

Recommended Operating Conditions

SYMBOL	PARAMETER		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	54	4.5	5	5.5	V
		74	4.75	5	5.25	
I_{OH}	High-level output current	54,74			-400	μ A
I_{OL}	Low-level output current	54			4	mA
		74			8	
f_{clock}	Clock frequency		0		25	MHz
t_w	Pulse Width	Clock High	18			ns
		Preset Low	15			
		Clear Low	15			
t_{SU}	Setup Time	Data High	30†			ns
		Data Low	20†			
t_H	Hold Time		0†			ns
T_A	Operating free-air temperature	54	-55		125	$^{\circ}$ C
		74	0		70	

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

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP (Note 1)	MAX	UNIT	
V_{IH}	High-level input voltage		2			V	
V_{IL}	Low-level input voltage		54		0.7	V	
			74		0.8		
V_{IK}	Input clamp voltage	$V_{CC} = \text{Min}, I_I = -18\text{mA}$			-1.5	V	
V_{OH}	High level output voltage	$V_{CC} = \text{Min}, V_{IL} = \text{Max}$	54	2.5	3.4	V	
		$I_{OH} = \text{Max}, V_{IH} = \text{Min}$	74	2.7	3.4		
V_{OL}	Low-level output voltage	$V_{CC} = \text{Min}$ $V_{IL} = \text{Max}$ $V_{IH} = \text{Min}$	$I_{OL} = 4\text{mA}$	54,74	0.25	0.4	V
			$I_{OL} = 8\text{mA}$	74	0.35	0.5	
I_I	Input current at maximum input voltage	$V_{CC} = \text{Max}$ $V_I = 7\text{V}$	J, \bar{K}		0.1	mA	
			Clock		0.1		
			Preset		0.2		
			Clear		0.2		
I_{IH}	High-level input current	$V_{CC} = \text{Max}$ $V_I = 2.7\text{V}$	J, \bar{K}		20	μ A	
			Clock		20		
			Preset		40		
			Clear		40		
I_{IL}	Low-level input current	$V_{CC} = \text{Max}$ $V_I = 0.4\text{V}$	J, \bar{K}		-0.4	mA	
			Clock		-0.4		
			Present		-0.8		
			Clear		-0.8		
I_{OS}	Short-circuit output current	$V_{CC} = \text{Max}$ (Note 2)	-20		-100	mA	
I_{CC}	Supply current	$V_{CC} = \text{Max}$ (Note 3)		4	8	mA	

Note 1: All typical values 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, and the duration should not exceed one second. For devices, with feedback from the outputs, where shorting the outputs to ground may cause the outputs to change logic state an equivalent test may be performed where $V_O = 2.25\text{V}$ and 2.125V for 54 and 74 series, respectively, with the minimum and maximum limits reduced by one half from their stated values.

This is very useful when using automatic test equipment.

Note 3: With all outputs open, I_{CC} is measured with the Q and \bar{Q} outputs high in turn. At the time of measurement the clock is grounded.

Switching Characteristics, $V_{CC} = 5V$, $T_A = 25^\circ C$

PARAMETER*	FROM (INPUT)	TO (OUTPUT)	TEST CONDITION	MIN	TYP	MAX	UNIT
f_{max}			$C_L = 15pF,$ $R_L = 2k\Omega$	25	33		MHz
t_{PLH}	Clock	Q or \bar{Q}		17	25		ns
t_{PHL}				22	30		ns
t_{PLH}	Clear	\bar{Q}		17	25		ns
t_{PHL}		Q		22	30		
t_{PLH}	Preset	Q		16	25		ns
t_{PHL}		\bar{Q}		22	30		

- * f_{max} = maximum clock frequency.
 t_{PLH} = propagation delay time, low-to-level output.
 t_{PHL} = propagation delay time, high-to-low-level output.