

SGS5N150UF

General Description

Fairchild's Insulated Gate Bipolar Transistor (IGBT) provides low conduction and switching losses. SGS5N150UF is designed for the Switching Power Supply applications.

Features

- High Speed Switching
- Low Saturation Voltage : $V_{CE(sat)} = 4.7$ V @ $I_C = 5$ A
- High Input Impedance

Application

Switching Power Supply - High Input Voltage Off-line Converter



Absolute Maximum Ratings

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

Symbol	Description	SGS5N150UF	Units
V_{CES}	Collector-Emitter Voltage	1500	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ $T_C = 25^\circ\text{C}$	10	A
	Collector Current @ $T_C = 100^\circ\text{C}$	5	A
$I_{CM(1)}$	Pulsed Collector Current	20	A
P_D	Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$	50	W
	Maximum Power Dissipation @ $T_C = 100^\circ\text{C}$	20	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	--	2.5	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	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	$V_{GE} = 0\text{V}$, $I_C = 1\text{mA}$	1500	--	--	V
I_{CES}	Collector Cut-Off Current	$V_{CE} = V_{CES}$, $V_{GE} = 0\text{V}$	--	--	1.0	mA
I_{GES}	G-E Leakage Current	$V_{GE} = V_{GES}$, $V_{CE} = 0\text{V}$	--	--	± 100	nA
On Characteristics						
$V_{GE(\text{th})}$	G-E Threshold Voltage	$I_C = 5\text{mA}$, $V_{CE} = V_{GE}$	2.0	3.0	4.0	V
$V_{CE(\text{sat})}$	Collector to Emitter Saturation Voltage	$I_C = 5\text{A}$, $V_{GE} = 10\text{V}$	--	4.7	5.5	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	$V_{CE} = 10\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$	--	780	--	pF
C_{oes}	Output Capacitance		--	130	--	pF
C_{res}	Reverse Transfer Capacitance		--	70	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 600\text{ V}$ $I_C = 5\text{A}$ $R_G = 10\Omega$ $V_{GE} = 10\text{V}$ Inductive Load $T_C = 25^\circ\text{C}$	--	10	--	ns
t_r	Rise Time		--	15	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	30	50	ns
t_f	Fall Time		--	70	120	ns
E_{on}	Turn-On Switching Loss		--	190	--	uJ
E_{off}	Turn-Off Switching Loss		--	100	--	uJ
E_{ts}	Total Switching Loss		--	290	580	uJ
Q_g	Total Gate Charge		--	30	45	nC
Q_{ge}	Gate-Emitter Charge	$V_{CE} = 600\text{ V}$, $I_C = 5\text{A}$ $V_{GE} = 10\text{V}$	--	3	5	nC
Q_{gc}	Gate-Collector Charge		--	15	25	nC

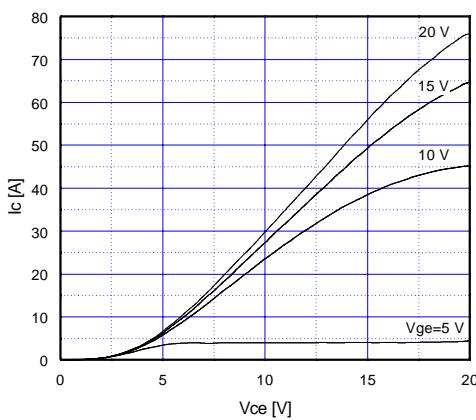


Fig 1. Typical Output Characteristics

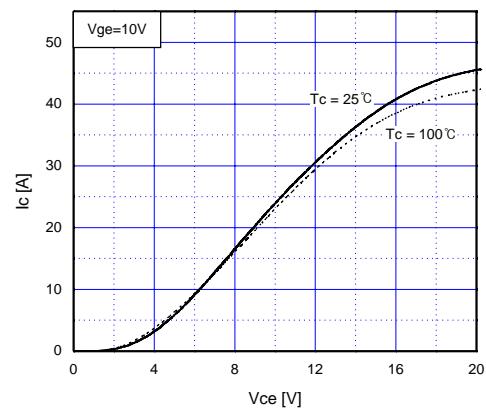


Fig 2. Typical Output Characteristics

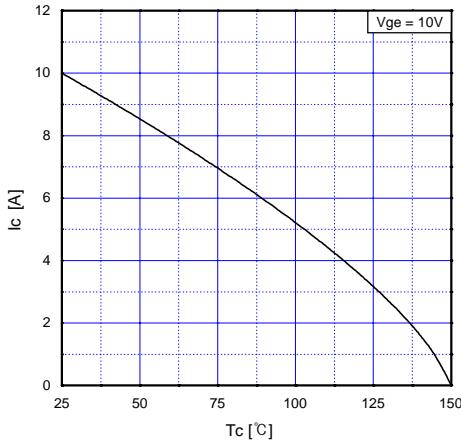


Fig 3. Maximum Collector Current vs. Case Temperature

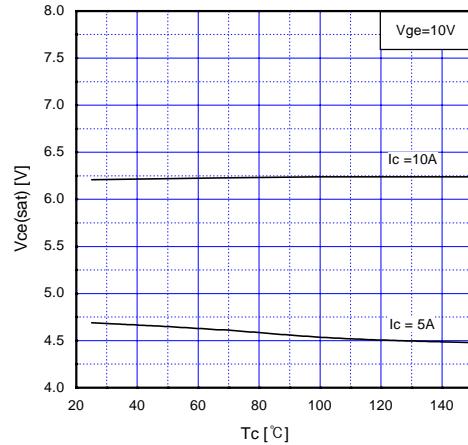


Fig 4. Saturation Voltage vs. Case Temperature

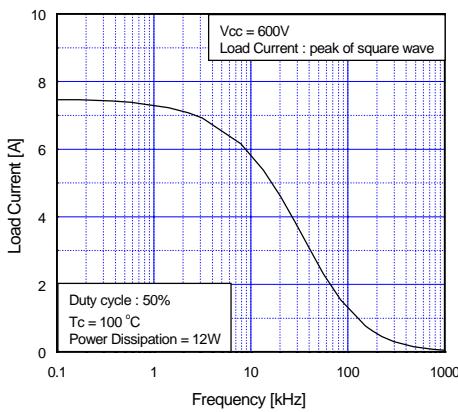


Fig 5. Load Current vs. Frequency

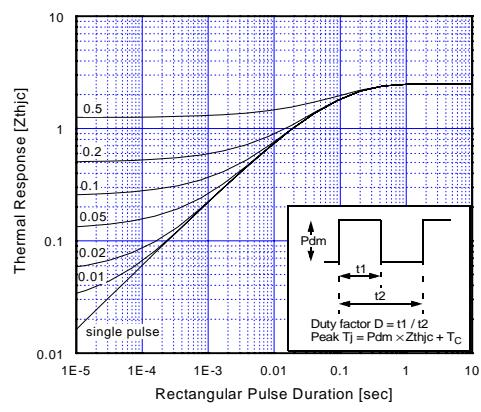
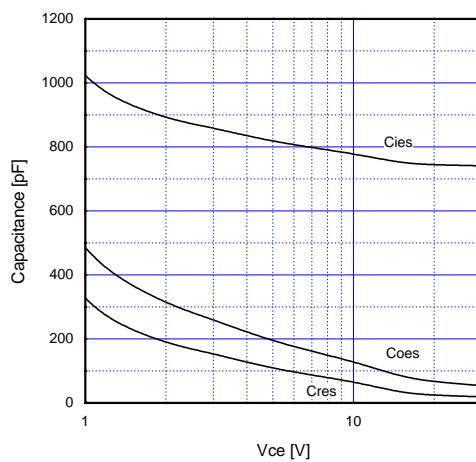


Fig 6. Transient Thermal Impedance of IGBT Junction to Case



**Fig 7. Typical Capacitance vs.
Collector to Emitter Voltage**

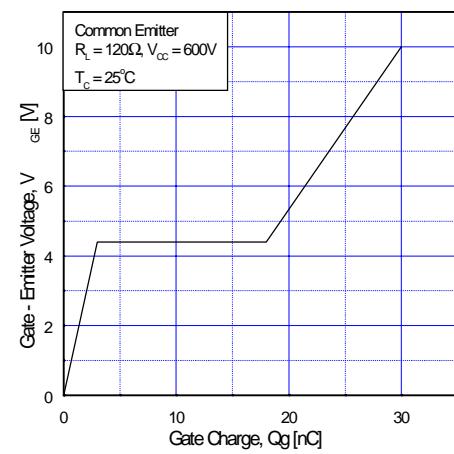
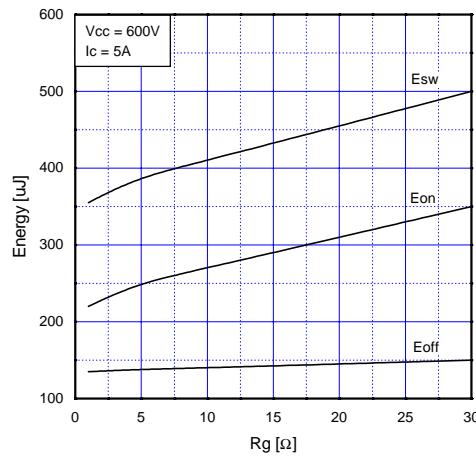
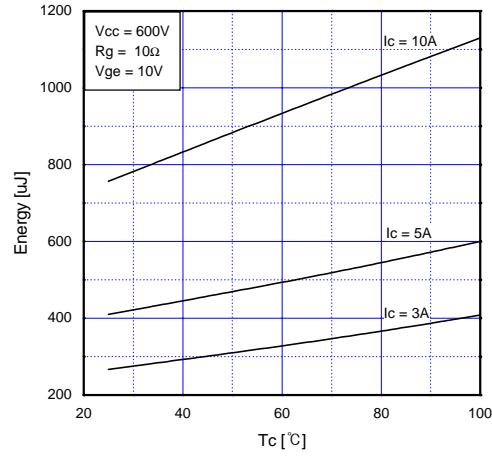


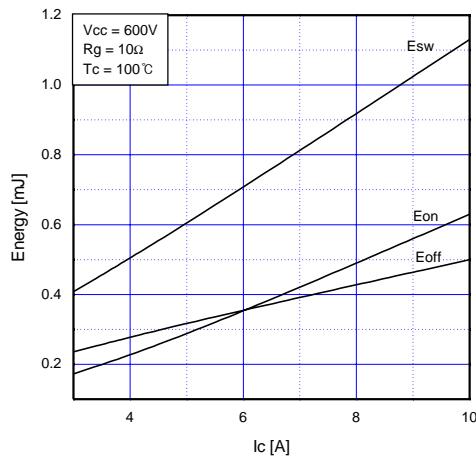
Fig 8. Typical Gate Charge Characteristic



**Fig 9. Typical Switching Loss vs.
Gate Resistance**



**Fig 10. Typical Switching Loss vs.
Case Temperature**



**Fig 11. Typical Switching Loss vs.
Collector Current**

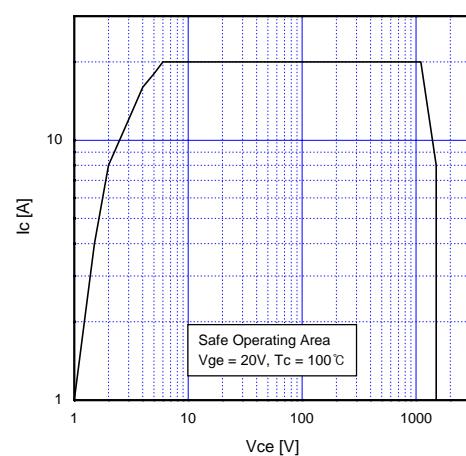
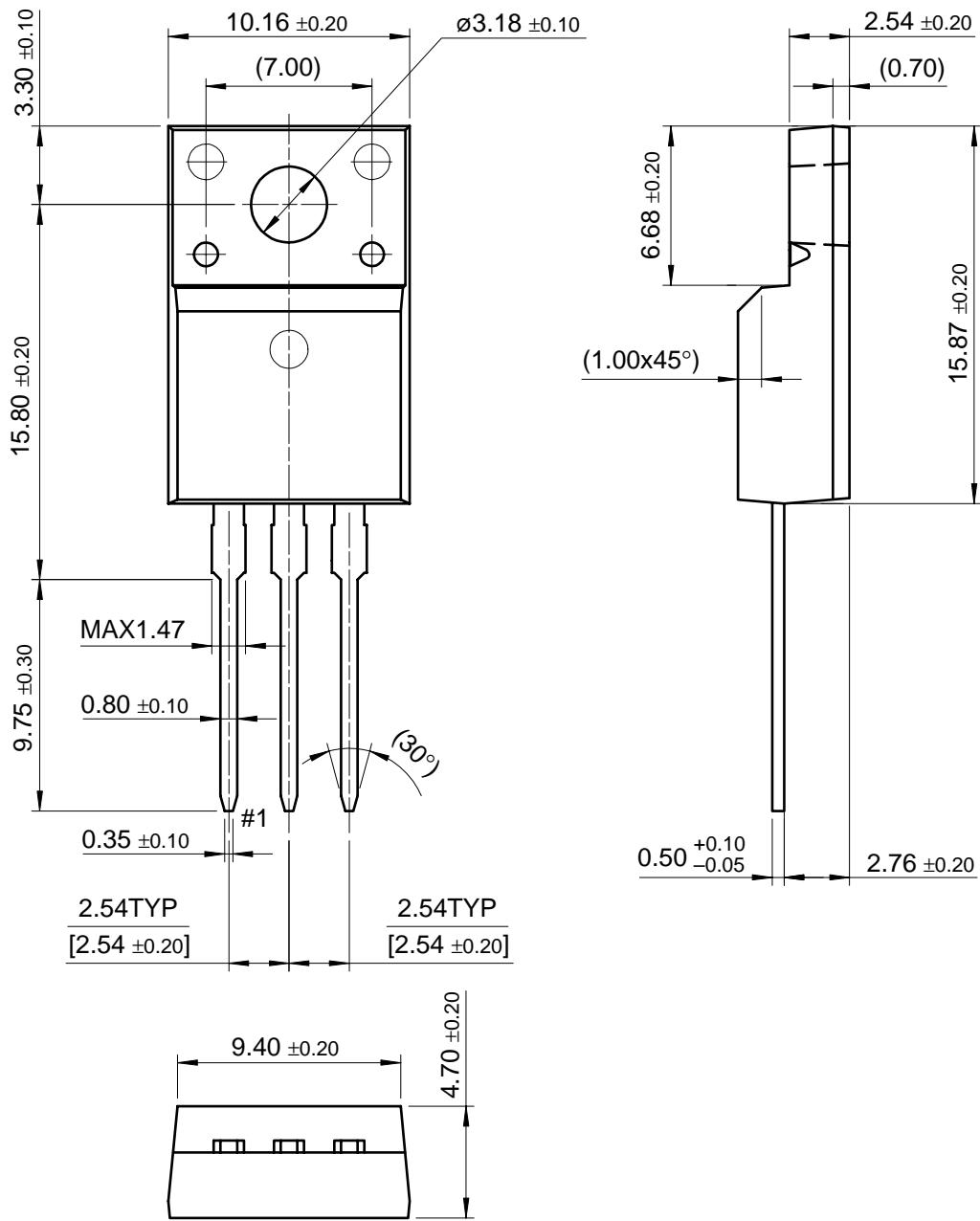


Fig 12. Turn-Off SOA

Package Dimension

SGS5N150UF

TO-220F (FS PKG CODE AQ)



Dimensions in Millimeters

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