

# MN4006B/MN4006BS

## 18-Bit Static Shift Register

### ■ Outline

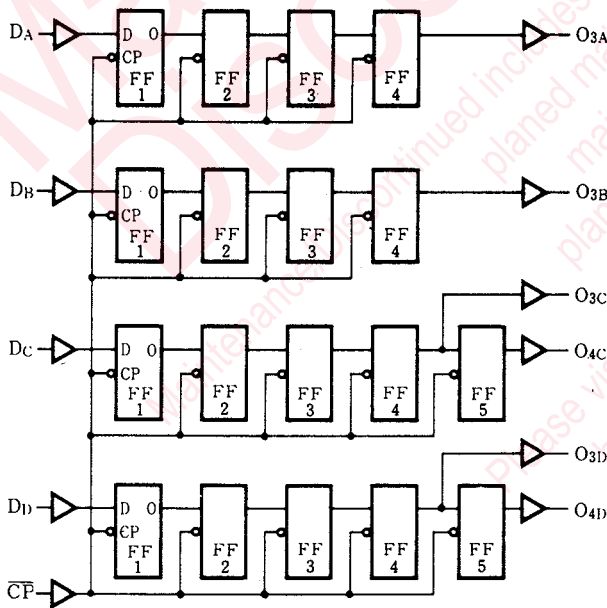
The MN4006B/S is a 18-bit static shift register consisting of two 4-bit shift registers and two 5-bit shift registers. The clock for all the registers is input from  $\overline{CP}$ , and any shift register of 4, 5, 8, 9, 10, 12, 13, 14, 16, 17, or 18 bits can be optionally constituted by suitable input/output combination. This static shift register is equivalent to Motorola's MC14006B and RCA's CD4006B.

### ■ Truth Table

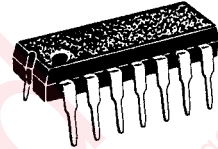
$D_n$	$\overline{CP}$	$O_{n+1}$
$D_i$		$D_i$
x		no change

Note) x : don't care

### ■ Logic Diagram

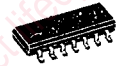


P-1



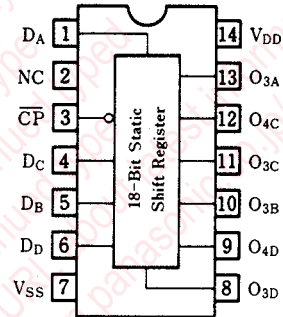
14-pin plastic DIL package

P-2



14-pin PANAFLAT package (SO-14D)

### Pin Configuration



### ■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Unit
Supply voltage	V <sub>DD</sub>	-0.5~+18	V
Input voltage	V <sub>I</sub>	-0.5~V <sub>DD</sub> +0.5*	V
Output pin voltage	V <sub>O</sub>	-0.5~V <sub>DD</sub> +0.5*	V
Peak input · output pin current	±I <sub>I</sub>	max. 10	mA
Power dissipation (per package)	Ta=-40~+60°C	max. 400	mW
	Ta=+60~+80°C	Decrease to 200mW at the rate of 8mW/°C	
Power dissipation (per output pin)	P <sub>D</sub>	max. 100	mW
Operating ambient temperature	T <sub>opr</sub>	-40~+85	°C
Storage temperature	T <sub>stg</sub>	-65~+150	°C

\* V<sub>DD</sub>+0.5V should be lower than 18V.

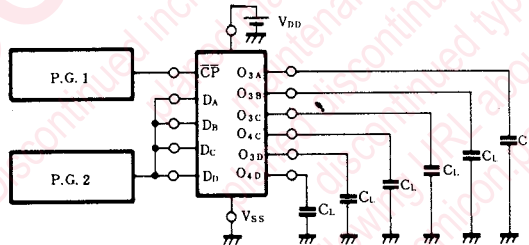
### ■ DC Characteristics (V<sub>SS</sub>=0V)

Item	V <sub>DD</sub> (V)	Symbol	Condition	Ta=-40°C		Ta=25°C		Ta=85°C		Unit	
				min.	max.	min.	max.	min.	max.		
Static supply current	5	I <sub>DD</sub>	V <sub>I</sub> =V <sub>SS</sub> or V <sub>DD</sub>	—	20	—	20	—	150	μA	
	10			—	40	—	40	—	300		
	15			—	80	—	80	—	600		
Output voltage low level	5	V <sub>OL</sub>	V <sub>I</sub> =V <sub>SS</sub> or V <sub>DD</sub>  I <sub>O</sub>  <1μA	—	0.05	—	0.05	—	0.05	V	
	10			—	0.05	—	0.05	—	0.05		
	15			—	0.05	—	0.05	—	0.05		
Output voltage high level	5	V <sub>OH</sub>	V <sub>I</sub> =V <sub>SS</sub> or V <sub>DD</sub>  I <sub>O</sub>  <1μA	4.95	—	4.95	—	4.95	—	V	
	10			9.95	—	9.95	—	9.95	—		
	15			14.95	—	14.95	—	14.95	—		
Input voltage low level	5	V <sub>IL</sub>	I <sub>O</sub>  <1μA	V <sub>O</sub> =0.5V or 4.5V V <sub>O</sub> =1V or 9V V <sub>O</sub> =1.5V or 13.5V	—	1.5	—	1.5	—	1.5	V
	10				—	3	—	3	—	3	
	15				—	4	—	4	—	4	
Input voltage high level	5	V <sub>IH</sub>	I <sub>O</sub>  <1μA	V <sub>O</sub> =0.5V or 4.5V V <sub>O</sub> =1V or 9V V <sub>O</sub> =1.5V or 13.5V	3.5	—	3.5	—	3.5	—	V
	10				7	—	7	—	7	—	
	15				11	—	11	—	11	—	
Output current low level	5	I <sub>OL</sub>	V <sub>O</sub> =0.4V, V <sub>I</sub> =0 or 5V V <sub>O</sub> =0.5V, V <sub>I</sub> =0 or 10V V <sub>O</sub> =1.5V, V <sub>I</sub> =0 or 15V	0.52	—	0.44	—	0.36	—	mA	
	10			1.3	—	1.1	—	0.9	—		
	15			3.6	—	3	—	2.4	—		
Output current high level	5	-I <sub>OH</sub>	V <sub>O</sub> =4.6V, V <sub>I</sub> =0 or 5V V <sub>O</sub> =9.5V, V <sub>I</sub> =0 or 10V V <sub>O</sub> =13.5V, V <sub>I</sub> =0 or 15V	0.52	—	0.44	—	0.36	—	mA	
	10			1.3	—	1.1	—	0.9	—		
	15			3.6	—	3	—	2.4	—		
Output current high level	5	-I <sub>OH</sub>	V <sub>O</sub> =2.5V, V <sub>I</sub> =0 or 5V	1.7	—	1.4	—	1.1	—	mA	
Input leakage current	15	±I <sub>I</sub>	V <sub>I</sub> =0 or 15V	—	0.3	—	0.3	—	1	μA	

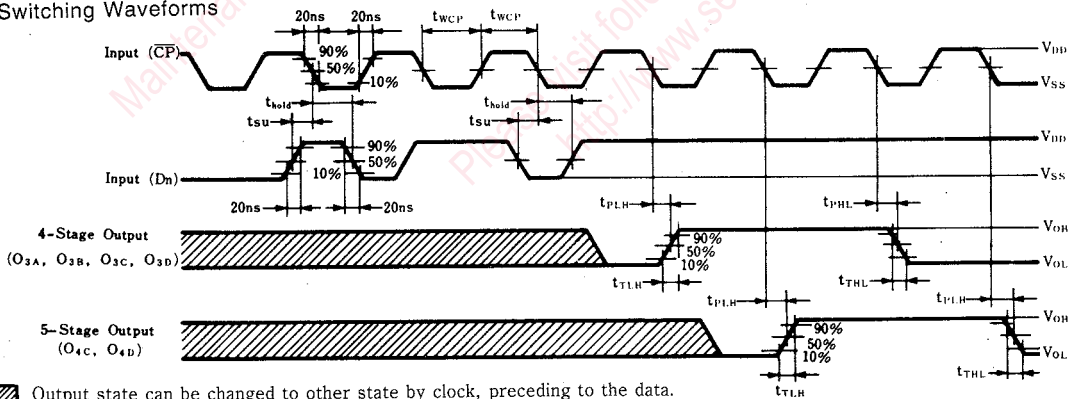
■ Switching Characteristics (Ta=25°C, VCC=0V, CL=50pF)

Item	V <sub>DD</sub> (V)	Symbol	min.	typ.	max.	Unit
Output rise time	5	t <sub>TLH</sub>	—	60	180	ns
	10		—	30	90	
	15		—	20	60	
Output fall time	5	t <sub>THL</sub>	—	60	180	ns
	10		—	30	90	
	15		—	20	60	
Propagation time CP→On (H→L)	5	t <sub>PHL</sub>	—	90	270	ns
	10		—	40	120	
	15		—	30	90	
Propagation time CP→On (L→H)	5	t <sub>PLH</sub>	—	90	270	ns
	10		—	40	120	
	15		—	35	105	
Minimum clock pulse width	5	t <sub>ECPH</sub>	—	30	90	ns
	10		—	20	60	
	15		—	15	45	
Setup time Dn→CP	5	t <sub>su</sub>	—	10	30	ns
	10		—	5	15	
	15		—	0	10	
Hold time DN→CP	5	t <sub>hold</sub>	—	-5	10	ns
	10		—	0	10	
	15		—	0	10	
Maximum clock frequency	5	f <sub>max</sub>	9	18	—	MHz
	10		15	30	—	
	15		18	36	—	
Input capacitance		C <sub>i</sub>	—	—	7.5	pF

1. Switching Time Measuring Circuit



2. Switching Waveforms



▨ Output state can be changed to other state by clock, preceding to the data.

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