Ordering number:2041A

PNP/NPN Epitaxial Planar Silicon Transistors

2SB1144/2SD1684

100V/1.5A Switching Applications

Features

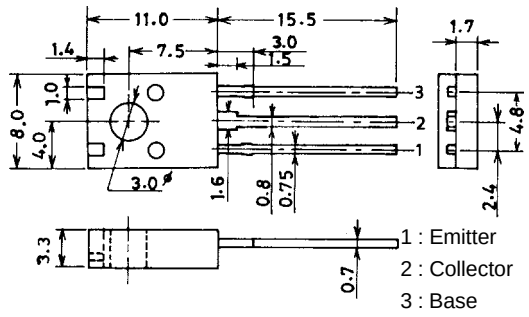
- Adoption of FBET and MBIT processes.
- High breakdown voltage.
- Low saturation voltage.
- Plastic-covered heat sink facilitating high-density mounting.

Package Dimensions

unit:mm

2042B

[2SB1144/2SD1684]



SANYO : TO-126ML

( ) : 2SB1144

Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–)120	V
Collector-to-Emitter Voltage	V_{CEO}		(–)100	V
Emitter-to-Base Voltage	V_{EBO}		(–)6	V
Collector Current	I_C		(–)1.5	A
Collector Current (Pulse)	I_{CP}		(–)2.0	A
Collector Dissipation	P_C		1.5	W
		Tc=25˚C	10	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}=(–)100V, I_E=0			(–)100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(–)4V, I_C=0			(–)100	nA
DC Current Gain	$h_{FE}1$	V_{CE}=(–)5V, I_C=(–)100mA	100*		400*	
	$h_{FE}2$	V_{CE}=(–)5V, I_C=(–)1A	30			
Gain-Bandwidth Product	f_T	V_{CE}=(–)10V, I_C=(–)50mA		(100)		MHz
				120		MHz
Output Capacitance	C_{ob}	V_{CB}=(–)10V, f=1MHz		11(18)		pF

* : The 2SB1144/2SD1684 are classified by 100mA h_{FE} as follows :

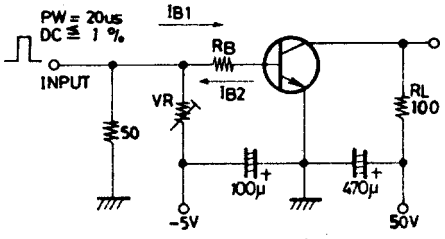
100	Q	200	140	S	280	200	T	400

SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

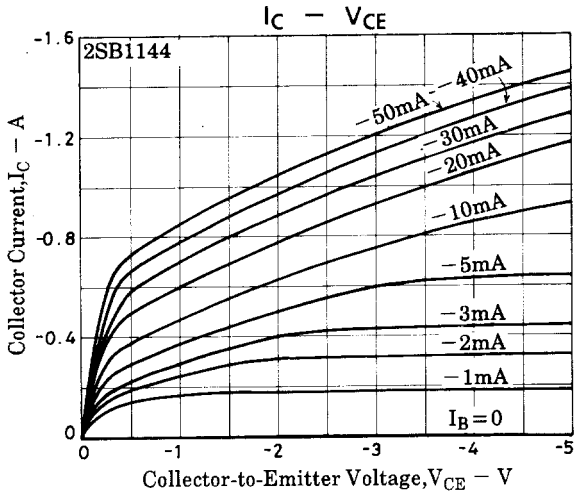
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=(–)500mA, I_B=(–)50mA		(–180)	(–500)	mV
				100	300	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=(–)500mA, I_B=(–)50mA		(–)0.85	(–)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(–)10μA, I_E=0	(–)120			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(–)1mA, R_{BE}=∞	(–)100			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		(80)80		ns
Storage Time	t_{stg}	See specified Test Circuit		1000		ns
				(750)		ns
Fall Time	t_f	See specified Test Circuit		(40)50		ns

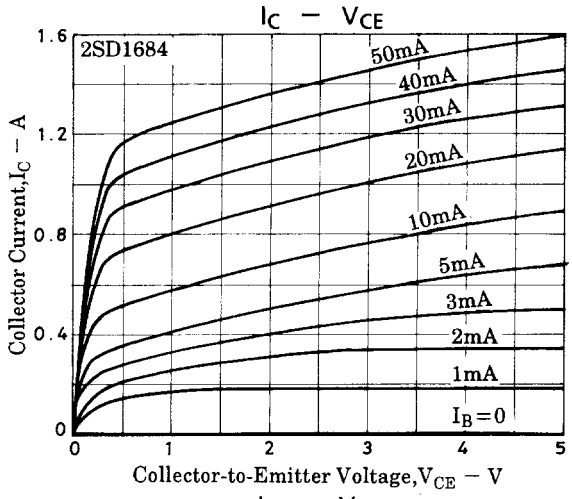
Switching Time Test Circuit

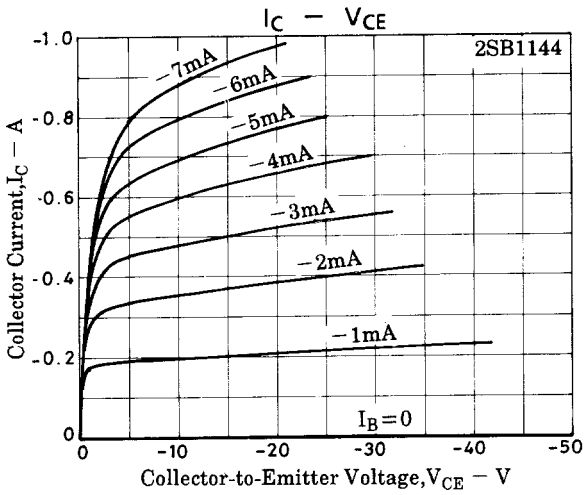


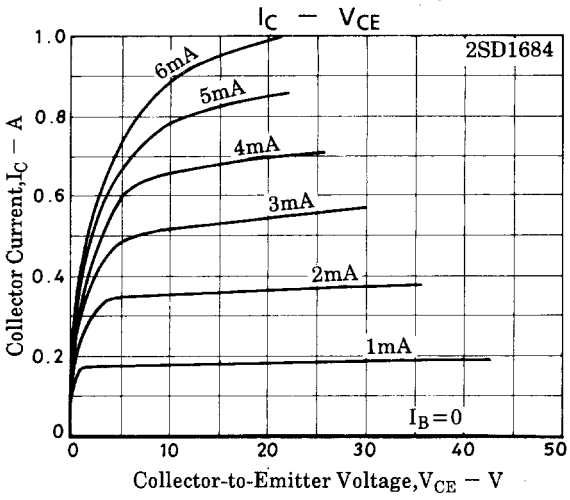
$I_C = 10I_{B1} = -10I_{B2} = 500mA$

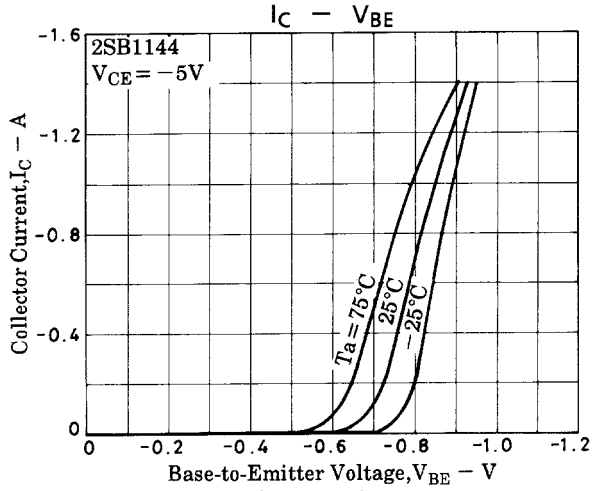
Unit (resistance : Ω, capacitance : F)

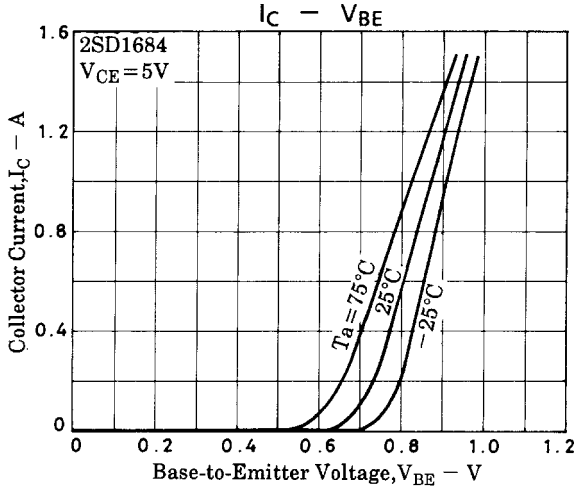


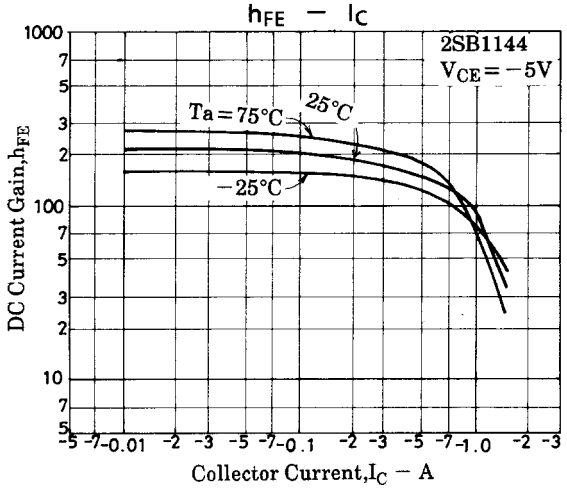


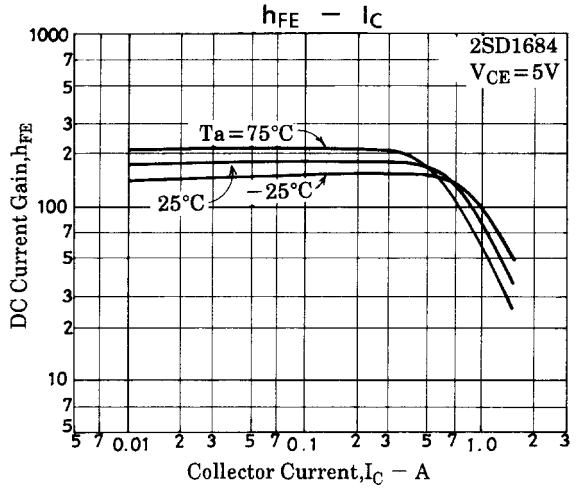


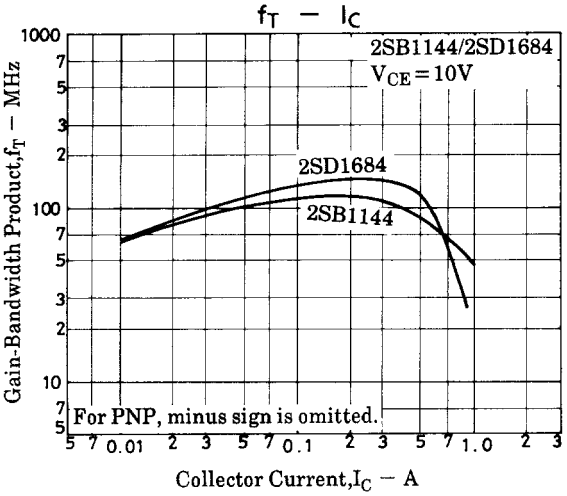


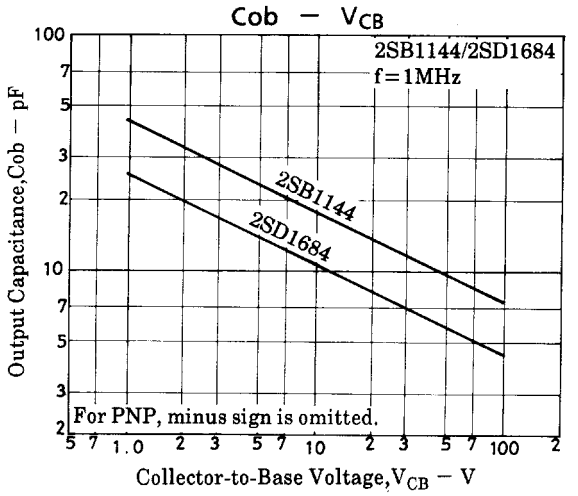

I_C – V_{BE}
2SB1144
V_{CE} = –5V
Ta = 75°C
25°C
–25°C
Collector Current, I_C – A
Base-to-Emitter Voltage, V_{BE} – V

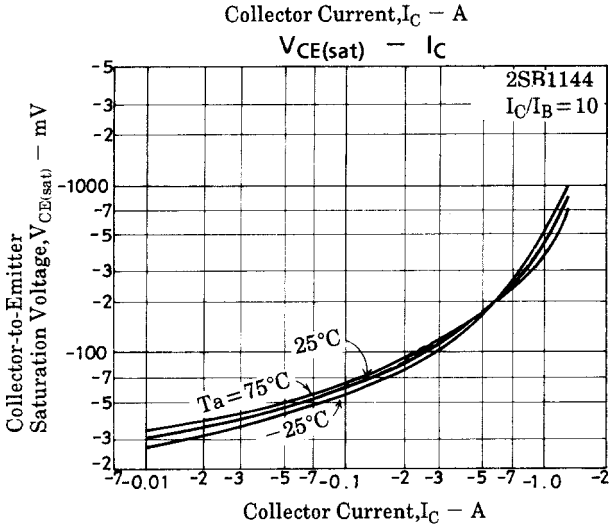

I_C – V_{BE}
2SD1684
V_{CE} = 5V
Ta = 75°C
25°C
–25°C
Collector Current, I_C – A
Base-to-Emitter Voltage, V_{BE} – V

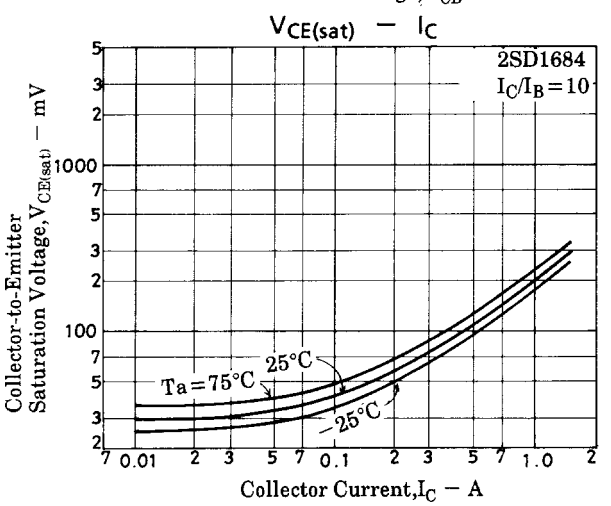

h_{FE} – I_C
2SB1144
V_{CE} = –5V
Ta = 75°C
25°C
–25°C
DC Current Gain, h_{FE}
Collector Current, I_C – A


h_{FE} – I_C
2SD1684
V_{CE} = 5V
Ta = 75°C
25°C
–25°C
DC Current Gain, h_{FE}
Collector Current, I_C – A


f_T – I_C
2SB1144/2SD1684
V_{CE} = 10V
2SD1684
2SB1144
For PNP, minus sign is omitted.
Gain-Bandwidth Product, f_T – MHz
Collector Current, I_C – A


Cob – V_{CB}
2SB1144/2SD1684
f = 1MHz
2SB1144
2SD1684
For PNP, minus sign is omitted.
Output Capacitance, Cob – pF
Collector-to-Base Voltage, V_{CB} – V


$V_{CE(sat)}$ – I_C
2SB1144
I_C/I_B = 10
25°C
Ta = 75°C
–25°C
Collector-to-Emitter Saturation Voltage, $V_{CE(sat)}$ – mV
Collector Current, I_C – A


$V_{CE(sat)}$ – I_C
2SD1684
I_C/I_B = 10
25°C
Ta = 75°C
–25°C
Collector-to-Emitter Saturation Voltage, $V_{CE(sat)}$ – mV
Collector Current, I_C – A