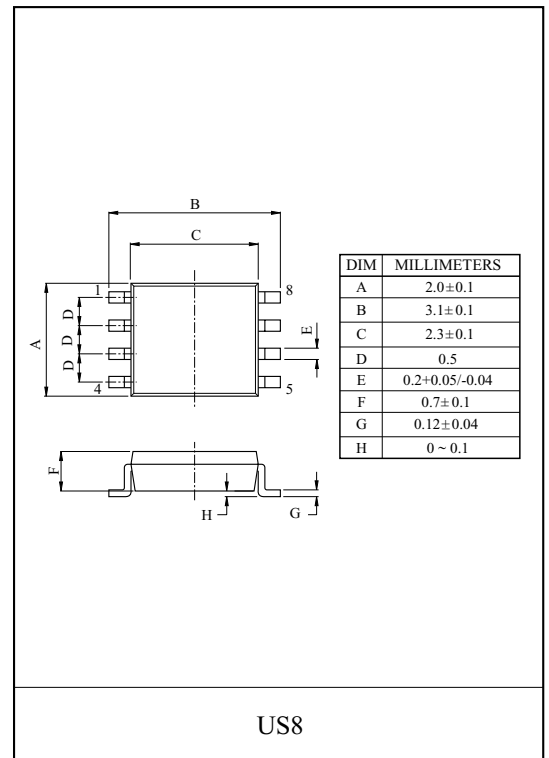
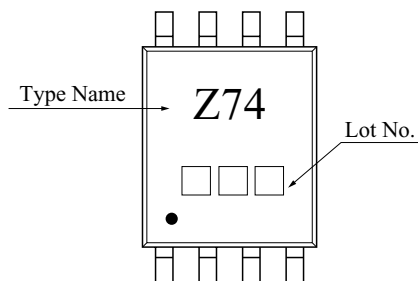


#### D-TYPE FLIP FLOP WITH PRESET AND CLEAR

#### FEATURES

- High output drive :  $\pm 24\text{mA}(\text{min.}) @ V_{CC}=3\text{V}$ .
- Super high speed operation :  $t_{pd} 2.8\text{ns}(\text{typ.}) @ V_{CC}=3\text{V}, 50\text{pF}$ .
- Operation voltage range :  $V_{CC(\text{opr})}=1.65\sim 5.5\text{V}$ .
- Latch-up performance :  $\pm 500\text{mA}$  or more
- ESD performance :  $\pm 200\text{V}$  or more (EIAJ)  
 $\pm 2000\text{V}$  or more (MIL)
- Power down protection is provided on all inputs and outputs.

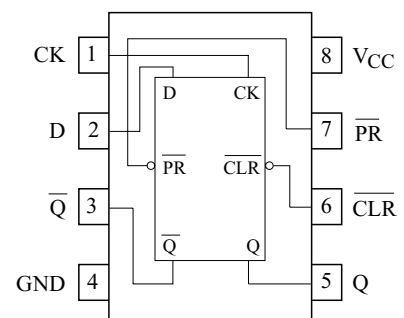
#### MARKING



#### MAXIMUM RATINGS (Ta=25 °C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	$V_{CC}$	-0.5~6	V
DC Input Voltage	$V_{IN}$	-0.5~6	V
DC Output Voltage	$V_{OUT}$	-0.5~6	V
Input Diode Current	$I_{IK}$	-20	mA
Output Diode Current	$I_{OK}$	-20	mA
DC Output Current	$I_{OUT}$	±50	mA
DC $V_{CC}$ /ground Current	$I_{CC}$	±50	mA
Power Dissipation	$P_D$	200	mW
Storage Temperature Range	$T_{stg}$	-65 ~ 150	°C
Lead Temperature (10s)	$T_L$	260	°C

#### PIN CONNECTION(TOP VIEW)

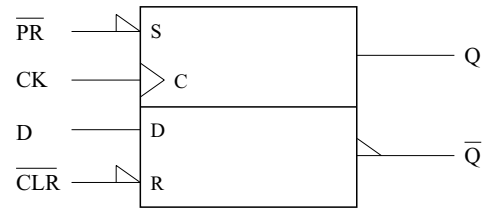


# KIC7WZ74FK

Truth Table

Inputs				Outputs		Function
$\overline{\text{CLR}}$	$\overline{\text{PR}}$	D	CK	Q	$\overline{\text{Q}}$	
L	H	X	X	L	H	Clear
H	L	X	X	H	L	Preset
L	L	X	X	H	H	-
H	H	L	$\downarrow$	L	H	-
H	H	H	$\downarrow$	H	L	-
H	H	X	$\uparrow$	Qn	Qn	No Change

Logic Diagram



Recommended Operating Conditions

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	$V_{CC}$	1.65~5.5	V
		1.5~5.5 (Note1)	
Input Voltage	$V_{IN}$	0~5.5	V
Output Voltage	$V_{OUT}$	0~5.5 (Note2)	V
		0~ $V_{CC}$ (Note3)	
Operating Temperature	$T_{opr}$	-40~85	$^{\circ}\text{C}$
Input Rise and Fall Time	$d_i/d_v$	0~20 ( $V_{CC}=1.8\text{V} \pm 0.15\text{V}$ , 2.5V $\pm 0.2\text{V}$ )	ns/V
		0~10 ( $V_{CC}=3.3\text{V} \pm 0.3\text{V}$ )	
		0~5 ( $V_{CC}=5.5\text{V} \pm 0.5\text{V}$ )	

Note1 : Data retention only.

Note2 :  $V_{CC}=0\text{V}$ .

Note3 : High or low

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## ELECTRICAL CHARACTERISTICS

### DC Characteristics

CHARACTERISTIC		SYMBOL	TEST CONDITION		Ta=25 °C			Ta=-40~85 °C		UNIT	
					V <sub>CC</sub> (V)	MIN.	TYP.	MAX.	MIN.		MAX.
Input Voltage	High Level	V <sub>IH</sub>	-	1.65~1.8	0.75 × V <sub>CC</sub>	-	-	0.75 × V <sub>CC</sub>	-	V	
				2.3~5.5	0.7 × V <sub>CC</sub>	-	-	0.7 × V <sub>CC</sub>	-		
	Low Level	V <sub>IL</sub>	-	1.65~1.95	-	-	0.25 × V <sub>CC</sub>	-	0.25 × V <sub>CC</sub>		
				2.3~5.5	-	-	0.3 × V <sub>CC</sub>	-	0.3 × V <sub>CC</sub>		
Output Voltage	High Level	V <sub>OH</sub>	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> =-100 μA	1.65	1.55	1.65	-	1.55	-	V
					2.3	2.2	2.3	-	2.2	-	
					3.0	2.9	3.0	-	2.9	-	
					4.5	4.4	4.5	-	4.4	-	
				I <sub>OH</sub> =-4mA	1.65	1.29	1.52	-	1.29	-	
					2.3	1.9	2.15	-	1.9	-	
					3.0	2.4	2.8	-	2.4	-	
					4.5	3.8	4.2	-	3.8	-	
	Low Level	V <sub>OL</sub>	V <sub>IN</sub> =V <sub>IL</sub>	I <sub>OH</sub> =100 μA	1.8	-	0	0.1	-	0.1	V
					2.3	-	0	0.1	-	0.1	
					3.0	-	0	0.1	-	0.1	
					4.5	-	0	0.1	-	0.1	
				I <sub>OH</sub> =4mA	1.65	-	0.08	0.24	-	0.24	
					2.3	-	0.1	0.3	-	0.3	
					3.0	-	0.15	0.4	-	0.4	
					4.5	-	0.22	0.55	-	0.55	
I <sub>OH</sub> =32mA	3.0	-	0.22	0.55	-	0.55					
	4.5	-	0.22	0.55	-	0.55					
	Input Leakage Current		I <sub>IN</sub>	V <sub>IN</sub> =5.5V or GND	0~5.5	-	-	±1	-	±10	μA
	Power Off Leakage Current		I <sub>OFF</sub>	V <sub>IN</sub> or V <sub>OUT</sub> =5.5V	0.0	-	-	1	-	10	μA
Quiescent Supply Current		I <sub>CC</sub>	V <sub>IN</sub> =5.5V or GND	1.65~5.5	-	-	1	-	10	μA	

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AC Characteristics (unless otherwise specified, Input :  $t_r=t_f=3ns$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION		Ta=25 °C			Ta=-40~85 °C		UNIT
			V <sub>CC</sub> (V)	MIN.	TYP.	MAX.	MIN.	MAX.	
Maximum Clock Frequency	f <sub>MAX</sub>	C <sub>L</sub> =50pF, R <sub>L</sub> =500 Ω	1.8 ± 0.15	51	-	-	38	-	MHz
			2.5 ± 0.2	130	-	-	100	-	
			3.3 ± 0.3	200	-	-	150	-	
			5.0 ± 0.5	200	-	-	180	-	
Propagation Delay Time (CK-Q, $\bar{Q}$ )	t <sub>PLH</sub> t <sub>PHL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1M Ω	1.8 ± 0.15	2.5	10.0	18.0	2.1	23.0	ns
			2.5 ± 0.2	2.0	4.9	7.5	1.7	9.0	
			3.3 ± 0.3	1.5	3.3	4.8	1.3	5.6	
			5.0 ± 0.5	1.0	2.4	3.5	1.0	3.9	
		C <sub>L</sub> =50pF, R <sub>L</sub> =500 Ω	3.3 ± 0.3	2.0	4.3	5.7	1.5	7.0	
			5.0 ± 0.5	1.5	2.8	4.0	1.3	4.4	
Propagation Delay Time ( $\overline{CLR}$ , $\overline{PR}$ , -Q, $\bar{Q}$ )	t <sub>PLH</sub> t <sub>PHL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1M Ω	1.8 ± 0.15	2.5	10.0	17.0	2.1	21.0	ns
			2.5 ± 0.2	2.0	5.0	7.3	1.7	8.8	
			3.3 ± 0.3	1.5	3.4	4.8	1.3	5.6	
			5.0 ± 0.5	1.5	2.2	3.5	1.0	3.9	
		C <sub>L</sub> =50pF, R <sub>L</sub> =500 Ω	3.3 ± 0.3	2.0	4.3	5.7	1.5	7.0	
			5.0 ± 0.5	1.0	3.1	3.9	1.0	4.3	
Minimum Setup Time	t <sub>s</sub>	C <sub>L</sub> =50pF, R <sub>L</sub> =500 Ω	2.5 ± 0.2	3.4	-	-	4.1	-	ns
			3.3 ± 0.3	2.1	-	-	2.5	-	
			5.0 ± 0.5	1.5	-	-	1.7	-	
Minimum Hold Time	t <sub>h</sub>	C <sub>L</sub> =50pF, R <sub>L</sub> =500 Ω	2.5 ± 0.2	2.4	-	-	2.9	-	ns
			3.3 ± 0.3	1.4	-	-	1.5	-	
			5.0 ± 0.5	1.0	-	-	1.1	-	
Minimum Pulse Width (CK)	t <sub>w</sub> (L) t <sub>w</sub> (H)	C <sub>L</sub> =50pF, R <sub>L</sub> =500 Ω	2.5 ± 0.2	3.0	-	-	3.6	-	ns
			3.3 ± 0.3	3.0	-	-	3.3	-	
			5.0 ± 0.5	3.0	-	-	3.2	-	
Minimum Pulse Width ( $\overline{CLR}$ , $\overline{PR}$ )	t <sub>w</sub> (L)	C <sub>L</sub> =50pF, R <sub>L</sub> =500 Ω	2.5 ± 0.2	3.0	-	-	3.6	-	ns
			3.3 ± 0.3	3.0	-	-	3.3	-	
			5.0 ± 0.5	3.0	-	-	3.2	-	
Minimum Removal Time	t <sub>rem</sub>	C <sub>L</sub> =50pF, R <sub>L</sub> =500 Ω	2.5 ± 0.2	3.6	-	-	4.4	-	ns
			3.3 ± 0.3	2.2	-	-	2.5	-	
			5.0 ± 0.5	1.3	-	-	1.4	-	
Input Capacitance	C <sub>IN</sub>	-	0~0.5	-	3.0	-	-	-	pF
Output Capacitance	C <sub>OUT</sub>	-	0~0.5	-	5.0	-	-	-	pF
Power Dissipation Capacitance	C <sub>PD</sub>	(Note 4)	3.3	-	30	-	-	-	pF
			5.5	-	47	-	-	-	

Note 4 : C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation :  $I_{CC(opr)}=C_{PD} \cdot V_{CC} \cdot f_{IN}+I_{CC}$