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TPG7227YU

High Speed USB 2.0 (480Mbps) DPDT Analog Switch

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Features

- Low On-resistance, Ron=1.5Ω when VCC =5V
- 1.8V Logic Compatible Control Pin
- High Off-Isolation: -100dB @ 100KHz
- COM+/- Overrides VCC to Achieve True Isolation Even When Supply Is Dead
- Low Channel-to-Channel Crosstalk: -97dB @ 100KHz
- High Bandwidth (-3dB @800MHz) Suitable For USB2.0 High-Speed Routing
- Low Quiescent Current (<2uA) With Very Wide Supply Range (1.5V ~ 5.5V)

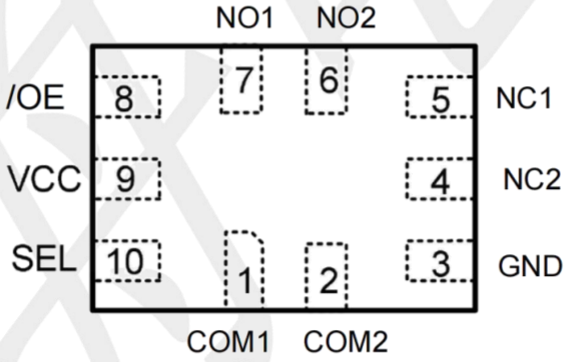
Applications

- Mobile Phones, Tablets and Notebooks
- Anywhere a USB Type-C™ or Micro-B Connector is Used

General Description

The is a bidirectional low-power dual port, high-speed, USB 2.0 analog switch with integrated protection for USB Type-C™ systems. The device is configured as a dual 2:1 or 1:2 switch. It is optimized for use with the USB 2.0 DP/DM lines in a USB Type-C™ system. The device is capable of true isolation. Even when COM+/- overrides VCC, very little current will flow back to the supply.has low bit-to-bit skew and high channel-to-channel noise isolation, and is compatible with various standards, such as high-speed USB 2.0 (480Mbps). Each switch is bidirectional and offers little or no attenuation of the high-speed signals at the outputs. Its bandwidth is wide enough to pass high-speed USB
2.0 differential signals (480 Mb/s) with good signal integrity.

PIN CONFIGURATIONS (TOP VIEW)

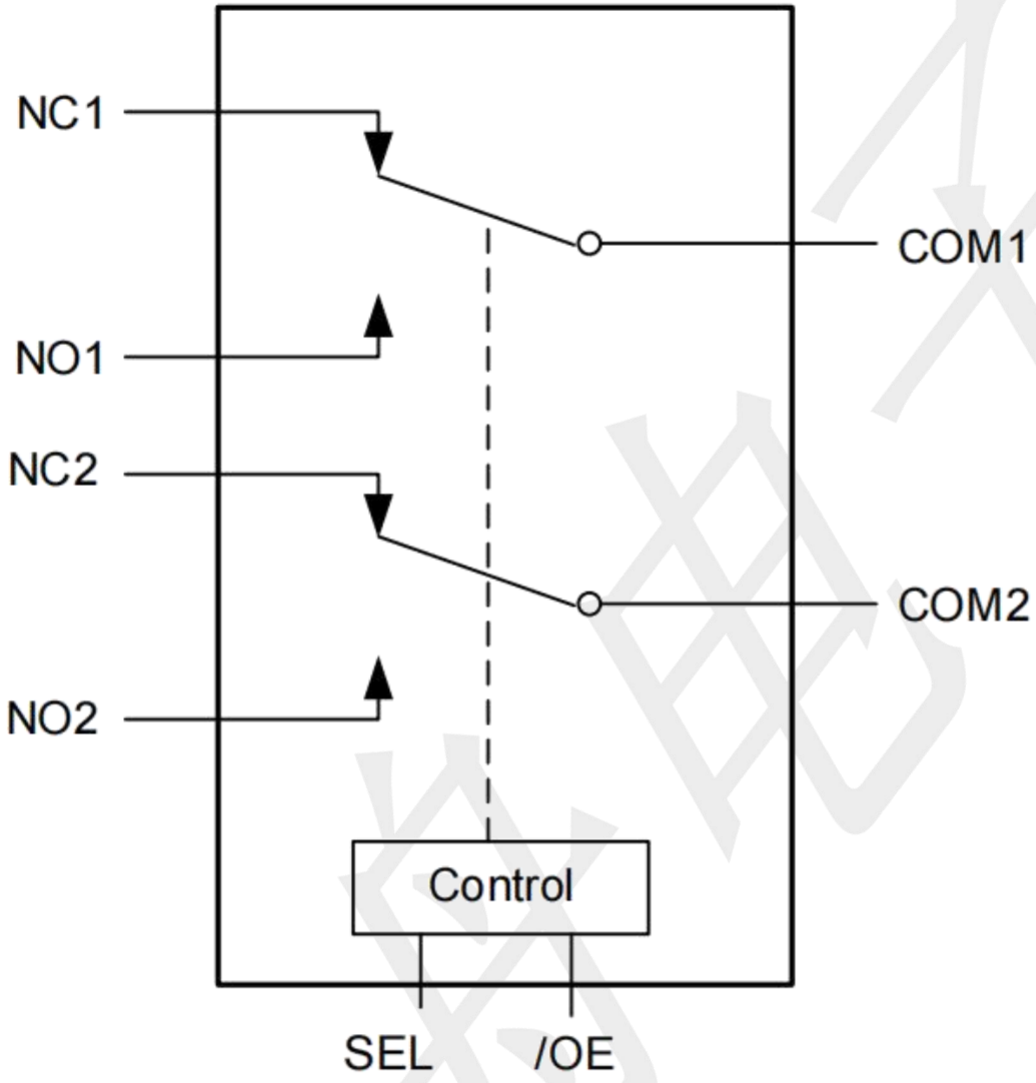


PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	COM1	Port A common data terminal, Connect to NC1 or NO1 according to SEL logic
2	COM2	Port B common data terminal, Connect to NC2 or NO2 according to SEL logic
3	GND	Ground
4	NC 2	Analog/Digital Signal Ports (Normally closed)
5	NC 1	Analog/Digital Signal Ports (Normally closed)
6	NO 2	Analog/Digital Signal Ports (Normally open)
7	NO 1	Analog/Digital Signal Ports (Normally open)
8	/OE	output enable input (active LOW)
9	VCC	Supply voltage
10	SEL	Logic Input Selection

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BLOCK DIAGRAM



Function Table

/OE	Input SEL	Function
0	0	NC1=COM1 and NC2=COM2
0	1	NO1=COM1 and NO2=COM2
1	X	OFF

Switches Shown For Logic “0” Input

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

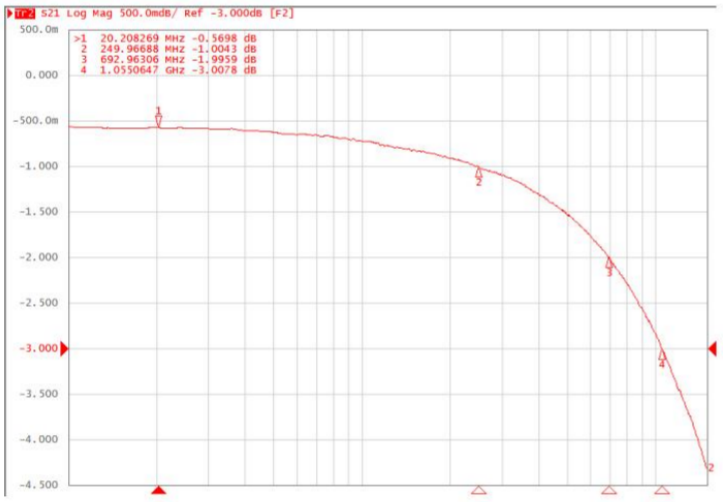
AC Electronics Characteristics (Ta=25°C, VCC=+3.3V, unless otherwise noted)

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	--	550	--	MHz
		R_L=50Ω, C_L=0pF	--	800	--	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

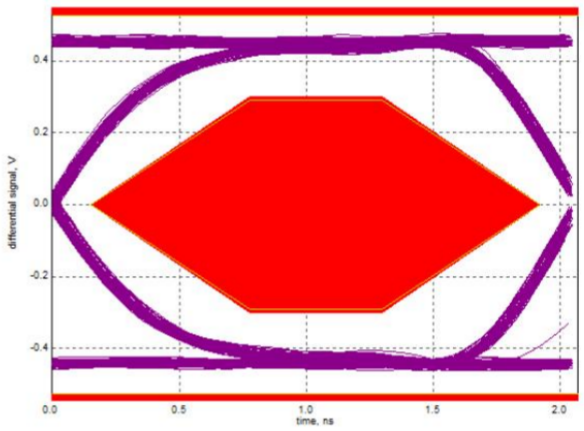
Capacitance (Ta=25°C,VCC=+3.3V, unless otherwise noted)

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

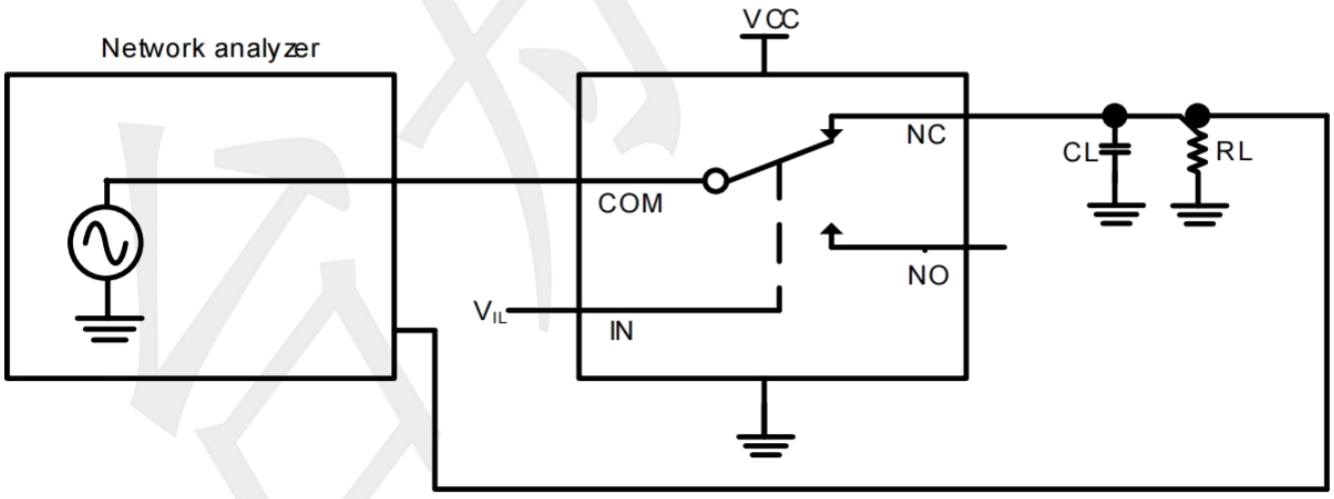
Typical Characteristics (Ta=25oC, VCC=3.3V, unless otherwise noted)



Bandwidth

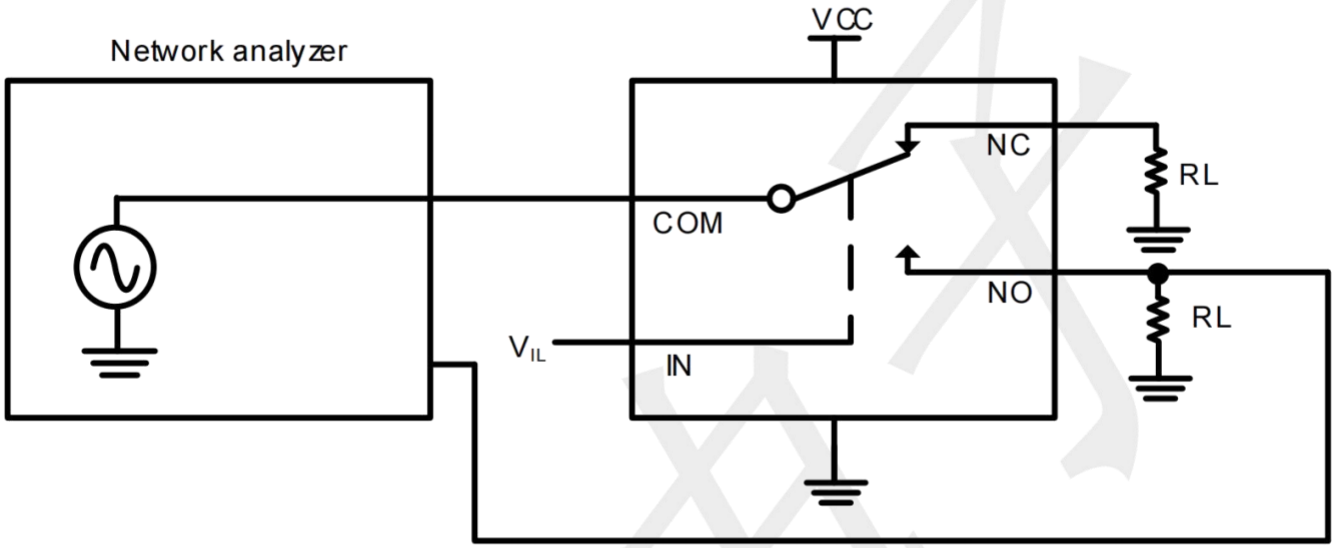


Eye Diagram (480Mbps)

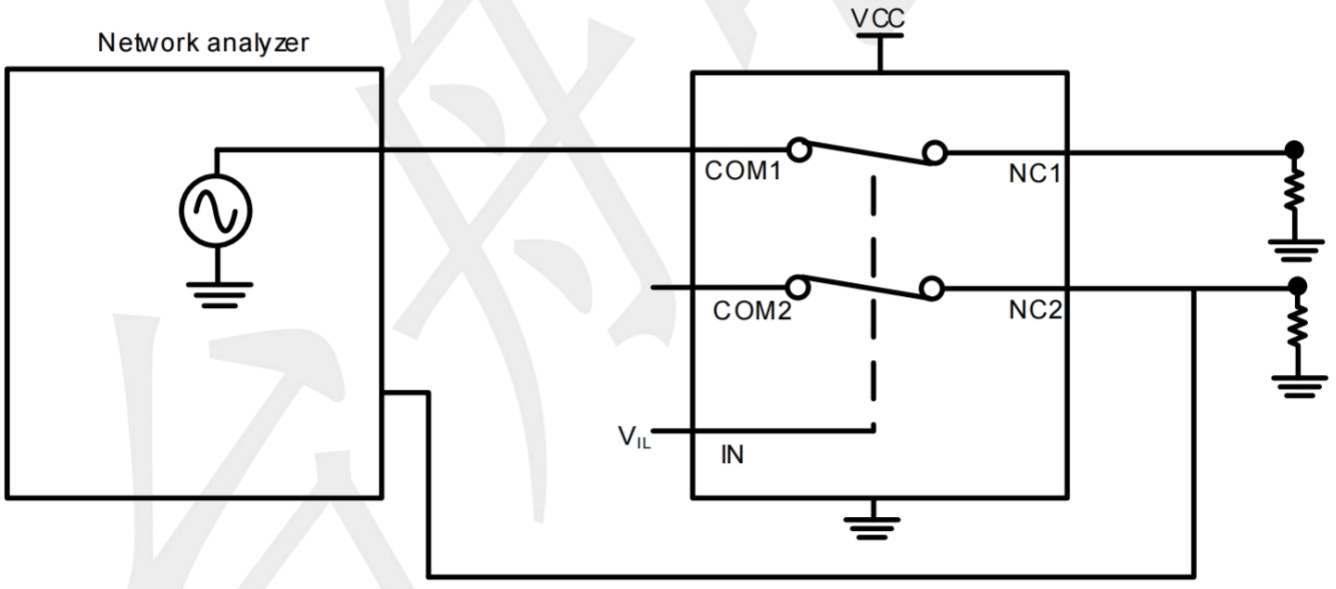


Bandwidth

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



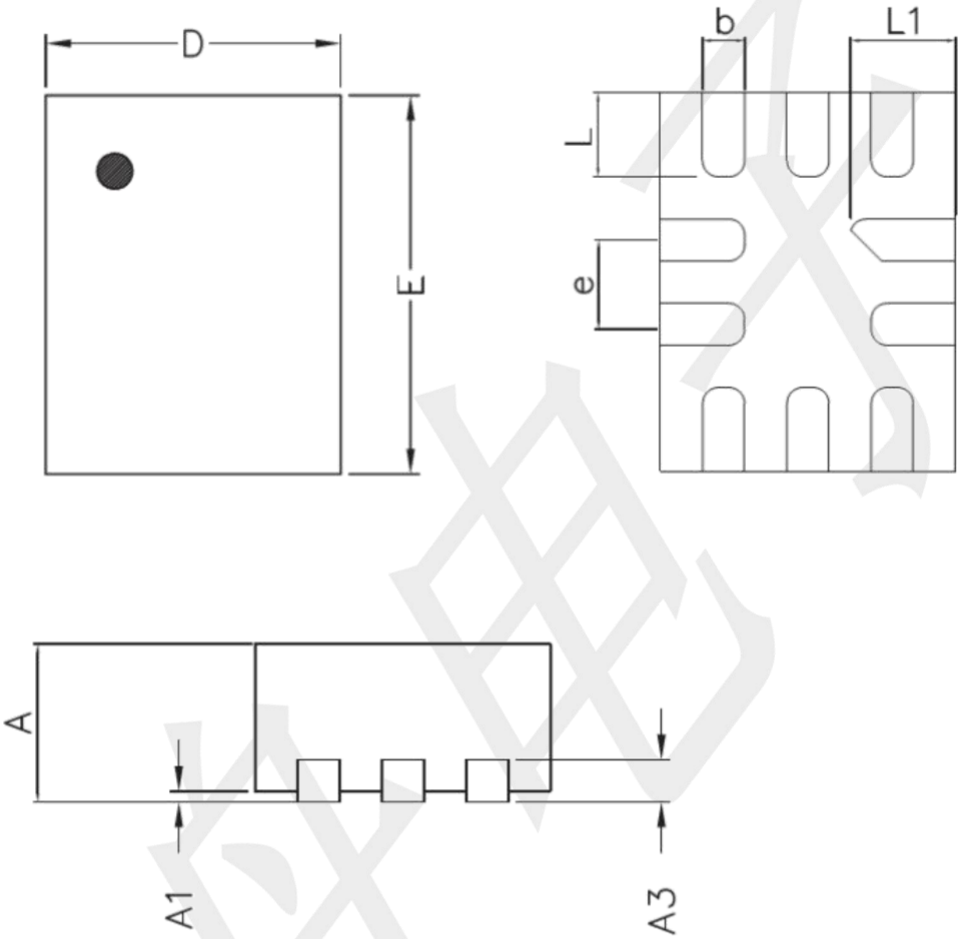
Off isolation



Crosstalk

Package information

QFN1418-10L (Unit: mm)



Symbol	Dimension in Millimeters	
	Min.	Max.
A	0.450	0.550
A1	0.000	0.050
A3	0.152 Ref.	
D	1.350	1.450
E	1.750	1.850
b	0.150	0.250
e	0.400 Typ.	
L	0.350	0.450
L1	0.450	0.550