

SGS10N60RUF

Short Circuit Rated IGBT

General Description

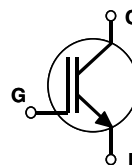
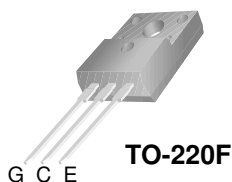
Fairchild's RUF series of Insulated Gate Bipolar Transistors (IGBTs) provide low conduction and switching losses as well as short circuit ruggedness. The RUF series is designed for applications such as motor control, uninterrupted power supplies (UPS) and general inverters where short circuit ruggedness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

Features

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

Application

AC & DC Motor controls, general purpose inverters, robotics, servo controls



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Description	SGS10N60RUF	Units
V_{CES}	Collector-Emitter Voltage	600	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ $T_C = 25^\circ\text{C}$	16	A
	Collector Current @ $T_C = 100^\circ\text{C}$	10	A
$I_{CM(1)}$	Pulsed Collector Current	30	A
T_{SC}	Short Circuit Withstand Time @ $T_C = 100^\circ\text{C}$	10	μs
P_D	Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$	55	W
	Maximum Power Dissipation @ $T_C = 100^\circ\text{C}$	22	W
T_J	Operating Junction Temperature	-55 to +150	$^\circ\text{C}$
T_{stg}	Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

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	--	2.3	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	62.5	$^\circ\text{C}/\text{W}$

Electrical Characteristics of IGBT $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	600	--	--	V
$\Delta BV_{CES}/\Delta T_J$	Temperature Coeff. of Breakdown Voltage	$V_{GE} = 0V, I_C = 1mA$	--	0.6	--	V/ $^\circ\text{C}$
I_{CES}	Collector Cut-off Current	$V_{CE} = V_{CES}, V_{GE} = 0V$	--	--	250	μA
I_{GES}	G-E Leakage Current	$V_{GE} = V_{GES}, V_{CE} = 0V$	--	--	± 100	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	$I_C = 10mA, V_{CE} = V_{GE}$	5.0	6.0	8.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C = 10A, V_{GE} = 15V$	--	2.2	2.8	V
		$I_C = 16A, V_{GE} = 15V$	--	2.5	--	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	$V_{CE} = 30V, V_{GE} = 0V,$ $f = 1MHz$	--	660	--	pF
C_{oes}	Output Capacitance		--	115	--	pF
C_{res}	Reverse Transfer Capacitance		--	25	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 300V, I_C = 10A,$ $R_G = 20\Omega, V_{GE} = 15V,$ Inductive Load, $T_C = 25^\circ\text{C}$	--	15	--	ns
t_r	Rise Time		--	30	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	36	50	nS
t_f	Fall Time		--	158	200	ns
E_{on}	Turn-On Switching Loss		--	141	--	μJ
E_{off}	Turn-Off Switching Loss		--	215	--	μJ
E_{ts}	Total Switching Loss	--	356	500	μJ	
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 300V, I_C = 10A,$ $R_G = 20\Omega, V_{GE} = 15V,$ Inductive Load, $T_C = 125^\circ\text{C}$	--	16	--	ns
t_r	Rise Time		--	33	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	42	60	ns
t_f	Fall Time		--	242	350	ns
E_{on}	Turn-On Switching Loss		--	161	--	μJ
E_{off}	Turn-Off Switching Loss		--	452	--	μJ
E_{ts}	Total Switching Loss	--	613	860	μJ	
T_{sc}	Short Circuit Withstand Time	$V_{CC} = 300V, V_{GE} = 15V$ @ $T_C = 100^\circ\text{C}$	10	--	--	μs
Q_g	Total Gate Charge	$V_{CE} = 300V, I_C = 10A,$ $V_{GE} = 15V$	--	30	45	nC
Q_{ge}	Gate-Emitter Charge		--	5	10	nC
Q_{gc}	Gate-Collector Charge		--	8	16	nC
L_e	Internal Emitter Inductance	Measured 5mm from PKG	--	7.5	--	nH

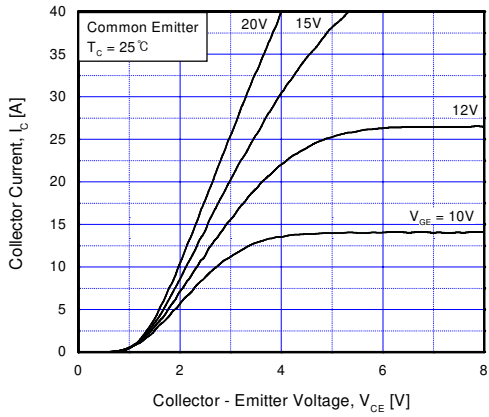


Fig 1. Typical Output Characteristics

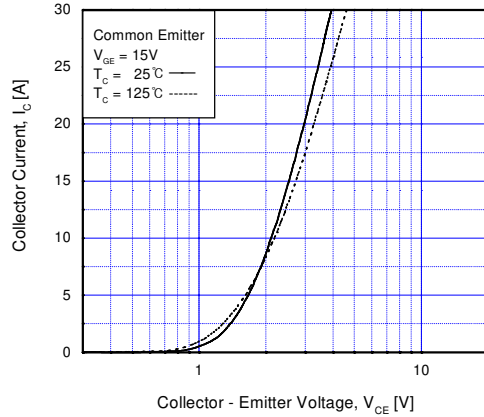


Fig 2. Typical Saturation Voltage Characteristics

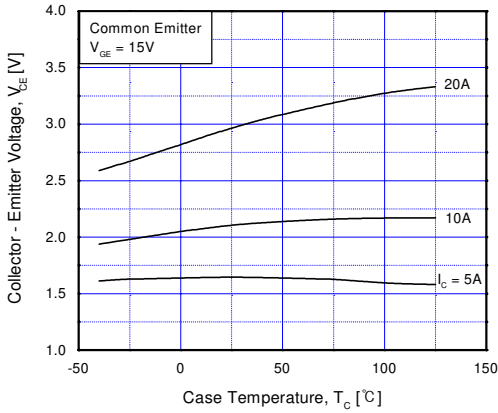


Fig 3. Saturation Voltage vs. Case Temperature at Variant Current Level

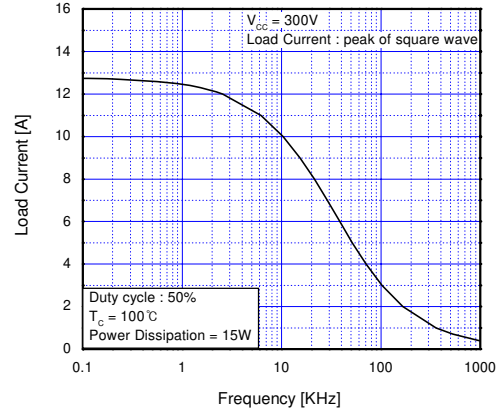


Fig 4. Load Current vs. Frequency

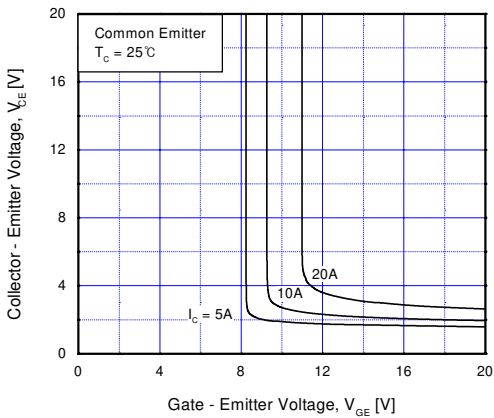


Fig 5. Saturation Voltage vs. V_{GE}

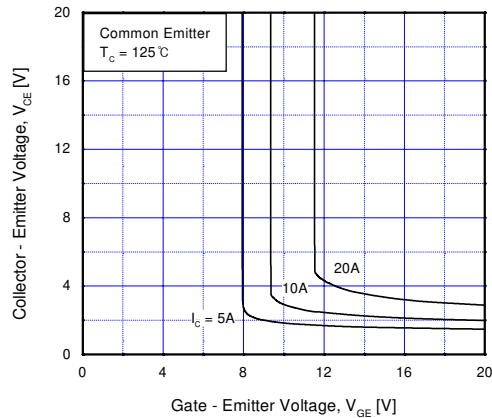


Fig 6. Saturation Voltage vs. V_{GE}

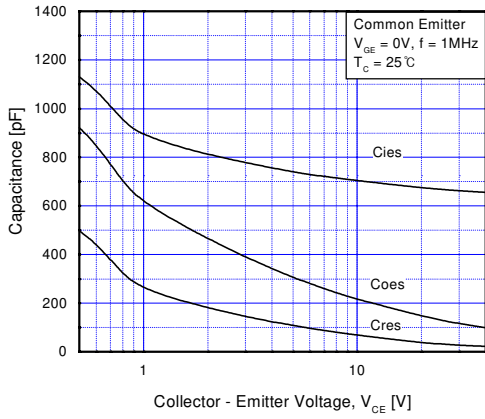


Fig 7. Capacitance Characteristics

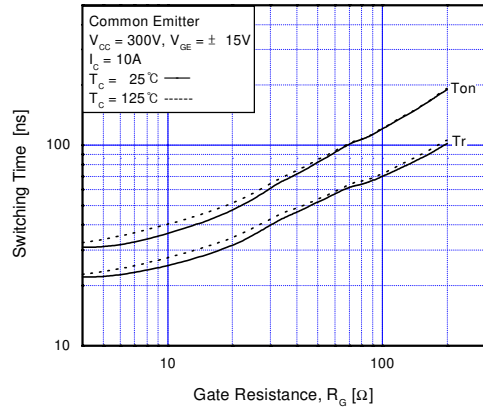


Fig 8. Turn-On Characteristics vs. Gate Resistance

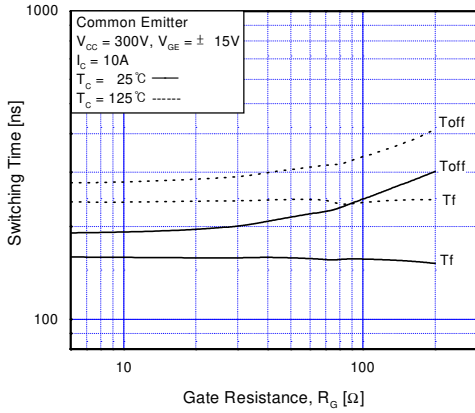


Fig 9. Turn-Off Characteristics vs. Gate Resistance

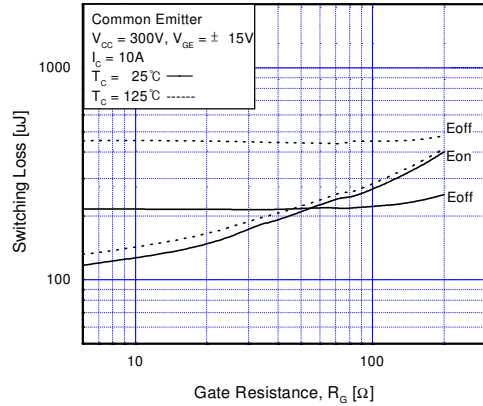


Fig 10. Switching Loss vs. Gate Resistance

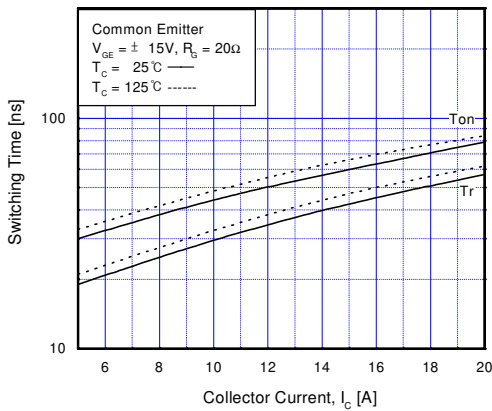


Fig 11. Turn-On Characteristics vs. Collector Current

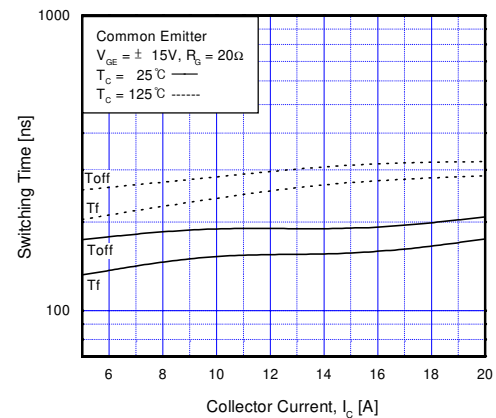


Fig 12. Turn-Off Characteristics vs. Collector Current

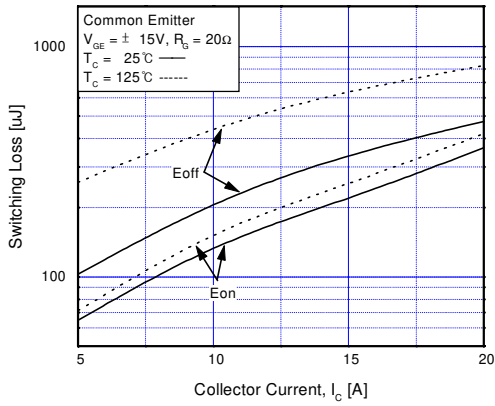


Fig 13. Switching Loss vs. Collector Current

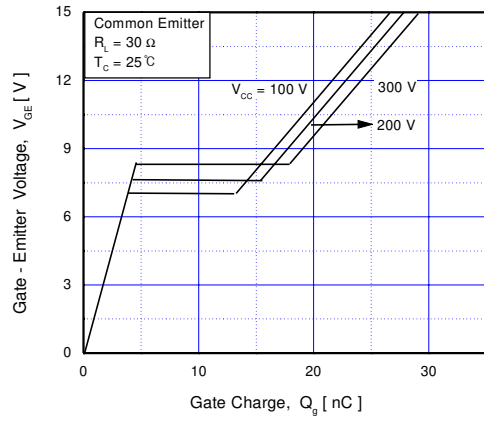


Fig 14. Gate Charge Characteristics

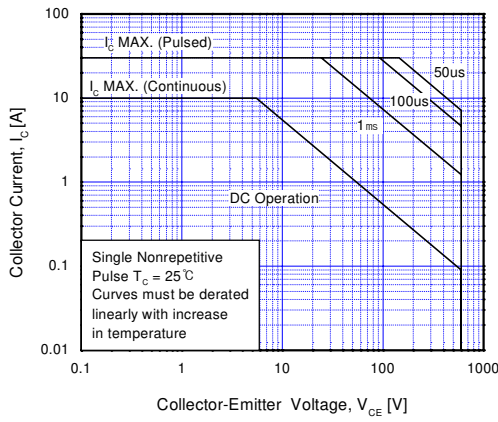


Fig 15. SOA Characteristics

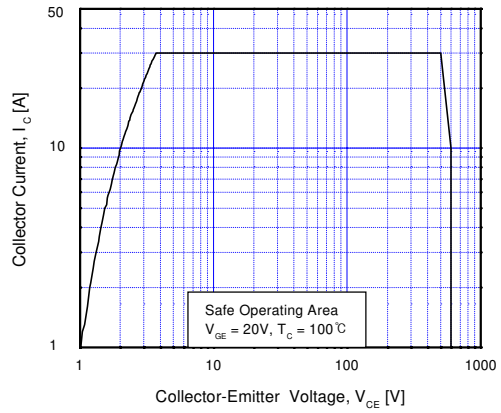


Fig 16. Turn-Off SOA Characteristics

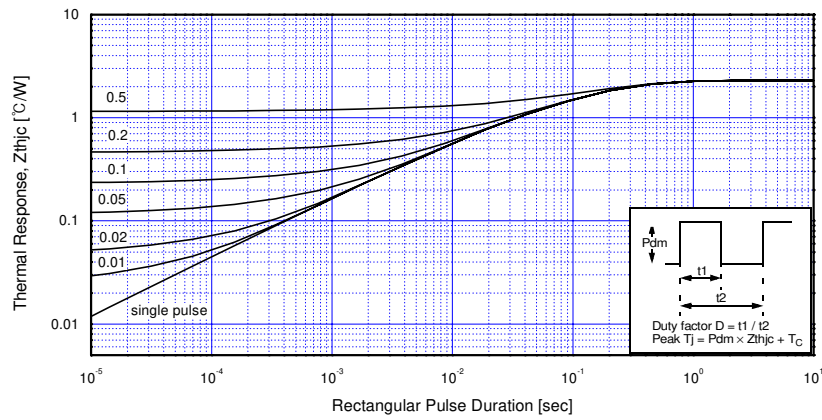
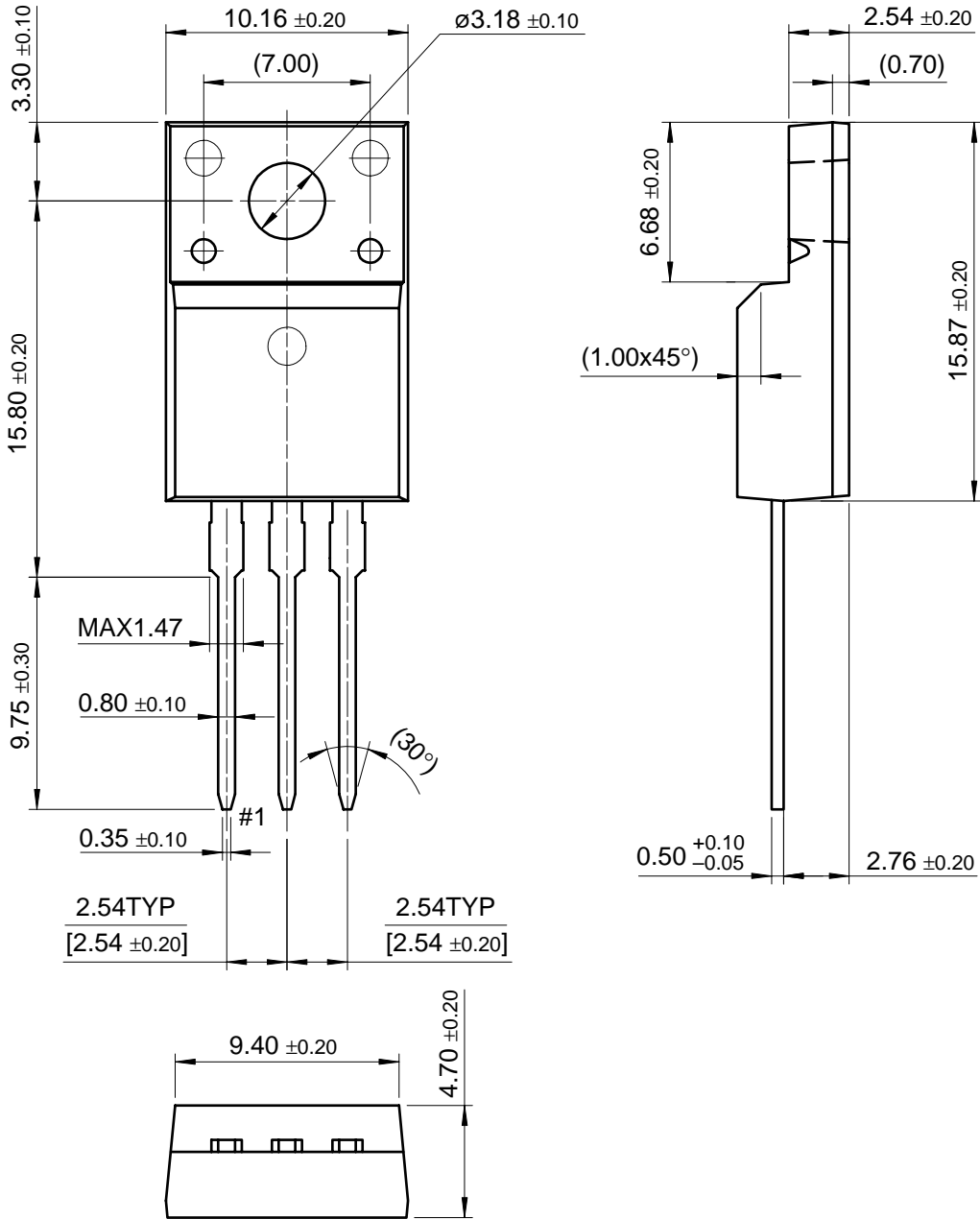


Fig 17. Transient Thermal Impedance of IGBT

Package Dimension

TO-220F (FS PKG CODE AQ)



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.

ACE _x TM	FAST [®]	PACMAN TM	SuperSOT TM -3
Bottomless TM	FAST _r TM	POP TM	SuperSOT TM -6
CoolFET TM	GlobalOptoisolator TM	PowerTrench [®]	SuperSOT TM -8
CROSSVOLT TM	GTO TM	QFET TM	SyncFET TM
DenseTrench TM	HiSeC TM	QS TM	TinyLogic TM
DOME TM	ISOPLANAR TM	QT Optoelectronics TM	UHC TM
EcoSPARK TM	LittleFET TM	Quiet Series TM	UltraFET [®]
E ² CMOS TM	MicroFET TM	SLIENT SWITCHER [®]	VCX TM
EnSigna TM	MICROWIRE TM	SMART START TM	
FACT TM	OPTOLOGIC TM	Star* Power TM	
FACT Quiet Series TM	OPTOPLANAR TM	Stealth TM	

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.

Fairchild Semiconductor

SEARCH | Parametric | Cross Reference

space Product Folders and Applies

find products

Home >> Find products >>

[Products groups](#)

[Analog and Mixed](#)

[Signal](#)

[Discrete](#)

[Interface](#)

[Logic](#)

[Microcontrollers](#)

[Non-Volatile](#)

[Memory](#)

[Optoelectronics](#)

[Markets and](#)

[applications](#)

[New products](#)

[Product selection and](#)

[parametric search](#)

[Cross-reference](#)

[search](#)

SGS10N60RUF

Discrete, Short Circuit Rated IGBT

Contents

[General description](#) | [Features](#) | [Applications](#) |

[Product status/pricing/packaging](#)

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.

Datasheet

[Download this](#)

[datasheet](#)



[e-mail this datasheet](#)



This page [Print version](#)

Related Links

[Request samples](#)

[Dotted line](#)

[How to order products](#)

[Dotted line](#)

[Product Change Notices](#)

[\(PCNs\)](#)

[Dotted line](#)

[Support](#)

[Dotted line](#)

[Distributor and field sales](#)

[representatives](#)

[Dotted line](#)

[Quality and reliability](#)

[Dotted line](#)

[Design tools](#)

[technical information](#)

[buy products](#)

[technical support](#)

[my Fairchild](#)

[company](#)

[back to top](#)

Features

- Short Circuit rated 10us @ $T_C = 100^\circ\text{C}$, $V_{GE} = 15\text{V}$
- High Speed Switching
- Low Saturation Voltage : $V_{CE(sat)} = 2.2\text{V}$ @ $I_C = 10\text{A}$
- High Input Impedance

[back to top](#)

Applications

AC & DC Motor controls, General Purpose Inverters, Robotics, Servo Controls

[back to top](#)

Product status/pricing/packaging

Product	Product status	Pricing*	Package type	Leads	Packing method
SGS10N60RUFTU	Full Production	\$1.61	TO-220F	3	RAIL

* 1,000 piece Budgetary Pricing

[back to top](#)

[Home](#) | [Find products](#) | [Technical information](#) | [Buy products](#) |
[Support](#) | [Company](#) | [Contact us](#) | [Site index](#) | [Privacy policy](#)

© Copyright 2002 Fairchild Semiconductor