**PNP/NPN Epitaxial Planar Silicon Transistors** 



2SB904/2SD1213

# **30V/12A High-Speed Switching Applications**

## Applications

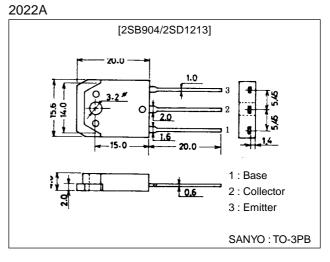
• Large current switching of relay drivers, high-speed inverters, converters.

### **Features**

- $\cdot$  Low collector-to-emitter saturation voltage :
- V<sub>CE(sat)</sub>=-0.5V (PNP), 0.4V (NPN) max.
- · Large current capacity.

### **Package Dimensions**

unit:mm



():2SB904

# **Specifications**

#### Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	VCBO		(–)60	V
Collector-to-Emitter Voltage	VCEO		(–)30	V
Emitter-to-Base Voltage	VEBO		(–)6	V
Collector Current	Ι <sub>C</sub>		(–)20	A
Collector Current (Pulse)	ICP		(–)30	A
Collector Dissipation	PC		2.5	W
		Tc=25°C	60	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	Unit
Collector Cutoff Current	ICBO	V <sub>CB</sub> =(-)40V, I <sub>E</sub> =0			(–)0.1	mA
Emitter Cutoff Current	IEBO	V <sub>EB</sub> =(-)4V, I <sub>C</sub> =0			(–)0.1	mA
DC Current Gain	h <sub>FE</sub> 1	V <sub>CE</sub> =(-)2V, I <sub>C</sub> =(-)1A	70*		280*	
	h <sub>FE</sub> 2	V <sub>CE</sub> =(-)2V, I <sub>C</sub> =(-)10A	30			
Collector-to-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =(-)8A, I <sub>B</sub> =(-)0.4A		(-0.25)	(-0.5)	V
				0.2	0.4	V

 $\ast$  : The 2SB904/2SD1213 are classified as follows according to  $h_{FE}$  at 1A.

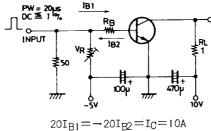
70 Q 140	100 R 200	140 S 280
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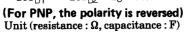
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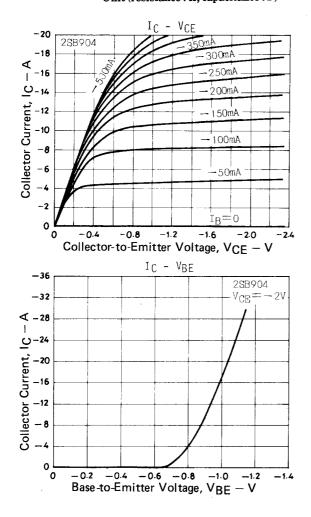
SANYO Electric Co., Ltd. Semiconductor Bussiness Headquaters TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

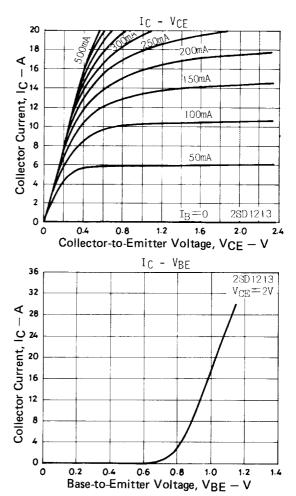
Parameter	Symbol	Conditions		Ratings		
			min	typ	max	Unit
Gain-Bandwidth Product	fT	V <sub>CE</sub> =(-)5V, I <sub>C</sub> =(-)1A		120		MHz
Collector-to-Base Breakdown Voltage	V <sub>(BR)</sub> CBO	I <sub>C</sub> =(-)1mA, I <sub>E</sub> =0	(–)60			V
Collector-to-Emitter Breakdown Voltage	V(BR)CEO	I <sub>C</sub> =(−)1mA, R <sub>BE</sub> =∞	(–)30			V
Emitter-to-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =(-)1mA, I <sub>C</sub> =0	(–)6			V
Turn-ON Time	ton	See specified Test Circuit		300		ns
Storage Time	<sup>t</sup> stg	See specified Test Circuit		(300)		ns
				600		ns
Fall Time	tf	See specified Test Circuit		20		ns

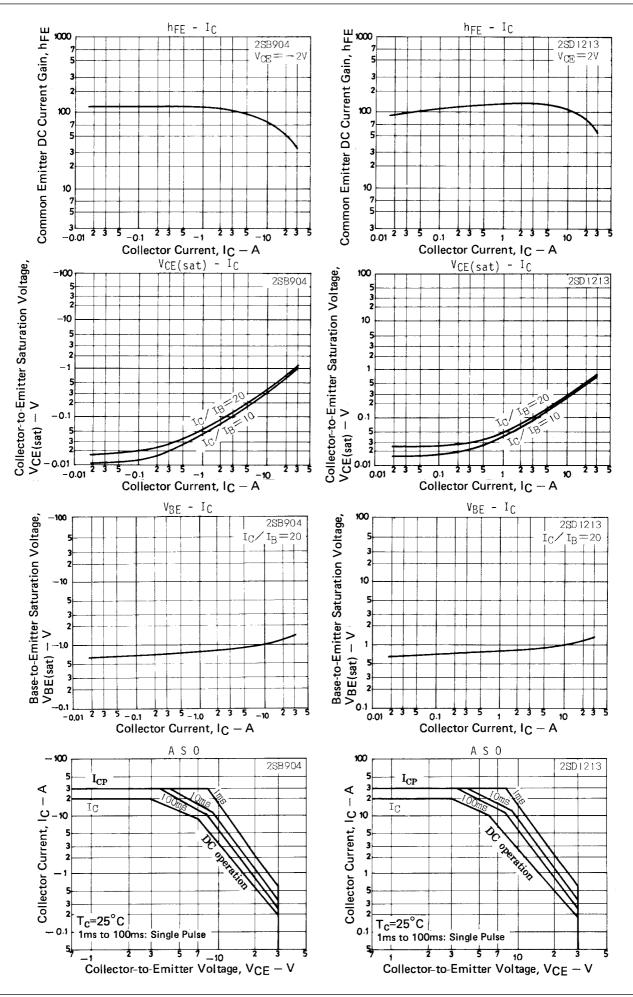
### **Switching Time Test Circuit**

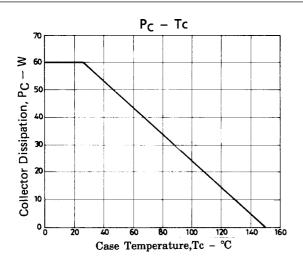












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