



January 2015

FFB2222A / FMB2222A / MMPQ2222A

NPN Multi-Chip General-Purpose Amplifier

Description

This device is for use as a medium power amplifier and switch requiring collector currents up to 500 mA. Sourced from process 19.

Block Diagram

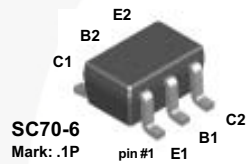


Figure 1. FFB2222A Device Package

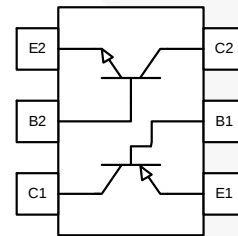


Figure 2. FFB2222A Internal Connection

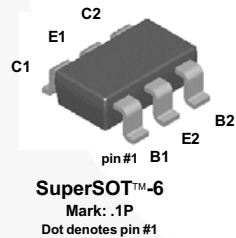


Figure 3. FMB2222A Device Package

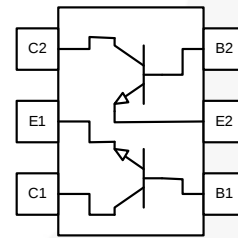


Figure 4. FMB2222A Internal Connection

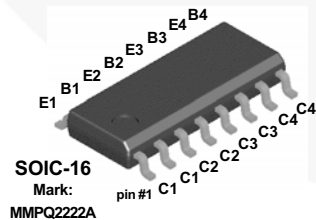


Figure 5. MMPQ2222A Device Package

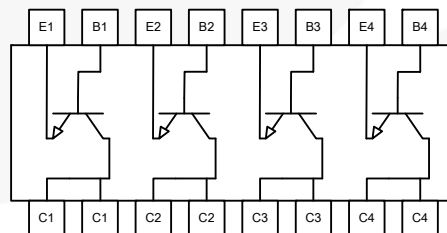


Figure 6. MMPQ2222A Internal Connection

FFB2222A / FMB2222A / MMPQ2222A — NPN Multi-Chip General-Purpose Amplifier

Ordering Information

Part Number	Top Mark	Package	Packing Method
FFB2222A	.1P	SC70 6L	Tape and Reel
FMB2222A	.1P	SSOT 6L	Tape and Reel
MMPQ2222A	MMPQ2222A	SOIC 16L	Tape and Reel

Absolute Maximum Ratings⁽¹⁾

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_{CEO}	Collector-Emitter Voltage	45	V
V_{CBO}	Collector-Base Voltage	75	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	500	mA
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

Note:

- These ratings are based on a maximum junction temperature of 150°C . These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty cycle operations.

Thermal Characteristics⁽²⁾

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

Symbol	Parameter	Max.			Unit
		FFB2222A	FMB2222A	MMPQ2222A	
P_D	Total Device Dissipation	300	700	1,000	mW
	Derate Above 25°C	2.4	5.6	8.0	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	415	180		$^\circ\text{C/W}$
	Thermal Resistance, Junction-to-Ambient, Effective 4 Dies			125	
	Thermal Resistance, Junction-to-Ambient, Each Die			240	

Note:

- PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

Electrical Characteristics

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage ⁽³⁾	$I_C = 10\text{ mA}, I_B = 0$	40			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\text{ }\mu\text{A}, I_E = 0$	75			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\text{ }\mu\text{A}, I_C = 0$	5.0			V
I_{CBO}	Collector Cut-Off Current	$V_{CB} = 60\text{ V}, I_E = 0$			10	nA
I_{EBO}	Emitter Cut-Off Current	$V_{EB} = 3.0\text{ V}, I_C = 0$			10	nA
h_{FE}	DC Current Gain	$I_C = 0.1\text{ mA}, V_{CE} = 10\text{ V}$	35			
		$I_C = 1.0\text{ mA}, V_{CE} = 10\text{ V}$	50			
		$I_C = 10\text{ mA}, V_{CE} = 10\text{ V}$	75			
		$I_C = 150\text{ mA}, V_{CE} = 10\text{ V}^{(3)}$	100		300	
		$I_C = 150\text{ mA}, V_{CE} = 1.0\text{ V}^{(3)}$	50			
		$I_C = 500\text{ mA}, V_{CE} = 10\text{ V}^{(3)}$	40			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ⁽³⁾	$I_C = 150\text{ mA}, I_B = 15\text{ mA}$			0.3	V
		$I_C = 500\text{ mA}, I_B = 50\text{ mA}$			1.0	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ⁽³⁾	$I_C = 150\text{ mA}, I_B = 15\text{ mA}$			1.2	V
		$I_C = 500\text{ mA}, I_B = 50\text{ mA}$			2.0	
f_T	Current Gain - Bandwidth Product	$I_C = 20\text{ mA}, V_{CE} = 20\text{ V},$ $f = 100\text{ MHz}$		300		MHz
C_{obo}	Output Capacitance	$V_{CB} = 10\text{ V}, I_E = 0,$ $f = 100\text{ kHz}$		4.0		pF
C_{ibo}	Input Capacitance	$V_{EB} = 0.5\text{ V}, I_C = 0,$ $f = 100\text{ kHz}$		20		pF
NF	Noise Figure	$I_C = 100\text{ }\mu\text{A}, V_{CE} = 10\text{ V},$ $R_S = 1.0\text{ k}\Omega, f = 1.0\text{ kHz}$		2.0		dB
t_d	Delay Time	$V_{CC} = 30\text{ V}, V_{BE(OFF)} = 0.5\text{ V},$ $I_C = 150\text{ mA}, I_{B1} = 15\text{ mA}$		8		ns
t_r	Rise Time			20		ns
t_s	Storage Time	$V_{CC} = 30\text{ V}, I_C = 150\text{ mA},$ $I_{B1} = I_{B2} = 15\text{ mA}$		180		ns
t_f	Fall Time			40		ns

Note:

3. Pulse test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2.0\%$.

Typical Performance Characteristics

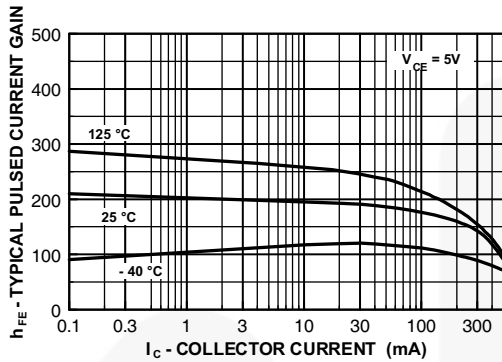


Figure 7. Typical Pulsed Current Gain vs. Collector Current

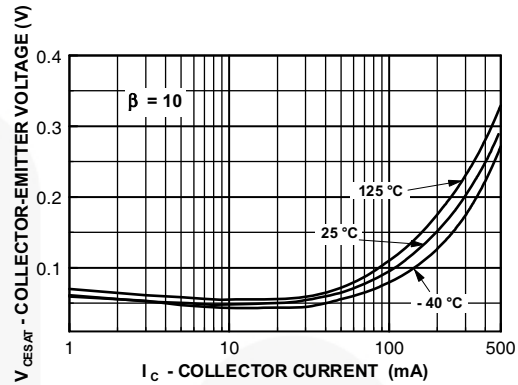


Figure 8. Collector-Emitter Saturation Voltage vs. Collector Current

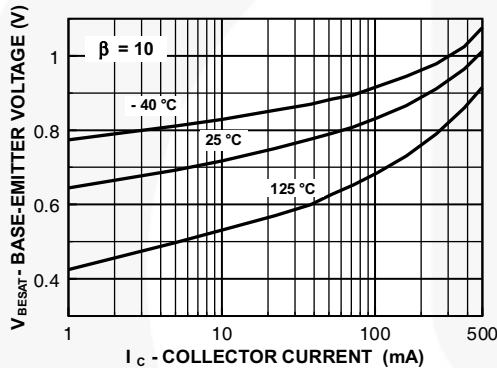


Figure 9. Base-Emitter Saturation Voltage vs. Collector Current

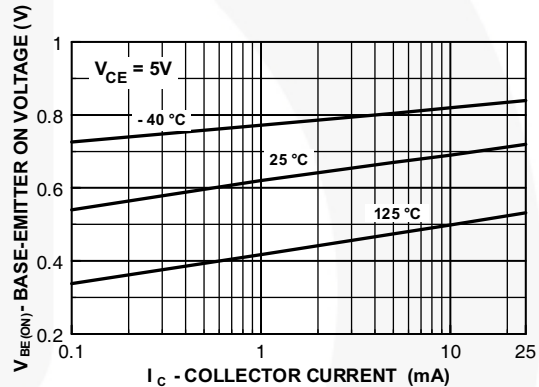


Figure 10. Base-Emitter On Voltage vs. Collector Current

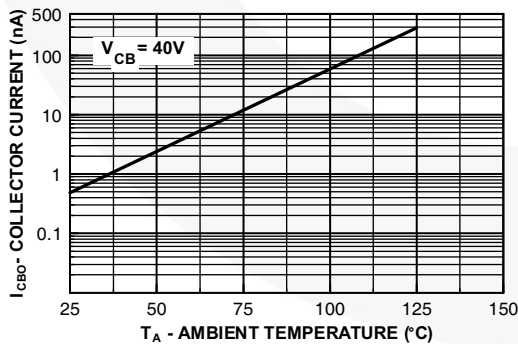


Figure 11. Collector Cut-Off Current vs. Ambient Temperature

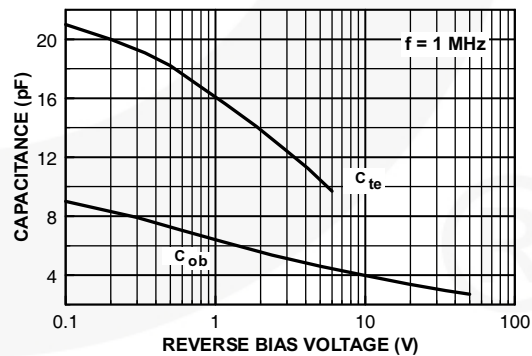


Figure 12. Emitter Transition and Output Capacitance vs. Reverse Bias Voltage

Typical Performance Characteristics (Continued)

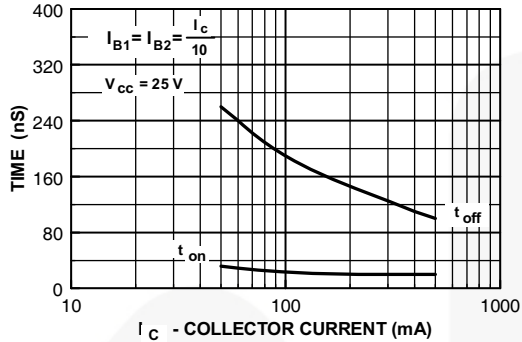


Figure 13. Turn-On and Turn-Off Times vs. Collector Current

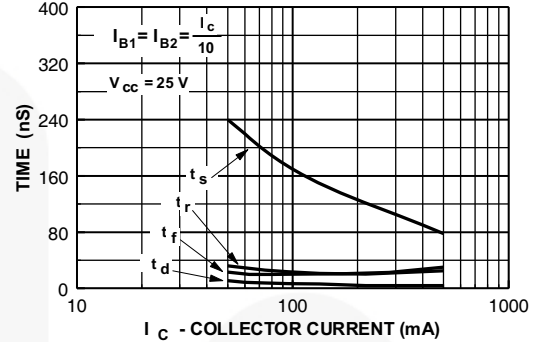


Figure 14. Switching Time vs. Collector Current

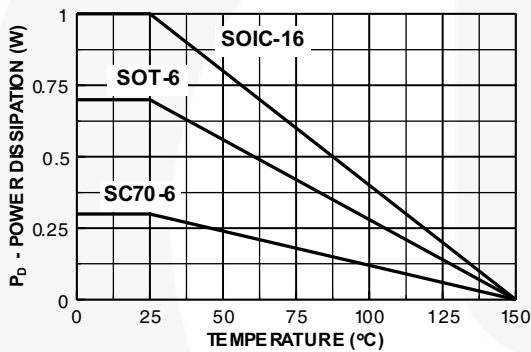


Figure 15. Power Dissipation vs. Ambient Temperature

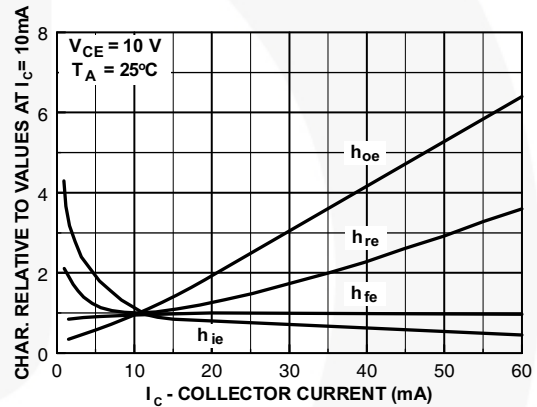


Figure 16. Common Emitter Characteristics

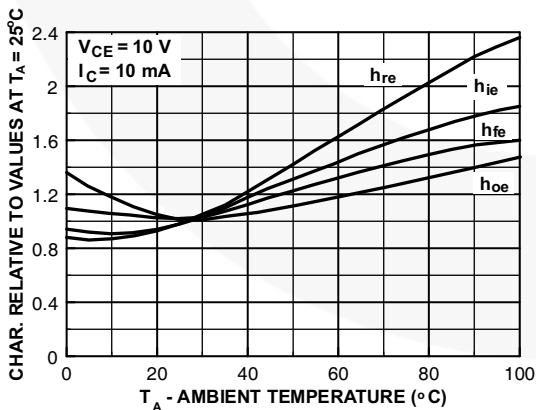


Figure 17. Common Emitter Characteristics

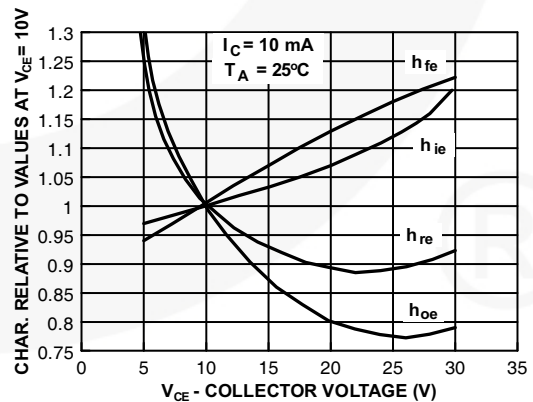


Figure 18. Common Emitter Characteristics

Test Circuits

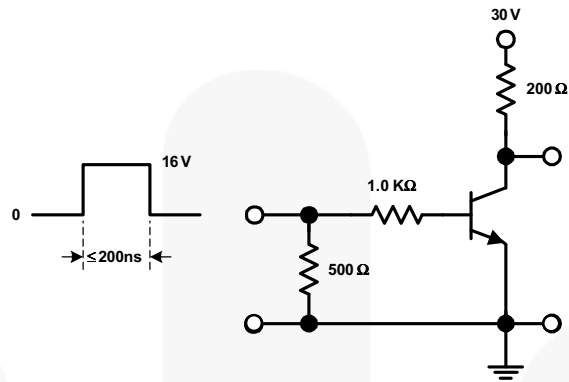


Figure 19. Saturated Turn-On Switching Time

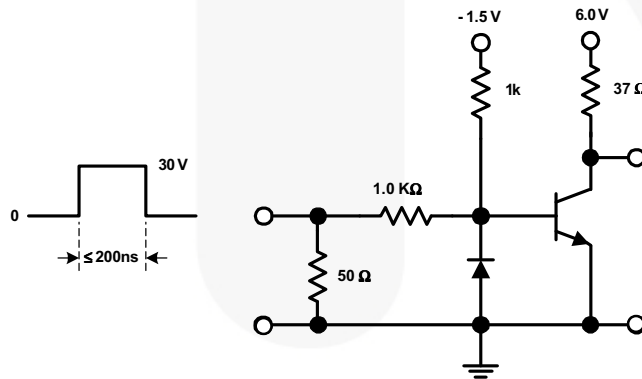


Figure 20. Saturated Turn-Off Switching Time

Physical Dimensions

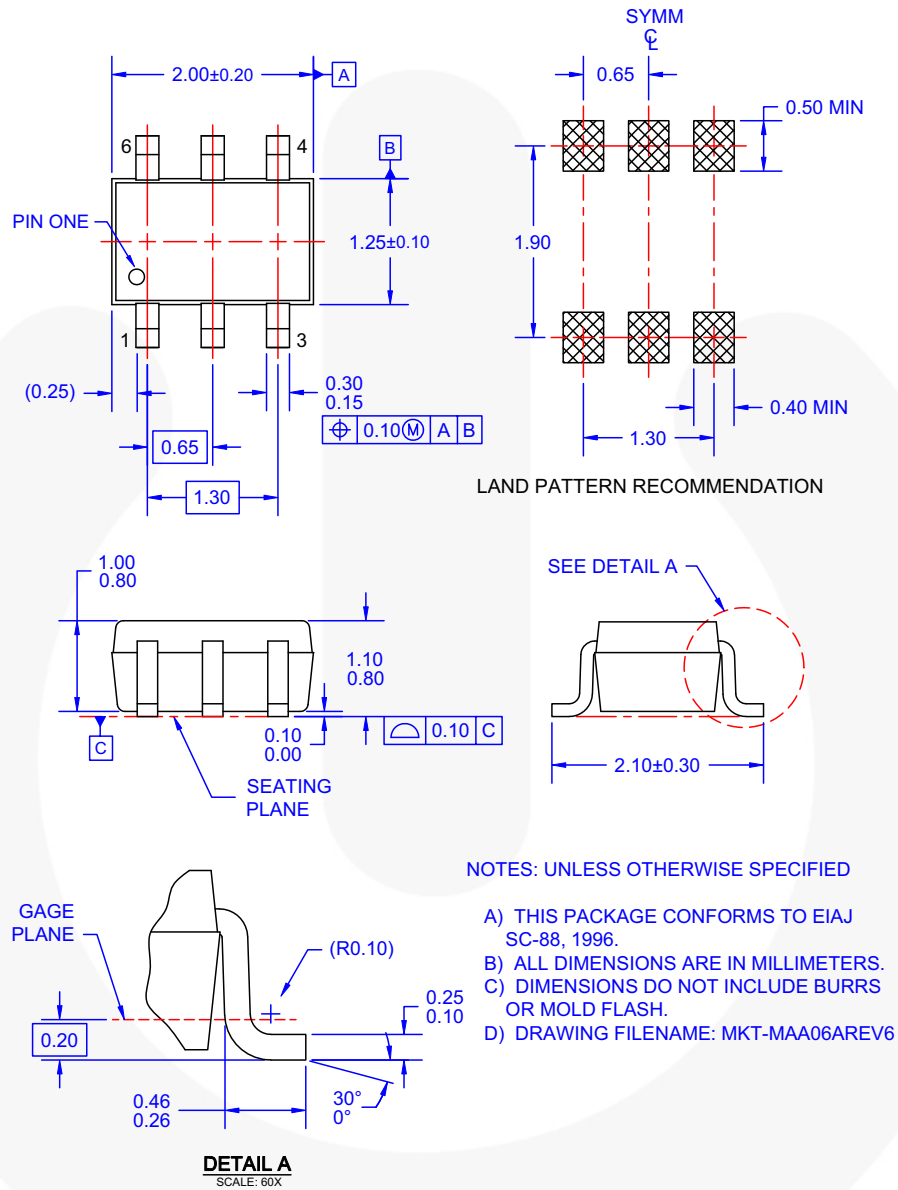


Figure 21. 6-LEAD, SC70, EIAJ SC-88, 1.25 MM WIDE

Physical Dimensions (Continued)

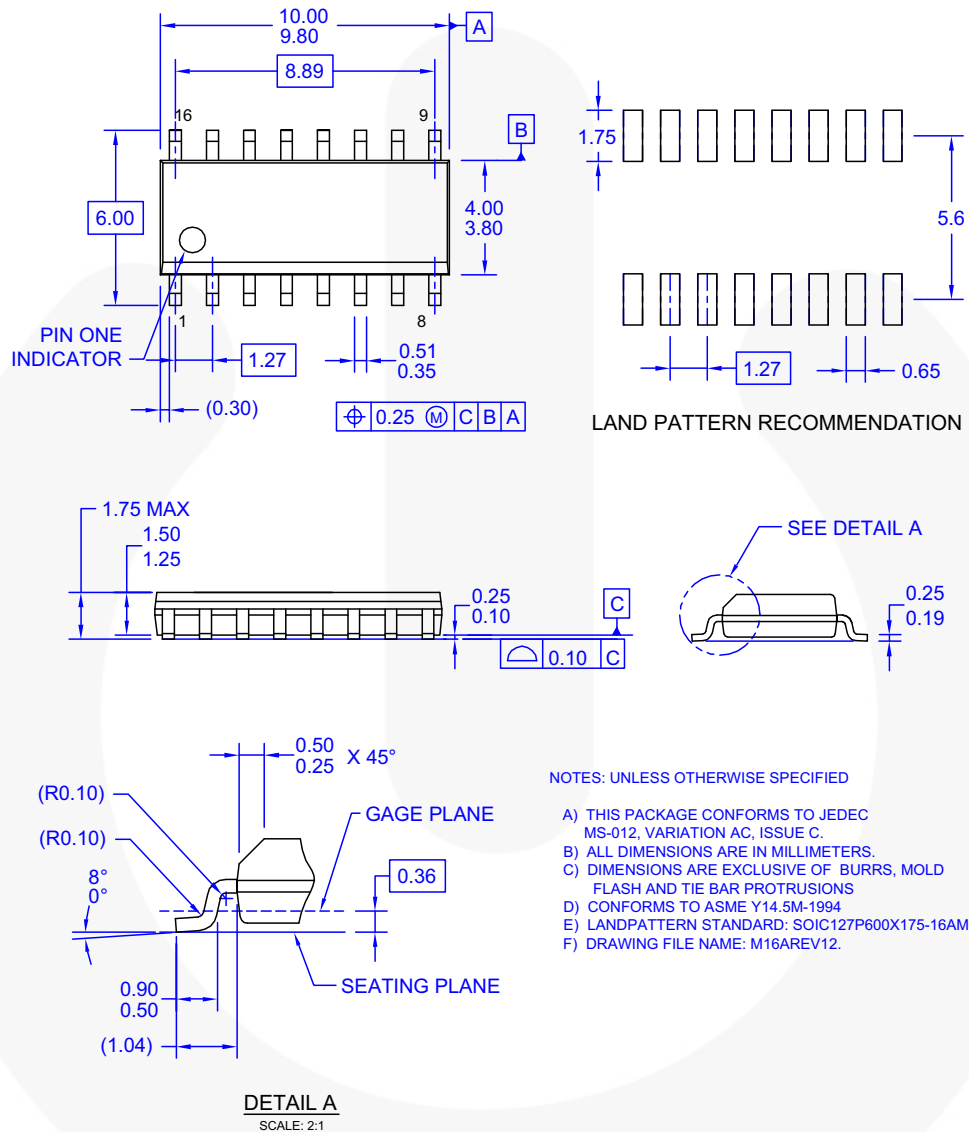


Figure 23. 16-LEAD, SOIC, JEDEC MS-012, 0.150 inch, NARROW BODY



TRADEMARKS

The following includes products 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™
F®
Fairchild®
Fairchild Semiconductor®
FACT Quiet Series™
FACT®
FAST®
FastvCore™
FETBench™
FPS™

F-PFS™
FRFET®
Global Power ResourceSM
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™
 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>. 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

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Fairchild Semiconductor:](#)

[MMPQ2222A](#)