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## SGS5N150UF

### General Description

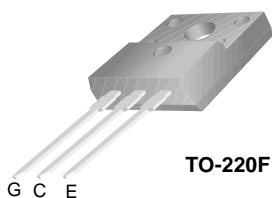
Fairchild's Insulated Gate Bipolar Transistor (IGBT) provides low conduction and switching losses. SGS5N150UF is designed for the Switching Power Supply applications.

### Features

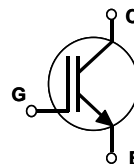
- High Speed Switching
- Low Saturation Voltage :  $V_{CE(sat)} = 4.7\text{ V @ } I_C = 5\text{ A}$
- High Input Impedance

### Application

Switching Power Supply - High Input Voltage Off-line Converter



TO-220F



### 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	$\pm 20$	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 :**

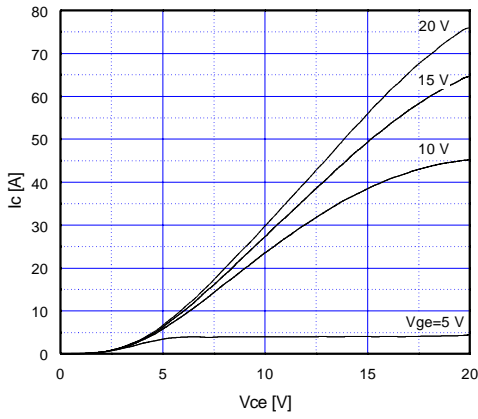
(1) Repetitive rating : Pulse width limited by max. junction temperature

### Thermal Characteristics

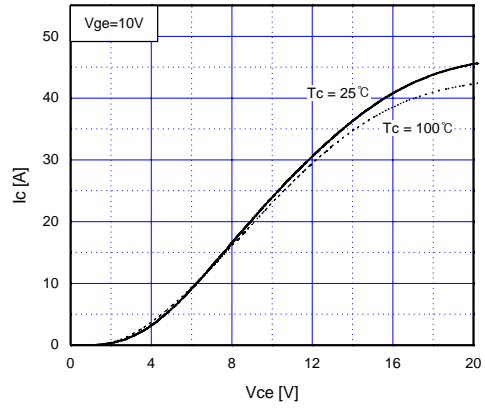
Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	--	2.5	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	62.5	$^\circ\text{C}/\text{W}$

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

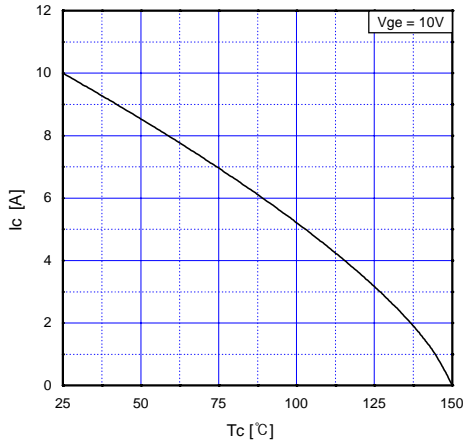
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
<b>Off Characteristics</b>						
$BV_{CES}$	Collector-Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 1mA$	1500	--	--	V
$I_{CES}$	Collector Cut-Off Current	$V_{CE} = V_{CES}, V_{GE} = 0V$	--	--	1.0	mA
$I_{GES}$	G-E Leakage Current	$V_{GE} = V_{GES}, V_{CE} = 0V$	--	--	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GE(th)}$	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
<b>Dynamic Characteristics</b>						
$C_{ies}$	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
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 600V$ $I_C = 5A$ $R_G = 10\Omega$ $V_{GE} = 10V$ 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	--	$\mu\text{J}$
$E_{off}$	Turn-Off Switching Loss		--	100	--	$\mu\text{J}$
$E_{ts}$	Total Switching Loss		--	290	580	$\mu\text{J}$
$Q_g$	Total Gate Charge	$V_{CE} = 600V, I_C = 5A$ $V_{GE} = 10V$	--	30	45	nC
$Q_{ge}$	Gate-Emitter Charge		--	3	5	nC
$Q_{gc}$	Gate-Collector Charge		--	15	25	nC



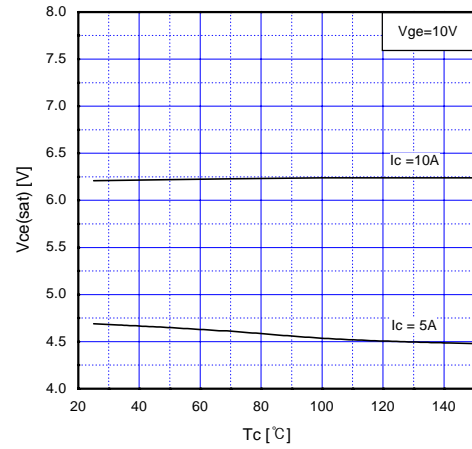
**Fig 1. Typical Output Characteristics**



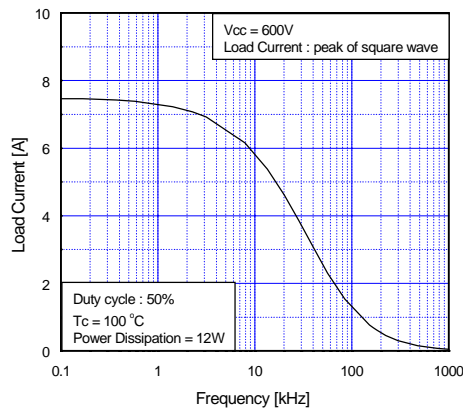
**Fig 2. Typical Output Characteristics**



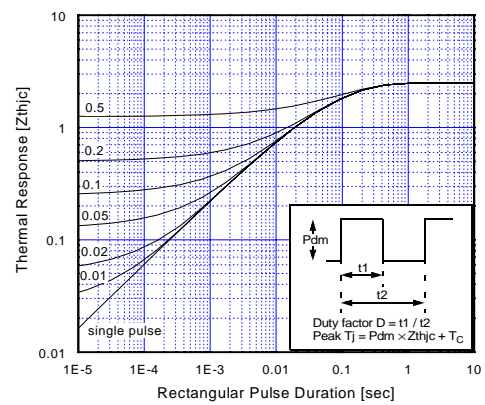
**Fig 3. Maximum Collector Current vs. Case Temperature**



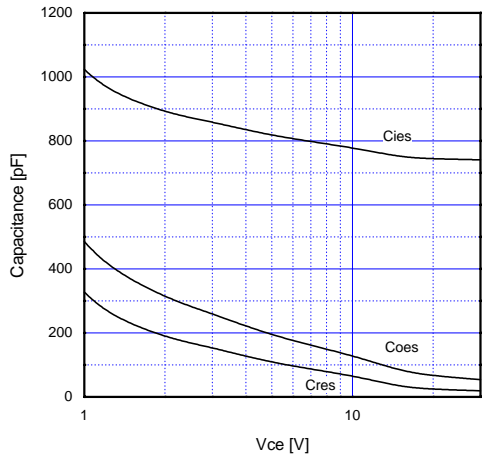
**Fig 4. Saturation Voltage vs. Case Temperature**



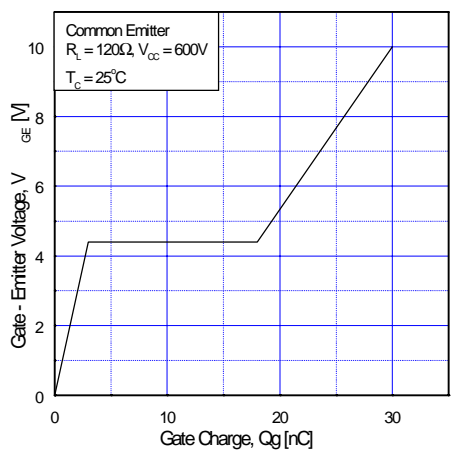
**Fig 5. Load Current vs. Frequency**



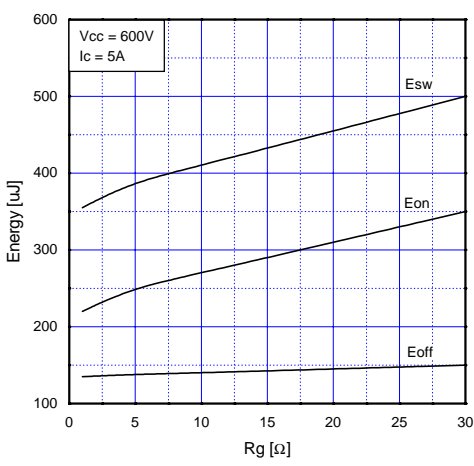
**Fig 6. Transient Thermal Impedance of IGBT Junction to Case**



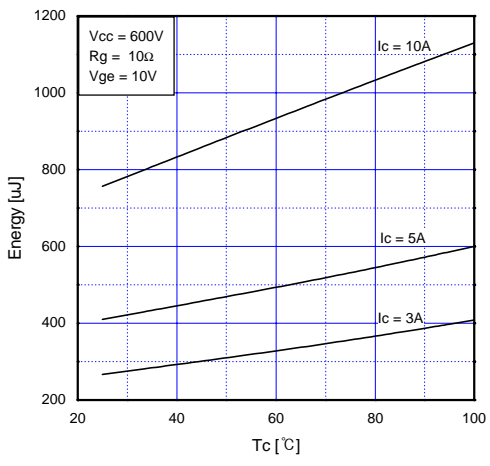
**Fig 7. Typical Capacitance vs. Collector to Emitter Voltage**



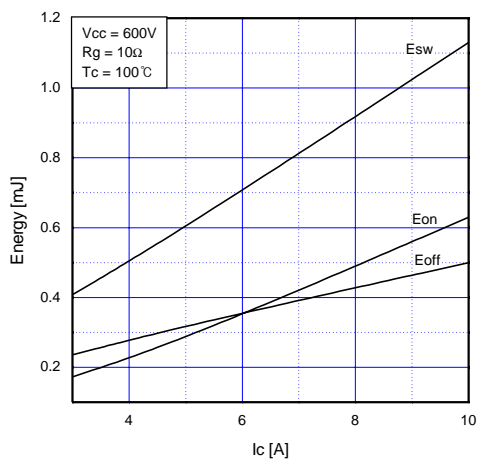
**Fig 8. Typical Gate Charge Characteristic**



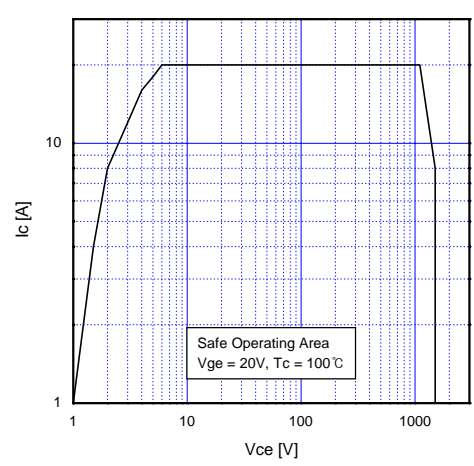
**Fig 9. Typical Switching Loss vs. Gate Resistance**



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



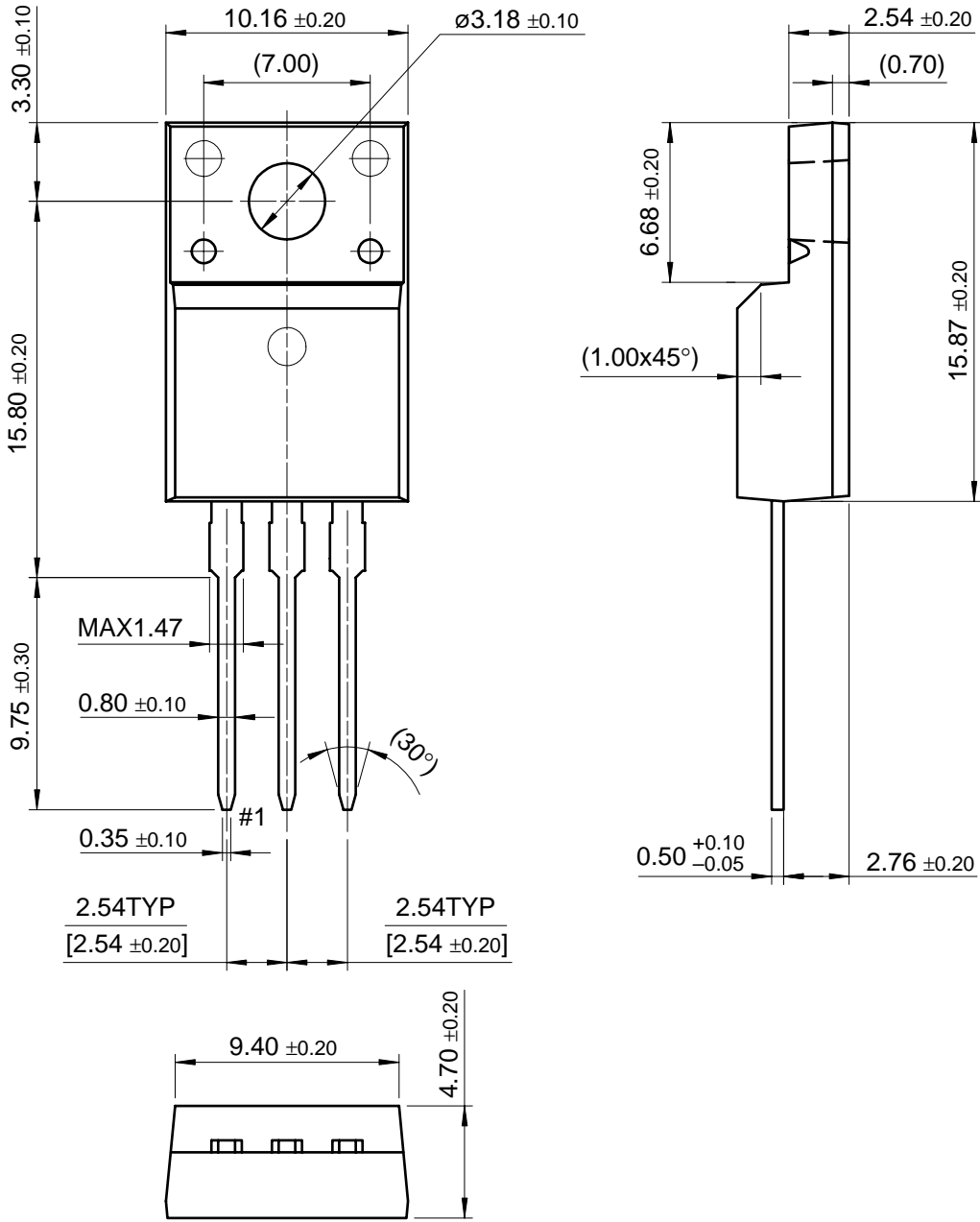
**Fig 11. Typical Switching Loss vs. Collector Current**



**Fig 12. Turn-Off SOA**

Package Dimension

TO-220F (FS PKG CODE AQ)



Dimensions in Millimeters

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