



U74AUP1G07

CMOS IC

LOW-POWER BUFFER WITH OPEN-DRAIN OUTPUT

DESCRIPTION

The **U74AUP1G07** provides the single non-inverting buffer with open-drain output. The output of the device is an open drain and can be connected to other open-drain outputs to implement active-LOW wire-OR active-HIGH wire-AND functions.

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 has power-down protective circuit, preventing device destruction when it is powered down.

FEATURES

- * Wide supply voltage range from 0.8V to 3.6V
- * Inputs accept voltages up to 3.6V
- * I_{OFF} supports partial-power-down mode
- * Low static power consumption; $I_{CC}=0.5\mu A$ (Max.)
- * Optimized for 3.3V Operation

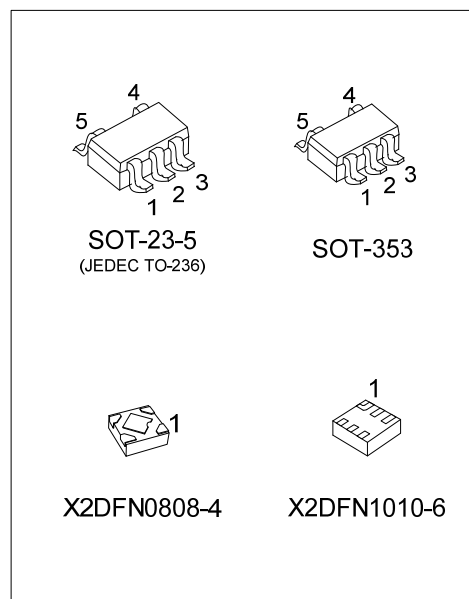
ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AUP1G07L-AE5-R	U74AUP1G07G-AE5-R	SOT-23-5	Tape Reel
U74AUP1G07L-AL5-R	U74AUP1G07G-AL5-R	SOT-353	Tape Reel
U74AUP1G07L-K04-0808X2-R	U74AUP1G07G-K04-0808X2-R	X2DFN0808-4	Tape Reel
U74AUP1G07L-K06-1010X2-R	U74AUP1G07G-K06-1010X2-R	X2DFN1010-6	Tape Reel

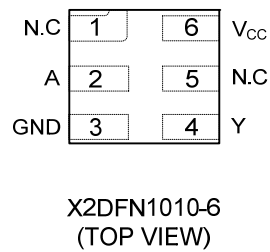
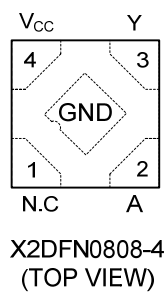
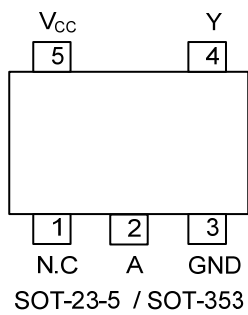
U74AUP1G07G-AE5-R (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) AE5: SOT-23-5, AL5: SOT-353, K04-0808X2: X2DFN0808-4 K06-1010X2: X2DFN1010-6 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

SOT-23-5 / SOT-353	X2DFN0808-4 / X2DFN1010-6
P07	



PIN CONFIGURATION



PIN DESCRIPTION

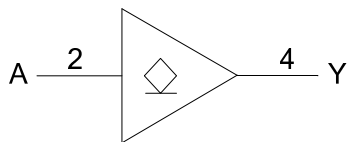
PIN NO			PIN NAME	PIN DESCRIPTION
SOT-23-5 SOT-353	X2DFN0808-4	X2DFN1010-6		
1	1	1, 5	N.C	No Connected
2	2	2	A	Input
3	-	3	GND	Ground
4	3	4	Y	Output
5	4	6	V _{CC}	Supply Voltage
-	Exposed Pad	-	GND	Connect exposed pad to GND

FUNCTION TABLE (each gate)

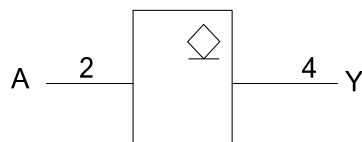
INPUT (A)	OUTPUT (Y)
L	L
H	Z

Note: H: HIGH voltage level; L: LOW voltage level; Z: high impedance state.

LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +4.6	V
Input Voltage	V_{IN}		-0.5 ~ +4.6	V
Output Voltage	V_{OUT}	Output in the high or low state	-0.5 ~ $V_{CC} + 0.5$	V
		Output in the power-off state	-0.5 ~ +4.6	V
Continuous V_{CC} or GND Current	I_{CC}		±50	mA
Continuous Output Current	I_{OUT}	$V_{OUT}=0 \sim V_{CC}$	±20	mA
Input Clamp Current	I_{IK}	$V_{IN} < 0$	-50	mA
Output Clamp Current	I_{OK}	$V_{OUT} < 0$	-50	mA
Storage Temperature Range	T_{STG}		-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	0.8		3.6	V
Input Voltage	V_{IN}		0		3.6	V
Output Voltage	V_{OUT}	High or low state	0		3.6	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=0.8V \sim 3.6V$			200	ns/V
Operating Temperature	T_A		-40		+125	°C

■ STATIC CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
HIGH-level Input Voltage	V_{IH}	$V_{CC}=0.8V$	V_{CC}			V
		$V_{CC}=0.9V \sim 1.95V$	$0.65 \times V_{CC}$			V
		$V_{CC}=2.3V \sim 2.7V$	1.6			V
		$V_{CC}=3V \sim 3.6V$	2.0			V
LOW-level Input Voltage	V_{IL}	$V_{CC}=0.8V$			0	V
		$V_{CC}=0.9V \sim 1.95V$			$0.35 \times V_{CC}$	V
		$V_{CC}=2.3V \sim 2.7V$			0.7	V
		$V_{CC}=3V \sim 3.6V$			0.9	V
Low-Level Output Voltage	V_{OL}	$V_{CC}=0.8V \sim 3.6V, I_{OL}=20\mu A$			0.1	V
		$V_{CC}=1.1V, I_{OL}=1.1mA$			$0.3 \times V_{CC}$	V
		$V_{CC}=1.4V, I_{OL}=1.7mA$			0.31	V
		$V_{CC}=1.65V, I_{OL}=1.9mA$			0.31	V
		$V_{CC}=2.3V$	$I_{OL}=2.3mA$		0.31	V
			$I_{OL}=3.1mA$		0.44	V
		$V_{CC}=3V$	$I_{OL}=2.7mA$		0.31	V
			$I_{OL}=4mA$		0.44	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0V \sim 3.6V, V_{IN}=V_{CC}$ or GND			±0.1	μA
OFF-State Output Current	I_{OZ}	$V_{CC}=0V \sim 3.6V, V_{IN}=V_{IH}, V_O=0V \sim 3.6V$			±0.1	μA
Power OFF Leakage Current	I_{OFF}	$V_{CC}=0V, V_{IN}$ or $V_O=0V \sim 3.6V$			±0.2	μA
Additional Power-off Leakage Current	ΔI_{OFF}	$V_{CC}=0V \sim 0.2V, V_{IN}$ or $V_O=0V \sim 3.6V$			±0.2	μA
Quiescent Supply Current	I_{CC}	$V_{CC}=0.8V \sim 3.6V, V_{IN}=V_{CC}$ or GND $I_{OUT}=0$			0.5	μA

■ STATIC CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Additional Quiescent Supply Current	ΔI_{CC}	$V_{CC}=3.3V$, One input at $V_{CC}-0.6V$, Other inputs at V_{CC} or GND			40	μA
Input Capacitance	C_{IN}	$V_{CC}=0V$, $V_{IN}=V_{CC}$ or GND		1.5		pF
		$V_{CC}=3.6V$, $V_{IN}=V_{CC}$ or GND		1.7		pF
Output Capacitance	C_{OUT}	$V_{CC}=0V$, $V_{OUT}=GND$		1.7		pF

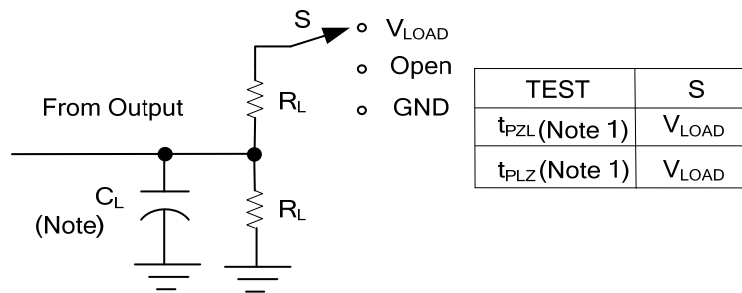
■ DYNAMIC CHARACTERISTICS ($T_A=25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A) to Output (Y)	t_{PD}	$C_L=5pF$, $R_L=5K\Omega$	$V_{CC}=0.8V$		12.2	ns
			$V_{CC}=1.2V\pm 0.1V$	2.1	5.1	ns
			$V_{CC}=1.5V\pm 0.1V$	1.6	3.6	ns
			$V_{CC}=1.8V\pm 0.15V$	1.6	3.1	ns
			$V_{CC}=2.5V\pm 0.2V$	1.1	2.1	ns
			$V_{CC}=3.3V\pm 0.3V$	1.4	2.2	ns
		$C_L=10pF$, $R_L=5K\Omega$	$V_{CC}=0.8V$		15	ns
			$V_{CC}=1.2V\pm 0.1V$	3	6.2	ns
			$V_{CC}=1.5V\pm 0.1V$	2.3	4.4	ns
			$V_{CC}=1.8V\pm 0.15V$	2.4	3.9	ns
			$V_{CC}=2.5V\pm 0.2V$	1.7	2.8	ns
			$V_{CC}=3.3V\pm 0.3V$	2.2	3.0	ns
		$C_L=15pF$, $R_L=5K\Omega$	$V_{CC}=0.8V$		18.2	ns
			$V_{CC}=1.2V\pm 0.1V$	3.5	7.3	ns
			$V_{CC}=1.5V\pm 0.1V$	3	5.2	ns
			$V_{CC}=1.8V\pm 0.15V$	2.8	4.8	ns
			$V_{CC}=2.5V\pm 0.2V$	2.4	3.4	ns
			$V_{CC}=3.3V\pm 0.3V$	2.2	3.7	ns
		$C_L=30pF$, $R_L=5K\Omega$	$V_{CC}=0.8V$		26.5	ns
			$V_{CC}=1.2V\pm 0.1V$	4.8	10.7	ns
			$V_{CC}=1.5V\pm 0.1V$	4.1	7.7	ns
			$V_{CC}=1.8V\pm 0.15V$	3.8	7.5	ns
			$V_{CC}=2.5V\pm 0.2V$	3.7	5.4	ns
			$V_{CC}=3.3V\pm 0.3V$	3.6	6.3	ns

■ OPERATING CHARACTERISTICS ($f=1\text{ MHz}$; $V_i=V_{CC}$ or GND, $T_A=25^\circ C$, unless otherwise specified)

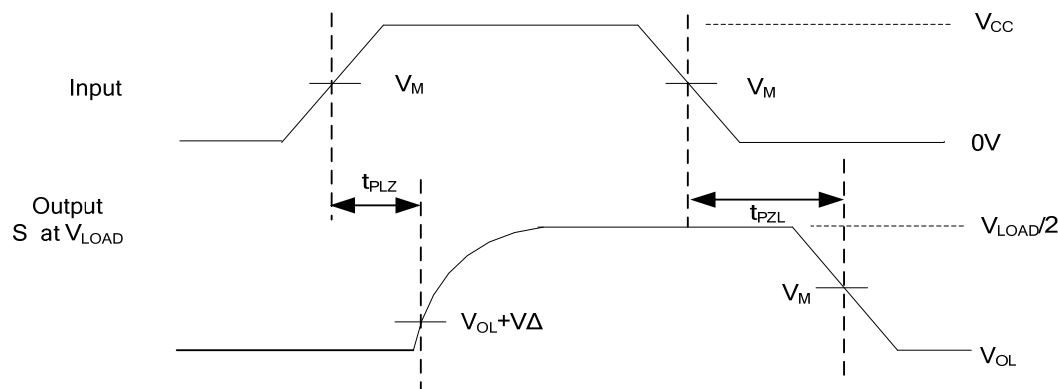
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$V_{CC}=0.8V$		1.0		pF
		$V_{CC}=1.2V\pm 0.1V$		1.0		pF
		$V_{CC}=1.5V\pm 0.1V$		1.0		pF
		$V_{CC}=1.8V\pm 0.15V$		1.0		pF
		$V_{CC}=2.5V\pm 0.2V$		1.0		pF
		$V_{CC}=3.3V\pm 0.3V$		1.0		pF

■ TEST CIRCUIT AND WAVEFORMS



Note: Since this device has open drain outputs, the t_{PLZ} and t_{PZL} is the same as t_{PLH} and t_{PHL} .

V_{CC}	V_{IN}	t_R / t_F	V_M	V_{LOAD}	C_L	R_L	V_{Δ}
0.8	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.1V
1.2 $\pm$ 0.1V	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.1V
1.5 $\pm$ 0.1V	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.1V
1.8 $\pm$ 0.15V	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.15V
2.5 $\pm$ 0.2V	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.15V
3.3 $\pm$ 0.3V	V_{CC}	3ns	$V_{CC}/2$	$2 \times V_{CC}$	5,10,15,30pF	5k Ω	0.3V



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