

DATA/AUDIO Low-Voltage Dual DPDT Analog Switch

FSA2466

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.

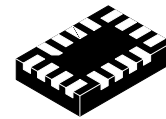
FSA2466 features very low quiescent current even when the control voltage is lower than the V_{CC} supply. This allows mobile handset applications direct interface with the baseband processor general-purpose I/Os.

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



UQFN16 1.8x2.6, 0.4P
CASE 523BF

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

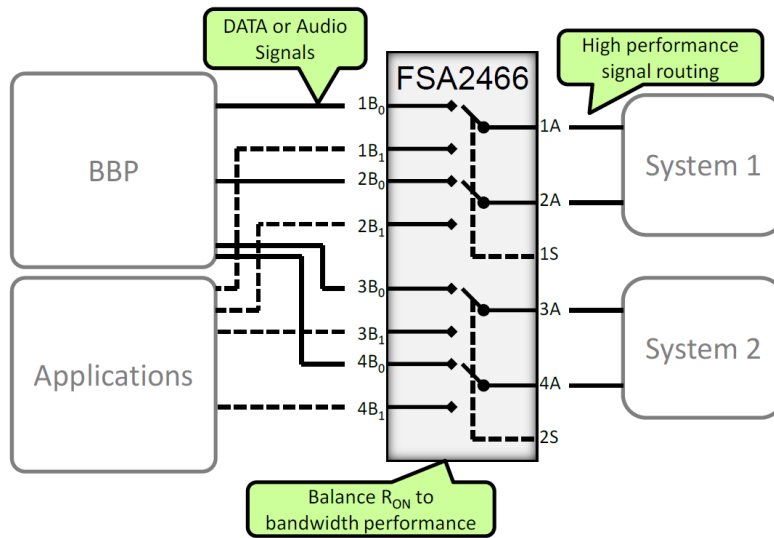


Figure 1. Typical Mobile Phone Application

ORDERING INFORMATION

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

[†]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

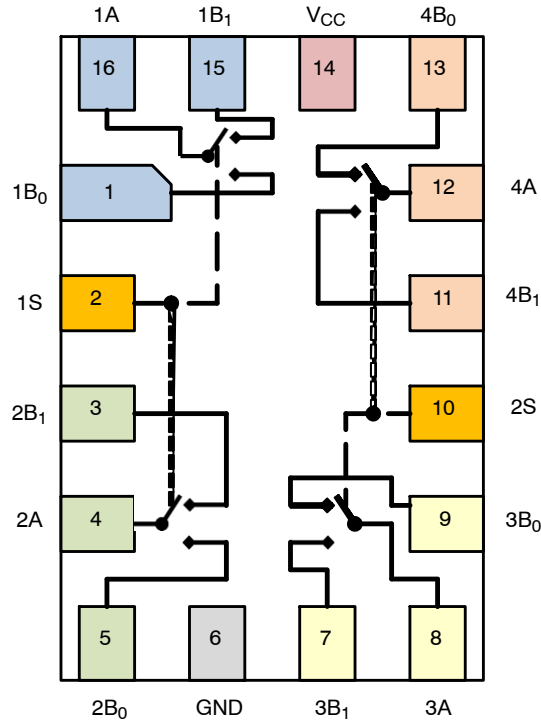


Figure 2. FSA2466UMX (Top View)

PIN DESCRIPTIONS

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

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Min	Max	Unit
V _{CC}	Supply Voltage		-0.50	5.25	V
V _S	Switch Voltage		-0.5	V _{CC} + 0.3	V
V _{IN}	Input Voltage		-0.5	5.0	V
I _{IK}	Input Diode Current		-50		mA
I _{SW}	Switch Current			350	mA
I _{SWPEAK}	Peak Switch Current (Pulsed at 1 ms Duration, <10% Duty Cycle)			500	mA
T _{STG}	Storage Temperature Range		-65	+150	°C
T _J	Junction Temperature			+150	°C
T _L	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 _{CC}	Supply Voltage (Note 1)		1.65	4.45	V
V _{IN}	Control Input Voltage (Note 2)		0	V _{CC}	V
V _S	Switch Input Voltage		0	V _{CC}	V
T _A	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	μA
$I_{NO(OFF)}$ $I_{NC(OFF)}$	Off Leakage Current of Port nB0 and nB1	$nA=0.3 \text{ V, } V_{CC}=0.3\text{V}$ $nB0 \text{ or } nB1=0.3 \text{ V, } V_{CC}=0.3\text{V or Floating}$	1.95 to 4.30	-10		10	-50	50	nA
$I_{A(ON)}$	On Leakage Current of Port A	$nA = 0.3 \text{ V, } V_{CC}=0.3\text{V}$ $nB0 \text{ or } nB1 = 0.3 \text{ V, } V_{CC}=0.3\text{V or Floating}$	1.95 to 4.30	-10		10	-50	50	nA
R_{ON}	Switch On Resistance (Note 3)	$I_{OUT}=100 \text{ mA}$	4.30		1.6			2.0	Ω
		$I_{OUT}=100 \text{ mA, } nB0 \text{ or } nB1=0 \text{ V, } 0.7 \text{ V, } 1.2 \text{ V, } V_{CC}$	2.70		2.0			2.5	
			2.30		2.2			2.7	
		$I_{OUT}=100\text{mA, } nB0 \text{ or } nB1=0.7 \text{ V}$	1.80		4.3			6.0	
ΔR_{ON}	On Resistance Matching Between Channels (Note 4)	$I_{OUT}=100 \text{ mA, } nB0 \text{ or } nB1=0.8 \text{ V}$	2.70		0.04			0.20	Ω
		$I_{OUT}=100 \text{ mA, } nB0 \text{ or } nB1=0.7 \text{ V}$	2.30		0.03			0.30	
$R_{FLAT(ON)}$	On Resistance Flatness (Note 5)	$I_{OUT}=100 \text{ mA, } nB0 \text{ or } nB1 = 0\text{V} \rightarrow V_{CC}$	2.70		0.60			0.8	Ω
			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	μA
		$V_{IN}=2.6 \text{ V}$	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.

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	$nB_0 \text{ or } nB_1 = 1.5 \text{ V}$ $R_L = 50 \Omega$, $C_L = 35 \text{ pF}$	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	$nB_0 \text{ or } nB_1 = 1.5 \text{ V}$ $R_L = 50 \Omega$, $C_L = 35 \text{ pF}$	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)	$nB_0 \text{ or } nB_1 = 1.5 \text{ V}$ $R_L = 50 \Omega$, $C_L = 35 \text{ pF}$	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	$R_L = 32 \Omega$, $V_{IN} = 2V_{PP}$, $f = 20 \text{ to } 20 \text{ kHz}$	3.6 to 4.3		0.21				%	Figure 9
			2.7 to 3.6		0.17					
			2.3. to 2.7		0.26					
		$R_L = 600 \Omega$, $V_{IN} = 2 V_{PP}$, $f = 20 \text{ to } 20 \text{ kHz}$	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

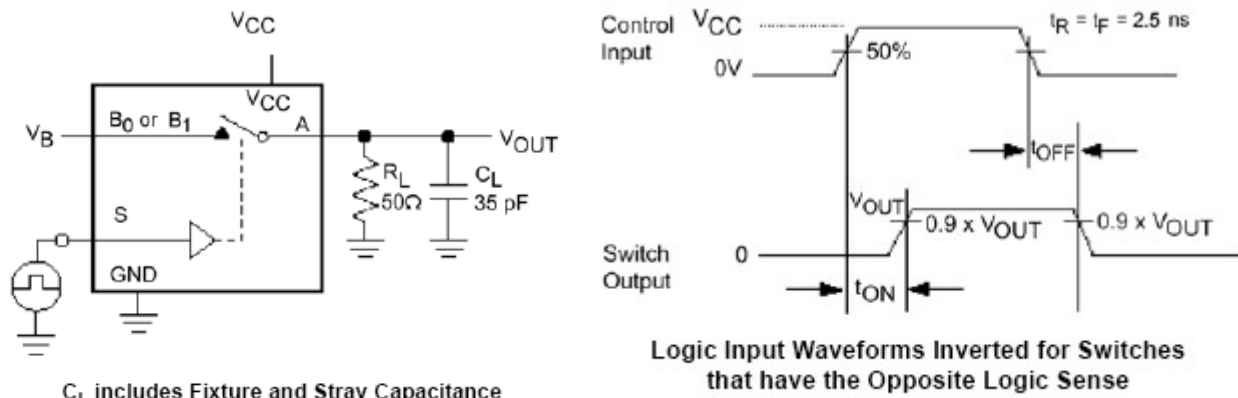


Figure 3. Turn-On / Turn-Off Timing

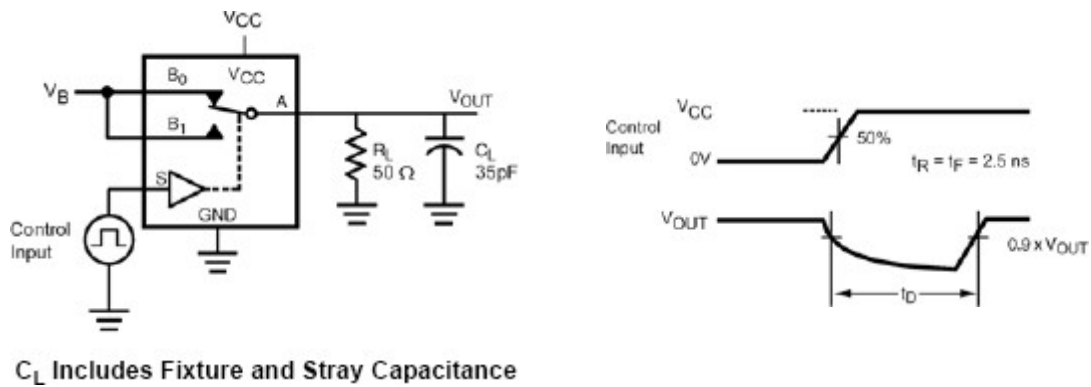


Figure 4. Break-Before-Make Timing

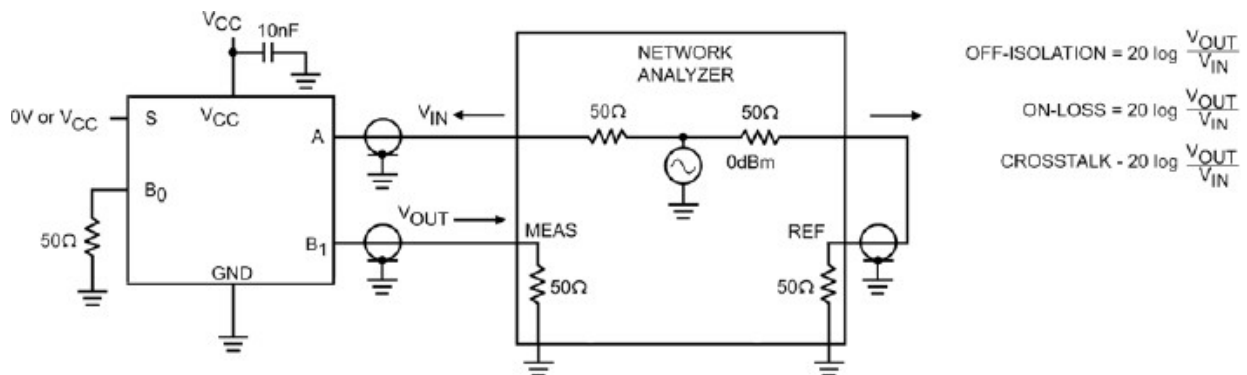


Figure 5. Off Isolation and Crosstalk

AC Loadings and Waveforms (Continued)

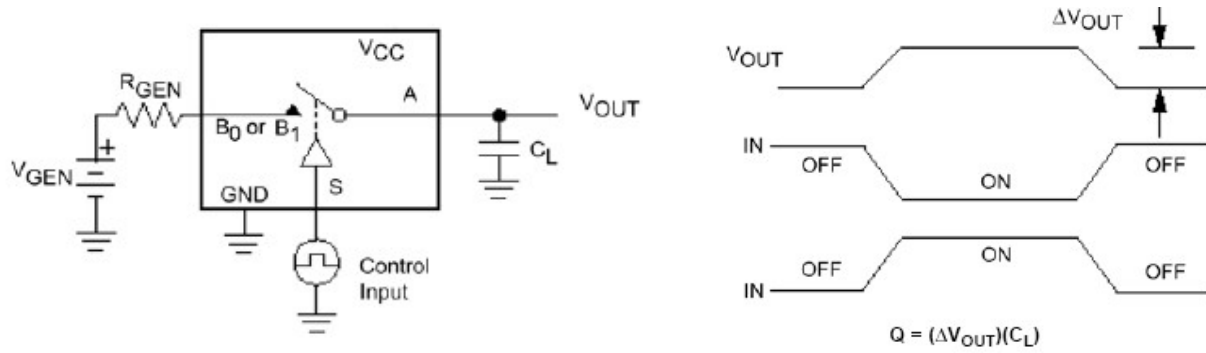


Figure 6. Charge Injection

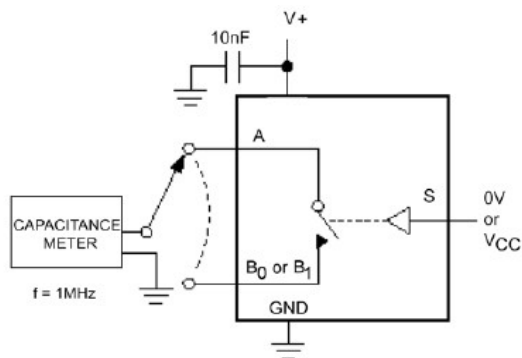


Figure 7. On / Off Capacitance Measurement Setup

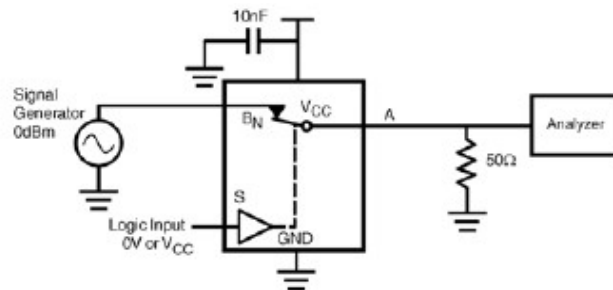


Figure 8. Bandwidth

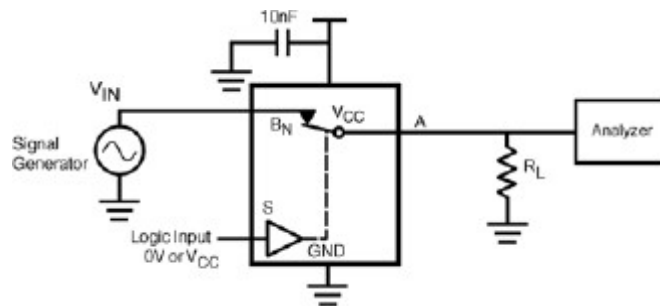
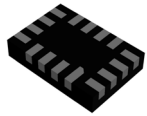


Figure 9. Harmonic Distortion

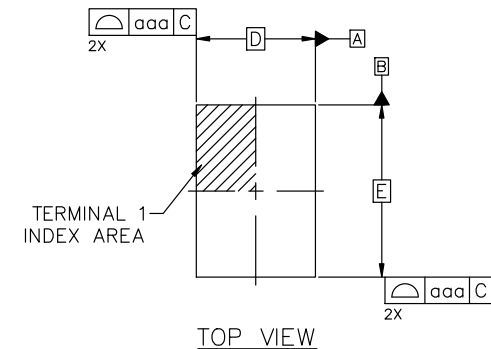
MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

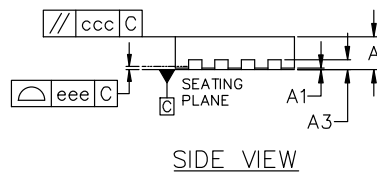


UQFN16 1.80x2.60x0.50, 0.40P
CASE 523BF
ISSUE A

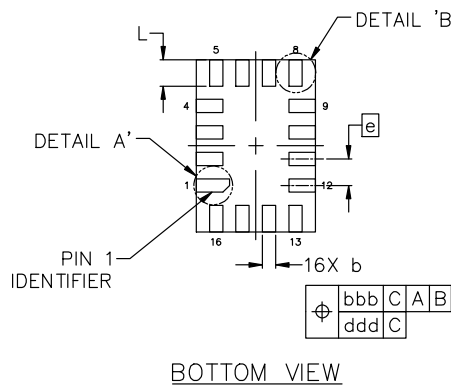
DATE 06 MAY 2024



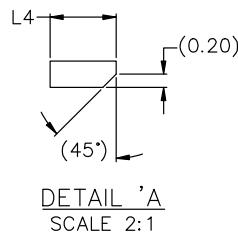
TOP VIEW



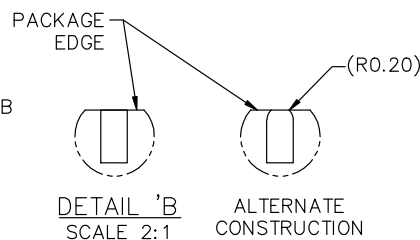
SIDE VIEW



BOTTOM VIEW



DETAIL 'A'
SCALE 2:1



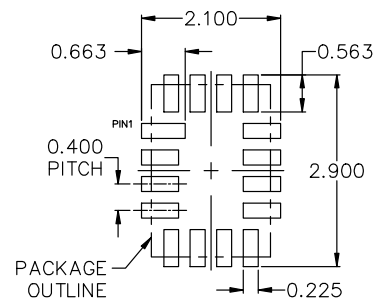
DETAIL 'B'
SCALE 2:1

ALTERNATE
CONSTRUCTION

NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5M-2018.
2. ALL DIMENSIONS ARE IN MILLIMETERS, DEGREES IN ANGLE.
3. LAND PATTERN RECOMMENDATION IS EXISTING INDUSTRY LAND PATTERN.
4. TERMINAL SHAPE MAY VARY ACCORDING TO PACKAGE SUPPLIER, SEE TERMINAL SHAPE VARIANTS.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.45	0.50	0.55
A1	0.00	---	0.05
A3	0.10	0.15	0.20
b	0.15	0.20	0.25
D	1.80 BSC		
E	2.60 BSC		
e	0.40 BSC		
L	0.35	0.40	0.45
L4	0.45	0.50	0.55
TOLERANCES FOR FEATURE CONTROL FRAME			
aaa	0.05		
bbb	0.10		
ccc	0.10		
ddd	0.05		
eee	0.05		



RECOMMENDED MOUNTING FOOTPRINT*

*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

DOCUMENT NUMBER:	98AON13709G	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	UQFN16 1.80x2.60x0.50, 0.40P	PAGE 1 OF 1

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi 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. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marketing.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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 **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** 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 **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales