

BILATERAL SWITCH

The KIC7S66FU is a high speed C²MOS BILATERAL SWITCH fabricated with silicon gate C²MOS technology. It consists of a high speed switch capable of controlling either digital or analog signals while maintaining the C²MOS low power dissipation.

Control input (C) is provided to control the switch.

The switch turns ON while the C input is high, and the switch turns OFF while low.

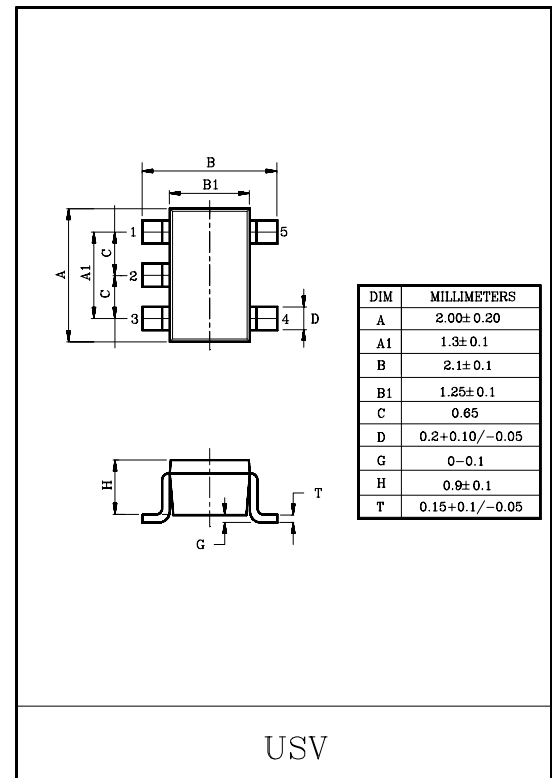
Input is equipped with protection circuits against static discharge or transient excess voltage.

FEATURES

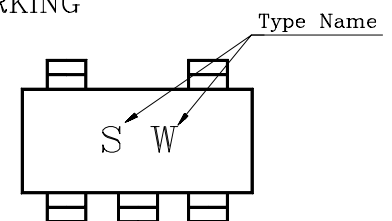
- High Speed : $t_{pd}=7\text{ns(Typ.)}$ at $V_{CC}=5\text{V}$.
- Low Power Dissipation : $I_{CC}=1\mu\text{A(Max.)}$ at $T_a=25^\circ\text{C}$.
- High Noise Immunity : $V_{NIH}=V_{NIL}=28\% V_{CC(\text{Min.})}$.
- Low ON Resistance : $R_{ON}=100\Omega(\text{Typ.})$ at $V_{CC}=9\text{V}$.
- Low T.H.D : $\text{THD}=0.05\%(\text{Typ.})$ at $V_{CC}=5\text{V}$.

MAXIMUM RATINGS

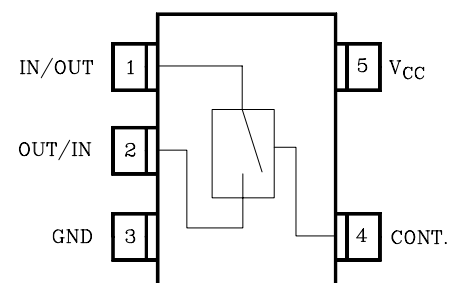
CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	V_{CC}	-0.5~10	V
Control Input Voltage	V_{IN}	-0.5~ $V_{CC}+0.5$	V
Switch I/O Voltage	$V_{I/O}$	-0.5~ $V_{CC}+0.5$	V
Control Diode Current	I_{CK}	± 20	mA
Output Diode Current	I_{OK}	± 20	mA
Through I/O Current	I_T	± 12.5	mA
DC V_{CC} /Ground Current	I_{CC}	± 25	mA
Power Dissipation	P_D	200	mW
Storage Temperature	T_{stg}	-65~150	$^\circ\text{C}$
Lead Temperature (10s)	T_L	260	$^\circ\text{C}$



MARKING



PIN CONNECTION(TOP VIEW)



KIC7S66FU

LOGIC DIAGRAM



TRUTH TABLE

CONTROL	SWITCH FUNCTION
H	ON
L	OFF

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	2~9	V
Control Input Voltage	V_{IN}	0~ V_{CC}	V
Switch I/O Voltage	$V_{I/O}$	0~ V_{CC}	V
Operating Temperature	T_{opr}	-40~85	°C
Input Rise and Fall Time	t_r, t_f	0~1000 ($V_{CC}=2.0V$) 0~ 500 ($V_{CC}=4.5V$) 0~ 400 ($V_{CC}=6.0V$) 0~ 250 ($V_{CC}=9.0V$)	ns

DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	V_{CC}	$T_a=25^{\circ}C$			$T_a=-40\sim 85^{\circ}C$		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Control Input Voltage	V_{IHC}	-	2.0 4.5 9.0	1.5 3.15 6.3	- - -	- - -	1.5 3.15 6.3	- - -	V
Low-Level Control Input Voltage	V_{ILC}	-	2.0 4.5 9.0	- - -	- - -	0.5 1.35 2.7	- - -	0.5 1.35 2.7	V
ON Resistance	R_{ON}	$V_{IN}=V_{IHC}$ $V_{I/O}=V_{CC}$ to GND $V_{I/O}\leq 1mA$	4.5	-	192	340	-	400	Ω
			9.0	-	110	170	-	200	
		$V_{IN}=V_{IHC}$ $V_{I/O}=V_{CC}$ to GND $V_{I/O}\leq 1mA$	2.0	-	320	-	-	-	
			4.5	-	140	200	-	260	
			9.0	-	100	150	-	190	
Input/Output Leakage Current (SWITCH OFF)	I_{OFF}	$V_{OS}=V_{CC}$ or GND $V_{IS}=GND$ or V_{CC} $V_{IN}=V_{ILC}$	9.0	-	-	± 100	-	± 1000	nA

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DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION		Ta=25℃			Ta=-40~85℃		UNIT
			V _{CC}	MIN.	TYP.	MAX.	MIN.	MAX.	
Switch Input Leakage Current (SW ON, Output OPEN)	I _{IZ}	V _{OS} =V _{CC} or GND V _{IN} =V _{IHC}	9.0	-	-	±100	-	±1000	nA
Control Input Current	I _{IN}	V _{IN} =V _{CC} or GND	9.0	-	-	±100	-	±1000	
Quiscent Device Current	I _{CC}	V _{IN} =V _{CC} or GND	6.0 9.0	- -	-	1.0 4.0	- -	10.0 40.0	μA

AC ELECTRICAL CHARACTERISTICS (C_L=50pF, Input t_r=t_f=6ns)

CHARACTERISTIC	SYMBOL	TEST CONDITION		Ta=25℃			Ta=-40~85℃		UNIT
			V _{CC}	MIN.	TYP.	MAX.	MIN.	MAX.	
Phase difference between input and output	φ _{I-O}	-	2.0 4.5 9.0	- - -	20 7 4	75 15 12	- - -	100 20 15	ns
Output Enable Time	t _{PZL} t _{PZH}	R _L =1kΩ	2.0 4.5 9.0	- - -	20 13 9	150 30 18	- - -	190 38 33	ns
Output Disable Time	t _{PLZ} t _{PHZ}	R _L =1kΩ	2.0 4.5 9.0	- - -	40 11 10	170 35 30	- - -	220 44 38	ns
Maximum Control Input Frequency	-	R _L =1kΩ C _L =15pF V _{OUT} =1/2 V _{CC}	2.0 4.5 9.0	- - -	30 30 30	- - -	- - -	- - -	MHz
Control Input Capacitance	C _{IN}	-	-	-	5	10	-	10	pF
Switch Terminal Capacitance	C _{I/O}	-	-	-	6	-	-	-	
Feedthrough Capacitance	C _{IOS}	-	-	-	0.5	-	-	-	
Power Dissipation Capacitance	C _{PD}	(Note 1)	-	-	15	-	-	-	

Note 1 : C_{PD} defined as the value of internal equivalent capacitance which is calculated from the operating current consumption without load
Average operating current can be obtained by the equation

$$: I_{CC(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

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ANALOG SWITCH CHARACTERISTICS (GND=0V, Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION		TYP.	UNIT
			V _{CC}		
Total Harmonic Distortion (T.H.D)	–	f _{IN} =1kHz, V _{IN} =4V _{PP} (V _{CC} =4.5V) R _L =10kΩ, V _{IN} =8V _{PP} (V _{CC} =9.0V) C _L =50pF	4.5 9.0	0.05 0.04	%
Maximum Propagation Frequency (SWITCH ON)	f _{MAX}	Adjust f _{IN} voltage to obtain 0dBm at V _{OS} Increase f _{IN} frequency until dB Meter reads -3dB. R _L =50Ω, C _L =10pF, f _{IN} =1MHz, Sine Wave	4.5 9.0	200 200	MHz
Feedthrough (SWITCH ON)	–	V _{in} is ceintered at V _{CC} /2 Adjust input for 0dBm R _L =600Ω, C _L =50pF, f _{IN} =1MHz, Sine Wave	4.5 9.0	-60 -60	dB
Crosstalk (CONTROL SWITCH)	–	R _L =600Ω, C _L =50pF, IN=1MHz, PULSE (t _r =t _f =6ns)	4.5 9.0	60 100	mV

Note : These Characteristics are determined by design of devices.