

TC4015BP, TC4015BF, TC4015BFN

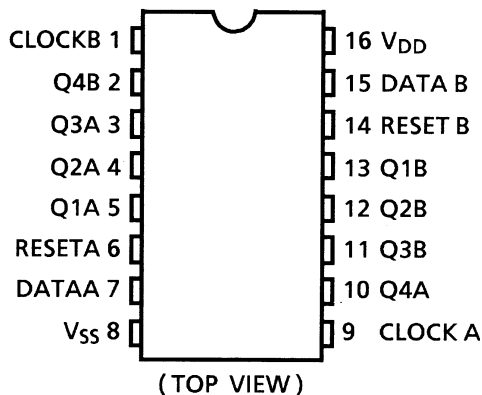
TC4015B Dual 4-Stage Static Shift Register (with serial input/parallel output)

TC4015B contains two circuits of 4 stage shift registers and the independent output is driven from each stage. As all the D type flip-flops of every stage have common RESET input, asynchronous clear operation can be achieved by an external signal at arbitrary timing. The flip-flop of each stage is triggered by rising edge of CLOCK input.

RESET input of "H" level resets the contents of all the stages to "L" regardless of CLOCK and DATA inputs and all of data outputs Q1 through Q4 become "L".

This can be used for converting serial data to parallel one and for ring counters of any numbering systems.

Pin Assignment



Truth Table

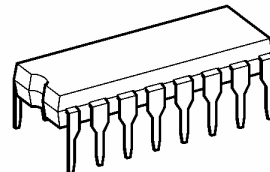
Inputs			Outputs			
CLOCK Δ	DATA	RESET	Q1	Q2	Q3	Q4
	L	L	L	Q1	Q2	Q3
	H	L	H	Q1	Q2	Q3
	*	L	No Change			
*	*	H	L	L	L	L

Δ : Level change

*: Don't care

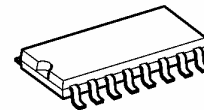
Note: xxxFN (JEDEC SOP) is not available in Japan.

TC4015BP

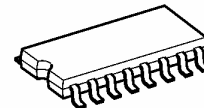


DIP16-P-300-2.54A

TC4015BF

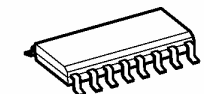


SOP16-P-300-1.27A



SOP16-P-300-1.27

TC4015BFN



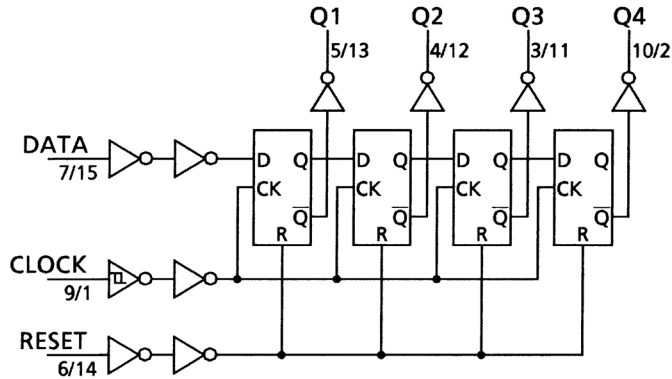
SOL16-P-150-1.27

Weight

DIP16-P-300-2.54A	: 1.00 g (typ.)
SOP16-P-300-1.27A	: 0.18 g (typ.)
SOP16-P-300-1.27	: 0.18 g (typ.)
SOL16-P-150-1.27	: 0.13 g (typ.)

Logic Diagram

1/2 TC4015B



Absolute Maximum Ratings (Note)

Characteristics	Symbol	Rating	Unit
DC supply voltage	V_{DD}	$V_{SS} - 0.5 \sim V_{SS} + 20$	V
Input voltage	V_{IN}	$V_{SS} - 0.5 \sim V_{DD} + 0.5$	V
Output voltage	V_{OUT}	$V_{SS} - 0.5 \sim V_{DD} + 0.5$	V
DC input current	I_{IN}	± 10	mA
Power dissipation	P_D	300 (DIP)/180 (SOIC)	mW
Operating temperature range	T_{opr}	$-40 \sim 85$	$^{\circ}\text{C}$
Storage temperature range	T_{stg}	$-65 \sim 150$	$^{\circ}\text{C}$

Note: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Recommended Operating Conditions ($V_{SS} = 0 \text{ V}$) (Note)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
DC supply voltage	V_{DD}	—	3	—	18	V
Input voltage	V_{IN}	—	0	—	V_{DD}	V

Note: The recommended operating conditions are required to ensure the normal operation of the device. Unused inputs must be tied to either VCC or GND.

Static Electrical Characteristics ($V_{SS} = 0\text{ V}$)

Characteristics		Sym- bol	Test Condition	V_{DD} (V)	-40°C		25°C			85°C		Unit
					Min	Max	Min	Typ.	Max	Min	Max	
High-level output voltage		V_{OH}	$ I_{OUT} < 1\text{ }\mu\text{A}$ $V_{IN} = V_{SS}, V_{DD}$	5	4.95	—	4.95	5.00	—	4.95	—	V
				10	9.95	—	9.95	10.00	—	9.95	—	
				15	14.95	—	14.95	15.00	—	14.95	—	
Low-level output voltage		V_{OL}	$ I_{OUT} < 1\text{ }\mu\text{A}$ $V_{IN} = V_{SS}, V_{DD}$	5	—	0.05	—	0.00	0.05	—	0.05	V
				10	—	0.05	—	0.00	0.05	—	0.05	
				15	—	0.05	—	0.00	0.05	—	0.05	
Output high current		I_{OH}	$V_{OH} = 4.6\text{ V}$	5	-0.61	—	-0.51	-1.0	—	-0.42	—	mA
			$V_{OH} = 2.5\text{ V}$	5	-2.50	—	-2.10	-4.0	—	-1.70	—	
			$V_{OH} = 9.5\text{ V}$	10	-1.50	—	-1.30	-2.2	—	-1.10	—	
			$V_{OH} = 13.5\text{ V}$	15	-4.00	—	-3.40	-9.0	—	-2.80	—	
			$V_{IN} = V_{SS}, V_{DD}$									
Output low current		I_{OL}	$V_{OL} = 0.4\text{ V}$	5	0.61	—	0.51	1.2	—	0.42	—	mA
			$V_{OL} = 0.5\text{ V}$	10	1.50	—	1.30	3.2	—	1.10	—	
			$V_{OL} = 1.5\text{ V}$	15	4.00	—	3.40	12.0	—	2.80	—	
			$V_{IN} = V_{SS}, V_{DD}$									
Input high voltage		V_{IH}	$V_{OUT} = 0.5\text{ V}, 4.5\text{ V}$	5	3.5	—	3.5	2.75	—	3.5	—	V
			$V_{OUT} = 1.0\text{ V}, 9.0\text{ V}$	10	7.0	—	7.0	5.50	—	7.0	—	
			$V_{OUT} = 1.5\text{ V}, 13.5\text{ V}$	15	11.0	—	11.0	8.25	—	11.0	—	
			$ I_{OUT} < 1\text{ }\mu\text{A}$									
Input low voltage		V_{IL}	$V_{OUT} = 0.5\text{ V}, 4.5\text{ V}$	5	—	1.5	—	2.25	1.5	—	1.5	V
			$V_{OUT} = 1.0\text{ V}, 9.0\text{ V}$	10	—	3.0	—	4.50	3.0	—	3.0	
			$V_{OUT} = 1.5\text{ V}, 13.5\text{ V}$	15	—	4.0	—	6.75	4.0	—	4.0	
			$ I_{OUT} < 1\text{ }\mu\text{A}$									
Input current	"H" level	I_{IH}	$V_{IH} = 18\text{ V}$	18	—	0.1	—	10^{-5}	0.1	—	1.0	μA
	"L" level	I_{IL}	$V_{IL} = 0\text{ V}$	18	—	-0.1	—	-10^{-5}	-0.1	—	-1.0	
Quiescent supply current		I_{DD}	$V_{IN} = V_{SS}, V_{DD}$ (Note)	5	—	5	—	0.005	5	—	150	μA
				10	—	10	—	0.010	10	—	300	
				15	—	20	—	0.015	20	—	600	

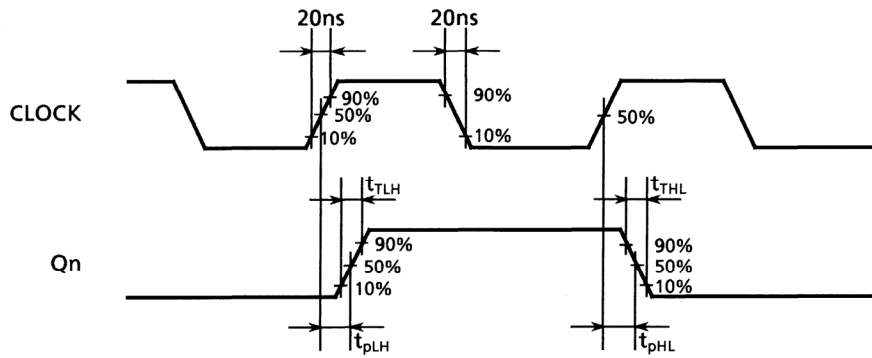
Note: All valid input combinations.

Dynamic Electrical Characteristics (Ta = 25°C, V_{SS} = 0 V, C_L = 50 pF)

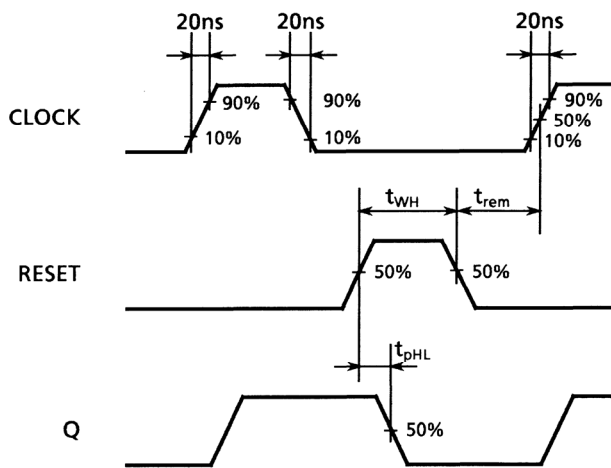
Characteristics	Symbol	Test Condition		Min	Typ.	Max	Unit
			V _{DD} (V)				
Output transition time (low to high)	t _{TLH}	—	5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Output transition time (high to low)	t _{THL}	—	5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Propagation delay time (CLOCK-Q)	t _{PLH} t _{pHL}	—	5	—	130	320	ns
			10	—	60	160	
			15	—	50	120	
Propagation delay time (RESET-Q)	t _{pHL}	—	5	—	90	400	ns
			10	—	45	200	
			15	—	40	160	
Max clock frequency	f _{CL}	—	5	3.0	8	—	MHz
			10	6.0	17	—	
			15	8.5	20	—	
Min clock pulse width	t _w	—	5	—	35	180	ns
			10	—	25	80	
			15	—	20	50	
Min pulse width (RESET)	t _{WH}	—	5	—	50	200	ns
			10	—	25	80	
			15	—	20	60	
Min set-up time (DATA-CLOCK)	t _{SU}	—	5	—	8	70	ns
			10	—	4	40	
			15	—	0	30	
Min hold time (DATA-CLOCK)	t _H	—	5	—	6	60	ns
			10	—	5	30	
			15	—	4	20	
Min removal time (RESET-CLOCK)	t _{rem}	—	5	—	0	80	ns
			10	—	0	30	
			15	—	0	20	
Max clock input rise time Max clock input fall time	t _{rCL} t _{fCL}	—	5	No limit			μs
			10				
			15				
Input capacitance	C _{IN}	—		—	5	7.5	pF

Waveforms for Measurement of Dynamic Characteristics

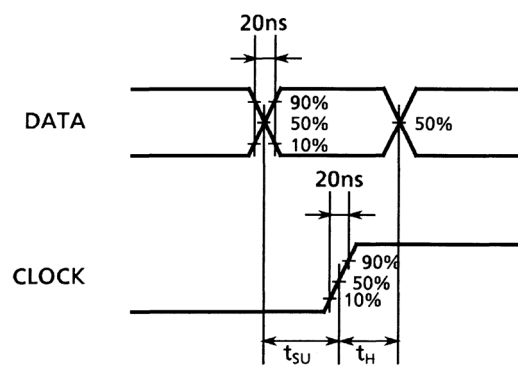
Waveform 1



Waveform 2



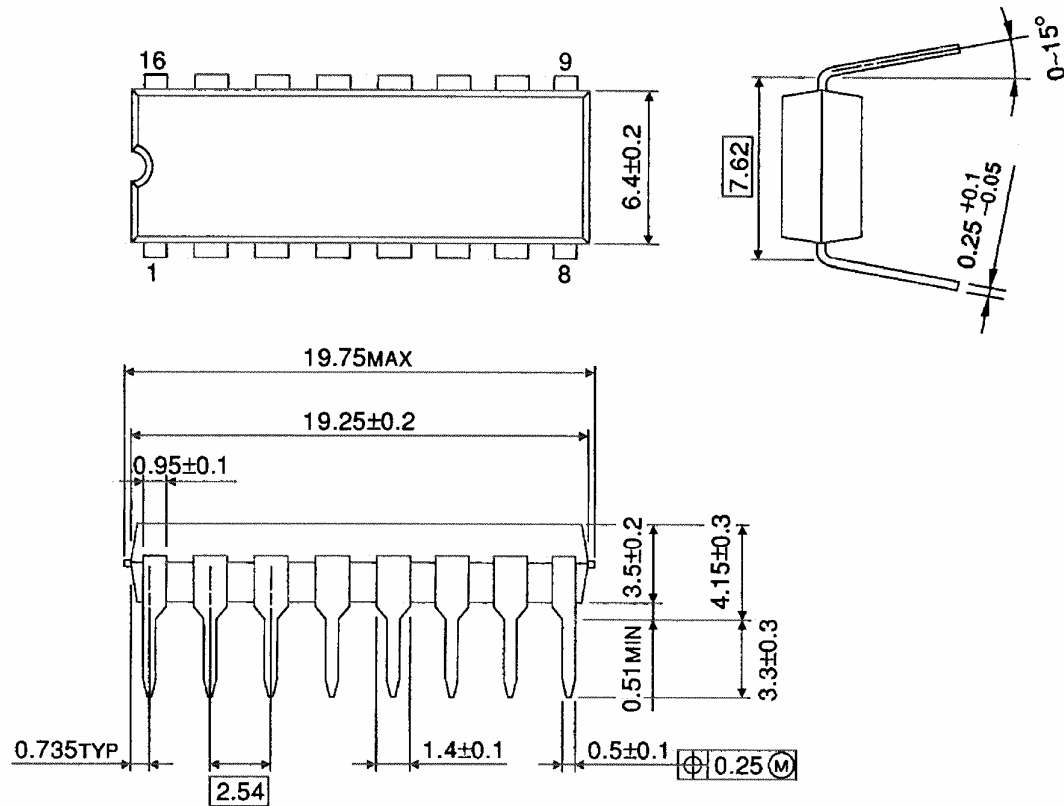
Waveform 3



Package Dimensions

DIP16-P-300-2.54A

Unit : mm

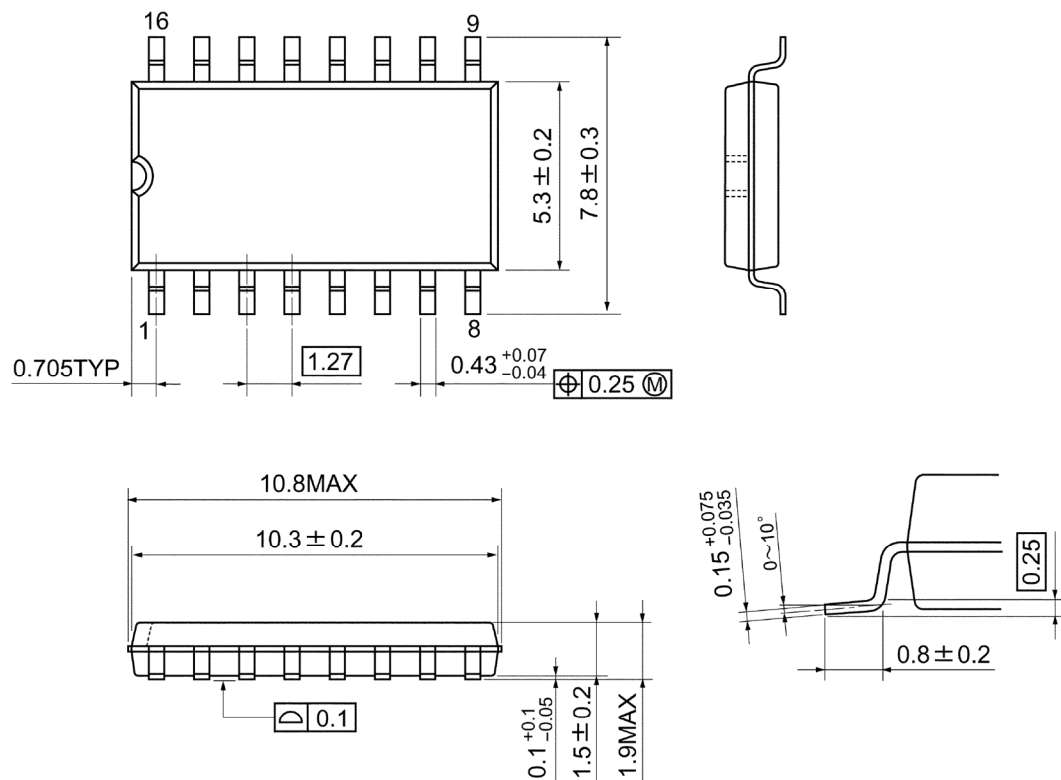


Weight: 1.00 g (typ.)

Package Dimensions

SOP16-P-300-1.27A

Unit: mm

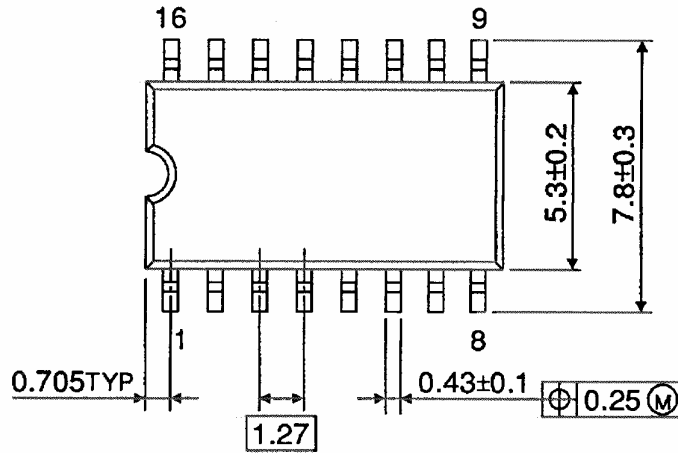
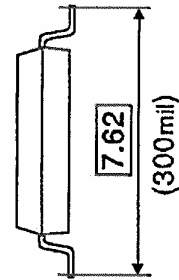
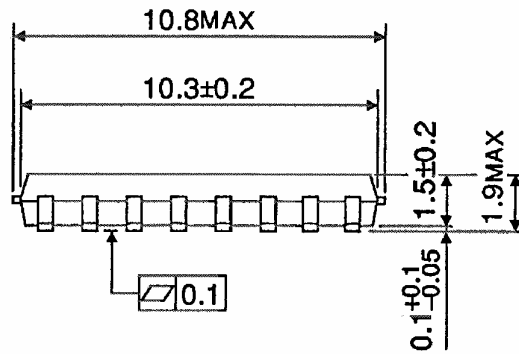
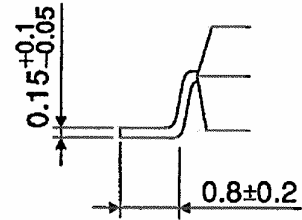


Weight: 0.18 g (typ.)

Package Dimensions

SOP16-P-300-1.27

Unit : mm

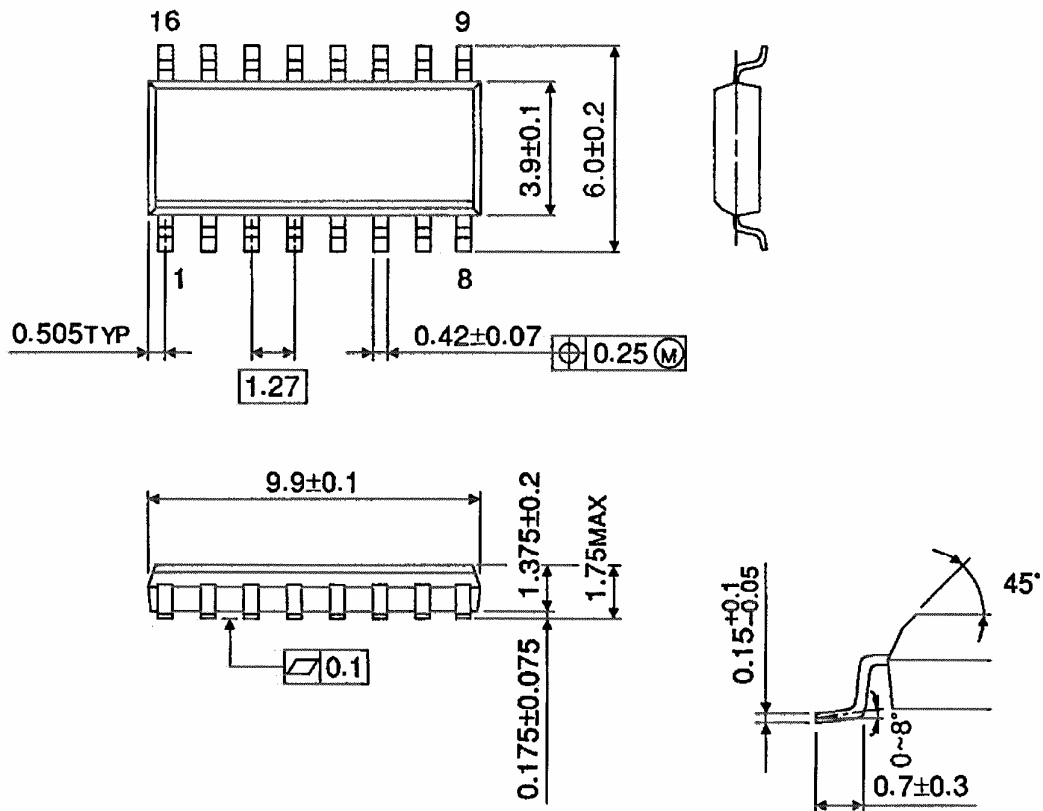


Weight: 0.18 g (typ.)

Package Dimensions (Note)

SOL16-P-150-1.27

Unit : mm



Note: This package is not available in Japan.

Weight: 0.13 g (typ.)

Note: Lead (Pb)-Free Packages

DIP16-P-300-2.54A SOP16-P-300-1.27A SOL16-P-150-1.27

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060116EBA

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