



## J211 / MMBFJ211 N-Channel RF Amplifier

### Description

This device is designed for HF/VHF mixer/amplifier and applications where process 50 is not adequate. Sufficient gain and low-noise for sensitive receivers. Sourced from process 90.

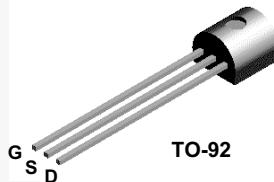


Figure 1. J211 Device Package

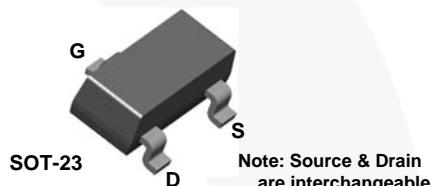


Figure 2. MMBFJ211 Device Package

### Ordering Information

Part Number	Top Mark	Package	Packing Method
J211_D74Z	J211	TO-92 3L	Ammo
MMBFJ211	62W	SOT-23 3L	Tape and Reel

### 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
$V_{DG}$	Drain-Gate Voltage	25	V
$V_{GS}$	Gate-Source Voltage	-25	V
$I_{GF}$	Forward Gate Current	10	mA
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to 150	°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.

## Thermal Characteristics

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

Symbol	Parameter	Max.		Unit
		J211 <sup>(3)</sup>	MMBFJ211 <sup>(3)</sup>	
$P_D$	Total Device Dissipation	350	225	mW
	Derate Above $25^\circ\text{C}$	2.8	1.8	$\text{mW}/^\circ\text{C}$
$R_{\theta\text{JC}}$	Thermal Resistance, Junction-to-Case	125		$^\circ\text{C}/\text{W}$
$R_{\theta\text{JA}}$	Thermal Resistance, Junction-to-Ambient	357	556	$^\circ\text{C}/\text{W}$

**Note:**

3. Device mounted on FR-4 PCB 36mm  $\times$  18mm  $\times$  1.5mm; mounting pad for the collector lead minimum 6cm<sup>2</sup>.

## Electrical Characteristics

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

Symbol	Parameter	Conditions	Min.	Max.	Unit
<b>Off Characteristics</b>					
$V_{(\text{BR})\text{GSS}}$	Gate-Source Breakdown Voltage	$I_G = 1.0 \mu\text{A}$ , $V_{DS} = 0$	-25		V
$I_{GSS}$	Gate Reverse Current	$V_{GS} = 15 \text{ V}$ , $V_{DS} = 0$		-100	pA
$V_{GS(\text{off})}$	Gate-Source Cut-Off Voltage	$V_{DS} = 15 \text{ V}$ , $I_D = 1.0 \text{ nA}$	-2.5	-4.5	V
<b>On Characteristics</b>					
$I_{DSS}$	Zero-Gate Voltage Drain Current <sup>(4)</sup>	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 0$	7.0	20	mA
<b>Small Signal Characteristics</b>					
$g_{fs}$	Common Source Forward Transconductance	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 0$ , $f = 1.0 \text{ kHz}$	7000	12000	$\mu\text{mhos}$
$g_{oss}$	Common Source Output Conductance	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 0$ , $f = 1.0 \text{ kHz}$		200	$\mu\text{mhos}$

**Note:**

4. Pulse test: pulse width  $\leq 300 \mu\text{s}$

## Typical Performance Characteristics

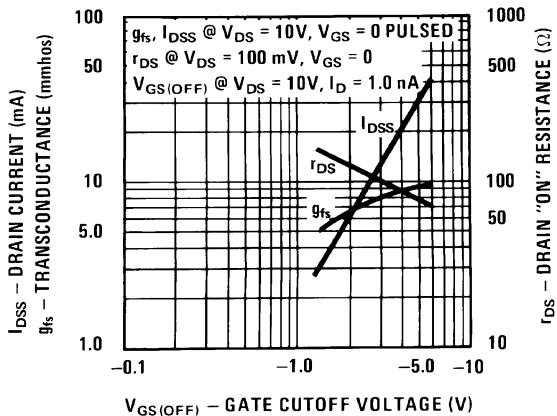


Figure 3. Parameter Interactions

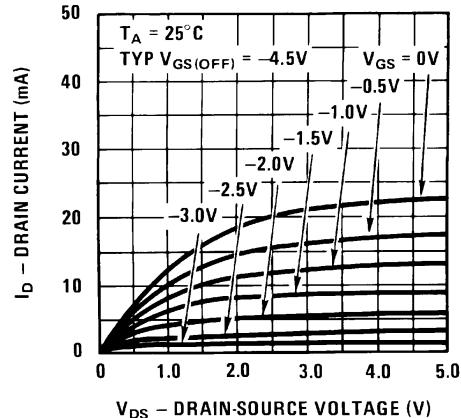


Figure 4. Common Drain-Source

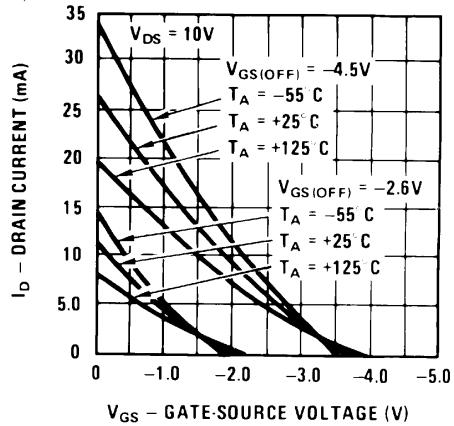


Figure 5. Transfer Characteristics

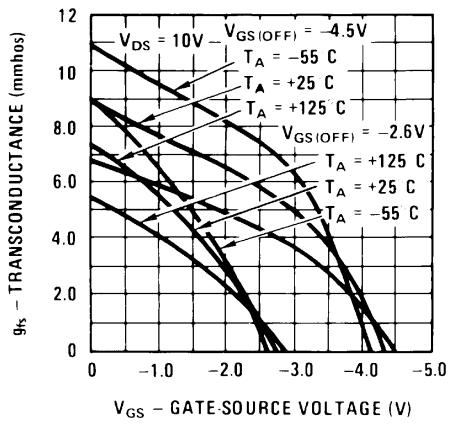


Figure 6. Transfer Characteristics

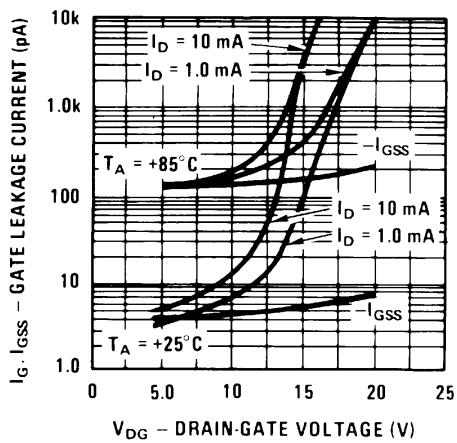


Figure 7. Leakage Current vs. Voltage

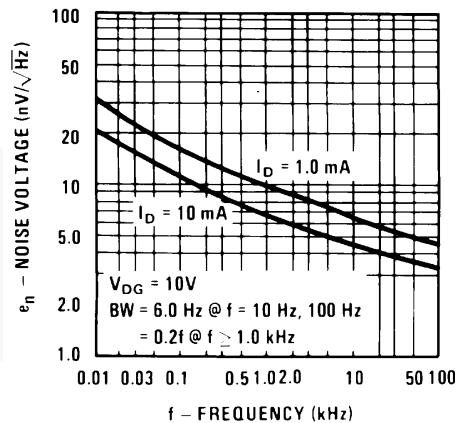


Figure 8. Noise Voltage vs. Frequency

Typical Performance Characteristics (Continued)

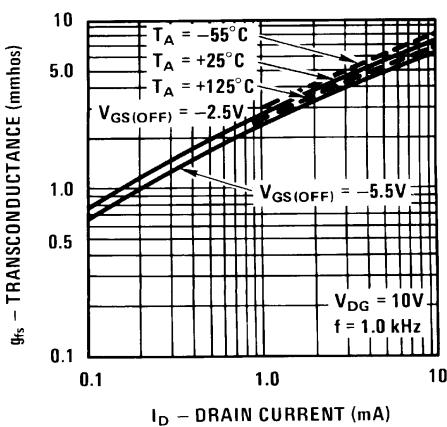


Figure 9. Transconductance vs. Drain Current

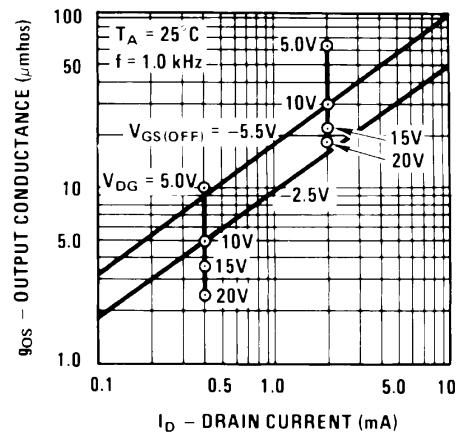


Figure 10. Output Conductance vs. Drain Current

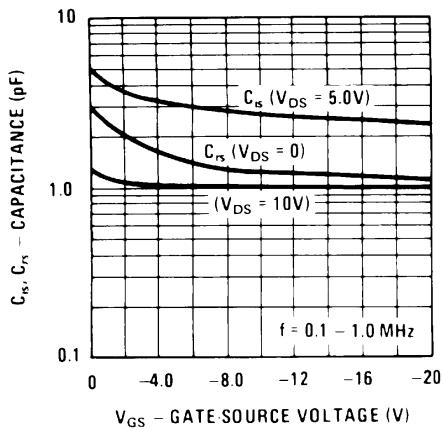


Figure 11. Capacitance vs. Voltage

## Common Source Characteristics

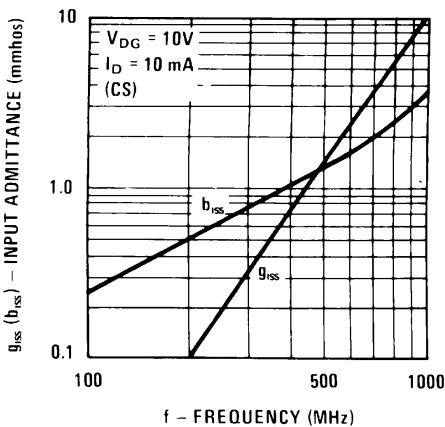


Figure 12. Input Admittance

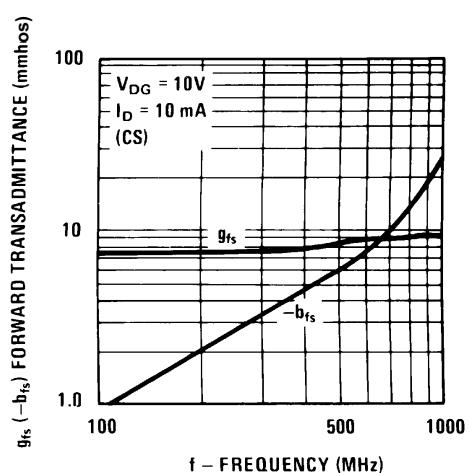


Figure 13. Forward Transadmittance

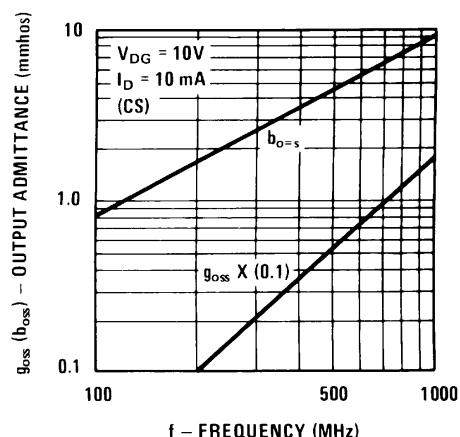


Figure 14. Output Admittance

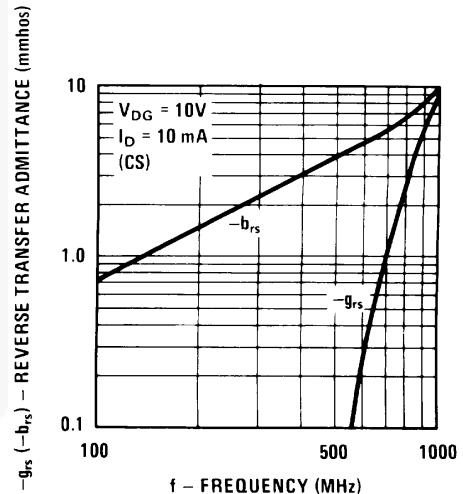


Figure 15. Reverse Transadmittance

## Common Gate Characteristics

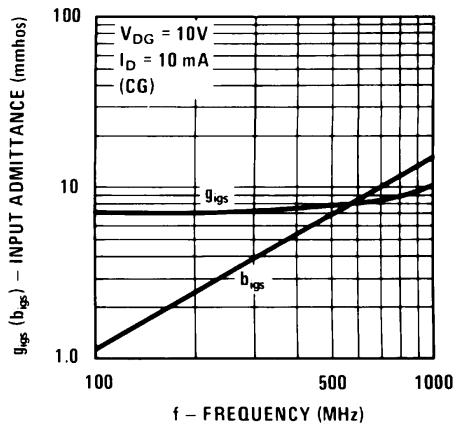


Figure 16. Input Admittance

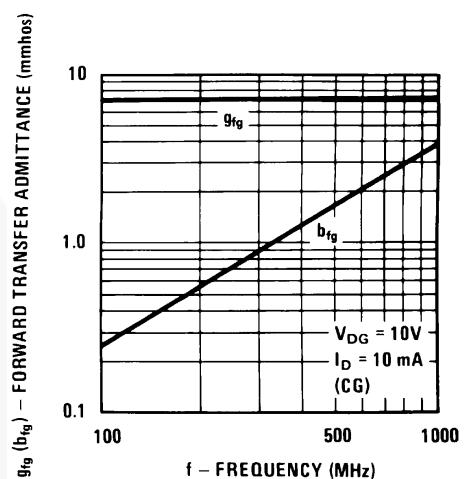


Figure 17. Forward Transadmittance

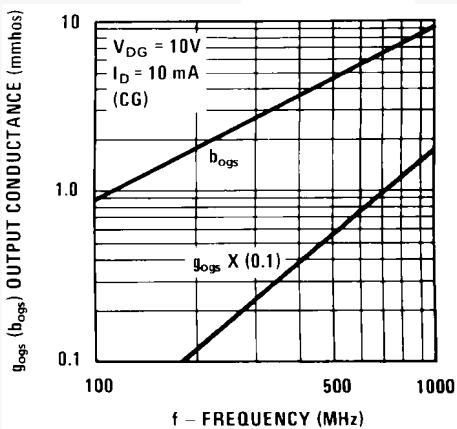


Figure 18. Output Admittance

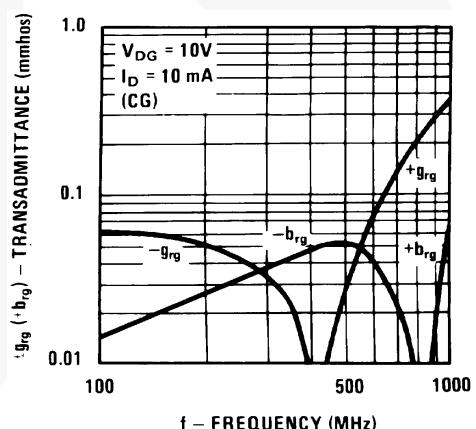
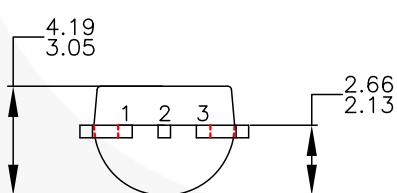
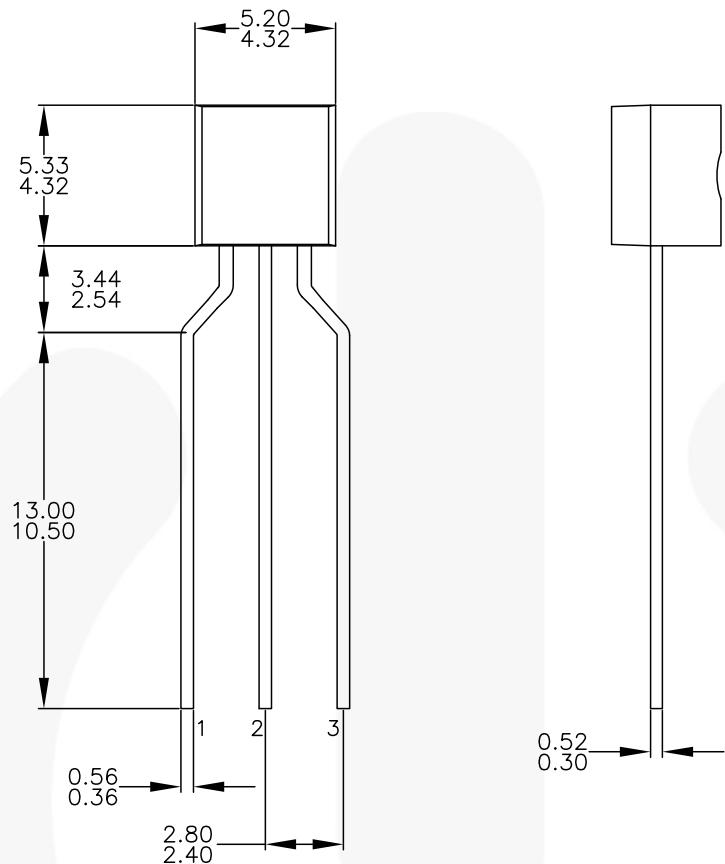


Figure 19. Reverse Transadmittance

### Physical Dimensions



#### NOTES: UNLESS OTHERWISE SPECIFIED

- A. DRAWING CONFORMS TO JEDEC MS-013,  
VARIATION AC.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DRAWING CONFORMS TO ASME Y14.5M-2009.
- D. DRAWING FILENAME: MKT-ZA03FREV3.
- E. FAIRCHILD SEMICONDUCTOR.

Figure 20. 3-Lead, TO-92, Molded, 0.2 In Line Spacing Lead Form, Ammo, Tape and Reel Type

**Physical Dimensions (Continued)**

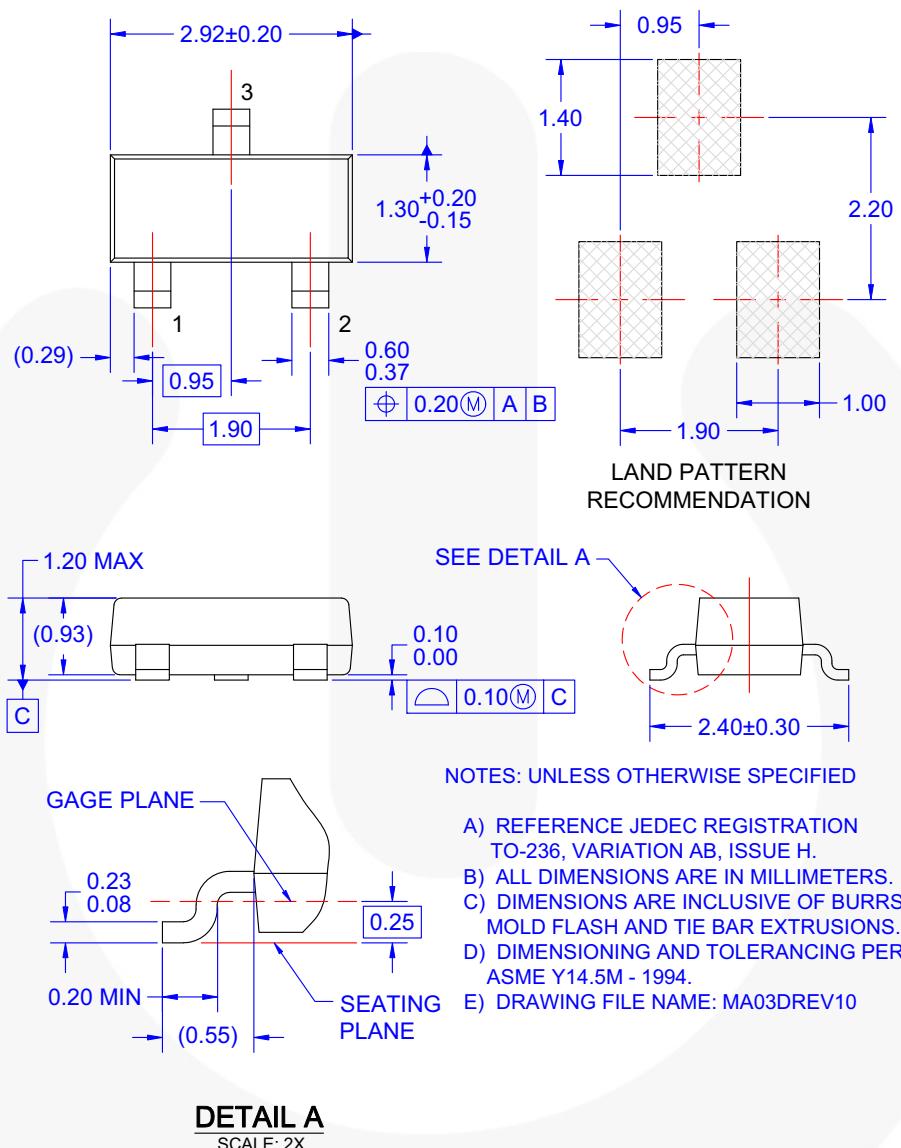


Figure 21. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE



## 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™

AltitudeEngine™

Awinda®

AX-CAP®\*

BitSiC™

Build it Now™

CorePLUS™

CorePOWER™

CROSSVOLT™

CTL™

Current Transfer Logic™

DEUXPEED®

Dual Cool™

EcoSPARK®

EfficientMax™

ESBC™

**f**®

Fairchild®

Fairchild Semiconductor®

FACT Quiet Series™

FACT®

FAST®

FastvCore™

FETBench™

FPS™

F-PFS™

FRFET®

Global Power Resource™<sup>SM</sup>

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®

PowerX™

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.

## 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](http://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