



2SB904/2SD1213

30V/12A High-Speed Switching Applications

Applications

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

Features

- Low collector-to-emitter saturation voltage : $V_{CE(sat)} = -0.5V$ (PNP), $0.4V$ (NPN) max.
- Large current capacity.

() : 2SB904

Specifications

Absolute Maximum Ratings at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(-)60	V
Collector-to-Emitter Voltage	V_{CEO}		(-)30	V
Emitter-to-Base Voltage	V_{EBO}		(-)6	V
Collector Current	I_C		(-)20	A
Collector Current (Pulse)	I_{CP}		(-)30	A
Collector Dissipation	P_C		2.5	W
		$T_c = 25^\circ C$	60	W
Junction Temperature	T_j		150	$^\circ C$
Storage Temperature	T_{stg}		-55 to +150	$^\circ C$

Electrical Characteristics at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	$V_{CB} = (-)40V, I_E = 0$			(-)0.1	mA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = (-)4V, I_C = 0$			(-)0.1	mA
DC Current Gain	h_{FE1}	$V_{CE} = (-)2V, I_C = (-)1A$	70*		280*	
	h_{FE2}	$V_{CE} = (-)2V, I_C = (-)10A$	30			
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = (-)8A, I_B = (-)0.4A$		(-)0.25	(-)0.5	V
				0.2	0.4	V

* : 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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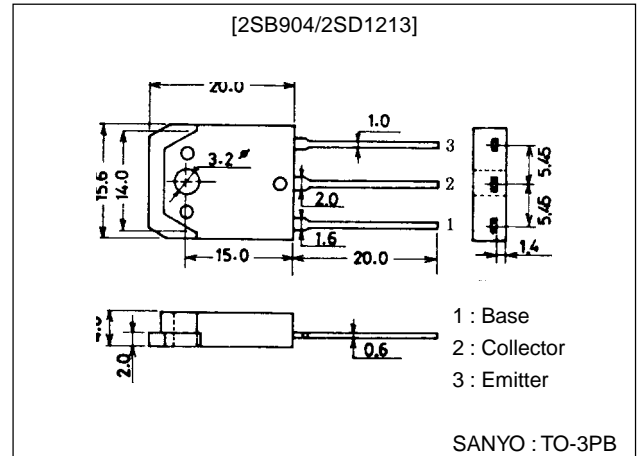
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Package Dimensions

unit:mm

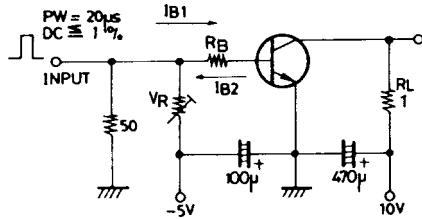
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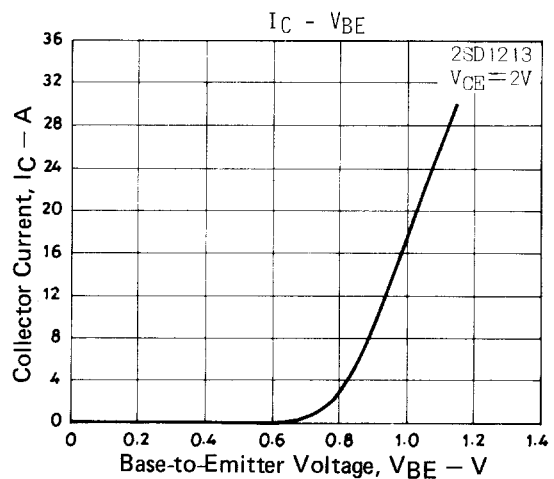
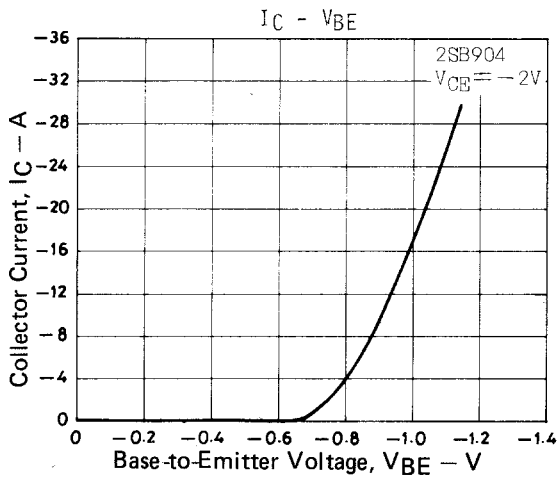
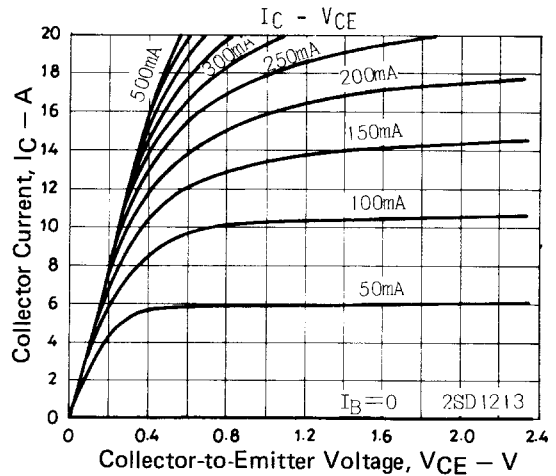
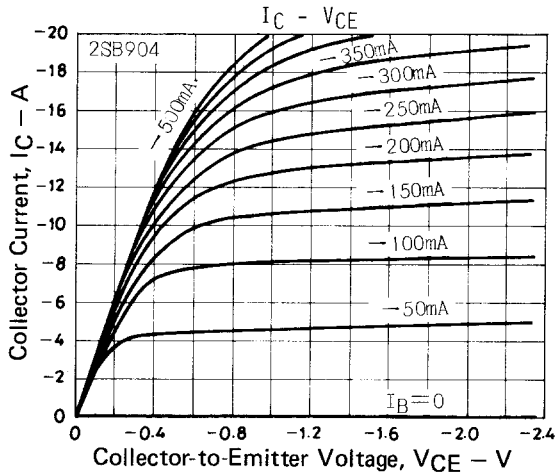
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Gain-Bandwidth Product	f_T	$V_{CE}=(-)5V, I_C=(-)1A$		120		MHz
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)1mA, I_E=0$	(-)60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=(-)1mA, R_{BE}=\infty$	(-)30			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=(-)1mA, I_C=0$	(-)6			V
Turn-ON Time	t_{on}	See specified Test Circuit		300		ns
Storage Time	t_{stg}	See specified Test Circuit		(300)		ns
				600		ns
Fall Time	t_f	See specified Test Circuit		20		ns

Switching Time Test Circuit

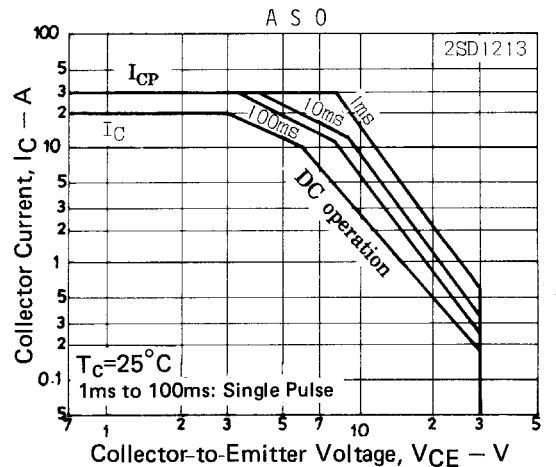
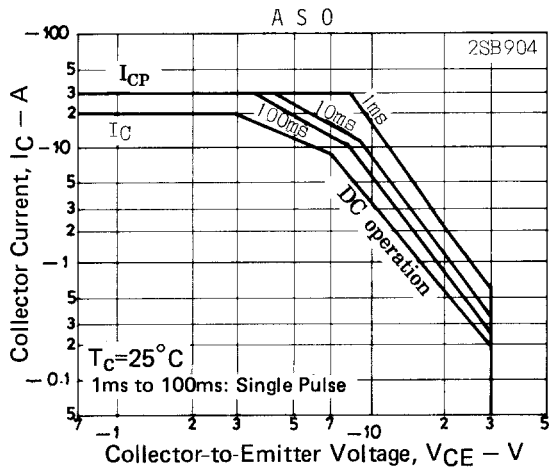
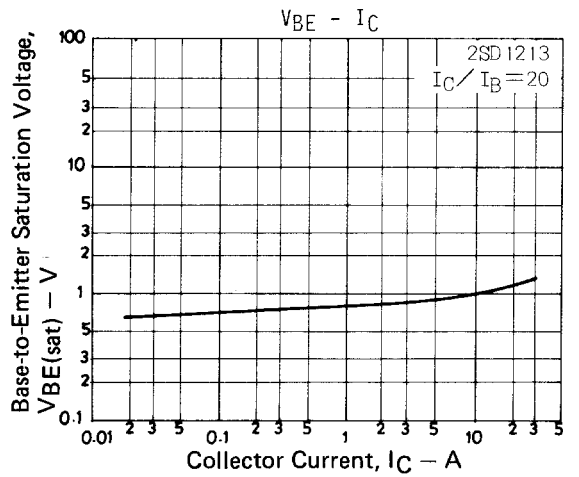
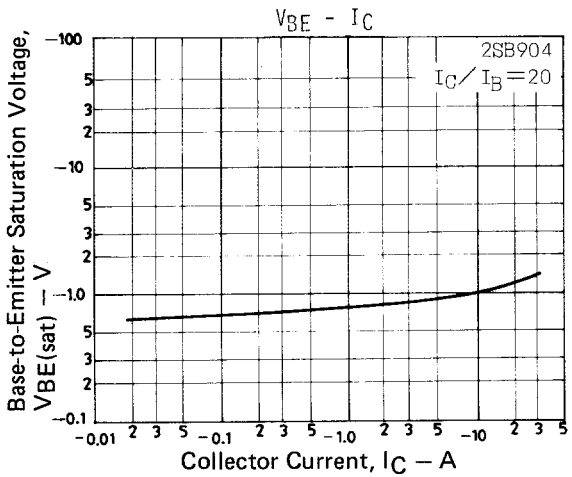
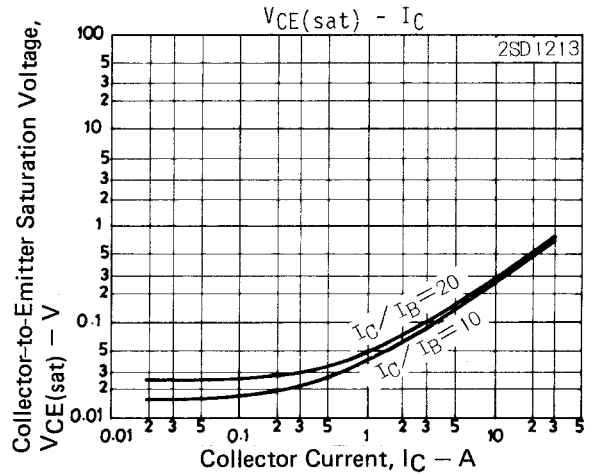
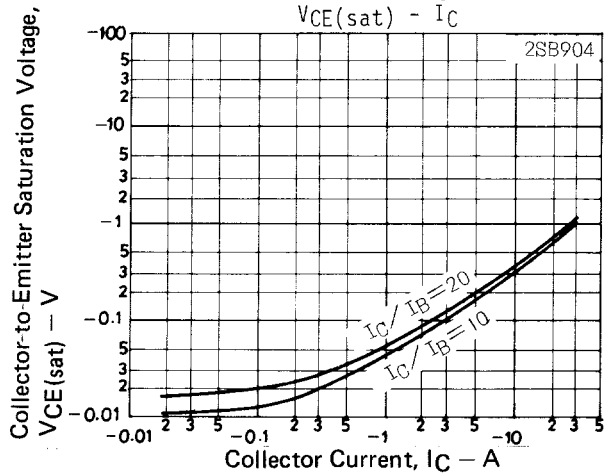
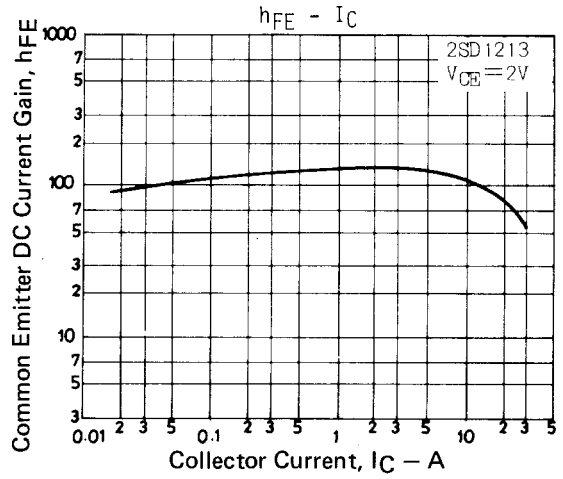
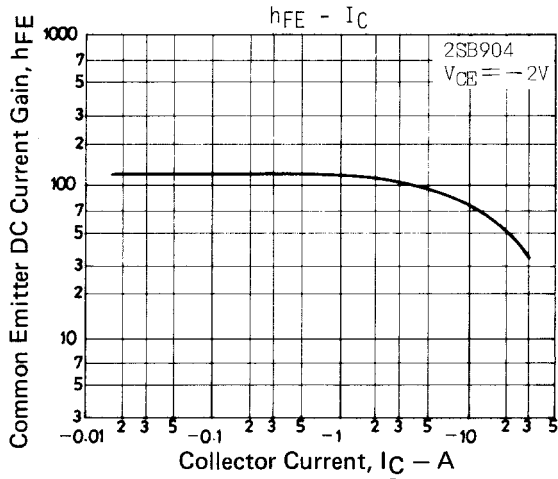


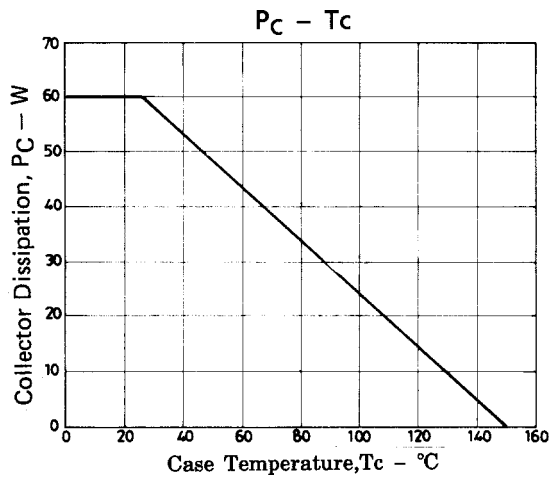
$$20I_{B1} = -20I_{B2} = I_C = 10A$$

(For PNP, the polarity is reversed)
Unit (resistance : Ω , capacitance : F)



2SB904/2SD1213





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