



## U74HC1G66

CMOS IC

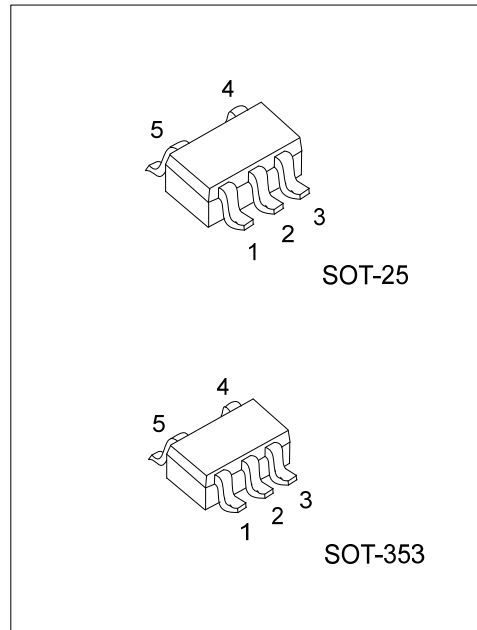
### BILATERAL SWITCH

#### DESCRIPTION

The UTC **U74HC1G66** 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

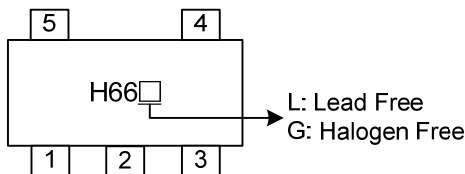


#### ORDERING INFORMATION

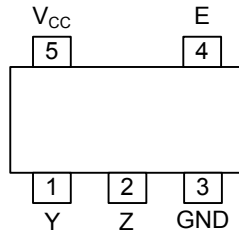
Order Number		Package	Packing
Lead Free	Halogen Free		
U74HC1G66L-AF5-R	U74HC1G66G-AF5-R	SOT-25	Tape Reel
U74HC1G66L-AL5-R	U74HC1G66G-AL5-R	SOT-353	Tape Reel

<p>U74HC1G66G-AF5-R</p>	<p>(1) R: Tape Reel  (2) AF5: SOT-25, AL5: SOT-353  (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



## ■ PIN CONFIGURATION

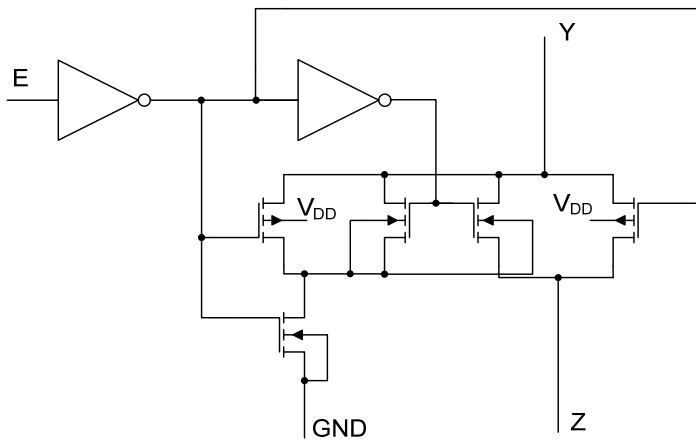


## ■ FUNCTION TABLE

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

Note: H: HIGH voltage level; L: LOW voltage level.

## ■ LOGIC DIAGRAM



■ 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	°C
Storage Temperature	$T_{STG}$	-65 ~ +150	°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	$V_{CC}$		2.0	5.0	10.0	V
Input Voltage	$V_{IN}$		GND		$V_{CC}$	V
Switch voltage	$V_S$		GND		$V_{CC}$	V
Input Transition Rise or Fall Rate	$t_R, t_F$	$V_{CC}=2.0\text{V}$			1000	ns
		$V_{CC}=4.5\text{V}$		6	500	ns
		$V_{CC}=6.0\text{V}$			400	ns
		$V_{CC}=10.0\text{V}$			250	ns

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	$V_{IH}$	$V_{CC}=2\text{V}$	1.5			V
		$V_{CC}=4.5\text{V}$	3.15			V
		$V_{CC}=6\text{V}$	4.2			V
		$V_{CC}=9\text{V}$	6.3			V
Low-Level Input Voltage	$V_{IL}$	$V_{CC}=2\text{V}$			0.5	V
		$V_{CC}=4.5\text{V}$			1.35	V
		$V_{CC}=6\text{V}$			1.8	V
		$V_{CC}=9\text{V}$			2.7	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=6\text{V}, V_{IN}=V_{CC}$ or GND		0.1	1	μA
		$V_{CC}=10\text{V}, V_{IN}=V_{CC}$ or GND		0.2	2	μA
Quiescent Supply Current	$I_Q$	$V_{CC}=6\text{V}, V_{IN}=V_{CC}$ or GND, $V_{IS}=\text{GND}$ or $V_{CC}, V_{OS}=V_{CC}$ or GND		1	10	μA
		$V_{CC}=10\text{V}, V_{IN}=V_{CC}$ or GND, $V_{IS}=\text{GND}$ or $V_{CC}, V_{OS}=V_{CC}$ or GND		2	20	μA
Analog Switch Current	OFF-state	$I_S$	$V_{CC}=10\text{V}, V_{IN}=V_{IH}$ or $V_{IL};  V_S =V_{CC}-\text{GND}$	0.1	1	μA
	ON-state		$V_{CC}=10\text{V}, V_{IN}=V_{IH}$ or $V_{IL};  V_S =V_{CC}-\text{GND}$	0.1	1	μA
ON-Resistance	PEAK	$R_{ON(PEAK)}$	$V_{CC}=2.0\text{V}, I_S=100\mu\text{A}, V_{IS}=V_{CC}$ to GND; $V_{IN}=V_{IH}$ or $V_{IL};$			Ω
			$V_{CC}=4.5\text{V}, I_S=1\text{mA}, V_{IN}=V_{IH}$ or $V_{IL};$ $V_{IS}=V_{CC}$ to GND	42	118	Ω
			$V_{CC}=6.0\text{V}, I_S=1\text{mA}, V_{IN}=V_{IH}$ or $V_{IL};$ $V_{IS}=V_{CC}$ to GND	31	105	Ω
			$V_{CC}=9.0\text{V}, I_S=1\text{mA}, V_{IN}=V_{IH}$ or $V_{IL};$ $V_{IS}=V_{CC}$ to GND	23	88	Ω

■ STATIC CHARACTERISTICS (Cont.) (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP (Note)	MAX	UNIT
ON-Resistance	RAIL	R <sub>ON(RAIL)</sub>	V <sub>CC</sub> =2.0V, I <sub>S</sub> =100μA, V <sub>IS</sub> =GND; V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>		75		Ω
			V <sub>CC</sub> =4.5V, I <sub>S</sub> =1mA, V <sub>IS</sub> =GND; V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>		29	95	Ω
			V <sub>CC</sub> =6.0V, I <sub>S</sub> =1mA, V <sub>IS</sub> =GND; V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>		23	82	Ω
			V <sub>CC</sub> =9.0V, I <sub>S</sub> =1mA, V <sub>IS</sub> =GND; V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>		18	70	Ω
			V <sub>CC</sub> =2.0V, I <sub>S</sub> =100μA, V <sub>IS</sub> =V <sub>CC</sub> ; V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>		75		Ω
			V <sub>CC</sub> =4.5V, I <sub>S</sub> =1mA, V <sub>IS</sub> =V <sub>CC</sub> ; V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>		35	106	Ω
			V <sub>CC</sub> =6.0V, I <sub>S</sub> =1mA, V <sub>IS</sub> =V <sub>CC</sub> ; V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>		27	94	Ω
			V <sub>CC</sub> =9.0V, I <sub>S</sub> =1mA, V <sub>IS</sub> =V <sub>CC</sub> ; V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>		21	78	Ω

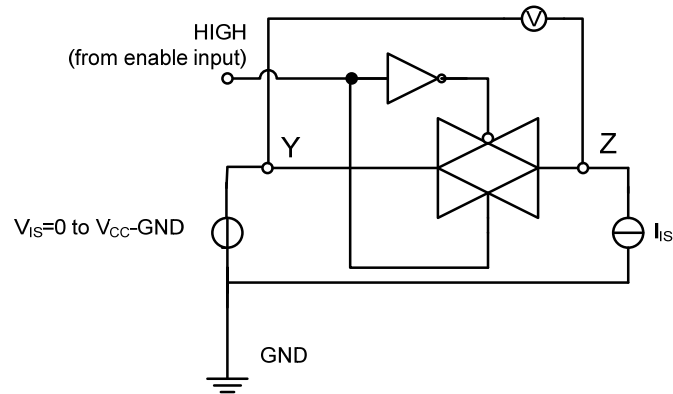
■ DYNAMIC CHARACTERISTICS (T<sub>A</sub>=25°C, C<sub>L</sub>=50pF, GND=0, t<sub>R</sub>=t<sub>F</sub>=6ns, unless otherwise specified )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note)	MAX	UNIT
Propagation Delay V <sub>IS</sub> to V <sub>OS</sub>	t <sub>PHL</sub> /t <sub>PLH</sub>	V <sub>CC</sub> =2.0V, R <sub>L</sub> =∞		8	75	ns
		V <sub>CC</sub> =4.5V, R <sub>L</sub> =∞		3	15	ns
		V <sub>CC</sub> =6.0V, R <sub>L</sub> =∞		2	13	ns
		V <sub>CC</sub> =9.0V, R <sub>L</sub> =∞		1	10	ns
Turn-ON Time E to V <sub>OS</sub>	t <sub>PZH</sub> /t <sub>PZL</sub>	V <sub>CC</sub> =2.0V, R <sub>L</sub> =1KΩ		50	125	ns
		V <sub>CC</sub> =4.5V, R <sub>L</sub> =1KΩ		16	25	ns
		V <sub>CC</sub> =6.0V, R <sub>L</sub> =1KΩ		13	21	ns
		V <sub>CC</sub> =9.0V, R <sub>L</sub> =1KΩ		9	16	ns
Turn-OFF Time E to V <sub>OS</sub>	t <sub>PHZ</sub> /t <sub>PLZ</sub>	V <sub>CC</sub> =2.0V, R <sub>L</sub> =1KΩ		27	190	ns
		V <sub>CC</sub> =4.5V, R <sub>L</sub> =1KΩ		16	38	ns
		V <sub>CC</sub> =6.0V, R <sub>L</sub> =1KΩ		14	33	ns
		V <sub>CC</sub> =9.0V, R <sub>L</sub> =1KΩ		12	16	ns

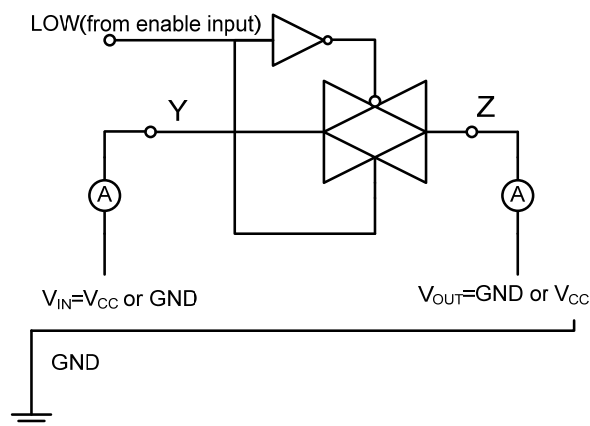
Note: All typical values are measured at T<sub>A</sub>=25°C

■ TEST CIRCUIT AND WAVEFORMS

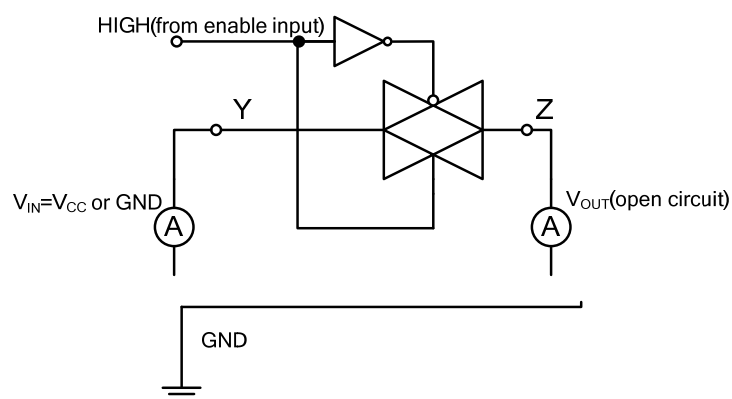
**Test circuit for measuring ON-resistance (Ron)**



**Test circuit for measuring OFF-state current**

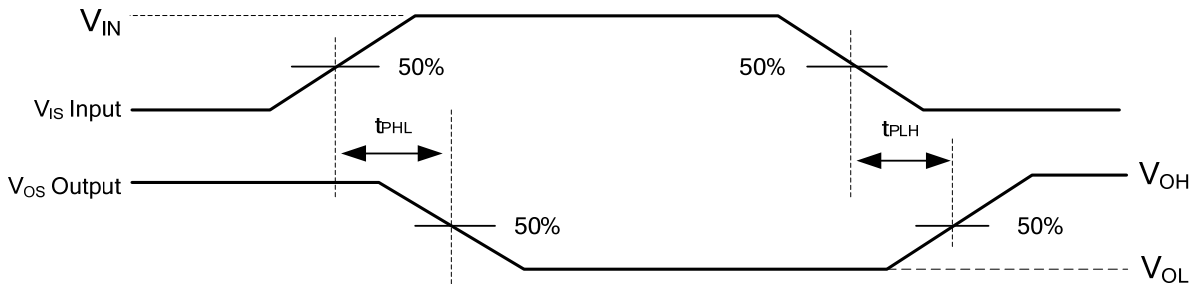


**Test circuit for measuring ON-state current**

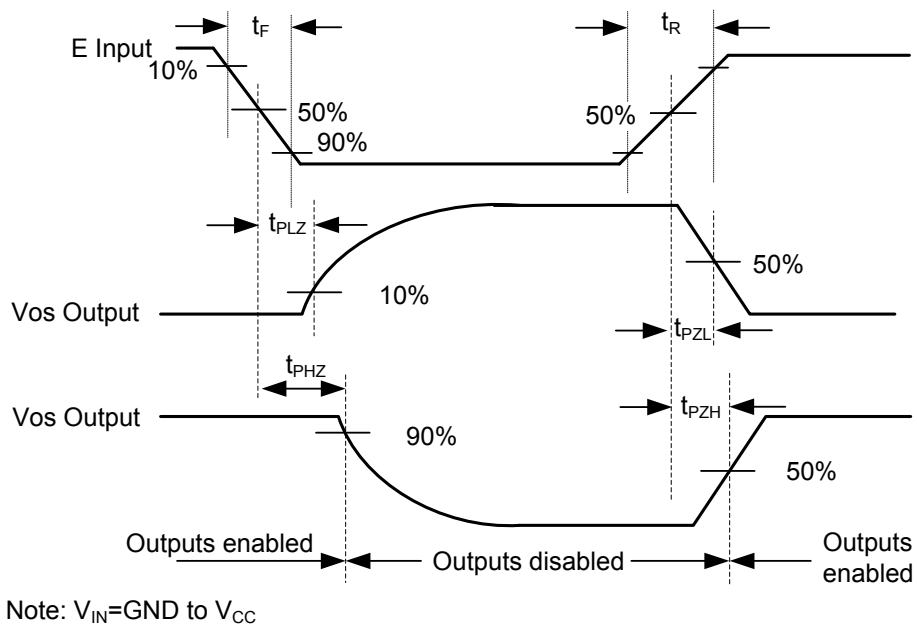


■ TEST CIRCUIT AND WAVEFORMS(Cont.)

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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