TECH PUBLIC
台舟电子

TPG4899YF

Low On Resistance, Quad SPDT Analog Switch

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Features

- ultra-low On Resistance：1.5 Ω
- Supply voltage：1.5 ~ 5.5V
- -3dB Bandwidth：700MHz
- Rail-to-Rail Signal Range
- Break-Before-Make Switching
- Low quiescent current over an Expanded Control Input Range

Applications

- Audio and Video Signal Routing
- Other electronics equipment
- LCD Monitor, TV and Set-Top Box
- Cell phones, PDA, Digital Camera and Notebook

General Description

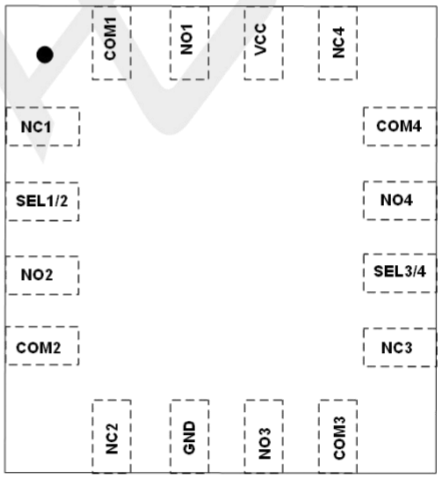
The is a high performance, quad, Single Pole Double Throw (SPDT) analog switch that features ultra-low Ron of 0.5 Ω (typical) at 3.0V VCC. The operates over a wide VCC range of 2.3V to 4.5V and is designed for break-before-make operation. The select input is TTL-level compatible.

The is also featured with smart circuitry to minimize VCC leakage current even when the control voltage is lower than VCC supply voltage. This feature suits mobile handset applications by allowing direct interface with baseband processor general-purpose IO with minimal battery consumption. In other word, there is no need of additional device to shift control level to be the same as that of VCC in real application.

The is available in QFN 3x3-16L package. Standard Products are Pb-free and halogen-free.

PIN CONFIGURATIONS

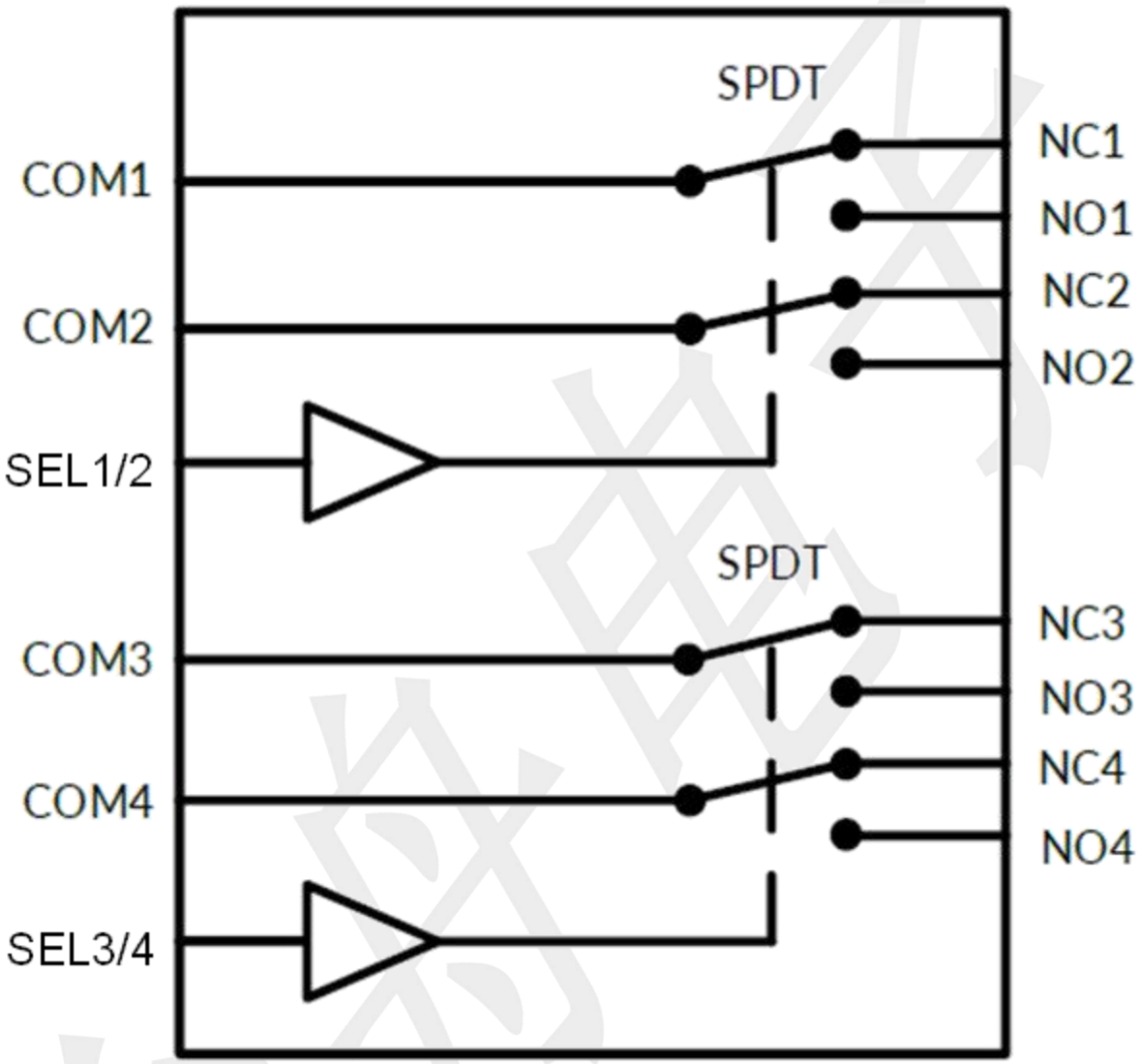
(TOP VIEW)
QFN3X3-16L



PIN DESCRIPTION

NO.	NAME	DESCRIPTION	NO.	NAME	DESCRIPTION
1	NC1	Data Port (Normally closed)	9	NC3	Data Port (Normally closed)
2	SEL1/2	Logic Input Control	10	SEL3/4	Logic Input Control
3	NO2	Data Port (Normally open)	11	NO4	Data Port (Normally open)
4	COM2	Common Data Port	12	COM4	Common Data Port
5	NC2	Data Port (Normally closed)	13	NC4	Data Port (Normally closed)
6	GND	Ground	14	VCC	Supply voltage
7	NO3	Data Port (Normally open)	15	NO1	Data Port (Normally open)
8	COM3	Common Data Port	16	COM1	Common Data Port

BLOCK DIAGRAM



Function Table

SEL1/2, SEL3/4	Function
0	NC1 Connected to COM1, NC2 Connected to COM2 NC3 Connected to COM3, NC4 Connected to COM4
1	NO1 Connected to COM1, NO2 Connected to COM2 NO3 Connected to COM1, NO4 Connected to COM2

Absolute Maximum Ratings

(Unless otherwise specified)

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.3 ~ 6.5	V
Control Input Voltage	V_{IN}	-0.3 ~ 6.5	V
DC Input Voltage (2)	V_{INPUT}	-0.3 ~ 6.5	V
Continuous Current NO_NC_COM_		±100	mA
Peak Current NO_NC_COM_ (pulsed at 1ms 50% duty cycle)		±200	mA
Peak Current NO_NC_COM_ (pulsed at 1ms 10% duty cycle)		±200	mA
Storage Temperature Range	T_{STG}	-65 ~ 150	°C
Junction Temperature under Bias	T_J	150	°C
Lead Temperature (Soldering, 10 seconds)	T_L	260	°C
Power Dissipation	P_D	250	mW

Note: Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied.

Recommend operating ratings

(Unless otherwise specified)

Parameter	Symbol	Value	Unit
Supply Voltage Operating	V_{CC}	1.5 ~ 5.5	V
Control Input Voltage	V_{IN}	0.0 ~ V_{CC}	V
Input Signal Voltage	V_{IS}	0.0 ~ V_{CC}	V
Operating Temperature	T_A	-40 ~ 85	°C
Input Raise and Fall Time(Control Input V_{CC}=2.3~3.6V)	t_r,t_f	0 ~ 10	ns/V
Thermal Resistance	$R_{\theta JA}$	350	°C/W

Note:Control input must be held high or Low, it must not float.

DC Electrical Characteristics

(TA =25°C，VC=+4.5V,unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input logic high level	V_{IH}	VCC: 3.0 ~ 4.5	1.6	--	--	V
		VCC: 2.3 ~ 3.0	1.4	--	--	V
Input logic low level	V_{IL}	VCC: 3.0 ~ 4.5	--	--	0.6	V
		VCC: 2.3 ~ 3.0	--	--	0.4	V
Supply quiescent current	I_{CC}	I_{OUT}=0, V_{IN} =0 or V_{IN} =VCC	--	--	1.0	uA
Increase in I_{CC} per input	I_{CCT}	I_{OUT}=0, VCC=4.5 V_{IN}>1.8 or V_{IN}<0.5	--	--	2.0	uA
Input leakage current	I_{IN}	V_{SEL}=VCC	--	--	±1.0	uA
Off state switch leakage current	I_{OFF}		--	--	±1.0	uA
On state switch leakage current	I_{ON}		--	--	±1.0	uA
On-Resistance	R_{ON}	VCC=4.5V, V_{IS}=0~4.5V, I_{ON}=100mA,	--	1.5	--	Ω
		VCC=3.0V, V_{IS}=0~3.0V, I_{OUT}=100mA,	--	1.8	--	Ω
On-Resistance Matching Between Channels	ΔR_{ON}	VCC=4.5V, V_{IS}=0.8V, I_{OUT}=100mA,	--	0.1	--	Ω
		VCC=3.0V, V_{IS}=0.8V, I_{OUT}=100mA,	--	0.14	--	Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	VCC=4.5V, V_{IS}=0~4.5V, I_{OUT}=100mA,	--	--	0.5	Ω
		VCC=3.0V, V_{IS}=0~3.0V, I_{OUT}=100mA,	--	--	0.8	Ω

AC Electronics Characteristics

(Ta=25°C, VCC=+4.5V, unless otherwise noted)

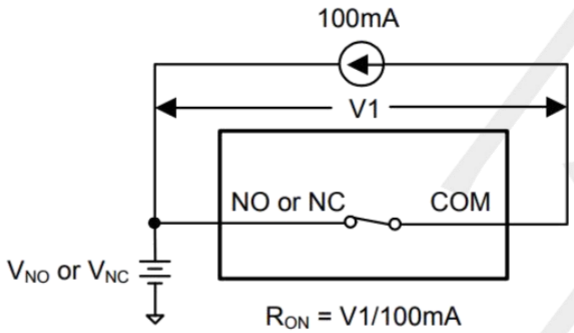
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Time	T_{ON}	VCC=4.5V, V_{IS}=1.5V, C_L=35pF, R_L=50Ω	--	200	--	ns
Turn-Off Time	T_{OFF}	VCC=4.5V, V_{IS}=1.5V, C_L=35pF, R_L=50Ω	--	200	--	ns
Break-Before-Make time	T_{BBM}	Generate by design	--	100	--	ns
-3dB Bandwidth	BW	R_L=50Ω, C_L=0pF	--	700	--	MHz
Off isolation (Per Channel)	OIRR	F=100KHz, R_L=50Ω	--	-50	--	dB
Crosstalk (Channel to Channel)	Xtalk	F=100KHz, R_L=50Ω	--	-50	--	dB
Total Harmonic Distortion	THD	F=20Hz to 20KHz R_L=32Ω, V_{IS}=0.5Vp-p	--	-80	--	dB

Capacitance

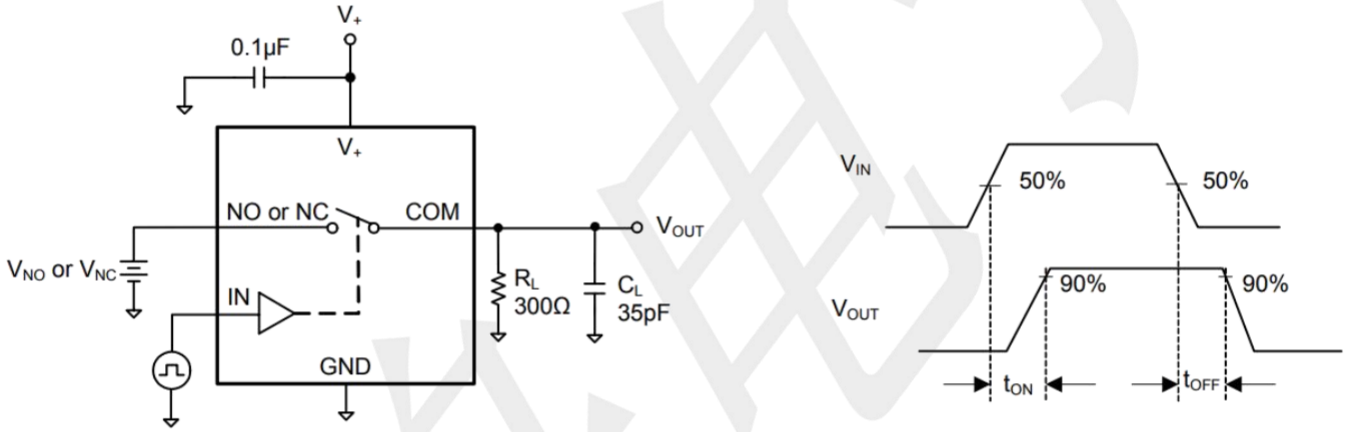
(Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off capacitance	C_{OFF}	F=1MHz, VCC=3.3V	--	5	--	pF
On capacitance	C_{ON}	F=1MHz, VCC=3.3V	--	8	--	pF

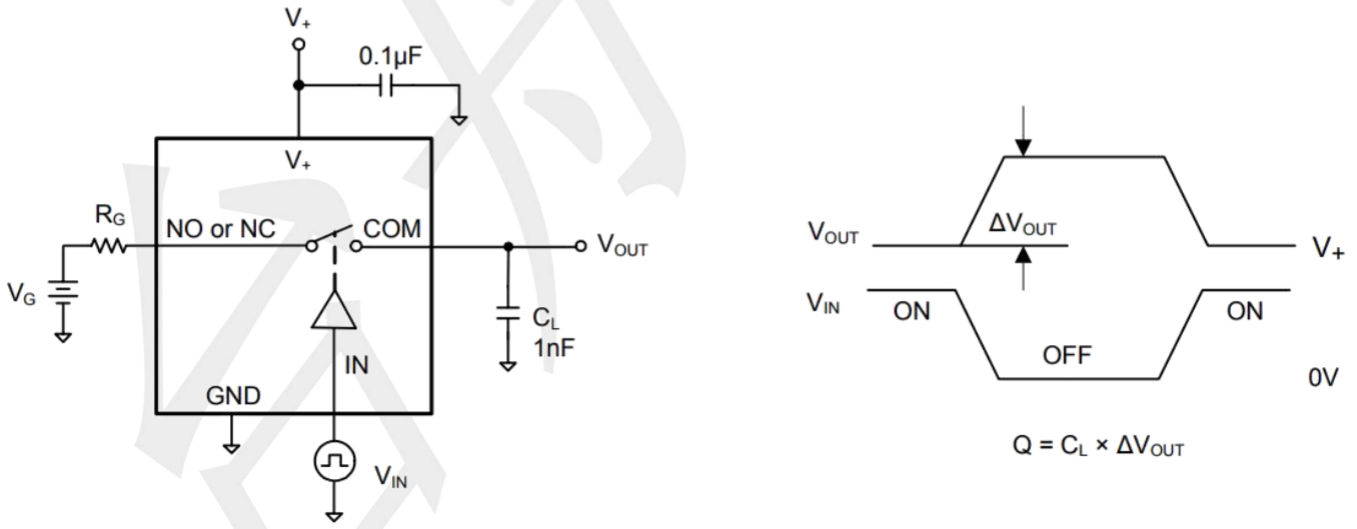
TEST CIRCUITS



Test Circuit 1. On Resistance



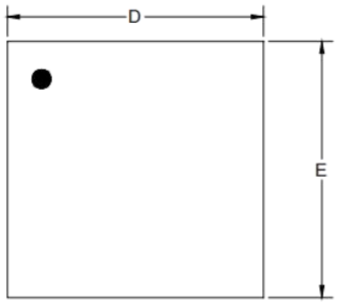
Test Circuit 2. Switching Times (t_{ON}, t_{OFF})



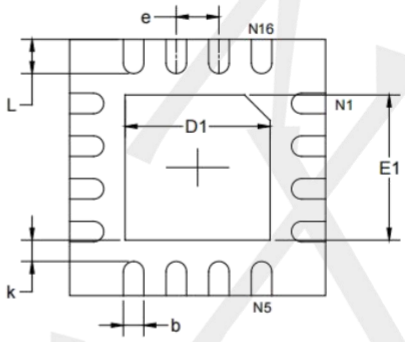
Test Circuit 3. Charge Injection

Package information

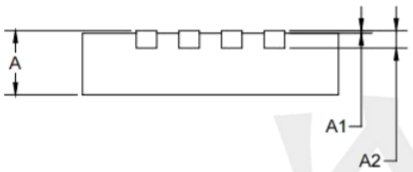
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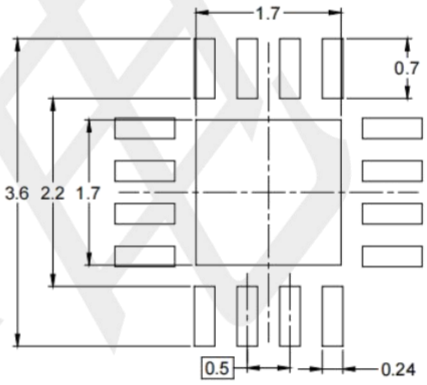
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	2.900	3.100	0.114	0.122
D1	1.600	1.800	0.063	0.071
E	2.900	3.100	0.114	0.122
E1	1.600	1.800	0.063	0.071
k	0.200 MIN		0.008 MIN	
b	0.180	0.300	0.007	0.012
e	0.500 TYP		0.020 TYP	
L	0.300	0.500	0.012	0.020