

1.Description

The SN74AUP1G125 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

2.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
- Packages are SC70-5, SOT23-5 or small DFN6
- MSL3(SC70-5, SOT23-5, DFN6)

3.Pinning information

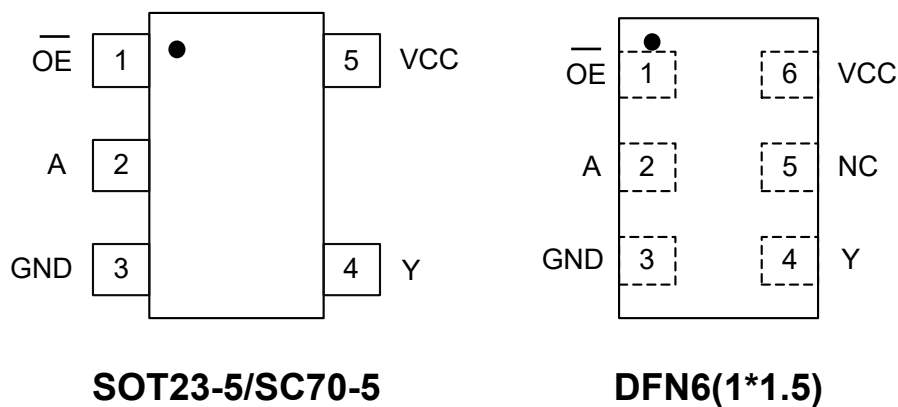


Figure1. Top View



4.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



5.Block Diagram

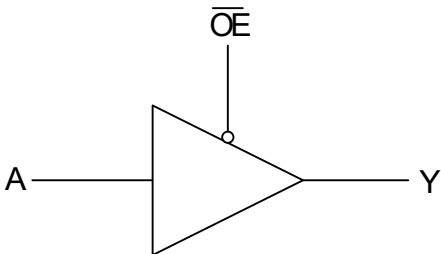


Figure2.

Function Table

Input		Output
OE	A	Y
L	L	L
L	H	H
H	X	Z



6. Absolute Maximum Ratings

Parameter		Symbol	Value	Units
DC Supply Voltage		V_{CC}	-0.5 to 4.6	V
DC Input Voltage		V_I	$-0.5 \leq V_I \leq +4.6$	V
DC Output Voltage Output in Higher or Low State ⁽¹⁾		V_O	-0.5 to 4.6	V
DC Input Diode Current $V_I < \text{GND}$		I_{IK}	-50	mA
DC Output Diode Current $V_O < \text{GND}$, $V_O > V_{CC}$		I_{OK}	± 50	mA
DC Output Sink Current		I_O	± 20	mA
DC Supply Current per Supply Pin		I_{CC}	± 50	mA
Storage Temperature Range		T_{STG}	-65 to 150	°C
Lead Temperature, 1 mm from Case for 10 Seconds		T_L	260	°C
Max Junction Temperature		T_J	150	°C
ESD Classification	Human Body Model ⁽²⁾	V_{ESD}	± 4000	V
	Charged Device Model ⁽³⁾		± 1000	V
Max Latch up Current Above V_{CC} and GND at 125°C ⁽⁴⁾		I_{LU}	± 100	mA



7. Thermal Characteristics

Ratings	Package	Symbol	Value	Units
Thermal Characteristics, Thermal Resistance, Junction-to-Air	SC70-5	$R_{\theta JA}$	300	°C/W
	SOT23-5		250	
	DFN6(1.0x1.5)		440	
Power Dissipation in Still Air at 85°C	SC70-5	P_D	215	mW
	SOT23-5		260	
	DFN6(1.0x1.5)		150	

8. Recommended Operating Conditions

Parameter		Symbol	Min	Max	Unit
DC Supply Voltage Operating		V_{CC}	0.8	3.6	V
DC input Voltage		V_{IN}	0	3.6	V
DC Output Voltage (High or Low State)		V_{OUT}	0	3.6	V
Operating Temperature Range		T_A	-40	85	°C
Input Rise and Fall Time	$V_{CC}=0.8V$ to $3.6V$	t_r, t_f	0	20	ns/V

Notes:

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



9. Electrical Characteristics

DC Electrical Characteristics

Parameter	Condition	Symbol	$V_{CC}(V)$	$T_A=25^{\circ}C$			$-40^{\circ}C \leq T_A \leq 85^{\circ}C$		Units
				Min	Typ	Max	Min	Max	
High-Level Input Voltage		V_{IH}	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 to 3.6	2			2		
Low-Level Input Voltage		V_{IL}	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	
High-Level Output Voltage	$I_{OH}=-20\mu A$	V_{OH}	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		
	$I_{OH}=-1.7\mu A$		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	2.72	2.95		2.67		
	$I_{OH}=-4.0mA$			2.6	2.92		2.55		
Low-Level Output Voltage	$I_{OL}=20\mu A$	V_{OL}	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		0.11	0.31		0.33	
	$I_{OL}=4.0mA$				0.16	0.44		0.45	



Input Leakage Current	$V_{IN}=V_{CC}$ or GND	I_{IN}	0 to 3.6			0.1		0.2	μA
Power Off Leakage Current	$V_{IN}=3.6V$ or $V_{OUT}=3.6V$	I_{OFF}	0			0.2		0.5	μA
Quiescent Supply Current	$V_{IN}=GND$ or (V_{CC} to 3.6V) $OE=GND, I_O=0$	I_{CC}	3.6			0.2		0.7	μA
Additional Quiescent Supply Current	$V_{IN}=2.7V$	ΔI_{CC}	3.3V			60		90	μA



10.1 Switching Characteristics: $C_L=5\text{pF}$

Over recommended operating free-air temperature range, $C_L=5\text{pF}$ (unless otherwise noted)

Parameter	From(Input)	To(Output)	Conditions		Min	Typ	Max	Units
t_{pd}	A	Y	$V_{CC}=0.8\text{V}$	$T_A=25^\circ\text{C}$		18.1		ns
			$V_{CC}=1.2\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	4.3	7.4	12.6	
				$T_A=-40\text{ to }85^\circ\text{C}$	2.7		15.3	
			$V_{CC}=1.5\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	3.3	5.2	8.5	
				$T_A=-40\text{ to }85^\circ\text{C}$	1		10.2	
			$V_{CC}=1.8\pm 0.15\text{V}$	$T_A=25^\circ\text{C}$	2.6	4.1	6.8	
				$T_A=-40\text{ to }85^\circ\text{C}$	1.3		8.3	
			$V_{CC}=2.5\pm 0.2\text{V}$	$T_A=25^\circ\text{C}$	2	2.9	4.7	
				$T_A=-40\text{ to }85^\circ\text{C}$	1.1		5.8	
			$V_{CC}=3.3\pm 0.3\text{V}$	$T_A=25^\circ\text{C}$	1.7	2.4	3.8	
				$T_A=-40\text{ to }85^\circ\text{C}$	1		4.6	
t_{en}	$\overline{\text{OE}}$	Y	$V_{CC}=0.8\text{V}$	$T_A=25^\circ\text{C}$		19.1		ns
			$V_{CC}=1.2\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	5.1	9.3	15.9	
				$T_A=-40\text{ to }85^\circ\text{C}$	3.6		19.2	
			$V_{CC}=1.5\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	4.1	6.6	10.5	
				$T_A=-40\text{ to }85^\circ\text{C}$	2.5		12.7	
			$V_{CC}=1.8\pm 0.15\text{V}$	$T_A=25^\circ\text{C}$	3.2	5.3	8.7	
				$T_A=-40\text{ to }85^\circ\text{C}$	2.1		10.3	
			$V_{CC}=2.5\pm 0.2\text{V}$	$T_A=25^\circ\text{C}$	2.5	3.8	6	
				$T_A=-40\text{ to }85^\circ\text{C}$	1.6		7.2	
			$V_{CC}=3.3\pm 0.3\text{V}$	$T_A=25^\circ\text{C}$	2.1	3.2	4.9	
				$T_A=-40\text{ to }85^\circ\text{C}$	1.4		5.9	



Parameter	From(Input)	To(Output)	Conditions		Min	Typ	Max	Units
t _{dis}	$\overline{\text{OE}}$	Y	V _{CC} =0.8V	T _A =25°C		12.1		ns
			V _{CC} =1.2±0.1V	T _A =25°C	2.4	4.1	6.9	
				T _A =-40 to 85°C	2.2		7.7	
			V _{CC} =1.5±0.1V	T _A =25°C	1.8	2.9	4.5	
				T _A =-40 to 85°C	1.7		5.1	
			V _{CC} =1.8±0.15V	T _A =25°C	1	2.9	4.3	
				T _A =-40 to 85°C	1.5		4.7	
			V _{CC} =2.5±0.2V	T _A =25°C	1	1.8	2.7	
				T _A =-40 to 85°C	1		3.3	
			V _{CC} =3.3±0.3V	T _A =25°C	1.2	2.2	3.2	
				T _A =-40 to 85°C	1.1		4	



10.2 Switching Characteristics: $C_L=10\text{pF}$

Over recommended operating free-air temperature range, $C_L=10\text{pF}$ (unless otherwise noted)

Parameter	From(Input)	To(Output)	Conditions		Min	Typ	Max	Units
t_{pd}	A	Y	$V_{CC}=0.8\text{V}$	$T_A=25^\circ\text{C}$		20.5	13.7	ns
			$V_{CC}=1.2\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	4.6	8.4	9.3	
				$T_A=-40\text{ to }85^\circ\text{C}$	3.6		16.6	
			$V_{CC}=1.5\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	3.5	5.9	7.5	
				$T_A=-40\text{ to }85^\circ\text{C}$	2.4		11.1	
			$V_{CC}=1.8\pm 0.15\text{V}$	$T_A=25^\circ\text{C}$	3.9	4.7	5.3	
				$T_A=-40\text{ to }85^\circ\text{C}$	1.3		9.1	
			$V_{CC}=2.5\pm 0.2\text{V}$	$T_A=25^\circ\text{C}$	2.3	3.4	4.3	
				$T_A=-40\text{ to }85^\circ\text{C}$	1.6		6.4	
			$V_{CC}=3.3\pm 0.3\text{V}$	$T_A=25^\circ\text{C}$	2.1	2.8		
				$T_A=-40\text{ to }85^\circ\text{C}$	1.4		5.2	
t_{en}	$\overline{\text{OE}}$	Y	$V_{CC}=0.8\text{V}$	$T_A=25^\circ\text{C}$		21.8	16.8	ns
			$V_{CC}=1.2\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	4.9	10.2	11.2	
				$T_A=-40\text{ to }85^\circ\text{C}$	4.4		20.2	
			$V_{CC}=1.5\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	3.9	7.3	9.2	
				$T_A=-40\text{ to }85^\circ\text{C}$	3.3		13.5	
			$V_{CC}=1.8\pm 0.15\text{V}$	$T_A=25^\circ\text{C}$	3.4	5.8	6.4	
				$T_A=-40\text{ to }85^\circ\text{C}$	2.7		11	
			$V_{CC}=2.5\pm 0.2\text{V}$	$T_A=25^\circ\text{C}$	2.5	4.3	5.4	
				$T_A=-40\text{ to }85^\circ\text{C}$	2.1		7.8	
			$V_{CC}=3.3\pm 0.3\text{V}$	$T_A=25^\circ\text{C}$	2.1	3.7		
				$T_A=-40\text{ to }85^\circ\text{C}$	1.9		6.4	



Parameter	From(Input)	To(Output)	Conditions		Min	Typ	Max	Units
t _{dis}	$\overline{\text{OE}}$	Y	V _{CC} =0.8V	T _A =25°C		13		ns
			V _{CC} =1.2±0.1V	T _A =25°C	3.8	6.6	11.7	
				T _A =-40 to 85°C	1.2		14	
			V _{CC} =1.5±0.1V	T _A =25°C	2.2	4.7	7.9	
				T _A =-40 to 85°C	1.3		9.3	
			V _{CC} =1.8±0.15V	T _A =25°C	2.4	4.4	6.4	
				T _A =-40 to 85°C	2.2		7.5	
			V _{CC} =2.5±0.2V	T _A =25°C	1.3	3.1	4.9	
				T _A =-40 to 85°C	1.2		5.4	
			V _{CC} =3.3±0.3V	T _A =25°C	1.9	3.4	5	
				T _A =-40 to 85°C	1.9		5.6	



10.3 Switching Characteristics: $C_L=15\text{pF}$

Over recommended operating free-air temperature range, $C_L=15\text{pF}$ (unless otherwise noted)

Parameter	From(Input)	To(Output)	Conditions		Min	Typ	Max	Units
t_{pd}	A	Y	$V_{CC}=0.8\text{V}$	$T_A=25^\circ\text{C}$		22.5		ns
			$V_{CC}=1.2\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	5.8	9.3	15.1	
				$T_A=-40\text{ to }85^\circ\text{C}$	4.3		17.9	
			$V_{CC}=1.5\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	4.4	6.6	10.2	
				$T_A=-40\text{ to }85^\circ\text{C}$	3		12.1	
			$V_{CC}=1.8\pm 0.15\text{V}$	$T_A=25^\circ\text{C}$	3.5	5.3	8.3	
				$T_A=-40\text{ to }85^\circ\text{C}$	2.3		9.9	
			$V_{CC}=2.5\pm 0.2\text{V}$	$T_A=25^\circ\text{C}$	2.7	3.9	5.8	
				$T_A=-40\text{ to }85^\circ\text{C}$	1.9		7	
			$V_{CC}=3.3\pm 0.3\text{V}$	$T_A=25^\circ\text{C}$	2.4	3.2	4.7	
				$T_A=-40\text{ to }85^\circ\text{C}$	1.8		5.7	
t_{en}	$\overline{\text{OE}}$	Y	$V_{CC}=0.8\text{V}$	$T_A=25^\circ\text{C}$		25.2		ns
			$V_{CC}=1.2\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	7	11.3	18.1	
				$T_A=-40\text{ to }85^\circ\text{C}$	5.4		21.4	
			$V_{CC}=1.5\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	5.5	8.1	12.2	
				$T_A=-40\text{ to }85^\circ\text{C}$	4.1		14.5	
			$V_{CC}=1.8\pm 0.15\text{V}$	$T_A=25^\circ\text{C}$	4.3	6.5	10.1	
				$T_A=-40\text{ to }85^\circ\text{C}$	3.3		12	
			$V_{CC}=2.5\pm 0.2\text{V}$	$T_A=25^\circ\text{C}$	3.4	4.8	7.1	
				$T_A=-40\text{ to }85^\circ\text{C}$	2.6		8.4	
			$V_{CC}=3.3\pm 0.3\text{V}$	$T_A=25^\circ\text{C}$	2.9	4.1	5.9	
				$T_A=-40\text{ to }85^\circ\text{C}$	2.3		6.9	



Parameter	From(Input)	To(Output)	Conditions		Min	Typ	Max	Units
t _{dis}	$\overline{\text{OE}}$	Y	V _{CC} =0.8V	T _A =25°C		14		ns
			V _{CC} =1.2±0.1V	T _A =25°C	3.7	5.8	8.2	
				T _A =-40 to 85°C	3.3		11	
			V _{CC} =1.5±0.1V	T _A =25°C	5.5	3.9	5.9	
				T _A =-40 to 85°C	2.1		8	
			V _{CC} =1.8±0.15V	T _A =25°C	3.3	4.5	6.6	
				T _A =-40 to 85°C	2.9		7.4	
			V _{CC} =2.5±0.2V	T _A =25°C	2.3	3.2	4.3	
				T _A =-40 to 85°C	1.8		5.1	
			V _{CC} =3.3±0.3V	T _A =25°C	2.4	4.8	6.2	
				T _A =-40 to 85°C	3.1		6.7	



10.4 Switching Characteristics: $C_L=30\text{pF}$

Over recommended operating free-air temperature range, $C_L=30\text{pF}$ (unless otherwise noted)

Parameter	From(Input)	To(Output)	Conditions		Min	Typ	Max	Units
t_{pd}	A	Y	$V_{CC}=0.8\text{V}$	$T_A=25^\circ\text{C}$		29		ns
			$V_{CC}=1.2\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	7.4	12	18.7	
				$T_A=-40\text{ to }85^\circ\text{C}$	6.6		21.4	
			$V_{CC}=1.5\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	5.7	8.6	12.5	
				$T_A=-40\text{ to }85^\circ\text{C}$	4.9		14.7	
			$V_{CC}=1.8\pm 0.15\text{V}$	$T_A=25^\circ\text{C}$	4.8	6.9	10.1	
				$T_A=-40\text{ to }85^\circ\text{C}$	3.1		12	
			$V_{CC}=2.5\pm 0.2\text{V}$	$T_A=25^\circ\text{C}$	3.9	5.1	7.2	
				$T_A=-40\text{ to }85^\circ\text{C}$	3.3		8.7	
			$V_{CC}=3.3\pm 0.3\text{V}$	$T_A=25^\circ\text{C}$	3.5	4.8	6	
				$T_A=-40\text{ to }85^\circ\text{C}$	3		7	
t_{en}	$\overline{\text{OE}}$	Y	$V_{CC}=0.8\text{V}$	$T_A=25^\circ\text{C}$		33.4		ns
			$V_{CC}=1.2\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	8.8	14.1	21.8	
				$T_A=-40\text{ to }85^\circ\text{C}$	7.4		25.5	
			$V_{CC}=1.5\pm 0.1\text{V}$	$T_A=25^\circ\text{C}$	6.9	10.1	14.6	
				$T_A=-40\text{ to }85^\circ\text{C}$	5.6		17.4	
			$V_{CC}=1.8\pm 0.15\text{V}$	$T_A=25^\circ\text{C}$	5.6	8.1	12	
				$T_A=-40\text{ to }85^\circ\text{C}$	4.7		14.1	
			$V_{CC}=2.5\pm 0.2\text{V}$	$T_A=25^\circ\text{C}$	4.3	6.1	8.5	
				$T_A=-40\text{ to }85^\circ\text{C}$	3.8		10	
			$V_{CC}=3.3\pm 0.3\text{V}$	$T_A=25^\circ\text{C}$	3.7	5.2	7.1	
				$T_A=-40\text{ to }85^\circ\text{C}$	3.4		8.3	



Parameter	From(Input)	To(Output)	Conditions		Min	Typ	Max	Units
t_{dis}	$\overline{OE}$	Y	$V_{CC}=0.8V$	$T_A=25^{\circ}C$		17.7		ns
			$V_{CC}=1.2\pm0.1V$	$T_A=25^{\circ}C$	5.8	10	16	
				$T_A=-40\text{ to }85^{\circ}C$	3.7		16	
			$V_{CC}=1.5\pm0.1V$	$T_A=25^{\circ}C$	5.7	7.7	10.9	
				$T_A=-40\text{ to }85^{\circ}C$	1		10.7	
			$V_{CC}=1.8\pm0.15V$	$T_A=25^{\circ}C$	4.5	7.7	9.8	
				$T_A=-40\text{ to }85^{\circ}C$	4.4		12.5	
			$V_{CC}=2.5\pm0.2V$	$T_A=25^{\circ}C$	3.9	5.6	7.4	
				$T_A=-40\text{ to }85^{\circ}C$	3.2		9	
			$V_{CC}=3.3\pm0.3V$	$T_A=25^{\circ}C$	3.3	8.4	10.7	
				$T_A=-40\text{ to }85^{\circ}C$	6.6		10.8	

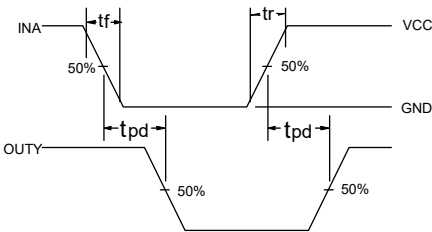
10.5 Operating Characteristics

$T_A=25^{\circ}C$

Parameter			Conditions	V_{CC}	Typ	Units
C_{pd}	Power dissipation capacitance	Output enabled	$f=10MHz$	0.8V	3.8	pF
				1.2V $\pm$ 0.1V	3.7	
				1.5V $\pm$ 0.1V	3.7	
				1.8V $\pm$ 0.15V	3.7	
				2.5V $\pm$ 0.2V	3.9	
				3.3V $\pm$ 0.3V	4	
		Output disabled	$f=10MHz$	0.8V	0	
				1.2V $\pm$ 0.1V	0	
				1.5V $\pm$ 0.1V	0	
				1.8V $\pm$ 0.15V	0	
				2.5V $\pm$ 0.2V	0	
				3.3V $\pm$ 0.3V	0	



11.AC Test Circuit



PROPAGATION DELAYS:
 $t_R=t_F=2.5\text{ns}$, 10% to 90%; $f=1\text{MHz}$;

Figure3. Switch Waveform

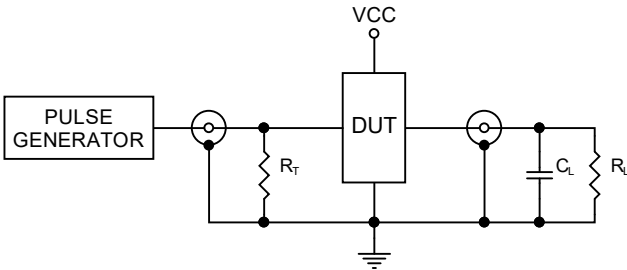


Figure4. Test Circuit $R_T=50\Omega(\text{typ})$

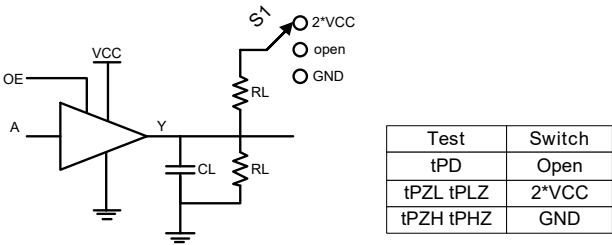


Figure5. Output Enable/Disable Time Test Circuit

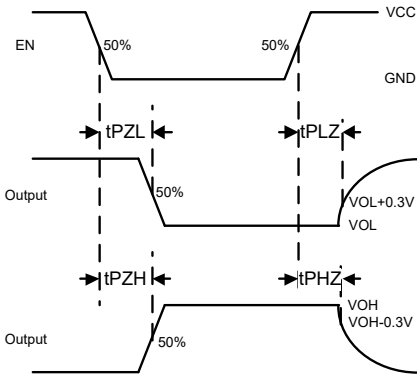
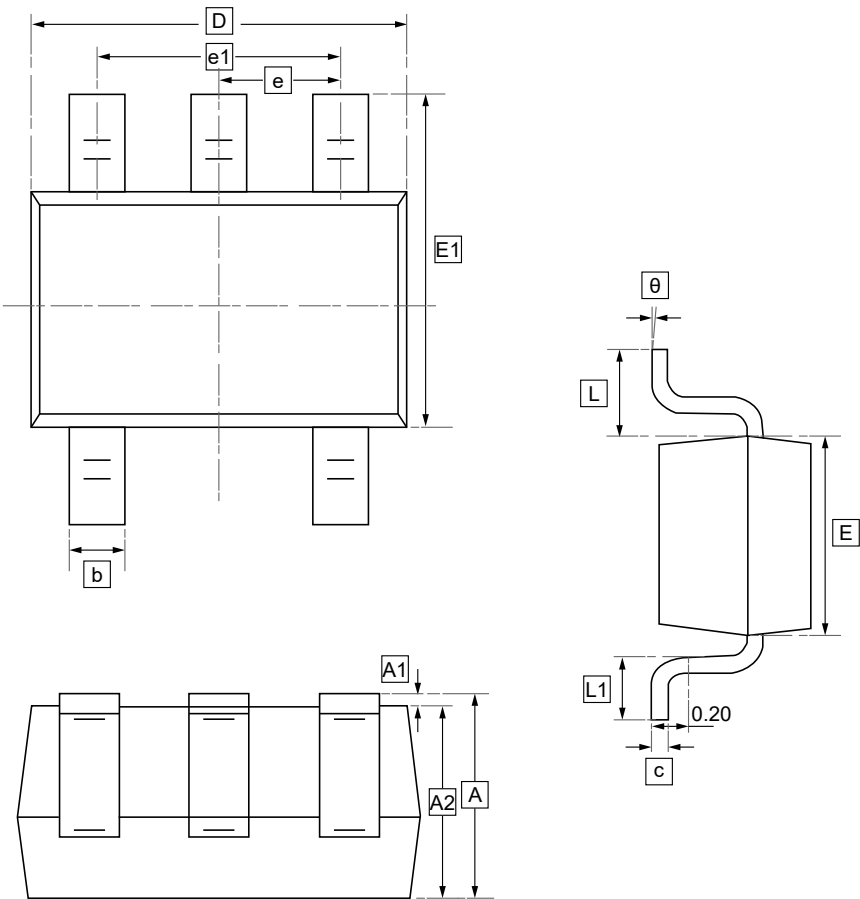


Figure6. Output Enable/Disable Waveform



12.1 SC70-5 Package Outline Dimensions

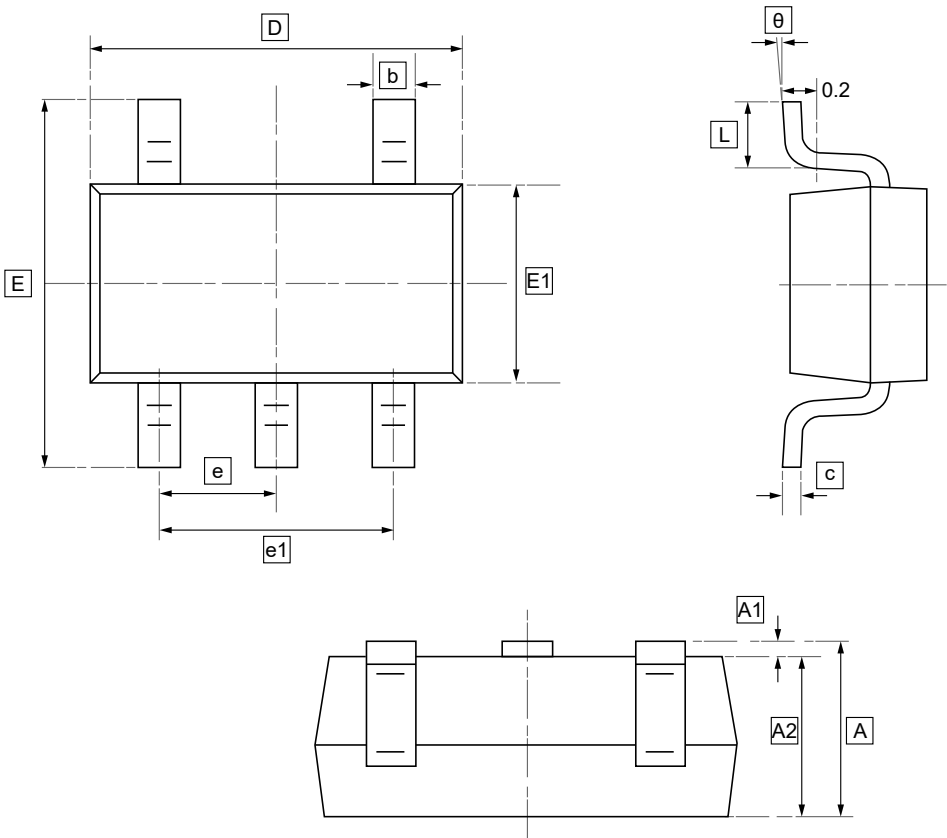


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	e1	L	θ
Min	0.90	0.00	0.90	0.15	0.08	2.05	1.15	2.15	0.65	1.20	0.26	7°
Max	1.10	0.10	1.00	0.35	0.15	2.25	1.35	2.45	TYP	1.40	0.46	REF.



12.2 SOT-23-5 Package Outline Dimensions

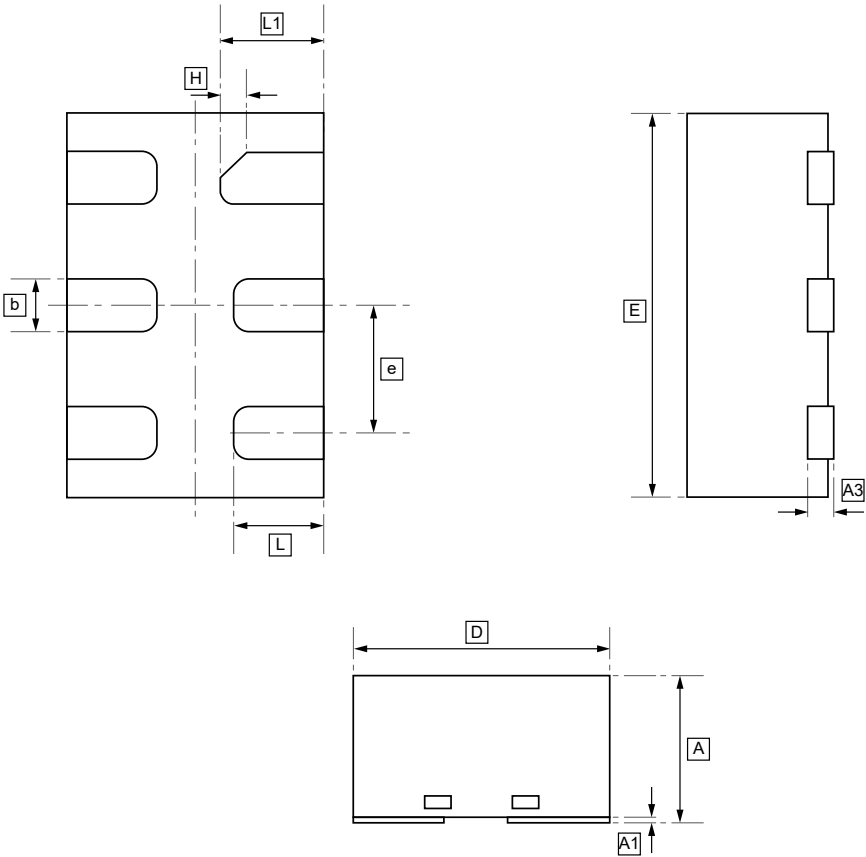


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E1	E	e	e1	L	θ
Min	1.050	0.000	1.050	0.300	0.100	2.820	1.500	2.650	0.950	1.800	0.300	0°
Max	1.250	0.100	1.150	0.500	0.200	3.020	1.700	2.950	BSC	2.000	0.600	8°



12.3 DFN6(1*1.5) Package Outline Dimensions

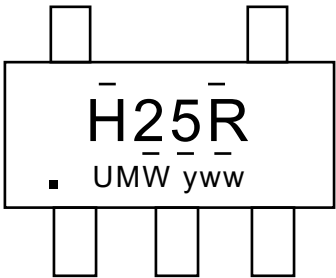


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A3	b	D	E	e	H	L	L1
Min	0.50	0	0.10	0.15	0.90	1.40	0.40	0.10	0.30	0.35
Max	0.60	0.05	REF	0.25	1.10	1.60	0.60	REF	0.40	0.45



13.Ordering information



Order Code	Marking	Package	Base QTY	Delivery Mode
UMW SN74AUP1G125DCKR	HM5	SC70-5	3000	Tape and reel
UMW SN74AUP1G125DBVR	H25R	SOT23-5	3000	Tape and reel
UMW SN74AUP1G125DRYR	HM	DFN6(1*1.5)	5000	Tape and reel



14.Disclaimer

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