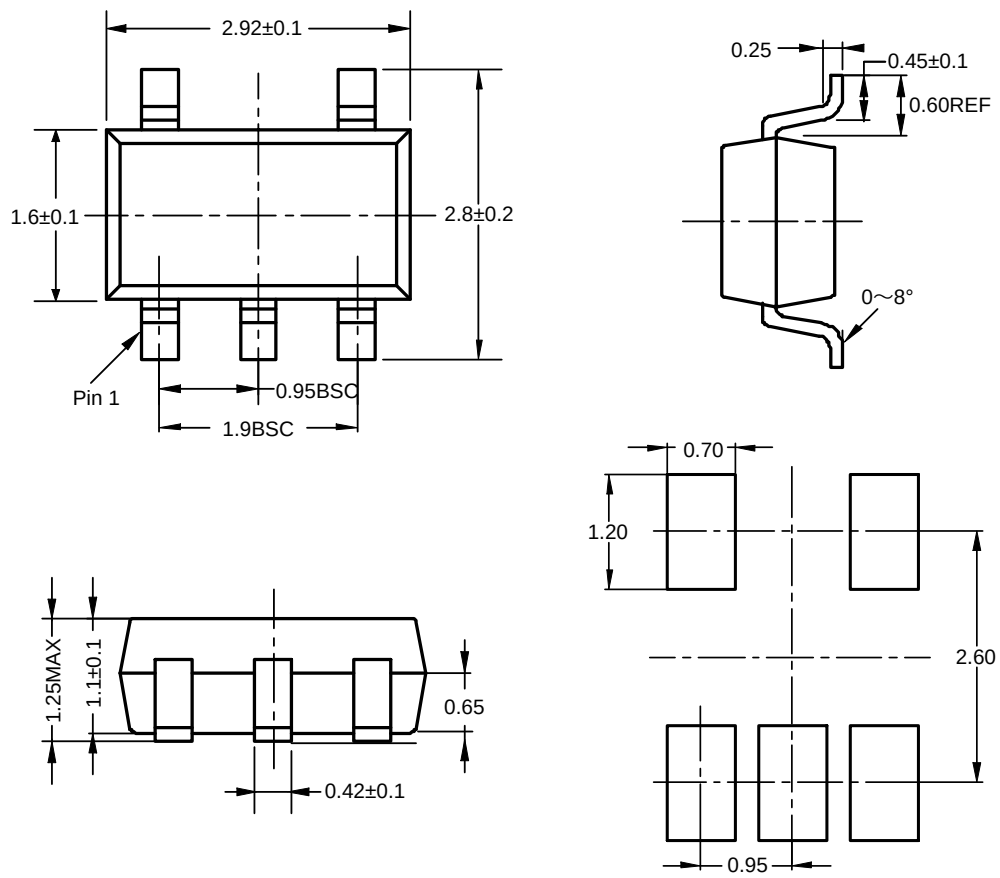


Recommended Land Pattern

Unit: mm

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SOT23-5

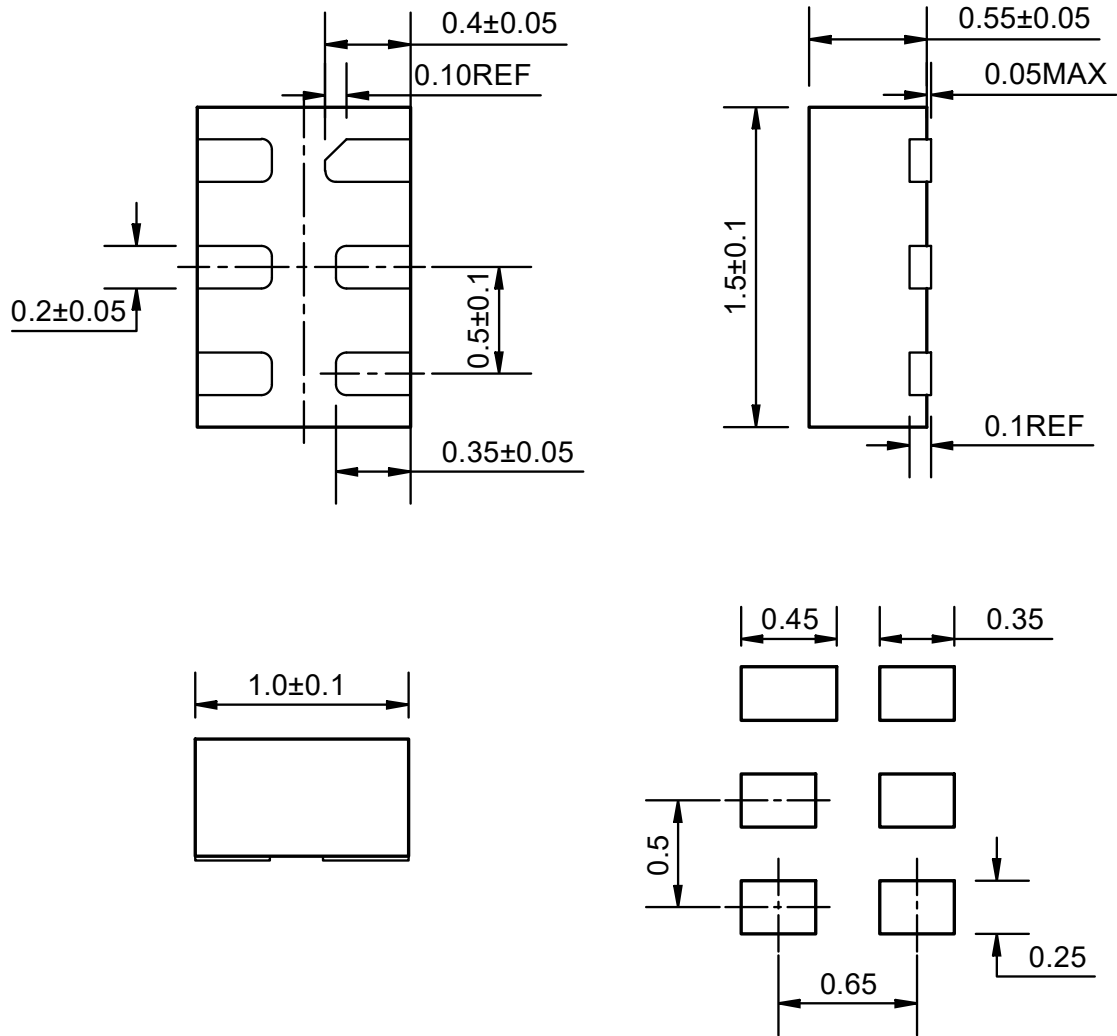


Recommended Land Pattern

Unit: mm

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DFN6 (1.0×1.5)



Recommended Land Pattern

Unit: mm

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Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2022-2-22	Initial Version	Shilj	Shilj	Liujiy
1.1	2022-09-8	Update Typeset	Shibo	Shilj	Liujiy
1.2	2023-11-29	Update Typeset /ESD/package picture	Shibo	Shibo	Liujiy
1.3	2025-06-03	Add Packing Option	Yang xiaoxu	Yang xiaoxu	Liu jiaiyng