



# 2SB1204/2SD1804

## High-Current Switching Applications

### Applications

- Relay drivers, high-speed inverters, converters, and other general high-current switching applications.

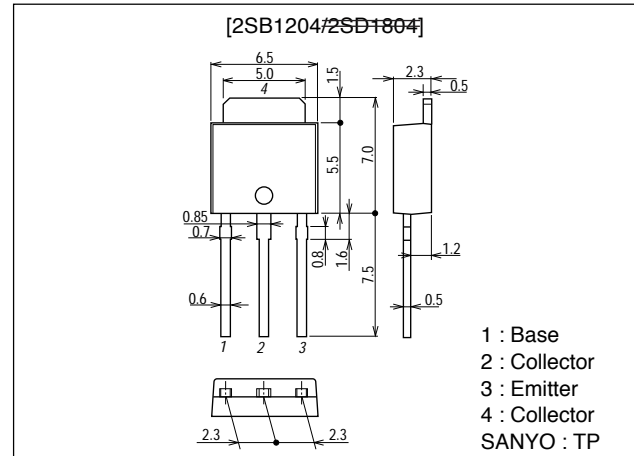
### Features

- Low collector-to-emitter saturation voltage.
- High current and high  $f_T$ .
- Excellent linearity of  $h_{FE}$ .
- Fast switching time.
- Small and slim package making it easy to make 2SB1204/2SD1804-applied sets smaller.

### Package Dimensions

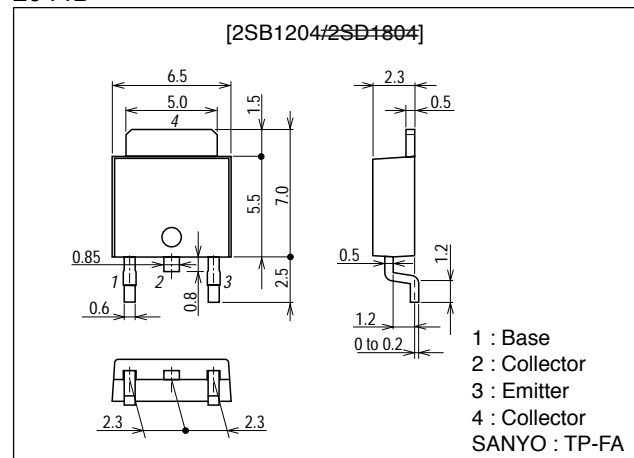
unit:mm

2045B



unit:mm

2044B



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# 2SB1204/2SD1804

( ) : 2SB1204

## Specifications

**Absolute Maximum Ratings** at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CBO}$		(-60)	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)	$I_{CP}$		(-12)	A
Collector Dissipation	$P_C$		1	W
		$T_c=25^\circ\text{C}$	20	W
Junction Temperature	$T_J$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

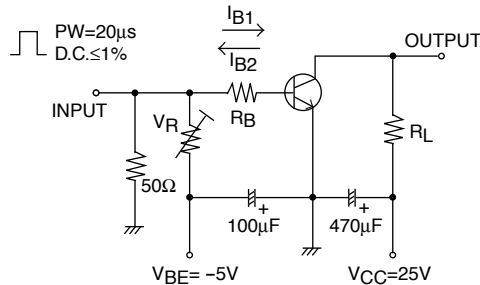
**Electrical Characteristics** at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=(-)40\text{V}, I_E=0$			(-1)	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=(-)4\text{V}, I_C=0$			(-1)	$\mu\text{A}$
DC Current Gain	$h_{FE1}$	$V_{CE}=(-)2\text{V}, I_C=(-)0.5\text{A}$	70*		400*	
	$h_{FE2}$	$V_{CE}=(-)2\text{V}, I_C=(-)6\text{A}$	35			
Gain-Bandwidth Product	$f_T$	$V_{CE}=(-)5\text{V}, I_C=(-)1\text{A}$		(130)		MHz
				<del>180</del>		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=(-)10\text{V}, f=1\text{MHz}$		(95) <del>65</del>		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=(-)4\text{A}, I_B=(-)0.2\text{A}$		<del>200</del>	<del>400</del>	mV
				(-250)	(-500)	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=(-)4\text{A}, I_B=(-)0.2\text{A}$		(-0.95)	(-1.3)	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)10\mu\text{A}, I_E=0$	(-60)			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=(-)1\text{mA}, R_{BE}=\infty$	(-50)			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=(-)10\mu\text{A}, I_C=0$	(-6)			V
Turn-ON Time	$t_{on}$	See specified Test Circuit		(50)		ns
Storage Time	$t_{stg}$	See specified Test Circuit		(450)		ns
				<del>500</del>		ns
Fall Time	$t_f$	See specified Test Circuit		20		ns

\* : The 2SB1204/2SD1804 are classified by 0.5A  $h_{FE}$  as follows :

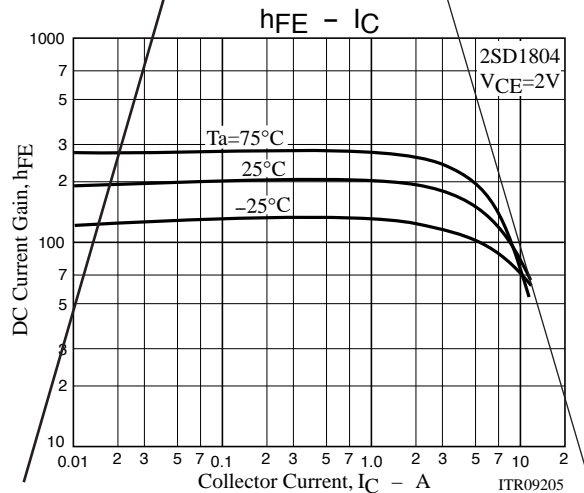
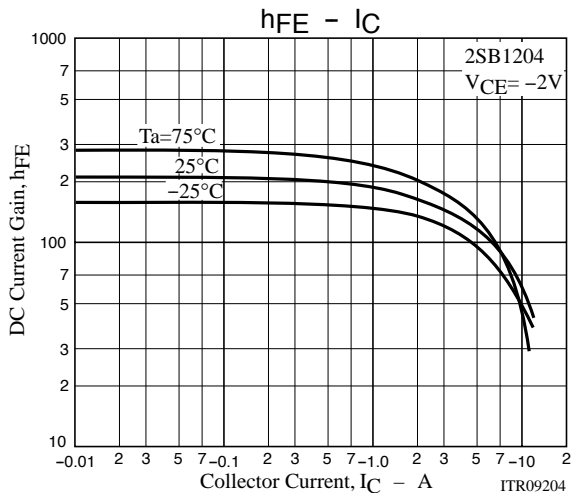
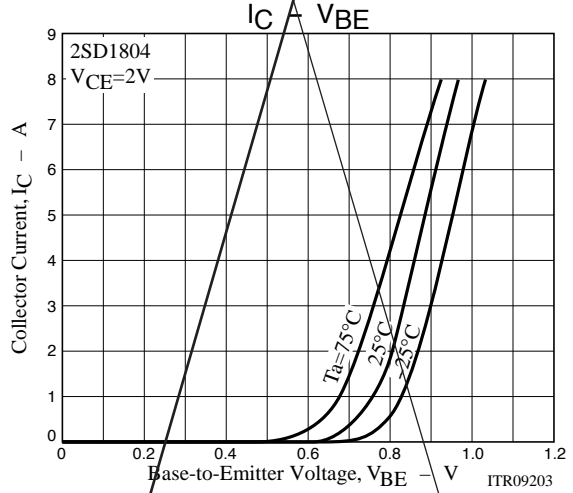
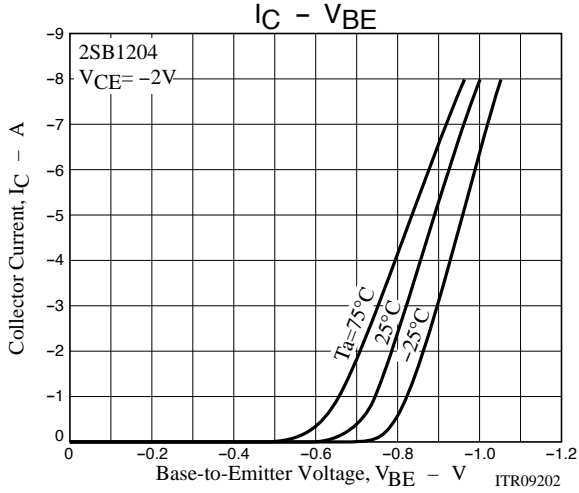
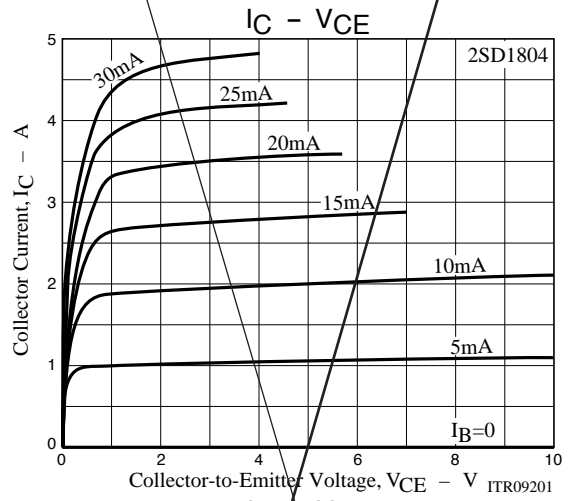
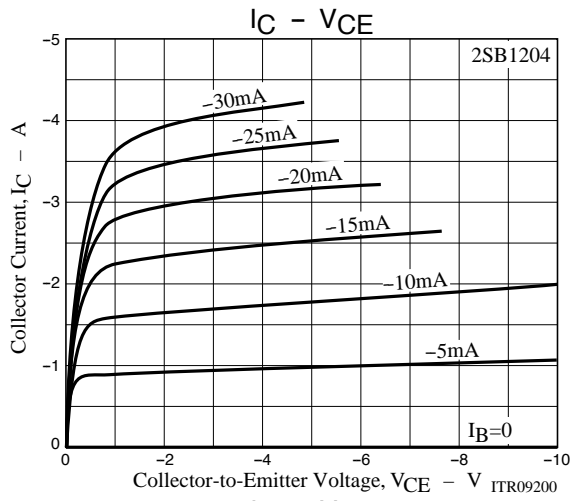
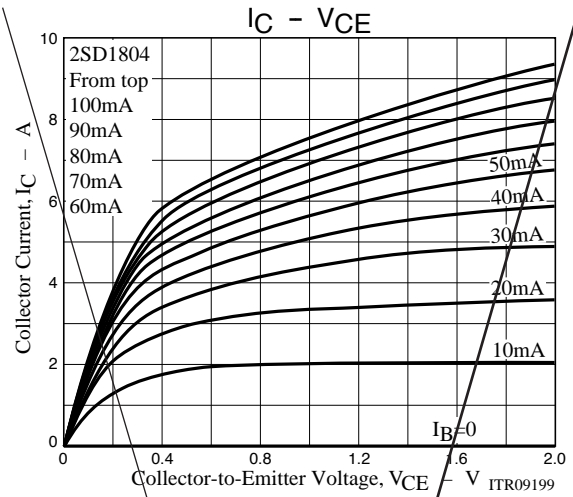
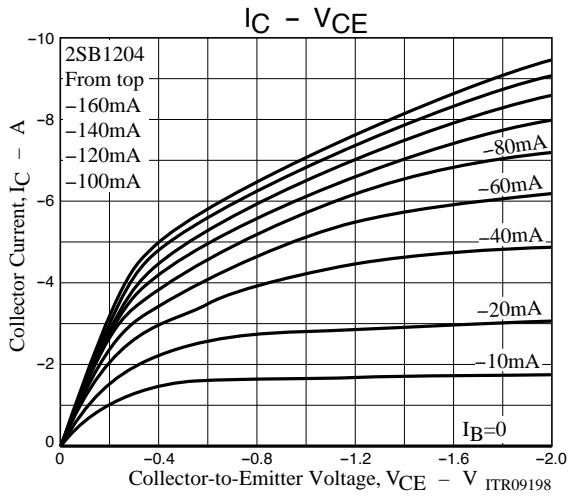
Rank	Q	R	S	T
$h_{FE}$	70 to 140	100 to 200	140 to 280	200 to 400

## Switching Time Test Circuit

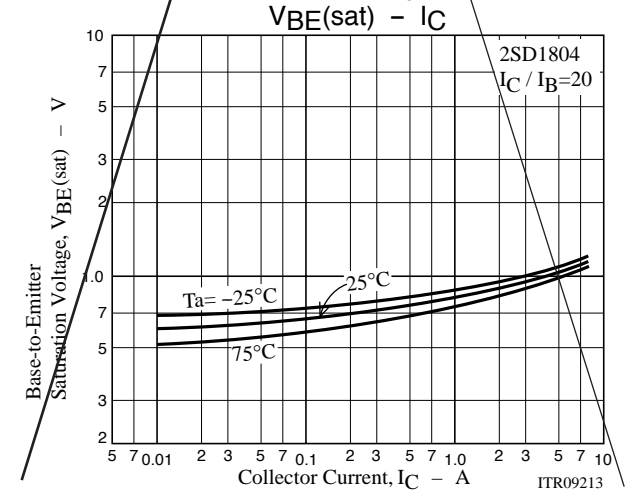
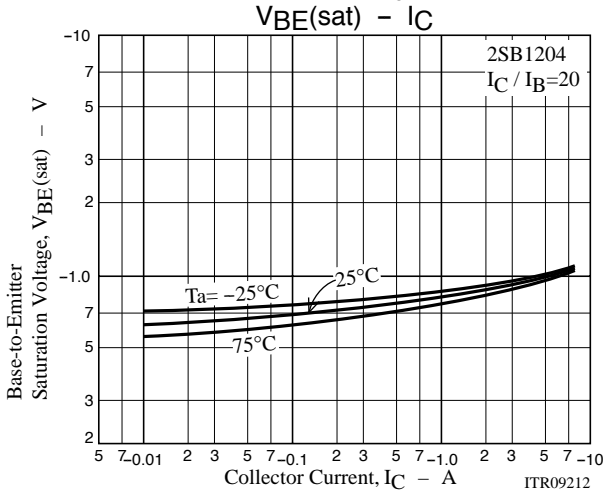
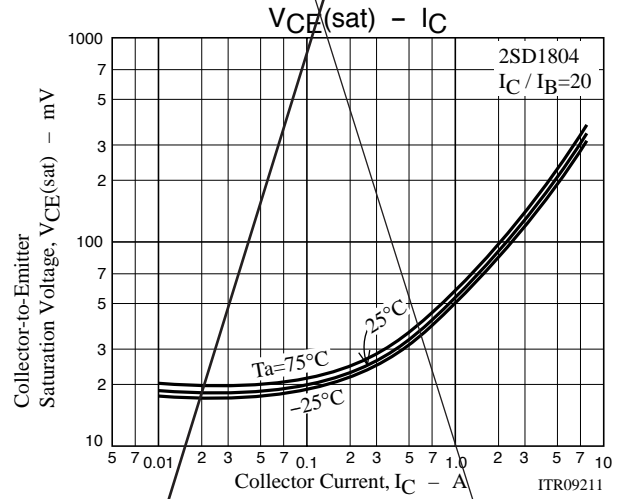
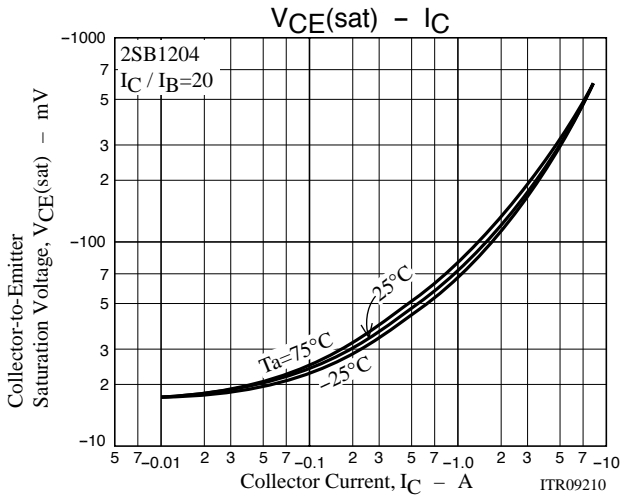
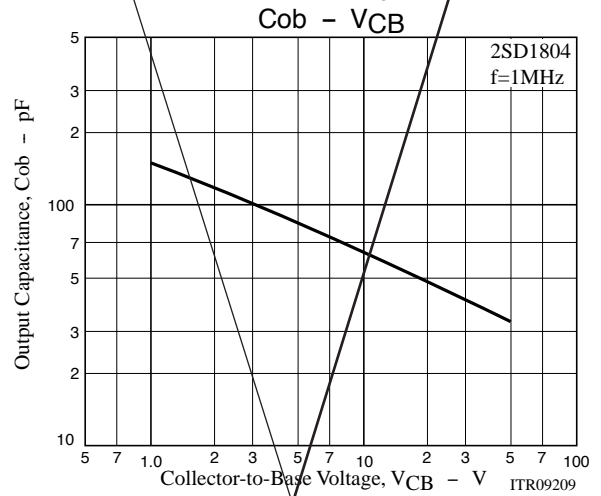
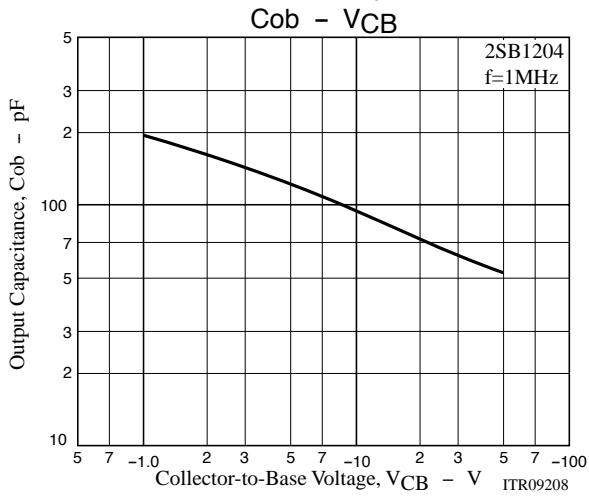
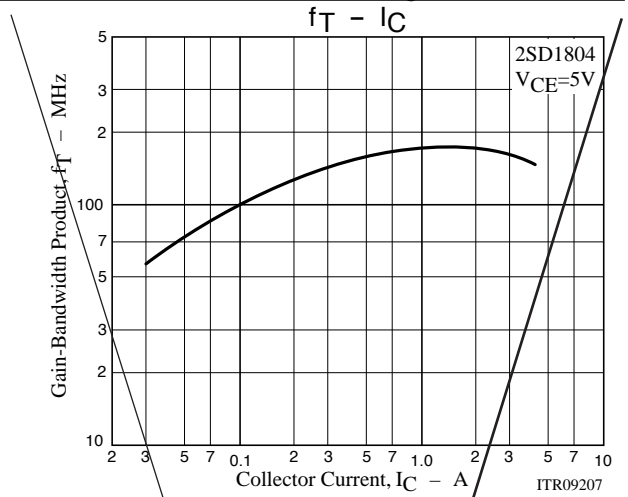
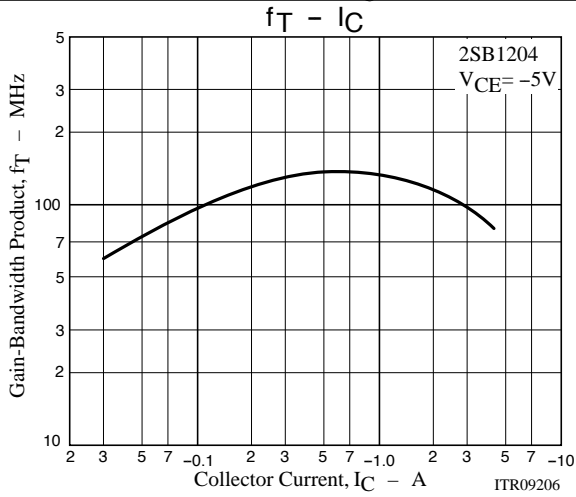


$I_C=10I_{B1}=-10I_{B2}=4\text{A}$   
 (For PNP, the polarity is reversed.)

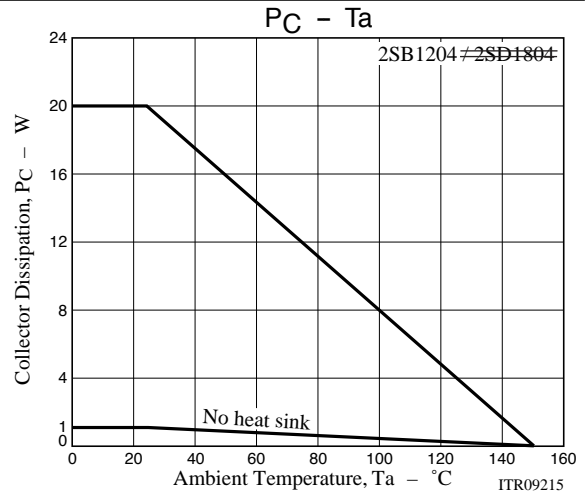
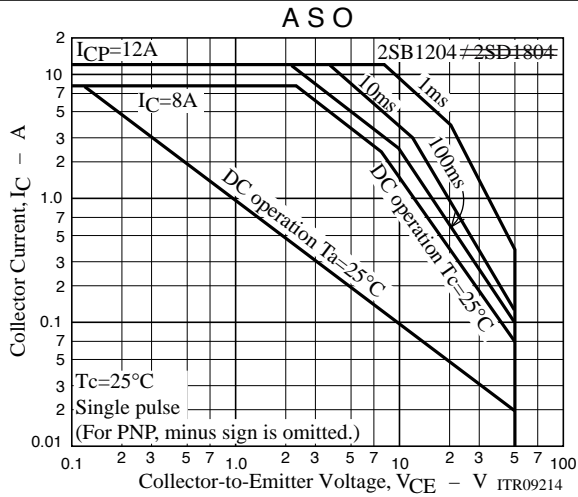
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