

## INVERTER

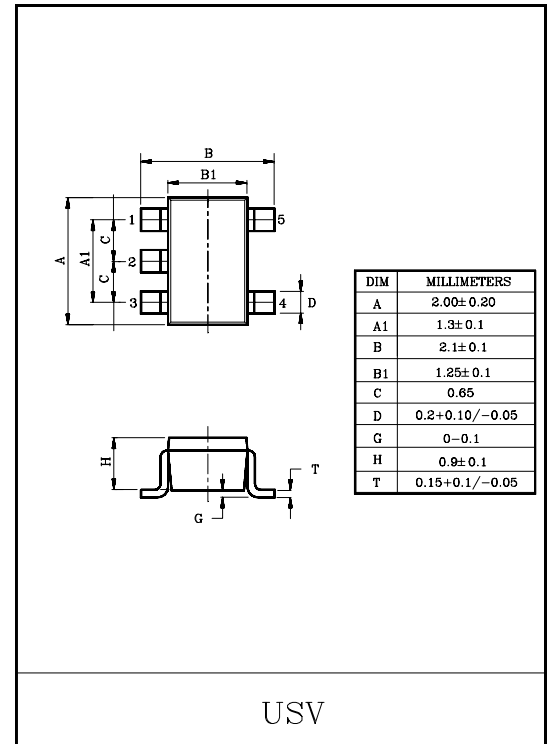
The KIC7S04FU is a high speed C<sup>2</sup>MOS INVERTER fabricated with silicon gate C<sup>2</sup>MOS technology. It achieves high speed operation similar to equivalent LSTTL while maintaining the C<sup>2</sup>MOS low power dissipation. The internal circuit is composed of 3 stages including buffer output, which enables high noise immunity and stable output. The inputs is equipped with protection circuits against static discharge or transient excess voltage.

## FEATURES

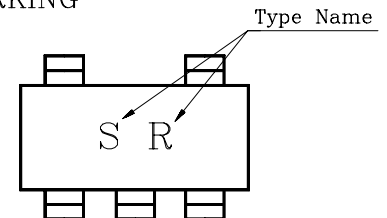
- High Speed :  $t_{pd}=7ns$ (Typ.) at  $V_{CC}=5V$ .
- Low Power Dissipation :  $I_{CC}=1\mu A$ (Max.) at  $T_a=25^\circ C$ .
- High Noise Immunity :  $V_{NIH}=V_{NIL}=28\% V_{CC}$ (Min.).
- Output Drive Capability : 5 LSTTL Loads.
- Symmetrical Output Impedance :  $|I_{OH}|=I_{OL}=2mA$ (Min.)
- Balanced Propagation Delays :  $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range :  $V_{CC(opr)}=2\sim 6V$ .

## MAXIMUM RATINGS

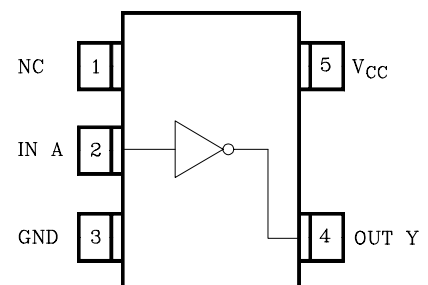
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage Range	$V_{CC}$	-0.5~7	V
DC Input Voltage	$V_{IN}$	-0.5~ $V_{CC}+0.5$	V
DC Output Voltage	$V_{OUT}$	-0.5~ $V_{CC}+0.5$	V
Input Diode Current	$I_{IK}$	$\pm 20$	mA
Output Diode Current	$I_{OK}$	$\pm 20$	mA
DC Output Current	$I_{OUT}$	$\pm 12.5$	mA
DC $V_{CC}$ /Ground Current	$I_{CC}$	$\pm 25$	mA
Power Dissipation	$P_D$	200	mW
Storage Temperature	$T_{stg}$	-65~150	$^\circ C$
Lead Temperature (10s)	$T_L$	260	$^\circ C$



## MARKING

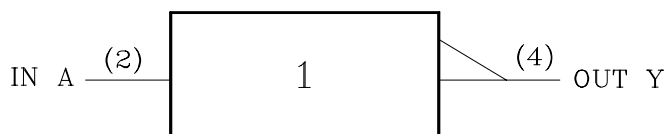


## PIN CONNECTION(TOP VIEW)



# KIC7S04FU

## CIRCUIT DIAGRAM



## RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	$V_{CC}$	2~6	V
Input Voltage	$V_{IN}$	0~ $V_{CC}$	V
Output Voltage	$V_{OUT}$	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 ( $V_{CC}=6.0V$ )	ns

## DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	$T_a=25^\circ C$			$T_a=-40\sim 85^\circ C$		UNIT		
			$V_{CC}$	MIN.	TYP.	MAX.	MIN.		MAX.	
High-Level Input Voltage	$V_{IH}$	-	2.0	1.5	-	-	1.5	-	V	
			4.5	3.15	-	-	3.15	-		
			6.0	4.2	-	-	4.2	-		
Low-Level Input Voltage	$V_{IL}$	-	2.0	-	-	0.5	-	0.5	V	
			4.5	-	-	1.35	-	1.35		
			6.0	-	-	1.8	-	1.8		
High-Level Output Voltage	$V_{OH}$	$V_{IN}=V_{IL}$	$I_{OH}=-20\mu A$	2.0	1.9	2.0	-	1.9	-	V
			$I_{OH}=-2mA$	4.5	4.4	4.5	-	4.4	-	
			$I_{OH}=-2.6mA$	6.0	5.9	6.0	-	5.9	-	
Low-Level Output Voltage	$V_{OL}$	$V_{IN}=V_{IH}$	$I_{OL}=20\mu A$	2.0	-	0.0	0.1	-	0.1	V
			$I_{OL}=2mA$	4.5	-	0.0	0.1	-	0.1	
			$I_{OL}=2.6mA$	6.0	-	0.0	0.1	-	0.1	
Input Leakage Current	$I_{IN}$	$V_{IN}=V_{CC}$ or GND	6.0	-	-	$\pm 0.1$	-	$\pm 1.0$	$\mu A$	
Quiescent Supply Current	$I_{CC}$	$V_{IN}=V_{CC}$ or GND	6.0	-	-	1.0	-	10.0		

# KIC7S04FU

AC ELECTRICAL CHARACTERISTICS ( $C_L=15\text{pF}$ , Input  $t_r=t_f=6\text{ns}$ ,  $V_{CC}=5\text{V}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	Ta=25°C			UNIT
			MIN.	TYP.	MAX.	
Output Transition Time	$t_{TLH}$ $t_{THL}$	-	-	5	10	ns
Propagation Delay Time	$t_{pLH}$ $t_{pHL}$	-	-	7	15	ns

AC ELECTRICAL CHARACTERISTICS ( $C_L=50\text{pF}$ , Input  $t_r=t_f=6\text{ns}$ )

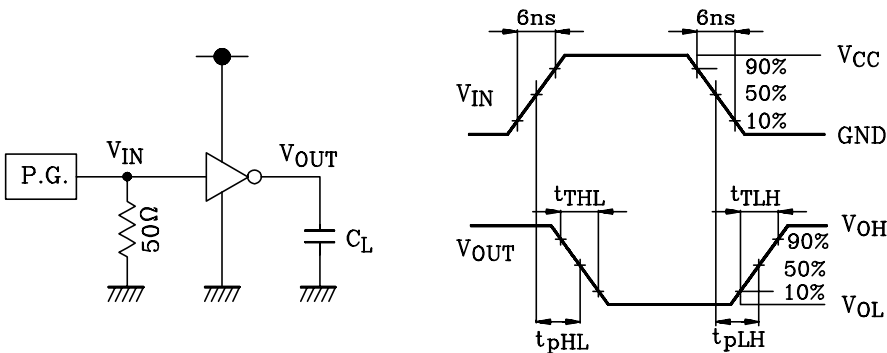
CHARACTERISTIC	SYMBOL	TEST CONDITION	$V_{CC}$	Ta=25°C			Ta=-40~85°C		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	
Output Transition Time	$t_{TLH}$ $t_{THL}$	-	2.0	-	50	125	-	155	ns
			4.5	-	14	25	-	31	
			6.0	-	12	21	-	26	
Propagation Delay Time	$t_{pLH}$ $t_{pHL}$	-	2.0	-	48	100	-	125	ns
			4.5	-	12	20	-	25	
			6.0	-	9	17	-	21	
Input Capacitance	$C_{IN}$	-	-	5	10	-	10	pF	
Power Dissipation Capacitance	$C_{PD}$	(Note 1)	-	10	-	-	-		

Note 1 :  $C_{PD}$  defined as the value of internal equivalent capacitance of IC which is calculated from the operating current consumption without load (refer to Test Circuit.)

Average operating current can be obtained by the equation hereunder.

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

## SWITCHING CHARACTERISTICS TEST CIRCUIT



## $I_{CC(\text{opr})}$ TEST CIRCUIT

