



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.

FST3125 — 4-Bit Bus Switch

Features

- 4Ω Switch Connection between Two Ports
- Minimal Propagation Delay through the Switch
- Low I_{CC}
- Zero Bounce in Flow-through Mode
- Control Inputs Compatible with TTL Level


Description

Fairchild switch FST3125 provides four high-speed CMOS TTL-compatible bus switches. The low on resistance of the switch allows inputs to be connected to outputs without adding propagation delay or generating additional ground bounce noise.

The device is organized as four one-bit switches with separate /OE inputs. When /OE is LOW, the switch is ON and port A is connected to port B. When /OE is HIGH, the switch is OPEN and a high-impedance state exists between the two ports.

Ordering Information

Part Number	Operating Temperature Range	Package	Packing Method
FST3125M	-40 to 85°C	14-Lead, Small Outline Integrated Circuit (SOIC) 0.150 inch Narrow	Tube
FST3125MX	-40 to 85°C	14-Lead, Small Outline Integrated Circuit (SOIC) 0.150 inch Narrow	Tape and Reel
FST3125QSC	-40 to 85°C	16-Lead, Quarter Size Outline Package (QSOP) MO-137 0.150 inch Wide	Tube
FST3125QSCX	-40 to 85°C	16-Lead, Quarter Size Outline Package (QSOP) MO-137 0.150 inch Wide	Tape and Reel
FST3125MTC	-40 to 85°C	14-Lead, Thin Shrink Small Outline Package (TSSOP) MO-153, 4mm Wide	Tube
FST3125MTCX	-40 to 85°C	14-Lead, Thin Shrink Small Outline Package (TSSOP) MO-153, 4mm Wide	Tape and Reel

 All packages are lead free per JEDEC: J-STD-020B standard.

The Fairchild switch family derives from and embodies Fairchild's proven switch technology used for several years in its 74LVX3L384 (FST3384) bus switch product.

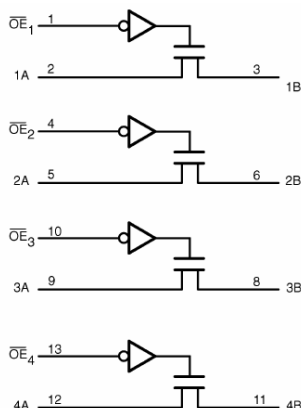


Figure 1. Logic Diagram

Pin Configurations

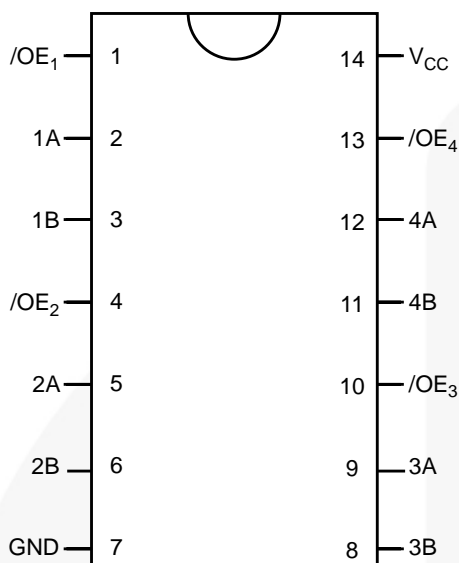


Figure 2. SOIC and TSSOP Pin Assignments

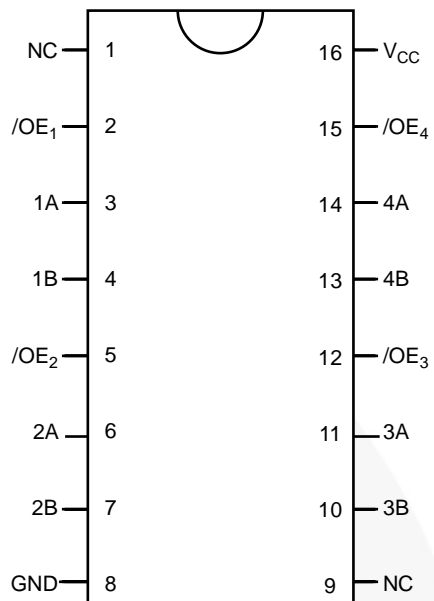


Figure 3. QSOP Pin Assignments

Pin Descriptions

Pin Names	Description
/OE ₁ , /OE ₂ , /OE ₃ , /OE ₄	Bus Switch Enables
1A, 2A, 3A, 4A	Bus A
1B, 2B, 3B, 4B	Bus B
NC	Not Connected
V _{CC}	Supply Voltage
GND	Ground

Truth Table

Inputs	Inputs/Outputs
/OE	A, B
LOW	A = B
HIGH	High Impedance

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	-0.5	7.0	V
V _{IN}	DC Input Voltage ⁽¹⁾	-0.5	7.0	V
I _{IK}	DC Input Current		-50	mA
I _{OUT}	DC Output Sink Current		128	mA
I _{CC} / I _{GND}	DC V _{CC} / GND Current		±100	mA
T _{STG}	Storage Temperature Range	-65	+150	°C

Note:

- 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.

Symbol	Parameter		Min.	Max.	Unit
V _{CC}	Power Supply Operating		4.0	5.5	V
V _{IN}	Input Voltage		0	5.5	V
V _{OUT}	Output Voltage		0	5.5	V
t _r , t _f	Input Rise and Fall Time	Switch Control Input ⁽²⁾	0	5	ns/V
		Switch I/O	0	DC	
T _A	Operating Temperature, Free Air		-40	+85	°C

Note:

- Unused control inputs must be held HIGH or LOW. They may not float.

DC Electrical Characteristics

Typical values are at $V_{CC} = 5.0V$ and $T_A = 25^\circ C$.

Symbol	Parameter	Conditions	V_{CC} (V)	$T_A = -40$ to $+85^\circ C$			Units
				Min.	Typ.	Max.	
V_{IK}	Clamp Diode Voltage	$I_{IN} = -18mA$	4.5			-1.2	V
V_{IH}	High-Level Input Voltage		4.0 to 5.5	2.0			V
V_{IL}	Low-Level Input Voltage		4.0 to 5.5			0.8	V
I_{IN}	Input Leakage Current	$0 \leq V_{IN} \leq 5.5$	5.5			± 1.0	μA
I_{OZ}	Off-state Leakage Current	$0 \leq A, B \leq V_{CC}$	5.5			± 1.0	μA
R_{ON}	Switch On Resistance ⁽³⁾	$V_{IN} = 0V, I_{IN} = 64mA$	4.5		4	7	Ω
		$V_{IN} = 0V, I_{IN} = 30mA$	4.5		4	7	
		$V_{IN} = 2.4V, I_{IN} = 15mA$	4.5		8	15	
		$V_{IN} = 2.4V, I_{IN} = 15mA$	4.0		11	20	
I_{CC}	Quiescent Supply Current	$V_{IN} = V_{CC}$ or GND, $I_{OUT} = 0$	5.5			3	μA
ΔI_{CC}	Increase in I_{CC} per Input	One Input at 3.4V, Other Inputs at V_{CC} or GND	5.5			2.5	mA

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 voltages on the A or B pins.

AC Electrical Characteristics

$T_A = -40$ to $+85^\circ C$, $C_L = 50pF$, and $R_U = R_D = 500\Omega$.

Symbol	Parameter	Conditions	$V_{CC} = 4.5 - 5.5V$		$V_{CC} = 4.0V$		Units	Figure
			Min.	Max.	Min.	Max.		
t_{PHL}, t_{PLH}	Propagation Delay Bus-to-Bus ⁽⁴⁾	$V_{IN} = \text{Open}$		0.25		0.25	ns	Figure 4 Figure 5
t_{PZH}, t_{PZL}	Output Enable Time	$V_{IN} = 7V$ for t_{PZL} $V_{IN} = \text{Open}$ for t_{PZH}	1.0	5.0		5.5	ns	Figure 4 Figure 5
t_{PHZ}, t_{PLZ}	Output Disable Time	$V_{IN} = 7V$ for t_{PLZ} $V_{IN} = \text{Open}$ for t_{PHZ}	1.5	5.3		5.6	ns	Figure 4 Figure 5

Note:

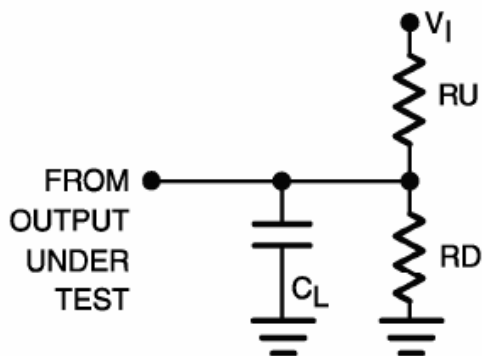
4. This parameter is guaranteed by design, but is not tested. The bus switch contributes no propagation delay other than the RC delay of the typical on resistance of the switch and the 50pF load capacitance when driven by an ideal voltage source (zero output impedance).

Capacitance

$T_A = +25^\circ C$, $f = 1MHz$. Capacitance is characterized, but not tested.

Symbol	Parameter	Conditions	Typ.	Units
C_{IN}	Control Pin Input Capacitance	$V_{CC} = 5.0V$	3	pF
$C_{I/O}$	Input/Output Capacitance	$V_{CC}, /OE = 5.0V$	2	pF

AC Loadings and Waveforms



Notes: Input driven by 50Ω source terminated in 50Ω .
 C_L includes load and stray capacitance.
 Input PRR = 1.0MHz, $t_w = 500\text{ns}$.

Figure 4. AC Test Circuit

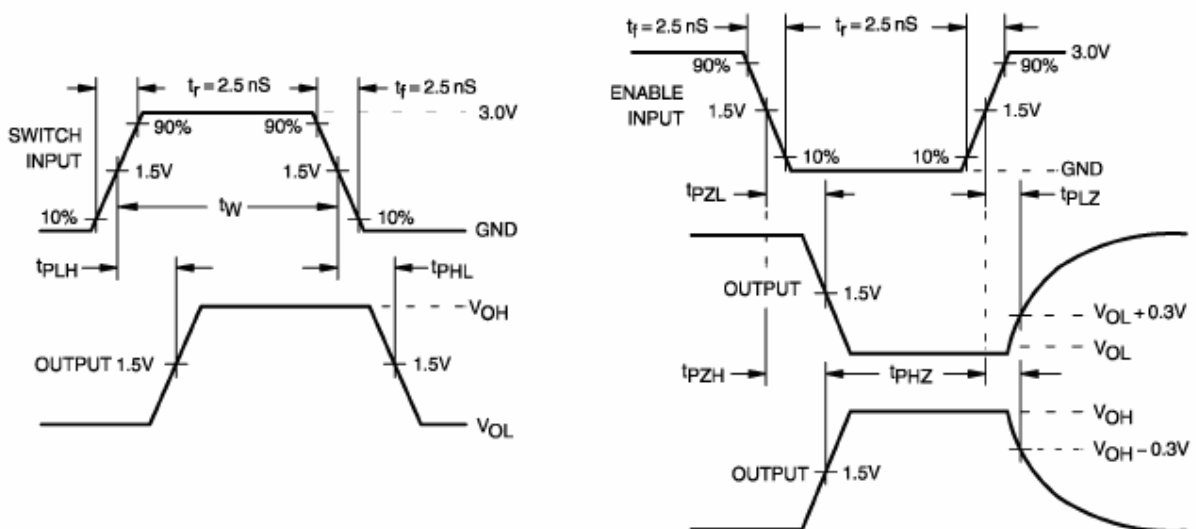


Figure 5. AC Waveforms

Physical Dimensions

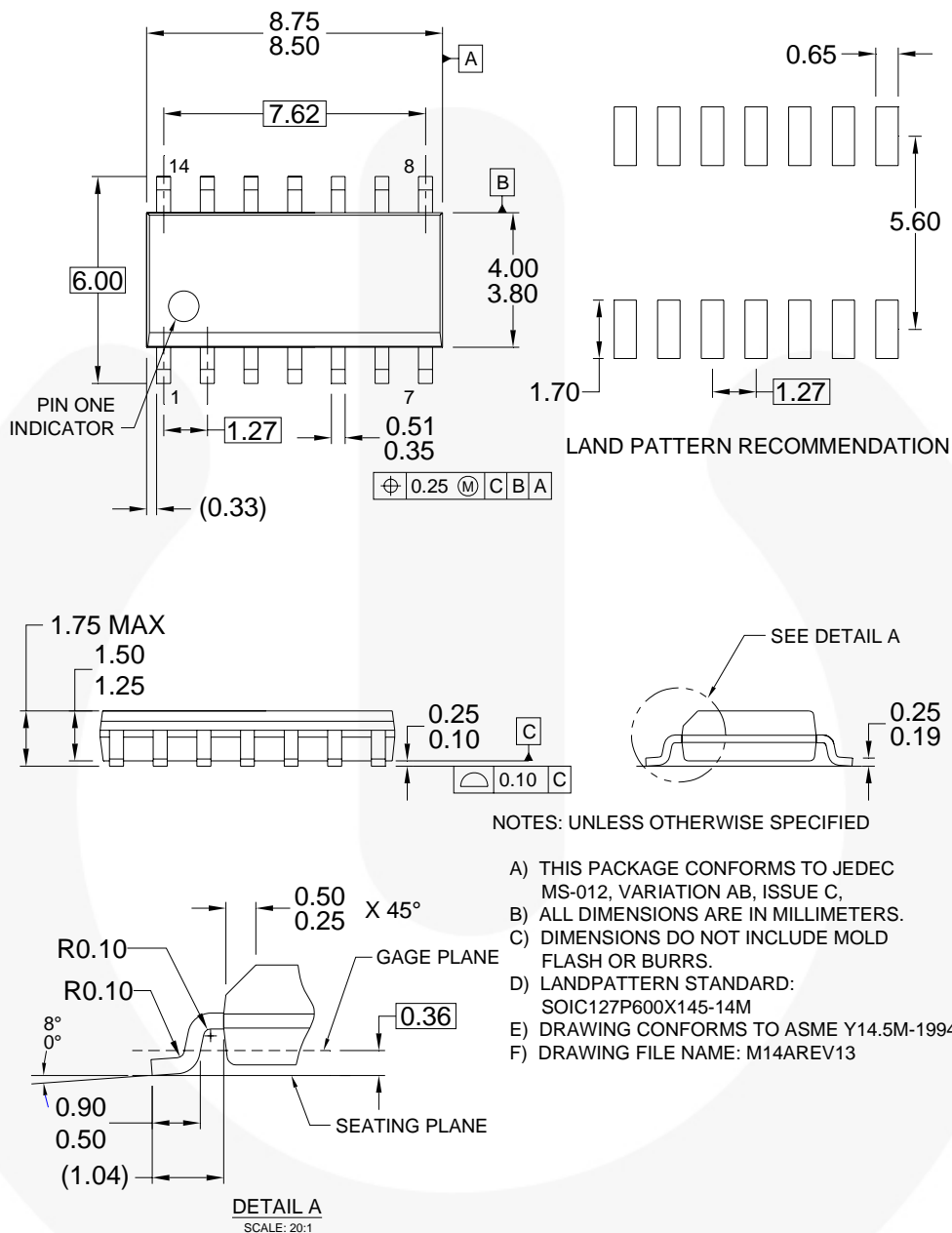
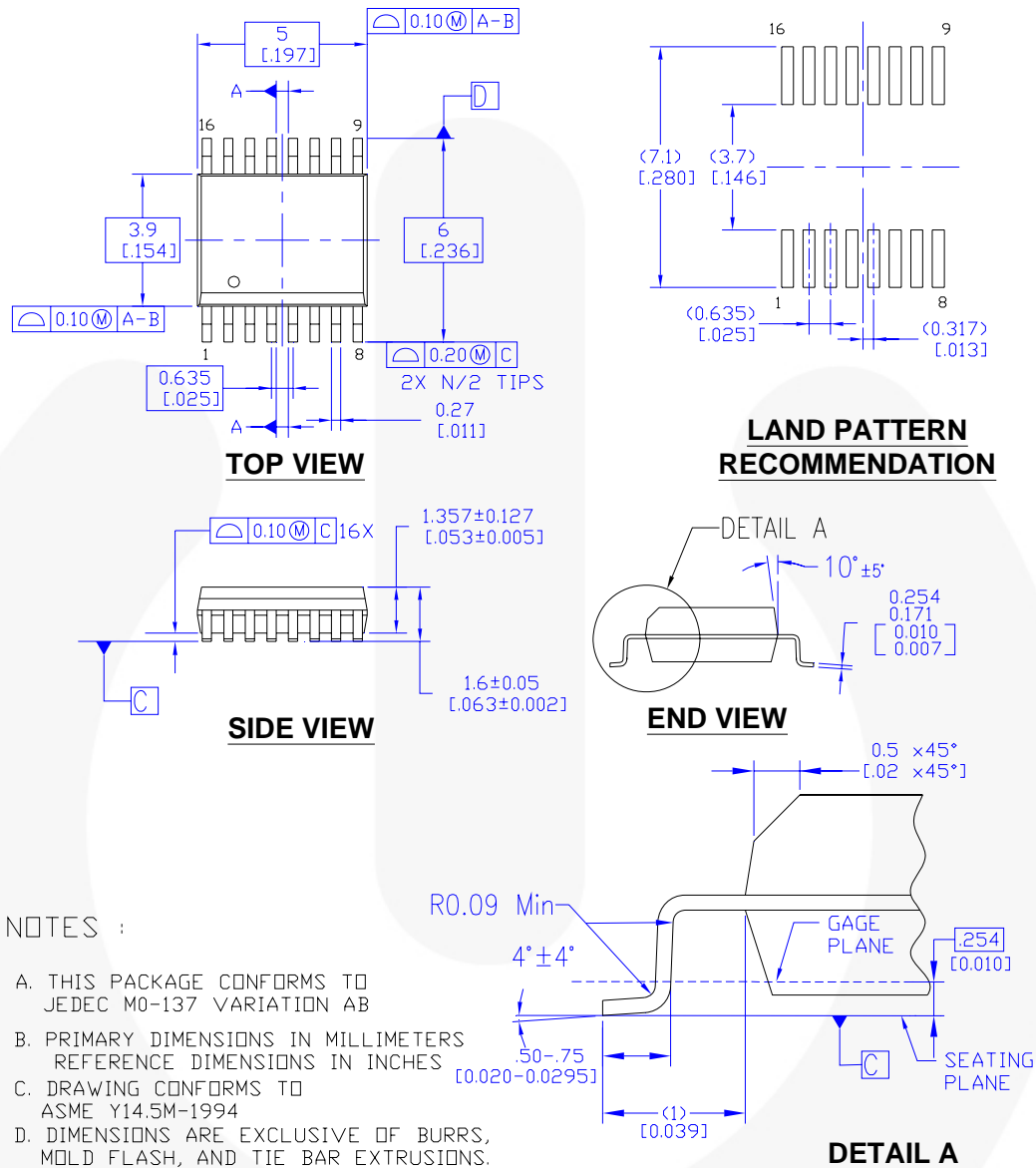


Figure 6. 14-Lead, Small-Outline Integrated Circuit (SOIC) 0.150-inch Narrow

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



MQA16AREVB

Figure 7. 16-Lead, Quarter-Size Outline Package (QSOP), MO-1370.150-inch 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/>



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.

- | | | | |
|---|---|---|---|
| ACEx [®] | FPST [™] | PDP SPM [™] | The Power Franchise [®] |
| Build it Now [™] | F-PFS [™] | Power-SPM [™] |  |
| CorePLUS [™] | FRFET [®] | PowerTrench [®] | TinyBoost [™] |
| CorePOWER [™] | Global Power Resource SM | Programmable Active Droop [™] | TinyBuck [™] |
| CROSSVOLT [™] | Green FPST [™] | QFET [®] | TinyLogic [®] |
| CTL [™] | Green FPST [™] e-Series [™] | QST [™] | TINYOPTO [™] |
| Current Transfer Logic [™] | GTO [™] | Quiet Series [™] | TinyPower [™] |
| EcoSPARK [®] | IntelliMAX [™] | RapidConfigure [™] | TinyPWM [™] |
| EfficientMax [™] | ISOPLANAR [™] | Saving our world, 1mW at a time [™] | TinyWire [™] |
| EZSWITCH [™] * | MegaBuck [™] | SmartMax [™] | μSerDes [™] |
|  | MICROCOUPLER [™] | SMART START [™] |  |
|  | MicroFET [™] | SPM [®] | UHC [®] |
| Fairchild [®] | MicroPak [™] | STEALTH [™] | Ultra FRFET [™] |
| Fairchild Semiconductor [®] | MillerDrive [™] | SuperFET [™] | UniFET [™] |
| FACT Quiet Series [™] | MotionMax [™] | SuperSOT [™] -3 | VCX [™] |
| FACT [®] | Motion-SPM [™] | SuperSOT [™] -6 | VisualMax [™] |
| FAST [®] | OPTOLOGIC [®] | SuperSOT [™] -8 | |
| FastvCore [™] | OPTOPLANAR [®] | SupreMOS [™] | |
| FlashWriter [®] * | | SyncFET [™] | |
| | |  | |

* EZSWITCH[™] and FlashWriter[®] are 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.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This 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	This 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	This datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I34

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