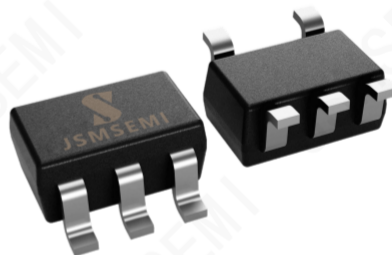


1、General Description

The 74AUP1G08GW-Q100H-JSM provides the single 2-input AND function. This device ensures a very low static and dynamic power consumption across the entire V_{CC} range from 0.8V to 3.6V.

This device is fully specified for partial Power-down applications using I_{OFF} . The I_{OFF} circuitry disables the output, preventing the damaging backflow current through the device when it is powered down.



Features:

- Wide supply voltage range from 0.8V to 3.6V
- Low static power consumption; $I_{CC}=1\mu A$ (maximum)
- Inputs accept voltages up to 3.6V
- I_{OFF} circuitry provides partial Power-down mode operation
- Specified from $-40^{\circ}C$ to $+125^{\circ}C$
- Packaging information: SOT23-5

2、Block Diagram And Pin Description

2.1、Block Diagram



Figure 1. Logic symbol



Figure 2. IEC logic symbol

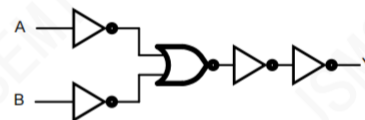
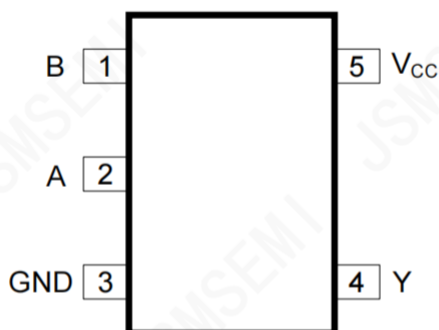


Figure 3. Logic diagram

Ordering Information

Order number	Package	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
74AUP1G08GW-Q100H-JSM	SOT23-5	-40 to $125^{\circ}C$	3	T&R,3000	Rohs

2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	B	data input
2	A	data input
3	GND	ground(0V)
4	Y	data output
5	V _{CC}	supply voltage

2.4、Function Table

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

Note: H=HIGH voltage level; L=LOW voltage level.

3、Electrical Parameter

3.1、Absolute Maximum Ratings

($T_{amb}=25^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified)

Characteristic	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	-	-0.5	+4.6	V
input clamping current	I_{IK}	$V_I < 0\text{V}$	-50	-	mA
input voltage	V_I	- ^[1]	-0.5	+4.6	V
output clamping current	I_{OK}	$V_O < 0\text{V}$	-	± 20	mA
output voltage	V_O	Active mode and Power-down mode ^[1]	-0.5	+4.6	V
output current	I_O	$V_O = 0\text{V}$ to V_{CC}	-	± 20	mA
supply current	I_{CC}	-	-	+50	mA
ground current	I_{GND}	-	-50	-	mA
storage temperature	T_{stg}	-	-65	+150	$^{\circ}\text{C}$
total power dissipation	P_{tot}	-	-	250	mW
soldering temperature	T_L	-	260		$^{\circ}\text{C}$

Note:

[1] The minimum input and output voltage ratings may be exceeded if the input and output current ratings are observed.

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{CC}	-	0.8	-	3.6	V
input voltage	V_I	-	0	-	3.6	V
output voltage	V_O	Active mode	0	-	V_{CC}	V
		Power-down mode; $V_{CC}=0\text{V}$	0	-	3.6	V
ambient temperature	T_{amb}	-	-40	-	+125	$^{\circ}\text{C}$
input transition rise and fall rate	$\Delta t/\Delta V$	$V_{CC}=0.8\text{V}$ to 3.6V	0	-	200	ns/V

3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

($T_{amb}=25^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V _{IH}	V _{CC} =0.8V		0.70×V _{CC}	-	-	V
		V _{CC} =0.9V to 1.95V		0.65×V _{CC}	-	-	V
		V _{CC} =2.3V to 2.7V		1.6	-	-	V
		V _{CC} =3.0V to 3.6V		2.0	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =0.8V		-	-	0.30×V _{CC}	V
		V _{CC} =0.9V to 1.95V		-	-	0.35×V _{CC}	V
		V _{CC} =2.3V to 2.7V		-	-	0.7	V
		V _{CC} =3.0V to 3.6V		-	-	0.9	V
HIGH-level output voltage	V _{OH}	V _I =V _{IH} or V _{IL}	I _O =-20uA; V _{CC} =0.8V to 3.6V	V _{CC} -0.1	-	-	V
			I _O =-1.1mA; V _{CC} =1.1V	0.75×V _{CC}	-	-	V
			I _O =-1.7mA; V _{CC} =1.4V	1.11	-	-	V
			I _O =-1.9mA; V _{CC} =1.65V	1.32	-	-	V
			I _O =-2.3mA; V _{CC} =2.3V	2.05	-	-	V
			I _O =-3.1mA; V _{CC} =2.3V	1.9	-	-	V
			I _O =-2.7mA; V _{CC} =3.0V	2.72	-	-	V
			I _O =-4.0mA; V _{CC} =3.0V	2.6	-	-	V
LOW-level output voltage	V _{OL}	V _I =V _{IH} or V _{IL}	I _O =20uA; V _{CC} =0.8V to 3.6V	-	-	0.1	V
			I _O =1.1mA; V _{CC} =1.1V	-	-	0.3×V _{CC}	V
			I _O =1.7mA; V _{CC} =1.4V	-	-	0.31	V
			I _O =1.9mA; V _{CC} =1.65V	-	-	0.31	V
			I _O =2.3mA; V _{CC} =2.3V	-	-	0.31	V
			I _O =3.1mA; V _{CC} =2.3V	-	-	0.44	V
			I _O =2.7mA; V _{CC} =3.0V	-	-	0.31	V
			I _O =4.0mA; V _{CC} =3.0V	-	-	0.44	V
input leakage current	I _I	V _I =GND to 3.6V; V _{CC} =0V to 3.6V		-	-	±1.0	uA
power-off leakage current	I _{OFF}	V _I or V _O =0V to 3.6V; V _{CC} =0V		-	-	±1.0	uA
additional power-off leakage current	ΔI _{OFF}	V _I or V _O =0V to 3.6V; V _{CC} =0V to 0.2V		-	-	±1.0	uA
supply current	I _{CC}	V _I =GND or V _{CC} ; I _O =0A; V _{CC} =0.8V to 3.6V		-	-	1.0	uA
additional supply current	ΔI _{CC}	V _I =V _{CC} -0.6V; I _O =0A; V _{CC} =3.3V ^[1]		-	-	40	uA
input capacitance	C _I	V _{CC} =0V to 3.6V; V _I =GND or V _{CC}		-	0.8	-	pF
output capacitance	C _O	V _O =GND; V _{CC} =0V		-	1.7	-	pF

Note:

[1] One input at $V_{CC}-0.6\text{V}$, other input at V_{CC} or GND.

3.3.2、DC Characteristics 2

($T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V _{IH}	V _{CC} =0.8V		0.70×V _{CC}	-	-	V
		V _{CC} =0.9V to 1.95V		0.65×V _{CC}	-	-	V
		V _{CC} =2.3V to 2.7V		1.6	-	-	V
		V _{CC} =3.0V to 3.6V		2.0	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =0.8V		-	-	0.30×V _{CC}	V
		V _{CC} =0.9V to 1.95V		-	-	0.35×V _{CC}	V
		V _{CC} =2.3V to 2.7V		-	-	0.7	V
		V _{CC} =3.0V to 3.6V		-	-	0.9	V
HIGH-level output voltage	V _{OH}	V _I =V _{IH} or V _{IL}	I _O =-20uA; V _{CC} =0.8V to 3.6V	V _{CC} -0.1	-	-	V
			I _O =-1.1mA; V _{CC} =1.1V	0.7×V _{CC}	-	-	V
			I _O =-1.7mA; V _{CC} =1.4V	1.03	-	-	V
			I _O =-1.9mA; V _{CC} =1.65V	1.30	-	-	V
			I _O =-2.3mA; V _{CC} =2.3V	1.97	-	-	V
			I _O =-3.1mA; V _{CC} =2.3V	1.85	-	-	V
			I _O =-2.7mA; V _{CC} =3.0V	2.67	-	-	V
			I _O =-4.0mA; V _{CC} =3.0V	2.55	-	-	V
LOW-level output voltage	V _{OL}	V _I =V _{IH} or V _{IL}	I _O =20uA; V _{CC} =0.8V to 3.6V	-	-	0.1	V
			I _O =1.1mA; V _{CC} =1.1V	-	-	0.3×V _{CC}	V
			I _O =1.7mA; V _{CC} =1.4V	-	-	0.37	V
			I _O =1.9mA; V _{CC} =1.65V	-	-	0.35	V
			I _O =2.3mA; V _{CC} =2.3V	-	-	0.33	V
			I _O =3.1mA; V _{CC} =2.3V	-	-	0.45	V
			I _O =2.7mA; V _{CC} =3.0V	-	-	0.33	V
			I _O =4.0mA; V _{CC} =3.0V	-	-	0.45	V
input leakage current	I _I	V _I =GND to 3.6V; V _{CC} =0V to 3.6V		-	-	±1.0	uA
power-off leakage current	I _{OFF}	V _I or V _O =0V to 3.6V; V _{CC} =0V		-	-	±1.0	uA
additional power-off leakage current	ΔI _{OFF}	V _I or V _O =0V to 3.6V; V _{CC} =0V to 0.2V		-	-	±1.0	uA
supply current	I _{CC}	V _I =GND or V _{CC} ; I _O =0A; V _{CC} =0.8V to 3.6V		-	-	1.0	uA
additional supply current	ΔI _{CC}	V _I =V _{CC} -0.6V; I _O =0A; V _{CC} =3.3V ^[1]		-	-	50	uA

Note:

[1] One input at $V_{CC}-0.6\text{V}$, other input at V_{CC} or GND.

3.3.3、DC Characteristics 3

($T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V _{IH}	V _{CC} =0.8V		0.75×V _{CC}	-	-	V
		V _{CC} =0.9V to 1.95V		0.70×V _{CC}	-	-	V
		V _{CC} =2.3V to 2.7V		1.6	-	-	V
		V _{CC} =3.0V to 3.6V		2.0	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =0.8V		-	-	0.25×V _{CC}	V
		V _{CC} =0.9V to 1.95V		-	-	0.30×V _{CC}	V
		V _{CC} =2.3V to 2.7V		-	-	0.7	V
		V _{CC} =3.0V to 3.6V		-	-	0.9	V
HIGH-level output voltage	V _{OH}	V _I =V _{IH} or V _{IL}	I _O =-20uA; V _{CC} =0.8V to 3.6V	V _{CC} -0.11	-	-	V
			I _O =-1.1mA; V _{CC} =1.1V	0.6×V _{CC}	-	-	V
			I _O =-1.7mA; V _{CC} =1.4V	0.93	-	-	V
			I _O =-1.9mA; V _{CC} =1.65V	1.17	-	-	V
			I _O =-2.3mA; V _{CC} =2.3V	1.77	-	-	V
			I _O =-3.1mA; V _{CC} =2.3V	1.67	-	-	V
			I _O =-2.7mA; V _{CC} =3.0V	2.40	-	-	V
			I _O =-4.0mA; V _{CC} =3.0V	2.30	-	-	V
LOW-level output voltage	V _{OL}	V _I =V _{IH} or V _{IL}	I _O =20uA; V _{CC} =0.8V to 3.6V	-	-	0.11	V
			I _O =1.1mA; V _{CC} =1.1V	-	-	0.33×V _{CC}	V
			I _O =1.7mA; V _{CC} =1.4V	-	-	0.41	V
			I _O =1.9mA; V _{CC} =1.65V	-	-	0.39	V
			I _O =2.3mA; V _{CC} =2.3V	-	-	0.36	V
			I _O =3.1mA; V _{CC} =2.3V	-	-	0.50	V
			I _O =2.7mA; V _{CC} =3.0V	-	-	0.36	V
			I _O =4.0mA; V _{CC} =3.0V	-	-	0.50	V
input leakage current	I _I	V _I =GND to 3.6V; V _{CC} =0V to 3.6V		-	-	±1.0	uA
power-off leakage current	I _{OFF}	V _I or V _O =0V to 3.6V; V _{CC} =0V		-	-	±1.0	uA
additional power-off leakage current	ΔI _{OFF}	V _I or V _O =0V to 3.6V; V _{CC} =0V to 0.2V		-	-	±1.0	uA
supply current	I _{CC}	V _I =GND or V _{CC} ; I _O =0A; V _{CC} =0.8V to 3.6V		-	-	1.4	uA
additional supply current	ΔI _{CC}	V _I =V _{CC} -0.6V; I _O =0A; V _{CC} =3.3V ^[1]		-	-	75	uA

Note:

[1] One input at $V_{CC}-0.6\text{V}$, other input at V_{CC} or GND.

3.3.4、AC Characteristics 1

($T_{amb}=25^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ. ^[1]	Max.	Unit	
propagation delay	t _{pd}	A, B to Y; see Figure 5 ^[2]	C _L =5pF				
			V _{CC} =0.8V	-	17.0	-	ns
			V _{CC} =1.1V to 1.3V	2.6	5.1	10.8	ns
			V _{CC} =1.4V to 1.6V	1.6	3.7	6.5	ns
			V _{CC} =1.65V to 1.95V	1.3	3.0	5.2	ns
			V _{CC} =2.3V to 2.7V	1.1	2.4	4.0	ns
			V _{CC} =3.0V to 3.6V	1.0	2.2	3.5	ns
			C _L =10pF				
			V _{CC} =0.8V	-	20.6	-	ns
			V _{CC} =1.1V to 1.3V	2.4	6.0	12.5	ns
			V _{CC} =1.4V to 1.6V	2.0	4.3	7.6	ns
			V _{CC} =1.65V to 1.95V	1.7	3.6	6.1	ns
			V _{CC} =2.3V to 2.7V	1.4	2.9	4.8	ns
			V _{CC} =3.0V to 3.6V	1.3	2.7	4.2	ns
			C _L =15pF				
			V _{CC} =0.8V	-	24.1	-	ns
			V _{CC} =1.1V to 1.3V	3.4	6.8	14.2	ns
			V _{CC} =1.4V to 1.6V	2.3	4.9	8.6	ns
			V _{CC} =1.65V to 1.95V	1.9	4.0	6.9	ns
			V _{CC} =2.3V to 2.7V	1.7	3.4	5.5	ns
			V _{CC} =3.0V to 3.6V	1.5	3.1	4.8	ns
			C _L =30pF				
			V _{CC} =0.8V	-	34.4	-	ns
			V _{CC} =1.1V to 1.3V	4.6	9.1	19.4	ns
			V _{CC} =1.4V to 1.6V	3.4	6.4	11.5	ns
			V _{CC} =1.65V to 1.95V	2.6	5.3	9.1	ns
			V _{CC} =2.3V to 2.7V	2.3	4.5	7.2	ns
			V _{CC} =3.0V to 3.6V	2.2	4.2	6.2	ns
power dissipation capacitance	C _{PD}	f=1MHz; V _I =GND to V _{CC} ^[3]	V _{CC} =0.8V	-	2.5	-	pF
			V _{CC} =1.1V to 1.3V	-	2.7	-	pF
			V _{CC} =1.4V to 1.6V	-	2.8	-	pF
			V _{CC} =1.65V to 1.95V	-	2.9	-	pF
			V _{CC} =2.3V to 2.7V	-	3.5	-	pF
			V _{CC} =3.0V to 3.6V	-	4.0	-	pF

Note:

[1] All typical values are measured at nominal V_{CC} .

[2] t_{pd} is the same as t_{PLH} and t_{PHL} .

[3] C_{PD} is used to determine the dynamic power dissipation (P_D in uW).

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

3.3.5、AC Characteristics 2

($T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
propagation delay	t _{pd}	A, B to Y; see Figure 5 ^[1]	C _L =5pF				
			V _{CC} =1.1V to 1.3V	2.1	-	11.7	ns
			V _{CC} =1.4V to 1.6V	1.5	-	7.5	ns
			V _{CC} =1.65V to 1.95V	1.3	-	6.1	ns
			V _{CC} =2.3V to 2.7V	1.0	-	4.8	ns
			V _{CC} =3.0V to 3.6V	0.9	-	4.3	ns
			C _L =10pF				
			V _{CC} =1.1V to 1.3V	2.2	-	13.6	ns
			V _{CC} =1.4V to 1.6V	1.8	-	8.9	ns
			V _{CC} =1.65V to 1.95V	1.6	-	7.2	ns
			V _{CC} =2.3V to 2.7V	1.3	-	5.7	ns
			V _{CC} =3.0V to 3.6V	1.2	-	4.7	ns
			C _L =15pF				
			V _{CC} =1.1V to 1.3V	3.1	-	15.7	ns
			V _{CC} =1.4V to 1.6V	2.1	-	10.1	ns
			V _{CC} =1.65V to 1.95V	1.8	-	8.2	ns
			V _{CC} =2.3V to 2.7V	1.6	-	6.5	ns
			V _{CC} =3.0V to 3.6V	1.5	-	5.9	ns
			C _L =30pF				
			V _{CC} =1.1V to 1.3V	4.1	-	21.8	ns
			V _{CC} =1.4V to 1.6V	2.9	-	13.6	ns
			V _{CC} =1.65V to 1.95V	2.4	-	10.9	ns
			V _{CC} =2.3V to 2.7V	2.2	-	8.6	ns
			V _{CC} =3.0V to 3.6V	2.1	-	7.5	ns

Note:

[1] t_{pd} is the same as t_{PLH} and t_{PHL} .

3.3.6、AC Characteristics 3

($T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
propagation delay	t _{pd}	A, B to Y; see Figure 5 ^[1]	C _L =5pF				
			V _{CC} =1.1V to 1.3V	2.1	-	12.9	ns
			V _{CC} =1.4V to 1.6V	1.5	-	8.3	ns
			V _{CC} =1.65V to 1.95V	1.3	-	6.7	ns
			V _{CC} =2.3V to 2.7V	1.0	-	5.3	ns
			V _{CC} =3.0V to 3.6V	0.9	-	4.8	ns
			C _L =10pF				
			V _{CC} =1.1V to 1.3V	2.2	-	15.0	ns
			V _{CC} =1.4V to 1.6V	1.8	-	9.8	ns
			V _{CC} =1.65V to 1.95V	1.6	-	7.9	ns
			V _{CC} =2.3V to 2.7V	1.3	-	6.3	ns
			V _{CC} =3.0V to 3.6V	1.2	-	5.2	ns
			C _L =15pF				
			V _{CC} =1.1V to 1.3V	3.1	-	17.3	ns
			V _{CC} =1.4V to 1.6V	2.1	-	11.2	ns
			V _{CC} =1.65V to 1.95V	1.8	-	9.0	ns
			V _{CC} =2.3V to 2.7V	1.6	-	7.2	ns
			V _{CC} =3.0V to 3.6V	1.5	-	6.5	ns
			C _L =30pF				
			V _{CC} =1.1V to 1.3V	4.1	-	24.0	ns
			V _{CC} =1.4V to 1.6V	2.9	-	15.0	ns
			V _{CC} =1.65V to 1.95V	2.4	-	12.1	ns
			V _{CC} =2.3V to 2.7V	2.2	-	9.5	ns
			V _{CC} =3.0V to 3.6V	2.1	-	8.3	ns

Note:

[1] t_{pd} is the same as t_{PLH} and t_{PHL} .

4、Testing Circuit

4.1、AC Testing Circuit

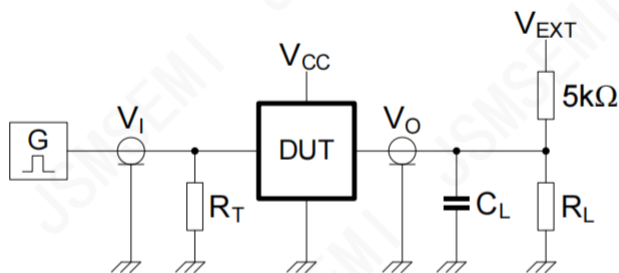


Figure 4. Test circuit for measuring switching times

Definitions for test circuit:

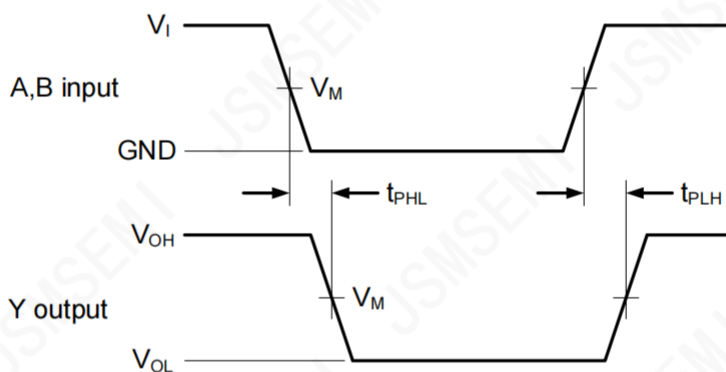
R_L =Load resistance.

C_L =Load capacitance including jig and probe capacitance.

R_T =Termination resistance should be equal to the output impedance Z_o of the pulse generator.

V_{EXT} =External voltage for measuring switching times.

4.2、AC Testing Waveforms



Logic levels: V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Figure 5. The data input (A or B) to output (Y) propagation delays

4.3、Measurement Points

Supply voltage	Output	Input		
V_{CC}	V_M	V_M	V_I	$t_r=t_f$
0.8V to 3.6V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	V_{CC}	$\leq 3.0\text{ns}$

4.4、Test Data

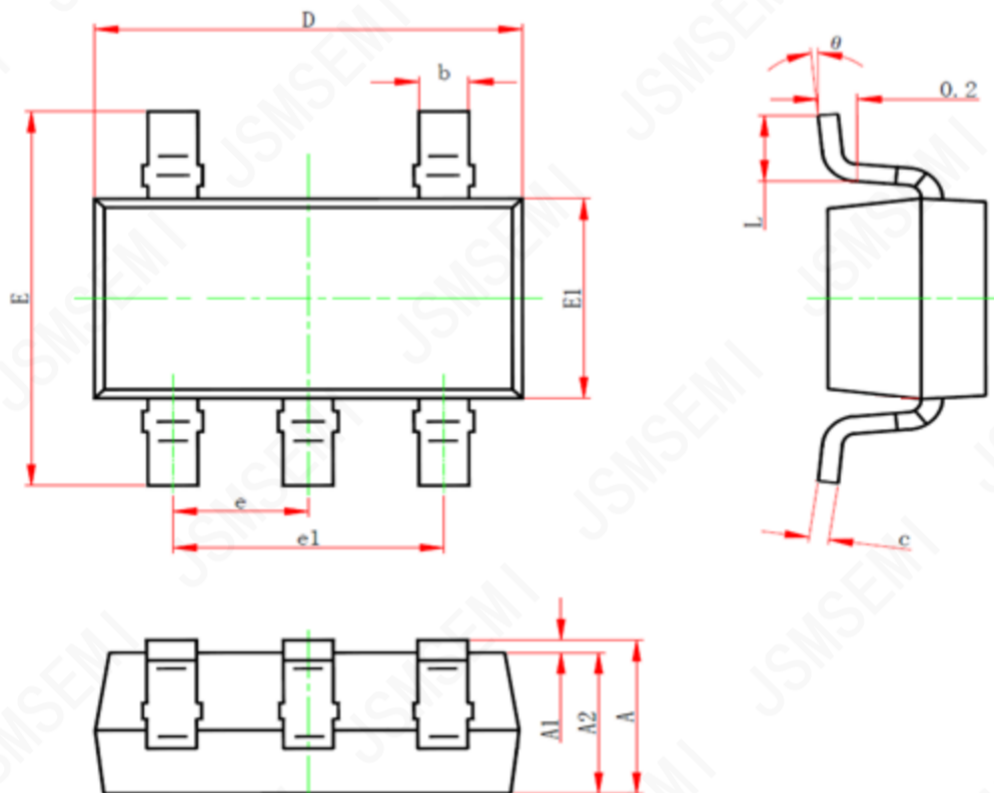
Supply voltage	Load		V_{EXT}		
V_{CC}	C_L	$R_L^{[1]}$	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
0.8V to 3.6V	5pF, 10pF, 15pF and 30pF	5kΩ or 1MΩ	open	GND	$2 \times V_{CC}$

Note:

[1] For measuring enable and disable times $R_L=5\text{k}\Omega$, for measuring propagation delays, setup and hold times and pulse width $R_L=1\text{M}\Omega$.

5、Package Information

5.1、SOT23-5



Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.26
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°

6、Statements And Notes

6.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○: Indicates that the content of hazardous substances or elements in the detection limit of the following SJ/T11363-2006 standard. ×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

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