Ordering number : ENA0403

SANYO Semiconductors
DATA SHEET

NPN Epitaxial Planar Silicon Transistor

F5H2201 — 50V / 15A High-Speed Switching Applications

Applications

- High-speed switching applications (switching regulator, driver circuit).

Features

- Adoption of MBIT process.
- Large current capacitance.
- Low collector-to-emitter saturation voltage.
- High-speed switching.
- The F5H2201 consists of two chips which are equivalent to the 2SC6082 encapsulated in a package.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		60	V
Collector-to-Emitter Voltage	V_{CES}		60	V
Collector-to-Emitter Voltage	V_{CEO}		50	V
Emitter-to-Base Voltage	V_{EBO}		6	V
Collector Current	I_C		10	A
Collector Current (PW=1s)	I_C	Duty cycle≤1%	12	A
Collector Current (PW=100ms)	I_C	Duty cycle≤1%	15	A
Collector Current (Pulse)	I_{CP}	PW≤10μs, duty cycle≤10%	20	A
Base Current	I_B		3	A
Collector Dissipation	P_C		2	W
		Tc=25°C, 1unit	25	W
Total Dissipation	P_T	Tc=25°C	28	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		-55 to +150	°C

Electrical Characteristics at Ta=25°C

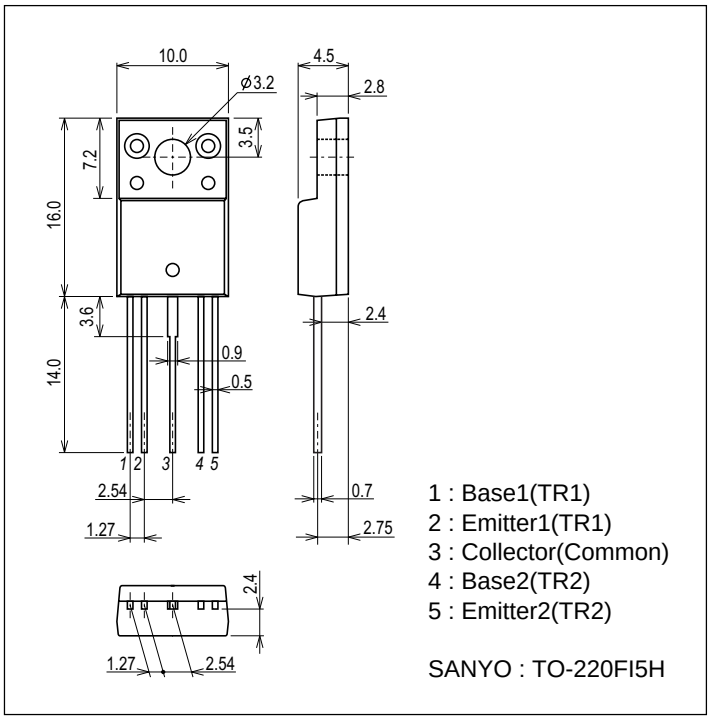
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=40V, I_E=0A			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=4V, I_C=0A			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=2V, I_C=330mA	200		560	
	$h_{FE}2$	V_{CE}=2V, I_C=10A	50			
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=2A		195		MHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		85		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=7.5A, I_B=375mA		250	500	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=7.5A, I_B=375mA			1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=100μA, I_E=0A	60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	I_C=100μA, R_{BE}=0Ω	60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=1mA, R_{BE}=∞	50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=100μA, I_C=0A	6			V
Turn-ON Time	t_{on}	See specified Test Circuit.		52		ns
Storage Time	t_{stg}	See specified Test Circuit.		560		ns
Fall Time	t_f	See specified Test Circuit.		37		ns

Note : The specifications shown above are for each individual transistor.

Package Dimensions

unit : mm (typ)

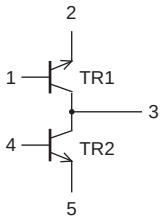
7526-001



1 : Base1(TR1)
2 : Emitter1(TR1)
3 : Collector(Common)
4 : Base2(TR2)
5 : Emitter2(TR2)

SANYO : TO-220FI5H

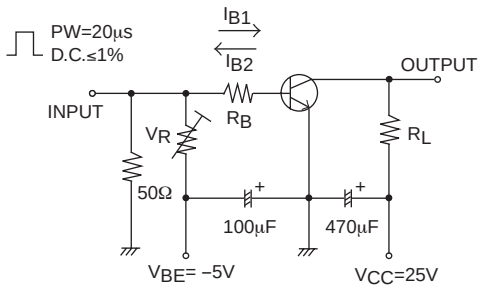
Electrical Connection



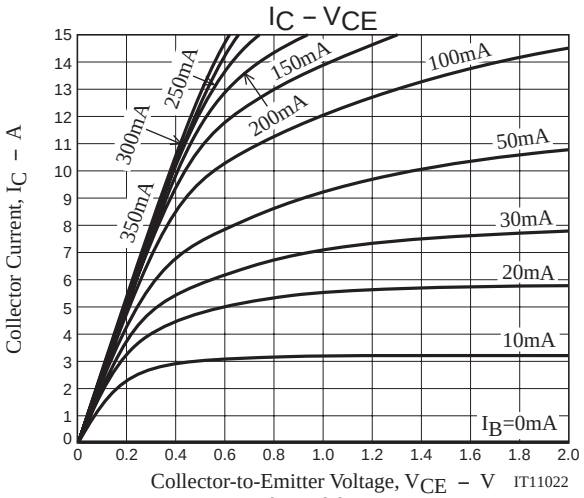
1 : Base1(TR1)
2 : Emitter1(TR1)
3 : Collector(Common)
4 : Base2(TR2)
5 : Emitter2(TR2)

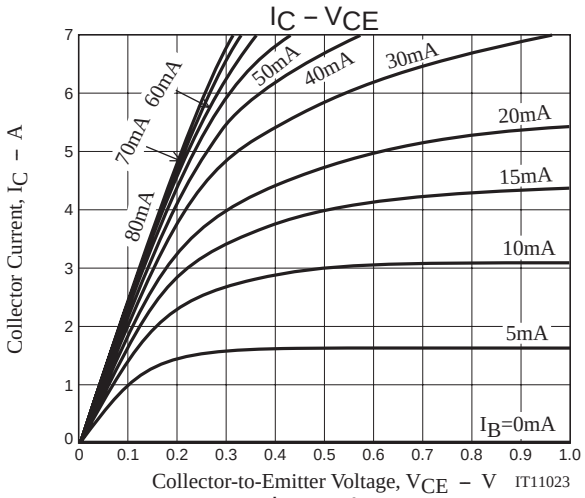
Top view

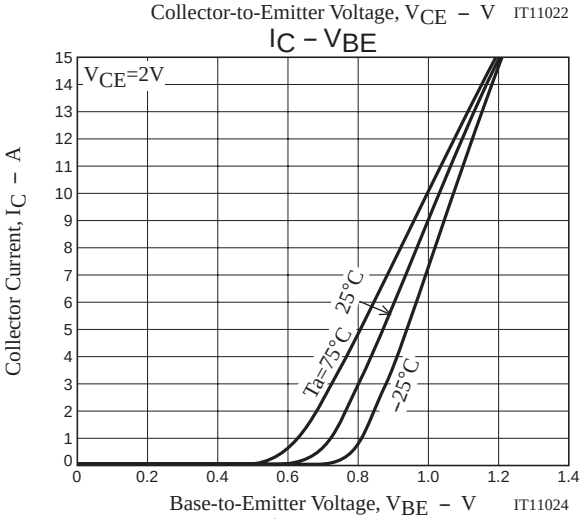
Switching Time Test Circuit

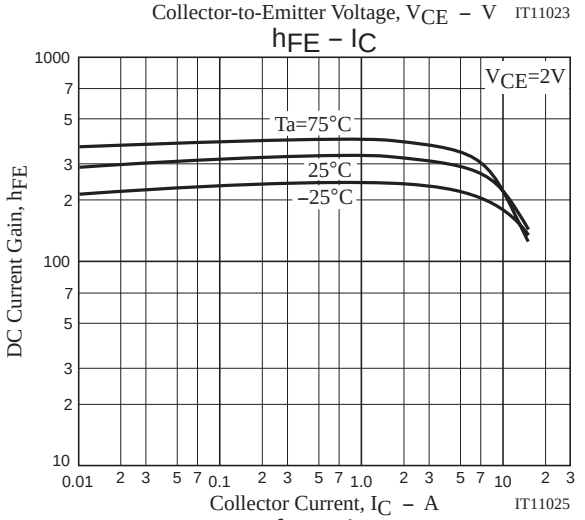


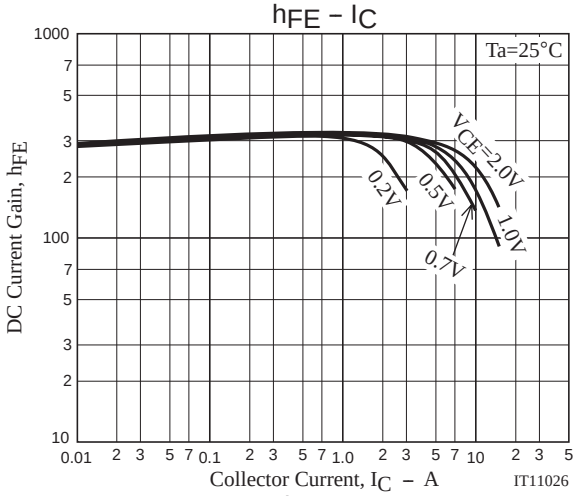
I_C=20I_{B1}= −20I_{B2}=5A

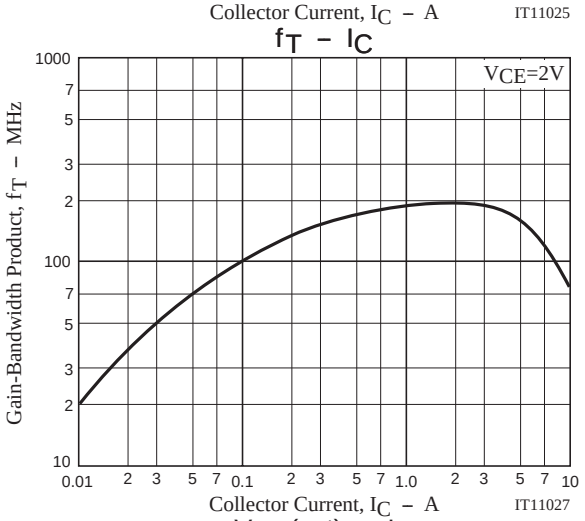

IC – VCE
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT11022
300mA
250mA
150mA
100mA
200mA
350mA
50mA
30mA
20mA
10mA
IB=0mA

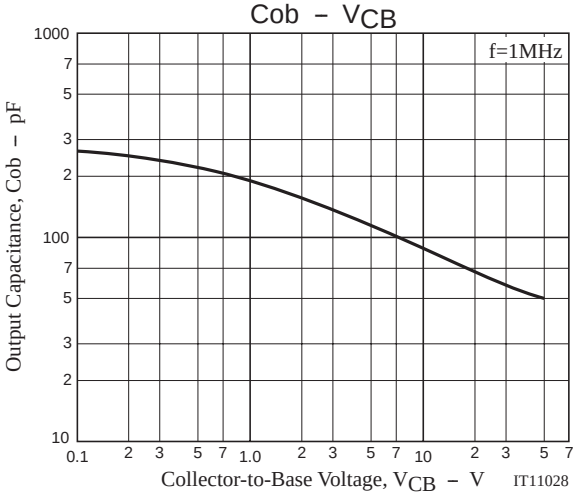

IC – VCE
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT11023
60mA
50mA
40mA
30mA
70mA
20mA
80mA
15mA
10mA
5mA
IB=0mA

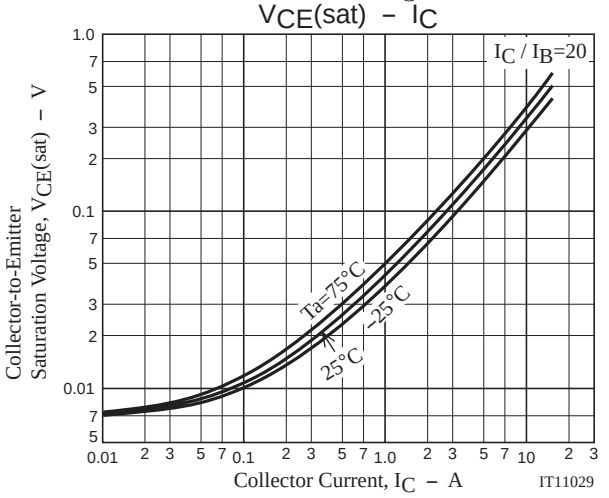

IC – VBE
VCE=2V
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT11024
25°C
Ta=75°C
–25°C

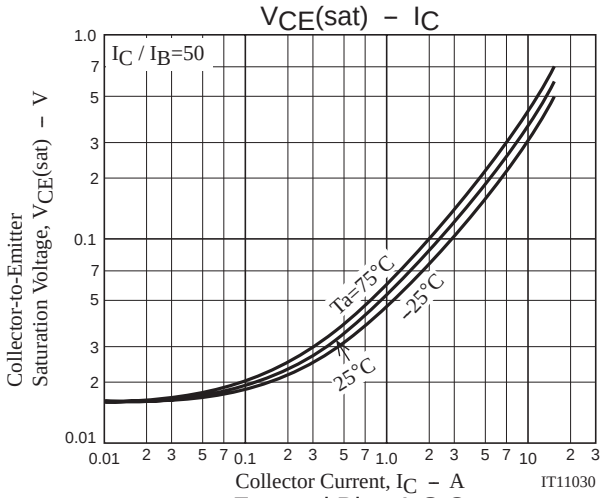

hFE – IC
VCE=2V
DC Current Gain, hFE
Collector Current, IC – A
IT11025
Ta=75°C
25°C
–25°C

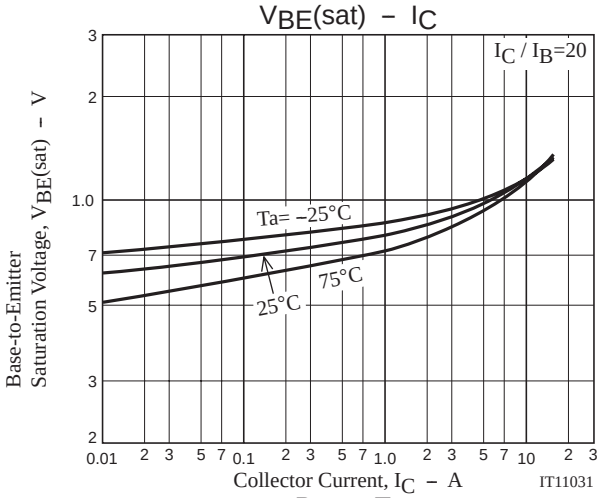

hFE – IC
Ta=25°C
DC Current Gain, hFE
Collector Current, IC – A
IT11026
VCE=2.0V
0.2V
0.5V
1.0V
0.7V

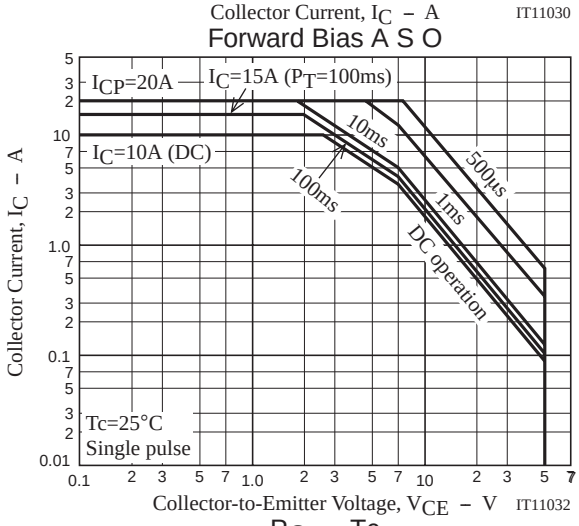

fT – IC
VCE=2V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT11027

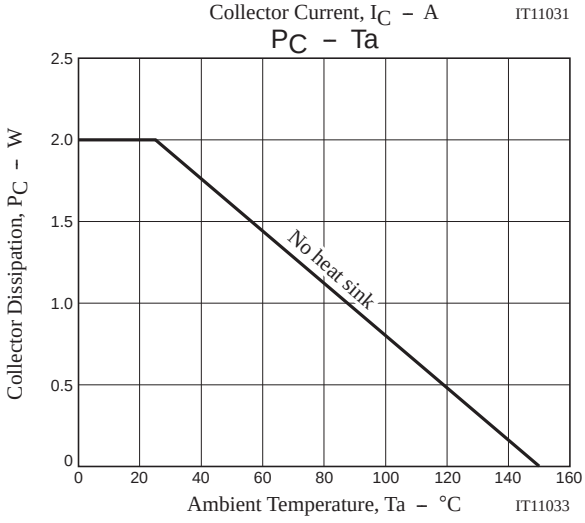

Cob – VCB
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT11028

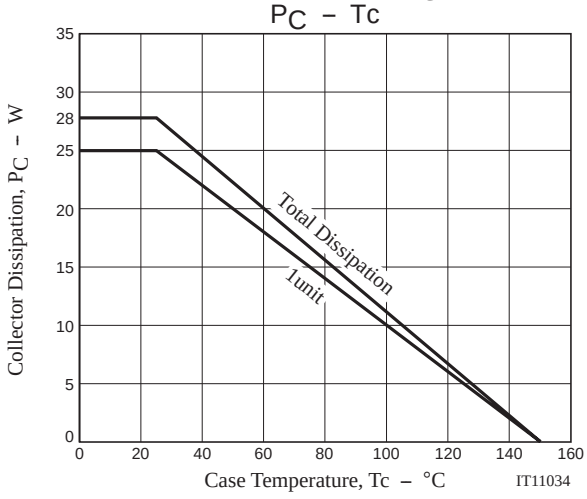

VCE(sat) – IC
IC / IB=20
Collector-to-Emitter
Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT11029
Ta=75°C
–25°C
25°C


VCE(sat) – IC
IC / IB=50
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT11030


VBE(sat) – IC
IC / IB=20
Ta= –25°C
25°C
75°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
IT11031


Forward Bias A S O
ICP=20A
IC=15A (PT=100ms)
IC=10A (DC)
10ms
100ms
500us
1ms
DC operation
Tc=25°C
Single pulse
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT11032


PC – Ta
No heat sink
Collector Dissipation, PC – W
Ambient Temperature, Ta – °C
IT11033


PC – Tc
Total Dissipation
1unit
Collector Dissipation, PC – W
Case Temperature, Tc – °C
IT11034