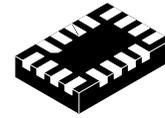


# DATA/AUDIO Low-Voltage Dual DPDT Analog Switch

## FSA2466



UQFN16 1.8x2.6, 0.4P  
 CASE 523BF

### Description

The FSA2466 is a dual Double-Pole, Double-Throw (DPDT) analog switch. The FSA2466 operates from a single 1.65 V to 4.45 V supply and features an ultra-low on resistance of 2 Ω at a +2.7 V supply and  $T_A = 25^\circ\text{C}$ . This device is fabricated with sub-micron CMOS technology to achieve fast switching speeds and is designed for break-before-make operation.

FSA2466 features very low quiescent current even when the control voltage is lower than the  $V_{CC}$  supply. This allows mobile handset applications direct interface with the baseband processor general-purpose I/Os.

### Features

Switch Type	DPDT (2x)
Input Type	Data / Audio Switch
Input Signal Range	0 to $V_{CC}$
$V_{CC}$	1.65 to 4.45 V
$R_{ON}$	2.5 Ω at 2.7 V
$R_{FLAT}$	0.8 Ω at 2.7 V
ESD	8 kV HBM
Bandwidth	245 MHz
$C_{ON}$ at 240 MHz	16 pF
$C_{OFF}$ at 240 MHz	6.0 pF
Features	Low $I_{CTT}$
Package	16-Lead UMLP 1.80 x 2.60 x 0.55 mm, 0.40 mm pitch
Top Mark	KA
Ordering Information	FSA2466UMX

### Applications

- MP3 Portable Media Players
- Cellular Phones, Smartphones

### MARKING DIAGRAM

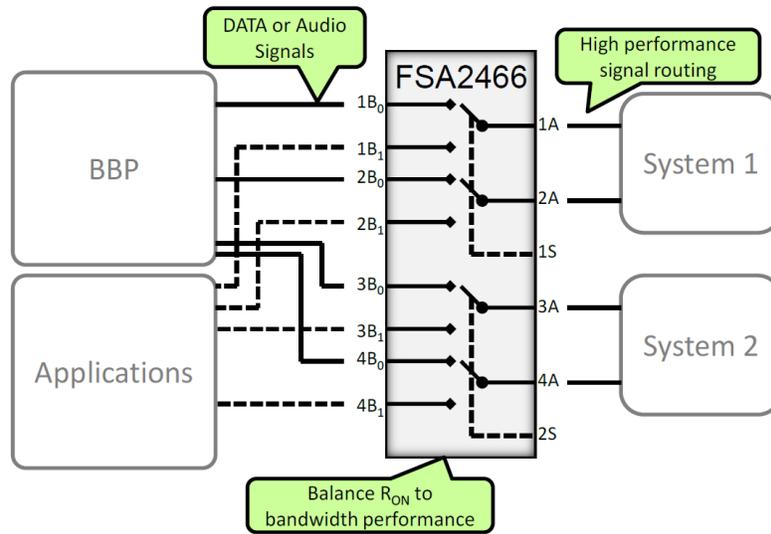


- KA = Specific Device Code
- &K = 2-Digits Lot Run Traceability Code
- &2 = 2-Digit Date Code
- &Z = Assembly Plant Code

### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

# FSA2466



**Figure 1. Typical Mobile Phone Application**

## ORDERING INFORMATION

Part Number	Top Mark	Operating Temperature Range	Package	Shipping <sup>†</sup>
FSA2466UMX	KA	-40 to 85°C	16-Lead, Quad, Ultrathin Molded Leadless Package (UMLP), 1.8 x 2.6 mm	5000 / Tape & Reel

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# FSA2466

## Pin Configuration

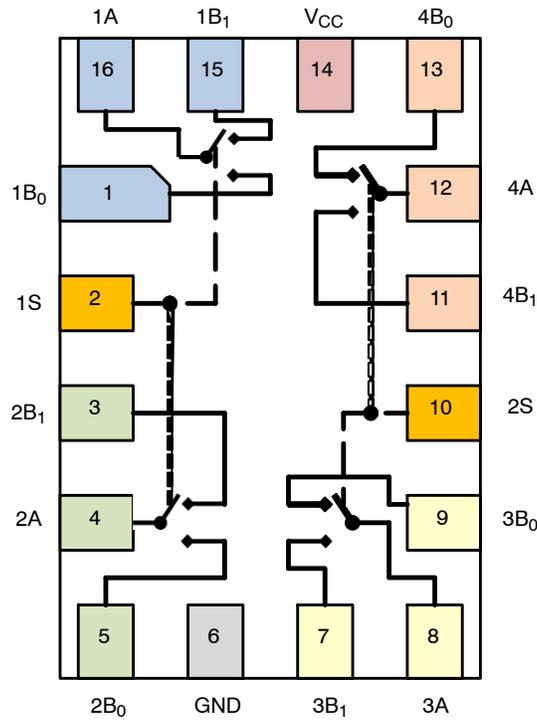


Figure 2. FSA2466UMX (Top View)

## PIN DESCRIPTIONS

Pin #	Name	Type	Description					
1	1B <sub>0</sub>	I/O	Data / Audio Port					
2	1S	Input	Control Input for Data & Common Ports 1 & 2	<table border="1"> <tr> <td>0</td> <td>1B<sub>0</sub> = 1A &amp; 2B<sub>0</sub> = 2A</td> </tr> <tr> <td>1</td> <td>1B<sub>1</sub> = 1A &amp; 2B<sub>1</sub> = 2A</td> </tr> </table>	0	1B <sub>0</sub> = 1A & 2B <sub>0</sub> = 2A	1	1B <sub>1</sub> = 1A & 2B <sub>1</sub> = 2A
0	1B <sub>0</sub> = 1A & 2B <sub>0</sub> = 2A							
1	1B <sub>1</sub> = 1A & 2B <sub>1</sub> = 2A							
3	2B <sub>1</sub>	I/O	Data / Audio Port					
4	2A	I/O	Data / Audio Common Port					
5	2B <sub>0</sub>	I/O	Data / Audio Port					
6	GND	GND						
7	3B <sub>1</sub>	I/O	Data / Audio Port					
8	3A	I/O	Data / Audio Common Port					
9	3B <sub>0</sub>	I/O	Data / Audio Port					
10	2S	Input	Control Input for Data & Common Ports 3 & 4	<table border="1"> <tr> <td>0</td> <td>3B<sub>0</sub> = 3A &amp; 4B<sub>0</sub> = 4A</td> </tr> <tr> <td>1</td> <td>3B<sub>1</sub> = 3A &amp; 4B<sub>1</sub> = 4A</td> </tr> </table>	0	3B <sub>0</sub> = 3A & 4B <sub>0</sub> = 4A	1	3B <sub>1</sub> = 3A & 4B <sub>1</sub> = 4A
0	3B <sub>0</sub> = 3A & 4B <sub>0</sub> = 4A							
1	3B <sub>1</sub> = 3A & 4B <sub>1</sub> = 4A							
11	4B <sub>1</sub>	I/O	Data / Audio Port					
12	4A	I/O	Data / Audio Common Port					
13	4B <sub>0</sub>	I/O	Data / Audio Port					
14	VCC	Supply	Voltage supply					
15	1B <sub>1</sub>	I/O	Data / Audio Port					
16	1A	I/O	Data / Audio Common Port					

# FSA2466

## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Min	Max	Unit
V <sub>CC</sub>	Supply Voltage	-0.50	5.25	V
V <sub>S</sub>	Switch Voltage	-0.5	V <sub>CC</sub> + 0.3	V
V <sub>IN</sub>	Input Voltage	-0.5	5.0	V
I <sub>IK</sub>	Input Diode Current	-50		mA
I <sub>SW</sub>	Switch Current		350	mA
I <sub>SWPEAK</sub>	Peak Switch Current (Pulsed at 1 ms Duration, <10% Duty Cycle)		500	mA
T <sub>STG</sub>	Storage Temperature Range	-65	+150	°C
T <sub>J</sub>	Junction Temperature		+150	°C
T <sub>L</sub>	Lead Temperature, Soldering 10 seconds		+260	°C
ESD	Human Body Model, JESD22-A114	I/O to GND	8	kV
		Power to GND	8	
		All Other Pins	8	
	Charged Device Model, JEDEC: JESD22-C101		2	

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

## RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V <sub>CC</sub>	Supply Voltage (Note 1)	1.65	4.45	V
V <sub>IN</sub>	Control Input Voltage (Note 2)	0	V <sub>CC</sub>	V
V <sub>S</sub>	Switch Input Voltage	0	V <sub>CC</sub>	V
TA	Operating Temperature	-40	+85	°C

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

1. For 4.45 V operation, SEL frequency (pins 1S & 2S) should not exceed 100 Hz and 100 ns edge rate.
2. Unused inputs must be held HIGH or LOW. They may not float.

**DC ELECTRICAL CHARACTERISTICS**

(Typical values are at  $T_A = 25^\circ\text{C}$  unless otherwise specified.)

Symbol	Parameter	Condition	$V_{CC}$ (V)	$T_A = +25^\circ\text{C}$			$T_A = -40 \text{ to } +85^\circ\text{C}$		Unit
				Min.	Typ.	Max.	Min.	Max.	
$V_{IH}$	Input Voltage High		4.30				1.4		V
			2.70 to 3.60				1.3		
			2.30 to 2.70				1.1		
			1.65 to 1.95				0.9		
$V_{IL}$	Input Voltage Low		4.30					0.7	V
			2.70 to 3.60					0.5	
			2.30 to 2.70					0.4	
			1.65 to 1.95					0.4	
$I_{IN}$	Control Input Leakage	$V_{IN} = 0 \text{ V to } V_{CC}$	1.65 to 4.30				-0.5	0.5	$\mu\text{A}$
$I_{NO(OFF)}$ $I_{NC(OFF)}$	Off Leakage Current of Port nB0 and nB1	$nA=0.3 \text{ V, } V_{CC}=0.3\text{V}$	1.95 to 4.30	-10		10	-50	50	nA
		$nB_0 \text{ or } nB_1=0.3 \text{ V, } V_{CC}=0.3\text{V or Floating}$							
$I_{A(ON)}$	On Leakage Current of Port A	$nA = 0.3 \text{ V, } V_{CC}=0.3\text{V}$	1.95 to 4.30	-10		10	-50	50	nA
		$nB_0 \text{ or } nB_1 = 0.3 \text{ V, } V_{CC}=0.3\text{V or Floating}$							
$R_{ON}$	Switch On Resistance (Note 3)	$I_{OUT}=100 \text{ mA}$	4.30		1.6			2.0	$\Omega$
		$I_{OUT}=100 \text{ mA, } nB_0 \text{ or } nB_1=0 \text{ V, } 0.7 \text{ V, } 1.2 \text{ V, } V_{CC}$	2.70		2.0			2.5	
			2.30		2.2			2.7	
		$I_{OUT}=100\text{mA, } nB_0 \text{ or } nB_1=0.7 \text{ V}$	1.80		4.3			6.0	
$\Delta R_{ON}$	On Resistance Matching Between Channels (Note 4)	$I_{OUT}=100 \text{ mA, } nB_0 \text{ or } nB_1=0.8 \text{ V}$	2.70		0.04			0.20	$\Omega$
		$I_{OUT}=100 \text{ mA, } nB_0 \text{ or } nB_1=0.7 \text{ V}$	2.30		0.03			0.30	
$R_{FLAT(ON)}$	On Resistance Flatness (Note 5)	$I_{OUT}=100 \text{ mA, } nB_0 \text{ or } nB_1 = 0\text{V} \rightarrow V_{CC}$	2.70		0.60			0.8	$\Omega$
			2.30		0.75			0.9	
$I_{CC}$	Quiescent Supply Current	$V_{IN}=0 \text{ V to } V_{CC}, I_{OUT}=0 \text{ V}$	4.30	-100		100	-500	500	nA
$I_{CCT}$	Increase in $I_{CC}$ Current per Control Voltage	$V_{IN}=1.8 \text{ V}$	4.30		7	12		15	$\mu\text{A}$
		$V_{IN}=2.6 \text{ V}$	4.30		3	6		7	

3. On resistance is determined by the voltage drop between the A and B pins at the indicated current through the switch.
4.  $\Delta R_{ON}=R_{ON \text{ max}} - R_{ON \text{ min}}$  measured at identical  $V_{CC}$ , temperature, and voltage.
5. Flatness is defined as the difference between the maximum and minimum value of on resistance over the specified range of conditions.

# FSA2466

## AC ELECTRICAL CHARACTERISTICS

(Typical values are at  $T_A = 25^\circ\text{C}$  unless otherwise specified.)

Symbol	Parameter	Condition	$V_{CC}$	$T_A = +25^\circ\text{C}$			$T_A = -40 \text{ to } +85^\circ\text{C}$		Unit	Figure
				Min.	Typ.	Max.	Min.	Max.		
$t_{ON}$	Turn-On Time	$nB_0$ or $nB_1=1.5\text{ V}$ $R_L=50\ \Omega$ , $C_L=35\ \text{pF}$	3.6 to 4.3			50		60	ns	Figure 3
			2.7 to 3.6			65		75		
			2.3 to 2.7			80		90		
$t_{OFF}$	Turn-Off Time	$nB_0$ or $nB_1=1.5\text{ V}$ $R_L=50\ \Omega$ , $C_L=35\ \text{pF}$	3.6 to 4.3			32		40	ns	Figure 3
			2.7 to 3.6			42		50		
			2.3 to 2.7			52		60		
$t_{BBM}$	Break-Before-Make Time (Note 6)	$nB_0$ or $nB_1=1.5\text{ V}$ $R_L=50\ \Omega$ , $C_L=35\ \text{pF}$	3.6 to 4.3		15				ns	Figure 4
			2.7 to 3.6		15					
			2.3 to 2.7		15					
Q	Charge Injection	$C_L=100\ \text{pF}$ , $V_{GEN}=0\ \text{V}$ , $R_{GEN}=0\ \Omega$	3.6 to 4.3		8				pC	Figure 6
		$C_L=100\ \text{pF}$ , $V_{GEN}=0\ \text{V}$ , $R_{GEN}=0\ \Omega$	2.7 to 3.6		6					
		$C_L=100\ \text{pF}$ , $V_{GEN}=0\ \text{V}$ , $R_{GEN}=0\ \Omega$	2.3 to 2.7		3					
OIRR	Off Isolation	$f=100\ \text{KHz}$ , $R_L=50\ \Omega$ , $C_L=5\ \text{pF}$	3.6 to 4.3		-90				dB	Figure 5
			2.7 to 3.6		-90					
			2.3 to 2.7		-90					
Xtalk	Crosstalk	$f=100\ \text{KHz}$ , $R_L=50\ \Omega$ , $C_L=5\ \text{pF}$	3.6 to 4.3		-90				dB	Figure 5
			2.7 to 3.6		-90					
			2.3 to 2.7		-90					
BW	-3dB Bandwidth	$R_L=50\ \Omega$	2.3 to 4.3		245			MHz	Figure 8	
THD	Total Harmonic Distortion	$R_L=32\ \Omega$ , $V_{IN}=2V_{PP}$ , $f=20$ to $20\ \text{kHz}$	3.6 to 4.3		0.21			%	Figure 9	
			2.7 to 3.6		0.17					
			2.3 to 2.7		0.26					
		$R_L=600\ \Omega$ , $V_{IN}=2\ V_{PP}$ , $f=20$ to $20\ \text{kHz}$	3.6 to 4.3		0.01					
			2.7 to 3.6		0.008					
			2.3 to 2.7		0.012					

6. Guaranteed by characterization, not production tested.

## CAPACITANCE

Symbol	Parameter	Condition	$V_{CC}$	$T_A = +25^\circ\text{C}$ Typical	Unit	Figure
$C_{IN}$	Control Pin Input Capacitance	$f = 1\ \text{MHz}$	0	1.3	pF	Figure 3
$C_{OFF}$	B Port Off Capacitance	$f = 1\ \text{MHz}$	3.3	6.0	pF	Figure 3
		$f = 240\ \text{MHz}$	3.3	6.0		
$C_{ON}$	A Port On Capacitance	$f = 1\ \text{MHz}$	3.3	21.0	pF	Figure 3
		$f = 240\ \text{MHz}$	3.3	16.0		

AC Loadings and Waveforms

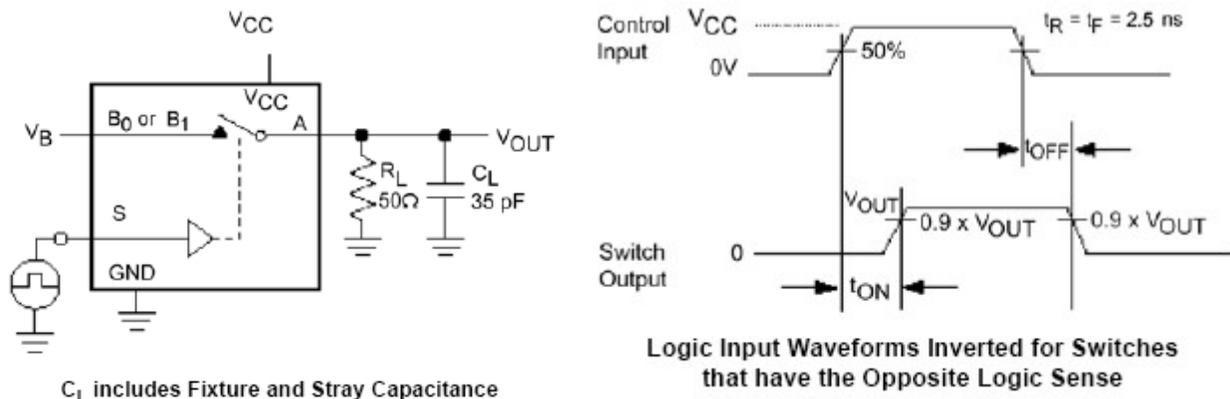


Figure 3. Turn-On / Turn-Off Timing

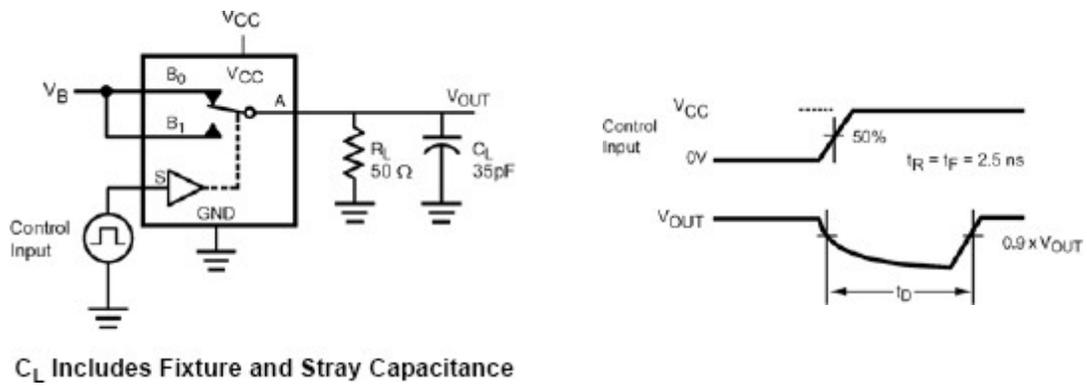


Figure 4. Break-Before-Make Timing

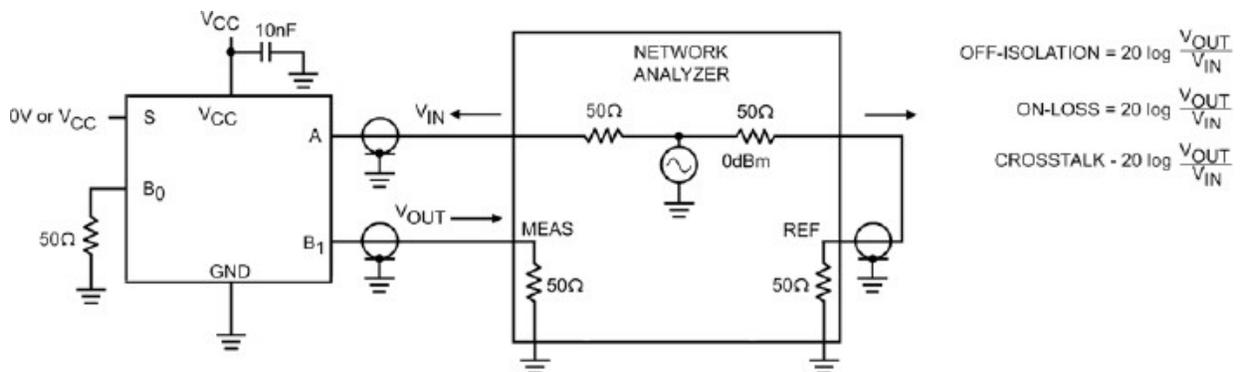


Figure 5. Off Isolation and Crosstalk

AC Loadings and Waveforms (Continued)

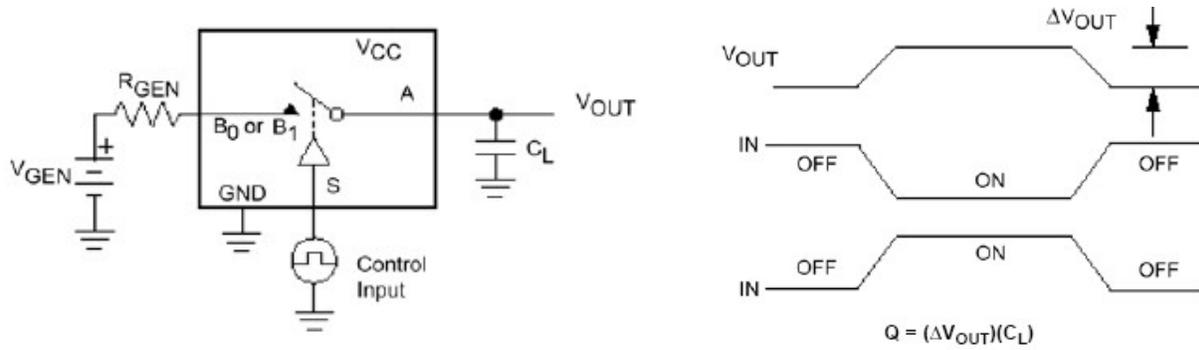


Figure 6. Charge Injection

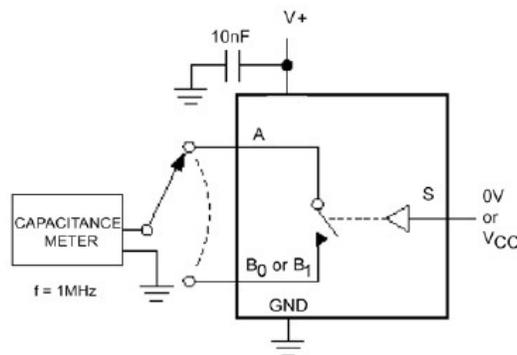


Figure 7. On / Off Capacitance Measurement Setup

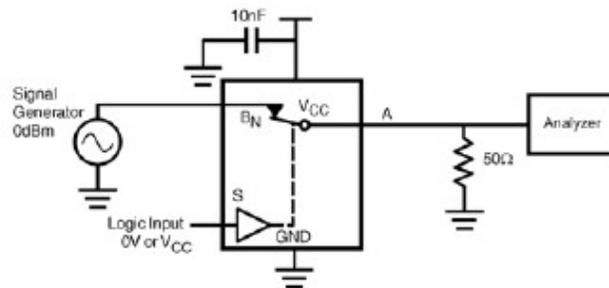


Figure 8. Bandwidth

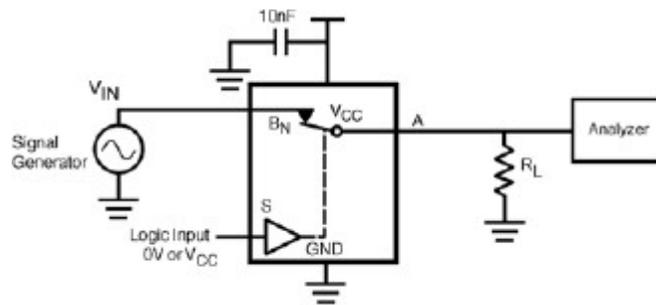
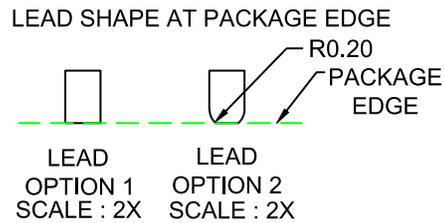
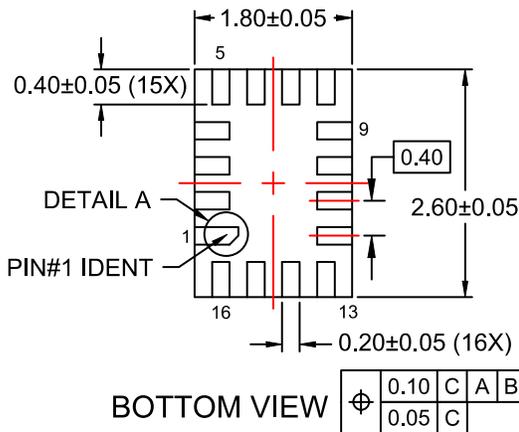
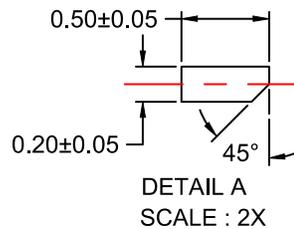
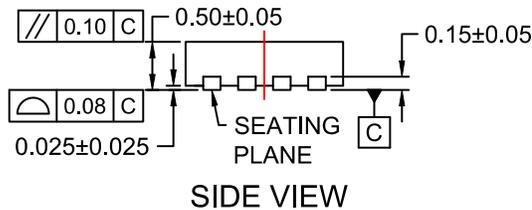
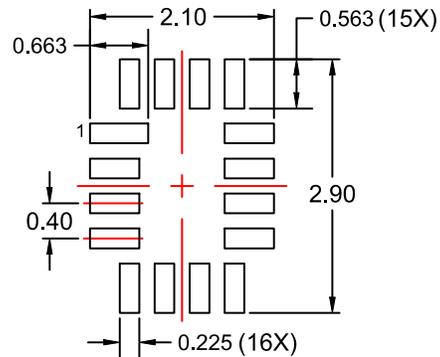
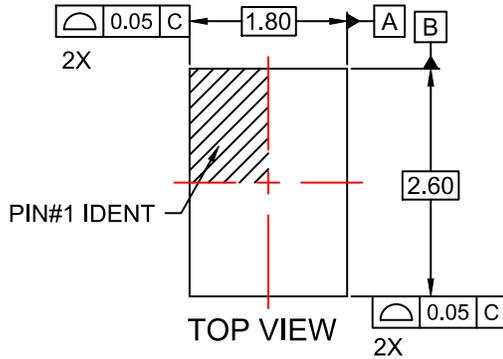


Figure 9. Harmonic Distortion



**UQFN16 1.8x2.6, 0.4P**  
CASE 523BF  
ISSUE O

DATE 31 OCT 2016



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- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 2009.
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