

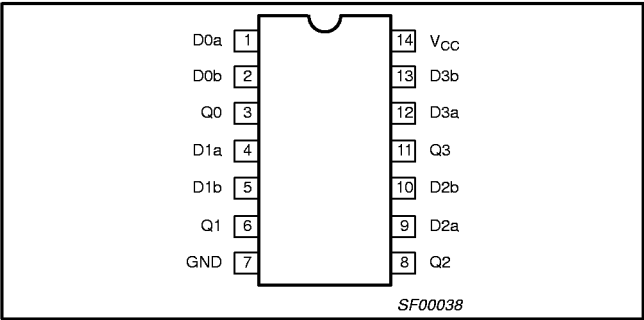
Quad 2-input AND gate

74F08

• 74F08 Available for industrial range (−40°C to +85°C)

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F08	4.1ns	7.1mA

PIN CONFIGURATION



ORDERING INFORMATION

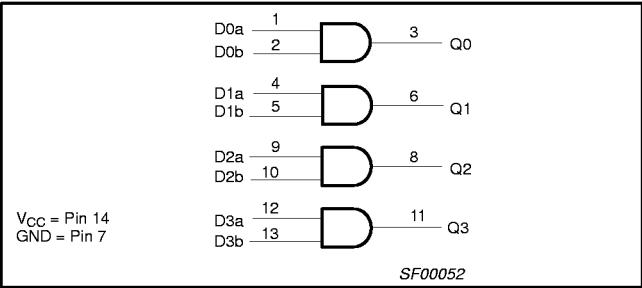
DESCRIPTION	COMMERCIAL RANGE V _{CC} = 5.0V ±10%, T _{amb} = 0°C to +70°C	INDUSTRIAL RANGE V _{CC} = 5.0V ±10%, T _{amb} = −40°C to +85°C	PKG DWG #
14-pin plastic DIP	N74F08N	I74F08N	SOT27-1
14-pin plastic SO	N74F08D	I74F08D	SOT108-1

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
Dna, Dnb	Data inputs	1.0/1.0	20µA/0.6mA
Qn	Data output	50/33	1.0mA/20mA

NOTE: One (1.0) FAST unit load is defined as: 20µA in the High state and 0.6mA in the Low state.

LOGIC DIAGRAM

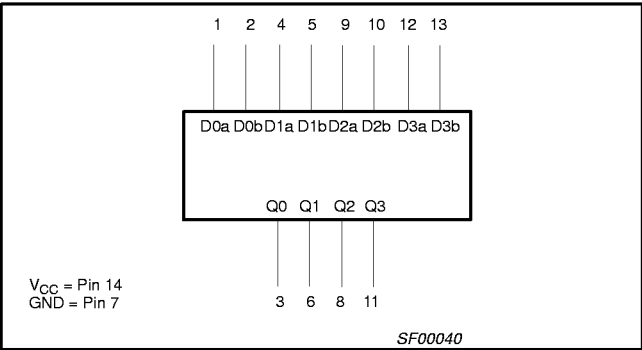


FUNCTION TABLE

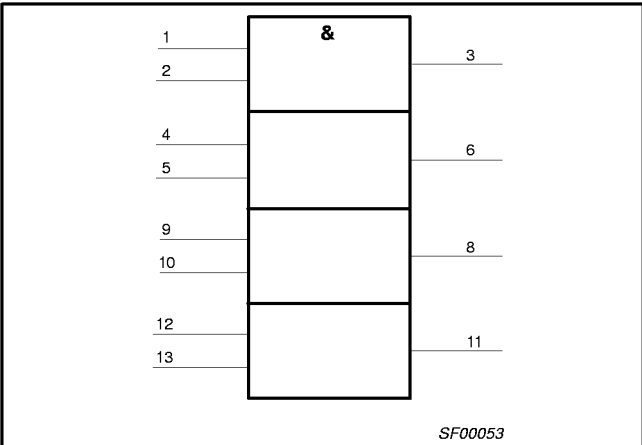
INPUTS		OUTPUT
Dna	Dnb	Qn
L	L	L
L	H	L
H	L	L
H	H	H

NOTES:
H = High voltage level
L = Low voltage level

LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



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ABSOLUTE MAXIMUM RATINGS

(Operation beyond the limits set forth in this table may impair the useful life of the device.
Unless otherwise noted these limits are over the operating free-air temperature range.)

SYMBOL	PARAMETER		RATING	UNIT
V_{CC}	Supply voltage		-0.5 to +7.0	V
V_{IN}	Input voltage		-0.5 to +7.0	V
I_{IN}	Input current		-30 to +5	mA
V_{OUT}	Voltage applied to output in High output state		-0.5 to V_{CC}	V
I_{OUT}	Current applied to output in Low output state		40	mA
T_{amb}	Operating free-air temperature range	Commercial range	0 to +70	°C
		Industrial range	-40 to +85	°C
T_{stg}	Storage temperature range		-65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5.0	5.5	V
V_{IH}	High-level input voltage	2.0			V
V_{IL}	Low-level input voltage			0.8	V
I_{IK}	Input clamp current			-18	mA
I_{OH}	High-level output current			-1	mA
I_{OL}	Low-level output current			20	mA
T_{amb}	Operating free-air temperature range	Commercial range	0	+70	°C
		Industrial range	-40	+85	°C

DC ELECTRICAL CHARACTERISTICS

(Over recommended operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER	TEST CONDITIONS ¹		LIMITS			UNIT
				MIN	TYP ²	MAX	
V_{OH}	High-level output voltage	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}$	$\pm 10\%V_{CC}$	2.5			V
		$V_{IH} = \text{MIN}, I_{OH} = \text{MAX}$	$\pm 5\%V_{CC}$	2.7	3.4		V
V_{OL}	Low-level output voltage	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}$	$\pm 10\%V_{CC}$		0.30	0.50	V
		$V_{IH} = \text{MIN}, I_{OL} = \text{MAX}$	$\pm 5\%V_{CC}$		0.30	0.50	V
V_{IK}	Input clamp voltage	$V_{CC} = \text{MIN}, I_I = I_{IK}$			-0.73	-1.2	V
I_I	Input current at maximum input voltage	$V_{CC} = \text{MAX}, V_I = 7.0\text{V}$				100	μA
I_{IH}	High-level input current	$V_{CC} = \text{MAX}, V_I = 2.7\text{V}$				20	μA
I_{IL}	Low-level input current	$V_{CC} = \text{MAX}, V_I = 0.5\text{V}$				-0.6	mA
I_{OS}	Short-circuit output current ³	$V_{CC} = \text{MAX}$		-60		-150	mA
I_{CC}	Supply current (total)	I_{CCH} $V_{CC} = \text{MAX}$	$V_{IN} = 4.5\text{V}$		5.5	8.3	mA
		I_{CCL} $V_{CC} = \text{MAX}$	$V_{IN} = \text{GND}$		8.6	12.9	mA

NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at $V_{CC} = 5\text{V}$, $T_{amb} = 25^\circ\text{C}$.
- Not more than one output should be shorted at a time. For testing I_{OS} , the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests, I_{OS} tests should be performed last.

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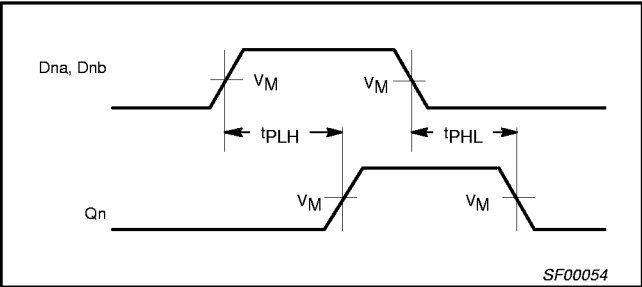
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AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS								UNIT
			$T_{amb} = +25^{\circ}C$ $V_{CC} = +5.0V$ $C_L = 50pF,$ $R_L = 500\Omega$			$T_{amb} = 0^{\circ}C \text{ to } +70^{\circ}C$ $V_{CC} = +5.0V \pm 10\%$ $C_L = 50pF,$ $R_L = 500\Omega$		$T_{amb} = -40^{\circ}C \text{ to } +85^{\circ}C$ $V_{CC} = +5.0V \pm 10\%$ $C_L = 50pF,$ $R_L = 500\Omega$			
			MIN	TYP	MAX	MIN	MAX	MIN	MAX		
t_{PLH} t_{PHL}	Propagation delay Dna, Dnb to Qn	Waveform 1	3.0 2.5	4.2 4.0	5.6 5.3	3.0 2.5	6.6 6.3	2.5 2.5	6.6 6.3	ns	

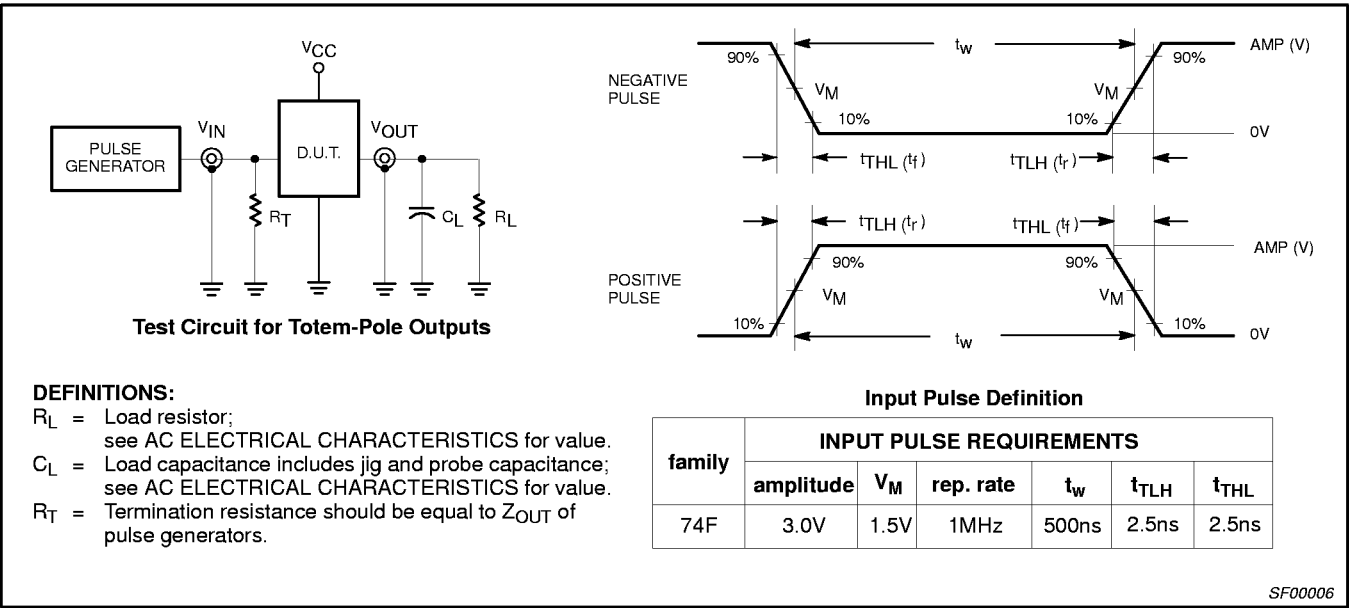
AC WAVEFORMS

For all waveforms, $V_M = 1.5V$.



Waveform 1. Propagation Delay for Non-Inverting Outputs

TEST CIRCUIT AND WAVEFORM

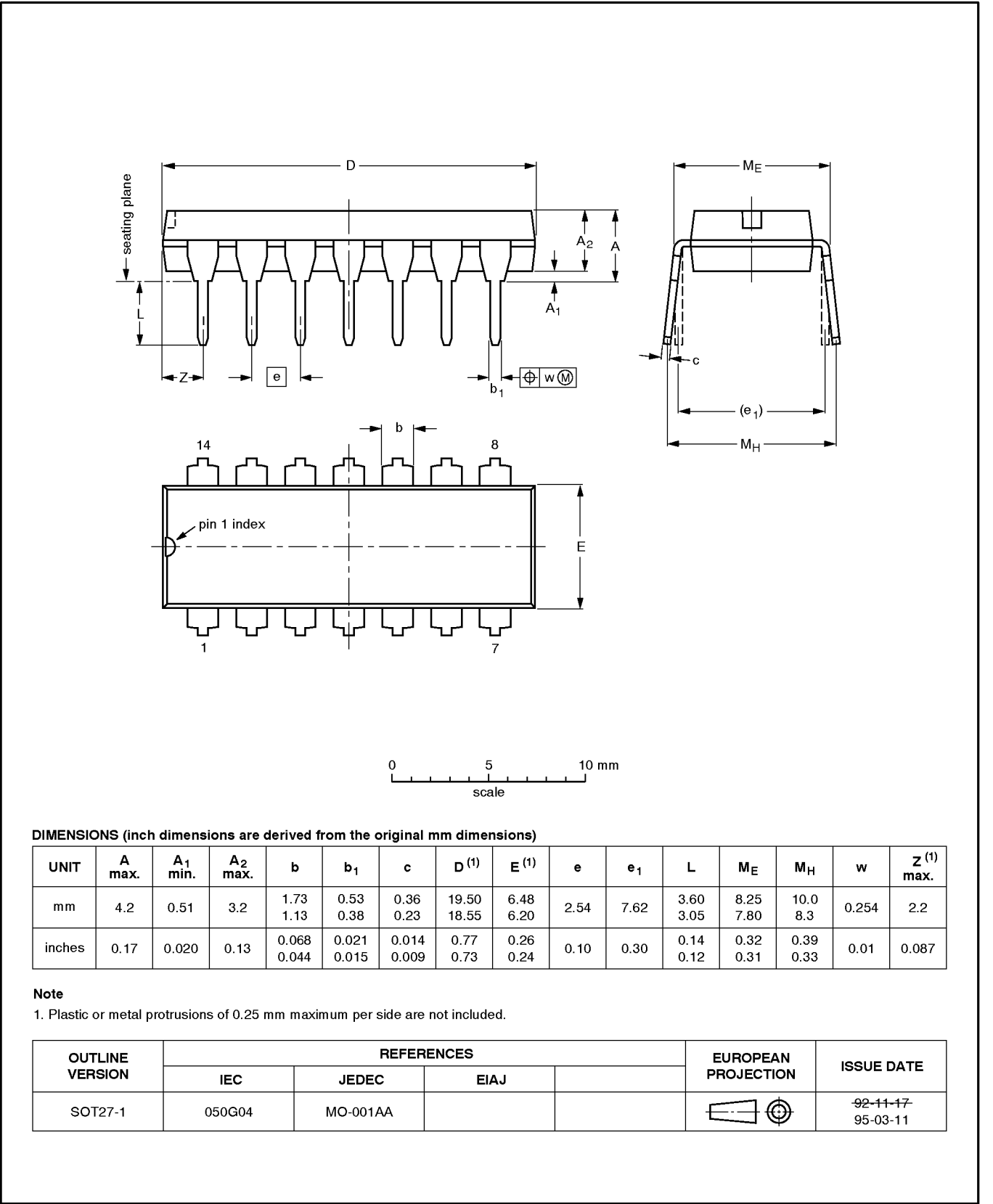


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DIP14: plastic dual in-line package; 14 leads (300 mil)

SOT27-1



Quad 2-input AND gate

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SO14: plastic small outline package; 14 leads; body width 3.9 mm

SOT108-1

