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TPBL1555MMG

Dual SPDT Analog Switch,2:1 Multiplexer / 1:2 Demultiplexer

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Features

- Low On-resistance, Ron=1.5Ω
- 1.8V Logic Compatible Control Pin
- High Off-Isolation: -100dB @ 100KHz
- COMx Overrides VCC to Achieve True Isolation Even When Supply Is Dead
- Low Channel-to-Channel Crosstalk: -97dB @ 100KHz
- High Bandwidth (-3dB @500MHz) Suitable For USB2.0 High-Speed Routing
- Low Quiescent Current (<2uA) With Very Wide Supply Range (1.5V ~ 5.5V)
- Small Packaging: MSOP-10L

Applications

- Mobile Phones, Tablets and Notebooks
- USB Type-C Mic/Gnd Switch
- Audio, Video, UART, USB2.0 Signal and Supply Routing
- Telecom Signal Switching
- Sample and Hold Systems
- Signal Gating,Multiplexer /Demultiplexer

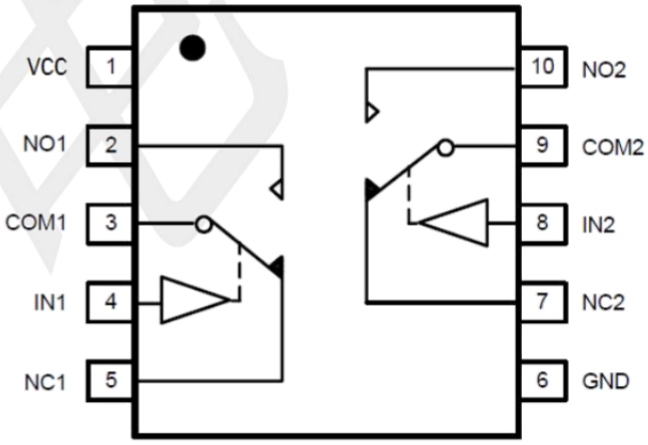
General Description

The is a dual SPDT low on-resistance analog switch. It can operate from a single 1.5V to 5.5V power supply.

The device offers low ON-state resistance and excellent ON-state resistan ce matching with break-before-make feature, to prevent signal distortion during the transferring of a signal from one channel to another.

The device is capable of true isolation. Even when COMx overrides VCC, very little current will flow back to the supply.

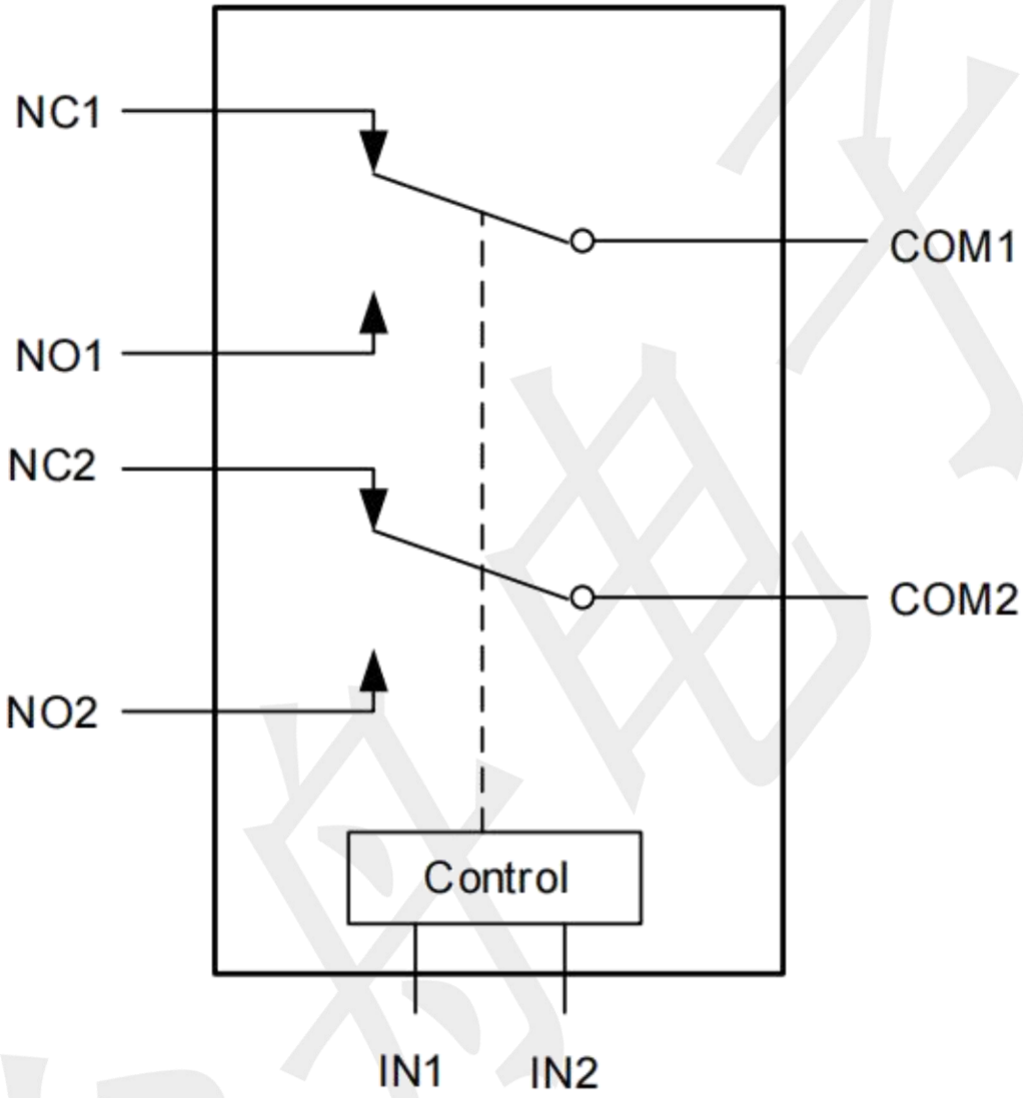
PIN CONFIGURATIONS



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	VCC	Supply voltage VCC
2	NO 1	Analog/Digital Signal Ports (Normally open)
3	COM1	Port 1 common data terminal, Connect to NC1 or NO1 according to SEL logic
4	IN1	Digital control to connect COM to NO or NC
5	NC 1	Analog/Digital Signal Ports (Normally closed)
6	GND	Ground
7	NC 2	Analog/Digital Signal Ports (Normally closed)
8	IN2	Digital control to connect COM to NO or NC
9	COM2	Port 2 common data terminal, Connect to NC2 or NO2 according to SEL logic
10	NO 2	Analog/Digital Signal Ports (Normally open)

BLOCK DIAGRAM



Function Table

Logic Input(INx)	Function
0	NC1=COM1 and NC2=COM2
1	NO1=COM1 and NO2=COM2

Note: X= 1 or 2

Absolute Maximum Ratings

(Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.3 ~ +6.5	**V**
Input Voltage	V_{IN}	-0.3 ~ +6.5	**V**
Continuous Current Through NO, NC, COM		±100	**mA**
Peak Current Through NO, NC, COM (pulsed at 1ms 50% duty cycle)		±200	**mA**
Storage Temperature Range	T_{STG}	-55 ~ +150	℃
Operating Junction Temperature	T_J	150	℃
Lead Temperature (Soldering, 10 seconds)	T_L	260	℃
Power Dissipation	P_D	250	**mW**

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_{CC}	1.5 ~ 5.5	**V**
Control Input Voltage	V_{IN}	-0.3 ~ 5.5	**V**
Input Signal Voltage	V_{COM}	-0.3 ~ 5.5	**V**
Operating Temperature	T_A	-40 ~ +85	℃
Junction to Ambient	$R\theta_{JA}$	360	℃/W

DC Electrical Characteristics (TA =25°C，VC=+3.3V,unless otherwise specified)

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	VCC=3.3V ~ 5.5V	1.6	--	--	V
		VCC=1.5V ~ 3.3V	1.4	--	--	V
Low-Level Input Voltage	V_{IL}	VCC=3.3V ~ 5.5V	--	--	0.6	V
		VCC=1.5V ~ 3.3V	--	--	0.4	V
Supply quiescent current	I_{CC}	I_A=0, V_{SEL} =0 or V_{SEL} =VCC	--	--	1.0	uA
Increase in ICC per input	I_{CCT}	I_A=0, VCC=4.5V V_{SEL}>1.8 or V_{SEL}<0.5	--	--	1.0	uA
Off state leakage from COMx to NCx (or NOx)	I_{COMx}	V_{COM} = 5.5V , $V_{NC(or\ NO)}$ = 0V	--	--	±2.0	uA
On-Resistance	R_{ON1}	V_A=0 ~ 0.5V, I_A=30mA	--	3.6	3.9	Ω
	R_{ON2}	V_A=0.5 ~ 2.0V, I_A=30mA	--	3.0	3.5	Ω
	R_{ON3}	V_A=2.0 ~ 4.0V, I_A=30mA	--	2.5	3.5	Ω
	R_{ON4}	V_A=4.0 ~ 5.5V, I_A=30mA	--	1.5	1.8	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

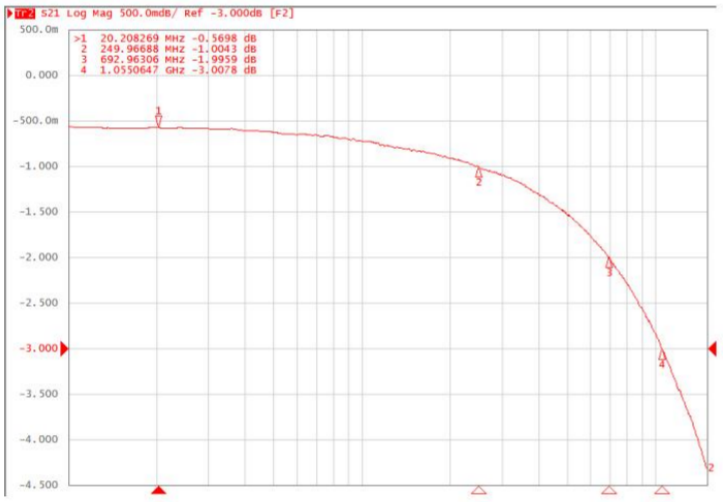
AC Electronics Characteristics (Ta=25°C, VCC=+3.3V, unless otherwise noted)

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=5pF	--	500	--	MHz
		R_L=50Ω, C_L=0pF	--	700	--	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

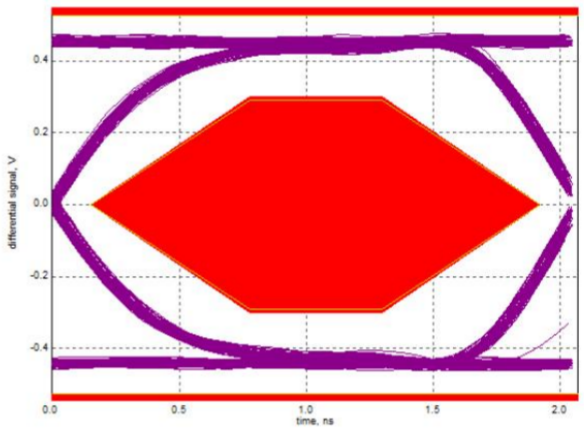
Capacitance (Ta=25°C,VCC=+3.3V, unless otherwise noted)

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

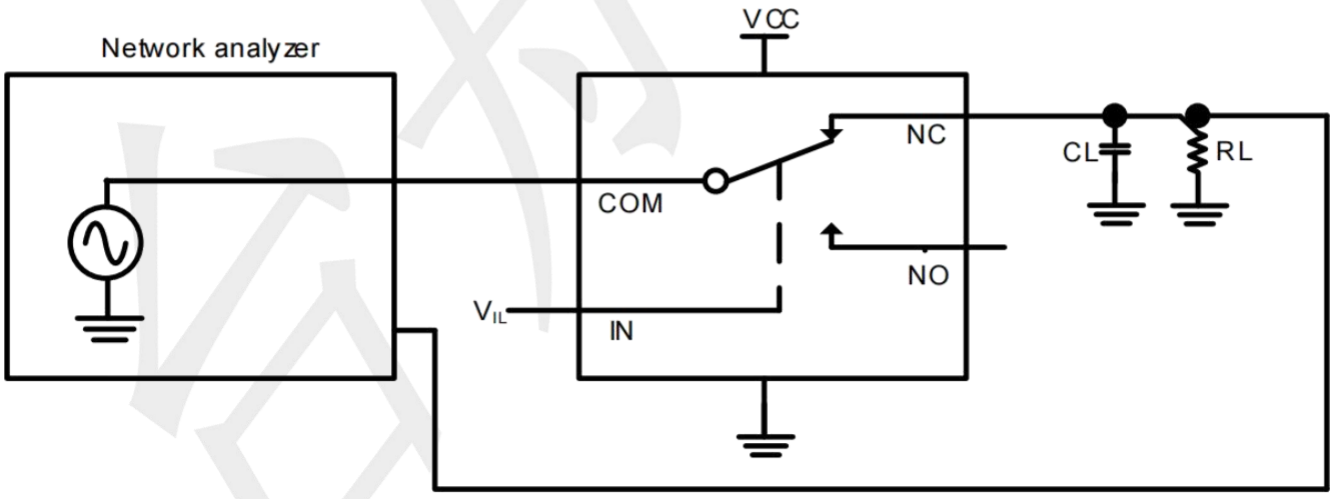
Typical Characteristics (Ta=25oC, VCC=3.3V, unless otherwise noted)



Bandwidth



Eye Diagram (480Mbps)



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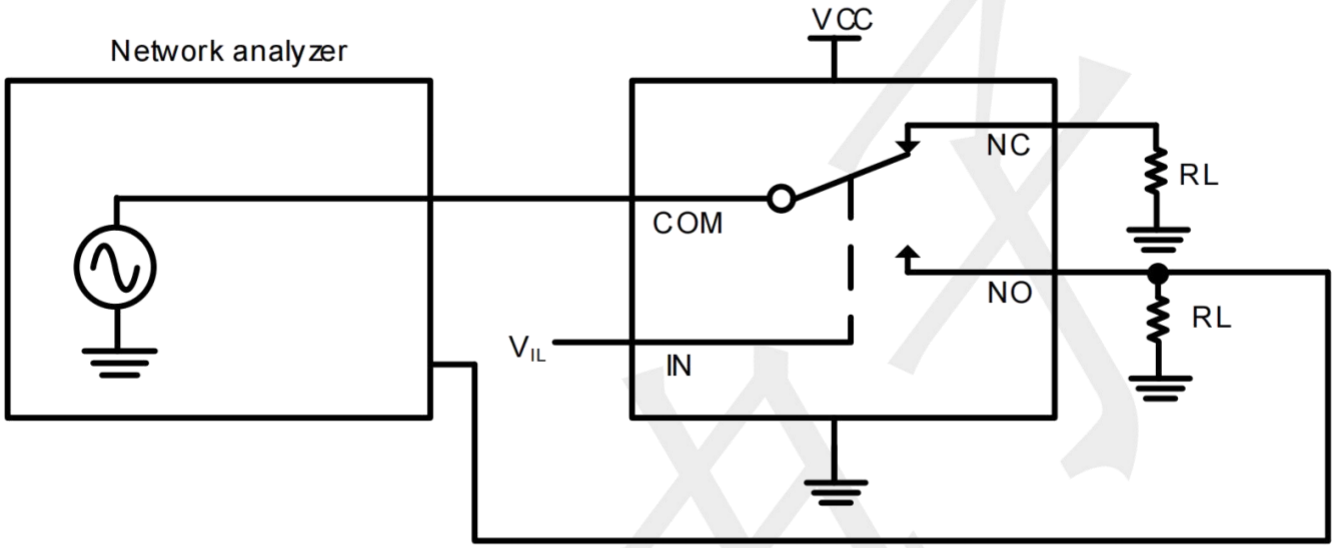
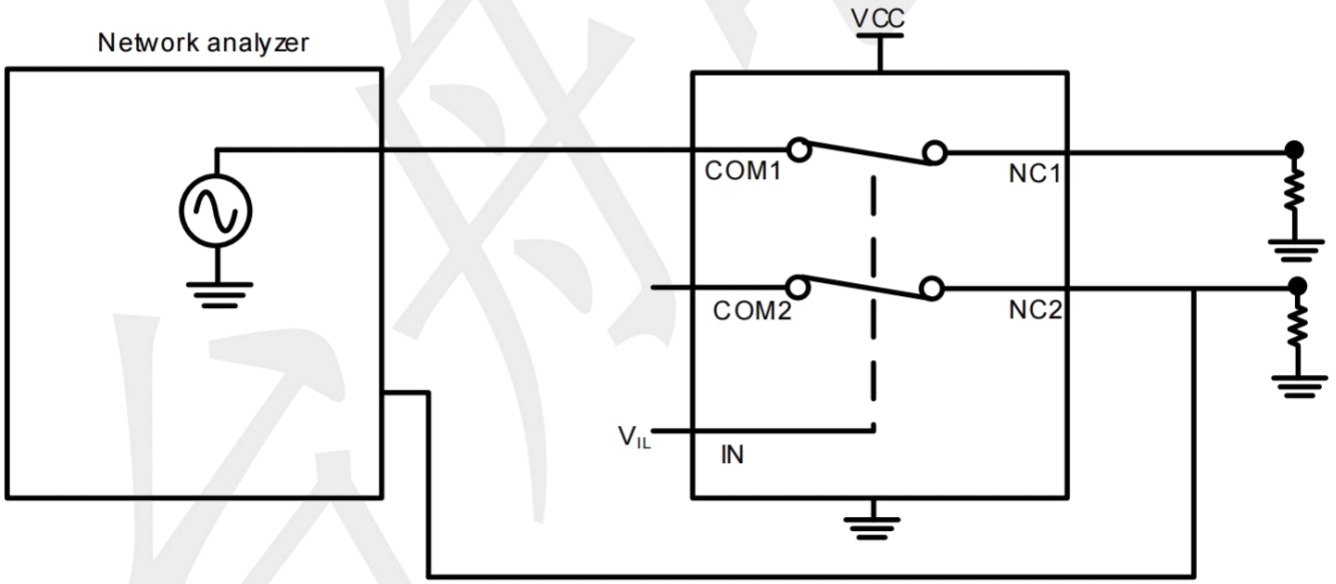


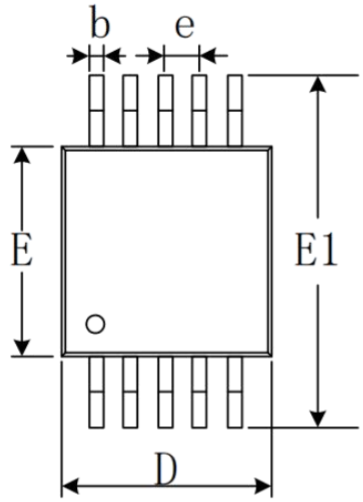
Off isolation

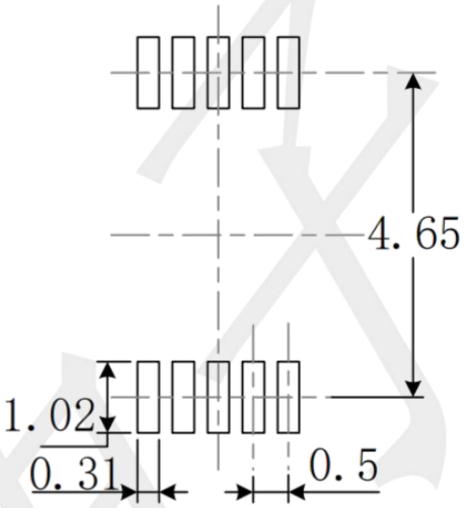


Crosstalk

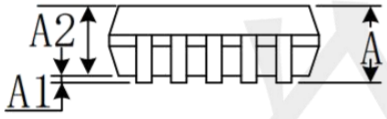
Package information

MSOP-10L





RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.180	0.280	0.007	0.011
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.50(BSC)		0.020(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°