



U74HCT1G66

CMOS IC

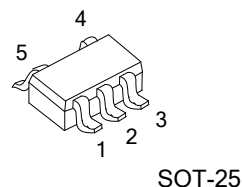
BILATERAL SWITCH

DESCRIPTION

The **U74HCT1G66** is a high-speed Si-gate CMOS device that provides an analog switch. The switch has two input/output pins(Y and Z) and an active high enable input pin (E). When pin E is low, the analog switch is turned off.

FEATURES

- * Operation voltage range: 2V~9V
- * Very low ON-resistance
- * Low power dissipation
- * Very small 5 pins package

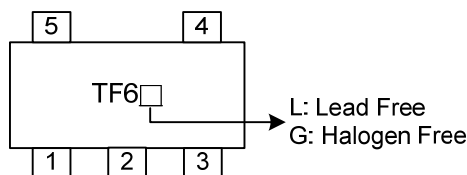


ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HCT1G66L-AF5-R	U74HCT1G66G-AF5-R	SOT-25	Tape Reel

U74HCT1G66L-AF5-R	(1)Packing Type (2)Package Type (3)Lead Free	(1) R: Tape Reel (2) AF5: SOT-25 (3) G: Halogen Free, L: Lead Free
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MARKING



INPUT(EN)	OUTPUT(Y/Z)
H	ON
L	OFF

The circuit diagram shows a 2-to-1 multiplexer. It consists of two inverters at the top. The input E is connected to the first inverter. The output of the first inverter is connected to the input of the second inverter and also to the input of a CMOS network. The output of the second inverter is labeled Y . The CMOS network is connected between V_{DD} and Z . It contains two PMOS transistors in parallel: the left one has its gate connected to the output of the first inverter, and the right one has its gate connected to the output of the second inverter. There are two NMOS transistors in series: the left one has its gate connected to the output of the first inverter, and the right one has its gate connected to the output of the second inverter. The output of the CMOS network is Z . The input E is also connected to the gates of both NMOS transistors. The output Y is connected to the gates of both PMOS transistors. The input Z is connected to the gates of both NMOS transistors. The output E is connected to the gates of both PMOS transistors. The input V_{DD} is connected to the sources of both PMOS transistors. The input GND is connected to the sources of both NMOS transistors.

■ ABSOLUTE MAXIMUM RATINGS (unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5~11	V
V_{CC} or GND Current	I_{CC}	± 50	mA
Input Clamp Current	I_{IK}	± 20	mA
Switch Diode Current	I_{SK}	± 20	mA
Switch Current	I_S	± 25	mA
Power Dissipation	P_D	200	mW
Derate above $T_A > 55^\circ\text{C}$		2.5	mW/K
Operating Temperature	T_{OPR}	-40 ~ + 125	$^\circ\text{C}$
Storage Temperature	T_{STG}	-65 ~ +150	$^\circ\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		4.5	5.0	5.5	V
Input Voltage	V_{IN}		GND		V_{CC}	V
Switch voltage	V_S		GND		V_{CC}	V
Input Transition Rise or Fall Rate	t_R, t_F	$V_{CC}=2.0\text{V}$				ns
		$V_{CC}=4.5\text{V}$		6	500	
		$V_{CC}=6.0\text{V}$				
		$V_{CC}=10.0\text{V}$				

■ STATIC CHARACTERISTICS ($T_A=25^\circ\text{C}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	$V_{CC}=4.5\text{V}\sim 5.5\text{V}$	2.0			V
Low-Level Input Voltage	V_{IL}	$V_{CC}=4.5\text{V}\sim 5.5\text{V}$			0.8	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=5.5\text{V}, V_{IN}=V_{CC}$ or GND		0.1	1.0	μA
Quiescent Supply Current	I_Q	$V_{CC}=4.5\text{V}\sim 5.5\text{V}, V_{IN}=V_{CC}$ or GND, $V_{IS}=\text{GND}$ or $V_{CC}, V_{OS}=V_{CC}$ or GND		1	10	μA
Additional supply current per input	ΔI_Q	$V_{CC}=4.5$ to $5.5\text{V}, V_{IN}=V_{CC}-2.1\text{V}$			500	μA
Analog Switch Current	OFF-state	$V_{CC}=5.5, V_{IN}=V_{IH}$ or $V_{IL};$ $ V_S =V_{CC}-\text{GND}$		0.1	1	μA
	ON-state			0.1	1	
ON-Resistance	PEAK	$R_{ON(PEAK)}$ $V_{CC}=4.5\text{V}, I_S=1\text{mA}, V_{IS}=V_{CC}$ to GND; $V_{IN}=V_{IH}$ or $V_{IL};$		42	118	Ω
	RAIL	$R_{ON(RAIL)}$ $V_{CC}=4.5\text{V}, I_S=1\text{mA}, V_{IS}=\text{GND};$ $V_{IN}=V_{IH}$ or $V_{IL};$		29	95	
		$V_{CC}=4.5\text{V}, I_S=1\text{mA}, V_{IS}=V_{CC};$ $V_{IN}=V_{IH}$ or $V_{IL};$		35	106	

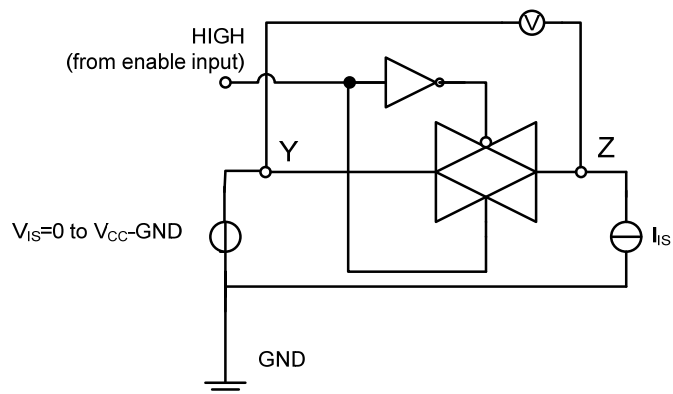
■ DYNAMIC CHARACTERISTICS ($T_A=25^\circ\text{C}, C_L=50\text{pF}$, Input: $t_R=t_F=6\text{ns}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note)	MAX	UNIT
Propagation Delay V_{IS} to V_{OS}	t_{PHL}/t_{PLH}	$V_{CC}=4.5\text{V}, R_L=\infty$		3	15	ns
Turn-ON Time E to V_{OS}	t_{PZH}/t_{PZL}	$V_{CC}=4.5\text{V}, R_L=1\text{K}\Omega$		15	30	ns
Turn-OFF Time E to V_{OS}	t_{PHZ}/t_{PLZ}	$V_{CC}=4.5\text{V}, R_L=1\text{K}\Omega$		13	44	ns

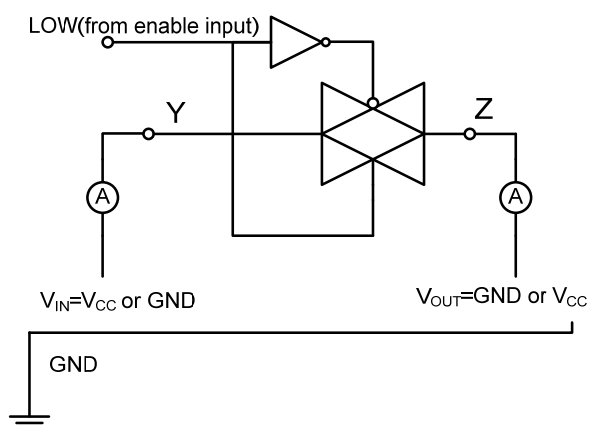
Note : All typical values are measured at $T_A=25^\circ\text{C}$

■ TEST CIRCUIT AND WAVEFORMS

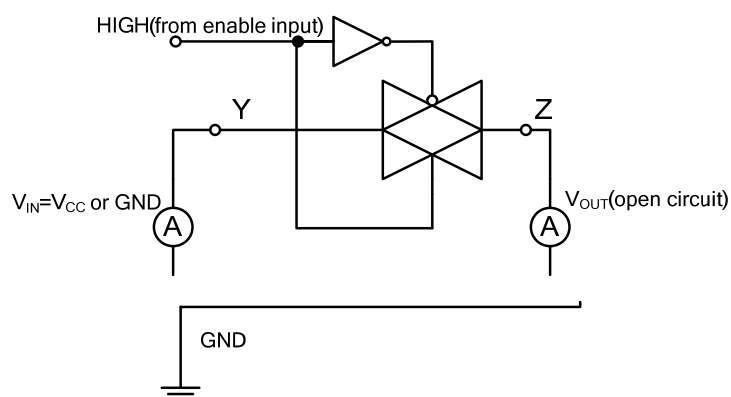
Test circuit for measuring ON-resistance (R_{on})



Test circuit for measuring OFF-state current

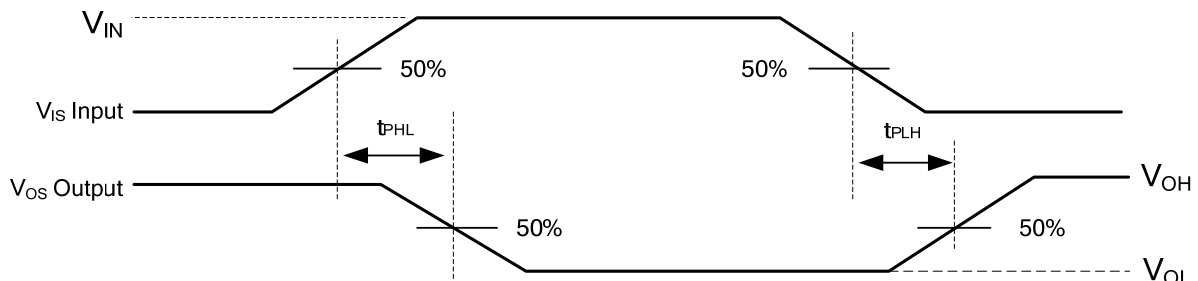


Test circuit for measuring ON-state current

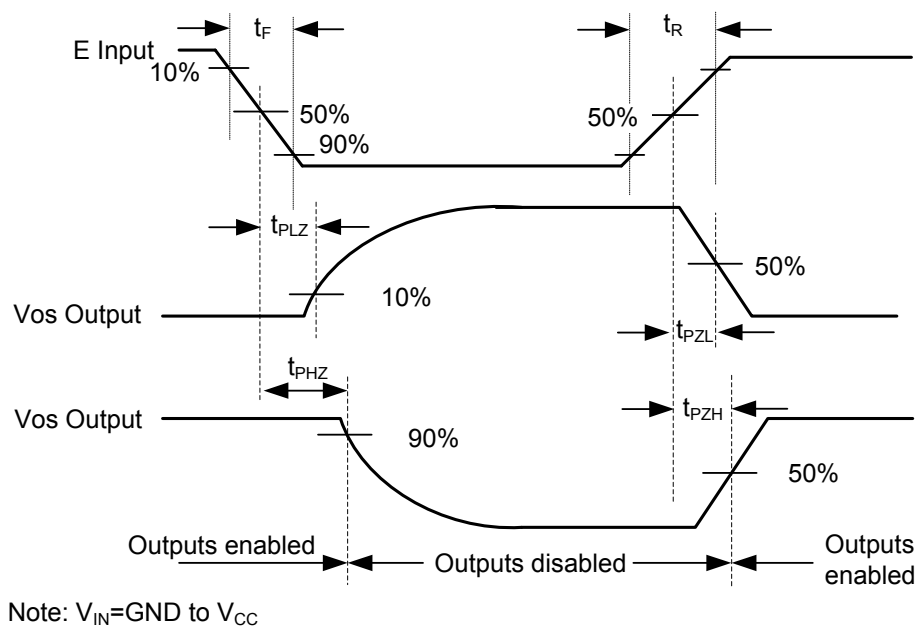


■ TEST CIRCUIT AND WAVEFORMS(Cont.)

Waveforms showing the Input (V_{IS}) to Output (V_{OS}) propagation delays



Waveforms showing the turn-on and turn-off times.



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