

TC4W66F, TC4W66FU

DUAL BILATERAL SWITCH

The TC4W66 contains two independence circuits of bidirectional switches.

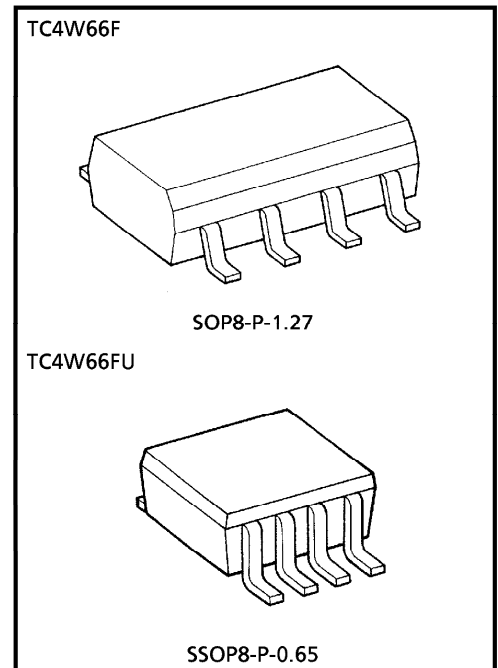
When control input CONT is set to "H" level, the impedance between input and output of the switch becomes low and when it is set to "L" level, the switch becomes high. This can be applied for switching of analog signals and digital signals.

FEATURES

- ON-resistance, R_{ON}
 - 250Ω (Typ.) $V_{DD}-V_{SS} = 5V$
 - 110Ω (Typ.) $V_{DD}-V_{SS} = 10V$
 - 70Ω (Typ.) $V_{DD}-V_{SS} = 15V$
- OFF-resistance, R_{OFF}
 - R_{OFF} (Typ.) $> 10^9\Omega$

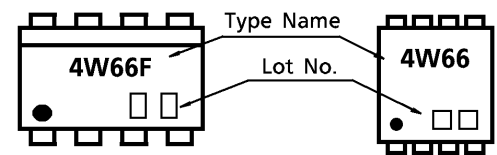
MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	V_{DD}	$V_{SS} - 0.5 \sim V_{SS} + 20$	V
Control Input Voltage	$V_{C IN}$	$V_{SS} - 0.5 \sim V_{DD} + 0.5$	V
Switch I/O Voltage	$V_{I/O}$	$V_{SS} - 0.5 \sim V_{DD} + 0.5$	V
Power Dissipation	P_D	300	mW
Potential difference across I/O during ON	V_I-V_O	± 0.5	V
Control Input Current	$I_{C IN}$	± 10	mA
Operating Temperature Range	T_{opr}	-40~85	°C
Storage Temperature	T_{stg}	-65~150	°C
Lead Temp./Time	T_L	260°C / 10s	

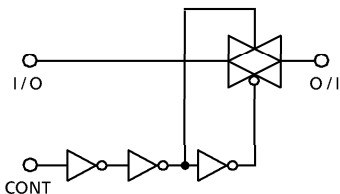


Weight SOP8-P-1.27 : 0.05g (Typ.)
SSOP8-P-0.65 : 0.02g (Typ.)

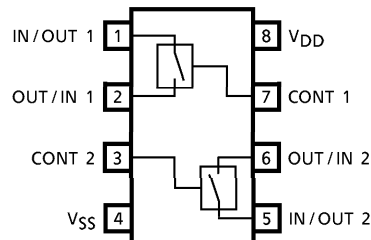
MARKING



LOGIC DIAGRAM (1/2 TC4W66F)



PIN ASSIGNMENT (TOP VIEW)



TRUTH TABLE

CONTROL	IMPEDANCE BETWEEN IN / OUT-OUT / IN *
H	$0.5 \sim 5 \times 10^2 \Omega$
L	$> 10^9 \Omega$

* See static electrical characteristics.

RECOMMENDED OPERATING CONDITIONS (V_{SS} = 0V)

CHARACTERISTICS	SYMBOL		MIN.	TYP.	MAX.	UNIT
DC Supply Voltage	V _{DD}	—	3	—	18	V
Input/Output Voltage	V _{DD} /V _{OUT}	—	0	—	V _{DD}	

STATIC ELECTRICAL CHARACTERISTICS (In case not specifically appointed, V_{SS} = 0V)

CHARACTERISTICS	SYM-BOL	TEST CONDITION	V _{DD} (V)	Ta = -40°C		Ta = 25°C			Ta = 85°C		UNIT	
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.		
Control Input High Voltage	V _{IH}	I _{IS} = 10 μA	5	3.5	—	3.5	2.75	—	3.5	—	V	
			10	7.0	—	7.0	5.50	—	7.0	—		
			15	11.0	—	11.0	8.25	—	11.0	—		
Control Input Low Voltage	V _{IL}	I _{IS} = 10 μA	5	—	1.5	—	2.25	1.5	—	1.5	V	
			10	—	3.0	—	4.5	3.0	—	3.0		
			15	—	4.0	—	6.75	4.0	—	4.0		
On-State Resistance	R _{ON}	0 ≤ V _{IS} ≤ V _{DD} R _L = 10kΩ	5	—	800	—	290	950	—	1200	Ω	
			10	—	210	—	120	250	—	300		
			15	—	140	—	85	160	—	200		
Δ On-State Resistance (Between Any2 Switches)	R _{ON Δ}	—	5	—	—	—	10	—	—	—	Ω	
			10	—	—	—	6	—	—	—		
			15	—	—	—	4	—	—	—		
Input/Output Leakage Current	I _{OFF}	V _{IN} = 18V, V _{OUT} = 0V V _{IN} = 0V, V _{OUT} = 18V	18	—	± 100	—	± 0.1	± 100	—	± 1000	nA	
			18	—	± 100	—	± 0.1	± 100	—	± 1000		
Quiescent Device Current	I _{DD}	V _{IN} = V _{DD} , V _{SS} *	5	—	0.25	—	0.001	0.25	—	7.5	μA	
			10	—	0.5	—	0.001	0.5	—	15		
			15	—	1.0	—	0.002	1.0	—	30		
Input Current	H Level	I _{IH}	V _{IH} = 18V	18	—	0.1	—	10 ⁻⁵	0.1	—	1.0	μA
	L Level	I _{IL}	V _{IL} = 0V	18	—	-0.1	—	-10 ⁻⁵	-0.1	—	-1.0	

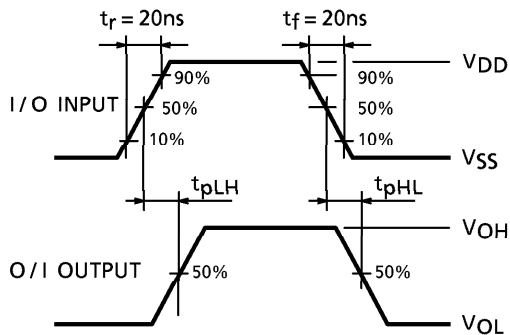
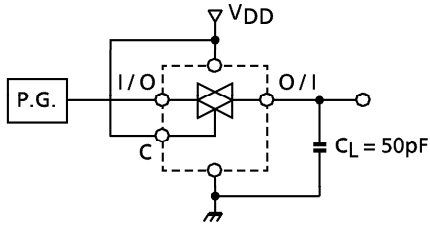
DYNAMIC ELECTRICAL CHARACTERISTICS (Ta = 25°C, V_{SS} = 0V, C_L = 50pF)

CHARACTERISTICS	SYMBOL	TEST CONDITION	V _{SS} (V) V _{DD} (V)		MIN.	TYP.	MAX.	UNIT
			V _{SS} (V)	V _{DD} (V)				
Phase Difference between Input to Output	φ _{I-O}	C _L = 50pF	0	5	—	15	40	ns
			0	10	—	8	20	
			0	15	—	5	15	
Propagation Delay Time (CONTROL-OUT)	t _{pZL} t _{pZH}	R _L = 1kΩ C _L = 50pF	0	5	—	55	120	
			0	10	—	25	40	
			0	15	—	20	30	
Propagation Delay Time (CONTROL-OUT)	t _{pLZ} t _{pHZ}	R _L = 1kΩ C _L = 50pF	0	5	—	45	80	
			0	10	—	30	70	
			0	15	—	25	60	
MAX. Control Input Repetition Rate	f _{MAX} (C)	R _L = 1kΩ C _L = 50pF	0	5	—	10	—	
			0	10	—	12	—	
			0	15	—	12	—	
- 3dB Cutoff Frequency	f _{MAX} (I-O)	R _L = 1kΩ C _L = 50pF (*1)	-5	5	—	30	—	
Total Harmonic Distortion	—	R _L = 10kΩ f = 1kHz (*2)	-5	5	—	0.03	—	%
- 50dB Feed through Frequency	—	R _L = 1kΩ (*3)	-5	5	—	600	—	kHz
- 50dB Crosstalk Frequency	—	R _L = 1kΩ (*4)	-5	5	—	1	—	MHz
Crosstalk (CONTROL-OUT)	—	R _{IN} = 1kΩ R _{OUT} = 10kΩ C _L = 15pF	0	5	—	200	—	mV
			0	10	—	400	—	
			0	15	—	600	—	
Input Capacitance	C _{IN}	Control Input	—	—	—	5	7.5	pF
		Switch I/O	—	—	—	10	—	
Feed through Capacitance	C _{IN-OUT}	—	—	—	—	0.5	—	

- *1 Since wave of ±2.5V_{p-p} shall be used for V_{IS} and the frequency of 20log₁₀ $\frac{V_{OS}}{V_{IS}}$ = -3dB shall be f_{MAX}.
- *2 V_{IS} shall be sine wave of ±2.5V_{p-p}.
- *3 Sine wave of ±2.5V_{p-p} shall be used for V_{IS} and the frequency of 20log₁₀ $\frac{V_{OUT}}{V_{IS}}$ = -50dB shall be feed-through.
- *4 Sine wave of ±2.5V_{p-p} shall be used for V_{IS} and the frequency of 20log₁₀ $\frac{V_{OUT}}{V_{IS}}$ = -50dB shall be crosstalk.

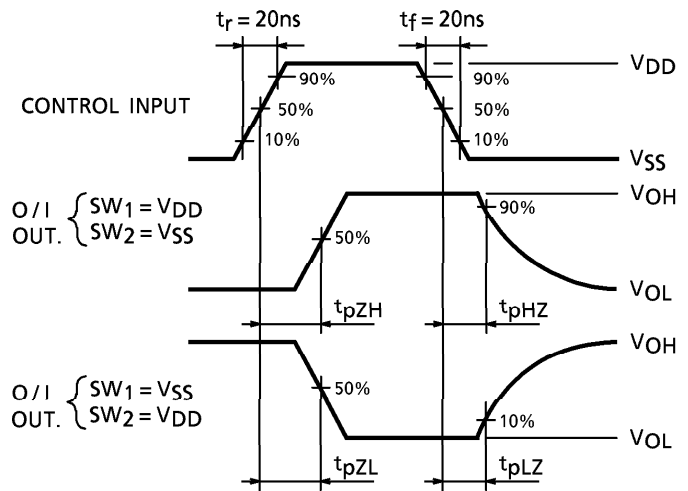
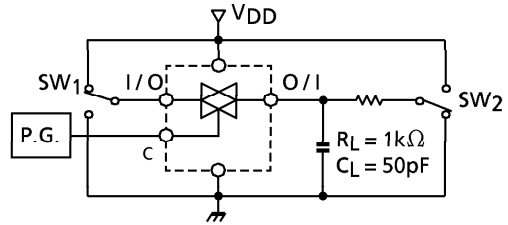
1. t_{pLH} , t_{pHL}

I/O-O/I

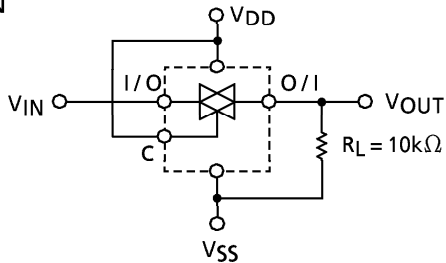


2. t_{pZL} , t_{pZH} , t_{pLZ} , t_{pHZ}

CONTROL-O/I

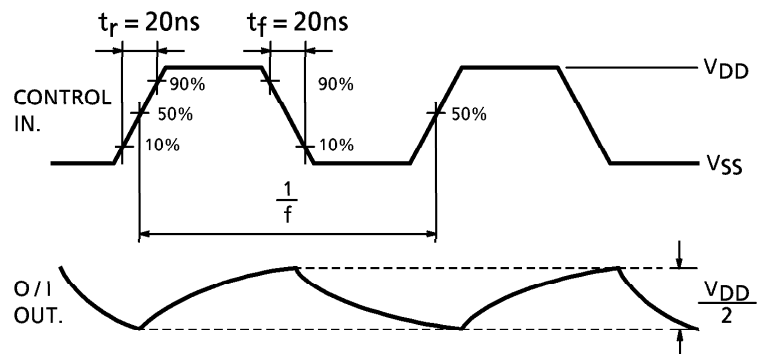
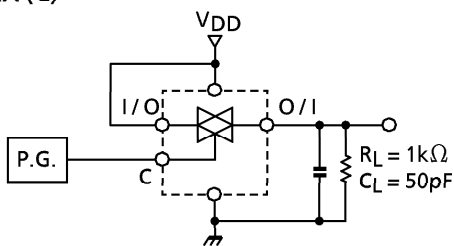


3. RON

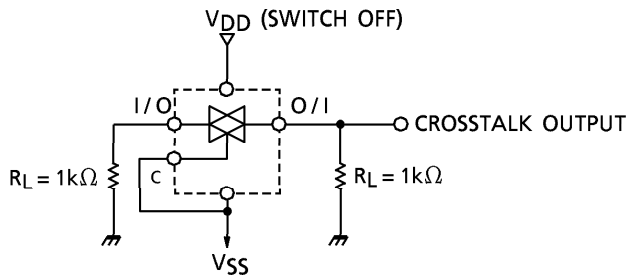
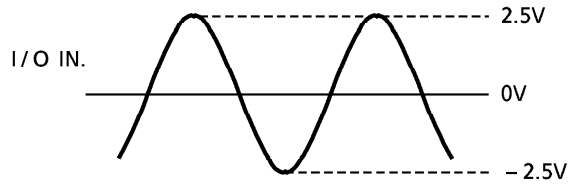
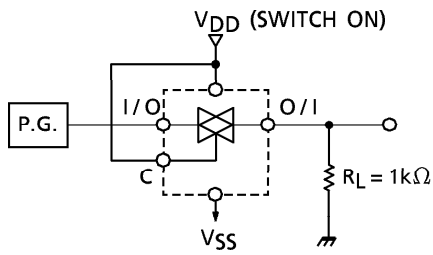


$$RON = 10 \times \frac{(VIN - VOUT)}{VOUT} \text{ (k}\Omega\text{)}$$

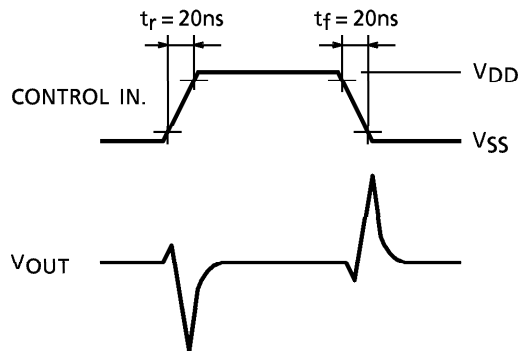
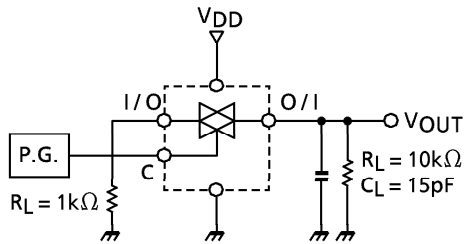
4. $f_{MAX}(C)$



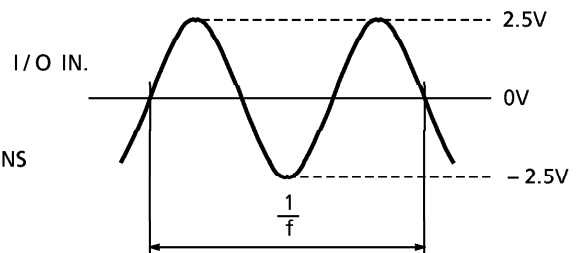
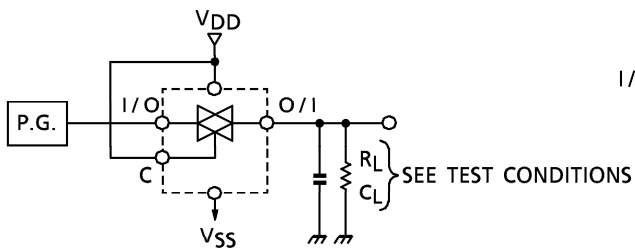
5. CROSSTALK (SWITCH I/O)



6. CROSSTALK (CONTROL INPUT)

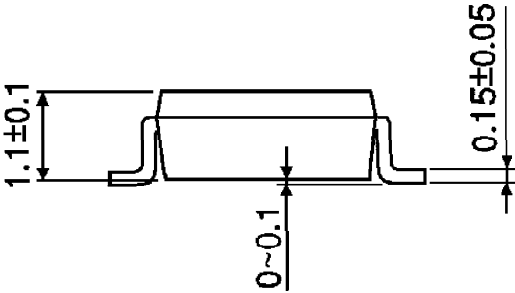
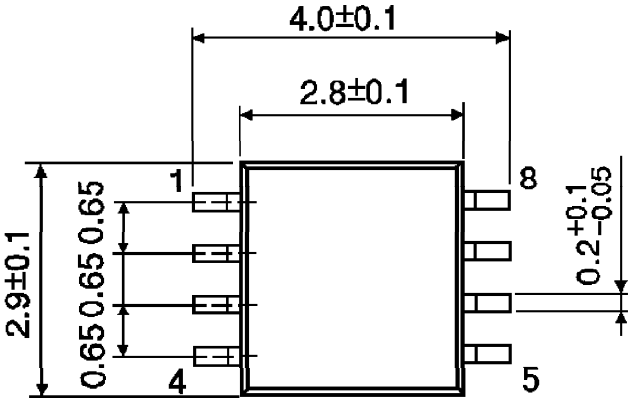


7. TOTAL HARMONIC DISTORTION, f_{MAX} (I/O-O/I), FEEDTHROUGH (SWITCH OFF)



PACKAGE DIMENSIONS
SSOP8-P-0.65

Unit : mm



Weight : 0.02g (Typ.)

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