



Is Now Part of



ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

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. 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.



FSA642

Low-Power, Three-Port, High-Speed MIPI Switch

Features

- Low On Capacitance: 7.0 pF Typical
- Low On Resistance: 7.0 Ω Typical
- Wide -3db Bandwidth: 1 GHz Typical
- 24-Lead UMLP (2.5 x 3.4 mm) Package
- 8 kV ESD Rating; >16 kV Power/GND ESD Rating

Applications

- Dual Camera Applications for Cell Phones
- Dual LCD Applications for Cell Phones, Digital Camera Displays, and Viewfinders

Description

The FSA642 is a bi-directional, low-power, high-speed analog switch. The pin out is designed to ease differential signal layout and is configured as a triple-pole, double-throw switch (TPDT). The FSA642 is optimized for switching between two MIPI devices, such as cameras or LCD displays and on-board Multimedia Application Processors (MAP).

The FSA642 is compatible with the requirements of Mobile Industry Processor Interface (MIPI). The low-capacitance design allows the FSA642 to switch signals that exceed 500 MHz in frequency. Superior channel-to-channel crosstalk immunity minimizes interference and allows the transmission of high-speed differential signals and single-ended signals, as described by the MIPI specification.

Ordering Information

Part Number	Top Mark	Operating Temperature Range	Package
FSA642UMX	JG	-40 to +85°C	24-Lead, Quad, Ultrathin Molded Leadless Package (UMLP), 2.5 x 3.4 mm

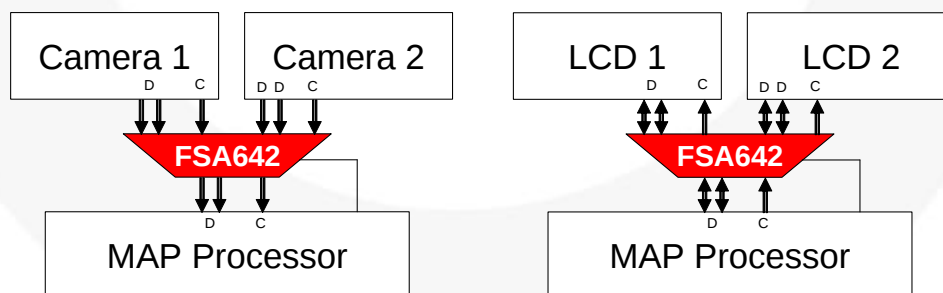


Figure 1. Application Block Diagram

Pin Configuration

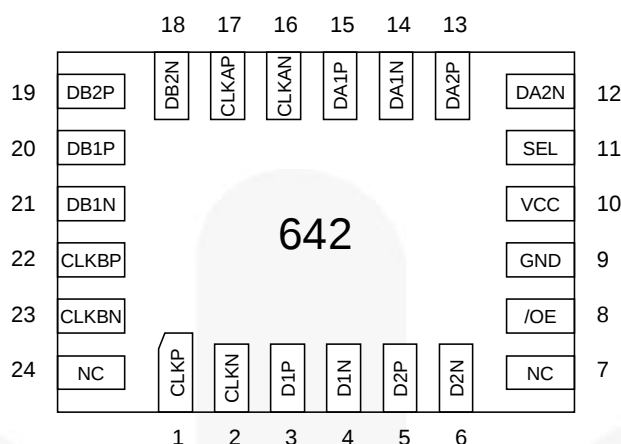


Figure 2. Pin Configuration (Top Through View)

Pin Definitions

Pin #	Name	Description
1, 2	CLKP, CLKN	Clock Path (Common)
3, 4	D1P, D1N	Data Path 1 (Common)
5, 6	D2P, D2N	Data Path 2 (Common)
7, 24	NC	No Connect (Float)
8	/OE	Output Enable (Active Low)
9	GND	Ground
10	VCC	Power
11	SEL	Select (0=A, 1=B)
12, 13	DA2N, DA2P	Data Path (A2)
14, 15	DA1N, DA1P	Data Path (A1)
16, 17	CLKAN, CLKAP	Clock Path (A)
18, 19	DB2N, DB2P	Data Path (2B)
20, 21	DB1P, DB1N	Data Path (1B)
22, 23	CLKBP, CLKBN,	Clock Path (B)

Functional Diagram

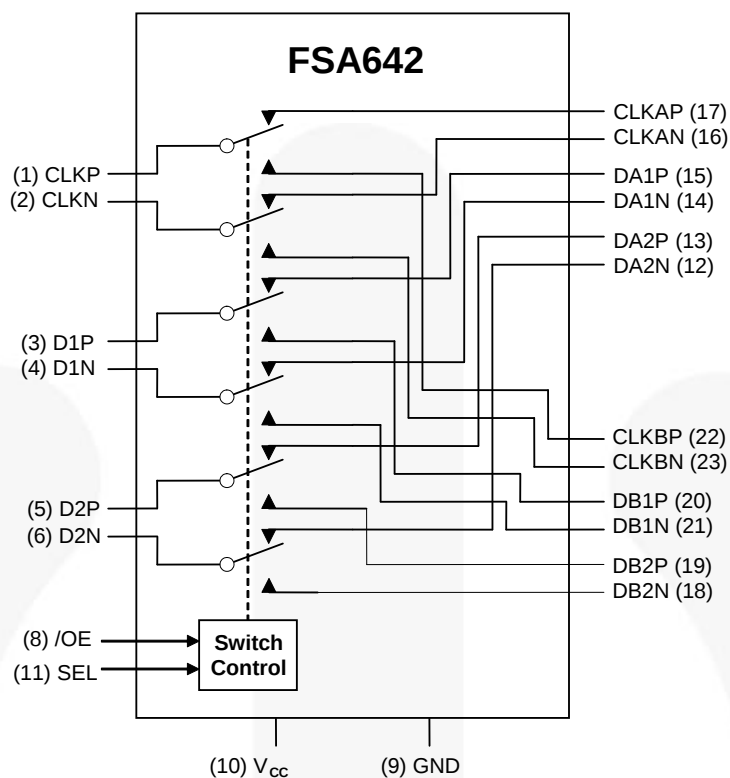


Figure 3. Functional Diagram

Truth Table

SEL	/OE	Function
Don't Care	HIGH	Disconnect
LOW	LOW	D1, D2, CLK=DA1, DA2, CLKA
HIGH	LOW	D1, D2, CLK=DB1, DB2, CLKB

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_{CC}	Supply Voltage		-0.50	+5.25	V
V_{CNTRL}	DC Input Voltage (SEL, /OE) ⁽¹⁾		-0.5	V_{CC}	V
V_{SW}	DC Switch I/O Voltage ⁽¹⁾		-0.5	$V_{CC} + 0.3$	V
I_{IK}	DC Input Diode Current		-50		mA
I_{OUT}	DC Output Current			50	mA
T_{STG}	Storage Temperature		-65	+150	°C
ESD	Human Body Model, JEDEC: JESD22-A114	All Pins		6.5	kV
		I/O to GND		8.0	
		Power to GND		16.0	
	Charged Device Model, JEDEC: JESD22-C101			2.5	

Note:

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

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. Fairchild does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Min.	Max.	Unit
V_{CC}	Supply Voltage	2.65	4.30	V
V_{CNTRL}	Control Input Voltage (SEL, /OE) ⁽²⁾	0	V_{CC}	V
V_{SW}	Switch I/O Voltage	-0.5	$V_{CC}-1$	V
T_A	Operating Temperature	-40	+85	°C

Note:

2. The control input must be held HIGH or LOW; it must not float.

DC Electrical Characteristics

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

Symbol	Parameter	Conditions	V_{CC} (V)	$T_A=-40$ to $+85^\circ\text{C}$			Units
				Min.	Typ.	Max.	
V_{IK}	Clamp Diode Voltage	$I_{IN}=-18$ mA	2.775			-1.2	V
I_{IN}	Control Input Leakage	$V_{SW}=0$ to 4.3 V	4.3	-1		1	μA
V_{IH}	Input Voltage High	$V_{IN}=0$ to V_{CC}	2.650 to 2.775	1.3			V
			4.3	1.7			
V_{IL}	Input Voltage Low	$V_{IN}=0$ to V_{CC}	2.650 to 2.775			0.5	V
I_{OZ}	Off-State Leakage	A,B=0+0.3 V to $V_{CC}-0.3$	4.3	-2		2	μA
I_{CC}	Quiescent Supply Current	$V_{CNTRL}=0$ or V_{CC} , $I_{OUT}=0$	4.3			1.0	μA
I_{CCT}	Increase in I_{CC} Current Per Control Voltage and V_{CC}	$V_{CNTRL}=1.8$ V	2.775			1.5	μA

DC Electrical Characteristics, Low-Speed Mode

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

Symbol	Parameter	Conditions	V_{CC} (V)	$T_A=-40$ to $+85^\circ\text{C}$			Units
				Min.	Typ.	Max.	
R_{ON}	LS Switch On Resistance ⁽³⁾	$V_{SW}=1.2$ V, $I_{ON}=-10$ mA, Figure 4	2.65		10	14	Ω
ΔR_{ON}	LS Delta R_{ON} ⁽⁴⁾	$V_{SW}=1.2$ V, $I_{ON}=-10$ mA (Intra-pair)	2.65		0.65		Ω

Notes:

3. Measured by the voltage drop between A/B and CLK/Dn pins at the indicated current through the switch.
4. Guaranteed by characterization.

DC Electrical Characteristics, High-Speed Mode

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

Symbol	Parameter	Conditions	V_{CC} (V)	$T_A=-40$ to $+85^\circ\text{C}$			Units
				Min.	Typ.	Max.	
R_{ON}	HS Switch On Resistance ⁽⁵⁾	$V_{SW}=0.4$ V, $I_{ON}=-10$ mA, Figure 4	2.65		7.0	9.5	Ω
ΔR_{ON}	HS Delta R_{ON} ⁽⁶⁾	$V_{SW}=0.4$ V, $I_{ON}=-10$ mA (Intra-pair)	2.65		0.65		Ω

Notes:

5. Measured by the voltage drop between A, B, and Dn pins at the indicated current through the switch.
6. Guaranteed by characterization.

AC Electrical Characteristics

All values are at $R_L=50\Omega$ and $R_S=50\Omega$ and all typical values are $V_{CC}=2.775V$ at $T_A=25^\circ C$ unless otherwise specified.

Symbol	Parameter	Conditions	V_{CC} (V)	$T_A=-40^\circ C$ to $+85^\circ C$			Units
				Min.	Typ.	Max.	
O_{IRR}	Off Isolation ⁽⁷⁾	$f=100$ MHz, $R_T=50\Omega$ Figure 14	2.775		-35		dB
Xtalk	Non-Adjacent Channel Crosstalk ⁽⁷⁾	$f=100$ MHz, $R_T=50\Omega$ Figure 15	2.775		-55		dB
BW	-3 db Bandwidth ⁽⁷⁾	$C_L=0$ pF, $R_T=50\Omega$ Figure 13	2.775		1.0		GHz
t_{ON}	Turn-On Time SEL, /OE to Output	$C_L=5$ pF, $V_{SW}=1.2$ V Figure 6, Figure 7	2.650 to 2.775		20	37	ns
t_{OFF}	Turn-Off Time SEL, /OE to Output	$C_L=5$ pF, $V_{SW}=1.2$ V Figure 6, Figure 7	2.650 to 2.775		15	27	ns
t_{PD}	Propagation Delay ⁽⁷⁾	$C_L=5$ pF Figure 6, Figure 8	2.775		0.25		ns
t_{BBM}	Break-Before-Make Time	$C_L=5$ pF, $V_{SW1}=V_{SW2}=1.2$ V Figure 12	2.650 to 2.775	3	5	8	ns

Note:

7. Guaranteed by characterization.

AC Electrical Characteristics, High-Speed

All typical values are $V_{CC}=2.775V$ at $T_A=25^\circ C$ unless otherwise specified.

Symbol	Parameter	Conditions	$T_A=-40^\circ C$ to $+85^\circ C$			Units
			Min.	Typ.	Max.	
$t_{SK(Part_Part)}$	Channel-to-Channel Skew Across Multiple Parts ^(8,9)	$V_{SW}=0.2$ Vdiff _{PP} , $C_L=5$ pF		40	80	ps
$t_{SK(Chl_Chl)}$	Channel-to-Channel Skew Within a Single Part ⁽⁸⁾	$V_{SW}=0.2$ Vdiff _{PP} , $C_L=5$ pF, Figure 9		15	30	ps
$t_{SK(Pulse)}$	Skew of Opposite Transitions in the Same Differential Channel ⁽⁸⁾	$V_{SW}=0.2$ Vdiff _{PP} , $C_L=5$ pF		10	20	ps

Notes:

8. Guaranteed by characterization.

9. Assumes the same V_{CC} and temperature for all devices.

Capacitance

Symbol	Parameter	Conditions	$T_A=-40^\circ C$ to $+85^\circ C$			Units
			Min.	Typ.	Max.	
C_{IN}	Control Pin Input Capacitance ⁽¹⁰⁾	$V_{CC}=0$ V		1.5		pF
C_{ON}	Dn/CLK- On Capacitance ⁽¹⁰⁾	$V_{CC}=2.775$ V, /OE=0 V, $f=1$ MHz, at $25^\circ C$, Figure 11	6.0	7.0	9.0	
C_{OFF}	Dn/CLK Off Capacitance ⁽¹⁰⁾	$V_{CC}=2.775$ V, /OE=2.775 V, $f=1$ MHz, Figure 10		2.5		

Note:

10. Guaranteed by characterization.

Test Diagrams

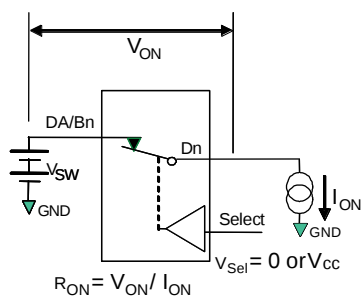
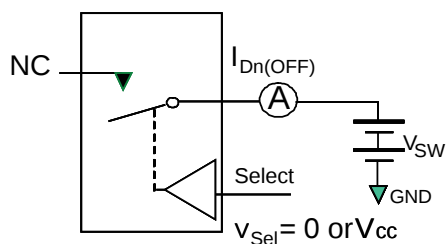
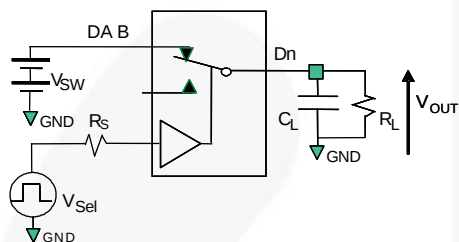


Figure 4. On Resistance



**Each switch port is tested separately

Figure 5. Off Leakage



R_L , R_S , and C_L are functions of the application environment (see AC Tables for specific values). C_L includes test fixture and stray capacitance.

Figure 6. AC Test Circuit Load

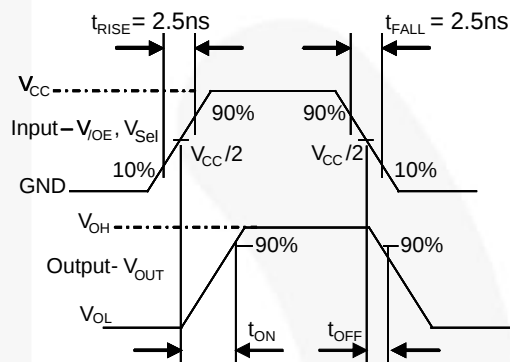


Figure 7. Turn-On / Turn-Off Waveforms

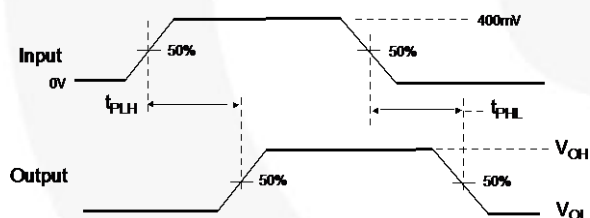


Figure 8. Propagation Delay ($t_{RF} = 500ps$)

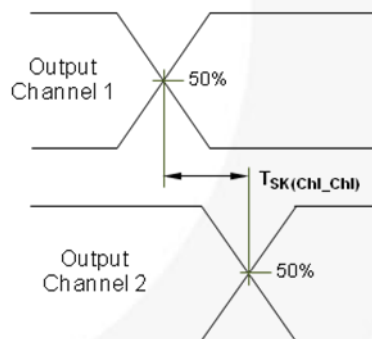


Figure 9. Channel-to-Channel Skew

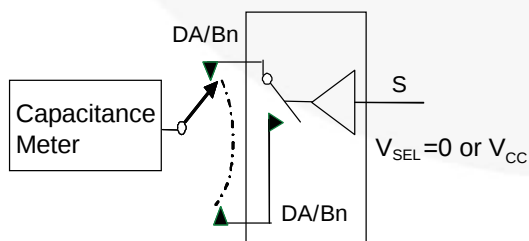


Figure 10. Channel Off Capacitance

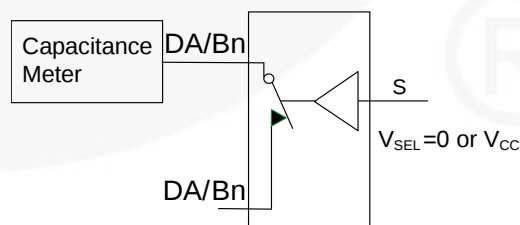


Figure 11. Channel On Capacitance

Test Diagrams (Continued)

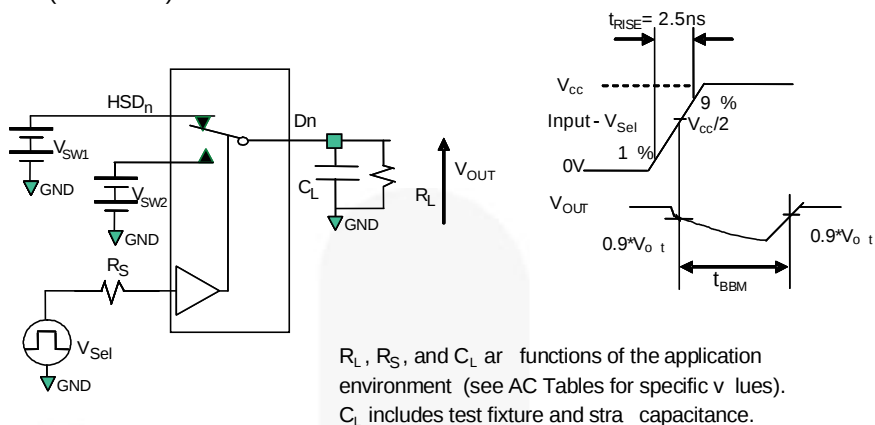


Figure 12. Break-Before-Make Interval Timing

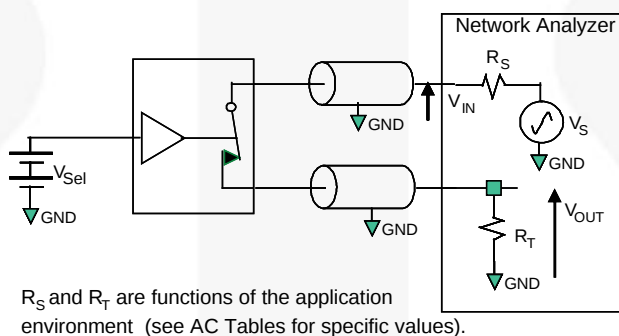


Figure 13. Bandwidth

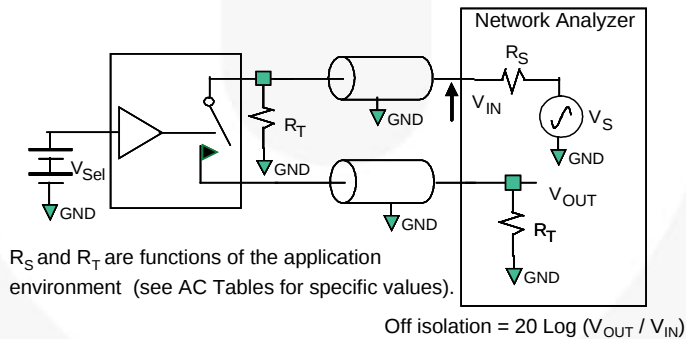


Figure 14. Channel Off Isolation

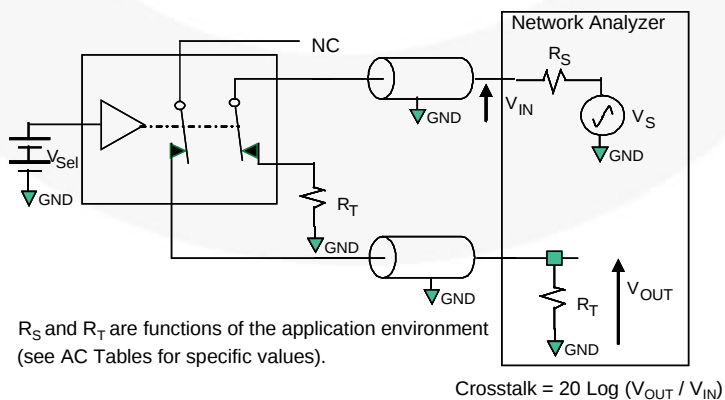
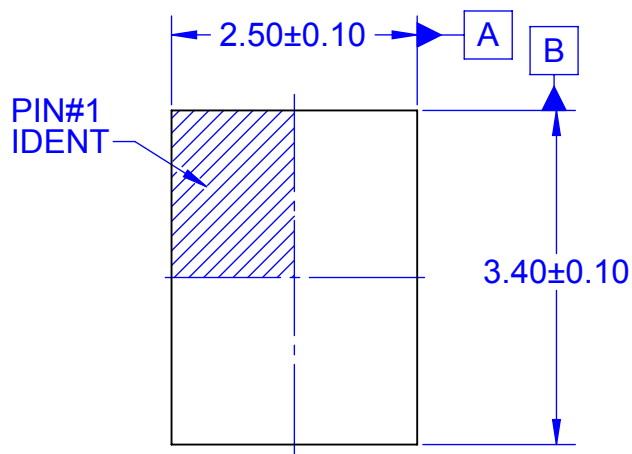
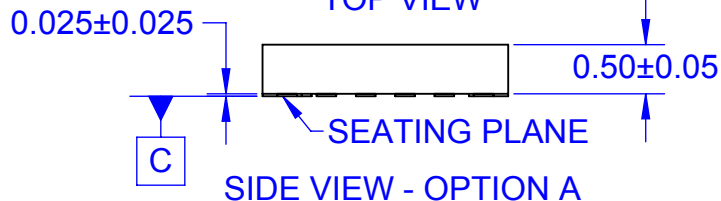


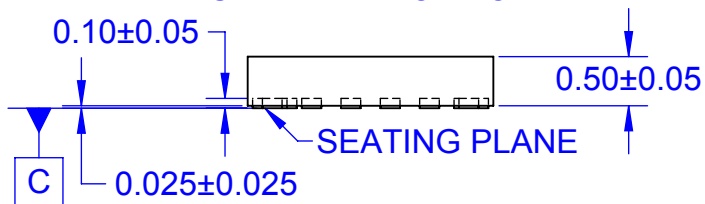
Figure 15. Non-Adjacent Channel-to-Channel Crosstalk



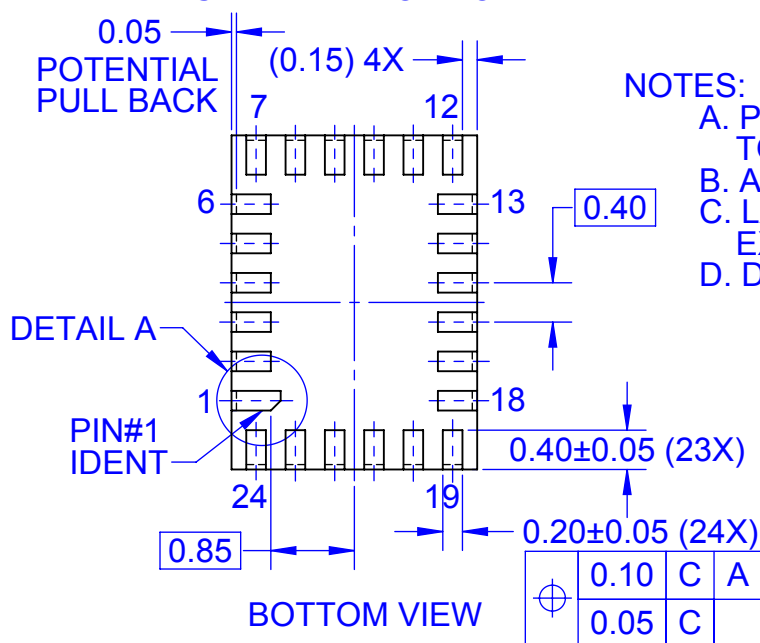
TOP VIEW



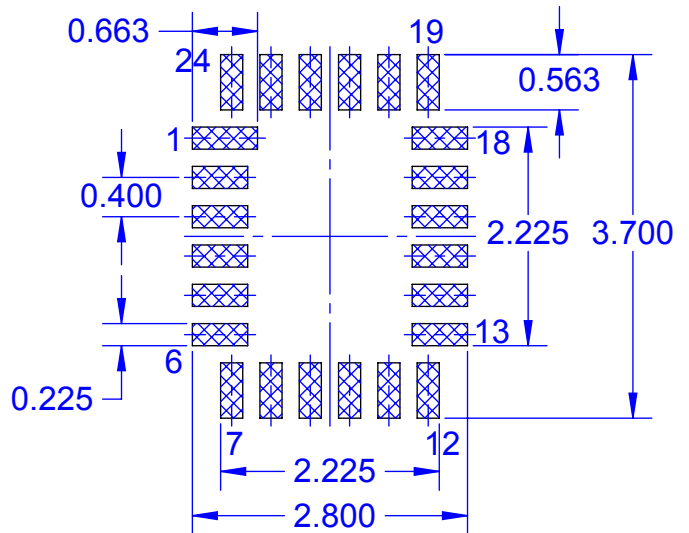
SIDE VIEW - OPTION A



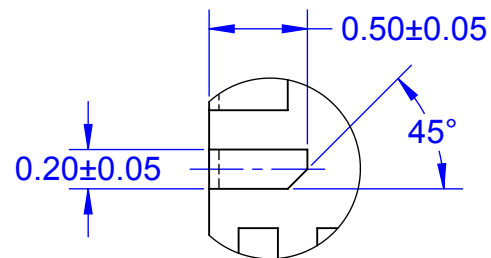
SIDE VIEW - OPTION B



BOTTOM VIEW



LAND PATTERN RECOMMENDATION



DETAIL A
SCALE 2:1

NOTES:

- A. PACKAGE DOES NOT FULLY CONFORM TO JEDEC STANDARD
- B. ALL DIMENSIONS ARE IN MILLIMETERS
- C. LAND PATTERN RECOMMENDATION IS EXISTING INDUSTRY LAND PATTERN
- D. DRAWING FILENAME: MKT-UMLP24ArevE

ON Semiconductor



ON Semiconductor and  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. 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

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

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

For additional information, please contact your local
Sales Representative

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[ON Semiconductor:](#)

[FSA642UMX](#)

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9