WAS4723Q

Low On Resistance, Dual SPDT Analog Switch

Http//:www.willsemi.com

Descriptions

The WAS4723Q is a high performance, dual Single Pole Double Throw (SPDT) analog switch that features ultra-low Ron of 0.5 Ω (typical) at 3.0V VCC. The WAS4723Q operates over a wide VCC range of 2.3V to 5.5V and is designed for break-before-make operation. The select input is TTL-level compatible.

WAS4723Q 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 WAS4723Q is available in QFN1418-10L package. Standard product is Pb-Free and halogen-Free.
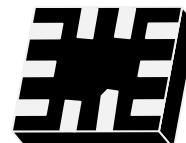
QFN1418-10L
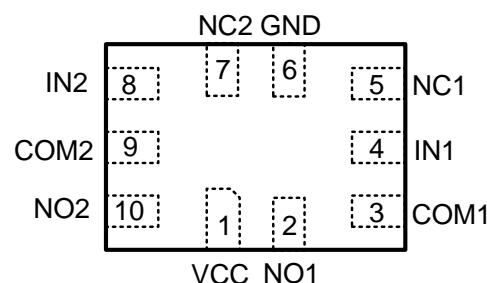
Pin configuration (Top view)

Features

- Supply voltage   : 2.3 ~ 5.5V
- ultra-low On Resistance : 0.5 Ω
- High Off isolation   : -81dB @ 1KHz
- Crosstalk Rejection   : -83dB @ 1KHz
- -3dB Bandwidth   : 50MHz
- Rail-to-Rail Signal Range
- Break-Before-Make Switching
- Low quiescent current over an Expanded Control Input Range
- HBM JEDEC: JESD22-A114
  - ◆ IO to GND   : ±8KV
  - ◆ Power to GND   : ±5KV
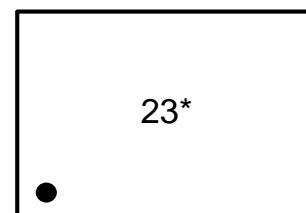
23 = Device code

* = Month (A~Z)

Marking

Applications

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

Order information

Device	Package	Shipping
WAS4723Q-10/TR	QFN1418-10L	3000/Reel&Tape

Pin descriptions

Pin Number	Symbol	Descriptions
2,10	NO_X	Data Port(Normally open)
6	GND	Ground
5,7	NC_X	Data Port(Normally closed)
3,9	COM_X	Common Data Port
1	VCC	Positive Power Supply
4,8	IN_X	Logic Control

Function descriptions

Logic Input(IN_X)	Function
0	NC_X Connected to COM_X
1	NO_X Connected to COM_X

Note: $_X$**=1 or 2**

Functional Block Diagram
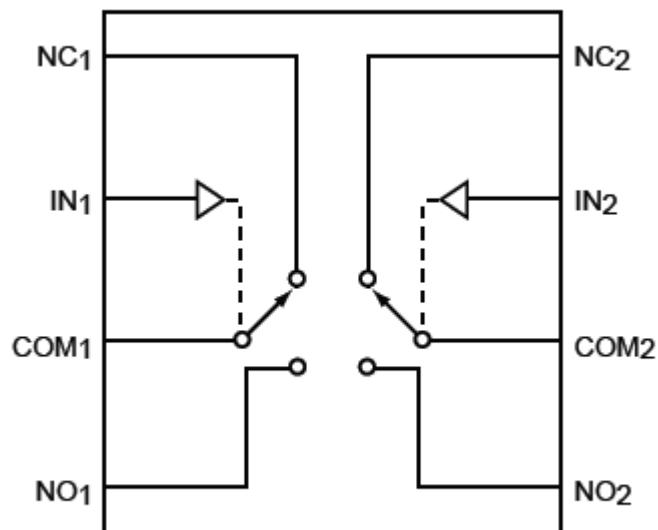
Absolute Maximum Ratings [1]

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.3 ~ 6.5	V
Control Input Voltage	VIN_X	-0.3 ~ 6.5	V
DC Input Voltage [2]	V_{INPUT}	-0.3 ~ 6.5	V
Continuous Current NO_NC_COM_		±300	mA
Peak Current NO_NC_COM_ (pulsed at 1ms 50% duty cycle)		±400	mA
Peak Current NO_NC_COM_ (pulsed at 1ms 10% duty cycle)		±500	mA
Storage Temperature Range	T_{STG}	-65 ~ 150	^{o}C
Junction Temperature under Bias	T_J	150	^{o}C
Lead Temperature (Soldering, 10 seconds)	T_L	260	^{o}C
Power Dissipation	P_D	250	mW

Recommend operating ratings [3]

Parameter	Symbol	Value	Unit
Supply Voltage Operating	V_{CC}	2.3 ~ 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	^{o}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	$^{o}C/W$

Note:

1. "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.

2. The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.

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

## DC Electronics Characteristics (Ta=25°C, VCC=4.5V, unless otherwise noted)

| 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,		0.5		Ω
		VCC=3.0V, V_{IS}=0~3.0V, I_{OUT}=100mA,		0.6		Ω
On-Resistance Matching Between Channels	ΔR_{ON}	VCC=4.5V, V_{IS}=0.8V, I_{OUT}=100mA,		0.08		Ω
		VCC=3.0V, V_{IS}=0.8V, I_{OUT}=100mA,		0.12		Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	VCC=4.5V, V_{IS}=0~4.5V, I_{OUT}=100mA,			0.2	Ω
		VCC=3.0V, V_{IS}=0~3.0V, I_{OUT}=100mA,			0.2	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		50		MHz
Off isolation (Per Channel)	OIRR	F=1KHz, R_L=50Ω		-81		dB
		F=10KHz, R_L=50Ω		-80		dB
Crosstalk (Channel to Channel)	Xtalk	F=1KHz, R_L=50Ω		-83		dB
		F=10KHz, R_L=50Ω		-82		dB
Total Harmonic Distortion	THD	F=20Hz to 20KHz R_L=32Ω, V_{IS}=2Vp-p		0.02		%

Capacitance (Ta=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off capacitance	C_{OFF}	F=100KHz, VCC=3.3V		40		pF
On capacitance	C_{ON}	F=100KHz, VCC=3.3V		100		pF

Typical Characteristics (Ta=25°C, VCC=4.5V, unless otherwise noted)
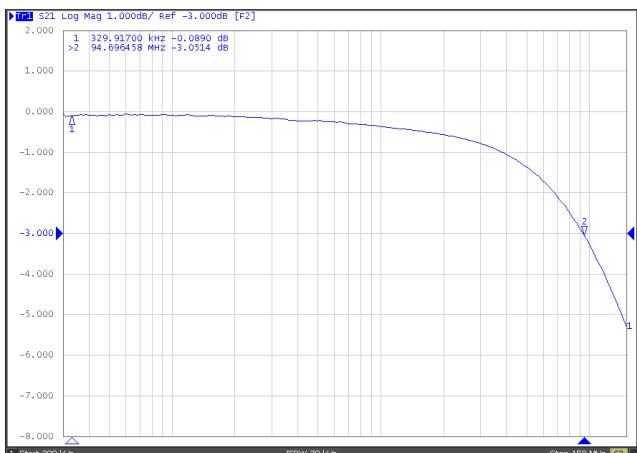
Bandwidth (BW)
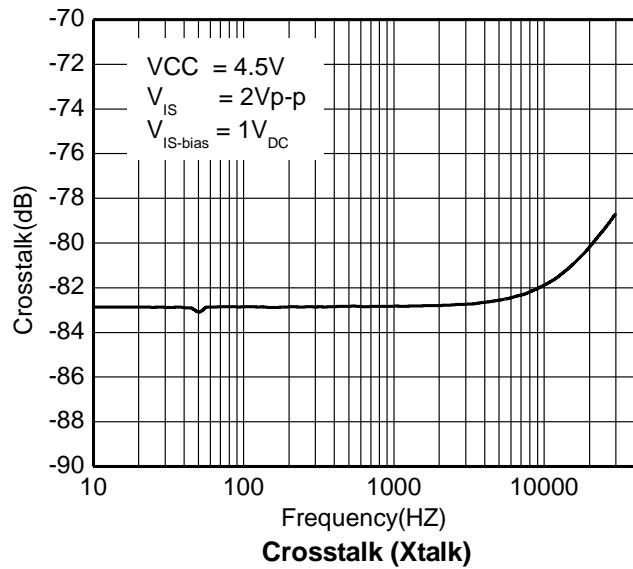
Crosstalk (Xtalk)
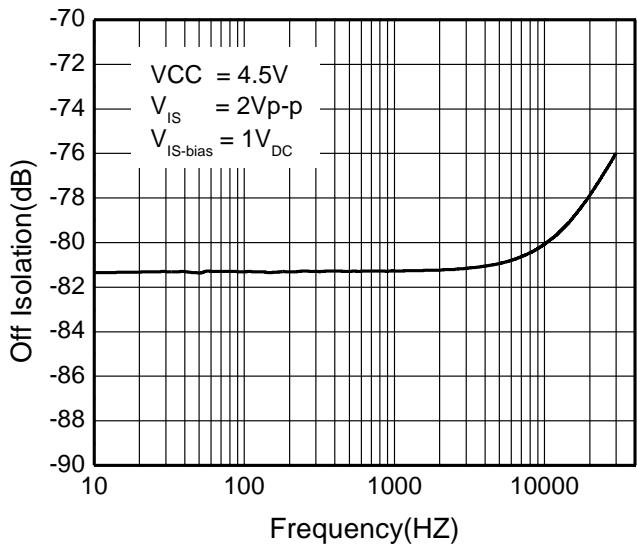
Off Isolation
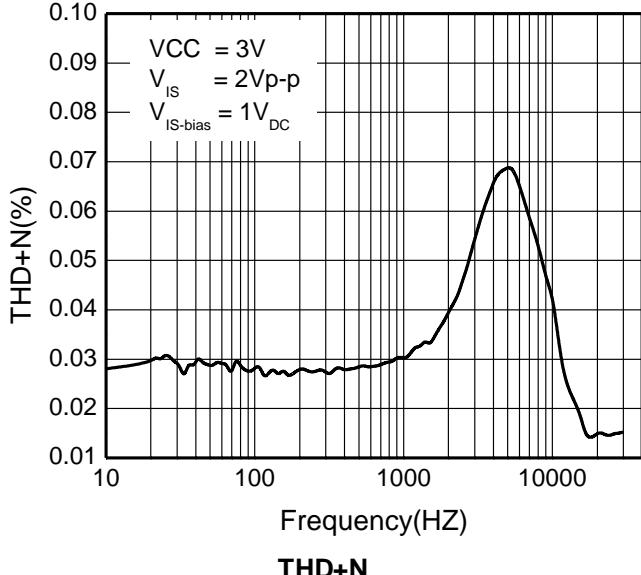
THD+N

Test Circuits

$$Ron = V / I_O$$
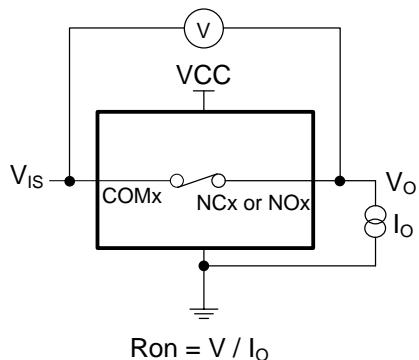
ON-Resistance (R$_{ON}$)
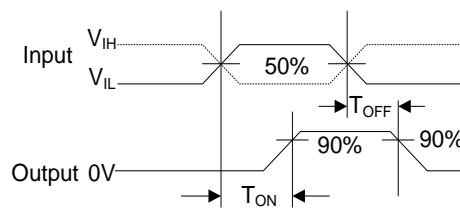
ON/OFF Time Waveforms (T$_{ON}$ / T$_{OFF}$)
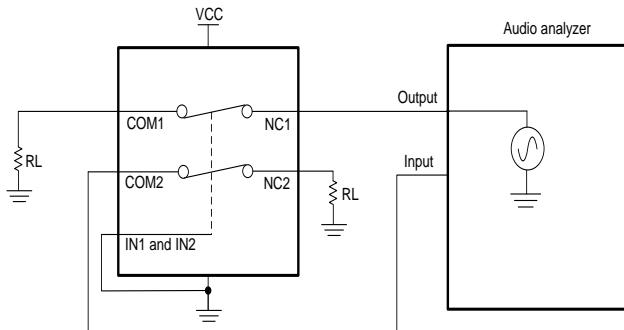
Crosstalk (Xtalk)
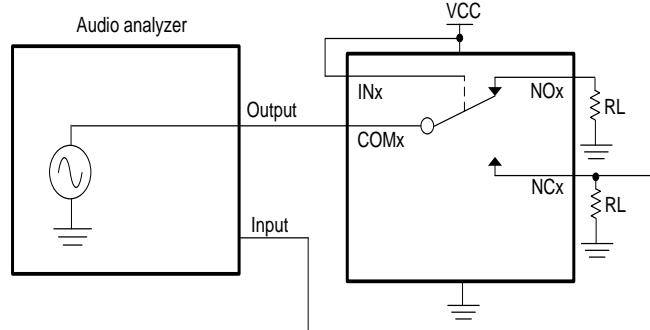
Off isolation (OIRR)
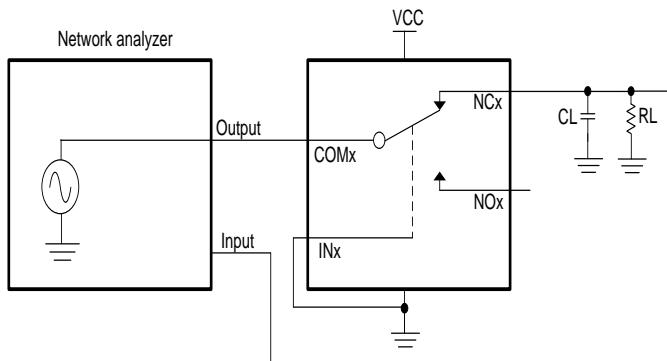
Bandwidth (BW)
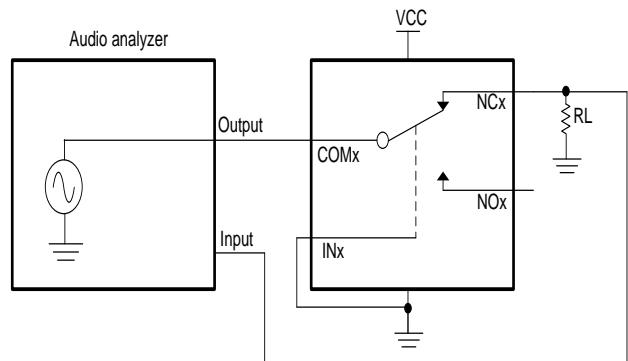
THD+N

Package outline dimensions

QFN1418-10L
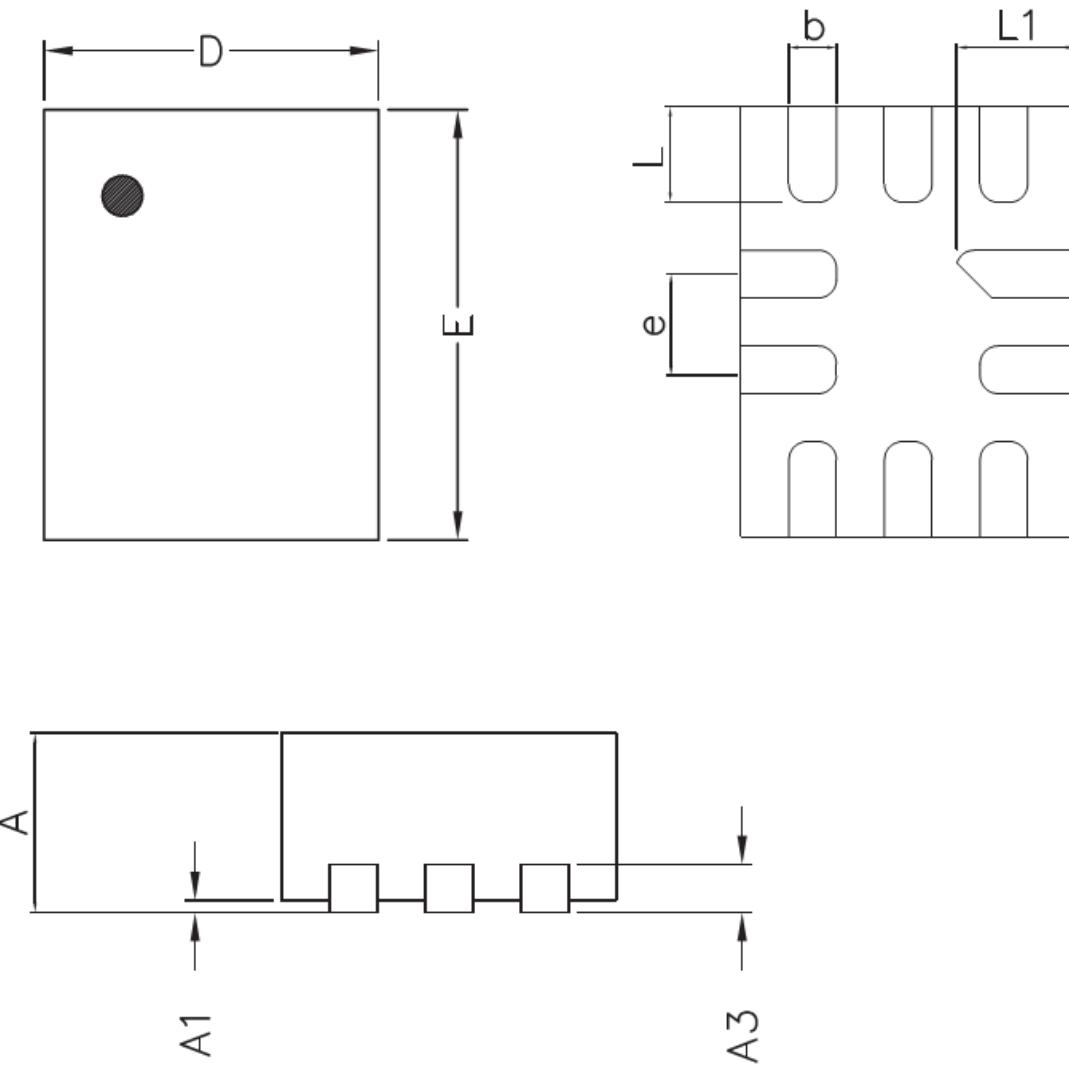
Symbol	Dimension in Millimeters	
	Min.	**Max.**
A	0.450	0.550
A1	0.000	0.050
A3	0.152 Ref.	
D	1.350	1.450
E	1.750	1.850
b	0.150	0.250
e	0.400 Typ.	
L	0.350	0.450
L1	0.450	0.550