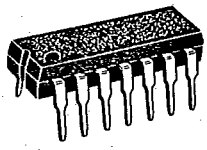
MN4006B/MN4006BS

18-Bit Static Shift Registers

■ Description

The MN4006B/S are maximum 18-bit static shift registers composed of two 4-bit shift registers and five 5-bit shift registers. Clock pulses for all registers are input through the common CP. By properly combining input and output, shift registers with the arbitrary stages of 4, 5, 8, 9, 10, 12, 13, 14, 16 and 17 are enabled.
The MN4006B/S are equivalent to MOTOROLA MC14006B and RCA CD4006B.

P-1



14-Pin • Plastic DIL Package

P-2

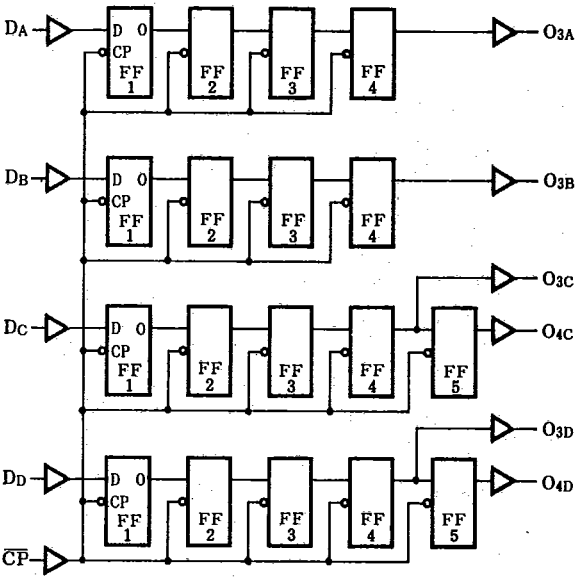
14-Pin • Panaflat Package (SO-14D)

■ Truth Table

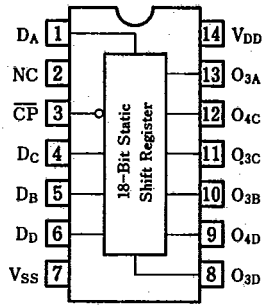
D_n	$\overline{CP}$	O_{n+1}
D_1	↓	D_1
×	↑	no change

Note) × : don't care

■ Logic Diagram



Pin Configuration



■ Maximum Ratings (Ta=25℃)

Item		Symbol	Ratings	Unit
Supply Voltage		V_{DD}	−0.5～+18	V
Input Voltage		V_I	−0.5～V_{DD}+0.5*	V
Output Voltage		V_O	−0.5～V_{DD}+0.5*	V
Peak Input · Output Current		$\pm I_I$	max. 10	mA
Power Dissipation (per package)	Ta=−40～+60℃	P_D	max. 400	mW
	Ta=+60～+85℃		Decrease up to 200mW rating at 8mW/°C	
Power Dissipation (per output terminal)		P_D	max. 100	mW
Operating Ambient Temperature		Topr	−40～+85	℃
Storage Temperature		Tstg	−65～+150	℃

* V_{DD} + 0.5V should be under 18V

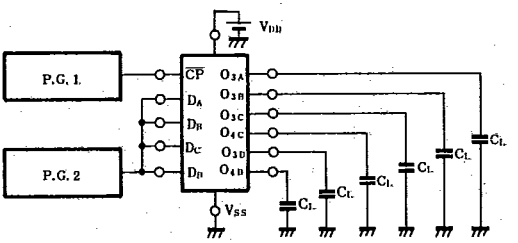
■ DC Characteristics (V_{SS}=0V)

Item	V_{DD} (V)	Symbol	Conditions		Ta=−40℃ min.	Ta=−40℃ max.	Ta=25℃ min.	Ta=25℃ max.	Ta=85℃ min.	Ta=85℃ max.	Unit
Quiescent Power Supply Current	5	I_{DD}	V_I=V_{SS} or V_{DD}		—	20	—	20	—	150	μA
	10				—	40	—	40	—	300	
	15				—	80	—	80	—	600	
Output Voltage Low Level	5	V_{OL}	V_I=V_{SS} or V_{DD} $\lvert I_O\rvert$<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_{OH}	V_I=V_{SS} or V_{DD} $\lvert I_O\rvert$<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_{IL}	$\lvert I_O\rvert$<1μA	V_O=0.5V or 4.5V	—	1.5	—	1.5	—	1.5	V
	10			V_O=1V or 9V	—	3	—	3	—	3	
	15			V_O=1.5V or 13.5V	—	4	—	4	—	4	
Input Voltage High Level	5	V_{IH}	$\lvert I_O\rvert$<1μA	V_O=0.5V or 4.5V	3.5	—	3.5	—	3.5	—	V
	10			V_O=1V or 9V	7	—	7	—	7	—	
	15			V_O=1.5V or 13.5V	11	—	11	—	11	—	
Output Current Low Level	5	I_{OL}	V_O=0.4V, V_I=0V or 5V		0.52	—	0.44	—	0.36	—	mA
	10		V_O=0.5V, V_I=0V or 10V		1.3	—	1.1	—	0.9	—	
	15		V_O=1.5V, V_I=0V or 15V		3.6	—	3	—	2.4	—	
Output Current High Level	5	$-I_{OH}$	V_O=4.6V, V_I=0V or 5V		0.52	—	0.44	—	0.36	—	mA
	10		V_O=9.5V, V_I=0V or 10V		1.3	—	1.1	—	0.9	—	
	15		V_O=13.5V, V_I=0V or 15V		3.6	—	3	—	2.4	—	
Output Current High Level	5	$-I_{OH}$	V_O=2.5V, V_I=0V or 5V		1.7	—	1.4	—	1.1	—	mA
Input Leakage Current	15	$\pm I_I$	V_I=0V or 15V		—	0.3	—	0.3	—	1	μA

■ Switching Characteristics ($Ta=25℃$, $V_{SS}=0V$, $C_L=50pF$)

Item	V_{DD} (V)	Symbol	min.	typ.	max.	Unit
Output Rise Time	5	t_{TLH}	—	60	180	ns
	10		—	30	90	
	15		—	20	60	
Output Fall Time	5	t_{THL}	—	60	180	ns
	10		—	30	90	
	15		—	20	60	
Propagation Delay Time $\overline{CP}\rightarrow On(H\rightarrow L)$	5	t_{PHL}	—	90	270	ns
	10		—	40	120	
	15		—	30	90	
Propagation Delay Time $\overline{CP}\rightarrow On(L\rightarrow H)$	5	t_{PLH}	—	90	270	ns
	10		—	40	120	
	15		—	35	105	
Minimum Clock Pulse Width	5	t_{WCPH}	—	30	90	ns
	10		—	20	60	
	15		—	15	45	
Set-up Time $Dn\rightarrow\overline{CP}$	5	t_{su}	—	10	30	ns
	10		—	5	15	
	15		—	0	10	
Hold Time $Dn\rightarrow\overline{CP}$	5	t_{hold}	—	−5	10	ns
	10		—	0	10	
	15		—	0	10	
Maximum Clock Frequency	5	f_{max}	9	18	—	MHz
	10		15	30	—	
	15		18	36	—	
Input Capacitance		C_I	—	—	7.5	pF

1. Switching Time Test Circuit



2. Waveforms