FAIRCHILD SEMICONDUCTOR®

IGBT

SGF5N150UF

General Description

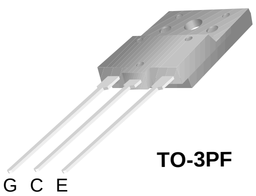
Fairchild's Insulated Gate Bipolar Transistor (IGBT) provides low conduction and switching losses. SGF5N150UF is designed for the Switching Power Supply applications.

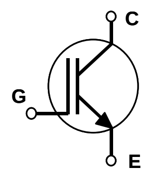
Features

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

Application

Switching Power Supply - High Input Voltage Off-line Converter





Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Description		SGF5N150UF	Units
V_{CES}	Collector-Emitter Voltage		1500	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Collector Current	@ T_C = 25°C	10	A
	Collector Current	@ T_C = 100°C	5	A
$I_{CM (1)}$	Pulsed Collector Current		20	A
P_D	Maximum Power Dissipation	@ T_C = 25°C	62.5	W
	Maximum Power Dissipation	@ T_C = 100°C	25	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	--	2.0	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	40	°C/W

Electrical Characteristics of 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 = 1mA	1500	--	--	V
I_{CES}	Collector Cut-Off Current	V_{CE} = V_{CES}, V_{GE} = 0V	--	--	1.0	mA
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 = 5mA, V_{CE} = V_{GE}	2.0	3.0	4.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 5A, V_{GE} = 10V	--	4.7	5.5	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 10V, V_{GE} = 0V, f = 1MHz	--	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 V, I_C = 5A, R_G =10Ω, V_{GE} = 10V, Inductive Load, T_C = 25°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	V_{CE} = 600 V, I_C = 5A, V_{GE} = 10V	--	30	45	nC
Q_{ge}	Gate-Emitter Charge		--	3	5	nC
Q_{gc}	Gate-Collector Charge		--	15	25	nC

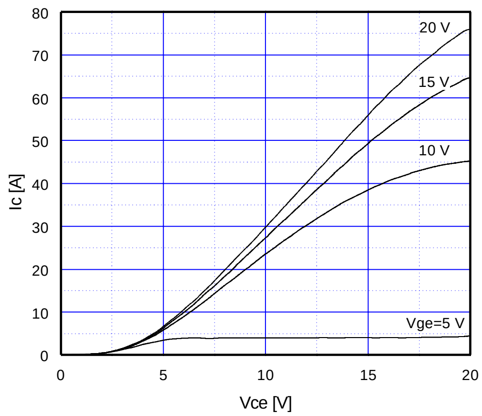


Fig 1. Typical Output Characteristics

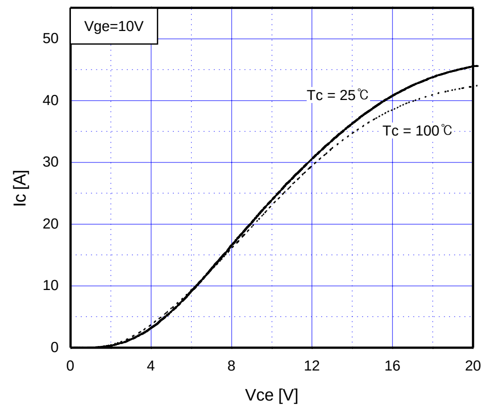


Fig 2. Typical Output Characteristics

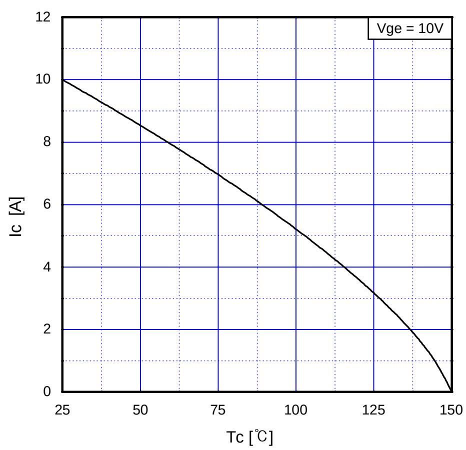


Fig 3. Maximum Collector Current vs. Case Temperature

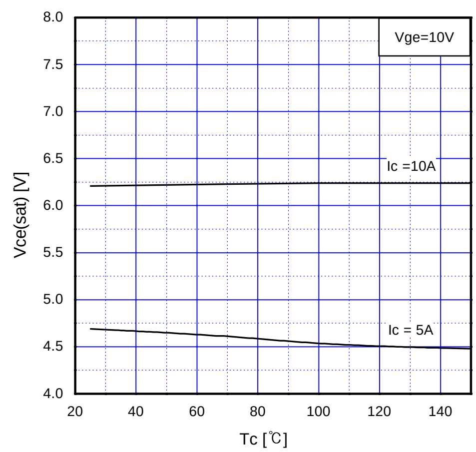


Fig 4. Saturation Voltage vs. Case Temperature

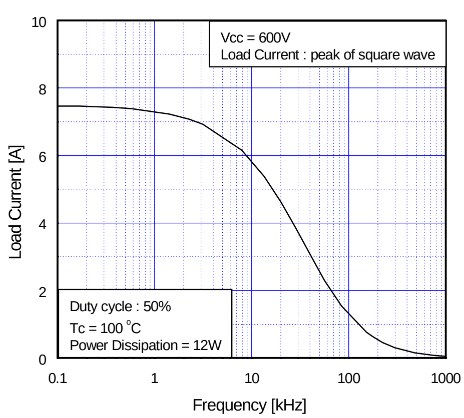


Fig 5. Load Current vs. Frequency

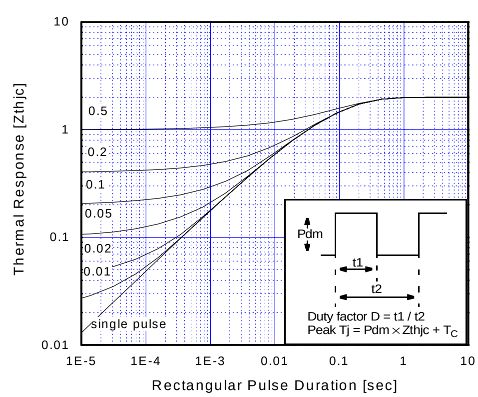


Fig 6. Transient Thermal Impedance of IGBT Junction to Case

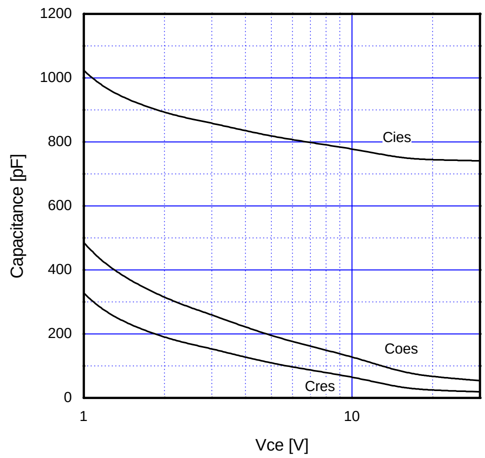


Fig 7. Typical Capacitance vs.
Collector to Emitter Voltage

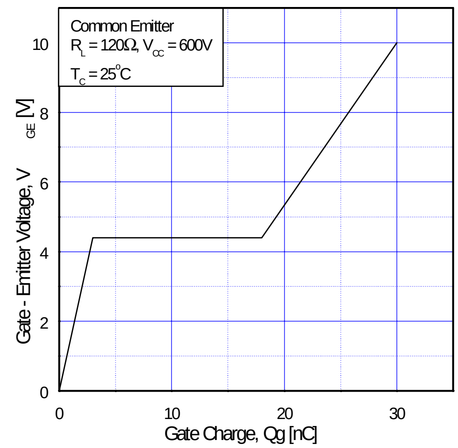


Fig 8. Typical Gate Charge Characteristic

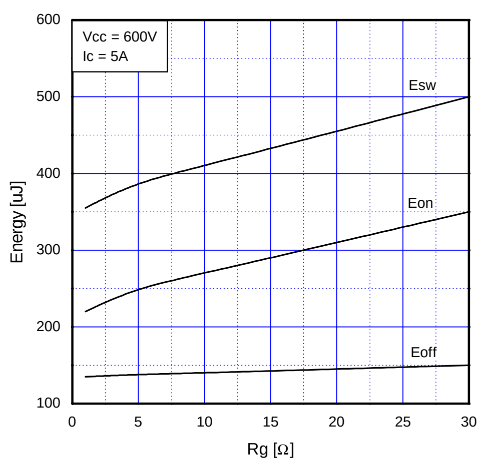


Fig 9. Typical Switching Loss vs.
Gate Resistance

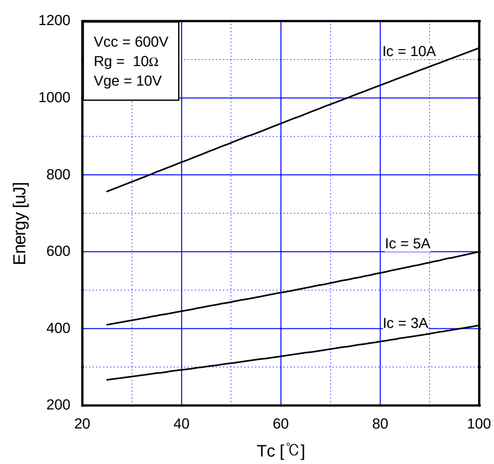


Fig 10. Typical Switching Loss vs.
Case Temperature

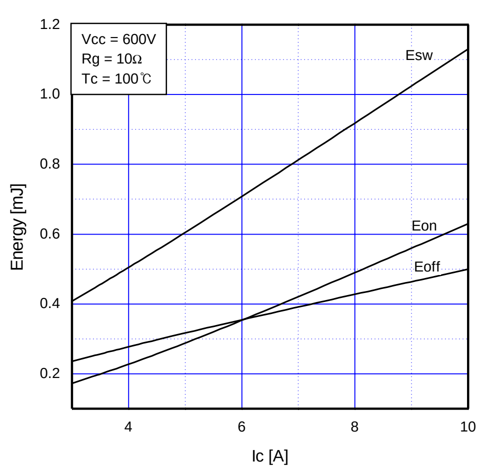


Fig 11. Typical Switching Loss vs.
Collector Current

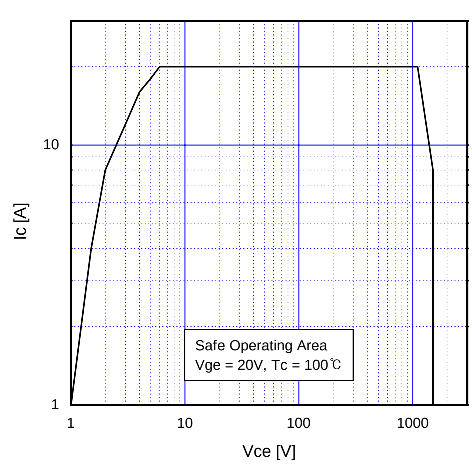
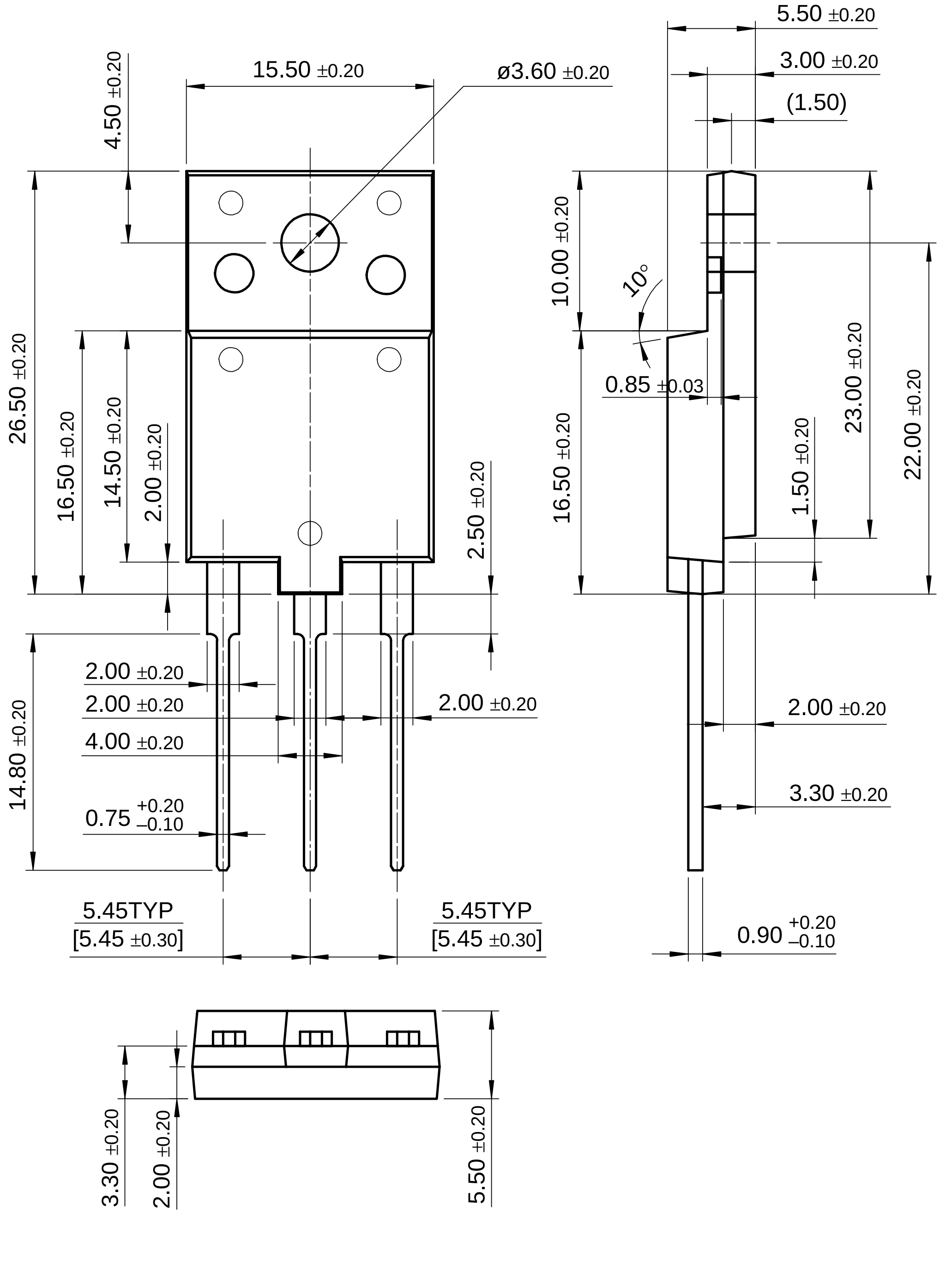


Fig 12. Turn-Off SOA

Package Dimension

TO-3PF (FS PKG CODE AG)



Dimensions in Millimeters

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