



Is Now Part of



ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at

www.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.

FSA3157B

Low-Voltage SPDT Analog Switch or 2:1 Multiplexer / De-multiplexer Bus Switch

Features

- Useful in Both Analog and Digital Applications
- Ultra-Small, MicroPak™ Leadless Package
- Low On Resistance: <math><10 \Omega</math> Typical at 3.3 V V_{CC}
- Broad V_{CC} Operating Range: 1.65 V to 5.5 V
- Rail-to-Rail Signal Handling
- Power-Down, High-Impedance Control Input
- Over-Voltage Tolerance of Control Input to 7.0 V
- Break-Before-Make Enable Circuitry
- 250 MHz, 3 dB Bandwidth

Description

The FSA3157B is a high-performance, Single-Pole / Double-Throw (SPDT) analog switch or 2:1 multiplexer / de-multiplexer bus switch.

The device is fabricated with advanced sub-micron CMOS technology to achieve high-speed enable and disable times and low on resistance. The break-before-make select circuitry prevents disruption of signals on the B Port due to both switches temporarily being enabled during select pin switching. The device is specified to operate over the 1.65 to 5.5 V V_{CC} operating range. The control input tolerates voltages up to 5.5 V, independent of the V_{CC} operating range.

Ordering Information

Part Number	Operating Temperature Range	Top Mark	Package	Packing Method
FSA3157BL6X	-40 to +85°C	7G	6-Lead, MicroPak™ 1.0 mm Wide Package	5000 Units on Tape and Reel
FSA3157BFHX	-40 to +85°C	7G	6-Lead, MicroPak2™, 1x1 mm Body, .35 mm Pitch	5000 Units on Tape and Reel

Analog Symbols

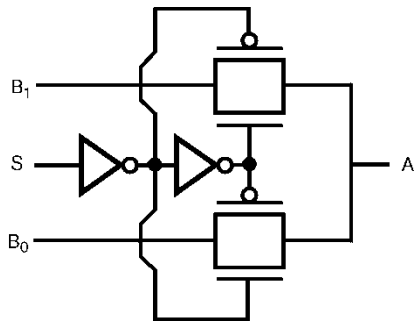


Figure 1. Logic Symbol

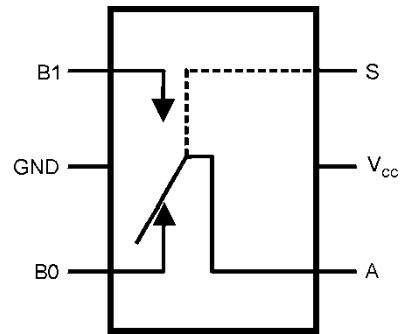


Figure 2. Analog Symbol

Pin Configuration

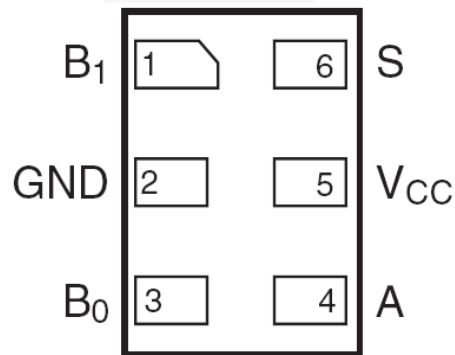


Figure 3. Pad Assignments

Function Table

Input (S)	Function
Logic Level LOW	B ₀ Connected to A
Logic Level HIGH	B ₁ Connected to A

Pin Descriptions

Pin#	Name	Description
1	B ₁	Data Ports
2	GND	Ground
3	B ₀	Data Ports
4	A	Data Ports
5	V _{CC}	Power Supply
6	S	Control Input

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	-0.5	7.0	V
V_S	DC Switch Voltage ⁽¹⁾	-0.5	$V_{CC}+0.5$	V
V_{IN}	DC Input Voltage ⁽¹⁾	-0.5	7.0	V
I_{IK}	DC Input Diode Current at $V_{IN} < 0$ V	-50		mA
I_{OUT}	DC Output Current		128	mA
$I_{CC/GND}$	DC V_{CC} or Ground Current		± 100	mA
T_{STG}	Storage Temperature Range	-65	+150	°C
T_J	Junction Temperature Under Bias		+150	°C
T_L	Junction Lead Temperature (Soldering, 10 seconds)		+260	°C
P_D	Power Dissipation at +85°C		180	mW
ESD	Electrostatic Discharge Capability	Human Body Model, JESD22-A114		5 kV

Note:

- Input and output negative voltage ratings may be exceeded if 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 Operating	1.65	5.50	V	
V_{IN}	Control Input Voltage ⁽²⁾	0	V_{CC}	V	
V_{IN}	Switch Input Voltage ⁽²⁾	0	V_{CC}	v	
V_{OUT}	Output Voltage ⁽²⁾	0	V_{CC}	V	
T_A	Operating Temperature	-40	+85	°C	
t_r, t_f	Input Rise and Fall Time	Control Input $V_{CC}=2.3$ V– 3.6 V	0	10	ns/V
		Control Input $V_{CC}=4.5$ V– 5.5 V	0	5	

Note:

- Control input must be held HIGH or LOW; it must not float.

Electrical Characteristics

Symbol	Parameter	Conditions	V _{CC} (V)	T _A =+25°C			T _A =-40 to +85°C		Units
				Min.	Typ.	Max.	Min.	Max.	
V _{IH}	High Level Input Voltage		1.65 to 1.95	0.75 V _{CC}			0.75 V _{CC}		V
			2.30 to 5.50	0.7 V _{CC}			0.7 V _{CC}		
V _{IL}	Low Level Input Voltage		1.65 to 1.95			0.25 V _{CC}		0.25 V _{CC}	V
			2.30 to 5.50			0.3 V _{CC}		0.3 V _{CC}	
I _{IN}	Input Leakage Current	0 ≤ V _{IN} ≤ 5.5 V	0 to 5.50		±0.05	±0.1		±1	μA
I _{OFF}	Off State Leakage Current	0 ≤ A, B ≤ V _{CC}	1.65 to 5.50		±0.05	±0.10		±1.00	μA
R _{ON}	Switch On Resistance ⁽³⁾	V _{IN} =0 V, I _O =30 mA	4.50		3.0	7.0		7.0	Ω
		V _{IN} =2.4 V, I _O =-30 mA			5.0	12.0		12.0	
		V _{IN} =4.5 V, I _O =-30 mA			7.0	15.0		15.0	
		V _{IN} =0 V, I _O =24 mA	3.00		4.0	9.0		9.0	
		V _{IN} =3 V, I _O =-24 mA			10.0	20.0		20.0	
		V _{IN} =0 V, I _O =8 mA	2.30		5.0	12.0		12.0	
		V _{IN} =2.3 V, I _O =-8 mA			13.0	30.0		30.0	
		V _{IN} =0 V, I _O =4 mA	1.65		6.5	20.0		20.0	
V _{IN} =1.65 V, I _O =-4 mA		17.0		50.0		50.0			
I _{CC}	Quiescent Supply Current: All Channels On or Off	V _{IN} =V _{CC} or GND I _{OUT} =0	5.50			1		10	μA
	Analog Signal Range		V _{CC}	0		V _{CC}	0	V _{CC}	V
R _{RANGE}	On Resistance Over Signal Range ^(3,7)	I _A =-30 mA, 0 ≤ V _{Bn} ≤ V _{CC}	4.50					25	Ω
		I _A =-24 mA, 0 ≤ V _{Bn} ≤ V _{CC}	3.00					50	
		I _A =-8 mA, 0 ≤ V _{Bn} ≤ V _{CC}	2.30					100	
		I _A =-4 mA, 0 ≤ V _{Bn} ≤ V _{CC}	1.65					300	
ΔR _{ON}	On Resistance Match Between Channels ^(3,4)	I _A =-30 mA, V _{Bn} =3.15	4.50		0.15				Ω
		I _A =-24 mA, V _{Bn} =2.1	3.00		0.20				
		I _A =-8 mA, V _{Bn} =1.6	2.30		0.50				
		I _A =-4 mA, V _{Bn} =1.15	1.65		0.50				
R _{FLAT}	On Resistance Flatness ^(3,4,6)	I _A =-30 mA, 0 ≤ V _{Bn} ≤ V _{CC}	5.00		6				Ω
		I _A =-24 mA, 0 ≤ V _{Bn} ≤ V _{CC}	3.00		12				
		I _A =-8 mA, 0 ≤ V _{Bn} ≤ V _{CC}	2.50		28				
		I _A =-4 mA, 0 ≤ V _{Bn} ≤ V _{CC}	1.80		125				

Notes:

- Measured by the voltage drop between the A and B pins at the indicated current through the switch. On resistance is determined by the lower of the voltages on the two (A or B Ports).
- Parameter is characterized, but not tested in production.
- ΔR_{ON} = R_{ON} maximum – R_{ON} minimum measured at identical V_{CC}, temperature, and voltage levels.
- Flatness is defined as the difference between the maximum and minimum value of on resistance over the specified range of conditions.
- Guaranteed by design.

AC Electrical Characteristics

Symbol	Parameter	Conditions	V _{CC} (V)	T _A =+25°C			T _A =-40 to +85°C		Units	Figure
				Min.	Typ.	Max.	Min.	Max.		
t _{PLH} , t _{PLH}	Propagation Delay Bus-to-Bus ⁽⁸⁾	V _{IN} =OPEN	1.65 to 1.95			3.5		3.5	ns	Figure 10 Figure 11
			2.30 to 2.70			1.2		1.2		
			3.00 to 3.60			0.8		0.8		
			4.05 to 5.50			0.3		0.3		
t _{PZL} , t _{PZH}	Output Enable Time Turn-On Time (A to B _n)	V _{IN} =2X V _{CC} for t _{PZL} V _{IN} =0 V for t _{PZH}	1.65 to 1.95	7.0		23.0		24.0	ns	Figure 10 Figure 11
			2.30 to 2.70	3.5		13.0		14.0		
			3.00 to 3.60	2.5		6.9		7.6		
			4.50 to 5.50	1.7		5.2		5.7		
t _{PLZ} , t _{PHZ}	Output Disable Time Turn-Off Time (A Port to B Port)	V _{IN} =2X V _{CC} for t _{PLZ} V _{IN} =0 V for t _{PHZ1}	1.65 to 1.95	3.0		12.5		13.0	ns	Figure 10 Figure 11
			2.30 to 2.70	2.0		7.0		7.5		
			3.00 to 3.60	1.5		5.0		5.3		
			4.50 to 5.50	0.8		3.5		3.8		
t _{BBM}	Break-Before-Make Time ⁽⁹⁾		1.65 to 1.95	0.5			0.5		ns	Figure 12
			2.30 to 2.70	0.5			0.5			
			3.00 to 3.60	0.5			0.5			
			4.50 to 5.50	0.5			0.5			
Q	Charge Injection ⁽⁹⁾	C _L =0.1 nF, V _{GEN} =0 V	5.00		7				pC	Figure 13
		R _{GEN} =0 Ω	3.30		3					
OIRR	Off Isolation ⁽¹⁰⁾	R _L =50 Ω, f=10 MHz	1.65 to 5.50		-57				dB	Figure 14
Xtalk	Crosstalk	R _L =50 Ω, f=10 MHz	1.65 to 5.50		-54				dB	Figure 15
BW	-3 dB Bandwidth	R _L =50 Ω	1.65 to 5.50		250				MHz	Figure 18
THD	Total Harmonic Distortion ⁽⁹⁾	R _L =600 Ω, 0.5 V _{PP} , f=600 Hz to 20 KHz	5.00		.011				%	

Notes:

8. This parameter is guaranteed by design, but not tested. The bus switch contributes no propagation delay other than the RC delay of the on resistance of the switch and the 50pF load capacitance when driven by an ideal voltage source (zero output impedance).
9. Guaranteed by design.
10. Off Isolation = 20 log₁₀ [V_A / V_{Bn}].

Capacitance

T_A = +25°C, f=1MHz. Capacitance is characterized, but not tested in production.

Symbol	Parameter	Conditions	Typical	Unit	Figure
C _{IN}	Control Pin Input Capacitance	V _{CC} =0 V	2.3	pF	
C _{IO-B}	B Port Off Capacitance	V _{CC} =5.0 V	6.5	pF	Figure 16
C _{IOA-ON}	A Port Capacitance, Switch Enabled	V _{CC} =5.0 V	18.5	pF	Figure 17

Typical Performance Characteristics

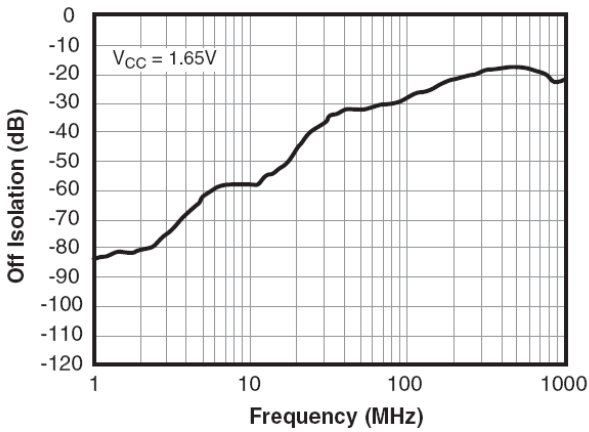


Figure 4. Off Isolation, $V_{CC}=1.65\text{ V}$

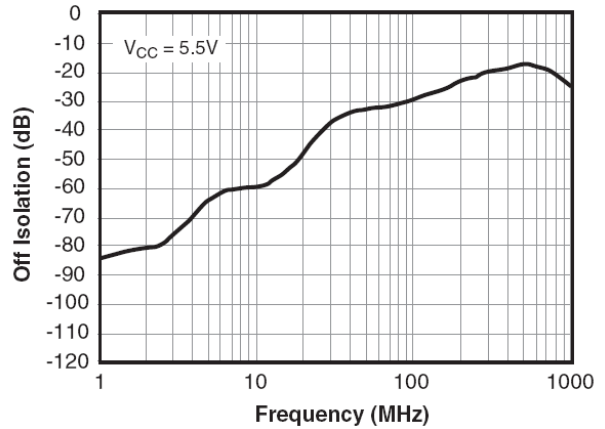


Figure 5. Off Isolation, $V_{CC}=5.5\text{ V}$

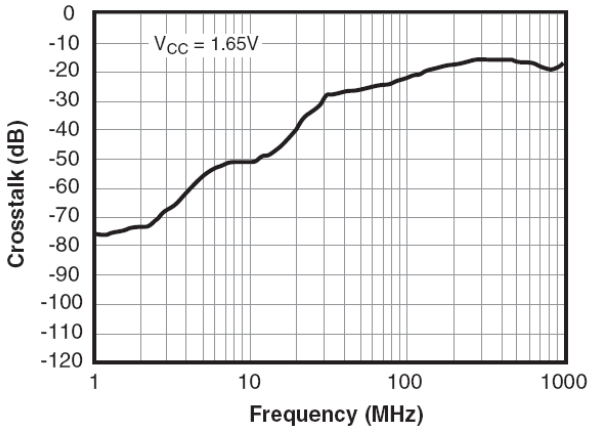


Figure 6. Crosstalk, $V_{CC}=1.65\text{ V}$

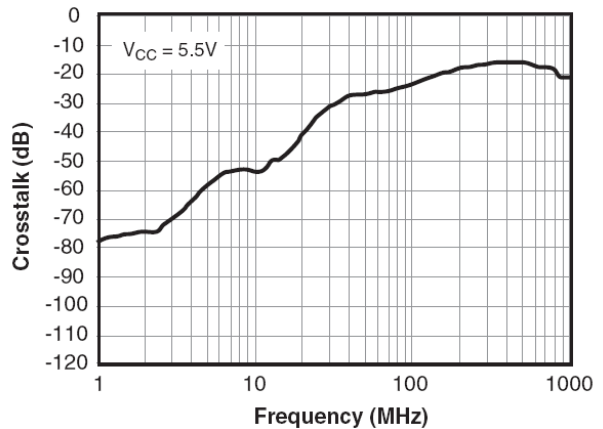


Figure 7. Crosstalk, $V_{CC}=5.5\text{ V}$

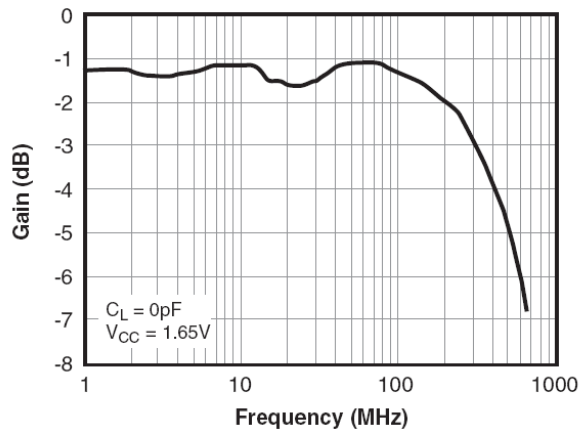


Figure 8. Bandwidth, $V_{CC}=1.65\text{ V}$

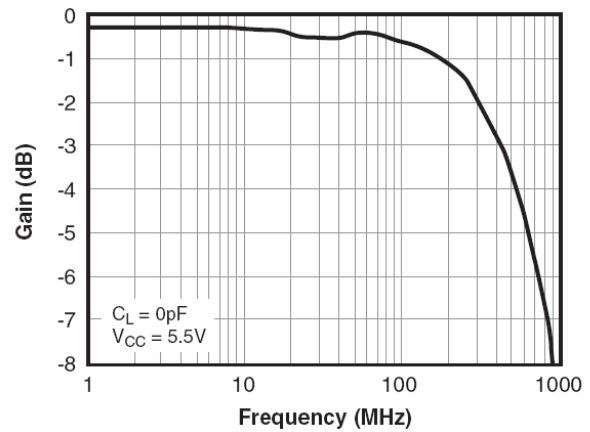
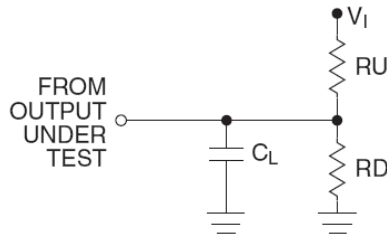


Figure 9. Bandwidth, $V_{CC}=5.5\text{ V}$

AC Loading and Waveforms



Notes:
 Input driven by 50Ω source terminated in 50Ω
 C_L includes load and stray capacitance
 Input PRR = 1.0 MHz; t_W = 500 ns

Figure 10. AC Test Circuit

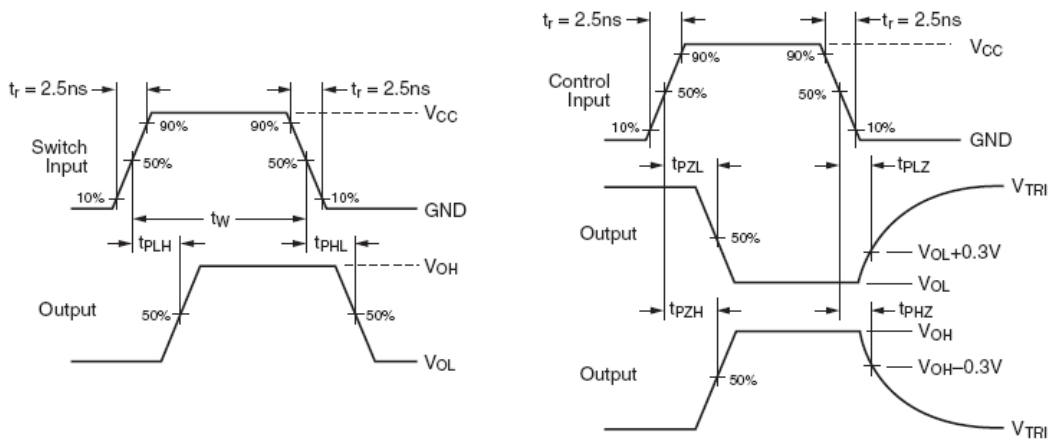


Figure 11. AC Waveforms

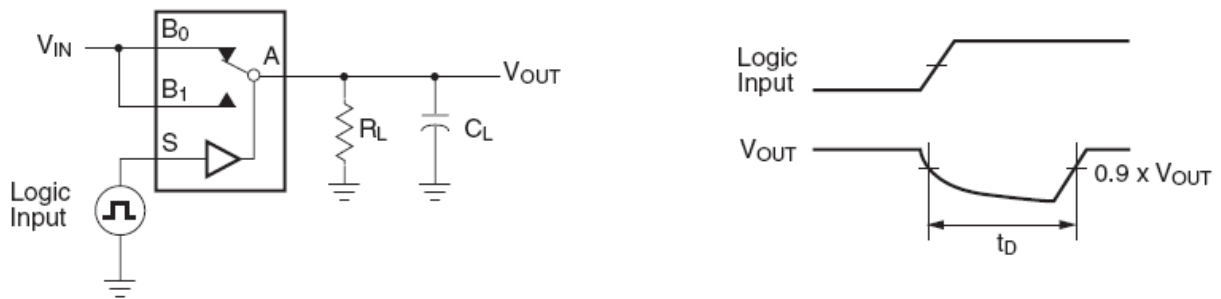


Figure 12. Break-Before-Make Interval Timing

AC Loading and Waveforms (Continued)

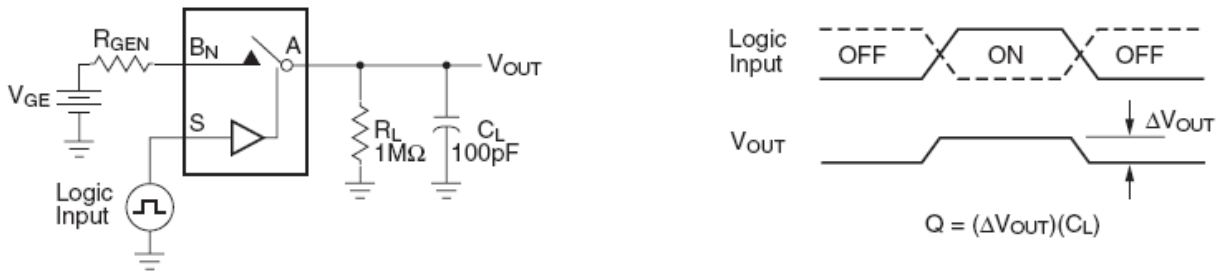


Figure 13. Charge Injection Test

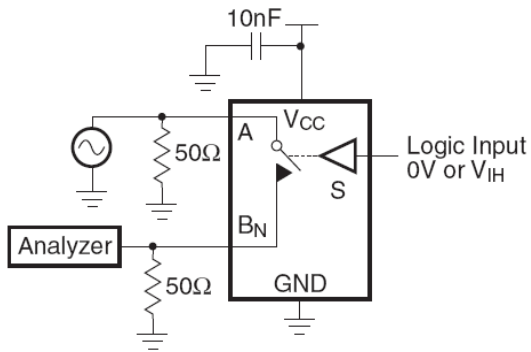


Figure 14. Off Isolation

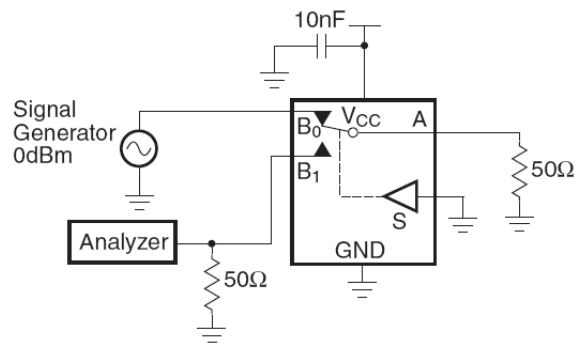


Figure 15. Crosstalk

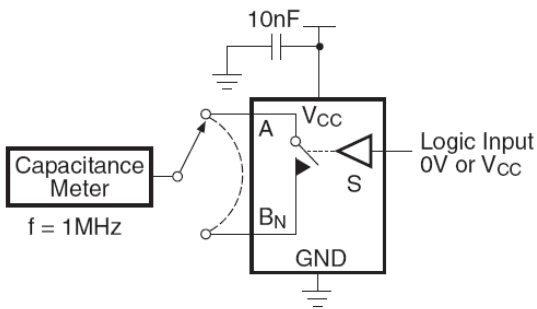


Figure 16. Channel Off Capacitance

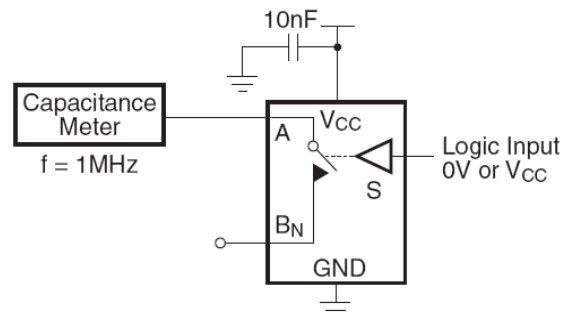


Figure 17. Channel On Capacitance

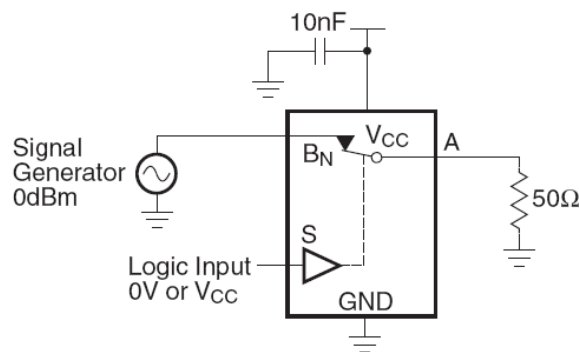
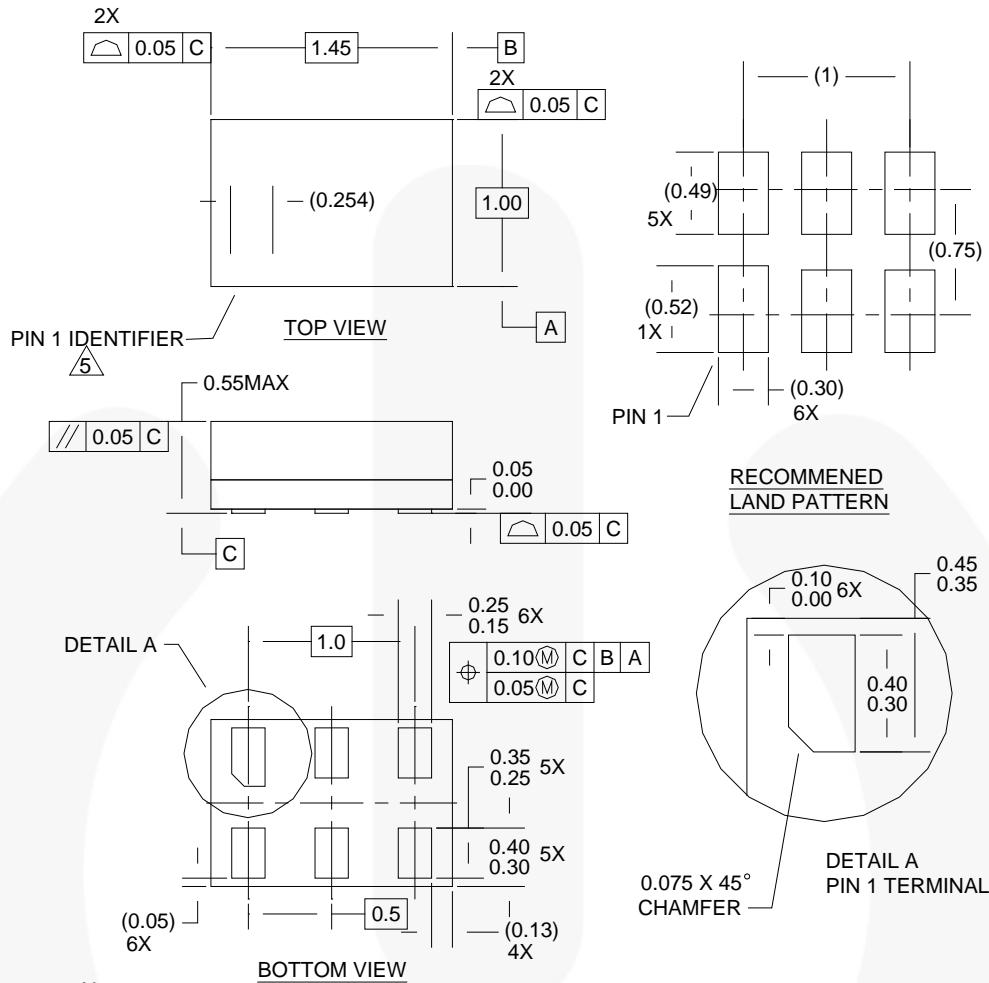


Figure 18. Bandwidth

Physical Dimensions



Notes:

1. CONFORMS TO JEDEC STANDARD M0-252 VARIATION UAAD
2. DIMENSIONS ARE IN MILLIMETERS
3. DRAWING CONFORMS TO ASME Y14.5M-1994
4. FILENAME AND REVISION: MAC06AREV4
5. PIN ONE IDENTIFIER IS 2X LENGTH OF ANY OTHER LINE IN THE MARK CODE LAYOUT.

Figure 19. 6-Lead, MicroPak™ 1.0 mm Wide Package

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

Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:
<http://www.fairchildsemi.com/packaging/>

Tape and Reel Specifications

Please visit Fairchild Semiconductor's online packaging area for the most recent tape and reel specifications:
http://www.fairchildsemi.com/products/logic/pdf/micropak_tr.pdf

Package Designator	Tape Section	Cavity Number	Cavity Status	Cover Type Status
L6X	Leader (Start End)	125 (Typical)	Empty	Sealed
	Carrier	5000	Filled	Sealed
	Trailer (Hub End)	75 (Typical)	Empty	Sealed

Physical Dimensions

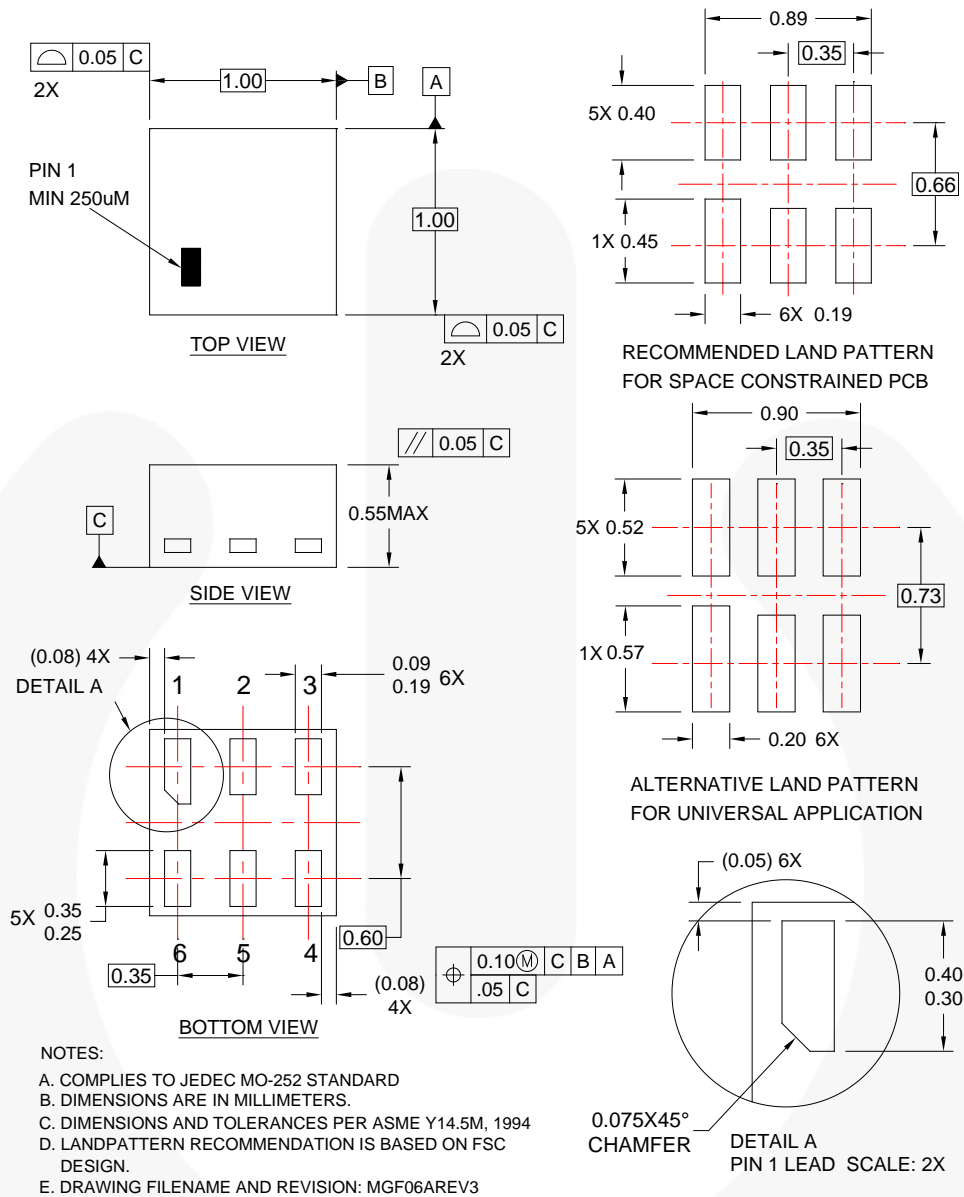


Figure 20. 6-Lead, MicroPak2™, 1x1 mm Body, .35 mm Pitch

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

Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:
<http://www.fairchildsemi.com/packaging/>.

Tape and Reel Specifications

Please visit Fairchild Semiconductor's online packaging area for the most recent tape and reel specifications:
http://www.fairchildsemi.com/packaging/MicroPAK2_6L_tr.pdf.

Package Designator	Tape Section	Cavity Number	Cavity Status	Cover Type Status
FHX	Leader (Start End)	125 (Typical)	Empty	Sealed
	Carrier	5000	Filled	Sealed
	Trailer (Hub End)	75 (Typical)	Empty	Sealed



TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

- | | | | |
|----------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------|
| AccuPower™ | F-PFST™ | PowerTrench® | Sync-Lock™ |
| AX-CAP® | FRFET® | PowerXS™ |  SYSTEM GENERAL® |
| BitSiC™ | Global Power Resource® | Programmable Active Droop™ | TinyBoost® |
| Build it Now™ | GreenBridge™ | QFET® | TinyBuck® |
| CorePLUS™ | Green FPS™ | QST™ | TinyCalc™ |
| CorePOWER™ | Green FPS™ e-Series™ | Quiet Series™ | TinyLogic® |
| CROSSVOLT™ | Gmax™ | RapidConfigure™ | TINYOPTO™ |
| CTL™ | GTO™ | Saving our world, 1mW/W/kW at a time™ | TinyPower™ |
| Current Transfer Logic™ | IntelliMAX™ | SignalWise™ | TinyPWM™ |
| DEUXPEED® | ISOPLANAR™ | SmartMax™ | TinyWire™ |
| Dual Cool™ | Making Small Speakers Sound Louder and Better™ | SMART START™ | TranSiC™ |
| EcoSPARK® | MegaBuck™ | Solutions for Your Success™ | TriFault Detect™ |
| EfficientMax™ | MICROCOUPLER™ | SPM® | TRUECURRENT® |
| ESBC™ | MicroFET™ | STEALTH™ | µSerDes™ |
|  Fairchild® | MicroPak™ | SuperFET® |  SerDes® |
| Fairchild Semiconductor® | MicroPak2™ | SuperSOT™-3 | UHC® |
| FACT Quiet Series™ | MillerDrive™ | SuperSOT™-6 | Ultra FRFET™ |
| FACT® | MotionMax™ | SuperSOT™-8 | UniFET™ |
| FAST® | mWSaver® | SupreMOS® | VCO™ |
| FastvCore™ | OptoHIT™ | SyncFET™ | VisualMax™ |
| FETBench™ | OPTOLOGIC® | | VoltagePlus™ |
| FPS™ | OPTOPLANAR® | | XS™ |

* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. 166

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