

DM7613/DM8613 Dual/Quad Gated Flip-Flops

General Description

The DM7613/8613 is a quad, gated, D-type flip-flop with common clock, common clear, and gated input. When a high logic level is applied to the gated input, data entry to the flip-flop is inhibited.

Features

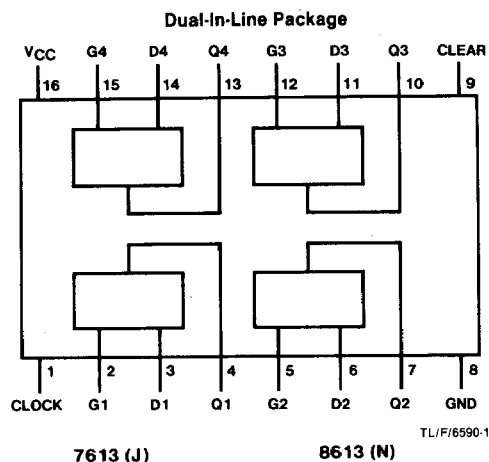
- Positive-edge triggered
- Do-nothing state
- Buffered inputs
- Typical toggle rate 30 MHz
- Typical power dissipation 290 mW

Absolute Maximum Ratings (Note 1)

Supply Voltage	7V
Input Voltage	5.5V
Storage Temperature Range	- 65°C to 150°C

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device can not be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Connection Diagram



Recommended Operating Conditions

Symbol	Parameter	DM7613			DM8613			Units
		Min	Nom	Max	Min	Nom	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High Level Input Voltage	2			2			V
V_{IL}	Low Level Input Voltage			0.8			0.8	V
I_{OH}	High Level Output Current			-0.8			-0.8	mA
I_{OL}	Low Level Output Current			16			16	mA
f_{CLK}	Clock Frequency	0		20	0		20	MHz
t_W	Pulse Width	Clock	24	16	24	16		ns
		Clear	27	18	27	18		
t_{SU}	Setup Time	D	24	16	24	16		ns
		G	30	21	30	21		
t_H	All Hold Time	0			0			ns
T_A	Free Air Operating Temperature	-55		125	0		70	°C

Electrical Characteristics over recommended operating free air temperature (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 1)	Max	Units
V_I	Input Clamp Voltage	$V_{CC} = \text{Min}, I_I = -12 \text{ mA}$			-1.5	V
V_{OH}	High Level Output Voltage	$V_{CC} = \text{Min}, I_{OH} = \text{Max}$ $V_{IL} = \text{Max}, V_{IH} = \text{Min}$	2.4			V
V_{OL}	Low Level Output Voltage	$V_{CC} = \text{Min}, I_{OL} = \text{Max}$ $V_{IH} = \text{Min}, V_{IL} = \text{Max}$			0.4	V
I_I	Input Current @ Max Input Voltage	$V_{CC} = \text{Max}, V_I = 5.5 \text{ V}$			1	mA
I_{IH}	High Level Input Current	$V_{CC} = \text{Max}, V_I = 2.4 \text{ V}$			40	μA
I_{IL}	Low Level Input Current	$V_{CC} = \text{Max}, V_I = 0.4 \text{ V}$			-1.6	mA
I_{OS}	Short Circuit Output Current	$V_{CC} = \text{Max}$ (Note 2)	DM76	-18	-55	mA
			DM86	-18	-55	
I_{CC}	Supply Current	$V_{CC} = \text{Max}$ (Note 3)		58	76	mA

Note 1: All typicals are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ \text{C}$.

Note 2: Not more than one output should be shorted at a time.

Note 3: I_{CC} is measured with CLEAR/CLOCK at 3V, all other inputs at 0V.

Switching Characteristics at $V_{CC} = 5V$ and $T_A = 25^\circ C$ (See Section 1 for Test Waveforms and Output Load)

Parameter	From (Input) To (Output)	$R_L = 400\Omega$ $C_L = 15\text{ pF}$			Units
		Min	Typ	Max	
f_{MAX} Maximum Clock Frequency		20	30		MHz
t_{PLH} Propagation Delay Time Low to High Level Output	Clock to Q		17	24	ns
t_{PHL} Propagation Delay Time High to Low Level Output	Clock to Q		22	33	ns
t_{PHL} Propagation Delay Time High to Low Level Output	Clear to Q		21	31	ns

Function Table

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D	G	CLR	Q_{n+1}
H	L	L	H
L	L	L	L
X	H	L	Q_n
X	X	H	L^*

* Asynchronous Transition
X = Don't Care

Logic Diagram
