

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.

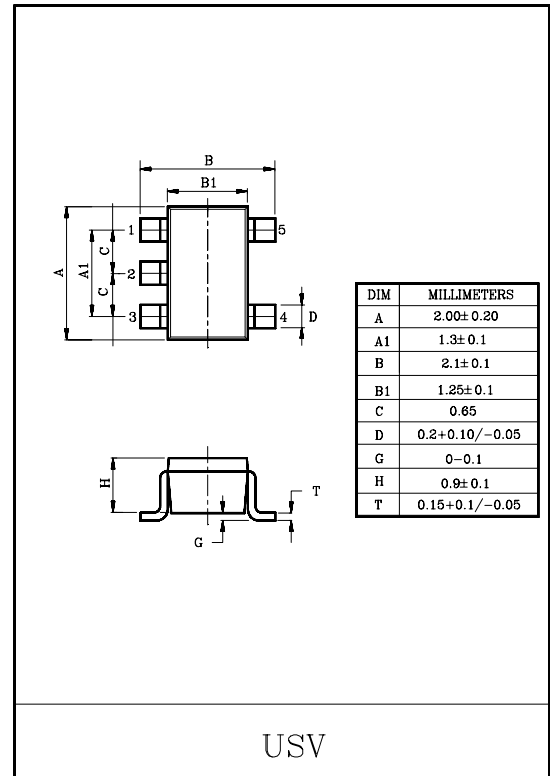
Input is equipped with protection circuits against static discharge or transient excess voltage.

FEATURES

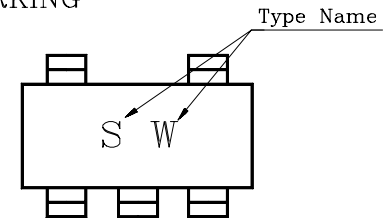
- High Speed : $t_{pd}=7ns$ (Typ.) at $V_{CC}=5V$.
- Low Power Dissipation : $I_{CC}=1\mu A$ (Max.) at $T_a=25^\circ C$.
- High Noise Immunity : $V_{NIH}=V_{NIL}=28\% V_{CC}(\text{Min.})$.
- Low ON Resistance : $R_{ON}=100\Omega$ (Typ.) at $V_{CC}=9V$.
- Low T.H.D : $THD=0.05\%$ (Typ.) at $V_{CC}=5V$.

MAXIMUM RATINGS

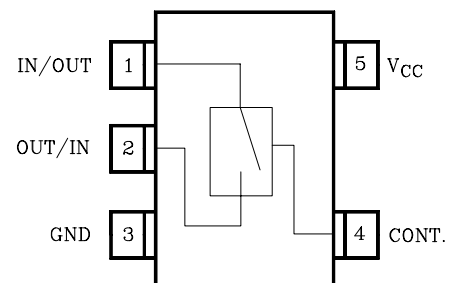
CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	V_{CC}	-0.5~10	V
Control Input Voltage	V_{IN}	-0.5~ $V_{CC}+0.5$	V
Switch I/O Voltage	$V_{I/O}$	-0.5~ $V_{CC}+0.5$	V
Control Diode Current	I_{CK}	± 20	mA
Output Diode Current	I_{OK}	± 20	mA
Through I/O Current	I_T	± 12.5	mA
DC V_{CC} /Ground Current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



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	$T_a=25^\circ\text{C}$				$T_a=-40\sim 85^\circ\text{C}$		UNIT
			V_{CC}	MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Control Input Voltage	V_{IHC}	-	2.0	1.5	-	-	1.5	-	V
			4.5	3.15	-	-	3.15	-	
			9.0	6.3	-	-	6.3	-	
Low-Level Control Input Voltage	V_{ILC}	-	2.0	-	-	0.5	-	0.5	V
			4.5	-	-	1.35	-	1.35	
			9.0	-	-	2.7	-	2.7	
ON Resistance	R_{ON}	$V_{IN}=V_{IHC}$ $V_{I/O}=V_{CC}$ to GND $V_{I/O}\leq 1\text{mA}$	4.5	-	192	340	-	400	Ω
			9.0	-	110	170	-	200	
			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	

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DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	V _{CC}	Ta=25°C			Ta=-40~85°C		UNIT
				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	
Quiescent Device Current	I _{CC}	V _{IN} =V _{CC} or GND	6.0	-	-	1.0	-	10.0	μA
			9.0	-	-	4.0	-	40.0	

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

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

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

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	V _{CC}	TYP.	UNIT
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.