



## 2SB903/2SD1212

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

#### Applications

- Suitable for relay drivers, high-speed inverters, converters, and other general large-current switching applications.

#### Features

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

( ) : 2SB903

#### 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	$I_C$		(-) $12$	A
Collector Current (Pulse)	$I_{CP}$		(-) $20$	A
Collector Dissipation	$P_C$		$1.75$	W
		$T_c = 25^\circ C$	$35$	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	$h_{FE1}$	$V_{CE} = (-)2V, I_C = (-)1A$	$70^*$		$280^*$	
	$h_{FE2}$	$V_{CE} = (-)2V, I_C = (-)6A$	$30$			
Gain-Bandwidth Product	$f_T$	$V_{CE} = (-)5V, I_C = (-)1A$		$120$		MHz

\* : The 2SB903/2SD1212 are graded as follows by  $h_{FE}$  at  $1A$  :

70	Q	140	100	R	200	140	S	280
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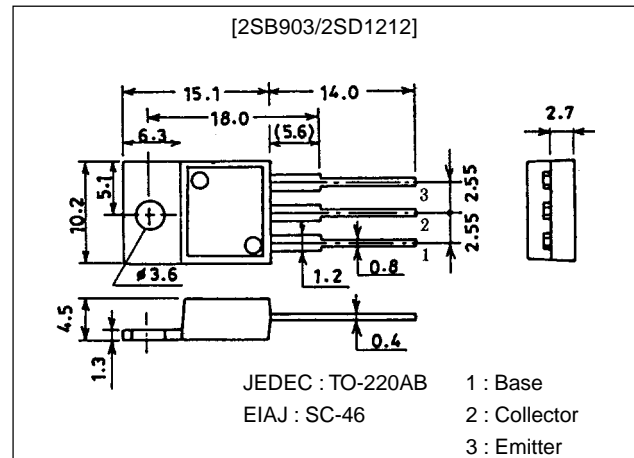
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#### Package Dimensions

unit:mm

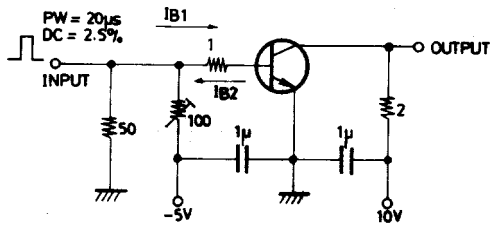
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# 2SB903/2SD1212

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=(-)5A, I_B=(-)0.25A$			(-0.5)	V
					0.4	V
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		(0.1)		$\mu s$
				0.2		$\mu s$
Storage Time	$t_{stg}$	See specified Test Circuit		(0.3)		$\mu s$
				0.5		$\mu s$
Fall Time	$t_f$	See specified Test Circuit		0.03		$\mu s$

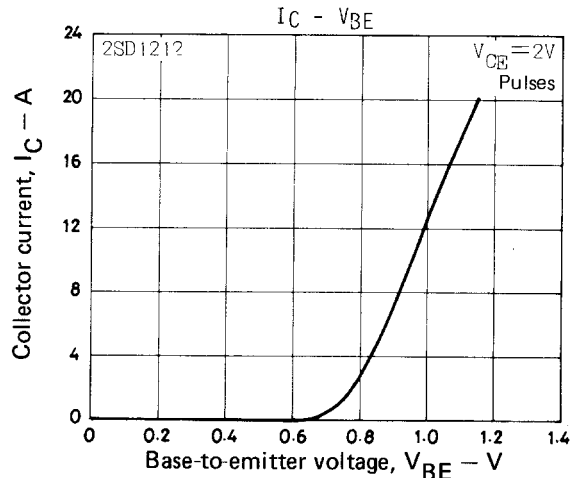
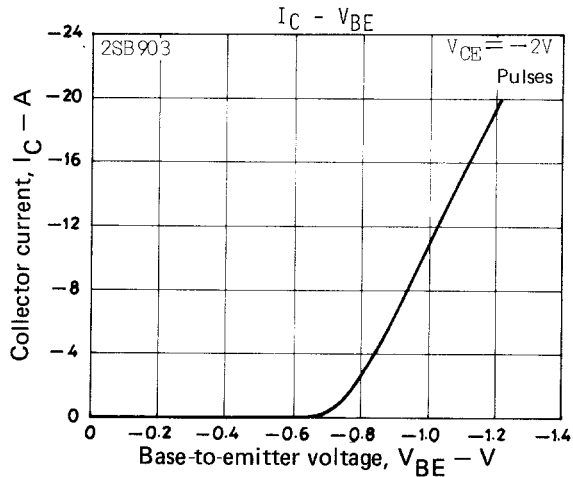
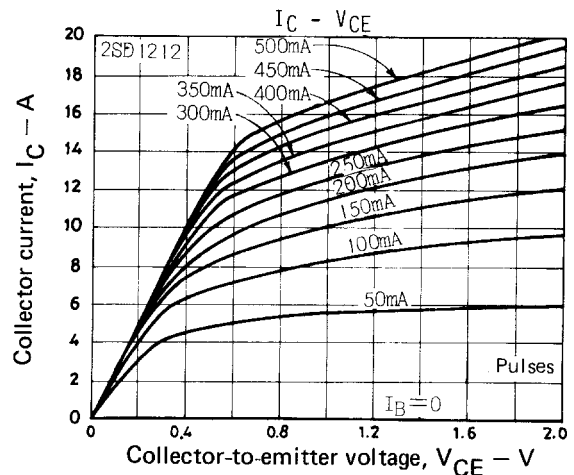
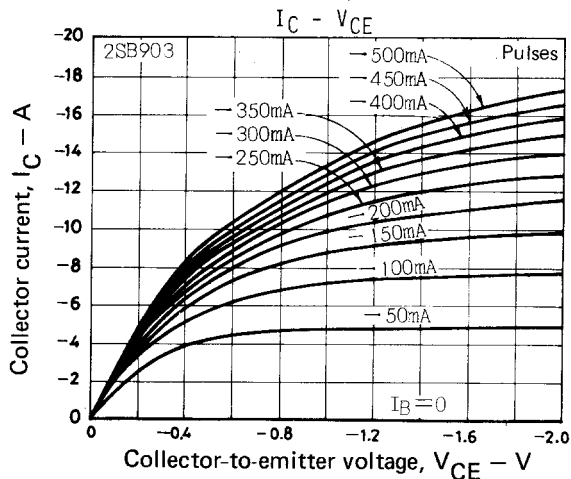
## Switching Time Test Circuit



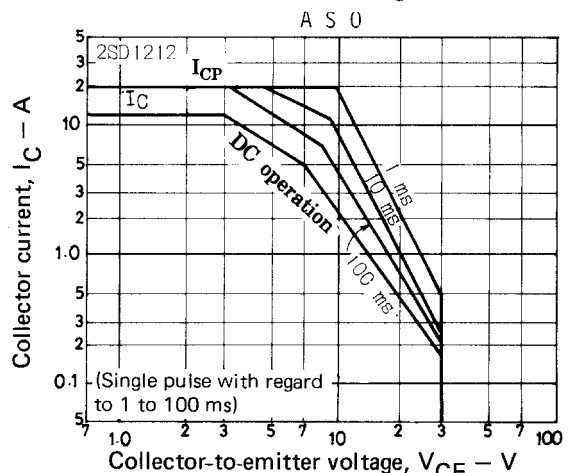
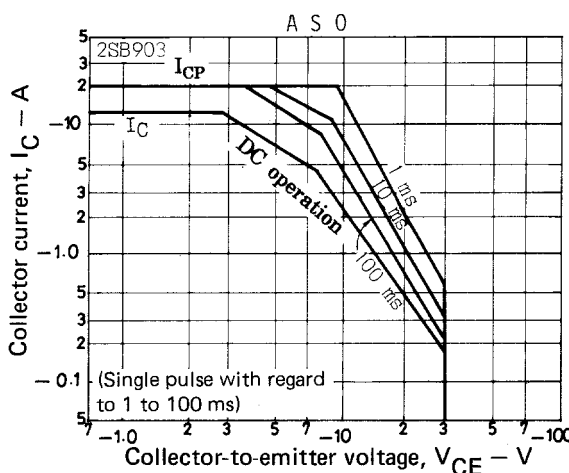
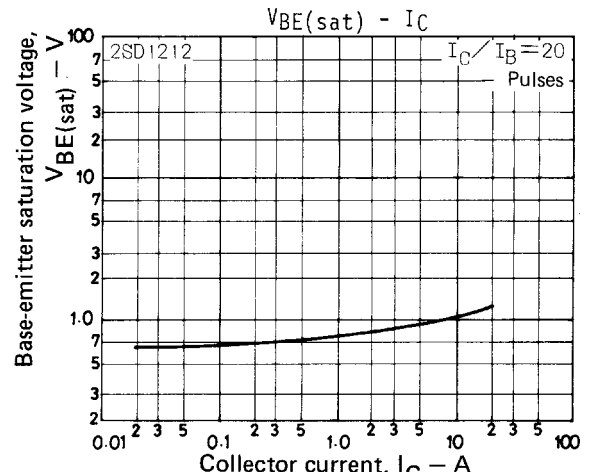
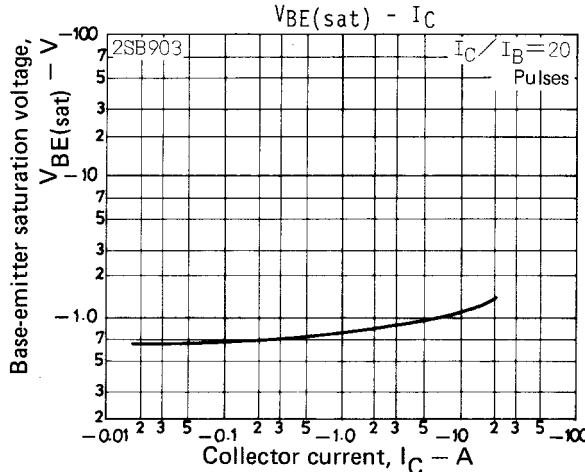
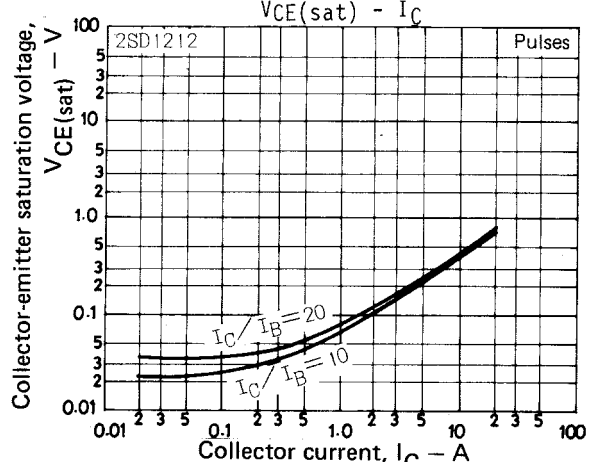
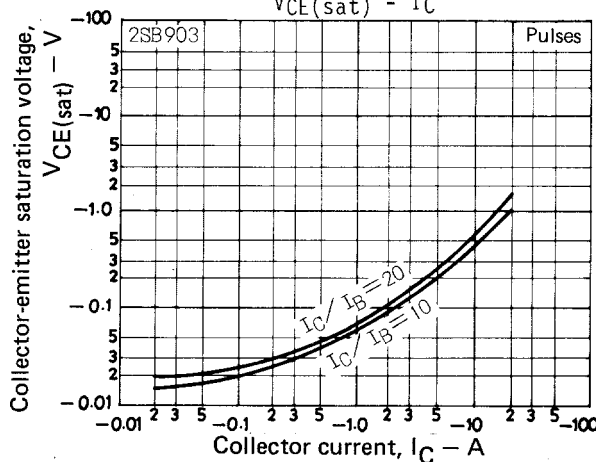
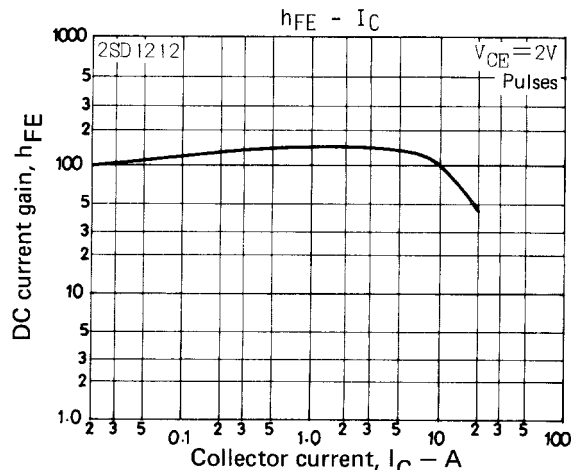
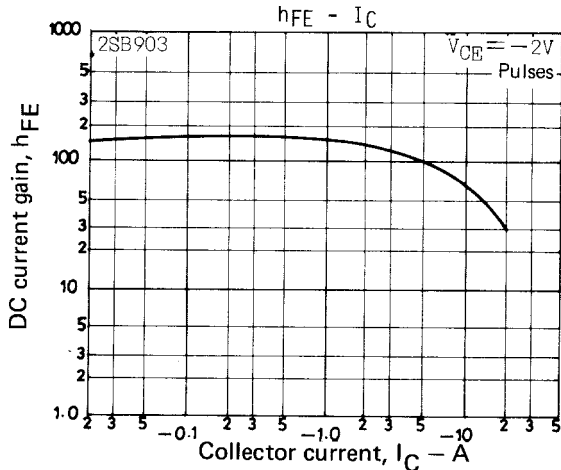
$$10I_{B1} = -10I_{B2} = I_C = 5A$$

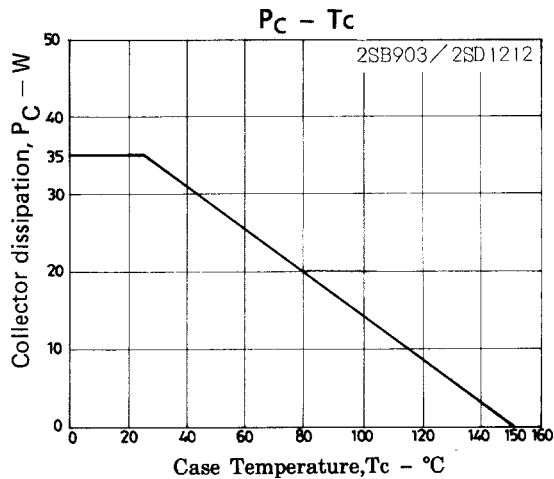
(For PNP, the polarity is reversed)

Unit (resistance :  $\Omega$ , capacitance : F)



# 2SB903/2SD1212





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