Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

Is Now Part of

ON Semiconductor®

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

FAIRCHILD SEMICONDUCTOR®

April 2013

FSUSB30
Low-Power, Two-Port, High-Speed USB 2.0 (480Mbps) Switch

Features

- Low On Capacitance: 3.7pF (Typical)
- Low On Resistance: 6.5Ω (Typical)
- Low Power Consumption: 1µA (Maximum)
  - 10µA Maximum I_{CCT} over an Expanded Control Voltage Range (V_{IN} = 2.6V, V_{CC} = 4.3V)
- Wide -3dB Bandwidth, >720MHz
- 8kV ESD Protection
- Power-Off Protection when V_{CC} = 0V; D+/D- Pins can Tolerate up to 5.5V
- Packaged in:
  - 10-lead MicroPak™ (1.6 x 2.1mm)
  - 10-lead MSOP
  - 10-lead UMLP (1.4 x 1.8mm)

Applications

- Cell phone, PDA, Digital Camera, and Notebook LCD Monitor, TV, and Set-top Box

Related Application Notes

- *AN-6022 Using the FSUSB30 / FSUSB31 to Comply with USB 2.0 Fault Condition Requirements*

Description

The FSUSB30 is a low-power, two-port, high-speed USB 2.0 switch. Configured as a double-pole double-throw (DPDT) switch, it is optimized for switching between two high-speed (480Mbps) sources or a Hi-Speed and Full-Speed (12Mbps) source. The FSUSB30 is compatible with the requirements of USB2.0 and features an extremely low on capacitance (C_{ON}) of 3.7pF. The wide bandwidth of this device (720MHz), exceeds the bandwidth needed to pass the third harmonic, resulting in signals with minimum edge and phase distortion. Superior channel-to-channel crosstalk minimizes interference.

The FSUSB30 contains special circuitry on the D+/D- pins which allows the device to withstand an overvoltage condition when powered off. This device is also designed to minimize current consumption even when the control voltage applied to the S pin, is lower than the supply voltage (V_{CC}). This feature is especially valuable to ultra-portable applications such as cell phones, allowing for direct interface with the general purpose I/Os of the baseband processor. Other applications include switching and connector sharing in portable cell phones, PDAs, digital cameras, printers, and notebook computers.

Ordering Information

Order Number	Package Number	Product Code Top Mark	Package Description
FSUSB30L10X	MAC010A	FJ	10-Lead MicroPak, 1.6 x 2.1mm
FSUSB30MUX	MUA10A	FSUSB30	10-Lead Molded Small Outline Package (MSOP), JEDEC MO-187, 3.0mm Wide
FSUSB30UMX	MLP010A	GJ	10-Lead, Quad, Ultrathin, MLP (UMLP) 1.4 x 1.8mm

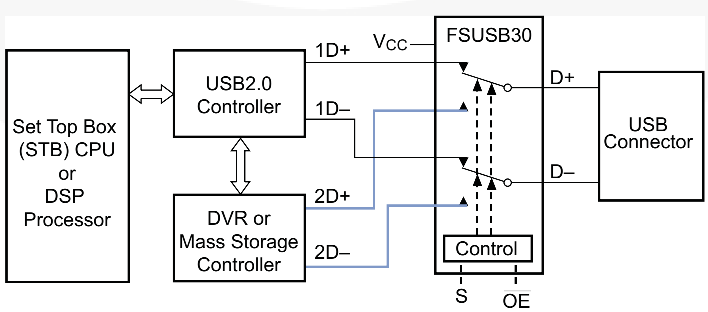
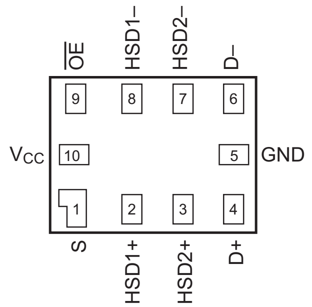


Figure 1. Typical Application

MicroPak™ is a trademark of Fairchild Semiconductor Corporation.

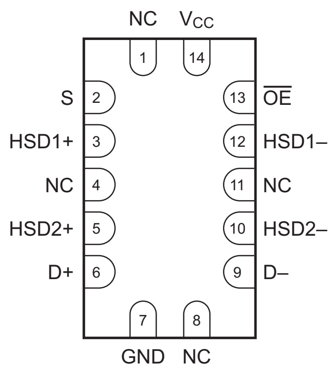
Connection Diagrams

Pad Assignments for MicroPak



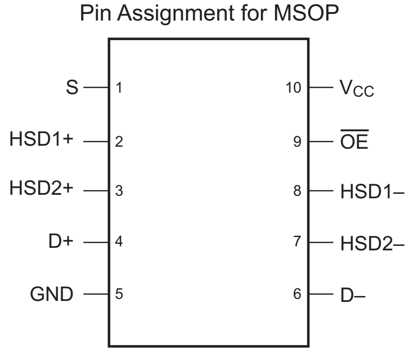
(Top View)

Pad Assignments for DQFN



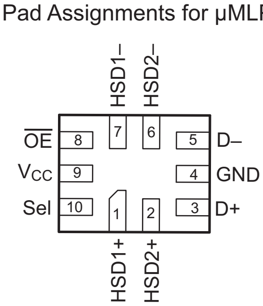
(Top Through View)

Pin Assignment for MSOP



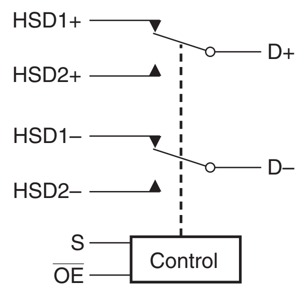
(Top Through View)

Pad Assignments for µMLP



(Top Through View)

Analog Symbol



Pin Descriptions

Pin Name	Description
$\overline{OE}$	Bus Switch Enable
S	Select Input
D+, D–, HSDn+, HSDn–	Data Ports
NC	No Connect

Truth Table

S	$\overline{OE}$	Function
X	HIGH	Disconnect
LOW	LOW	D+, D– = $HSD1_n$
HIGH	LOW	D+, D– = $HSD2_n$

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		Minimum	Maximum	Unit
V_{CC}	Supply Voltage		-0.5	+5.5	V
V_{CNTRL}	DC Input Voltage(1)		-0.5	V_{CC}	V
V_{SW}	DC Switch Voltage(1)	HSDnX	0.5	V_{CC}	V
		D+,D- when $V_{CC} > 0$	0.5	V_{CC}	V
		D+,D- when $V_{CC} = 0$	-0.50	V_{CC}	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	All Pins		8	kV
		I/O to GND		8	kV

Note:

1. The input and output negative voltage 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.(2)

Symbol	Parameter	Minimum	Maximum	Unit
V_{CC}	Supply Voltage	3.0	4.3	V
V_{IN}	Control Input Voltage	0	V_{CC}	V
V_{SW}	Switch Input Voltage	0	V_{CC}	V
T_A	Operating Temperature	-40	+85	°C
ΘJ_A	Thermal Resistance, 10 MicroPak		250	°C/W

Note:

2. Control input must be held HIGH or LOW and it must not float.

DC Electrical Characteristics

All typical values are at 25°C unless otherwise specified.

Symbol	Parameter	Conditions	V_{CC} (V)	T_A = –40°C to +85°C			Unit
				Min.	Typ.	Max.	
V_{IK}	Clamp Diode Voltage	I_{IN} = -18mA	3.0			-1.2	V
V_{IH}	Input Voltage HIGH		3.0 to 3.6	1.3			V
			4.3	1.7			V
V_{IL}	Input Voltage LOW		3.0 to 3.6			0.5	V
			4.3			0.7	V
I_{IN}	Control Input Leakage	V_{SW} = 0.0V to V_{CC}	4.3	-1.0		1.0	µA
I_{OZ}	OFF State Leakage	$0 \leq$ Dn, $HSD1_n$, $HSD2_n \leq V_{CC}$	4.3	-2.0		2.0	µA
I_{OFF}	Power OFF Leakage Current (D+, D–)	V_{SW} = 0V to 4.3V, V_{CC} = 0V	0	-2.0		2.0	µA
R_{ON}	Switch On Resistance(3)	V_{SW} = 0.4V, I_{ON} = -8mA	3.0		6.5	10.0	Ω
		V_{SW} = 0V, I_O = 30mA at 25°C	3.6			7.0	Ω
ΔR_{ON}	Delta R_{ON}(4)	V_{SW} = 0.4V, I_{ON} = -8mA	3.0		0.35		Ω
R_{ON} Flatness	R_{ON} Flatness(3)	V_{SW} = 0.0V - 1.0V, I_{ON} = -8mA	3.0		2.0		Ω
I_{CC}	Quiescent Supply Current	V_{CNTRL} = 0.0V or V_{CC}, I_{OUT} = 0	4.3			1.0	µA
I_{CCT}	Increase in I_{CC} Current per Control Voltage	V_{CNTRL} (control input) = 2.6V	4.3			10.0	µA

Notes:

3. Measured by the voltage drop between Dn, $HSD1_n$, $HSD2_n$ pins at the indicated current through the switch. On resistance is determined by the lower of the voltage on the two ports.

4.Guaranteed by characterization.

AC Electrical Characteristics

All typical values are for V_{CC} = 3.3V at 25°C unless otherwise specified.

Symbol	Parameter	Conditions	V_{CC} (V)	T_A = –40°C to +85°C			Unit	Figure Number
				Min.	Typ.	Max.		
t_{ON}	Turn-On Time S, $\overline{OE}$ to Output	$HD1_n$, $HD2_n$ = 0.8V, R_L = 50Ω, C_L = 5pF	3.0 to 3.6		13	30	ns	Figure 9
t_{OFF}	Turn-Off Time S, $\overline{OE}$ to Output	$HD1_n$, $HD2_n$ = 0.8V, R_L = 50Ω, C_L = 5pF	3.0 to 3.6		12	25	ns	Figure 9
t_{PD}	Propagation Delay(4)	R_L = 50Ω, C_L = 5pF	3.3		0.25		ns	Figure 7 Figure 8
t_{BBM}	Break-Before-Make	R_L = 50Ω, C_L = 5pF, V_{IN} = 0.8V	3.0 to 3.6	2.0		6.5	ns	Figure 10
O_{IRR}	Off Isolation (Non-Adjacent)	f = 240MHz, R_T = 50Ω	3.0 to 3.6		-30		dB	Figure 13
Xtalk	Non-Adjacent Channel Crosstalk	R_T = 50Ω, f = 240MHz	3.0 to 3.6		-45		dB	Figure 14
BW	–3dB Bandwidth	R_T = 50Ω, C_L = 0pF	3.0 to 3.6		720		MHz	Figure 12
		R_T = 50Ω, C_L = 5pF			550			

USB Hi-Speed Related AC Electrical Characteristics

Symbol	Parameter	Conditions	V_{CC} (V)	T_A = –40°C to +85°C			Units	Figure Number
				Min.	Typ.	Max.		
$t_{SK(O)}$	Channel-to-Channel Skew[5]	$R_L = 50\Omega$, $C_L = 5pF$	3.0 to 3.6		50		ps	Figure 7 Figure 11
$t_{SK(P)}$	Skew of Opposite Transitions of the Same Output[5]	$R_L = 50\Omega$, $C_L = 5pF$	3.0 to 3.6		20		ps	Figure 7 Figure 11
t_J	Total Jitter[5]	$R_L = 50\Omega$, $C_L = 5pF$, $t_R = t_F = 500ps$ at 480 Mbps (PRBS = $2^{15} - 1$)	3.0 to 3.6		200		ps	

Note:

5. Guaranteed by characterization.

Capacitance

Symbol	Parameter	Conditions	T_A = –40°C to +85°C			Units	Figure Number
			Min.	Typ.	Max.		
C_{IN}	Control Pin Input Capacitance	$V_{CC} = 0V$		1.5		pF	Figure 16
C_{ON}	$D1_n$, $D2_n$, Dn On Capacitance	$V_{CC} = 3.3$, $\overline{OE} = 0V$		3.7		pF	Figure 15
C_{OFF}	$D1_n$, $D2_n$ Off Capacitance	V_{CC} and $\overline{OE} = 3.3$		2.5		pF	Figure 16

Typical Characteristics

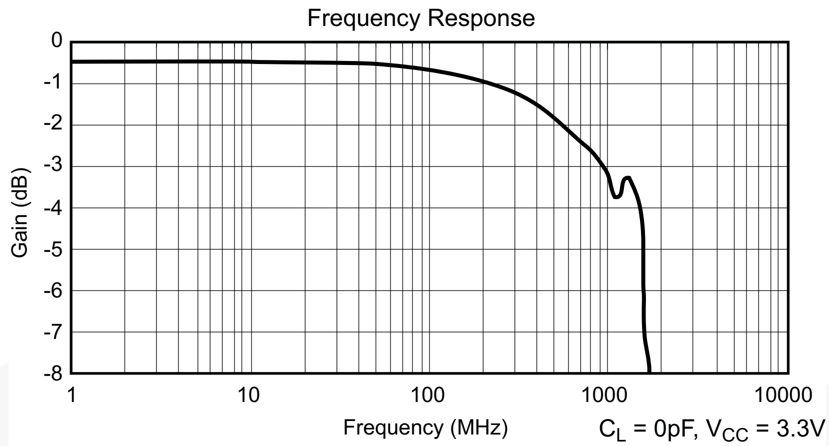


Figure 2. Gain vs. Frequency

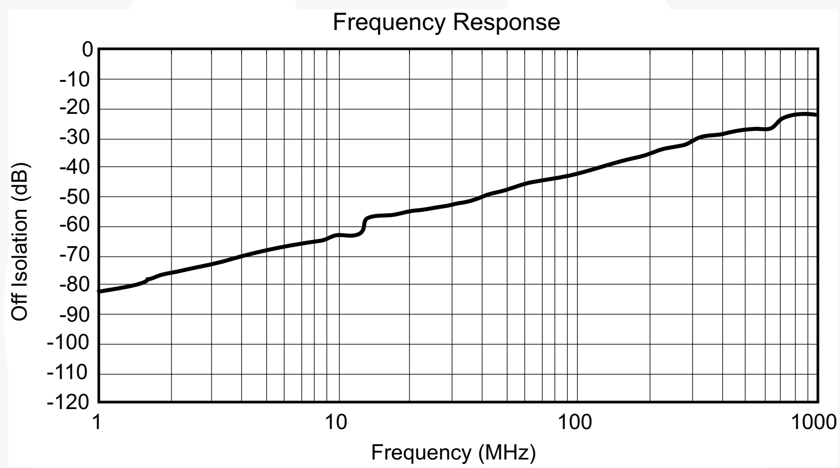


Figure 3. Off Isolation

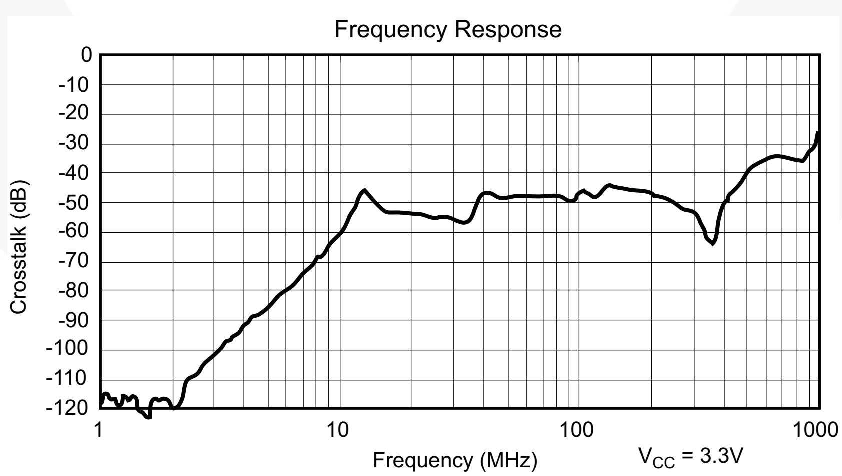


Figure 4. Crosstalk

Test Diagrams

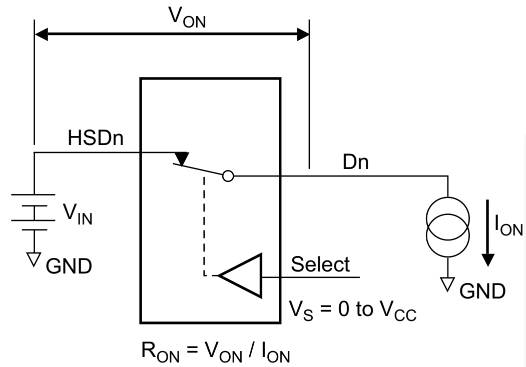


Figure 5. On Resistance

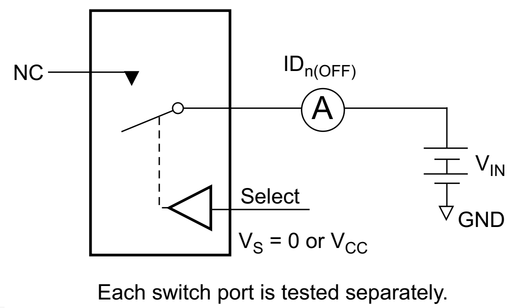
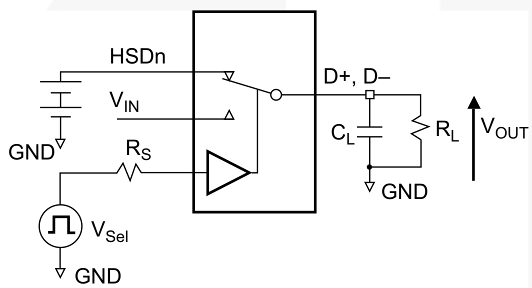


Figure 6. Off Leakage



R_L, R_S, and C_L are functions of the application environment (see AC Electrical tables for specific values).

C_L includes test fixture and stray capacitance.

Figure 7. AC Test Circuit Load

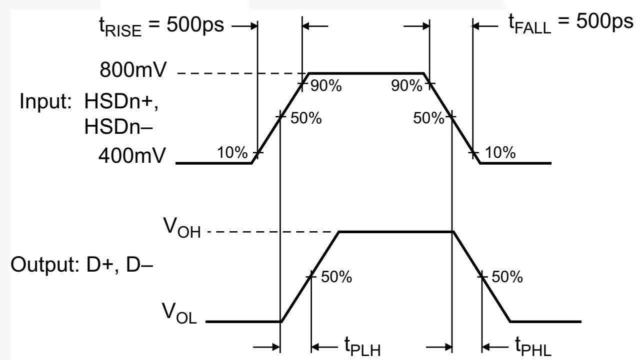


Figure 8. Switch Propagation Delay Waveforms

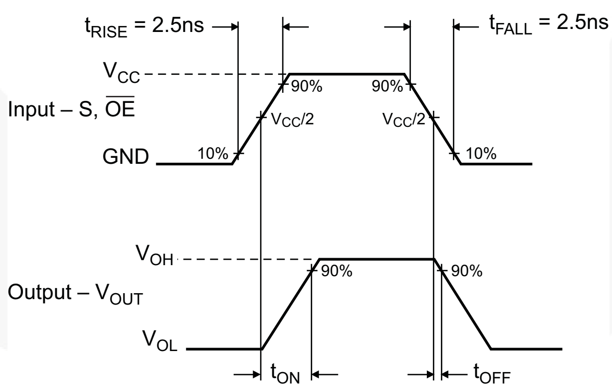
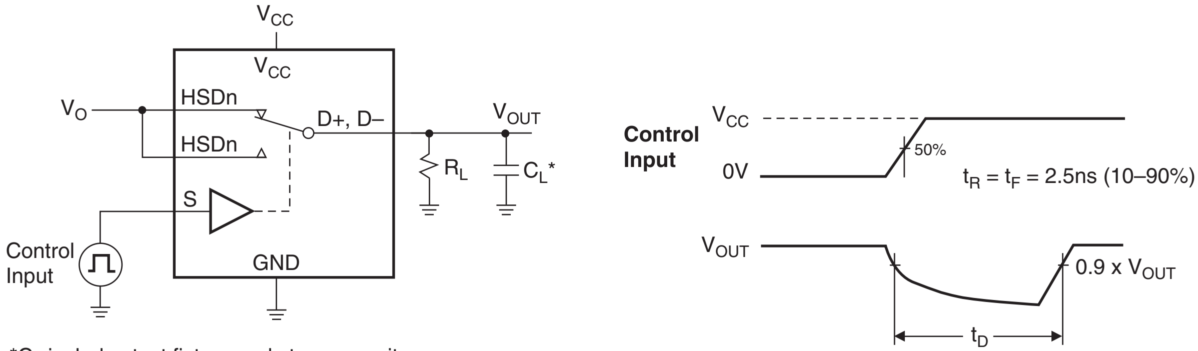


Figure 9. Turn-On / Turn-Off Waveform



*C_L includes test fixture and stray capacitance.

Figure 10. Break-Before-Make (t_{BBM})

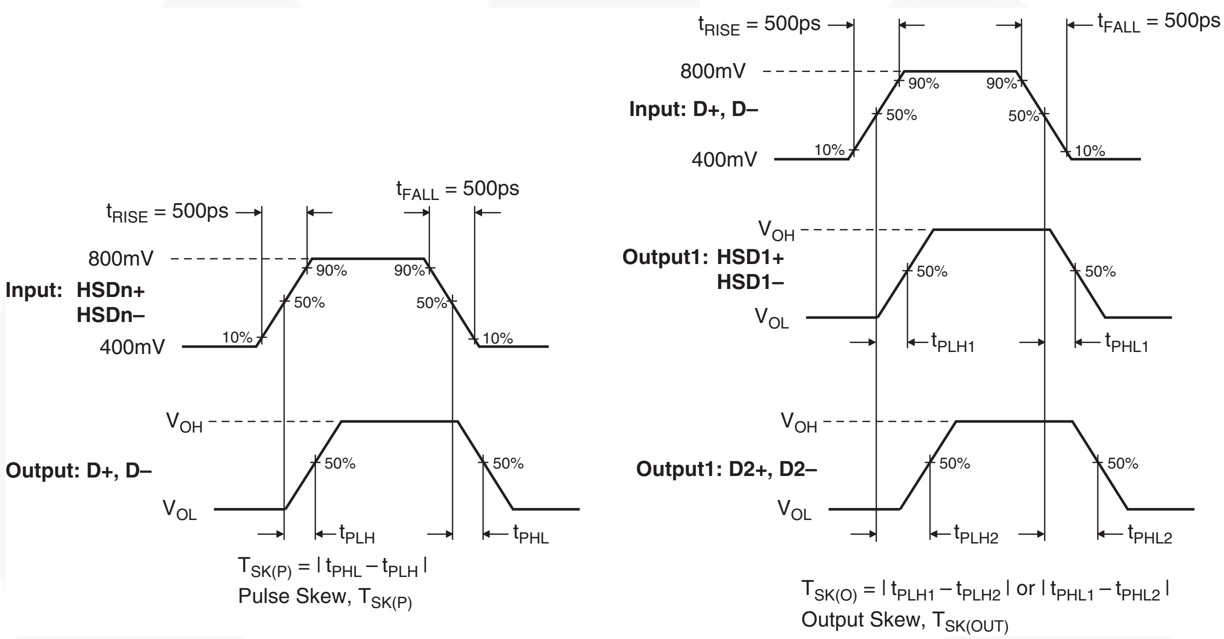
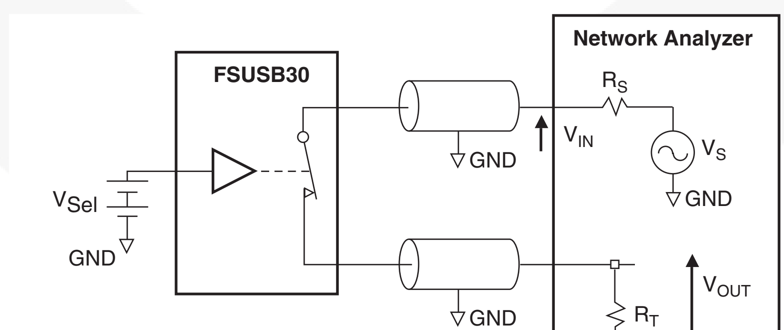


Figure 11. Switch Skew Tests



R_S and R_T are functions of the application environment (See AC Electrical Tables for specific values).

Figure 12. Bandwidth

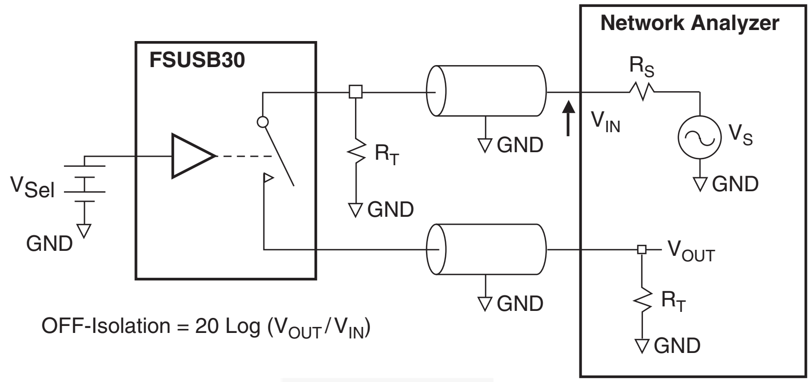


Figure 13. Channel Off Isolation

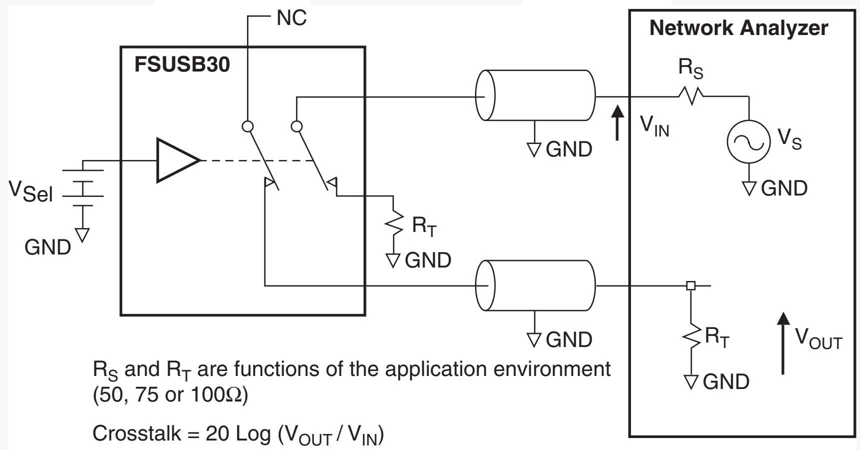


Figure 14. Non-Adjacent Channel-to-Channel Crosstalk

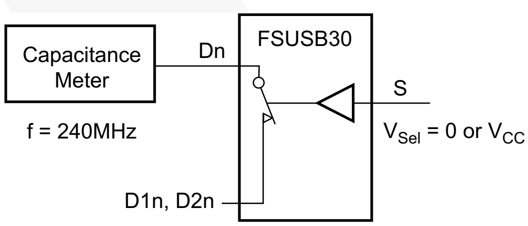


Figure 15. Channel On Capacitance

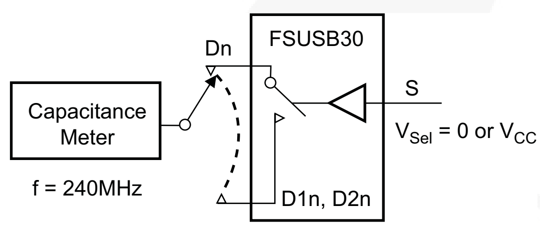


Figure 16. Channel Off Capacitance

Application Guidance: Meeting USB 2.0 Vbus Short Requirements

In section 7.1.1 of the USB 2.0 specification, it notes that USB devices must be able to withstand a Vbus short to D+ or D- when the USB devices is either powered off or powered on. The FSUSB30 can be successfully configured to meet both these requirements.

Power-Off Protection

For a Vbus short circuit, the switch is expected to withstand such a condition for at least 24 hours. The FSUSB30 has specially designed circuitry which prevents unintended signal bleed through as well as guaranteed system reliability during a power-down, overvoltage condition. The protection has been added to the common pins (D+, D-).

Power-On Protection

The USB 2.0 specification also notes that the USB device should be capable of withstanding a Vbus short during transmission of data. Fairchild recommends adding a 100Ω series resister between the switch VCC pin and supply rail to protect against this case. This modification works by limiting current flow back into the V_{CC} rail during the over-voltage event so current remains within the safe operating range. In this application, the switch passes the full 5.25V input signal through to the selected output, while maintaining specified off isolation on the un-selected pins.

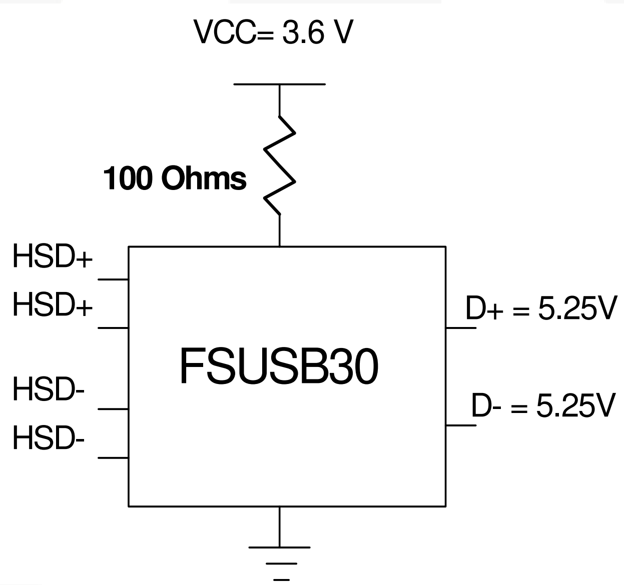


Figure 17. Adding 100Ω resistor in series with the V_{CC} supply allows the FSUSB30 to withstand a Vbus short when powered up

For more information, see Applications Note *AN-6022 Using the FSUSB30 to Comply with USB 2.0 Fault Condition Requirements* at www.fairchildsemi.com

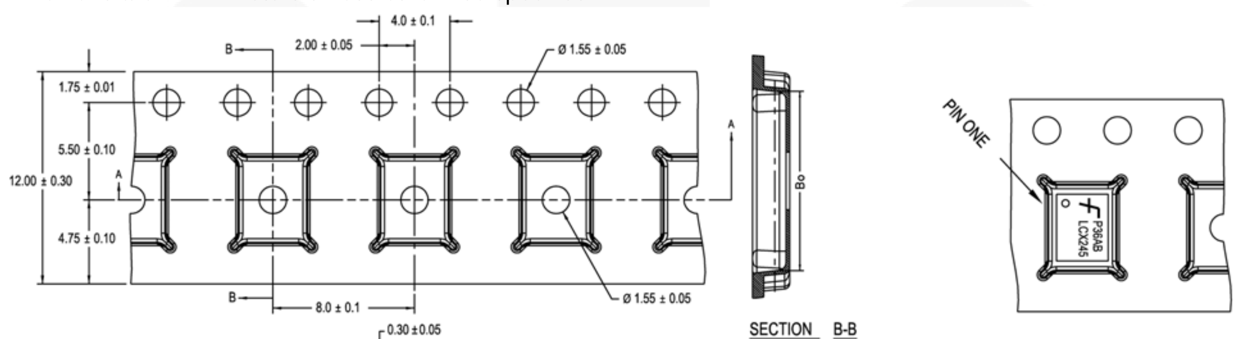
Tape and Reel Specifications

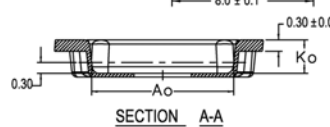
Tape Format for DQFN

Package Designator	Tape Section	Number Cavities	Cavity Status	Cover Tape Status
BQX	Leader (Start End)	125 (typ)	Empty	Sealed
	Carrier	2500/3000	Filled	Sealed
	Trailer (Hub End)	75 (typ)	Empty	Sealed

Tape Dimensions

Dimenions are in millimeters unless otherwise specified.





PKG. SIZE	DIM.Ao	DIM.Bo	DIM.Ko
3.5 X 4.5	3.8 ± 0.1	4.8 ± 0.1	0.9 ± 0.1
3.0 X 3.0	3.3 ± 0.1	3.3 ± 0.1	0.9 ± 0.1
2.5 X 4.5	2.8 ± 0.1	4.8 ± 0.1	0.9 ± 0.1
2.5 X 3.5	2.8 ± 0.1	3.8 ± 0.1	0.9 ± 0.1
2.5 X 3.0	2.8 ± 0.1	3.3 ± 0.1	0.9 ± 0.1
2.5 X 2.5	2.8 ± 0.1	2.8 ± 0.1	0.9 ± 0.1

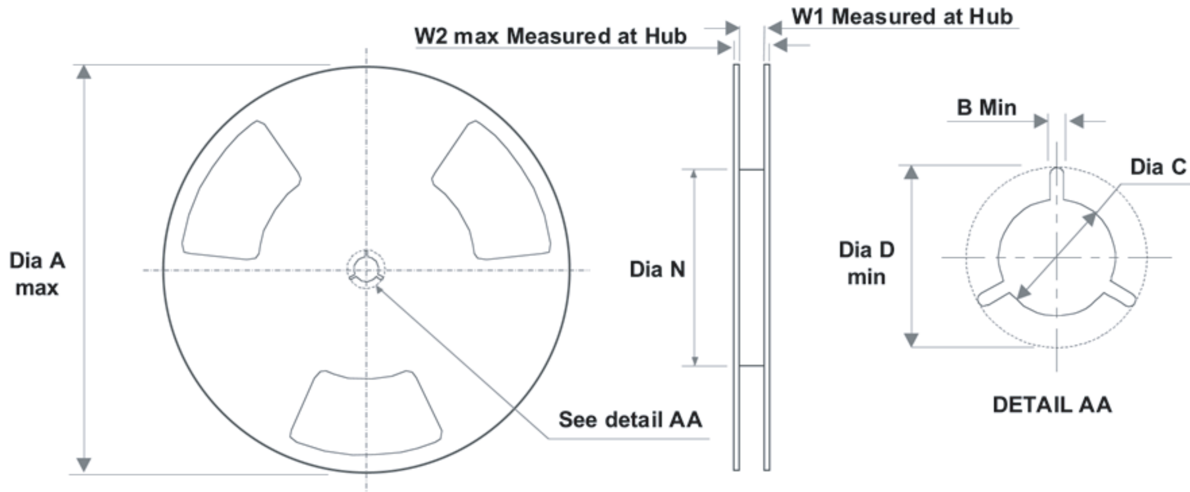
DIMENSIONS ARE IN MILLIMETERS

NOTES: unless otherwise specified

1. Cummulative pitch for feeding holes and cavities (chip pockets) not to exceed 0.008[0.20] over 10 pitch span.
2. Smallest allowable bending radius.
3. Thru hole inside cavity is centered within cavity.
4. Tolerance is ±0.002[0.05] for these dimensions on all 12mm tapes.
5. Ao and Bo measured on a plane 0.120[0.30] above the bottom of the pocket.
6. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
7. Pocket position relative to sprocket hole measured as true position of pocket. Not pocket hole.
8. Controlling dimension is millimeter. Diemension in inches rounded.

Reel Dimensions for DQFN

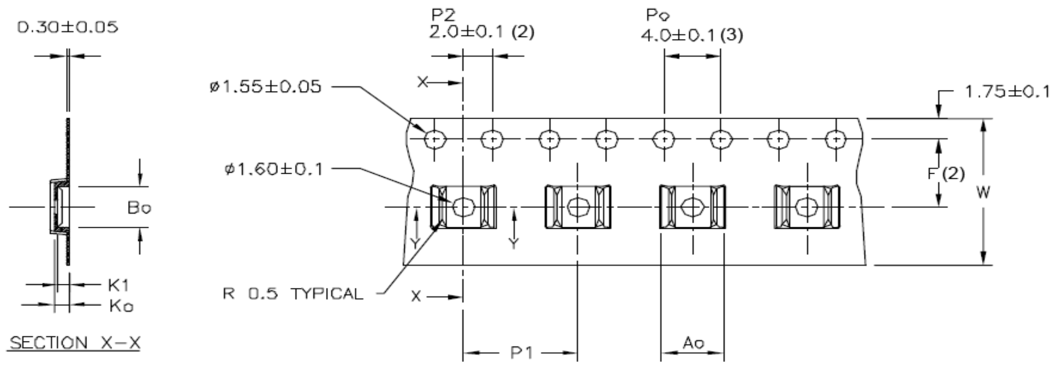
Dimensions are in inches (millimeters) unless otherwise specified.



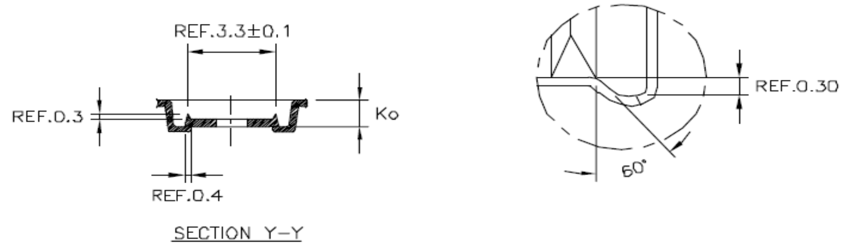
Tape Size	A	B	C	D	N	W1	W2
(12mm)	13.0 (330)	0.059 (1.50)	0.512 (13.00)	0.795 (20.20)	7.008 (178)	0.488 (12.4)	0.724 (18.4)

Tape Dimensions for MSOP

Dimensions are in inches (millimeters) unless otherwise specified.



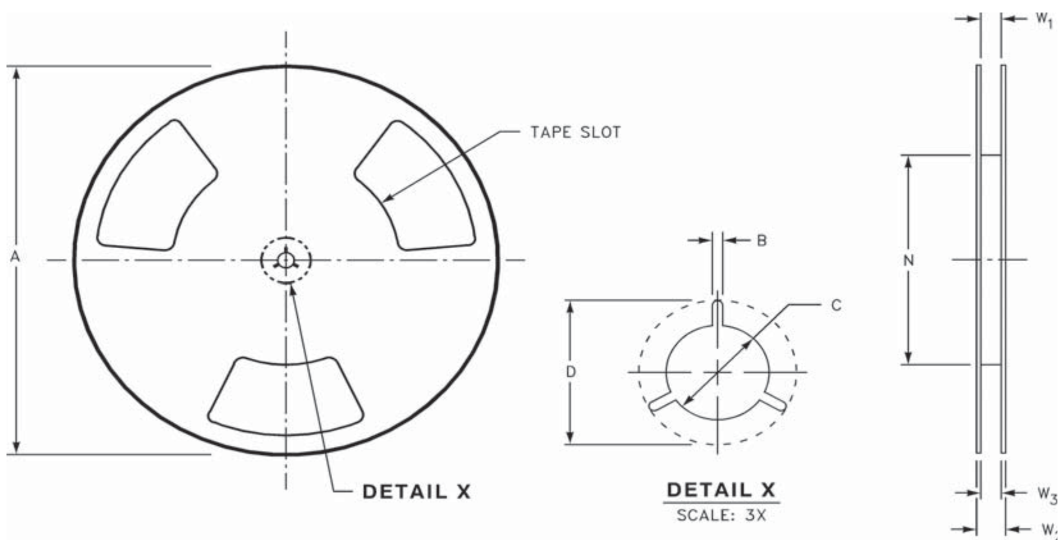
Ao	5.30+/-0.1
Bo	3.30+/-0.1
Ko	1.30+/-0.1
K1	1.00+/-0.1
F	5.50+/-0.1
P1	8.00+/-0.1
W	12.00+/-0.3



Notes:
1. All dimensions are in millimeters.
2. Measured from centerline of sprocket hole to centerline of pocket.
3. Cumulative tolerance of ten sprocket holes is ±0.20mm.
4. Other material available.

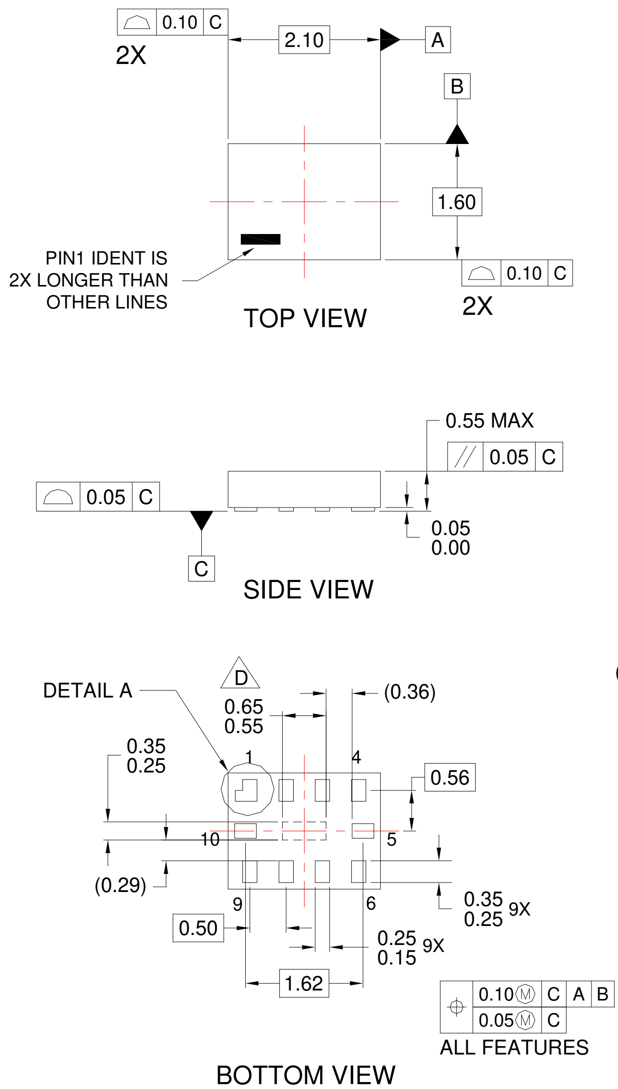
Reel Dimensions for MSOP

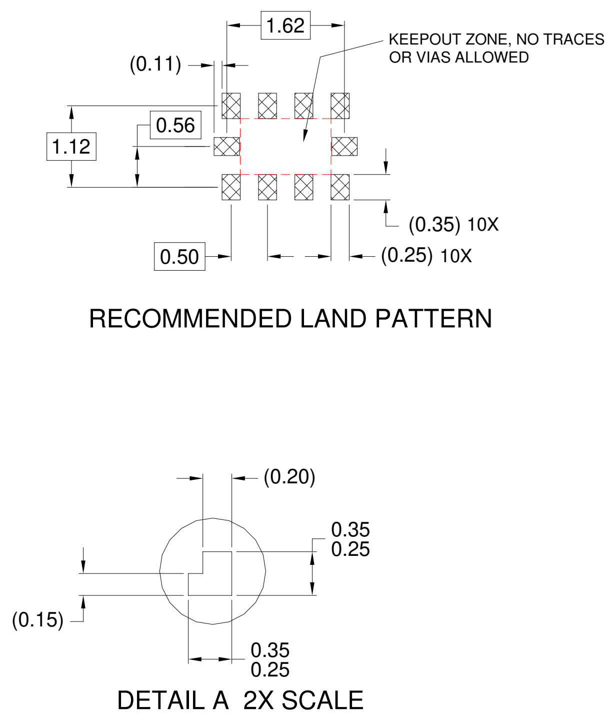
Dimensions are in inches (millimeters) unless otherwise specified



Tape Size	A	B	C	D	N	W1	W2	W3
(12mm)	13 (330)	0.059 (1.5)	0.512 (13)	0.795 (20.2)	7.008 (178)	0.448 (12.4)	0.724 (18.4)	0.468-0.606 (11.9 -15.4)

Physical Dimensions





NOTES:

A. PACKAGE CONFORMS TO JEDEC REGISTRATION MO-255, VARIATION UABD .

B. DIMENSIONS ARE IN MILLIMETERS.

C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.

D. PRESENCE OF CENTER PAD IS PACKAGE SUPPLIER DEPENDENT. IF PRESENT IT IS NOT INTENDED TO BE SOLDERED AND HAS A BLACK OXIDE FINISH.

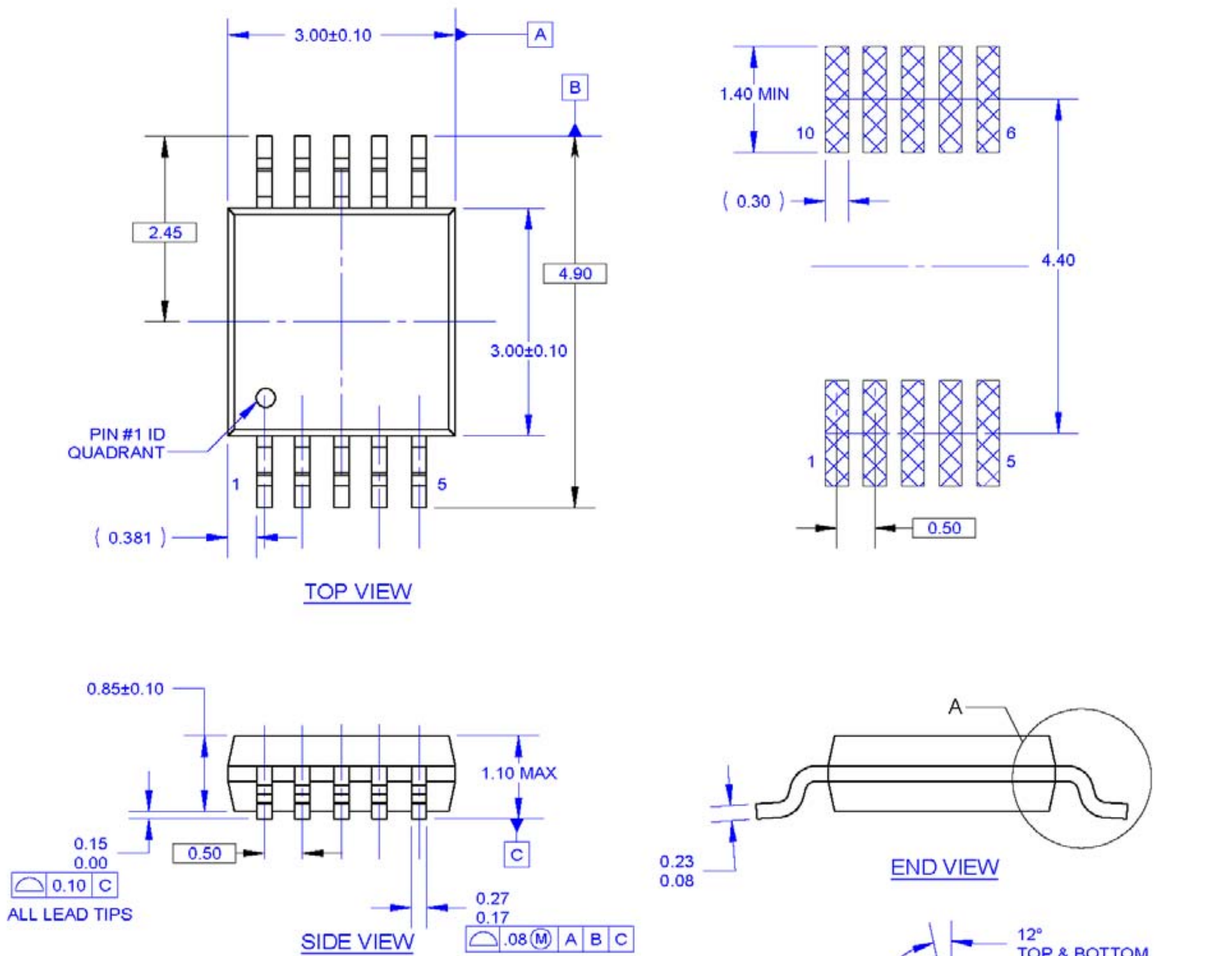
E. DRAWING FILENAME: MKT-MAC10Arev5.

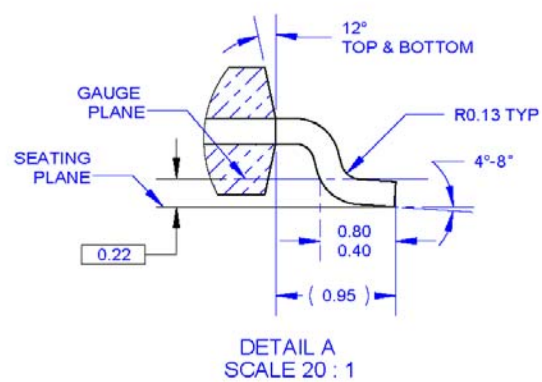
Figure 17. 10-Lead MicroPak, 1.6 x 2.1mm

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/.

Physical Dimensions





NOTES: UNLESS OTHERWISE SPECIFIED

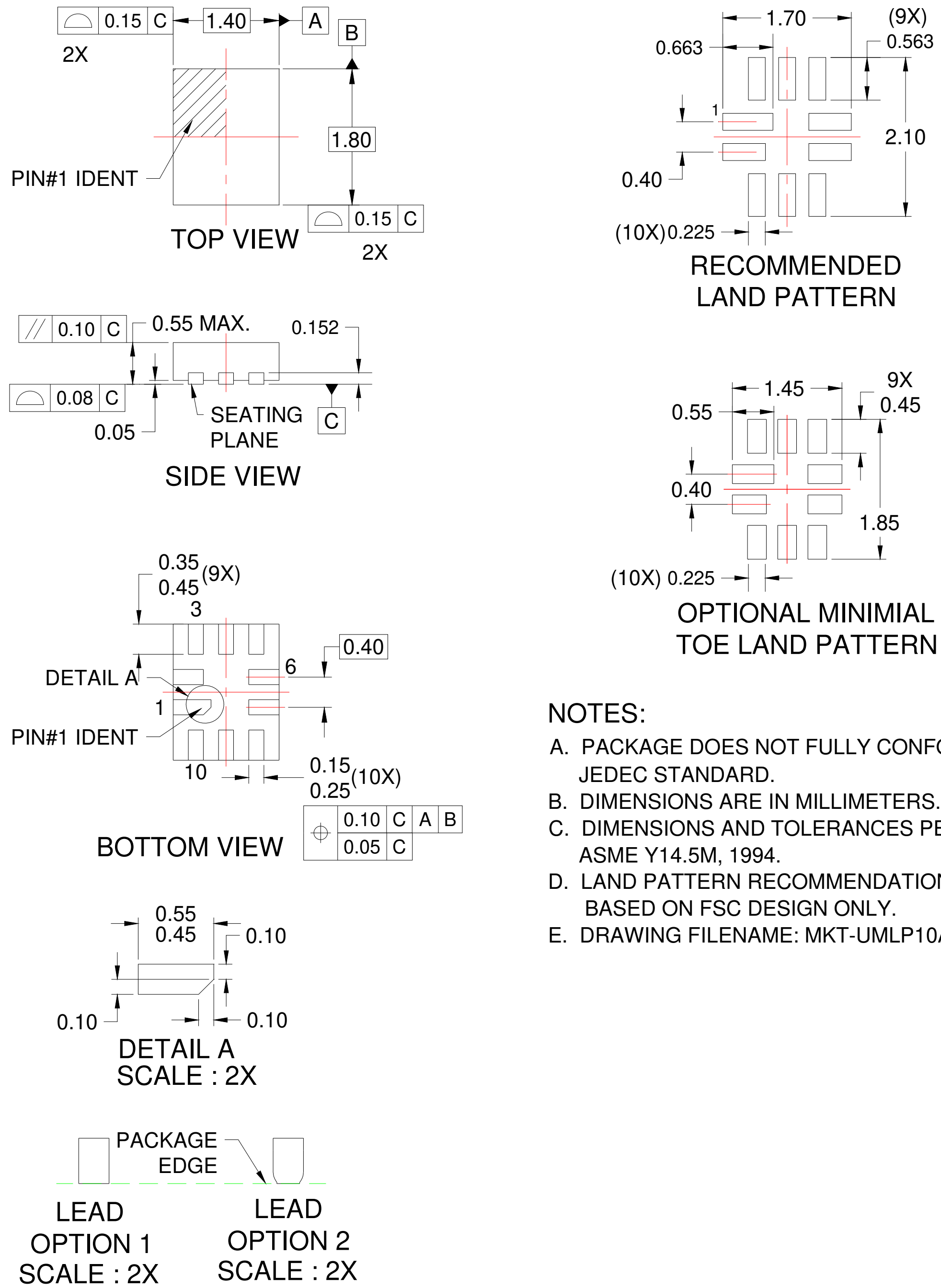
A. THIS PACKAGE CONFORMS TO JEDEC MO-187 VARIATION BA.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
D. DIMENSIONS AND TOLERANCES AS PER ASME Y14.5-1994.
E. LAND PATTERN AS PER IPC7351#SOP50P490X110-10AN
F. FILE NAME: MKT-MUA10AREV3

Figure 18. 10-Lead Molded Small Outline Package (MSOP), JEDEC MO-187, 3.0mm Wide

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/.

Physical Dimensions



NOTES:

A. PACKAGE DOES NOT FULLY CONFORM TO JEDEC STANDARD.
B. DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
D. LAND PATTERN RECOMMENDATION IS BASED ON FSC DESIGN ONLY.
E. DRAWING FILENAME: MKT-UMLP10Arev3.

Figure 19. 10-Lead, Quad, Ultrathin Molded Leadless Package (UMLP), 1.4 x 1.8mm

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/.

FAIRCHILD SEMICONDUCTOR®

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.

2Cool™
AccuPower™
AX-CAP®*
BitSiC™
Build it Now™
CorePLUS™
CorePOWER™
CROSSVOLT™
CTL™
Current Transfer Logic™
DEUXPEED®
Dual Cool™
EcoSPARK®
EfficientMax™
ESBC™
®
Fairchild®
Fairchild Semiconductor®
FACT Quiet Series™
FACT®
FAST®
FastvCore™
FETBench™
FPS™
F-PFS™
FRFET®
Global Power Resource℠
GreenBridge™
Green FPS™
Green FPS™ e-Series™
G*max*™
GTO™
IntelliMAX™
ISOPLANAR™
Making Small Speakers Sound Louder and Better™
MegaBuck™
MICROCOUPLER™
MicroFET™
MicroPak™
MicroPak2™
MillerDrive™
MotionMax™
mWSaver™
OptoHiT™
OPTOLOGIC®
OPTOPLANAR®
®
PowerTrench®
PowerXS™
Programmable Active Droop™
QFET®
QS™
Quiet Series™
RapidConfigure™
™
Saving our world, 1mW/W/kW at a time™
SignalWise™
SmartMax™
SMART START™
Solutions for Your Success™
SPM®
STEALTH™
SuperFET®
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SupreMOS®
SyncFET™
Sync-Lock™
SYSTEM GENERAL®*
TinyBoost™
TinyBuck™
TinyCalc™
TinyLogic®
TINYOPTO™
TinyPower™
TinyPWM™
TinyWire™
TranSiC™
TriFault Detect™
TRUECURRENT®*
μSerDes™
SerDes™
UHC®
Ultra FRFET™
UniFET™
VCX™
VisualMax™
VoltagePlus™
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. I64

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