TS5A3166DBVR-TP

SINGLE-CHANNEL 2Ω SPST Analog Switches

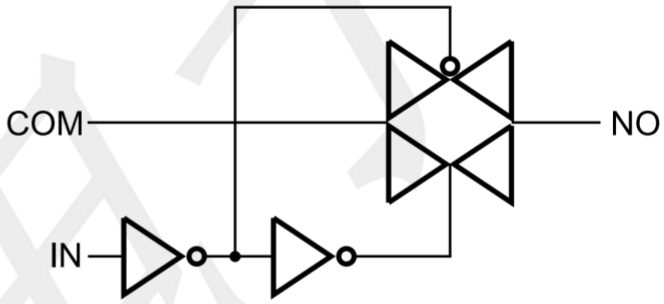
Features

- Low On-resistance, Ron=2Ω
- 1.8V Logic Compatible Control Pin
- Overrides V+ to Achieve True Isolation Even When Supply Is Dead
- High Off-Isolation: -100dB @ 100KHz
- Low Channel-to-Channel Crosstalk: -97dB @ 100KHz
- High Bandwidth (-3dB @400MHz) Suitable For USB2.0 High-Speed Routing
- Low Quiescent Current (<2uA) With Very Wide Supply Range (1.5V ~ 5.5V)

Applications

- Cell phones and TWS headset
- Audio, Video, UART, USB2.0 Signal and Supply Routing

Logic Diagram



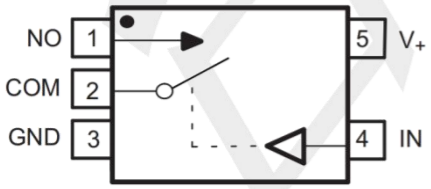
General Description

The is a low voltage single-pole,double-throw (SPDT) analog switch intending for use in chopping,modem, signal gating, and signal multiplexing for analog-to-digital and digital -to-analog conversion systems.

PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	NO	Normally opened port
2	COM	Common port
3	GND	Ground
4	IN	Digital control pin to connect COM to NO
5	V+	Supply voltage

Pin Configuratio



SOT23-5

Function Table

INPUT(IN)	Switch
L	OFF
H	ON

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

Absolute Maximum Ratings

(Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_+	-0.3 ~ +6.5	V
Switch Voltage	V_S	-0.3 ~ +6.5	V
Input Voltage	V_{IN}	-0.3 ~ +6.5	V
Continuous Current Through IN, COM, NO		±50	mA
Peak Current Through IN, COM, NO (pulsed at 1ms 50% duty cycle)		±100	mA
Storage Temperature Range	T_{STG}	-55 ~ +150	℃
Operating Junction Temperature	T_J	150	℃
Junction to Ambient	$R\theta_{JA}$	280	℃/W

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.

Recommend operating ratings

(Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage Operating	V_+	1.6 ~ 5.5	V
Control Input Voltage	V_{SEL}	-0.3 ~ 5.5	V
Input Signal Voltage	V_A	-0.3 ~ 5.5	V
Operating Temperature	T_A	-40 ~ +85	℃

Electrical Characteristics (TA =25°C， unless otherwise specified)

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	V+=3.3V ~ 5.5V	1.6	--	--	V
		V+=1.5V ~ 3.3V	1.4	--	--	V
Low-Level Input Voltage	V_{IL}	V+=3.3V ~ 5.5V	--	--	0.6	V
		V+=1.5V ~ 3.3V	--	--	0.4	V
Supply quiescent current	I_{CC}	I_A=0, V_{SEL} =0 or V_{SEL} =V+	--	--	1.0	uA
Increase in ICC per input	I_{CCT}	I_A=0, V+=4.5V V_{SEL}>1.8 or V_{SEL}<0.5	--	--	1.0	uA
Off state leakage from IN to COM (or NO)	I_A	V_A = 5.5V , $V_{B0(or\ B1)}$ = 0V	--	--	±2.0	uA
On-Resistance	R_{ON1}	V_A=0 ~ 0.5V, I_A=30mA	--	4.6	7.0	Ω
	R_{ON2}	V_A=0.5 ~ 2.0V, I_A=30mA	--	4.0	6.0	Ω
	R_{ON3}	V_A=2.0 ~ 4.0V, I_A=30mA	--	3.0	5.0	Ω
	R_{ON4}	V_A=4.0 ~ 5.5V, I_A=30mA	--	2.0	4.5	Ω
On-Resistance Flatness	R_{FLAT1}	V_A=0 ~ 0.5V, I_A=30mA	--	1.6	--	Ω
	R_{FLAT2}	V_A=0.5 ~ 2.0V, I_A=30mA	--	0.7	--	Ω
	R_{FLAT3}	V_A=2.0 ~ 4.0V, I_A=30mA	--	0.5	--	Ω
	R_{FLAT4}	V_A=4.0 ~ 5.5V, I_A=30mA	--	0.3	--	Ω
On-Resistance Matching Between Channels	ΔR_{ON}	V_A=0~5.5V, I_A=30mA	--	0.1	0.2	Ω

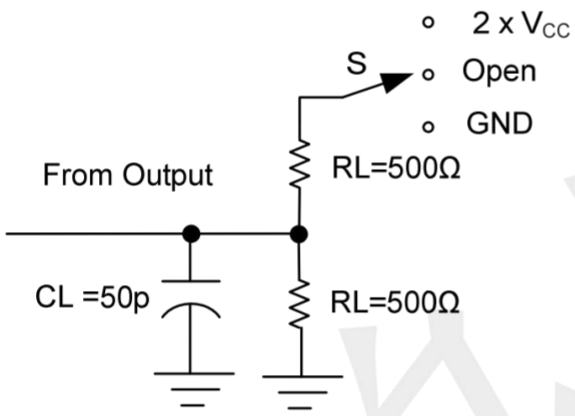
AC Electronics Characteristics (Ta=25oC, VCC=3.3V, unless otherwise noted)

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
Turn-On Time	T_{ON}	V_A=1.5V, C_L=35pF, R_L=50Ω	--	200	--	ns
Turn-Off Time	T_{OFF}	V_A=1.5V, C_L=35pF, R_L=50Ω	--	200	--	ns
Break-Before-Make time	T_{BBM}	V_A=1.5V, C_L=35pF, R_L=50Ω	--	500	--	ns
-3dB Bandwidth	BW	R_L=50Ω, C_L=0pF	--	400	--	MHz
Off isolation	OIRR	F=1KHz, R_L=50Ω	--	-81	--	dB
		F=10KHz, R_L=50Ω	--	-80	--	dB
Crosstalk	Xtalk	F=1KHz, R_L=50Ω	--	-83	--	dB
		F=10KHz, R_L=50Ω	--	-82	--	dB
Total Harmonic Distortion	THD	F=20Hz to 20KHz V_A=600mVp-p @R_L=32Ω	--	-80	--	dB

Capacitance (Ta=25oC unless otherwise noted)

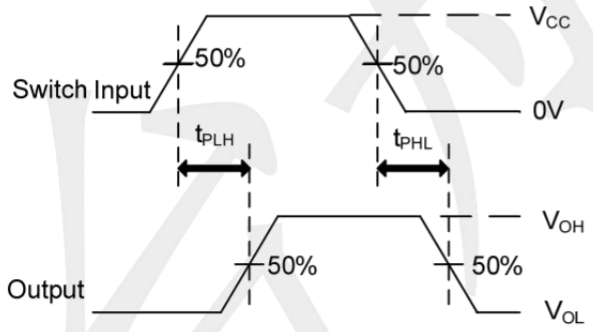
PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
Off capacitance	C_{OFF}	F=100KHz, V+=3.3	--	5.0	--	pF
On capacitance	C_{ON}	F=100KHz, V+=3.3	--	7.0	--	pF

TEST CIRCUIT AND WAVEFORMS

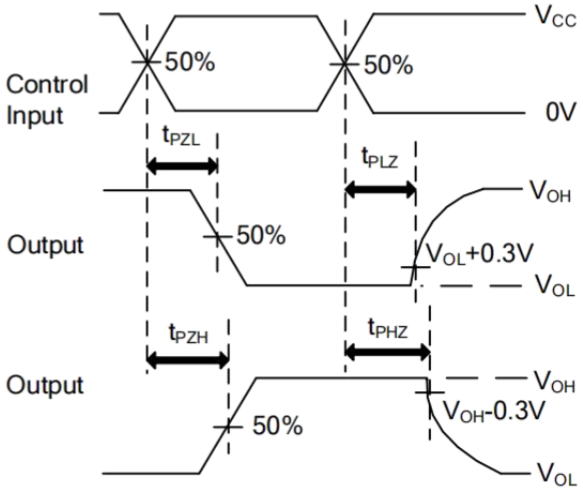


TEST CIRCUIT

TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	2 x V_{CC}



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES

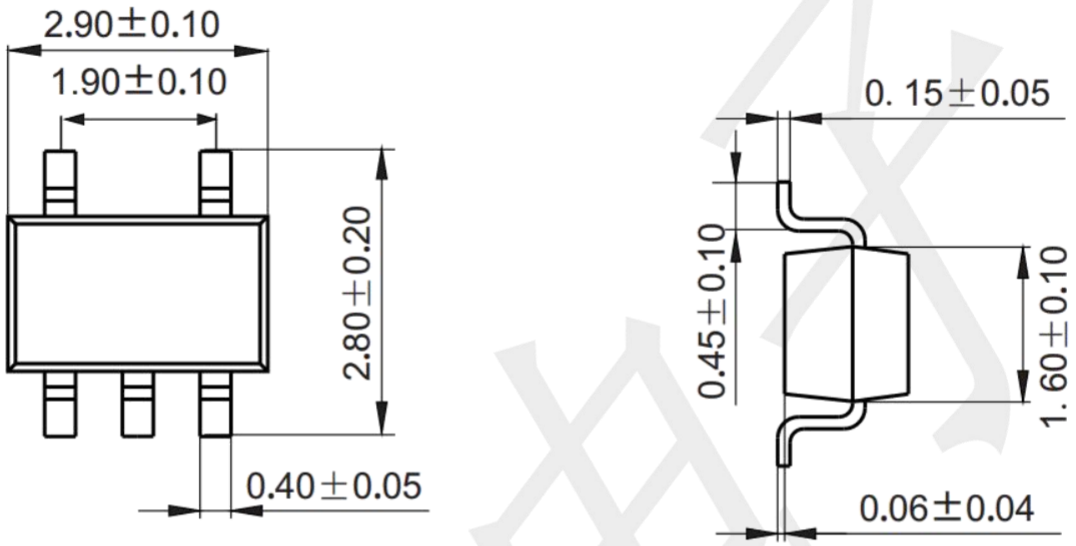


VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES

Note: C_L includes probe and jig capacitance.
PRR ≤1MHz, Z_O = 50Ω, t_R ≤2.5ns, t_F ≤2.5ns.

Package information

SOT23-5 (Unit: mm)



Mounting Pad Layout (Unit: mm)

