

Silicon NPN transistor epitaxial type D5890

[Applications]

Switching regulators/ DC-DC convertors
 Low voltage drop out(LDO) linear regulator out-put
 Battery chargers
 Power management switches

[Feature]

Low collector-emitter saturation voltage $V_{CE(sat)}= 210\text{mV}(\text{Max.})$ at $I_C=2\text{A}$, $I_B=0.2\text{A}$
 High collector current $I_{CP}= 5\text{A}$
 High DC current gain $h_{FE}= 150(\text{Min.})$ at $V_{CE}= 2\text{V}$, $I_C= 3\text{A}$
 Complement PNP type P/N B5890 available

[Absolute maximum ratings (Ta=25C)]

Characteristic	Symbol	Maximum ratings	Unit
Collector-base voltage	VCBO	20	V
Collector-emitter voltage	VCEO	20	V
Emitter-base voltage	VEBO	5	V
Collector current(DC)	IC	2	A
Repetitive peak collector current *1	ICRP	3	A
Collector current(Pulse) *2	ICP	5	A
Base current	IB	0.5	A
Junction temperature	Tj	150	C
Storage temperature	Tstg	-65 to 150	C

*1) Pulse width $\leq 100\text{ms}$, duty $\leq 25\%$

*2) Single pulse peak

[Electrical characteristics (Ta=25C)]

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BVCBO	20	-	-	V	$I_C= 10\mu\text{A}$, $I_E= 0\text{A}$
Collector-emitter breakdown voltage	BVCEO	20	-	-	V	$I_C= 1\text{mA}$, $I_B= 0\text{A}$
Emitter-base breakdown voltage	BVEBO	5	-	-	V	$I_E= 10\mu\text{A}$, $I_C= 0\text{A}$
Collector cut-off current	ICBO	-	-	100	nA	$V_{CB}= 20\text{V}$, $I_E= 0\text{A}$
Emitter cut-off current	IEBO	-	-	100	nA	$V_{EB}= 5\text{V}$, $I_E= 0\text{A}$
DC current gain 1	$h_{FE} 1$	220	-	-	-	$V_{CE}= 2\text{V}$, $I_C= 0.1\text{A}$
DC current gain 2	$h_{FE} 2$	220	-	-	-	$V_{CE}= 2\text{V}$, $I_C= 0.5\text{A}$
DC current gain 3 *3	$h_{FE} 3$	220	-	-	-	$V_{CE}= 2\text{V}$, $I_C= 1\text{A}$
DC current gain 4 *3	$h_{FE} 4$	200	-	-	-	$V_{CE}= 2\text{V}$, $I_C= 2\text{A}$
DC current gain 5 *3	$h_{FE} 5$	120	-	-	-	$V_{CE}= 2\text{V}$, $I_C= 3\text{A}$
Collector-emitter saturation voltage 1	$V_{CE(sat)} 1$	-	-	70	mV	$I_C= 0.5\text{A}$, $I_B= 50\text{mA}$
Collector-emitter saturation voltage 2	$V_{CE(sat)} 2$	-	-	120	mV	$I_C= 1\text{A}$, $I_B= 50\text{mA}$
Collector-emitter saturation voltage 3 *3	$V_{CE(sat)} 3$	-	-	230	mV	$I_C= 2\text{A}$, $I_B= 40\text{mA}$
Collector-emitter saturation voltage 4 *3	$V_{CE(sat)} 4$	-	-	210	mV	$I_C= 2\text{A}$, $I_B= 0.2\text{A}$
Collector-emitter saturation voltage 5 *3	$V_{CE(sat)} 5$	-	-	310	mV	$I_C= 3\text{A}$, $I_B= 0.3\text{A}$
Collector-emitter on resistance *3	$R_{CE(sat)}$	-	80	105	m \cdot ohm	$I_C= 2\text{A}$, $I_B= 0.2\text{A}$
Base-emitter saturation voltage 1 *3	$V_{BE(sat)} 1$	-	-	1.1	V	$I_C= 2\text{A}$, $I_B= 40\text{mA}$
Base-emitter saturation voltage 2 *3	$V_{BE(sat)} 2$	-	-	1.2	V	$I_C= 3\text{A}$, $I_B= 0.3\text{A}$
Base-emitter on voltage *3	$V_{BE(on)}$	-	-	1.2	V	$V_{CE}= 2\text{V}$, $I_C= 1\text{A}$
Transition frequency	f T	100	-	-	MHz	$V_{CE}= 5\text{V}$, $I_E= -0.1\text{A}$
Collector output capacitance	Cob	-	-	35	pF	$V_{CB}= 10\text{V}$, $f = 1\text{MHz}$, $I_E= 0\text{A}$

*3) Pulse width $\leq 300\mu\text{s}$, duty $\leq 2\%$

Notice 1) These are measured data of transistors assembled by PHENITEC SEMICONDUCTOR Corp. and are for reference only.

Notice 2) The contents described herein are subject to change without notice.

No. D5890-20080121

Fig.1 VBE(on) - IC
at VCE= 2V, Ta= 25C

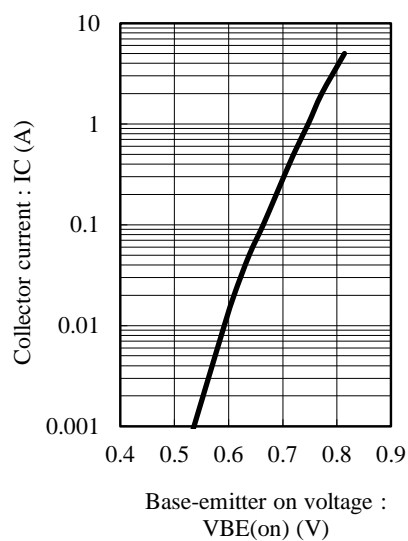


Fig.2 hFE - IC
at VCE= 2V, Ta= 25C

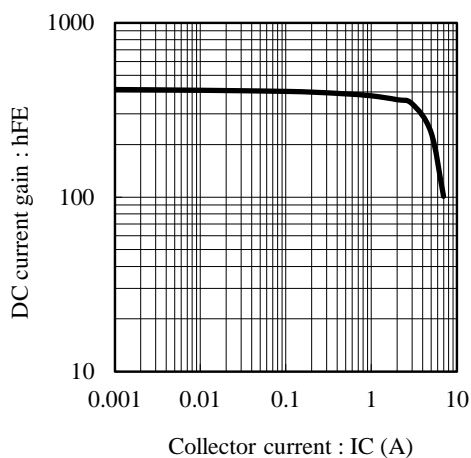


Fig.3 VCE(sat) - IC
at IC/IB= 10, Ta= 25C

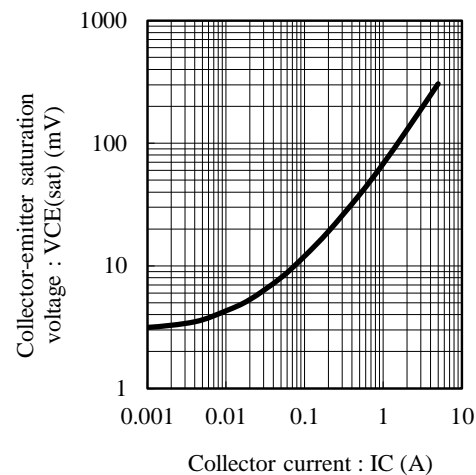


Fig.4 VCE(sat) - IC
at IC/IB= 20, Ta= 25C

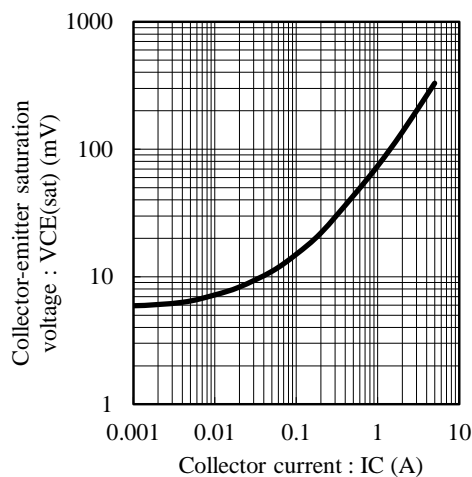


Fig.5 VCE(sat) - IC
at IC/IB=50, Ta= 25C

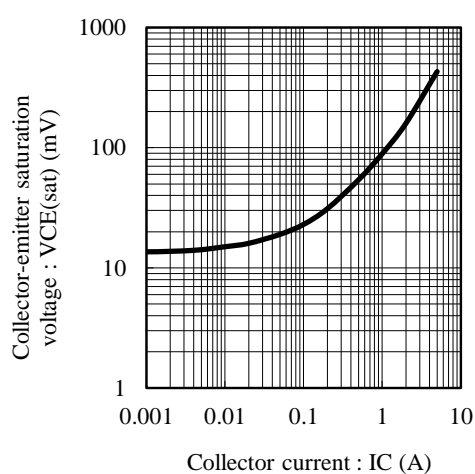


Fig.6 VBE(sat) - IC
at IC/IB= 10, Ta= 25C

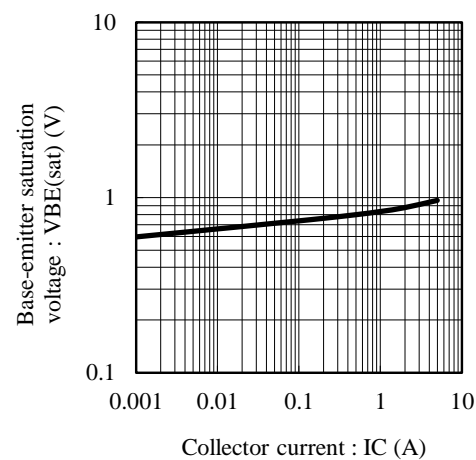


Fig.7 fT - IE
at VCE= 5V, Ta= 25C

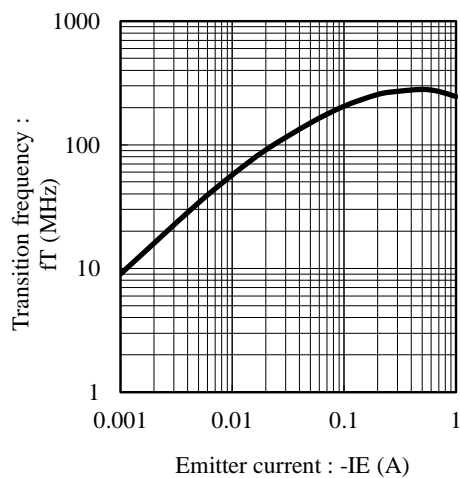


Fig.8 Cob - VCB
at f= 1MHz, Ta= 25C

