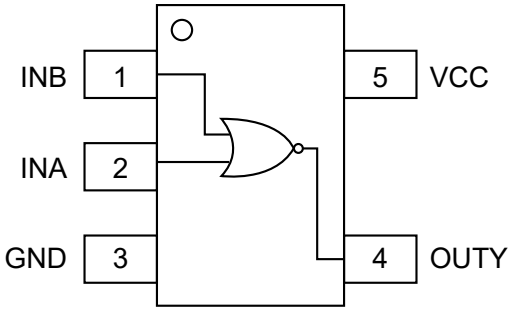
1.Description

The UMW SN74LVC1G02 is a single 2−input NOR Gate in three tiny footprint packages.

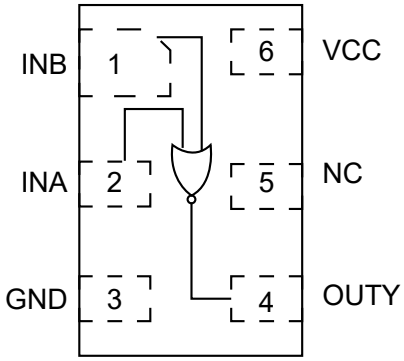
2.Features

- Tiny SC70-5 /SOT23-5 /DFN6(1.5mm*1.0mm) Packages
- 2.4ns tPD at 5V (typ)
- Source/Sink 24mA at 3.0V
- Over−Voltage Tolerant Inputs
  Designed for 1.65V to 5.5V VCC Operation
- These Devices are Pb−Free and are RoHS Compliant

3.Pinning information



SC70-5/SOT23-5



DFN6(1*1.5)

4.Pin Function

Pin (SC70-5/SOT23-5)	Function
1	INB
2	INA
3	GND
4	Y
5	VCC

Pin (DFN6)	Function
1	INB
2	INA
3	GND
4	Y
5	NC
6	VCC

5.Block Diagram

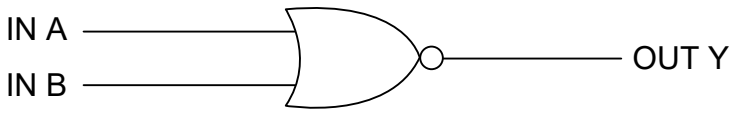


Figure2: Logic symbol

Function Table

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

6.Absolute Maximum Ratings

Parameter		Symbol	Value	Units
DC Supply Voltage		V_{CC}	−0.5 to 7	V
DC Input Voltage		V_I	$-0.5 \le V_I \le 7$	V
DC Output Voltage Output in Higher or Low State		V_O	−0.5 to V_C +0.5	V
DC Input Diode Current V_I<GND		I_{IK}	-50	mA
DC Output Diode Current V_O<GND, V_O>V_{CC}		I_{OK}	±50	mA
DC Output Sink Current		I_O	±50	mA
DC Supply Current per Supply Pin		I_{CC}	±100	mA
Storage Temperature Range		T_{STG}	-65 to 150	°C
Lead Temperature, 1 mm from Case for 10 Seconds		T_L	260	°C
Junction Temperature Under Bias		T_J	150	°C
Thermal Resistance	SC70-5	θ_{JA}	435	°C/W
	SOT23-5		300	
	DFN6		423	
Power Dissipation in Still Air at 85°C		P_D	200	mW
Moisture Sensitivity		MSL	Level 1	
ESD Classification Human	Human Body Model (2)	ESD	2000	V
	Machine Model (3)		200	
	Charged Device Model (4)		N/A	
Latchup Performance Above V_{CC} and Below GND at 125°C (Note 5)		$I_{Latchup}$	±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.

1. IO absolute maximum rating must be observed.
2. Tested to EIA/JESD22−A114−A, rated to EIA/JESD22−A114−B.
3. Tested to EIA/JESD22−A115−A, rated to EIA/JESD22−A115−A.
4. Tested to JESD22−C101−A.
5. Tested to EIA/JESD78.

7.Recommended Operating Conditions

Parameter		Symbol	Min	Max	Unit
DC Supply Voltage Operating		V_{CC}	1.65	5.5	V
Date Retention			1.5	5.5	V
DC input Voltage		V_{IN}	0	5.5	V
DC Output Voltage (High or Low State)		V_{OUT}	0	5.5	V
Operating Temperature Range		T_A	-40	85	°C
Input Rise and Fall Time	V_{CC}=2.5V ± 0.2V	t_r, t_f	0	20	ns/V
	V_{CC}=3V ± 0.3V		0	10	ns/V
	V_{CC}=5V ± 0.5V		0	5	ns/V

8.Electrical Characteristics

DC Electrical Characteristics

Parameter	Condition	Symbol	V_{CC}(V)	T_A=25°C			−40°C≤T_A≤85°C		Units
				Min	Typ	Max	Min	Max	
High−Level Input Voltage		V_{IH}	1.65 to1.95	0.75V_{CC}			0.75V_{CC}		V
			2.3 to 5.5	0.7V_{CC}			0.7V_{CC}		
Low−Level Input Voltage		V_{IL}	1.65 to1.95			0.25V_{CC}		0.25V_{CC}	
			2.3 to 5.5			0.3V_{CC}		0.3V_{CC}	
High−Level Output Voltage V_{IN}=V_{IL}	I_{OH}=−100μA	V_{OH}	1.65to5.5	V_{CC}-0.1	V_{CC}		V_{CC}-0.1		V
	I_{OH}=−3mA		1.65	1.29	1.52		1.29		
	I_{OH}=−8mA		2.3	1.9	2.1		1.9		
	I_{OH}=−12mA		2.7	2.2	2.4		2.2		
	I_{OH}=−16mA		3	2.4	2.7		2.4		
	I_{OH}=−24mA		3	2.3	2.5		2.3		
	I_{OH}=−32mA		4.5	3.8	4		3.8		
Low−Level Output Voltage V_{IN}=V_{IH}	I_{OH}=100μA	V_{OL}	1.65to5.5		0.0	0.1		0.1	V
	I_{OL}=3mA		1.65		0.08	0.24		0.24	
	I_{OL}=8mA		2.3		0.2	0.3		0.3	
	I_{OL}=12mA		2.7		0.22	0.4		0.4	
	I_{OL}=16mA		3		0.28	0.4		0.4	
	I_{OL}=24mA		3		0.38	0.55		0.55	
	I_{OL}=32mA		4.5		0.42	0.55		0.55	
Input Leakage Current	V_{IN}=5.5V or GND	I_{IN}	0 to 5.5		±0.1			±1	μA
Power Off Leakage Current	V_{IN}=5.5V or V_{OUT}=5.5V	I_{OFF}	0			1		10	
Quiescent Supply Current	V_{IN}=5.5V or GND	I_{CC}	5.5					10	

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.

9.AC Electrical Characteristics

tr = tf = 3ns;

Parameter	Condition	Symbol	V_{CC}(V)	T_A=25°C			−40°C≤T_A≤85°C		Units
				Min	Typ	Max	Min	Max	
Propagation Delay (Figure 3 and 4)	R_L=1MΩ, C_L=15pF	t_{PHL} t_{PLH}	1.65	2	10.1	12.9	2	13.9	ns
			1.8	2	9.1	11.6	2	12.4	
	R_L=1MΩ, C_L=15pF		2.5±0.2	0.2	6	7.7	0.8	8.2	
	R_L=1MΩ, C_L=15pF		3.3±0.3	0.8	5	6.5	0.5	7	
	R_L=500Ω, C_L=50pF			1.2	5.6	7.1	1.5	7.6	
	R_L=1MΩ, C_L=15pF		5.0±0.5	0.5	4.4	5.6	0.5	6.1	
	R_L=500Ω, C_L=50pF			0.8	4.8	6.1	0.8	6.6	

10.Capacitance Characteristics

Parameter	Symbol	Condition	Typ	Units
Input Capacitance	C_{IN}	V_{CC}=3.6V, V_I= 0V or V_{CC}	>2.5	pF
Output Capacitance	C_{PD}	10MHz,V_{CC}=3.3V, V_I=0V or V_{CC}	4	pF
		10MHz,V_{CC}=5.5V, V_I=0V or V_{CC}	4	pF

Notes:

(6) 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.

11.Test Circuit

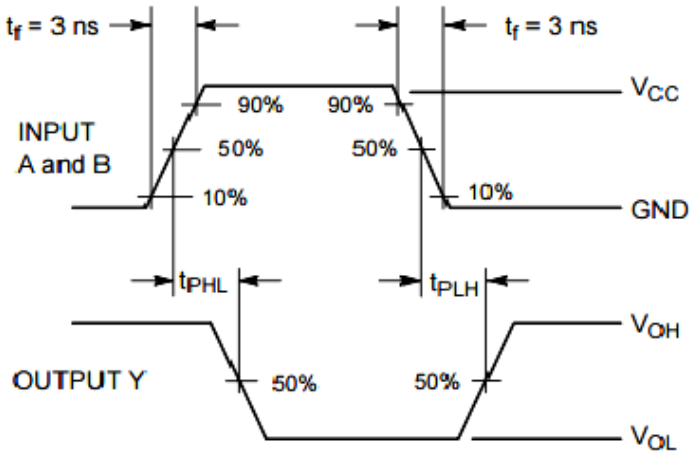


Figure 3. Switching Waveform

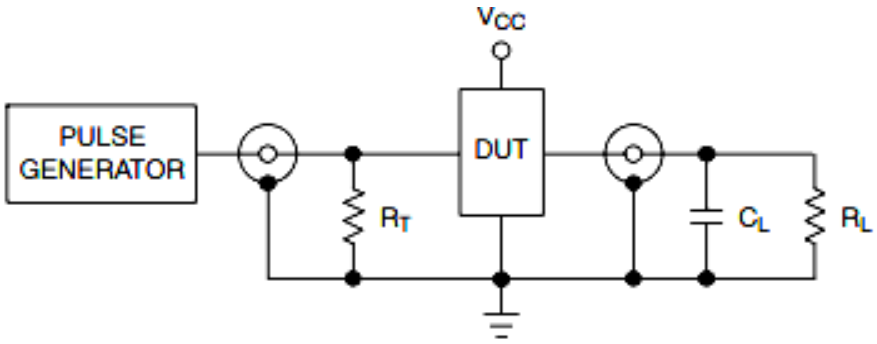
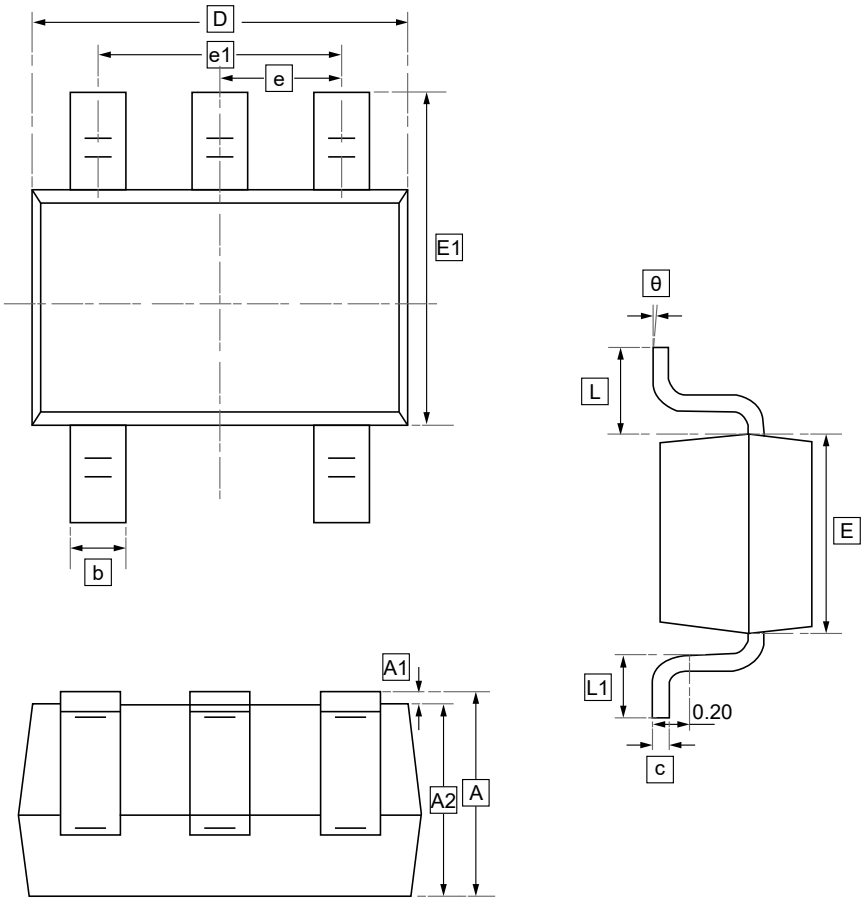


Figure 4. Test Circuit

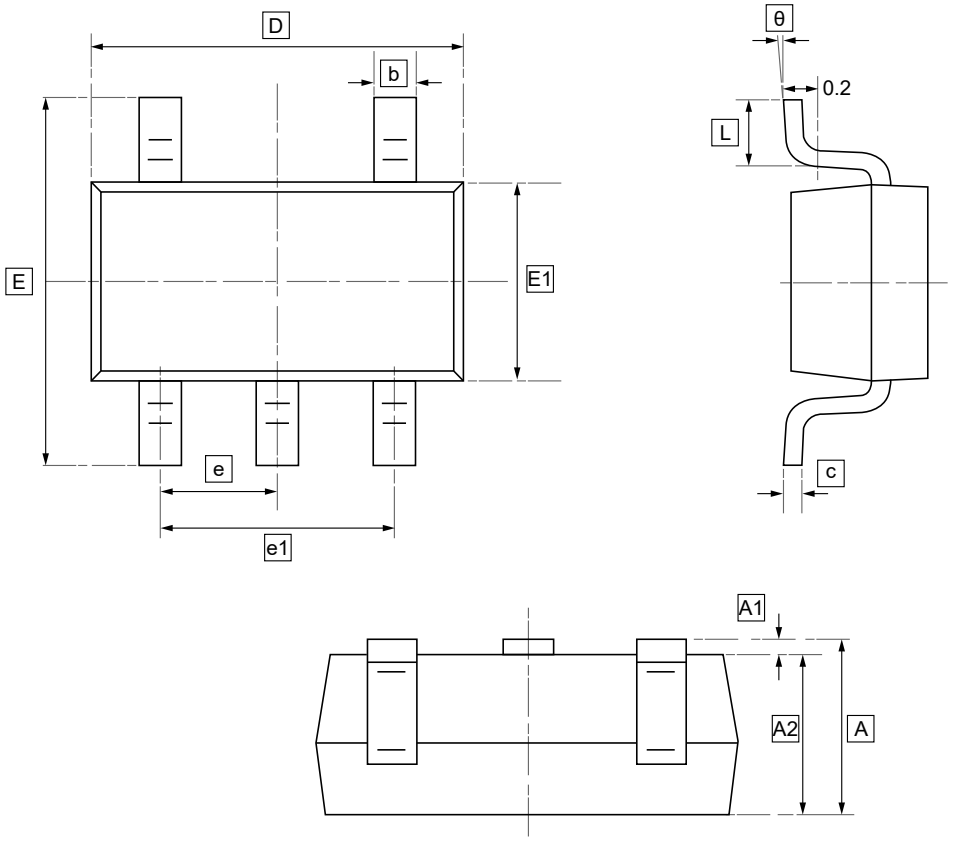
12.1 SC70-5 Package Outline Dimensions



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.

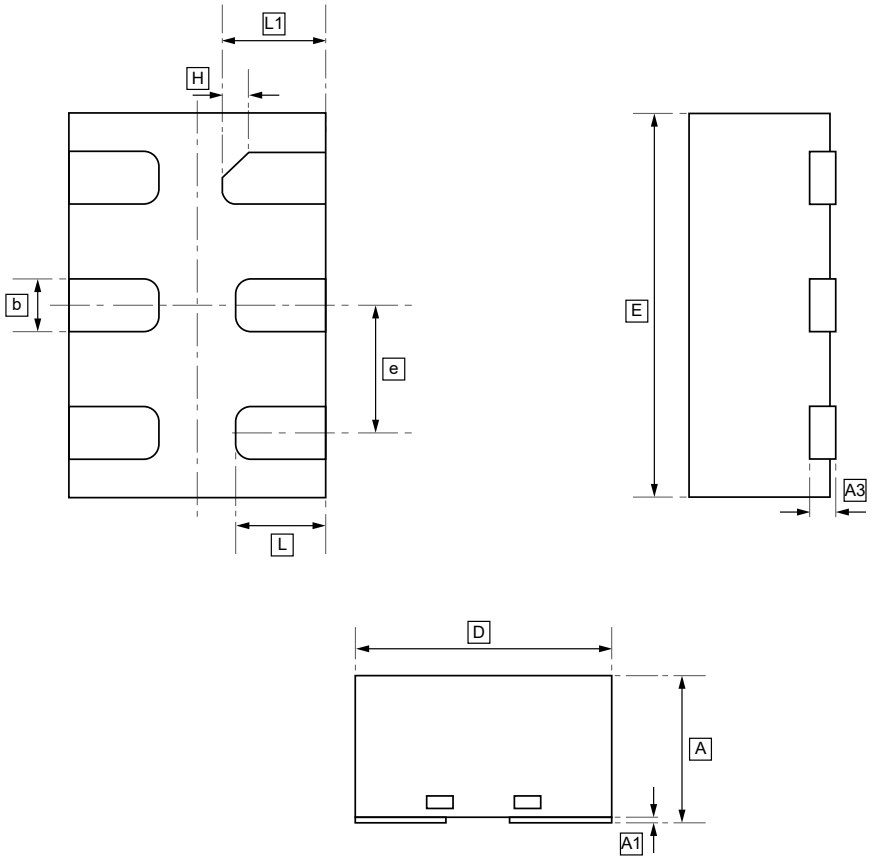
12.2 SOT23-5 Package Outline Dimensions



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°

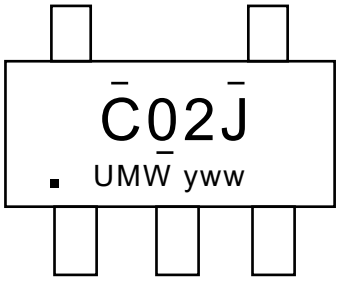
12.3 DFN6 Package Outline Dimensions



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



yww: Batch Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW SN74LVC1G02DBVR	C02J	SOT23-5	3000	Tape and reel
UMW SN74LVC1G02DCKR	CBK	SC70-5	3000	Tape and reel
UMW SN74LVC1G02DRYR	CB	DFN6	5000	Tape and reel

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