Ordering number : ENN6914

PNP / NPN Epitaxial Planar Silicon Transistors

2SA2043 / 2SC5709

DC / DC Converter Applications

Applications

- Relay drivers, lamp drivers, motor drivers, strobes.

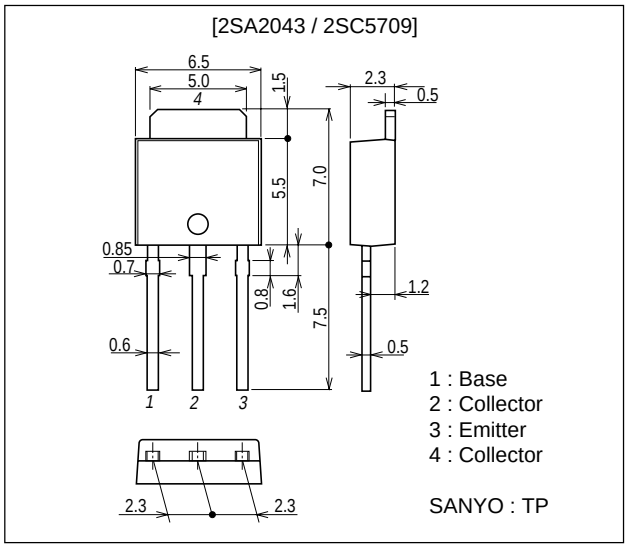
Features

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

Package Dimensions

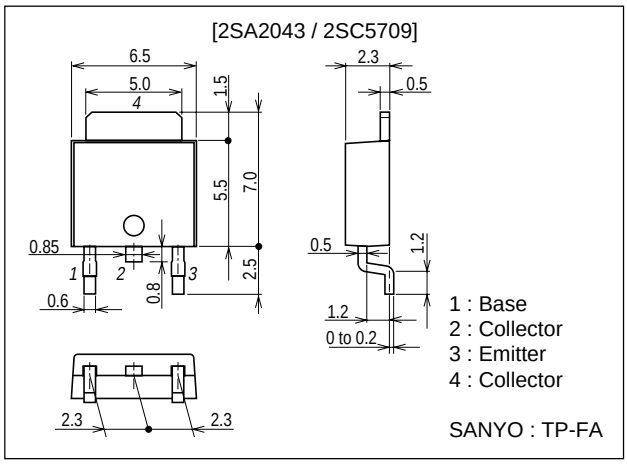
unit : mm

2045B



unit : mm

2044B



Specifications

( ) : 2SA2043

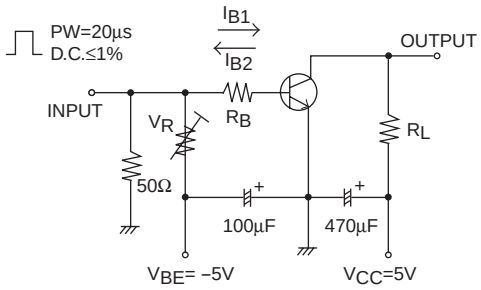
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–)15	V
Collector-to-Emitter Voltage	V_{CEO}		(–)15	V
Emitter-to-Base Voltage	V_{EBO}		(-)5	V
Collector Current	I_C		(–)10	A
Collector Current (Pulse)	I_{CP}		(–)13	A
Base Current	I_B		(–)1.2	A
Collector Dissipation	P_C		1	W
		Tc=25°C	15	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		-55 to +150	°C

Electrical Characteristics at Ta=25°C

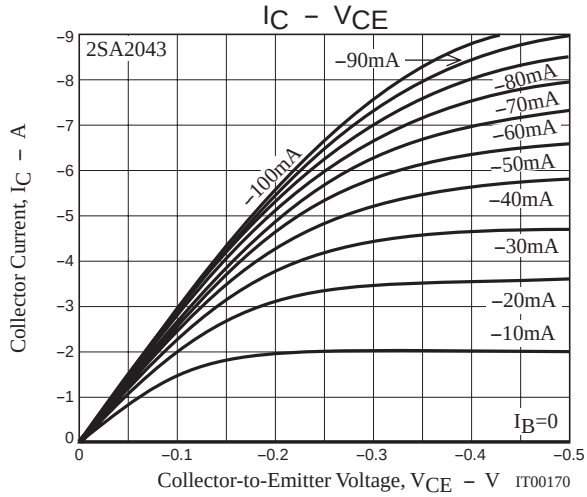
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(-)12V, I_E=0			(–)0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(-)4V, I_C=0			(–)0.1	μA
DC Current Gain	h_{FE}	V_{CE}=(-)2V, I_C=(-)500mA	200		560	
Gain-Bandwidth Product	f_T	V_{CE}=(-)2V, I_C=(-)500mA		(220)280		MHz
Output Capacitance	Cob	V_{CB}=(-)10V, f=1MHz		(90)50		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=(-)3A, I_B=(-)60mA		(–110)120	(–170)180	mV
		I_C=(-)4.5A, I_B=(-)90mA		(–160)180	(–240)280	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=(-)3A, I_B=(-)60mA		(–)0.85	(–)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(-)10μA, I_E=0	(-)15			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(-)1mA, R_{BE}=∞	(-)15			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=(-)10μA, I_C=0	(–)5			V
Turn-On Time	t_{on}	See specified test circuit.		30		ns
Storage Time	t_{stg}	See specified test circuit.		(120)180		ns
Fall Time	t_f	See specified test circuit.		(14)25		ns

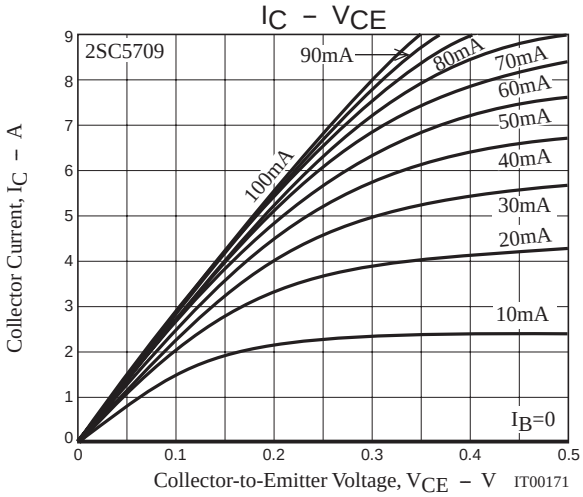
Swicthing Time Test Circuit

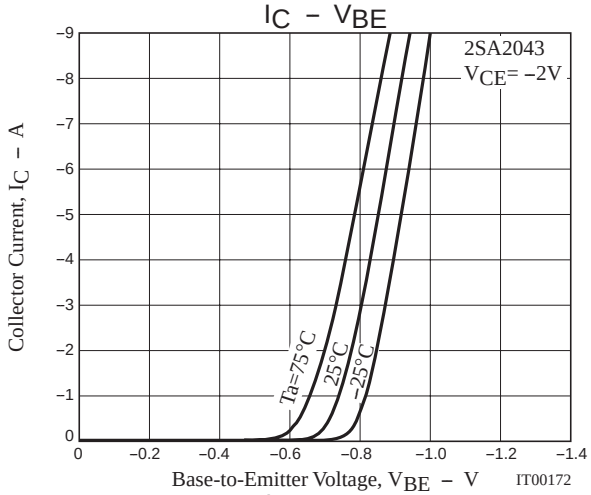


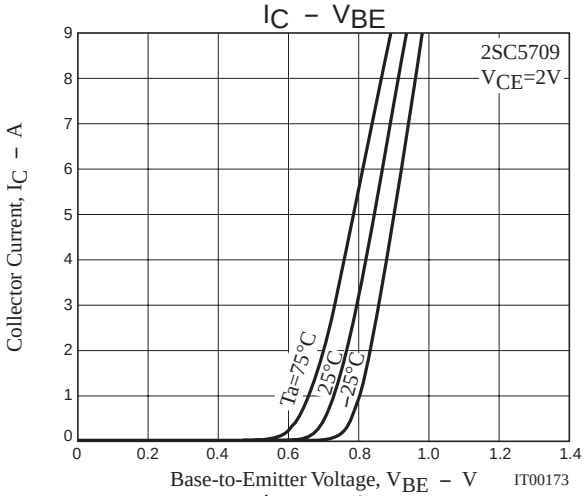
I_C=20I_{B1}= –20I_{B2}=3A

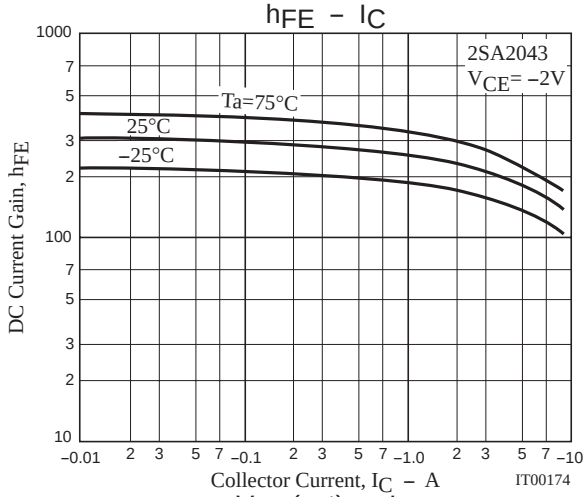
For PNP, the polarity is reversed.

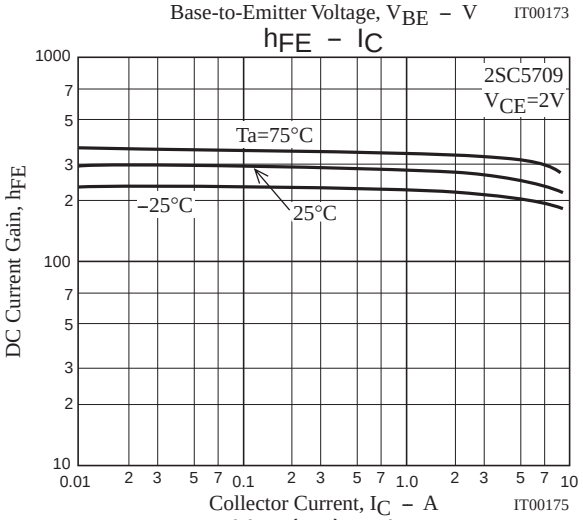

IC – VCE
2SA2043
–90mA
–80mA
–70mA
–60mA
–50mA
–40mA
–30mA
–20mA
–10mA
–100mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT00170

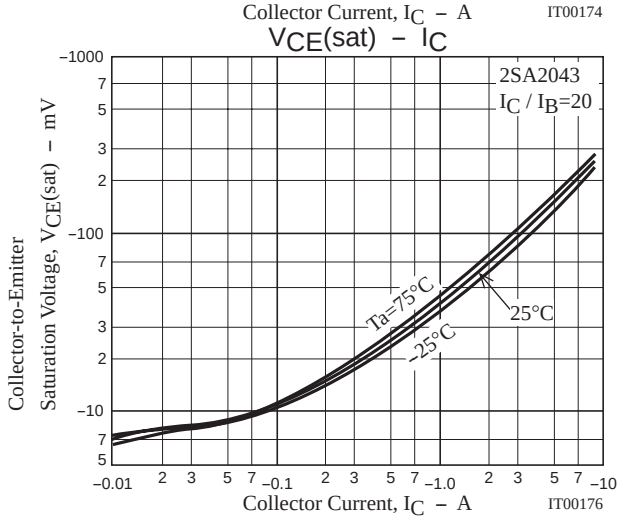

IC – VCE
2SC5709
90mA
80mA
70mA
60mA
50mA
40mA
30mA
20mA
10mA
100mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT00171

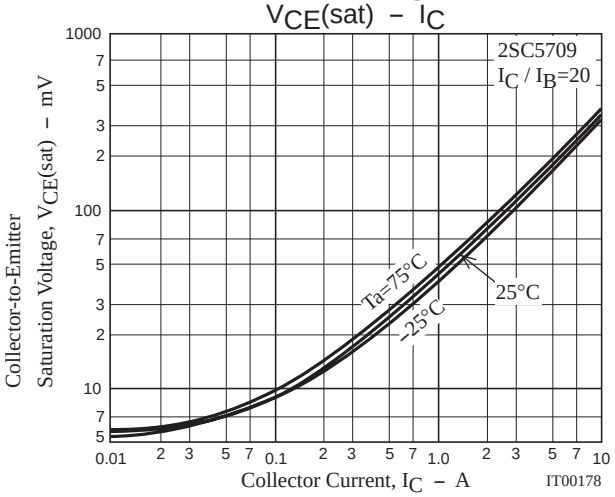

IC – VBE
2SA2043
VCE= –2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT00172

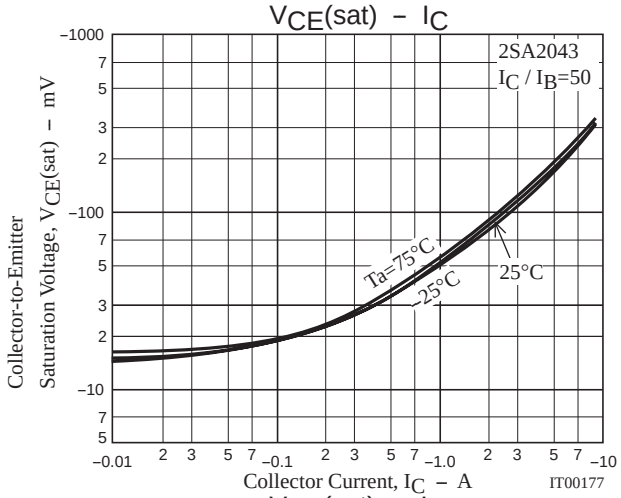

IC – VBE
2SC5709
VCE=2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT00173

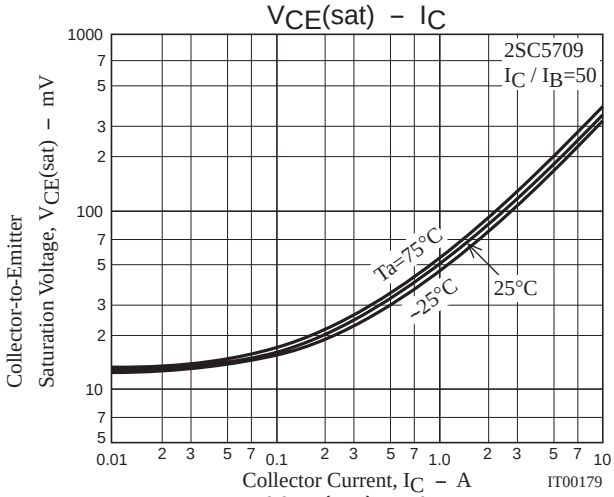

hFE – IC
2SA2043
VCE= –2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
IT00174

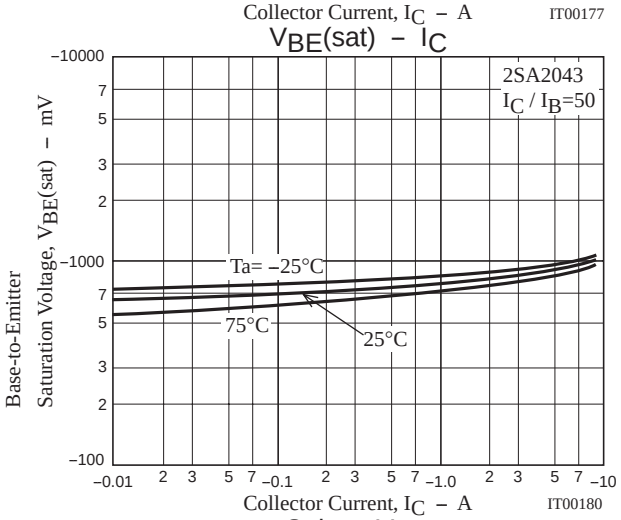

hFE – IC
2SC5709
VCE=2V
Ta=75°C
–25°C
25°C
DC Current Gain, hFE
Collector Current, IC – A
IT00175

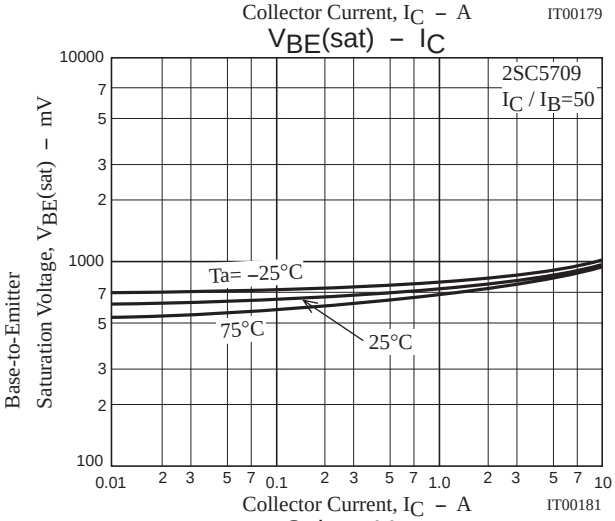

VCE(sat) – IC
2SA2043
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
IT00176

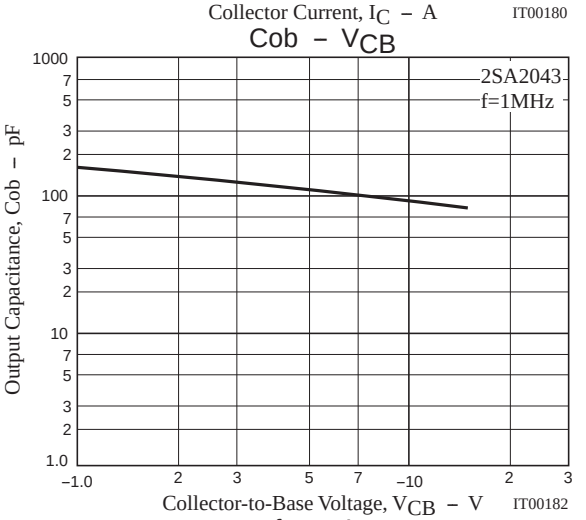

VCE(sat) – IC
2SC5709
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
IT00178

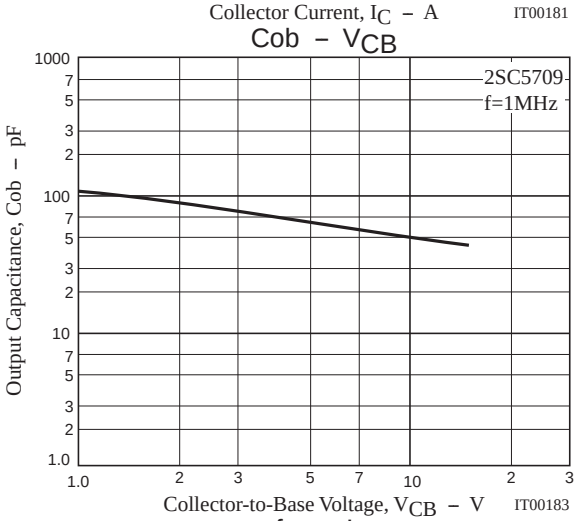

VCE(sat) – IC
2SA2043
IC / IB=50
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
IT00177

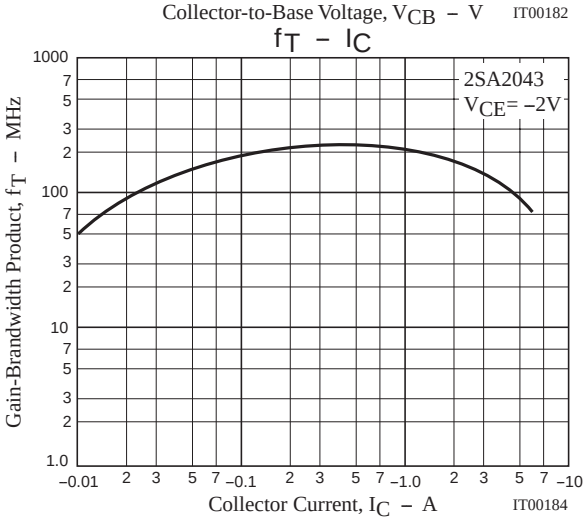

VCE(sat) – IC
2SC5709
IC / IB=50
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
IT00179

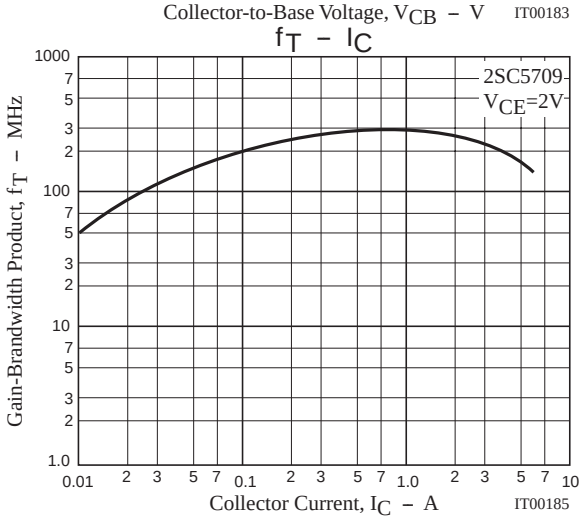

VBE(sat) – IC
2SA2043
IC / IB=50
Ta= –25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – mV
Collector Current, IC – A
IT00180


VBE(sat) – IC
2SC5709
IC / IB=50
Ta= –25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – mV
Collector Current, IC – A
IT00181


Cob – VCB
2SA2043
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT00182


Cob – VCB
2SC5709
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT00183


fT – IC
2SA2043
VCE= –2V
Gain-Brandwidth Product, fT – MHz
Collector Current, IC – A
IT00184


fT – IC
2SC5709
VCE=2V
Gain-Brandwidth Product, fT – MHz
Collector Current, IC – A
IT00185