Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

FAIRCHILD SEMICONDUCTOR®

IGBT

SGH30N60RUF

Short Circuit Rated IGBT

General Description

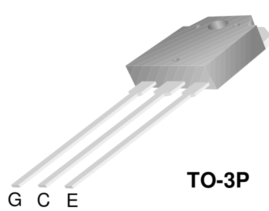
Fairchild's RUF series of Insulated Gate Bipolar Transistors (IGBTs) provide low conduction and switching losses as well as short circuit ruggedness. The RUF series is designed for applications such as motor control, uninterrupted power supplies (UPS) and general inverters where short circuit ruggedness is a required feature.

Features

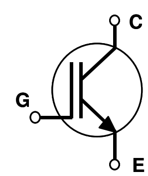
- Short circuit rated 10us @ T_C = 100°C, V_{GE} = 15V
- High speed switching
- Low saturation voltage : $V_{CE(sat)}$ = 2.2 V @ I_C = 30A
- High input impedance

Applications

AC & DC motor controls, general purpose inverters, robotics, and servo controls.



TO-3P



Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Description		SGH30N60RUF	Units
V_{CES}	Collector-Emitter Voltage		600	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Collector Current	@ T_C = 25°C	48	A
	Collector Current	@ T_C = 100°C	30	A
$I_{CM\ (1)}$	Pulsed Collector Current		90	A
T_{SC}	Short Circuit Withstand Time	@ T_C =100°C	10	us
P_D	Maximum Power Dissipation	@ T_C = 25°C	235	W
	Maximum Power Dissipation	@ T_C = 100°C	90	W
T_J	Operating Junction Temperature		-55 to +150	°C
T_{stg}	Storage Temperature Range		-55 to +150	°C
T_L	Maximum Lead Temp. for Soldering Purposes, 1/8" from Case for 5 Seconds		300	°C

Notes :
(1) Repetitive rating : Pulse width limited by max. junction temperature

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	--	0.53	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	40	°C/W

Electrical Characteristics of the IGBT T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 250uA	600	--	--	V
$\Delta B_{VCES}/\Delta T_J$	Temperature Coefficient of Breakdown Voltage	V_{GE} = 0V, I_C = 1mA	--	0.6	--	V/°C
I_{CES}	Collector Cut-Off Current	V_{CE} = V_{CES}, V_{GE} = 0V	--	--	250	uA
I_{GES}	G-E Leakage Current	V_{GE} = V_{GES}, V_{CE} = 0V	--	--	± 100	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	I_C = 30mA, V_{CE} = V_{GE}	5.0	6.0	8.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 30A, V_{GE} = 15V	--	2.2	2.8	V
		I_C = 48A, V_{GE} = 15V	--	2.5	--	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V, f = 1MHz	--	1970	--	pF
C_{oes}	Output Capacitance		--	310	--	pF
C_{res}	Reverse Transfer Capacitance		--	74	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 300 V, I_C = 30A, R_G = 7Ω, V_{GE} = 15V, Inductive Load, T_C = 25°C	--	30	--	ns
t_r	Rise Time		--	65	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	54	80	ns
t_f	Fall Time		--	138	200	ns
E_{on}	Turn-On Switching Loss		--	919	--	uJ
E_{off}	Turn-Off Switching Loss		--	814	--	uJ
E_{ts}	Total Switching Loss		--	1733	2430	uJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 300 V, I_C = 30A, R_G = 7Ω, V_{GE} = 15V, Inductive Load, T_C = 125°C	--	34	--	ns
t_r	Rise Time		--	67	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	60	90	ns
t_f	Fall Time		--	281	400	ns
E_{on}	Turn-On Switching Loss		--	921	--	uJ
E_{off}	Turn-Off Switching Loss		--	1556	--	uJ
E_{ts}	Total Switching Loss		--	2477	3470	uJ
T_{sc}	Short Circuit Withstand Time	V_{CC} = 300 V, V_{GE} = 15V @ T_C = 100°C	10	--	--	us
Q_g	Total Gate Charge	V_{CE} = 300 V, I_C = 30A, V_{GE} = 15V	--	85	120	nC
Q_{ge}	Gate-Emitter Charge		--	17	25	nC
Q_{gc}	Gate-Collector Charge		--	39	55	nC
L_e	Internal Emitter Inductance	Measured 5mm from PKG	--	14	--	nH

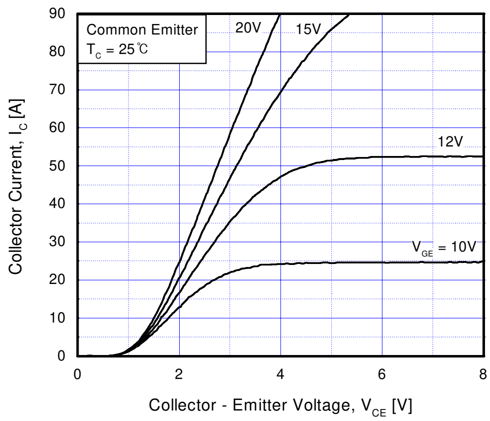


Fig 1. Typical Output Characteristics

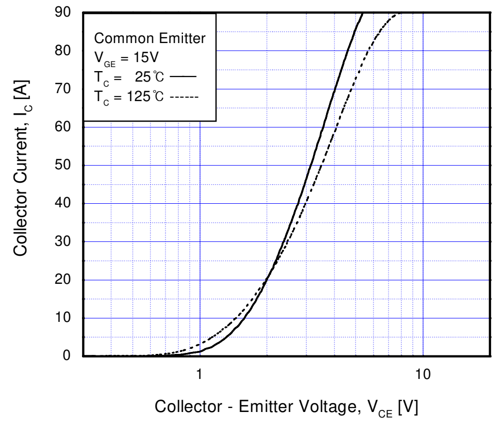


Fig 2. Typical Saturation Voltage Characteristics

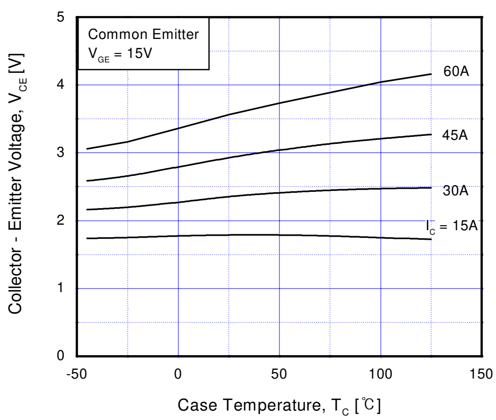


Fig 3. Saturation Voltage vs. Case Temperature at Variant Current Level

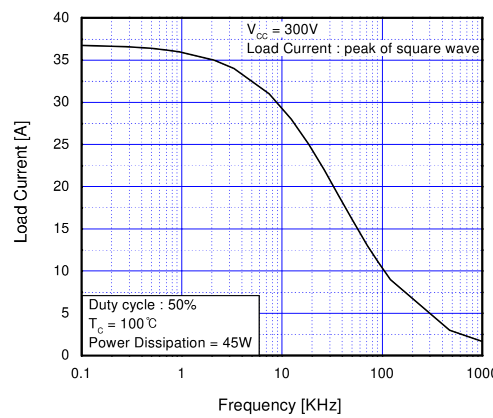


Fig 4. Load Current vs. Frequency

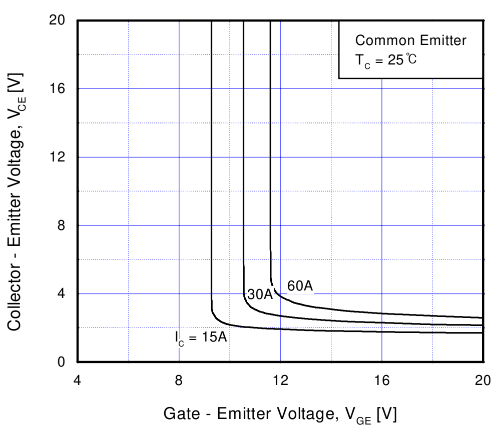


Fig 5. Saturation Voltage vs. V_{GE}

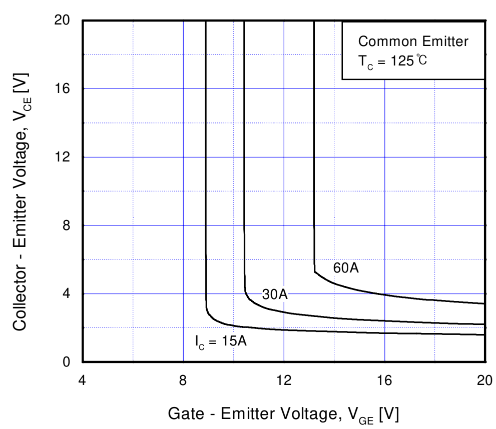


Fig 6. Saturation Voltage vs. V_{GE}

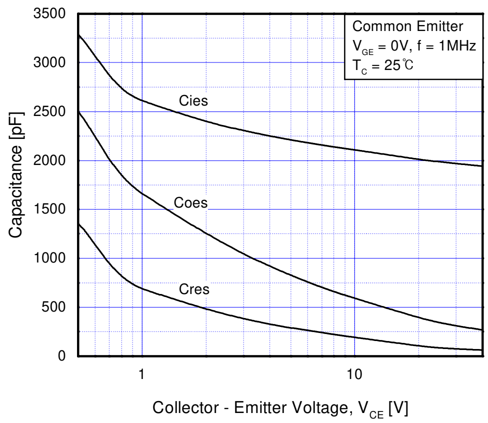


Fig 7. Capacitance Characteristics

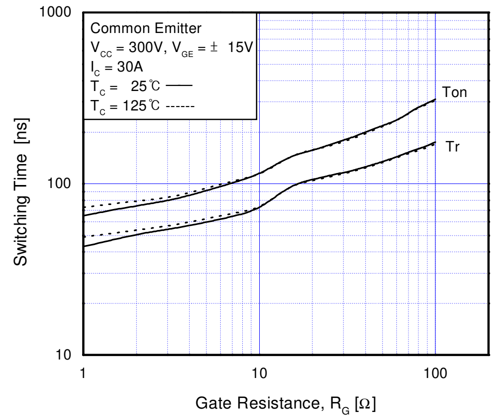


Fig 8. Turn-On Characteristics vs. Gate Resistance

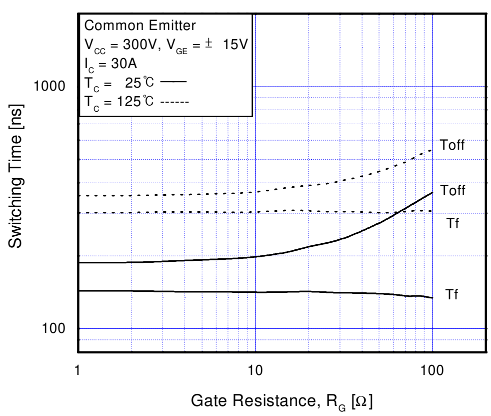


Fig 9. Turn-Off Characteristics vs. Gate Resistance

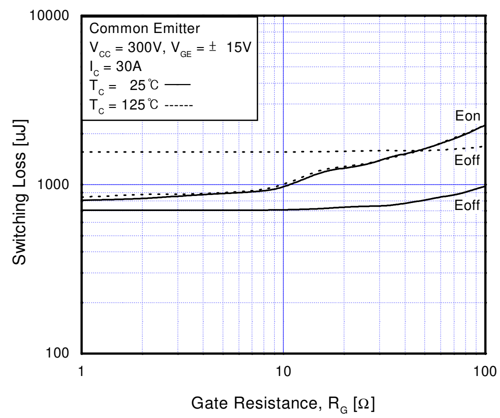


Fig 10. Switching Loss vs. Gate Resistance

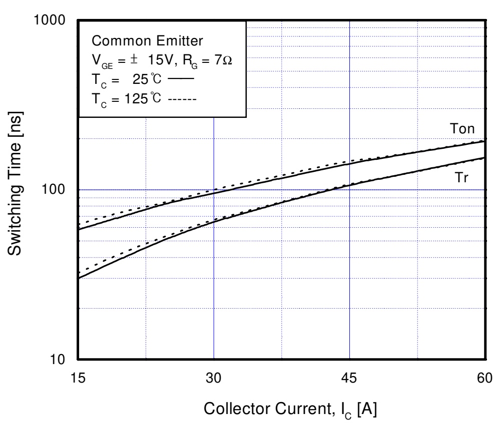


Fig 11. Turn-On Characteristics vs. Collector Current

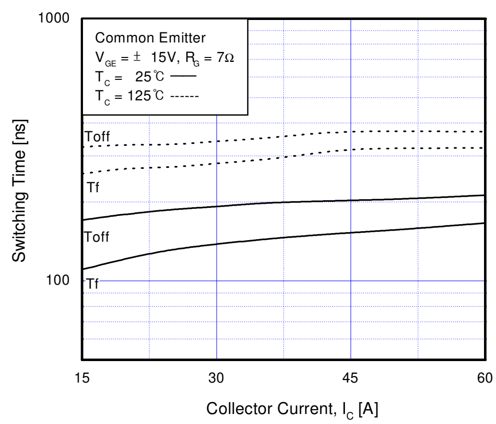


Fig 12. Turn-Off Characteristics vs. Collector Current

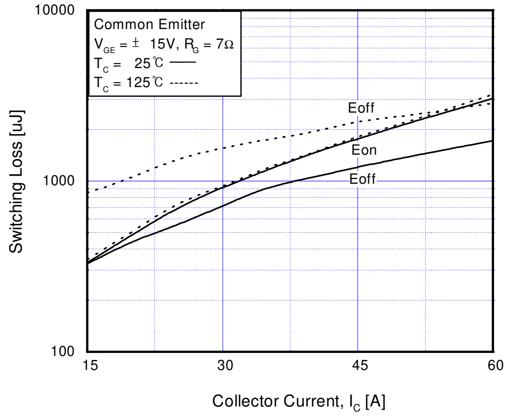


Fig 13. Switching Loss vs. Collector Current

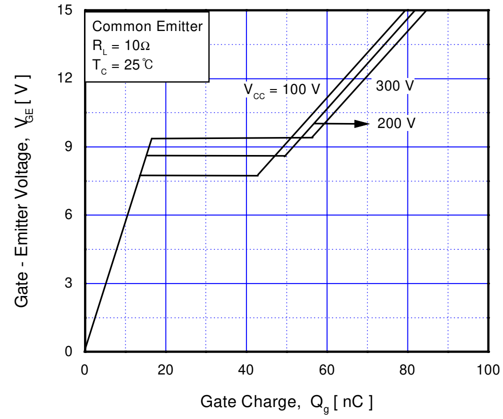


Fig 14. Gate Charge Characteristics

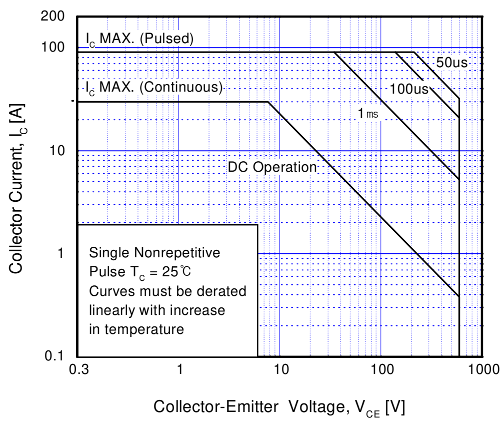


Fig 15. SOA Characteristics

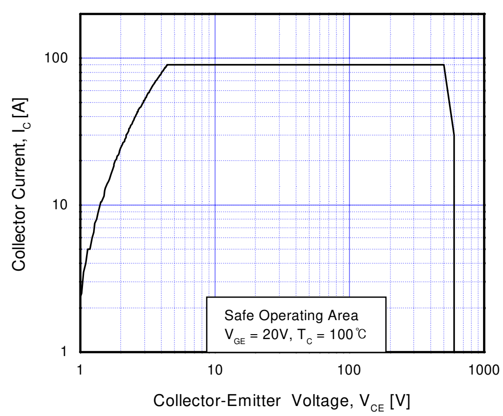


Fig 16. Turn-Off SOA Characteristics

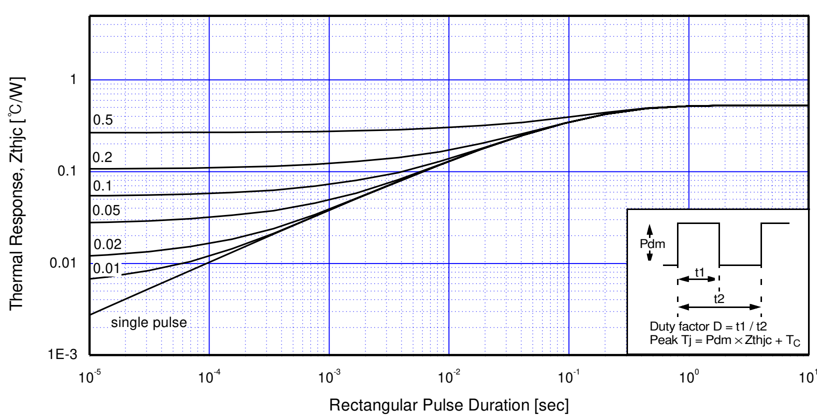
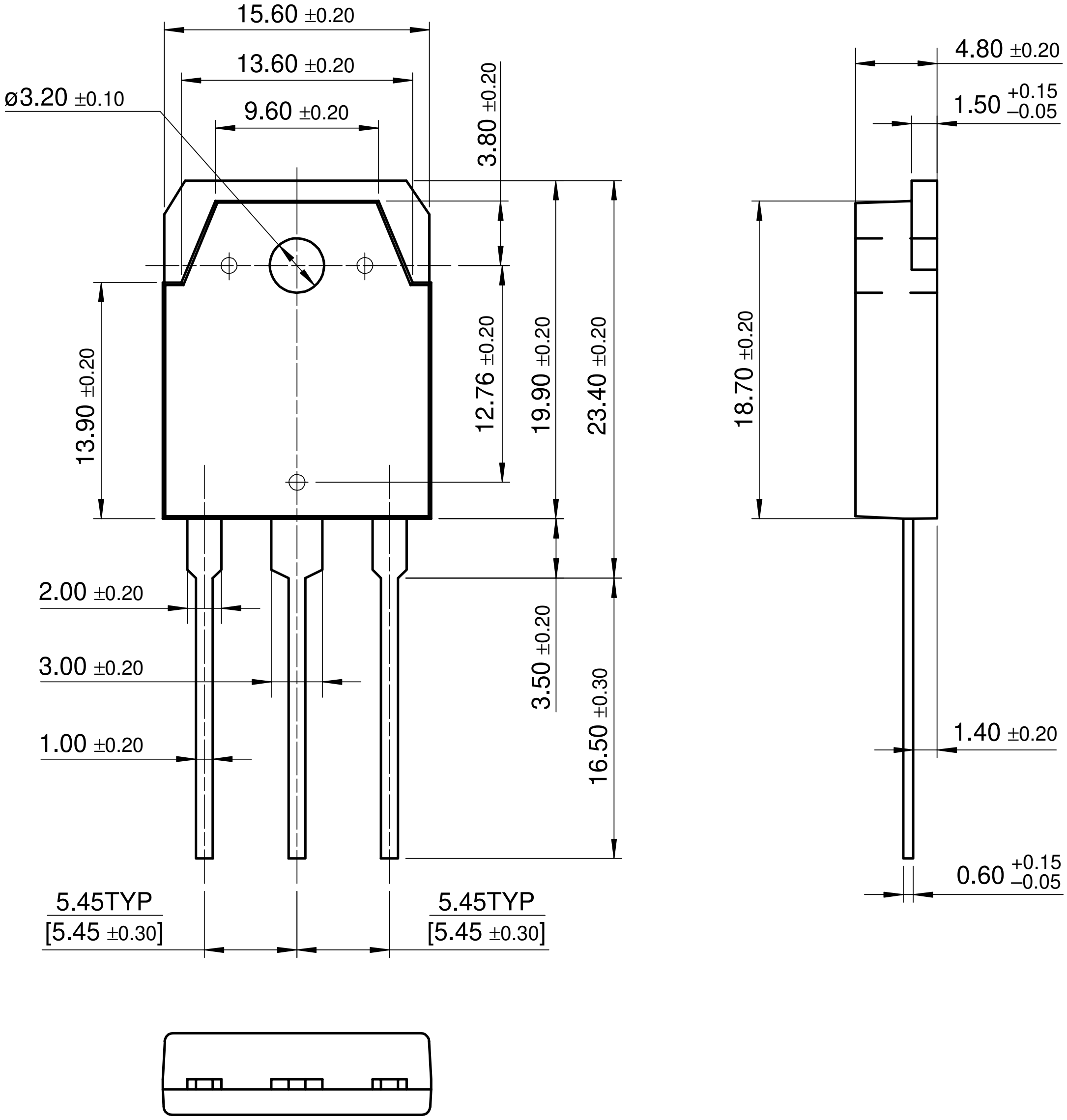


Fig 17. Transient Thermal Impedance of IGBT

Package Dimension

TO-3P



Dimensions in Millimeters

TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™	FAST®	MICROWIRE™	SLIENT SWITCHER®	UHC™
Bottomless™	FASTr™	OPTOLOGIC™	SMART START™	UltraFET®
CoolFET™	FRFET™	OPTOPLANAR™	SPM™	VCX™
CROSSVOLT™	GlobalOptoisolator™	PACMAN™	STAR*POWER™	
DenseTrench™	GTO™	POP™	Stealth™	
DOME™	HiSeC™	Power247™	SuperSOT™-3	
EcoSPARK™	I^2C™	PowerTrench®	SuperSOT™-6	
E^2CMOS™	ISOPLANAR™	QFET™	SuperSOT™-8	
EnSigna™	LittleFET™	QS™	SyncFET™	
FACT™	MicroFET™	QT Optoelectronics™	TinyLogic™	
FACT Quiet Series™	MicroPak™	Quiet Series™	TruTranslation™	

STAR*POWER is used under license

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.

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, or (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 significant injury to the user.

2. A critical component is 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 or 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, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order 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 in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.