



**THE DATASHEET OF  
FSA2466UMX**





ON Semiconductor®

# FSA2466

## DATA / AUDIO Low-Voltage Dual DPDT Analog Switch

### 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 $\Omega$ at 2.7 V
$R_{FLAT}$	0.8 $\Omega$ at 2.7 V
ESD	8 kV HBM
Bandwidth	245 MHz
$C_{ON}$ at 240MHz	16 pF
$C_{OFF}$ at 240MHz	6.0 pF
Features	Low $I_{CC}$
Package	16- Lead UMLP 1.80 x 2.60 x 0.55 mm, 0.40 mm pitch
Top Mark	KA
Ordering Information	FSA2466UMX

### 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  $\Omega$  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.

### Applications

- MP3 Portable Media Players
- Cellular Phones, Smartphones

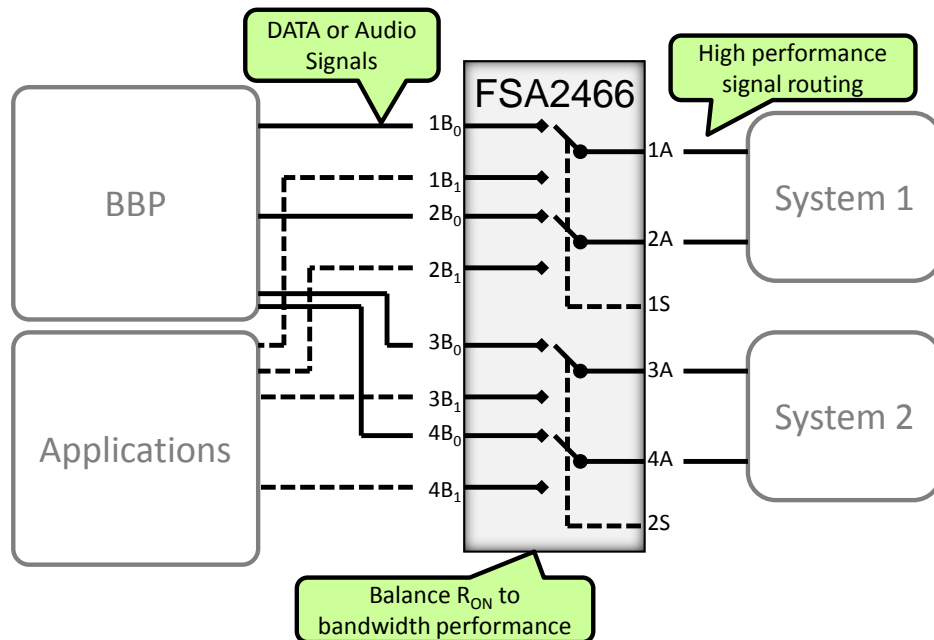


Figure 1. Typical Mobile Phone Application

## Pin Configuration

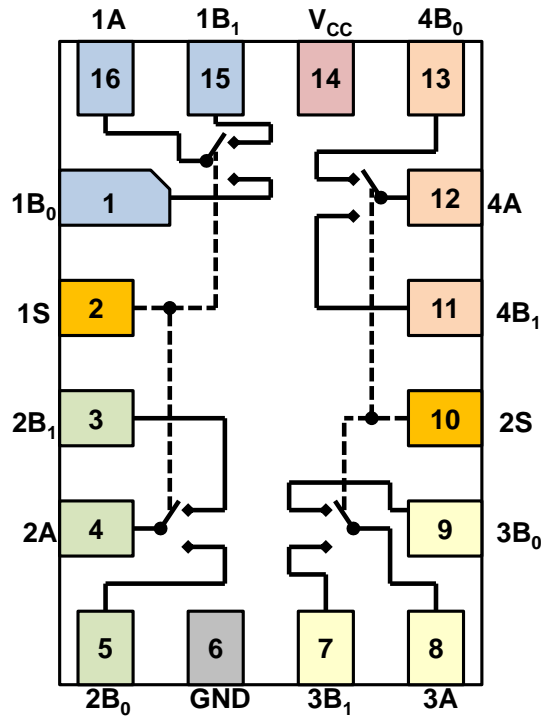


Figure 2. FSA2466UMX (Top View)

## 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	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	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	V <sub>CC</sub>	Supply	Voltage supply		
15	1B <sub>1</sub>	I/O	Data / Audio Port		
16	1A	I/O	Data / Audio Common Port		

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

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 1ms 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	
	Charge Device Model, JEDEC: JESD22-C101			2	

## Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. ON Semiconductor does not recommend exceeding them or designing to Absolute Maximum Ratings.

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

### Note:

- For 4.45 V operation, SEL frequency (pins 1S & 2S) should not exceed 100Hz and 100ns edge rate.
- 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)	$T_A=+25^\circ\text{C}$			$T_A=-40$ 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 $nB_0$ and $nB_1$	$nA=0.3\text{ V}$ , $V_{CC}=0.3\text{ V}$ $nB_0$ or $nB_1=0.3\text{ V}$ , $V_{CC}=0.3\text{ V}$ or Floating	1.95 to 4.30	-10		10	-50	50	nA
$I_{A(ON)}$	On Leakage Current of Port A	$nA=0.3\text{ V}$ , $V_{CC}=0.3\text{ V}$ $nB_0$ or $nB_1=0.3\text{ V}$ , $V_{CC}=0.3\text{ V}$ or Floating	1.95 to 4.30	-10		10	-50	50	nA
$R_{ON}$	Switch On Resistance <sup>(3)</sup>	$I_{OUT}=100\text{ mA}$	4.30		1.6			2.0	$\Omega$
		$I_{OUT}=100\text{ mA}$ , $nB_0$ or $nB_1=0\text{ V}$ , $0.7\text{ V}$ , $1.2\text{ V}$ , $V_{CC}$	2.70		2.0			2.5	
		$I_{OUT}=100\text{ mA}$ , $nB_0$ or $nB_1=0.7\text{ V}$	2.30		2.2			2.7	
$\Delta R_{ON}$	On Resistance Matching Between Channels <sup>(4)</sup>	$I_{OUT}=100\text{ mA}$ , $nB_0$ or $nB_1=0.8\text{ V}$	2.70		0.04			0.20	$\Omega$
		$I_{OUT}=100\text{ mA}$ , $nB_0$ or $nB_1=0.7\text{ V}$	2.30		0.03			0.30	
$R_{FLAT(ON)}$	On Resistance Flatness <sup>(5)</sup>	$I_{OUT}=100\text{ mA}$ , $nB_0$ 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	

### Notes:

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

## AC Electrical Characteristics

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

Symbol	Parameter	Condition	$V_{CC}$	$T_A=+25^{\circ}\text{C}$			$T_A=-40$ 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 <sup>(6)</sup>	$nB_0$ 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					

**Note:**

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

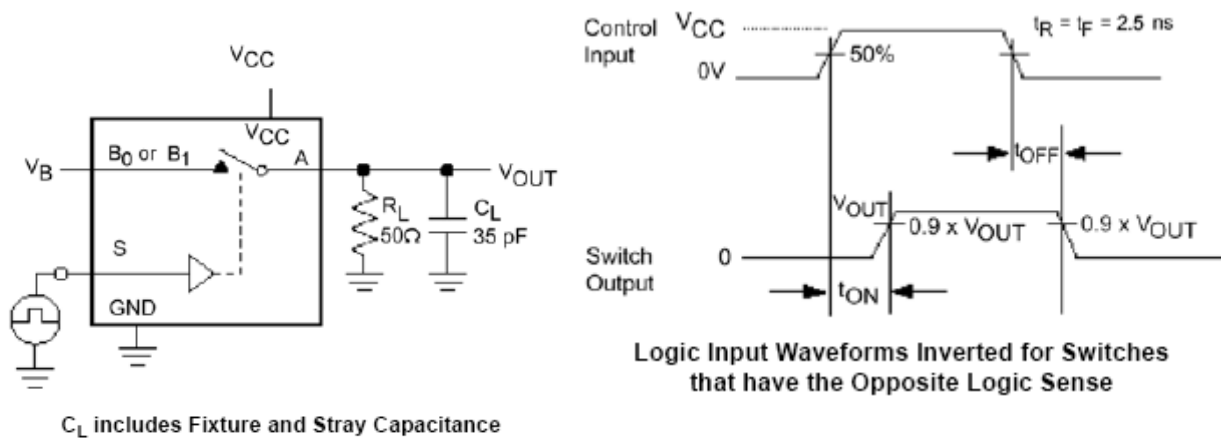


Figure 3. Turn-On / Turn-Off Timing

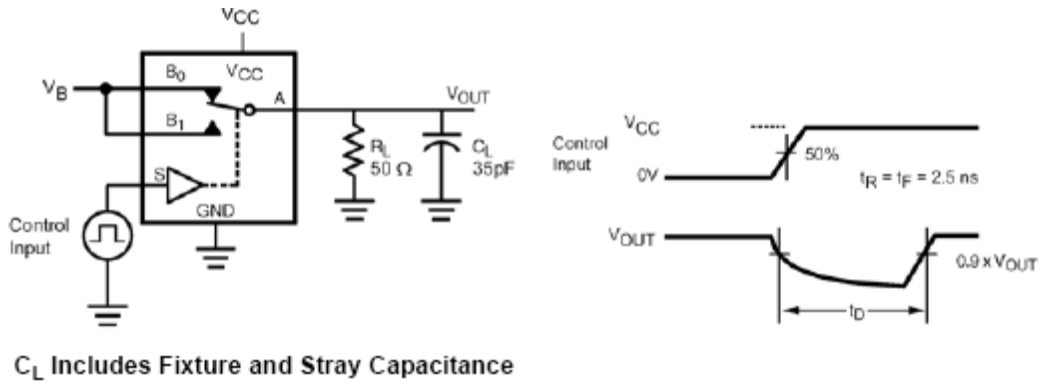


Figure 4. Break-Before-Make Timing

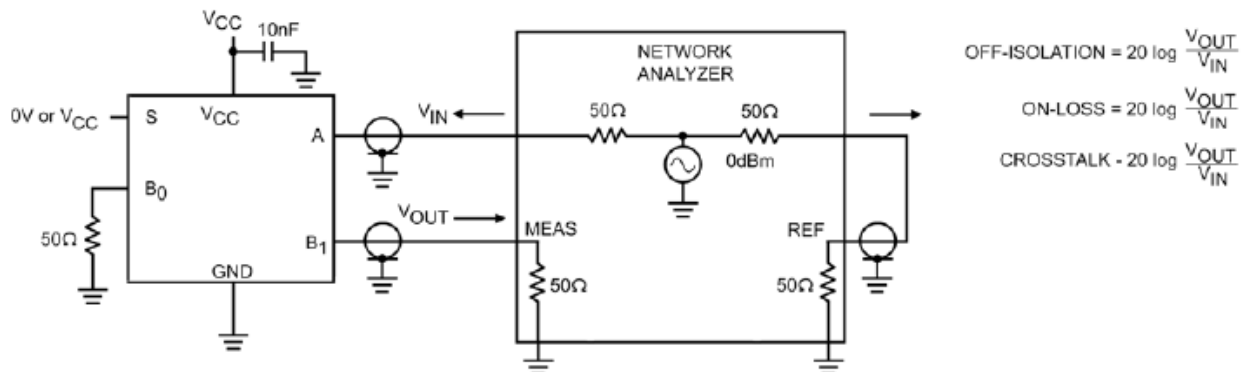
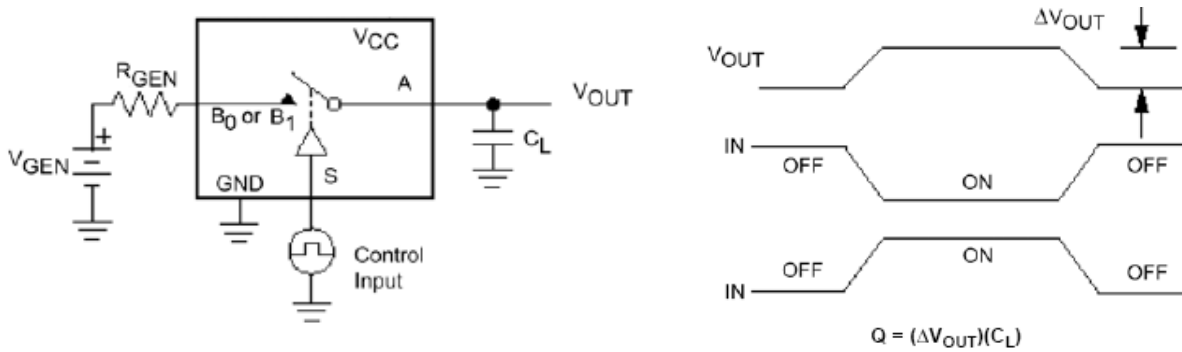
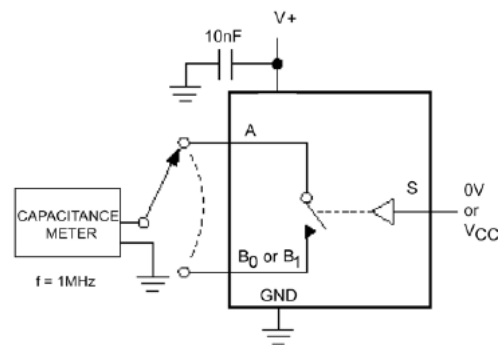


Figure 5. Off Isolation and Crosstalk

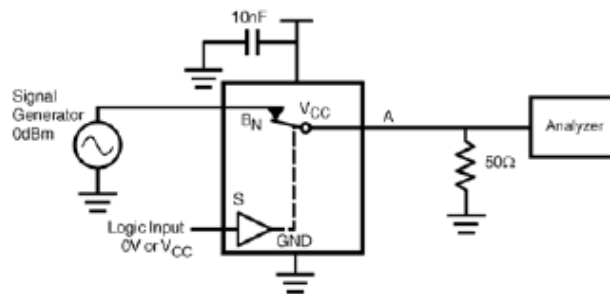
**AC Loadings and Waveforms** (Continued)



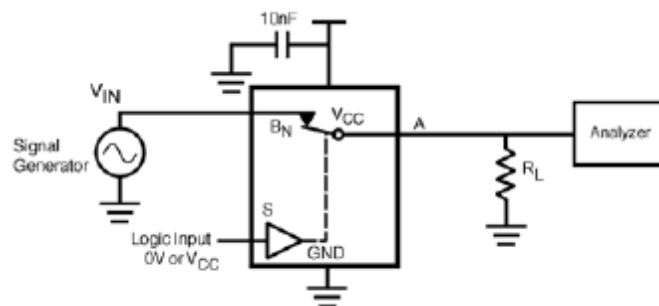
**Figure 6. Charge Injection**



**Figure 7. On / Off Capacitance Measurement Setup**

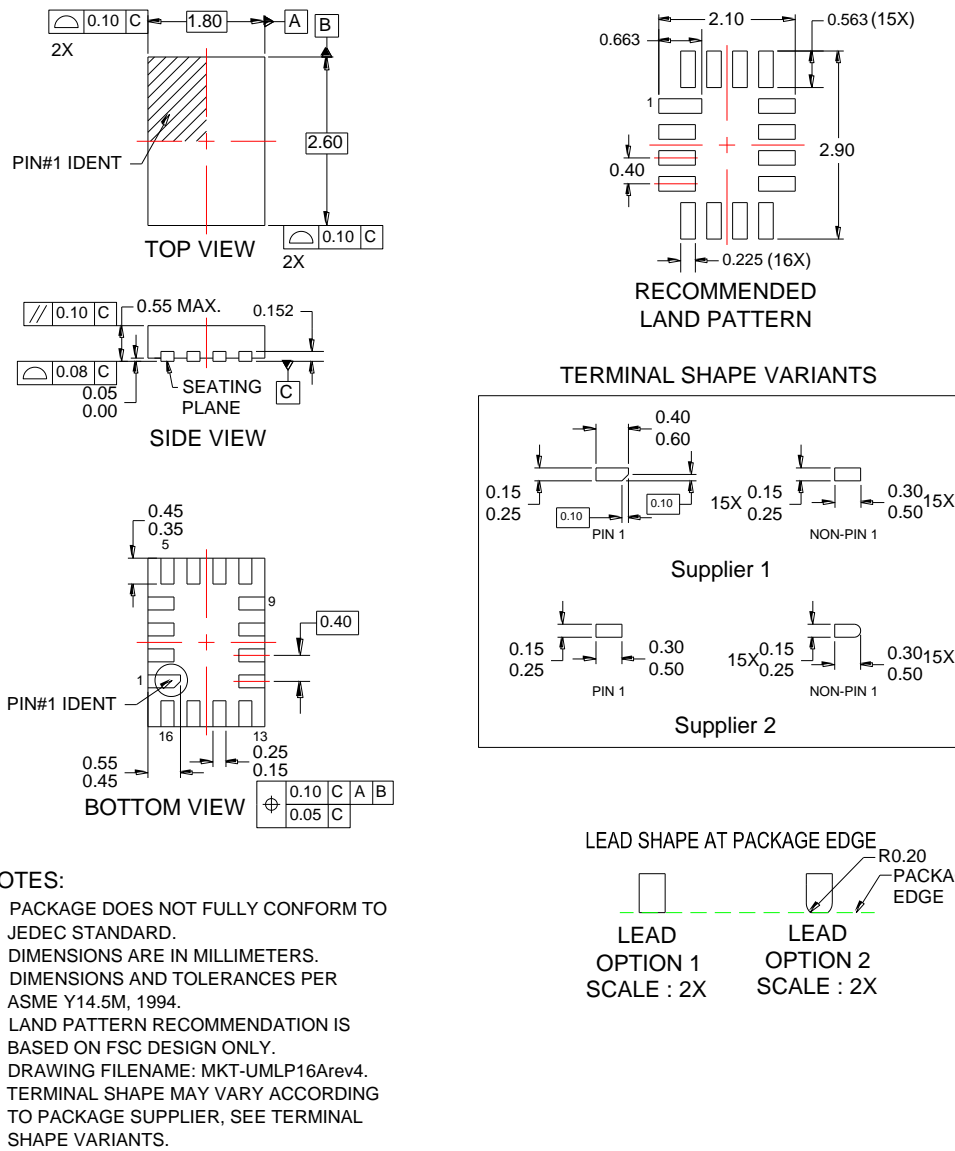


**Figure 8. Bandwidth**



**Figure 9. Harmonic Distortion**

## Physical Dimensions



**Figure 10. 16-Pin Ultrathin Molded Leadless Package (UMLP)**

Order Number	Operating Temperature Range	Package Description	Packing Method
FSA2466UMX	-40 to 85°C	16-Terminal Ultrathin Molded Leadless Package	Tape & Reel

Package drawings are provided as a service to customers considering ON Semiconductor components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a ON Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of ON Semiconductor's worldwide terms and conditions, specifically the warranty therein, which covers ON Semiconductor products.

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada.

**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910

**Japan Customer Focus Center**  
Phone: 81-3-5817-1050



**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)

**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local  
Sales Representative

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View FSA2466UMX on WIN SOURCE](#)
-  [Fairchild/ON Semiconductor Information](#)

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management