

TPMAX4596DBVR

SINGLE-CHANNEL 10Ω SPST ANALOG SWITCH

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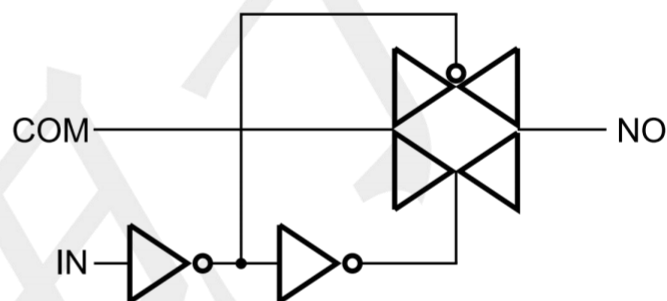
Features

- Low On-resistance, $R_{on}=10\Omega$
- 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 @ 300MHz) Suitable For USB2.0 High-Speed Routing
- Low Quiescent Current ($<2\mu\text{A}$) With Very Wide Supply Range (1.5V ~ 5.5V)
- Reference: MAX4596DBVR

Applications

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

Logic Diagram



General Description

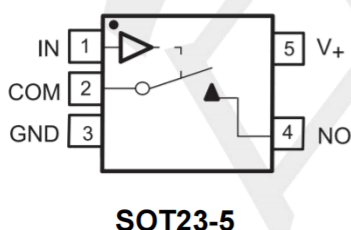
The is a low voltage single-pole, double-throw

(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	IN	Digital control pin to connect COM to NO
2	COM	Analog Switch—Common
3	GND	Ground
4	NO	Analog Switch—Normally Open
5	V+	Supply voltage

Pin Configuratio



Function Table

INPUT(IN)	NO TO COM, COM TO NO
L	OFF
H	ON

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

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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		±20	mA
Peak Current Through IN, COM, NO (pulsed at 1ms 50% duty cycle)		±50	mA
Continuous Current Through V+&GND		±100	mA
Storage Temperature Range	T _{STG}	-55 ~ +150	°C
Operating Junction Temperature	T _J	150	°C
Junction to Ambient	R _{θJA}	280	°C/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	°C

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

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
High-Level Input Voltage	VIH	V+=3.3V ~ 5.5V	1.6	--	--	V
		V+=1.5V ~ 3.3V	1.4	--	--	V
Low-Level Input Voltage	VIL	V+=3.3V ~ 5.5V	--	--	0.6	V
		V+=1.5V ~ 3.3V	--	--	0.4	V
Supply quiescent current	ICC	IA=0, VSEL=0 or VSEL=V+	--	--	1.0	uA
Increase in ICC per input	ICCT	IA=0, V+=4.5V VSEL>1.8 or VSEL<0.5	--	--	1.0	uA
Off state leakage from IN to COM (or NO)	IA	VA = 5.5V, VB0(or B1) = 0V	--	--	±2.0	uA
On-Resistance	RON1	VA=0 ~ 0.5V, IA=30mA	--	5.6	10	Ω
	RON2	VA=0.5 ~ 2.0V, IA=30mA	--	4.6	9.0	Ω
	RON3	VA=2.0 ~ 4.0V, IA=30mA	--	4.0	8.0	Ω
	RON4	VA=4.0 ~ 5.5V, IA=30mA	--	3.5	7.0	Ω
On-Resistance Flatness	RFLAT1	VA=0 ~ 0.5V, IA=30mA	--	1.5	--	Ω
	RFLAT2	VA=0.5 ~ 2.0V, IA=30mA	--	0.7	--	Ω
	RFLAT3	VA=2.0 ~ 4.0V, IA=30mA	--	0.5	--	Ω
	RFLAT4	VA=4.0 ~ 5.5V, IA=30mA	--	0.3	--	Ω
On-Resistance Matching Between Channels	Δ RON	VA=0~5.5V, IA=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	TON	VA=1.5V, CL=35pF, RL=50Ω	--	200	--	ns
Turn-Off Time	TOFF	VA=1.5V, CL=35pF, RL=50Ω	--	200	--	ns
Break-Before-Make time	TBBM	VA=1.5V, CL=35pF, RL=50Ω	--	500	--	ns
-3dB Bandwidth	BW	RL=50Ω, CL=0pF	--	300	--	MHz
Off isolation	OIRR	F=1KHz, RL=50Ω	--	-81	--	dB
		F=10KHz, RL=50Ω	--	-80	--	dB
Crosstalk	Xtalk	F=1KHz, RL=50Ω	--	-83	--	dB
		F=10KHz, RL=50Ω	--	-82	--	dB
Total Harmonic Distortion	THD	F=20Hz to 20KHz VA=600mVp-p @RL=32Ω	--	-80	--	dB

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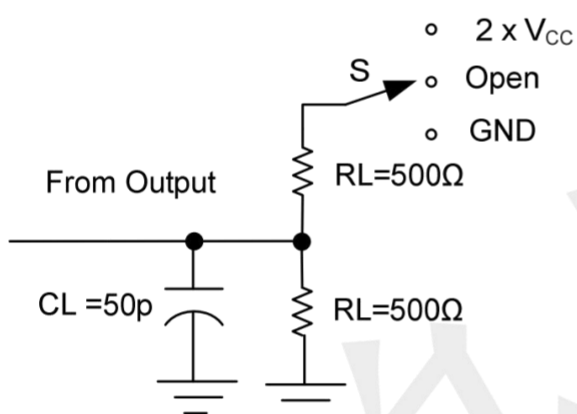
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Capacitance ($T_a=25^\circ\text{C}$ unless otherwise noted)

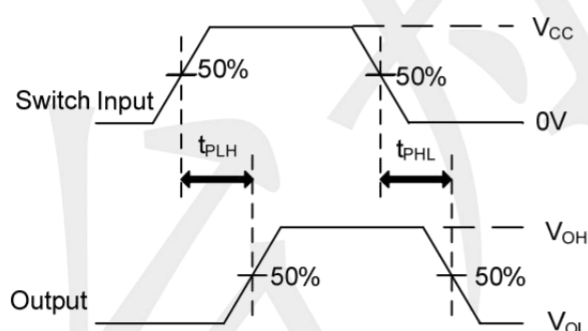
PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
Off capacitance	C_{OFF}	$F=100\text{KHz}$, $V_+=3.3$	--	5.0	--	pF
On capacitance	C_{ON}	$F=100\text{KHz}$, $V_+=3.3$	--	7.0	--	pF

TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

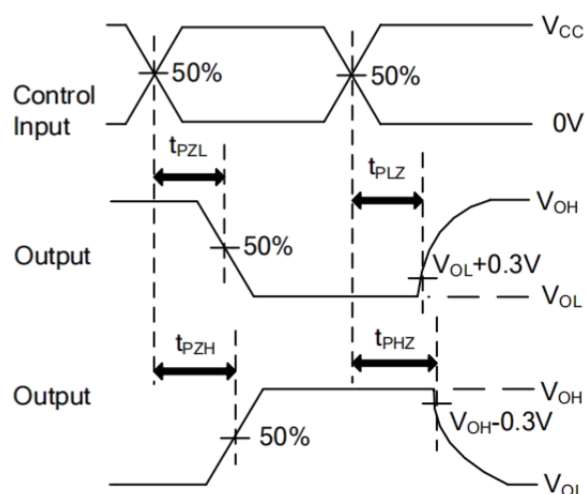
TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	$2 \times V_{CC}$



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES

Note: C_L includes probe and jig capacitance.

$PRR \leq 1\text{MHz}$, $Z_O = 50\Omega$, $t_R \leq 2.5\text{ns}$, $t_F \leq 2.5\text{ns}$.



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES

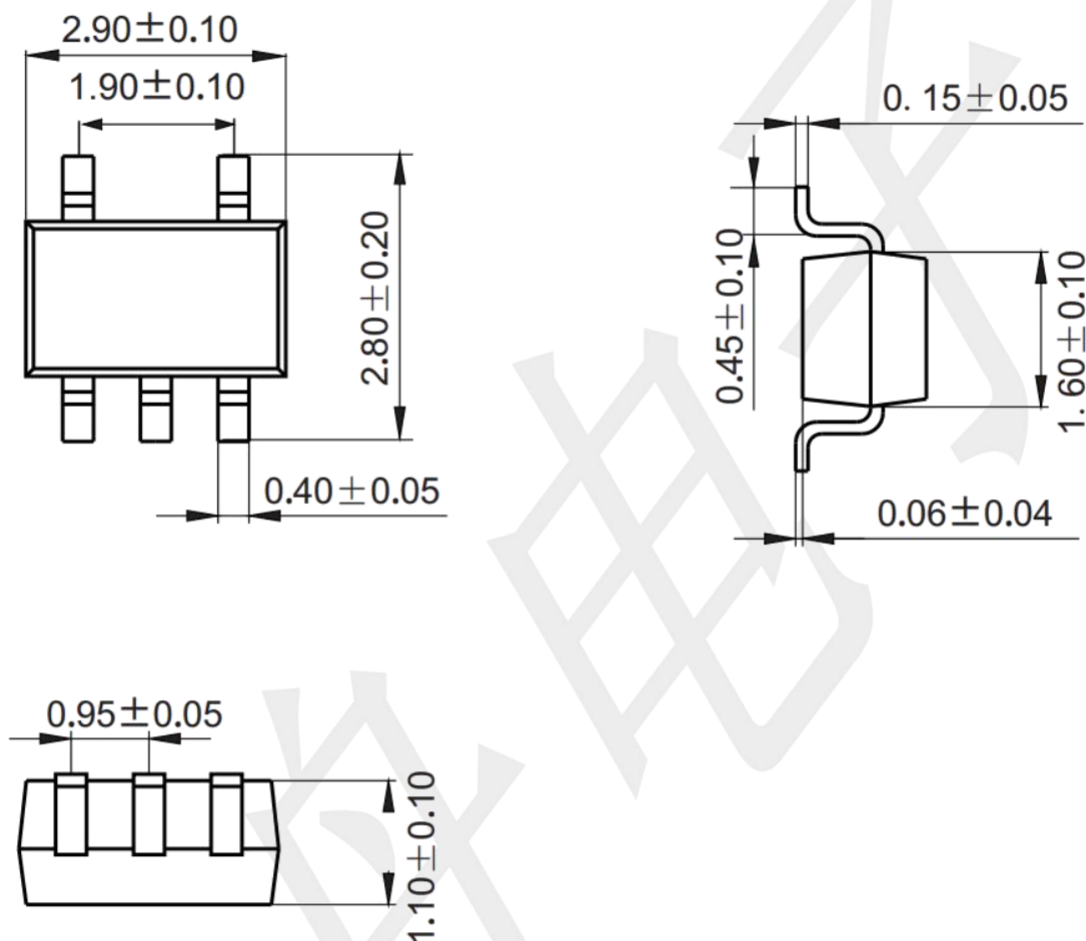
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Package informantion

SOT23-5 (Unit: mm)



Mounting Pad Layout (Unit: mm)

