



November 2015

# BZX84C3V3 - BZX84C33 Zeners

Tolerance: C = 5%



SOT-23



## Absolute Maximum Ratings<sup>(1),(2)</sup>

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. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$I_{FRM}$	Repetitive Peak Forward Current	250	mA
$I_{ZRM}$	Repetitive Peak Working Current	250	mA
$P_D$	Power Dissipation	Referencing $R_{\theta JA}$ , $T_A = 25^\circ\text{C}$	250
		Referencing $\psi_{JL}$ , $T_L = 25^\circ\text{C}$	550
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance <sup>(3)</sup>	465	$^\circ\text{C}/\text{W}$
$\psi_{JL}$	Junction-to-Lead Thermal Characteristics (with reference to Cathode)	220	$^\circ\text{C}/\text{W}$
$T_{STG}$	Storage Temperature Range	-55 to +150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature	-55 to +150	$^\circ\text{C}$

### Notes:

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty-cycle operations.
3. Device mounted on FR-4 PCB, board size = 76.2 mm x 114.3 mm

## Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Device	Mark	$I_Z = 5.0 \text{ mA}$			$I_Z = 1.0 \text{ mA}$			$I_Z = 20 \text{ mA}$		
		$V_Z \text{ (V)}$		$Z_Z \text{ (}\Omega\text{)}$	$V_Z \text{ (V)}$		$Z_Z \text{ (}\Omega\text{)}$	$V_Z \text{ (V)}$		$Z_Z \text{ (}\Omega\text{)}$
		Min.	Max.		Min.	Max.		Min.	Max.	
BZX84C3V3	Z14	3.1	3.5	95	2.3	2.9	600	3.6	4.2	40
BZX84C3V6	Z15	3.4	3.8	90	2.7	3.3	600	3.9	4.5	40
BZX84C3V9	Z16	3.7	4.1	90	2.9	3.5	600	4.1	4.7	30
BZX84C4V3	Z17	4.0	4.6	90	3.3	4.0	600	4.4	5.1	30
BZX84C4V7	Z1	4.4	5.0	80	3.7	4.7	500	4.5	5.4	15
BZX84C5V1	Z2	4.8	5.4	60	4.2	5.3	480	5.0	5.9	15
BZX84C5V6	Z3	5.2	6.0	40	4.8	6.0	400	5.2	6.3	10
BZX84C6V2	Z4	5.8	6.6	10	5.6	6.6	150	5.8	6.8	6
BZX84C6V8	Z5	6.4	7.2	15	6.3	7.2	80	6.4	7.4	6
BZX84C7V5	Z6	7.0	7.9	15	6.9	7.9	80	7.0	8.0	6
BZX84C8V2	Z7	7.7	8.7	15	7.6	8.7	80	7.7	8.8	6
BZX84C9V1	Z8	8.5	9.6	15	8.4	9.6	100	8.5	9.7	8
BZX84C10	Z9	9.4	10.6	20	9.3	10.6	150	9.4	10.7	10
BZX84C11	Y1	10.4	11.6	20	10.2	11.6	150	10.4	11.8	10
BZX84C12	Y2	11.4	12.7	25	11.2	12.7	150	11.4	12.9	10
BZX84C13	Y3	12.4	14.1	30	12.3	14.0	170	12.5	14.2	15
BZX84C15	Y4	13.8	15.6	30	13.7	15.5	200	13.9	15.7	20
BZX84C16	Y5	15.3	17.1	40	15.2	17.0	200	15.4	17.2	20
BZX84C18	Y6	16.8	19.1	45	16.7	19.0	225	16.9	19.2	20
BZX84C20	Y7	18.8	21.2	55	18.7	21.1	225	18.9	21.4	20
BZX84C22	Y8	20.8	23.3	55	20.7	23.2	250	20.9	23.4	25
BZX84C24	Y9	22.8	25.6	70	22.7	25.5	250	22.9	25.7	25
BZX84C27	Y10	25.1	28.9	80	25.0	28.9	300	25.2	29.3	45
BZX84C30	Y11	28.0	32.0	80	27.8	32.0	300	28.1	32.4	50
BZX84C33	Y12	31.0	35.0	80	30.8	35.0	325	31.1	35.4	55

$V_F$  Forward Voltage = 0.9 V Maximum at  $I_F = 10 \text{ mA}$  for all BZX84 series

**Electrical Characteristics** (Continued)Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Device	$V_R$ (V)	$I_R$ ( $\mu\text{A}$ )	Cap <sup>(4)</sup> (pF)	$D_{VZ} / D_t$ at 5.0 mA (mV/k)	
				Min.	Max.
BZX84C3V3	1.0	5.0	450	-3.5	0.0
BZX84C3V6	1.0	5.0	450	-3.5	0.0
BZX84C3V9	1.0	5.0	450	-3.5	0.0
BZX84C4V3	1.0	5.0	450	-3.5	0.0
BZX84C4V7	2.0	3	260	-3.5	0.2
BZX84C5V1	2.0	2	225	-2.7	1.2
BZX84C5V6	2.0	1	200	-2.0	2.5
BZX84C6V2	4.0	3	185	0.4	3.7
BZX84C6V8	4.0	2	155	1.2	4.5
BZX84C7V5	5.0	1	140	2.5	5.3
BZX84C8V2	5.0	0.7	135	3.2	6.2
BZX84C9V1	6.0	0.5	130	3.8	7.0
BZX84C10	7.0	0.2	130	4.5	8.0
BZX84C11	8.0	0.1	130	5.4	9.0
BZX84C12	8.0	0.1	130	6.0	10
BZX84C13	8.0	0.1	120	7.0	11
BZX84C15	10.5	0.05	110	9.2	13
BZX84C16	11.2	0.05	105	10.4	14
BZX84C18	12.6	0.05	100	12.4	16
BZX84C20	14	0.05	85	14.4	18
BZX84C22	15.4	0.05	85	16.4	20
BZX84C24	16.8	0.05	80	18.4	22
BZX84C27	18.9	0.05	70	21.4	25.3
BZX84C30	21	0.05	70	24.4	29.4
BZX84C33	23.1	0.05	70	27.4	33.4

**Note:**4. Capacitance at  $V_R = 0.0$  V,  $f = 1.0$  MHz.

Typical Performance Characteristics



Figure 1. Zener Current vs. Zener Voltage



Figure 2. Zener Current vs. Zener Impedance



Figure 3. 3.3 V Zener Voltage vs. Temperature



Figure 4. 5.1 V Zener Voltage vs. Temperature



Figure 5. 12 V Zener Voltage vs. Zener Temperature

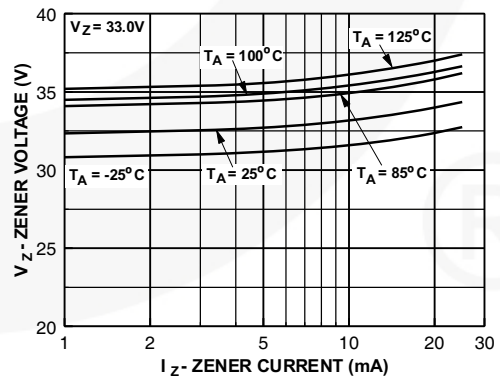
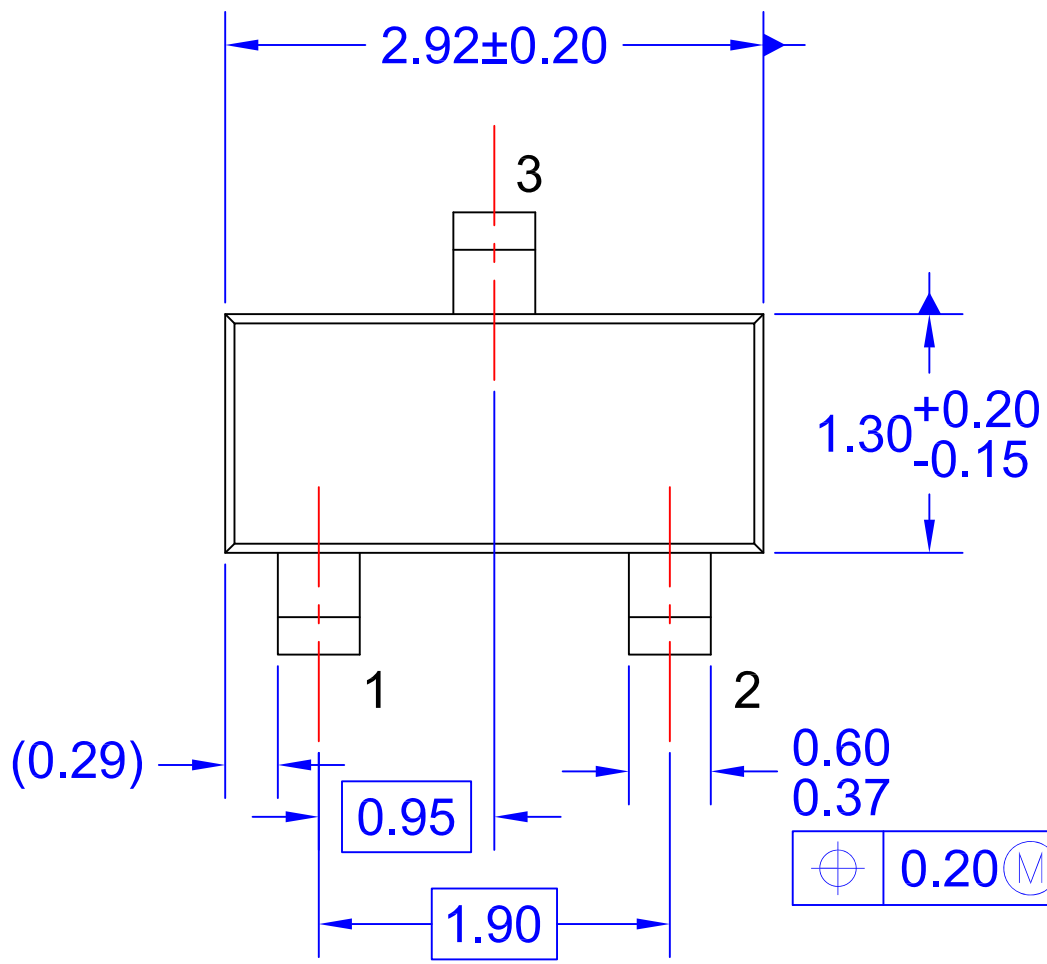
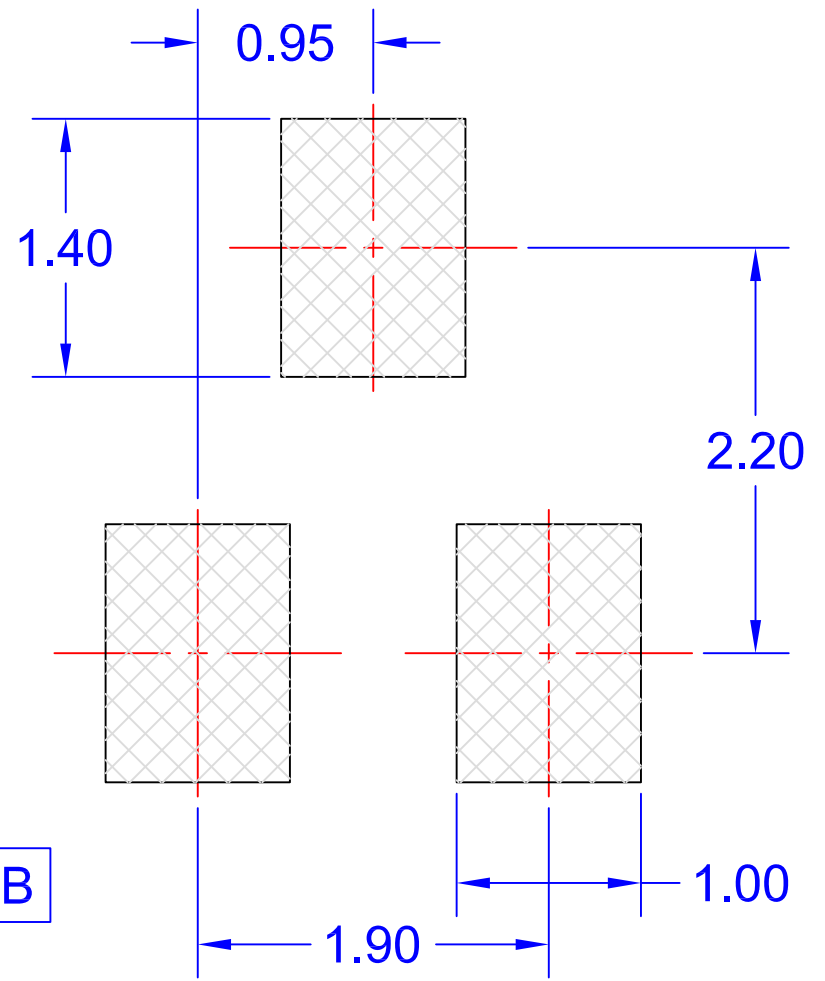


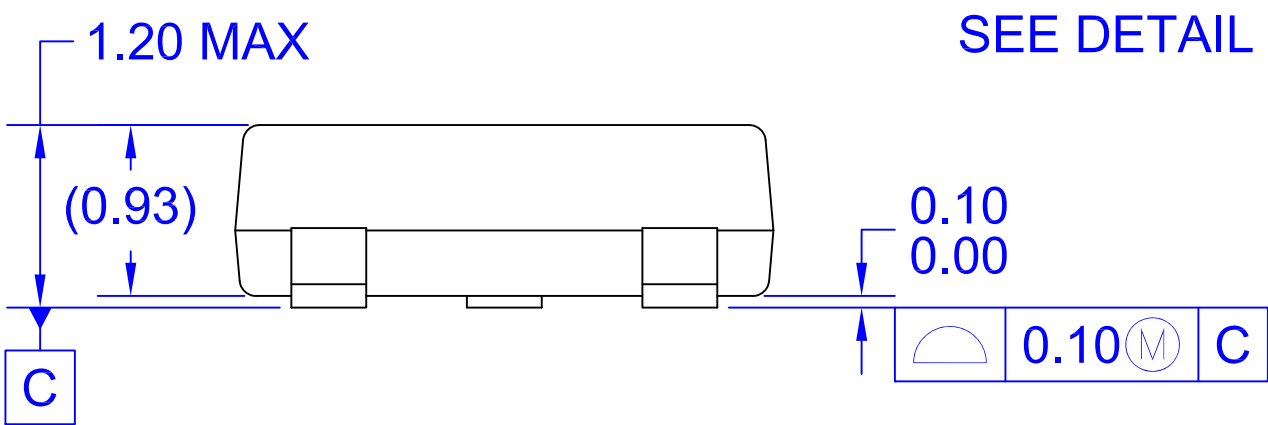
Figure 6. 33 V Zener Voltage vs. Zener Temperature



$\oplus$  0.20 (M) A B

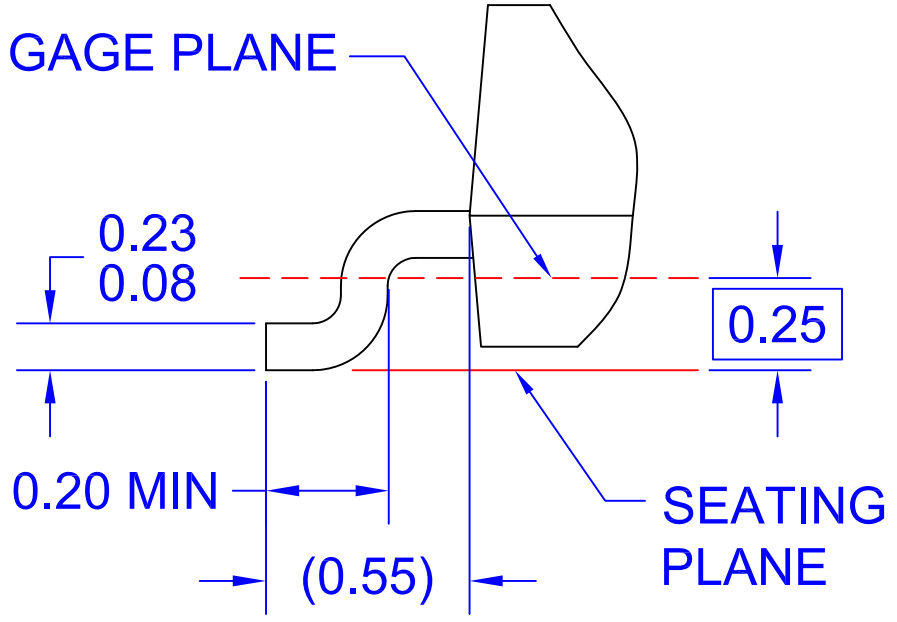
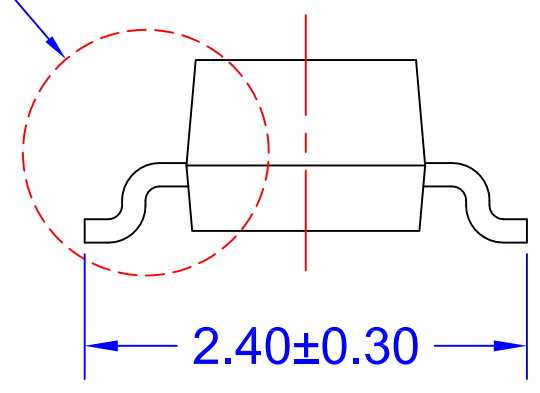


LAND PATTERN RECOMMENDATION



$\text{R}$  0.10 (M) C

SEE DETAIL A



DETAIL A  
SCALE: 2X

NOTES: UNLESS OTHERWISE SPECIFIED

- A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 2009.
- E) DRAWING FILE NAME: MA03DREV11





**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™  
CROSSVOL™  
CTL™  
Current Transfer Logic™  
DEUXPEED®  
Dual Cool™  
EcoSPARK®  
EfficientMax™  
ESBC™  
F®  
Fairchild®  
Fairchild Semiconductor®  
FACT Quiet Series™  
FACT®  
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®  
Power Supply WebDesigner™  
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™  
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](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.

**AUTHORIZED USE**

Unless otherwise specified in this data sheet, this product is a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability. This product may not be used in the following applications, unless specifically approved in writing by a Fairchild officer: (1) automotive or other transportation, (2) military/aerospace, (3) any safety critical application – including life critical medical equipment – where the failure of the Fairchild product reasonably would be expected to result in personal injury, death or property damage. Customer's use of this product is subject to agreement of this Authorized Use policy. In the event of an unauthorized use of Fairchild's product, Fairchild accepts no liability in the event of product failure. In other respects, this product shall be subject to Fairchild's Worldwide Terms and Conditions of Sale, unless a separate agreement has been signed by both Parties.

**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](http://www.fairchildsemi.com), under Terms of Use

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.