

TC4S66F, TC4S66FU

BILATERAL SWITCH

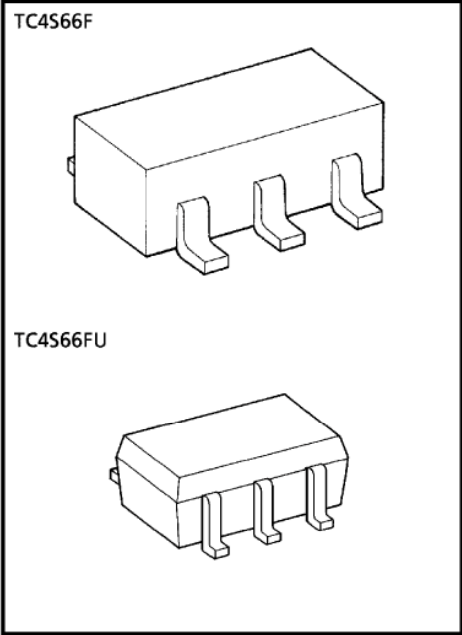
TC4S66F/FU contains one circuit of bidirectional switches. When control input, CONT is set to "H" level, the impedance between input and output of the switch becomes low and when it is set to "L" level, the switch becomes high. This can be applied for switching of analog signals and digital signals.

FEATURES

- ON-resistance (RON)
300 Ω (Typ.) VDD - VSS = 5 V
110 Ω (Typ.) VDD - VSS = 10 V
70 Ω (Typ.) VDD - VSS = 15 V
- OFF-resistance (ROFF)
ROFF (Typ.) > 10⁹ Ω

Absolute Maximum Ratings

CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	VDD	VSS - 0.5~VSS + 20	V
Control Input Voltage	VC IN	VSS - 0.5~VDD + 0.5	V
Switch I/O Voltage	VI/O	VSS - 0.5~VDD + 0.5	V
Power Dissipation	PD	200	mW
Potential difference across I/O during ON	VI-VO	±0.5	V
Control Input Current	IC IN	± 10	mA
Operating Temperature Range	Topr	- 40~85	°C
Storage Temperature	Tstg	- 65~150	°C
Lead Temperature (10 s)	TL	260	°C



Weight
SSOP5-P-0.95 : 0.016 g (Typ.)
SSOP5-P-0.65A : 0.006 g (Typ.)

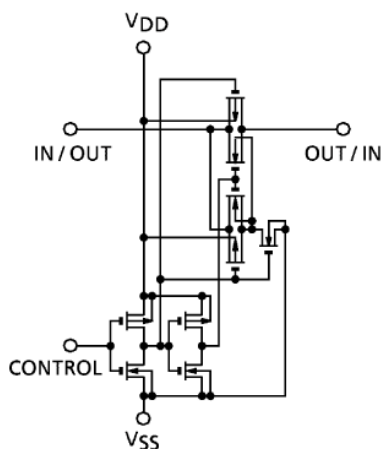
TRUTH TABLE

CONTROL	IMPEDANCE BETWEEN IN / OUT-OUT / IN *
H	0.5~5 × 10 ² Ω
L	> 10 ⁹ Ω

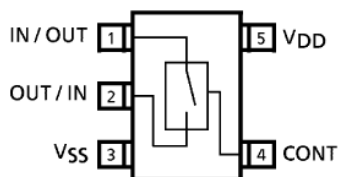
* : See static electrical characteristics.

Start of commercial production
1988-01

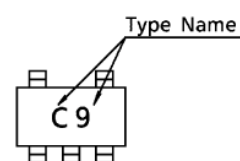
CIRCUIT DIAGRAM



PIN ASSIGNMENT (TOP VIEW)



MARKING



Operating Ranges ($V_{SS} = 0\text{ V}$)

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

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

CHARACTERISTIC	SYM-BOL	TEST CONDITION	V_{DD} (V)	- 40°C		25°C			85°C		UNIT
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.	
Control Input High Voltage	V_{IH}	$ I_{IS} = 10\text{ }\mu\text{A}$	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\text{ }\mu\text{A}$	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}	$0 \leq V_{IS} \leq V_{DD}$ $R_L = 10\text{ k}\Omega$	5	—	800	—	290	950	—	1200	Ω
			10	—	210	—	120	250	—	300	
			15	—	140	—	85	160	—	200	
Input / Output Leakage Current	I_{OFF}	$V_{IN} = 18\text{ V}$ $V_{OUT} = 0\text{ V}$	18	—	± 100	—	± 0.1	± 100	—	± 1000	nA
		$V_{IN} = 0\text{ V}$ $V_{OUT} = 18\text{ V}$	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}	$V_{IH} = 18\text{ V}$	18	—	0.1	—	10^{-5}	0.1	—	μA
	L Level	I_{OL}	$V_{IL} = 0\text{ V}$	18	—	-0.1	—	-10^{-5}	-0.1	—	

DYNAMIC ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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

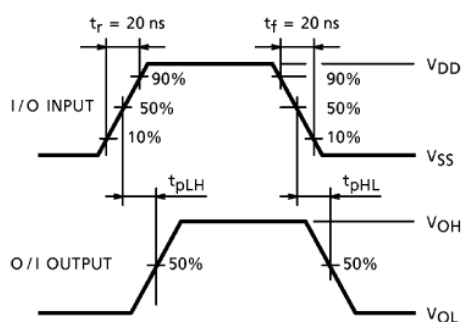
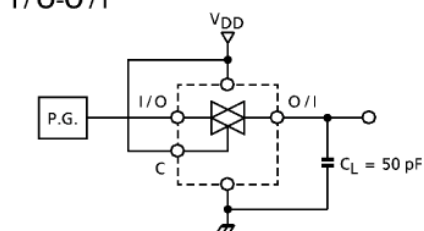
*1 : The frequency at $20\log_{10} \frac{V_{OS}}{V_{IS}} = -3 \text{ dB}$ shall be f_{MAX} (I/O) using sine wave of $\pm 2.5 V_{p-p}$ for V_{IS}.

*2 : V_{IS} shall be sine wave of $\pm 2.5 V$.

*3 : The frequency at $20\log_{10} \frac{V_{OS}}{V_{IS}} = 50 \text{ dB}$ shall be the feed through using of $\pm 2.5 V_{p-p}$.

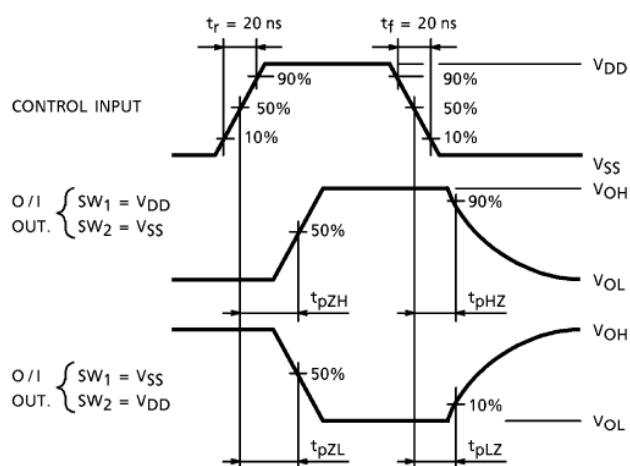
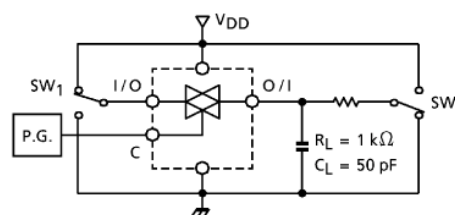
1. t_{pLH} , t_{pHL}

I/O-O/I

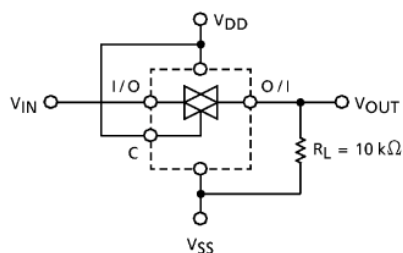


2. t_{pZL} , t_{pZH} , t_{pLZ} , t_{pHZ}

CONTROL-O/I

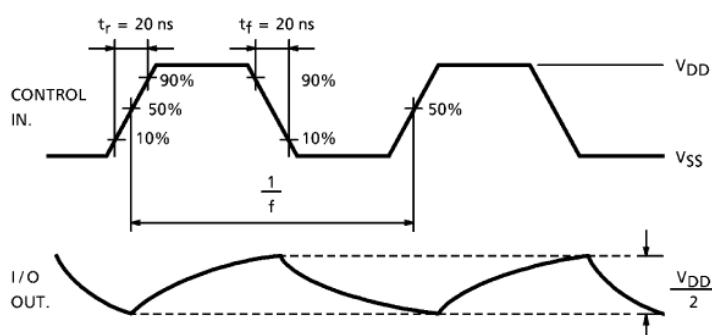
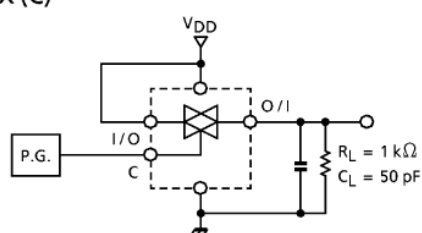


3. R_{ON}

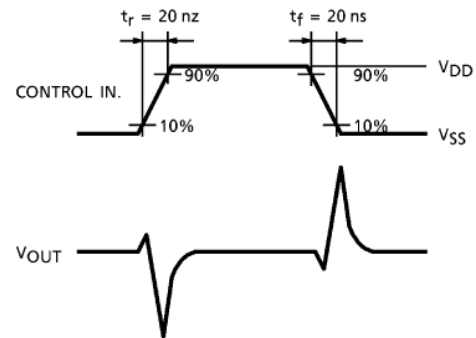
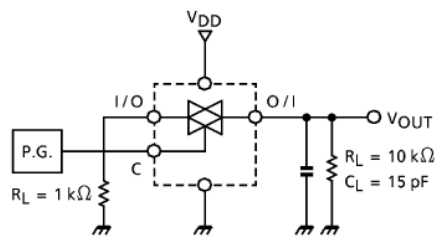


$$R_{ON} = 10 \times \frac{(V_{IN} - V_{OUT})}{V_{OUT}} \text{ (k}\Omega\text{)}$$

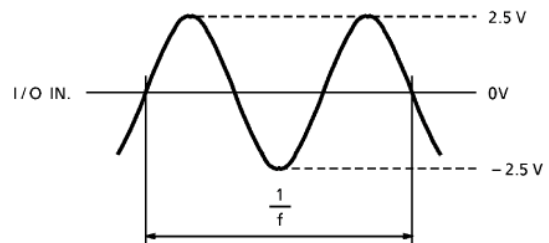
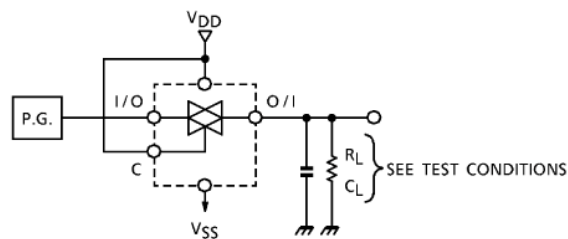
4. $f_{MAX}(C)$



5. CROSSTALK (CONTROL INPUT)

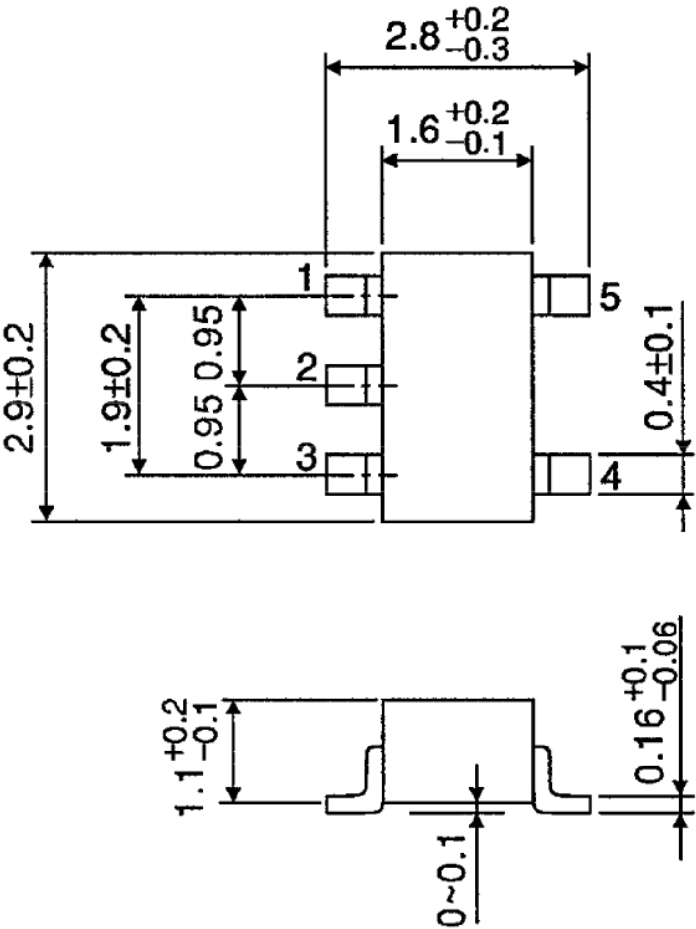


6. TOTAL HARMONIC DISTORTION, f_{MAX} (I/O-O/I), FEEDTHROUGH (SWITCH OFF)



PACKAGE DIMENSIONS
SSOP5-P-0.95

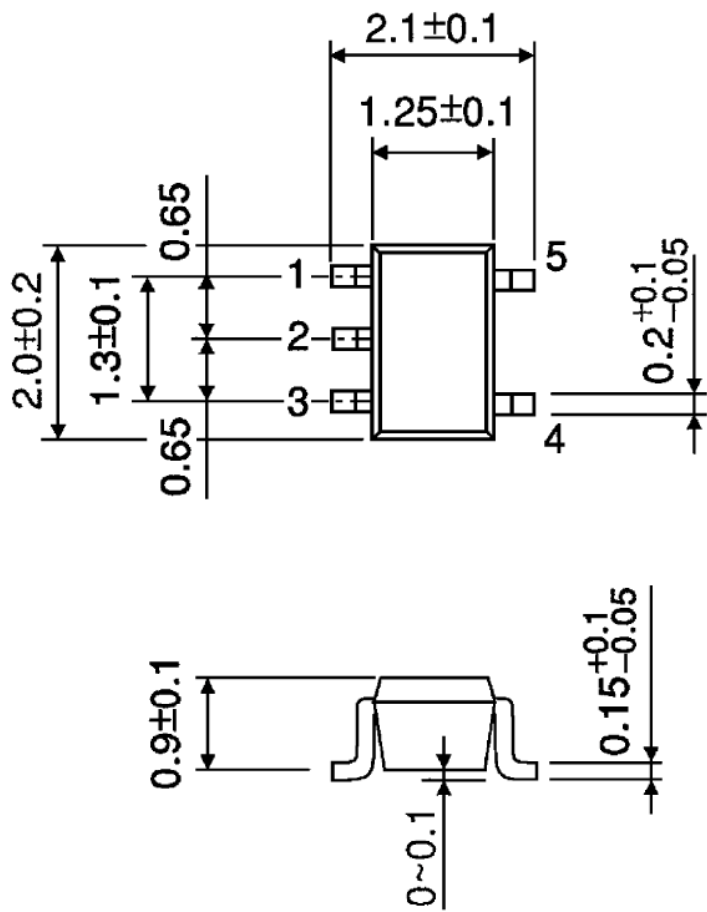
Unit : mm



Weight : 0.016 g (Typ.)

PACKAGE DIMENSIONS
SSOP5-P-0.65A

Unit : mm



Weight : 0.006 g (Typ.)

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