Is Now Part of

ON Semiconductor®

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

December 2014

FSA1208
Low-Power, Eight-Port, High-Speed Isolation Switch

Features

- Low On Capacitance: 6 pF Typical
- Low On Resistance: 15 Ω Typical
- Low Power Consumption: 1 A Maximum
- 10 µA Maximum I_{CCT} over an Expanded Voltage Range (V_{IN}=2.3 V, V_{CC}=4.3 V)
- Wide -3 dB Bandwidth: > 400 MHz
- Packaged in Space-Saving 20-Lead MLP (2.5 x 4.5 mm)
- 7.5 kV ESD Rating; >16 kV Power/GND ESD Rating
- Low C_{OFF} Capacitance: 2.5 pF Typical

Applications

- DIMM DDR Memory

Description

The FSA1208 is a low-power, eight-port, high-speed switch. This part is configured as a single-pole, single-throw switch and is optimized for isolating a high-speed source, such as a DDR memory bus. The FSA1208 features an extremely low on capacitance (C_{ON}) of 6 pF Superior channel-to-channel crosstalk minimizes interference.

The FSA1208 contains special circuitry on the A & B pins that allows the device to withstand an over-voltage condition. This device is also designed to minimize current consumption even when the control voltage applied to the /OE pin is lower than the supply voltage (V_{CC}). Applications include port isolation and switching in DDR memory modules, portable cell phones, PDAs, digital cameras, printers, and notebook computers.

Ordering Information

Part Number	Top Mark	Operating Temperature Range	Package
FSA1208BQX	F1208	-40 to +85°C	20-Lead, Quad, Molded Leadless Package (MLP), 2.5 x 4.5 mm

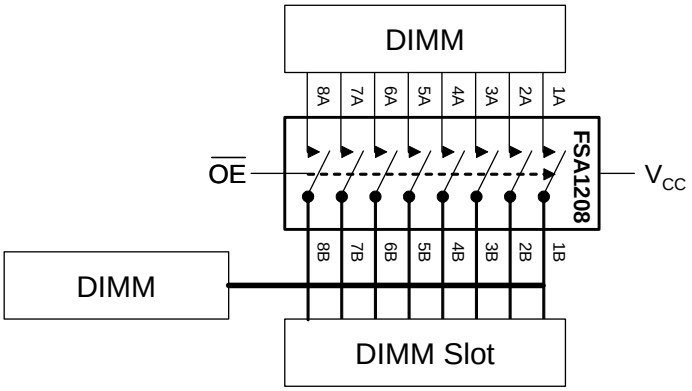


Figure 1. Analog Symbol

Pin Configurations

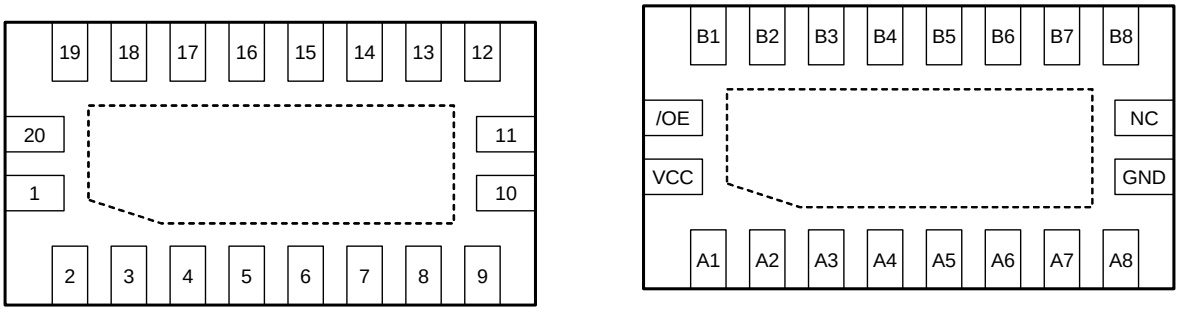


Figure 2. Pin Assignments for MLP (Top Through View)

Pin Definitions

Pin #	Name	Description
20	/OE	Switch Enable
2-9	A1-A8	A Side of Bus
12-19	B8-B1	B Side of Bus
11	NC	No Connection
1	VCC	Power
10	GND	Ground

Truth Table

/OE	Function
HIGH	Disconnect
LOW	A1-A8=B1-B8

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 (/OE)[1]		-0.50	V_{CC}	V
V_{SW}	DC Switch I/O Voltage[1]		-0.50	5.25	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		7.5	kV
		I/O to GND		8	
		Power to GND		16	
	Charged Device Model, JEDEC: JESD22-C101			2	

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	2.3	4.3	V
V_{CNTRL}[2]	Control Input Voltage (S, /OE)	0	V_{CC}	V
V_{SW}	Switch I/O Voltage	-0.5	V_{CC}	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 at 25°C unless otherwise specified.

Symbol	Parameter	Conditions	V_{CC} (V)	T_A=- 40ºC to +85ºC			Units
				Min.	Typ.	Max.	
V_{IK}	Clamp Diode Voltage	I_{IN}=-18 mA	2.5			-1.2	V
V_{IH}	Input Voltage High		2.3 to 3.6	1.3			V
			4.3	1.7			V
V_{IL}	Input Voltage Low		2.3 to 3.6			0.5	V
			4.3			0.7	V
I_{IN}	Control Input Leakage	V_{SW}=0 to V_{CC}	4.3	-1		1	µA
I_{OZ}	Off State Leakage	0 ≤ A, B ≤ 3.6 V	4.3	-2		2	µA
R_{ON}	Switch On Resistance[3]	V_{SW}=0 V, I_{ON}=-10 mA Figure 3	2.5		7		Ω
		V_{SW}=1.8 V, I_{ON}=-10 mA Figure 3	2.5		15		Ω
I_{CC}	Quiescent Supply Current	V_{IN}=0 or V_{CC}, I_{OUT}=0	4.3			1	µA
I_{CCT}	Increase in I_{CC} Current Per Control Voltage and V_{CC}	V_{IN}=1.8 V	2.7			10	µA

Note:

3. Measured by the voltage drop between A and B pins at the indicated current through the switch. On resistance is determined by the lower of the voltage on the two (A or B ports).

AC Electrical Characteristics

All typical values are for V_{CC}=2.5 V at 25°C unless otherwise specified.

Symbol	Parameter	Conditions	V_{CC} (V)	T_A=- 40ºC to +85ºC			Units
				Min.	Typ.	Max.	
t_{on}	Turn-On Time, /OE to Output	R_L=50 Ω, C_L=5 pF V_{SW}=1.8 V Figure 4, Figure 5	2.3 to 3.6		15	34	ns
t_{uff}	Turn-Off Time, /OE to Output	R_L=50 Ω, C_L=5 pF V_{SW}=1.8 V Figure 4, Figure 5	2.3 to 3.6		12	25	ns
t_{ad}	Propagation Delay[4]	R_L=50 Ω, C_L=5 pF Figure 4, Figure 6	3.3		0.35		ns
O_{IRR}	Off Isolation	R_L=50 Ω, f=400 MHz Figure 11	2.3 to 3.6		-40		dB
Xtalk	Non-Adjacent Channel Crosstalk	R_L=50 Ω, f=100 MHz Figure 12	2.3 to 3.6		-40		dB
BW	-3dB Bandwidth	R_L=50 Ω, C_L=0 pF Figure 10	2.3 to 3.6		1000		MHz
		R_L=50 Ω, C_L=5 pF Figure 10			750		MHz

Note:

4. Guaranteed by characterization.

High-Speed-Related AC Electrical Characteristics

Symbol	Parameter	Conditions	V_{CC} (V)	T_A=- 40ºC to +85ºC			Units
				Min.	Typ.	Max.	
$t_{SK(O)}$	Channel-to-Channel Skew[5]	C_L=5 pF	3.3		40	80	ps
$t_{SK(P)}$	Skew of Opposite Transitions of the Same Output[5]	C_L=5 pF	3.3		15	40	ps
$t_{SK(PKG)}$	Package-to-Package Skew[5]	C_L=5 pF	3.3		60	100	ps

Note:
5. Guaranteed by characterization.

Capacitance

Symbol	Parameter	Conditions	T_A=- 40ºC to +85ºC			Units
			Min.	Typ.	Max.	
C_{IN}	Control Pin Input Capacitance	V_{CC}=0.2 V, f=1 MHz		2.0		pF
C_{ON}	D+/D- On Capacitance	V_{CC}=2.5 V, /OE=0 V, f=1 MHz Figure 9		6.0		
C_{OFF}	D1n, D2n Off Capacitance	V_{CC} and /OE=2.5 V, f=1 MHz Figure 8		2.5		

Test Diagrams

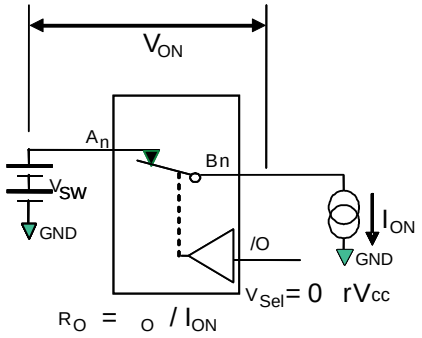
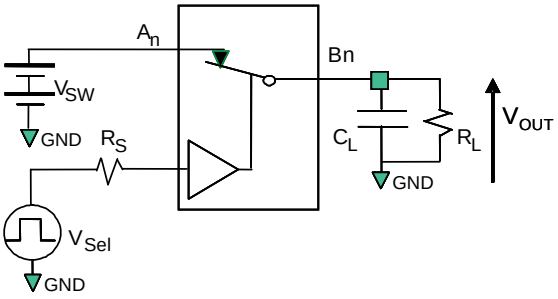


Figure 3. On Resistance



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 4. AC Test Circuit Load

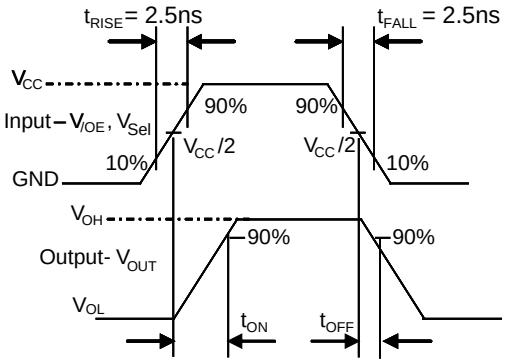


Figure 5. Turn-On / Turn-Off Waveforms

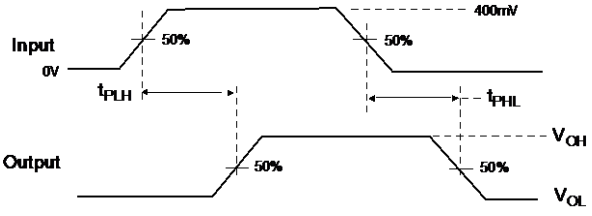


Figure 6. Propagation Delay (t_{ry} t_o – 500ps)

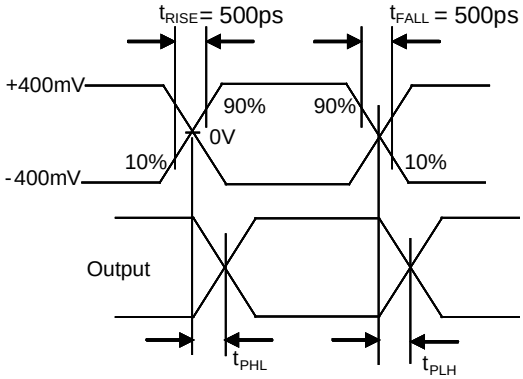


Figure 7. Intra-Pair Skew Test tSK(P)

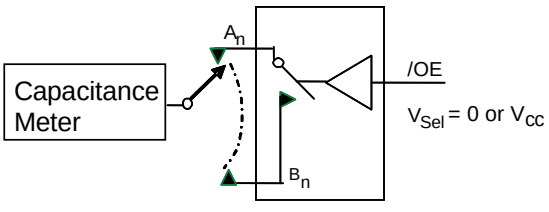


Figure 8. Channel Off Capacitance

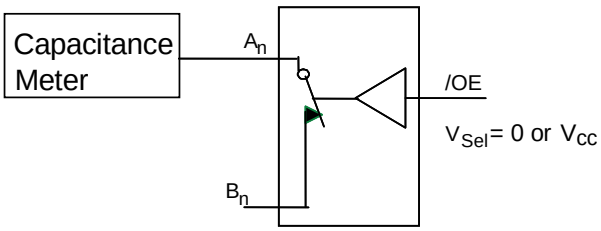
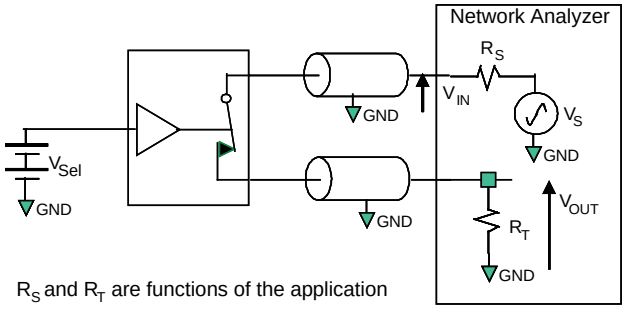


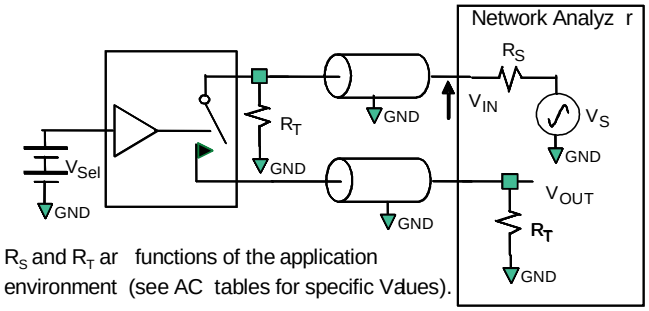
Figure 9. Channel On Capacitance

Test Diagrams (Continued)



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

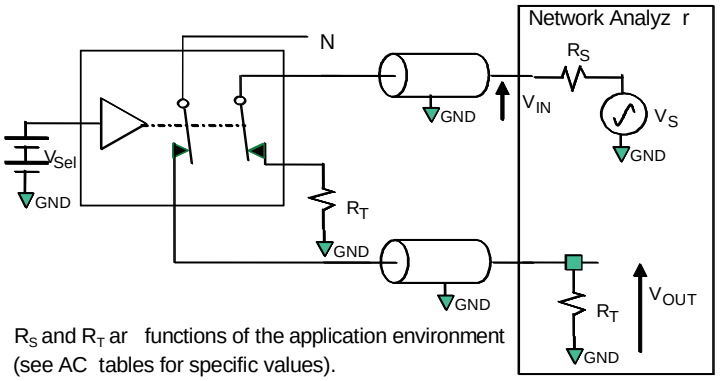
Figure 10. Bandwidth



R_S and R_T ar functions of the application environment (see AC tables for specific Values).

Off isolation = 20 Log (V_{OUT}/ V_{IN})

Figure 11. Channel Off Isolation

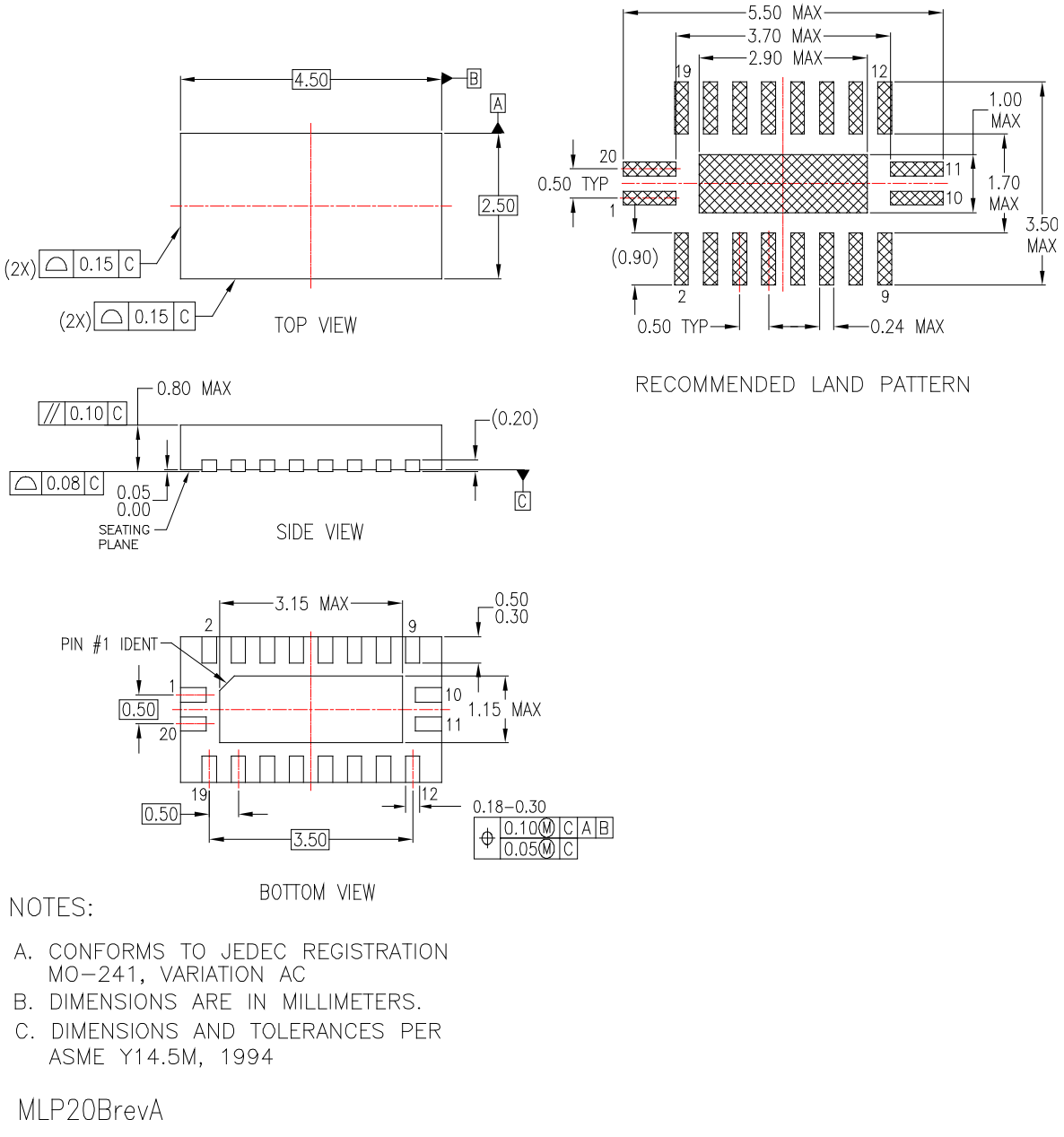


R_S and R_T ar functions of the application environment (see AC tables for specific values).

Crosstalk= 20 Log (V_{OUT} / V_{IN})

Figure 12. Non-Adjacent Channel-to-Channel Crosstalk

Physical Dimensions



NOTES:

A. CONFORMS TO JEDEC REGISTRATION MO–241, VARIATION AC
B. DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994

MLP20BrevA

Figure 13. 20-Lead, Molded Leadless Package (MLP)

FAIRCHILD

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™
AttitudeEngine™
Awinda®
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™
Gmax™
GTO™
IntelliMAX™
ISOPLANAR™
Making Small Speakers Sound Louder and Better™
MegaBuck™
MICROCOUPLER™
MicroFET™
MicroPak™
MicroPak2™
MillerDrive™
MotionMax™
MotionGrid®
MTi®
MTx®
MVN®
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™
UHC®
Ultra FRFET™
UniFET™
VCX™
VisualMax™
VoltagePlus™
XS™
Xsens™
仙童™

* 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. TO OBTAIN THE LATEST, MOST UP-TO-DATE DATASHEET AND PRODUCT INFORMATION, VISIT OUR WEBSITE AT HTTP://WWW.FAIRCHILDSEMI.COM. 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. I73

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