Ordering number : ENN6913

PNP / NPN Epitaxial Planar Silicon Transistors

2SA2040 / 2SC5707

High Current Switching Applications

Applications

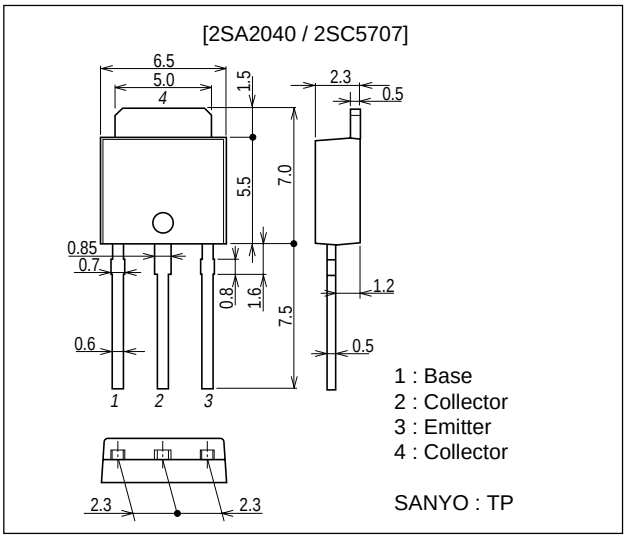
- DC-DC converter, relay drivers, lamp drivers, motor drivers, strobes.

Features

- Adoption of FBET, MBIT process.
- Large current capacitance.
- Low collector-to-emitter saturation voltage.
- High-speed switching.
- High allowable power dissipation.

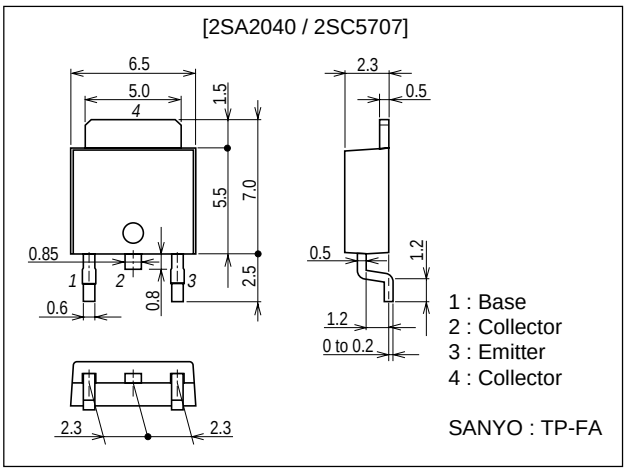
Package Dimensions

unit : mm
2045B



Package Dimensions

unit : mm
2044B



Specifications

Note*( ) : 2SA2040

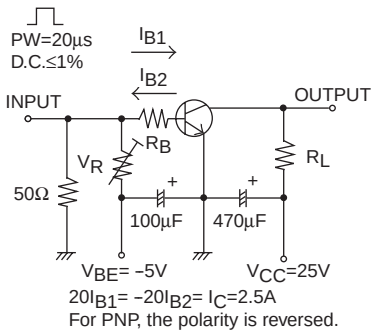
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(-50)80	V
Collector-to-Emitter Voltage	V_{CES}		(-50)80	V
Collector-to-Emitter Voltage	V_{CEO}		(-)50	V
Emitter-to-Base Voltage	V_{EBO}		(-)6	V
Collector Current	I_C		(-)8	A
Collector Current (Pulse)	I_{CP}		(-)11	A
Base Current	I_B		(-)2	A
Collector Dissipation	P_C		1.0	W
		Tc=25°C	15	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		–55 to +150	°C

Electrical Characteristics at Ta=25°C

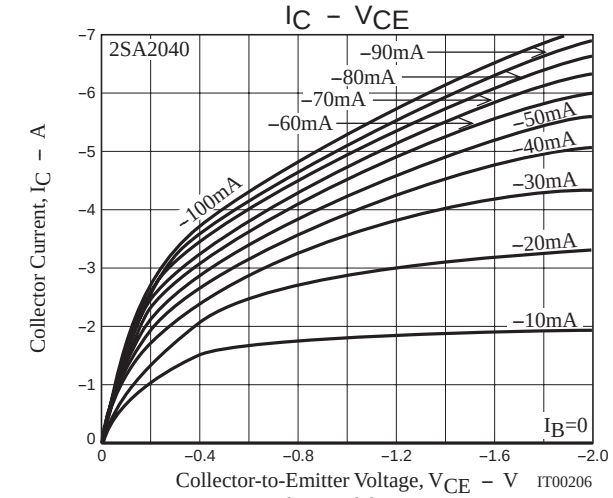
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(-)40V, I_E=0			(-)0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(-)4V, I_C=0			(-)0.1	μA
DC Current Gain	h_{FE}	V_{CE}=(-)2V, I_C=(-)500mA	200		560	
Gain-Bandwidth Product	f_T	V_{CE}=(-)10V, I_C=(-)500mA		(290)330		MHz
Output Capacitance	Cob	V_{CB}=(-)10V, f=1MHz		(50)28		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=(-)3.5A, I_B=(-)175mA		(-230)160	(-390)240	mV
		I_C=(-)2A, I_B=(-)40mA		(-240)110	(-400)170	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	IC=(-)2A, IB=(-)40mA		(-)0.83	(-)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(-)10μA, I_E=0	(-50)80			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	I_C=(-)100μA, R_{BE}=∞	80			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=(-)10μA, I_C=0	(-)6			V
Turn-On Time	t_{on}	See specified test circuit.		(40)30		ns
Storage Time	t_{stg}	See specified test circuit.		(225)420		ns
Fall Time	t_f	See specified test circuit.		25		ns

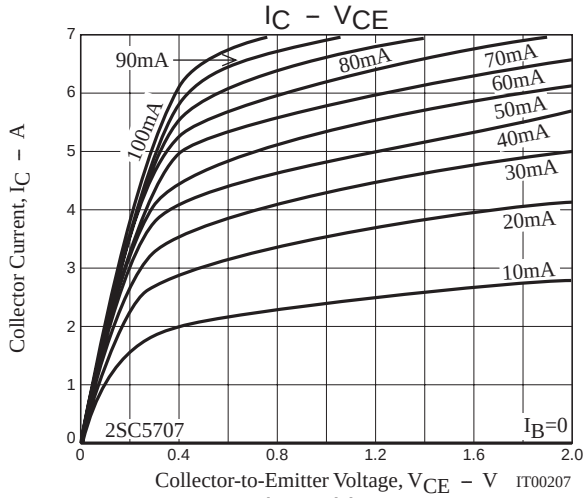
Swicthing Time Test Circuit

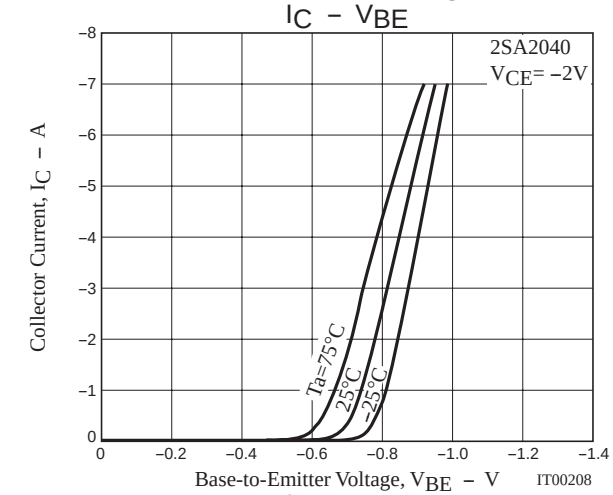


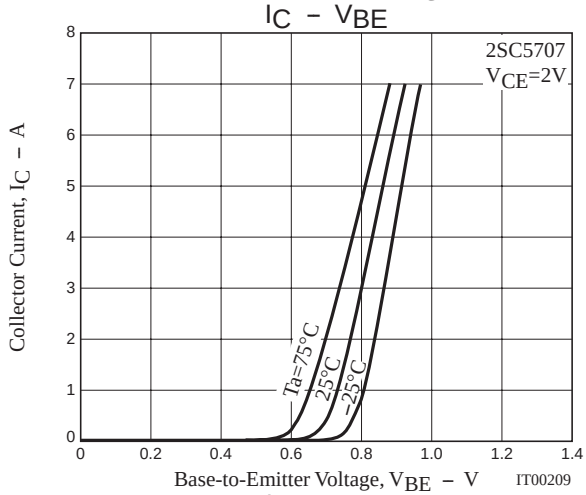
$20I_{B1}$= $-20I_{B2}$= I_C=2.5A

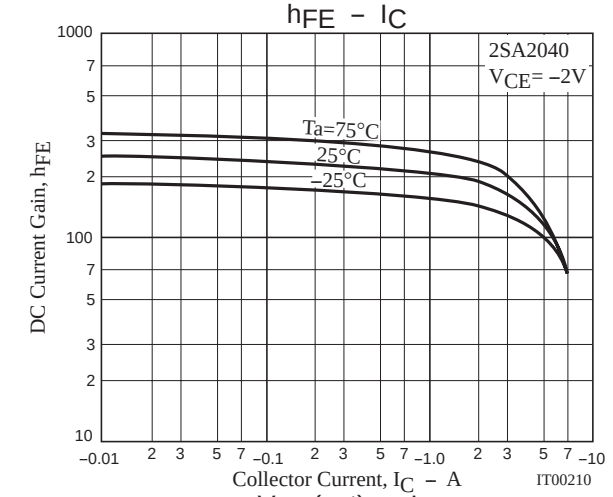
For PNP, the polarity is reversed.

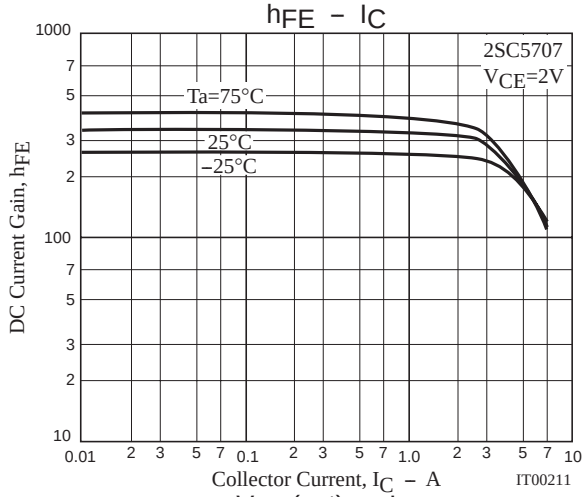

IC – VCE
2SA2040
–90mA
–80mA
–70mA
–60mA
–50mA
–40mA
–30mA
–20mA
–10mA
–100mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT00206

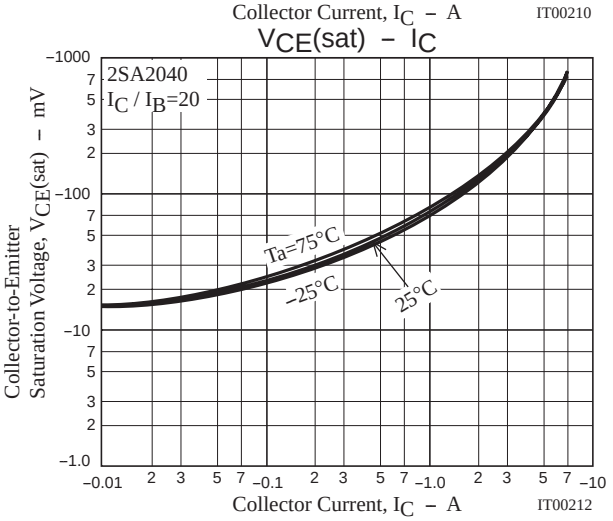

IC – VCE
90mA
80mA
70mA
60mA
50mA
40mA
30mA
20mA
10mA
100mA
2SC5707
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT00207

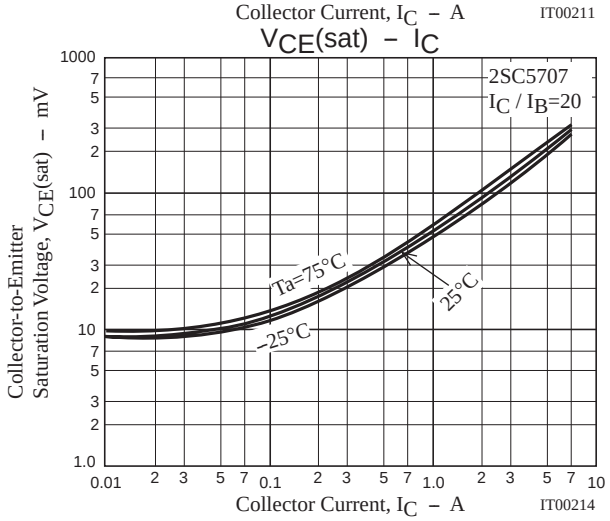

IC – VBE
2SA2040
VCE= –2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT00208

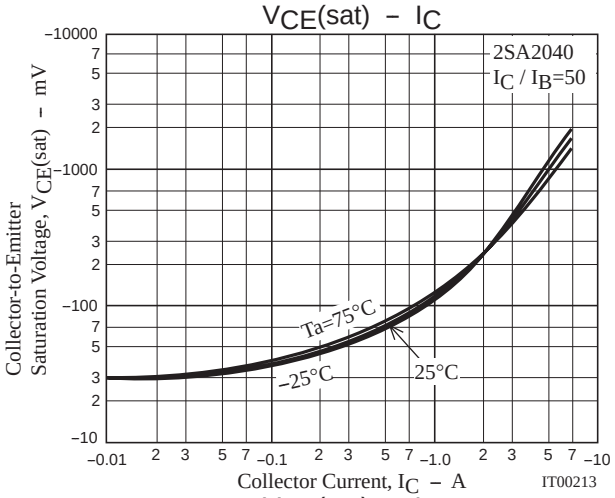

IC – VBE
2SC5707
VCE=2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT00209

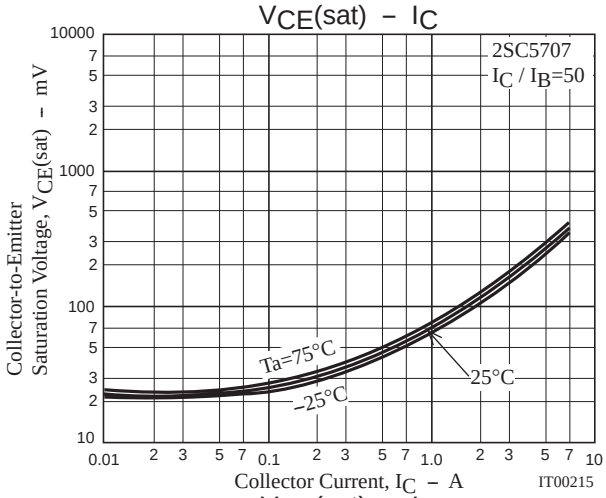

hFE – IC
2SA2040
VCE= –2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
IT00210

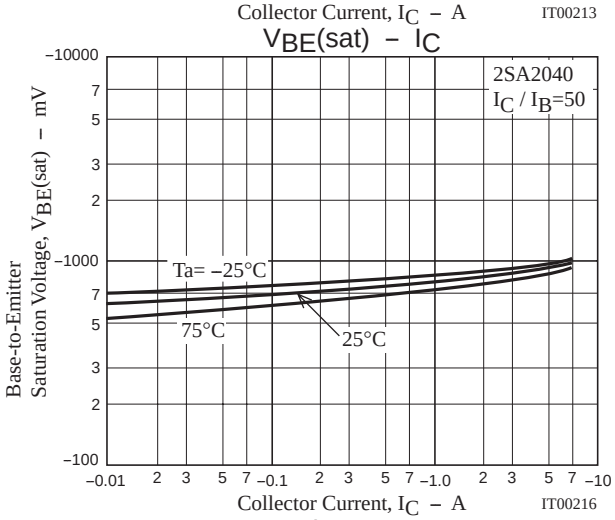

hFE – IC
2SC5707
VCE=2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
IT00211

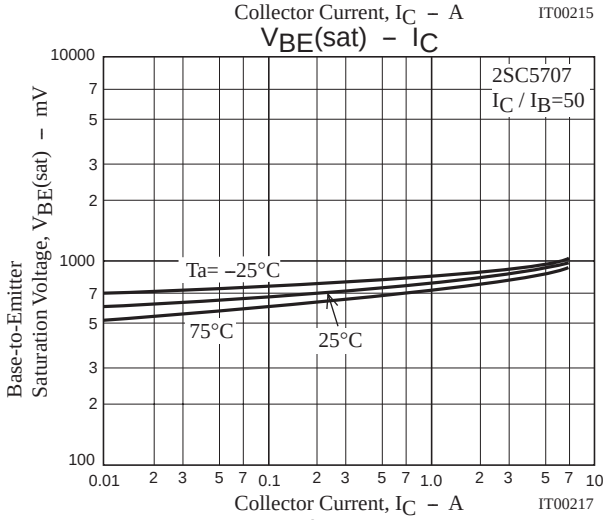

VCE(sat) – IC
2SA2040
IC / IB=20
Ta=75°C
–25°C
25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
IT00212

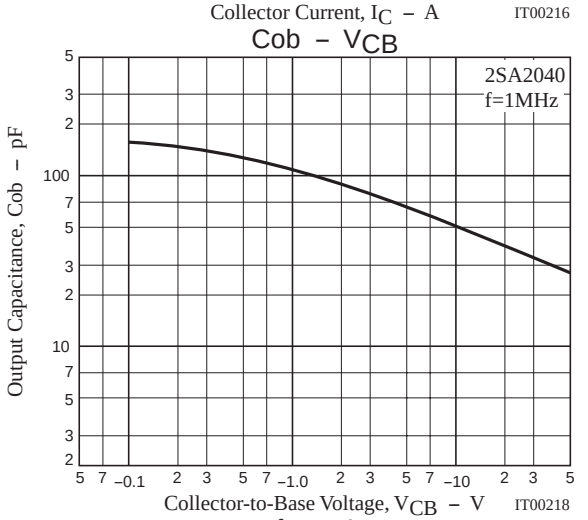

VCE(sat) – IC
2SC5707
IC / IB=20
Ta=75°C
–25°C
25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
IT00214

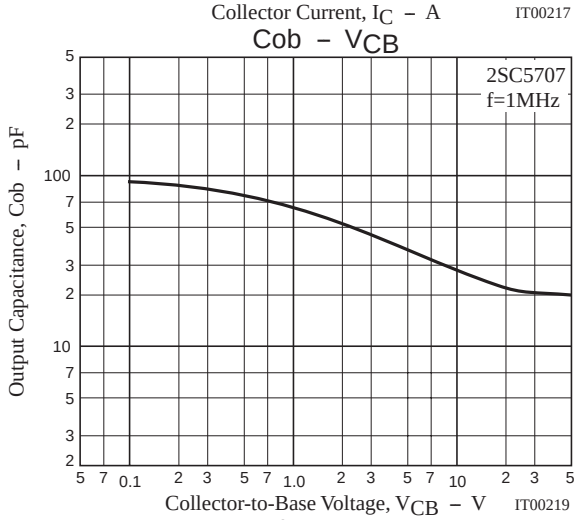

VCE(sat) – IC
2SA2040
IC / IB=50
Ta=75°C
–25°C
25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
IT00213

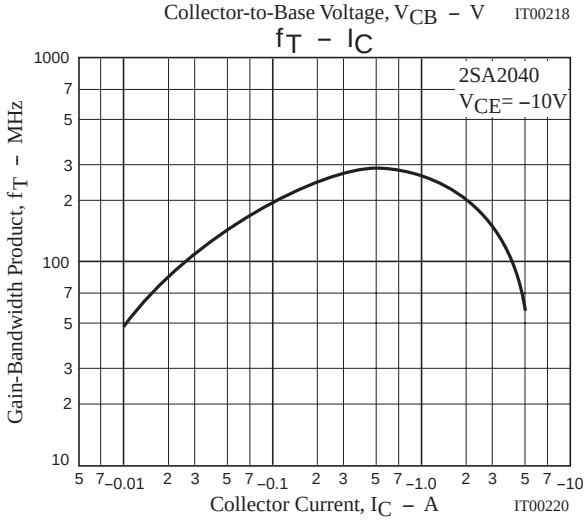

VCE(sat) – IC
2SC5707
IC / IB=50
Ta=75°C
–25°C
25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
IT00215

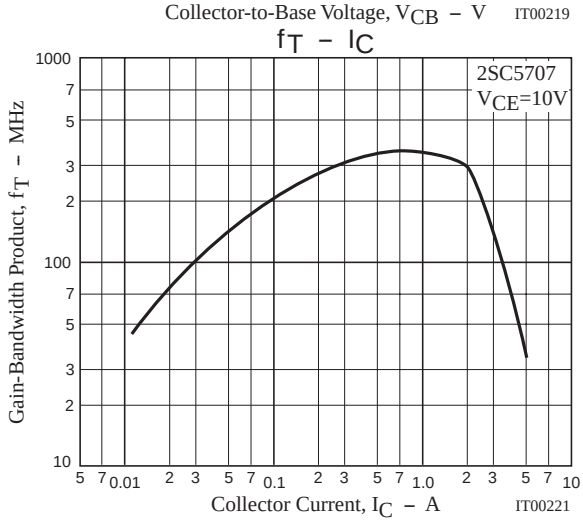

VBE(sat) – IC
2SA2040
IC / IB=50
Ta= –25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – mV
Collector Current, IC – A
IT00216


VBE(sat) – IC
2SC5707
IC / IB=50
Ta= –25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – mV
Collector Current, IC – A
IT00217


Cob – VCB
2SA2040
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT00218


Cob – VCB
2SC5707
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT00219


fT – IC
2SA2040
VCE= –10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT00220


fT – IC
2SC5707
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT00221