

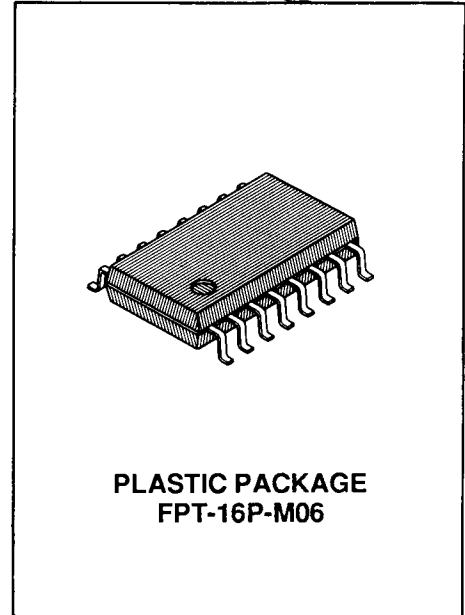
# MB87026

## DUAL 2-INPUT NAND GATE AND FOUR INVERTERS

### DUAL 2-INPUT NAND GATES AND FOUR INVERTERS

The Fujitsu MB87026 contains two 2-input NAND gates and four inverters. This device uses the same technology of Fujitsu standard high speed CMOS logic, MB74HC series.

- Transition time of this device is equivalent to that of LS-TTL. : 9ns/gate
- Power dissipation is equivalent to CMOS standard device.
- All Inputs/outputs pins have buffer circuitry.  
High noise immunity  
Threshold voltage is constant ( $\approx V_{CC} / 2$ ) regardless of the number of fanin.  
High output current.  
Output characteristics have been improved and the level of source current ( $I_{OH}$ ) and that of sink current ( $I_{OL}$ ) become almost the same.  
Ten LS-TTL inputs can be driven directly.
- Wide operating supply voltage range :  $V_{CC} = 2$  to  $6$  V
- Wide operating temperature range :  $T_A = -40$  to  $+85^\circ\text{C}$
- High immunity against static electricity  
Optimum protection circuitry is adopted.
- Latch up preventive measure is taken.
- 16-pin Plastic Flat Package ( Suffix : -PF)



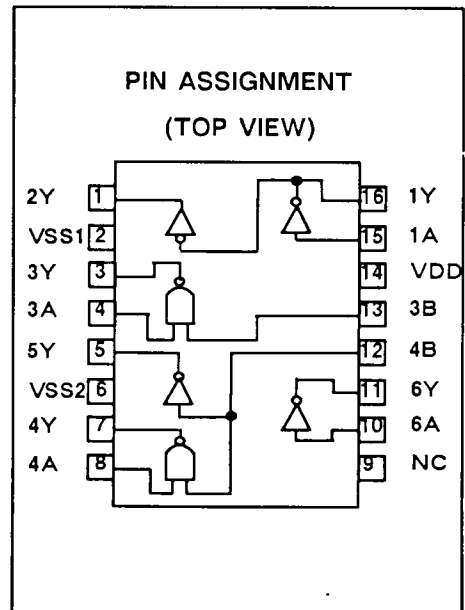
### ABSOLUTE MAXIMUM RATINGS (see NOTE)

GND = 0V

Rating	Symbol	Value	Unit
Power Supply Voltage	$V_{CC}$	-0.5 to +7.0	V
Input Voltage	$V_{IN}$	-0.5 to $V_{CC} + 0.5$	V
Output Voltage	$V_{OUT}$	-0.5 to $V_{CC} + 0.5$	V
Input Protection Diode Current	$I_{IK}$	$\pm 20$	mA
Output Parastic Diode Current	$I_{OK}$	$\pm 20$	mA
Output Current	$I_{OUT}$	$\pm 25$	mA
Power Supply Current	$I_{CC}$	$\pm 50$	mA
Power Dissipation	$P_D$	500 *	mW
Storage Temperature	$T_{STG}$	-65 to +150	$^\circ\text{C}$
Lead Temperature (10 seconds)	$T_L$	260	$^\circ\text{C}$

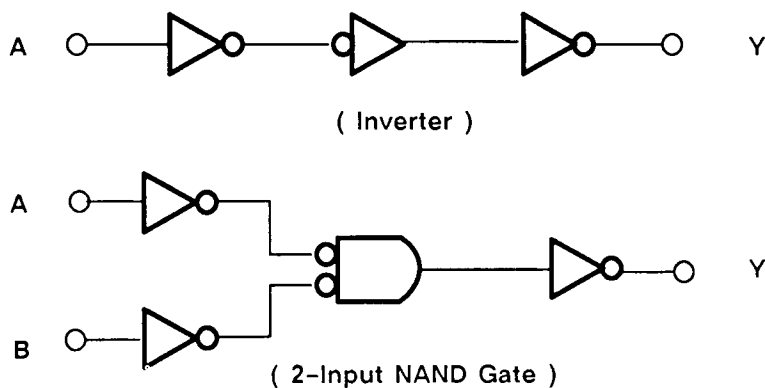
\* Power dissipation of 500mW is specified at  $T_A = -40$  to  $+65^\circ\text{C}$

**NOTE:** Permanent device damage may occur if the above Absolute Maximum Ratings are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields. However, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit.

Fig. 1 — EQUIVALENT CIRCUIT (ONE GATE ONLY)



## TRUTH TABLE

2 INPUT NAND

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

INVERTER

Input	Output
A	Y
H	L
L	H

## RECOMMENDED OPERATING CONDITIONS

GND = 0V

Parameter	Symbol	Value	Unit
Power Supply Voltage	$V_{CC}$	+ 2 to + 6	V
Input Voltage	$V_{IN}$	0 to $V_{CC}$	V
Rise Time / Fall Time	$t_r, t_f$	0 to 500	ns
Output Voltage	$V_{OUT}$	0 to $V_{CC}$	V
Operating Temperature	$T_A$	- 40 to + 85	°C

## DC CHARACTERISTICS

GND = 0V

Parameter	Symbol	Conditions	V <sub>CC</sub>	TA=25 °C			TA=-40 to +85 °C		Unit	
				Min	Typ	Max	Min	Max		
High-level Input Voltage	V <sub>IH</sub>		2.0	1.5			1.5		V	
			4.5	3.15			3.15			
			6.0	4.2			4.2			
Low-level Input Voltage	V <sub>IL</sub>		2.0			0.3		0.3	V	
			4.5			0.9		0.9		
			6.0			1.2		1.2		
High-level Output Voltage	V <sub>OH</sub>	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -20 μA	2.0	1.9	2.0		1.9	V	
				4.5	4.4	4.5		4.4		
			6.0	5.9	6.0		5.9			
			I <sub>OH</sub> = -4mA I <sub>OH</sub> = -5.2mA	4.5	3.86	4.31		3.76		
				6.0	5.36	5.80		5.26		
Low-level Output Voltage	V <sub>OL</sub>	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 20 μA	2.0		0.0	0.1		0.1	V
				4.5		0.0	0.1		0.1	
				6.0		0.0	0.1		0.1	
			I <sub>OL</sub> = 4mA I <sub>OL</sub> = 5.2mA	4.5		0.17	0.32		0.37	
				6.0		0.18	0.32		0.37	
Input Current	I <sub>I</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND	6.0			± 0.1		± 1.0	μA	
Static Power Supply Current	I <sub>CC</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND	6.0			2.0		20.0	μA	

## SWITCHING CHARACTERISTICS

Except for 1A to 2Y

GND = 0V, CL = 50pF, tr = tf = 6ns

Parameter	Symbol	Conditions	V <sub>CC</sub>	TA=25 °C			TA=-40 to +85 °C		Unit
				Min	Typ	Max	Min	Max	
Output Transition Time	t <sub>TLH</sub> t <sub>THL</sub>		2.0		22	75		90	ns
			4.5		8	15		18	
			6.0		7	13		16	
Propagation Delay Time	t <sub>pLH</sub> t <sub>pHL</sub>		2.0		33	90		110	ns
			4.5		10	18		22	
			6.0		9	16		19	
Input Capacitance	C <sub>IN</sub>				5	10		10	pF

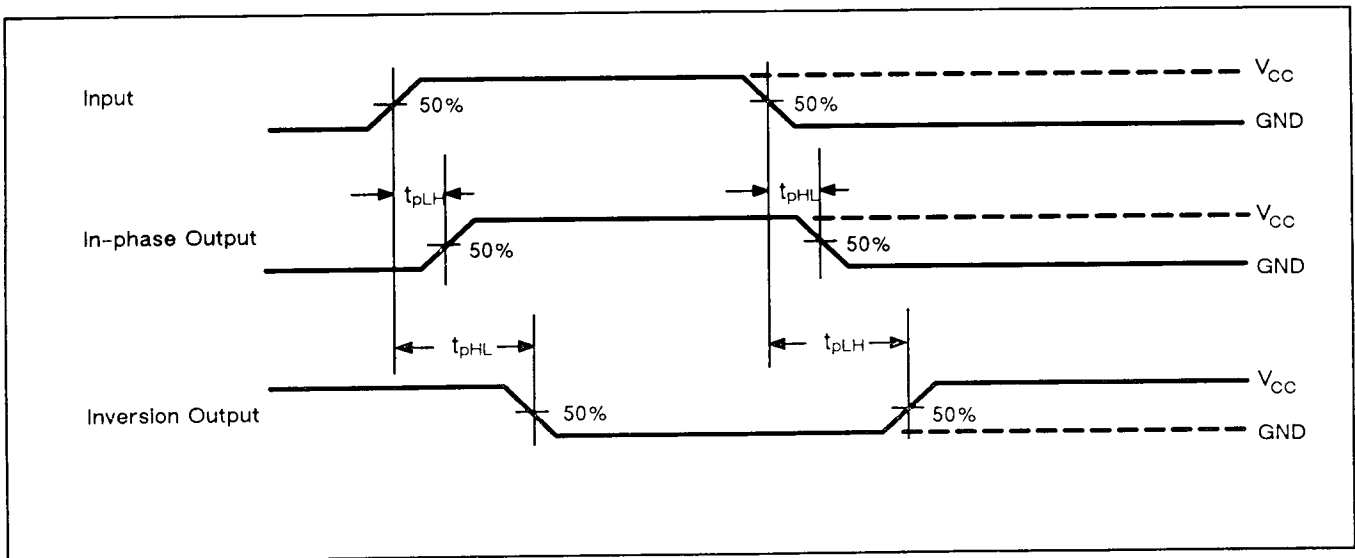
# SWITCHING CHARACTERISTICS (Cont'd)

1A to 2Y only

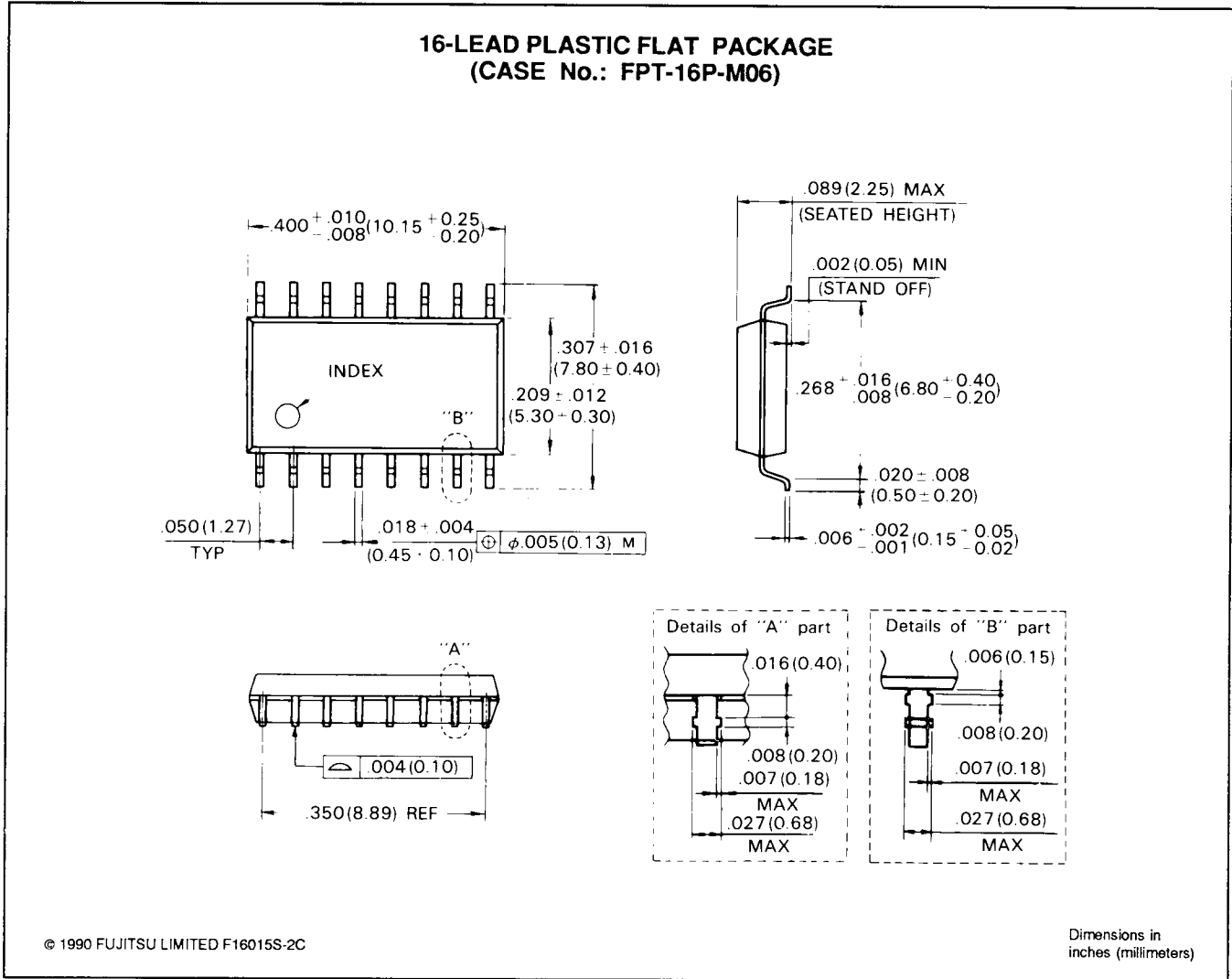
GND = 0V, CL = 50pF, tr = tf = 6ns

Parameter	Symbol	Conditions	TA=25 °C			TA=-40 to +85 °C		Unit	
			V <sub>CC</sub>	Min	Typ	Max	Min		Max
Output Transition Time	t <sub>TLH</sub>		2.0		22	75		90	ns
	t <sub>THL</sub>		4.5		8	15		18	
			6.0		7	13		16	
Propagation Delay Time	t <sub>pLH</sub>		2.0		66	180		220	ns
	t <sub>pHL</sub>		4.5		20	36		44	
			6.0		18	32		38	
Input Capacitance	C <sub>IN</sub>			5	10		10	pF	

## WAVEFORM OF PROPAGATION DELAY TIME



# PACKAGE DIMENSIONS



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