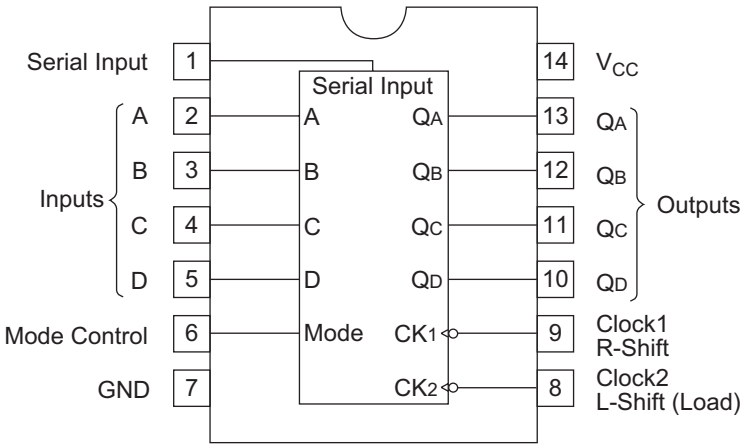
The 4-bit register features parallel and serial inputs, parallel outputs, mode control, and two clock inputs. The register has three mode operation:

- Parallel (broadside) load
- Shift right (the direction Q_A toward Q_D)
- Shift left (the direction Q_D toward Q_A)

Parallel loading is accomplished by applying the four bits of data and taking the mode control input high. The data is loaded into the associated flip-flops and appears at the outputs after the high-to-low transition of the clock-2 input. During loading, the entry of serial data is inhibited. Shift right is accomplished on the high-to-low transition of clock-1 when the mode control is low; shift left is accomplished on the high-to-low transition of clock-2 when the mode control is high by connecting the output of each flip-flop to the parallel input of the previous flip-flop (Q_D to input C, etc.) and serial data is entered at input D. The clock input may be applied commonly to clock-1 and clock-2 if both modes can be clocked from the same source. Changes at the mode control inputs are low; however, conditions described in the last three lines of the function table will also ensure that register contents are protected.

Pin Arrangement



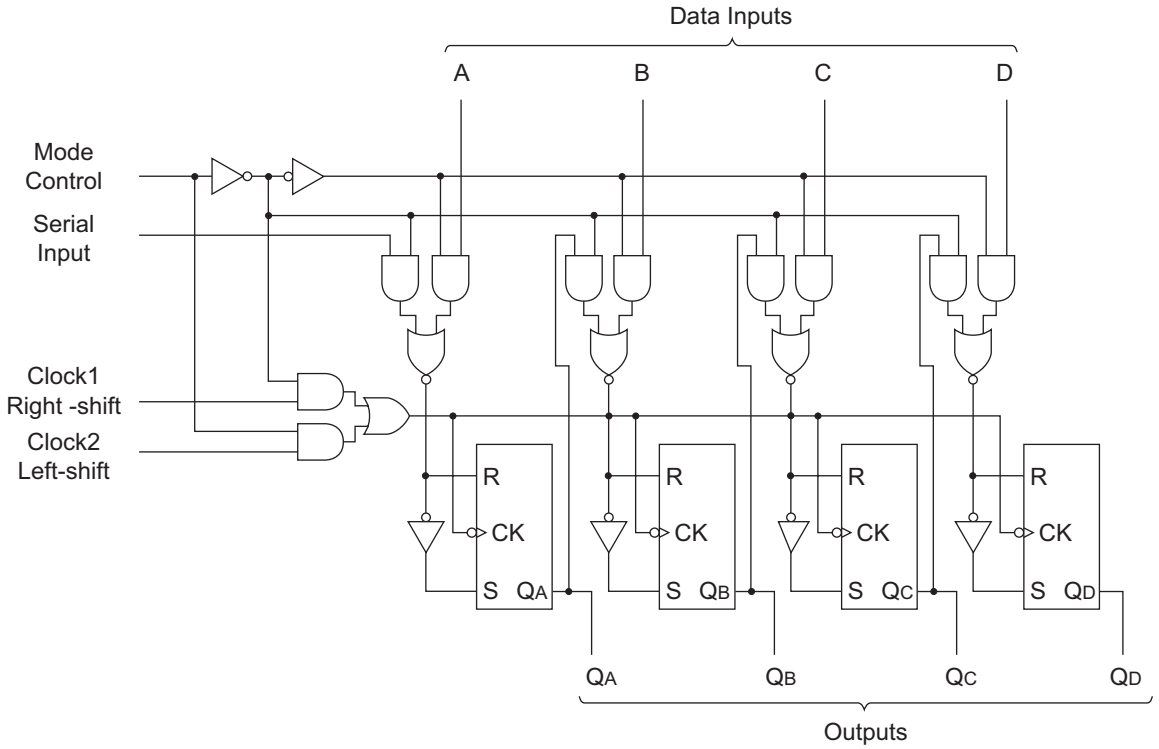
(Top view)

Function Table

Inputs								Outputs			
Mode control	Clocks		Serial	Parallel				Q_A	Q_B	Q_C	Q_D
	2(L)	1(R)		A	B	C	D				
H	H	X	X	X	X	X	X	Q_{AO}	Q_{BO}	Q_{CO}	Q_{DO}
H	↓	X	X	a	b	c	d	a	b	c	d
H	↓	X	X	Q_B*	Q_C*	Q_D*	d	Q_{Bn}	Q_{Cn}	Q_{Dn}	d
L	L	H	X	X	X	X	X	Q_{AO}	Q_{BO}	Q_{CO}	Q_{DO}
L	X	↓	H	X	X	X	X	H	Q_{An}	Q_{Bn}	Q_{Cn}
L	X	↓	L	X	X	X	X	L	Q_{An}	Q_{Bn}	Q_{Cn}
↑	L	L	X	X	X	X	X	Q_{AO}	Q_{BO}	Q_{CO}	Q_{DO}
↓	L	L	X	X	X	X	X	Q_{AO}	Q_{BO}	Q_{CO}	Q_{DO}
↓	L	H	X	X	X	X	X	Q_{AO}	Q_{BO}	Q_{CO}	Q_{DO}
↑	H	L	X	X	X	X	X	Q_{AO}	Q_{BO}	Q_{CO}	Q_{DO}
↑	H	H	X	X	X	X	X	Q_{AO}	Q_{BO}	Q_{CO}	Q_{DO}

Notes: 1. H; high level, L; low level, X; irrelevant
2. ↑; transition from low to high level
3. ↓; transition from high to low level
4. a to d; the level of steady-state input at inputs A, B, C, or D, respectively.
5. Q_{AO} to Q_{DO}; the level of Q_A, Q_B, Q_C, or Q_D, respectively, before the indicated steady-state input conditions were established.
6. Q_{An} to Q_{Dn}; the level of Q_A, Q_B, Q_C, or Q_D, respectively, before the most-recent (↑) transition of the clock.
7. *; Shifting left require external connection of Q_B to A, Q_C to B, and Q_D to C. Serial data is entered at input D.

Block Diagram



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage	V_{CC}	7	V
Input voltage	V_{IN}	7	V
Power dissipation	P_T	400	mW
Storage temperature	Tstg	–65 to +150	°C

Note: Voltage value, unless otherwise noted, are with respect to network ground terminal.

Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{CC}	4.75	5.00	5.25	V
Output current	I_{OH}	—	—	–400	μA
	I_{OL}	—	—	8	mA
Operating temperature	Topr	–20	25	75	°C
Clock frequency	f_{clock}	0	—	25	MHz
Clock pulse width	$t_{w\,(CK)}$	20	—	—	ns
Setup time	t_{su}	20	—	—	ns
Hold time	t_h	10	—	—	ns
Enable time 1	$t_{enable\ 1}$	20	—	—	ns
Enable time 2	$t_{enable\ 2}$	20	—	—	ns
Inhibit time 1	$t_{inhibit\ 1}$	20	—	—	ns
Inhibit time 2	$t_{inhibit\ 2}$	20	—	—	ns

Electrical Characteristics

(Ta = –20 to +75 °C)

Item	Symbol	min.	typ.*	max.	Unit	Condition
Input voltage	V_{IH}	2.0	—	—	V	
	V_{IL}	—	—	0.8	V	
Output voltage	V_{OH}	2.7	—	—	V	V_{CC} = 4.75 V, V_{IH} = 2 V, V_{IL} = 0.8 V, I_{OH} = –400 μA
	V_{OL}	—	—	0.4	V	I_{OL} = 4 mA; V_{CC} = 4.75 V, V_{IH} = 2 V, V_{IL} = 0.8 V
		—	—	0.5		I_{OL} = 8 mA
Input current	I_{IH}	—	—	20	μA	V_{CC} = 5.25 V, V_I = 2.7 V
	I_{IL}	—	—	–0.4	mA	V_{CC} = 5.25 V, V_I = 0.4 V
	I_I	—	—	0.1	mA	V_{CC} = 5.25 V, V_I = 7 V
Short-circuit output current	I_{OS}	–20	—	–100	mA	V_{CC} = 5.25 V
Supply current**	I_{CC}	—	13	21	mA	V_{CC} = 5.25 V
Input clamp voltage	V_{IK}	—	—	–1.5	V	V_{CC} = 4.75 V, I_{IN} = –18 mA

Notes: * V_{CC} = 5 V, Ta = 25°C

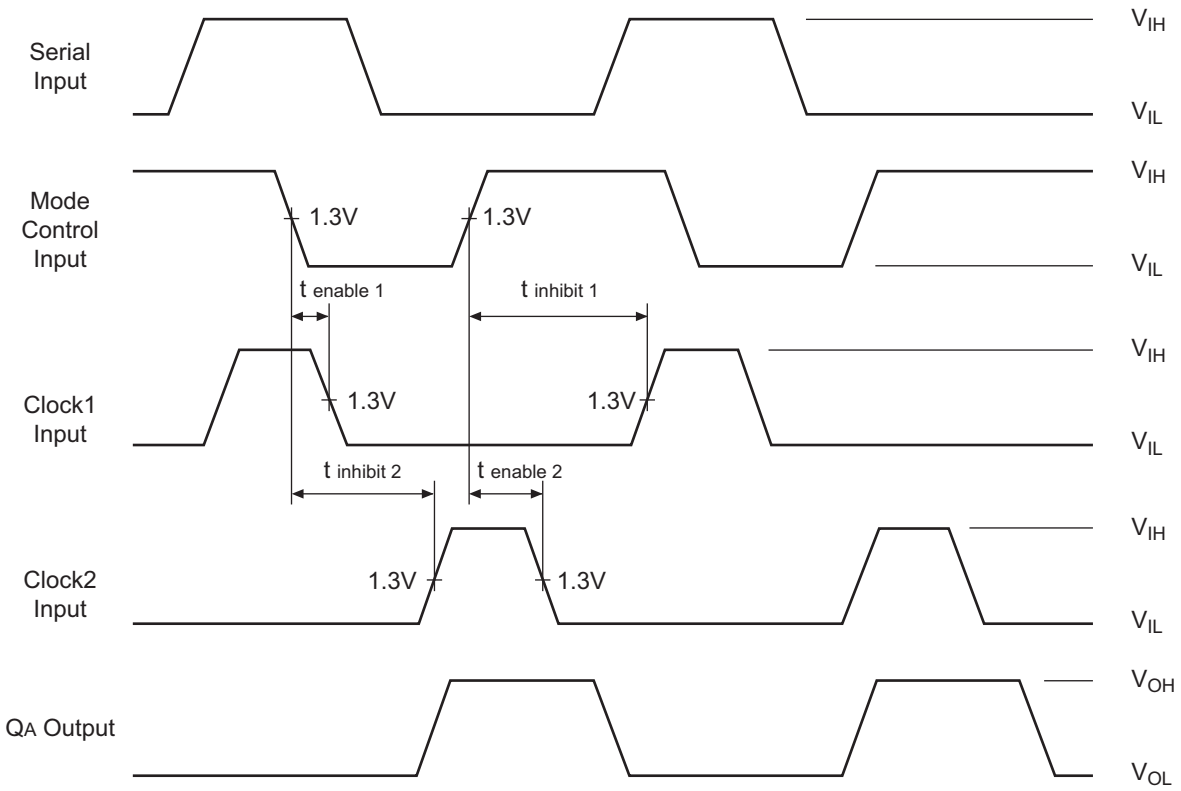
** I_{CC} is measured with all outputs and serial input open; A, B, C, and D inputs grounded; mode control at 4.5 V; and momentary 3 V, then ground, applied both clock inputs.

Switching Characteristics

(V_{CC} = 5 V, Ta = 25°C)

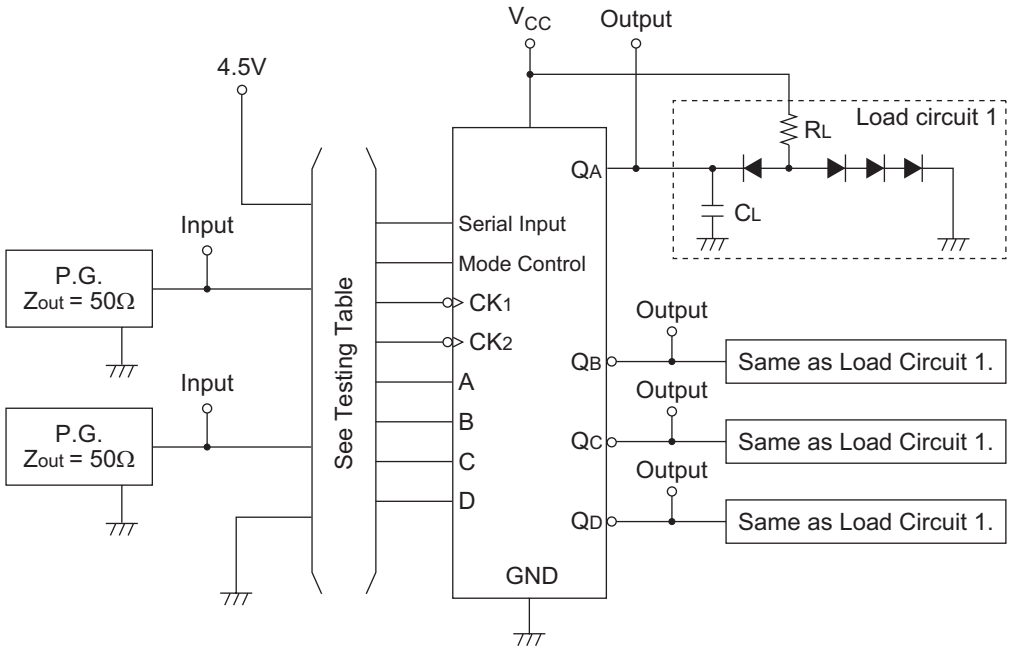
Item	Symbol	min.	typ.	max.	Unit	Condition
Maximum clock frequency	f_{max}	25	36	—	MHz	C_L = 15 pF, R_L = 2 kΩ
Propagation delay time	t_{PLH}	—	18	27	ns	
	t_{PHL}	—	21	32	ns	

Clock Enable / Inhibit Times



Testing Method

Test Circuit

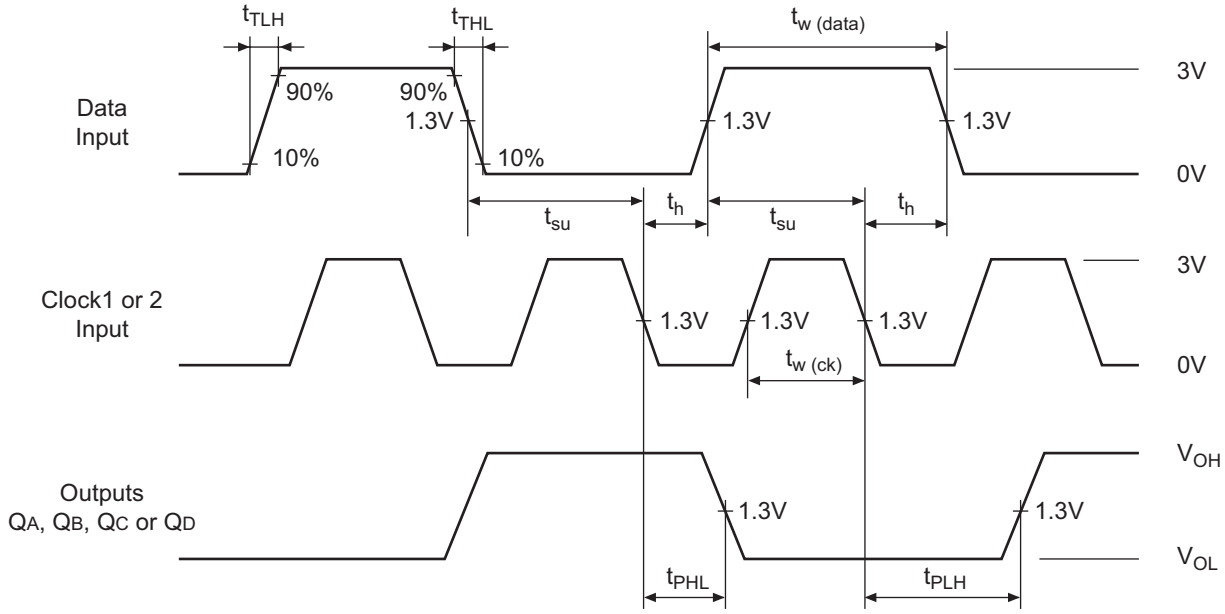


Notes: 1. C_L includes probe and jig capacitance.
2. All diodes are 1S2074(H).

Testing Table

Item	From input to output	Inputs								Outputs			
		CK-1	CK-2	Mode control	Serial Inputs	A	B	C	D	Q_A	Q_B	Q_C	Q_D
f_{max}	CK-1 → Q	IN	4.5 V	0 V	IN	4.5 V	4.5 V	4.5 V	4.5 V	OUT	OUT	OUT	OUT
	CK-2 → Q	4.5 V	IN	4.5 V	4.5 V	IN	IN	IN	IN	OUT	OUT	OUT	OUT
t_{PLH}	CK-1 → Q	IN	4.5 V	0 V	IN	4.5 V	4.5 V	4.5 V	4.5 V	OUT	OUT	OUT	OUT
t_{PHL}	CK-2 → Q	4.5 V	IN	4.5 V	4.5 V	IN	IN	IN	IN	OUT	OUT	OUT	OUT

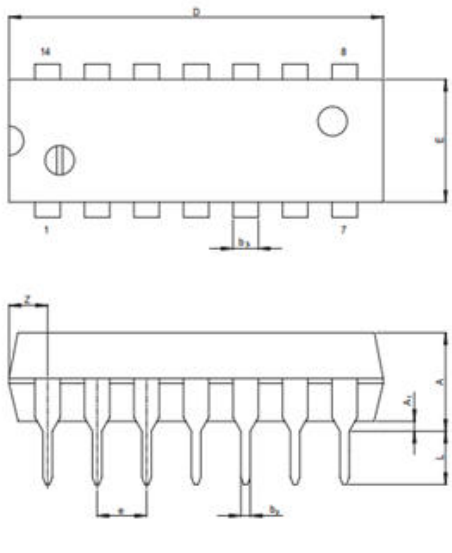
Waveform



Note: Input pulse; t_{TLH}, $t_{THL} \leq 10$ ns, Data PRR = 500 kHz, Clock PRR = 1 MHz,

Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP14-6.3x19.2-2.54	PRDP0014AB-B	DP-14AV	0.97g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e_1	—	7.62	—
D	—	19.2	20.32
E	—	6.3	7.4
A	—	—	5.06
A_1	0.51	—	—
b_p	0.40	0.48	0.56
b_3	—	1.30	—
c	0.19	0.25	0.31
θ	0°	—	15°
e	2.29	2.54	2.79
Z	—	—	2.39
L	2.54	—	—

以上信息仅供参考.如需帮助联系客服人员。谢谢 XINLUDA

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