



## 2SB1388/2SD2093

### Driver Applications

#### Applications

- Motor drivers, printer hammer drivers, relay drivers, voltage regulator control.

#### Features

- High DC current gain.
- Large current capacity and large ASO.
- Low saturation voltage.
- Micaless package facilitating mounting.

( ) : 2SB1388

#### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CB0}$		(-)110	V
Collector-to-Emitter Voltage	$V_{CEO}$		(-)100	V
Emitter-to-Base Voltage	$V_{EBO}$		(-)6	V
Collector Current	$I_C$		(-)10	A
Collector Current (Pulse)	$I_{CP}$		(-)15	A
Collector Dissipation	$P_C$		3.0	W
		$T_c=25^\circ\text{C}$	45	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	$I_{CB0}$	$V_{CB} = (-)80\text{V}, I_E = 0$			(-)0.1	mA
Emitter Cutoff Current	$I_{EBO}$	$V_{CE} = (-)5\text{V}, I_C = 0$			(-)3.0	mA
DC Current Gain	$h_{FE}$	$V_{CE} = (-)3\text{V}, I_C = (-)5\text{A}$	1500	4000		
Gain-Bandwidth Product	$f_T$	$V_{CE} = (-)5\text{V}, I_C = (-)5\text{A}$		20		MHz
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = (-)5\text{A}, I_B = (-)10\text{mA}$		(-)1.0	(-)1.5	V
				0.9		V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = (-)5\text{A}, I_B = (-)10\text{mA}$			(-)2.0	V

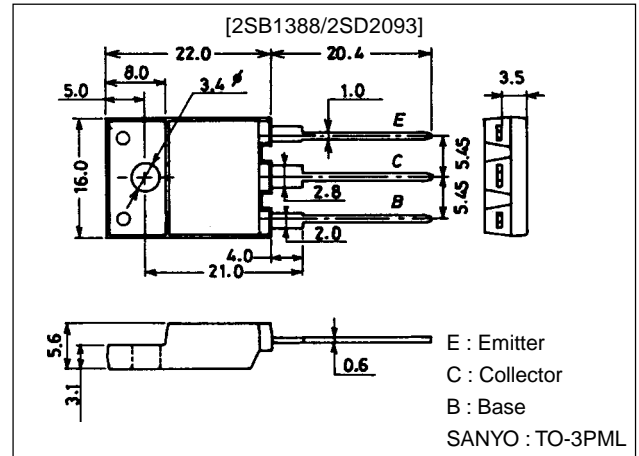
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#### Package Dimensions

unit:mm

2039A

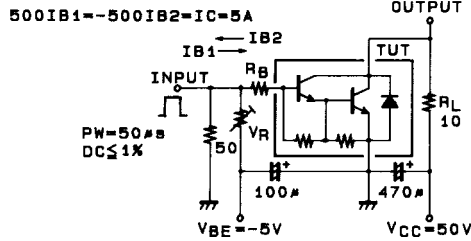


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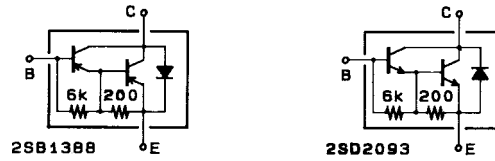
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)5mA, I_E=0$	(-)110			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=(-)50mA, R_{BE}=\infty$	(-)100			V
Turn-ON Time	$t_{on}$	See specified test circuit.		(0.7)		$\mu s$
Storage Time	$t_{stg}$	See specified test circuit.		0.6		$\mu s$
				(1.4)		$\mu s$
Fall Time	$t_f$	See specified test circuit.		4.8		$\mu s$
				(1.5)		$\mu s$
				1.6		$\mu s$

## Switching Time Test Circuit

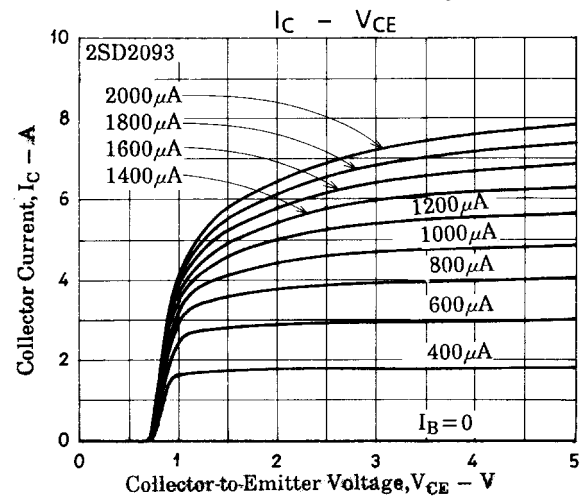
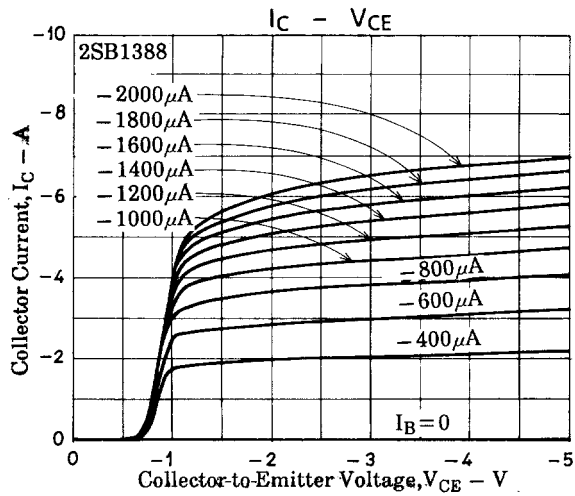
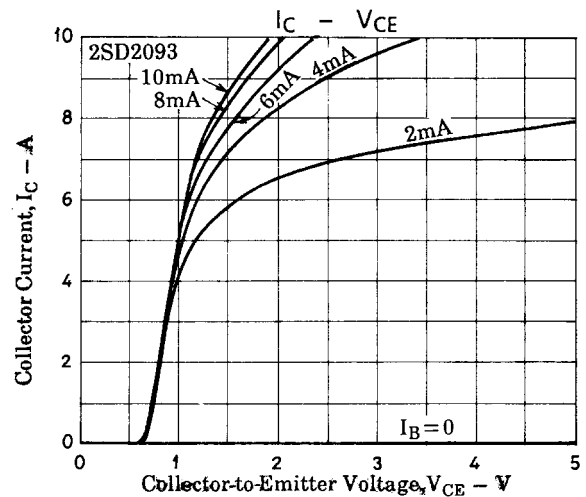
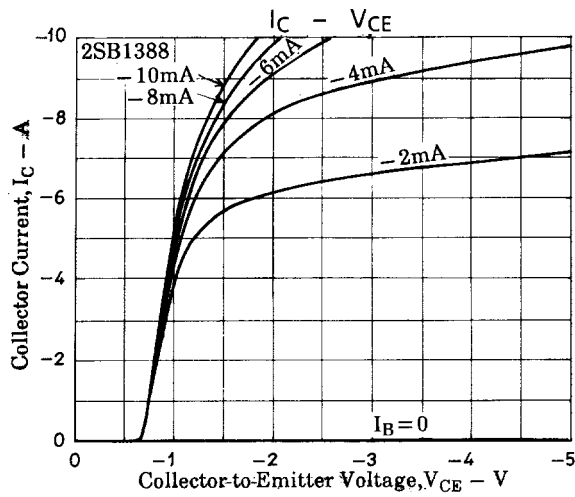
(For PNP, the polarity is reversed)



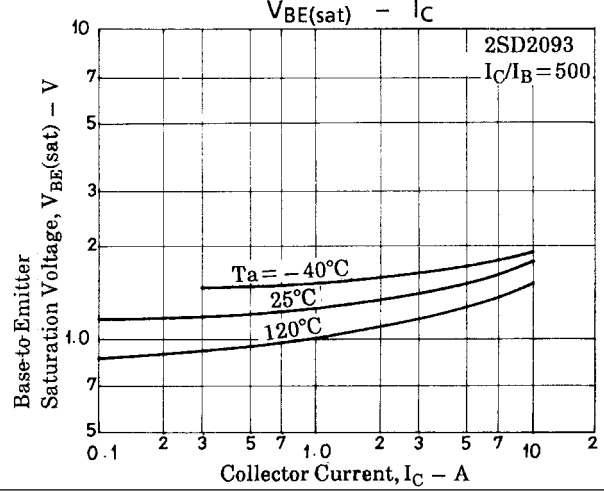
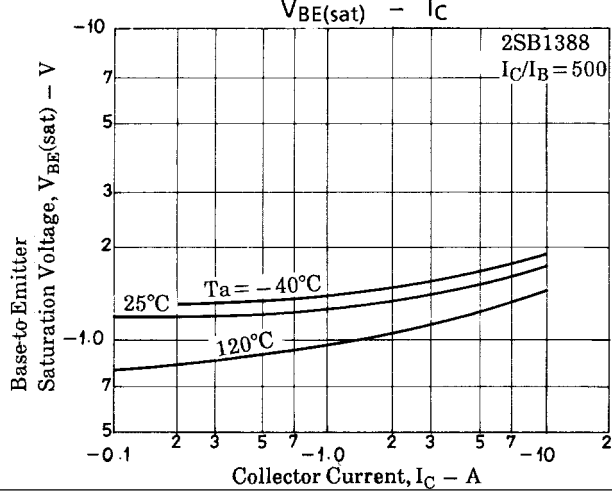
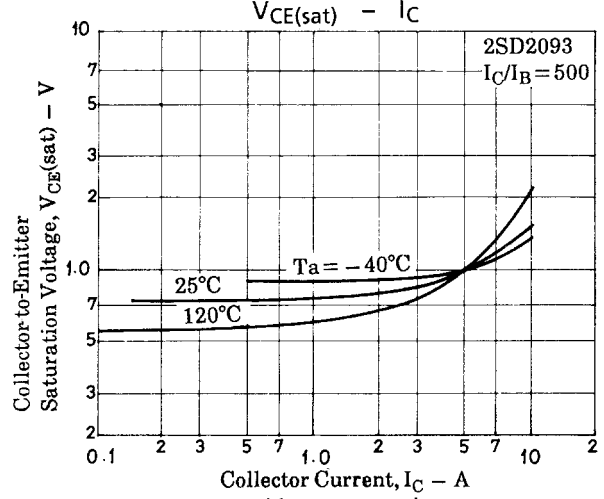
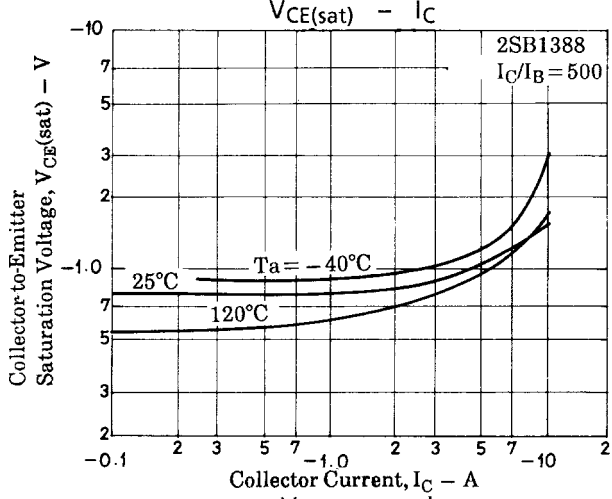
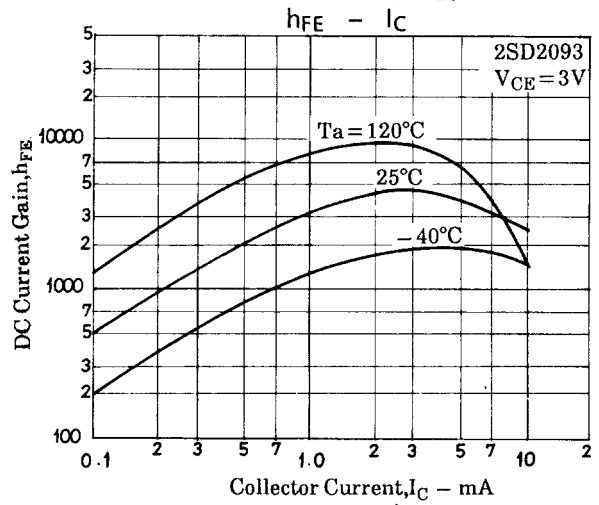
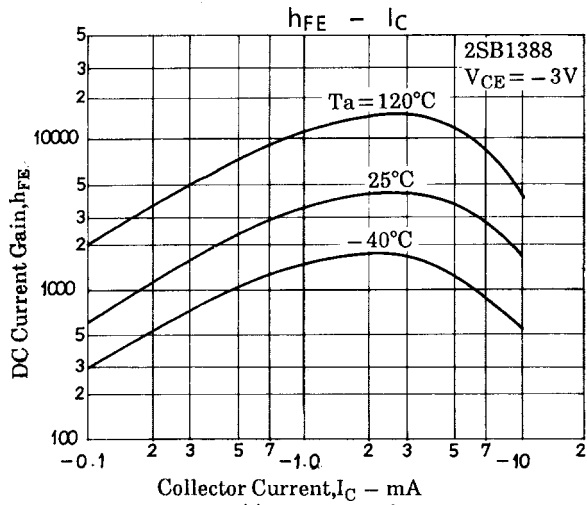
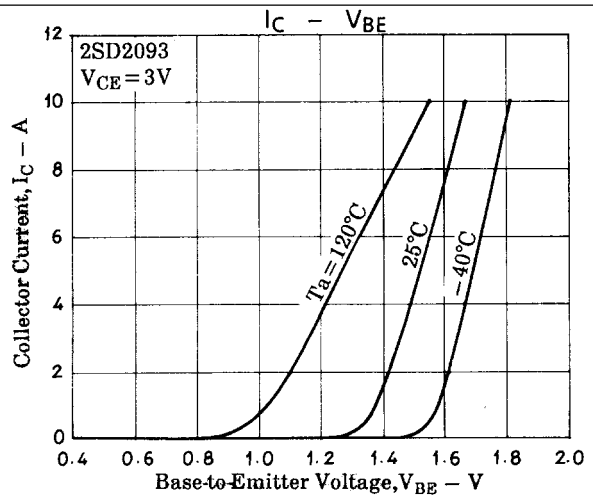
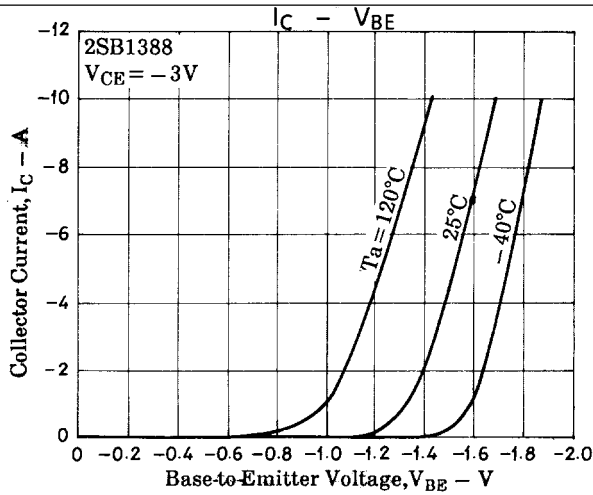
## Electrical Connection



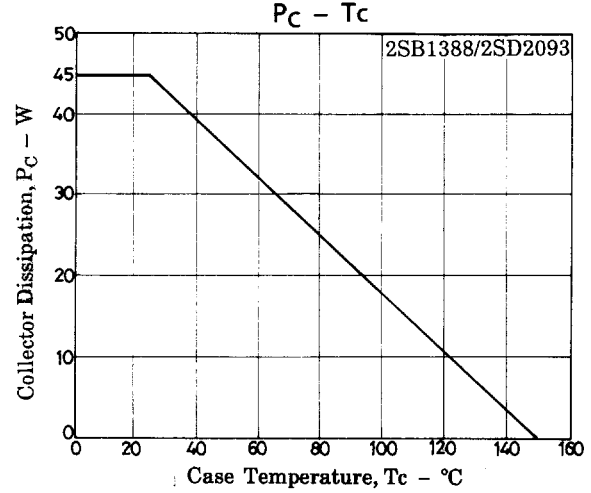
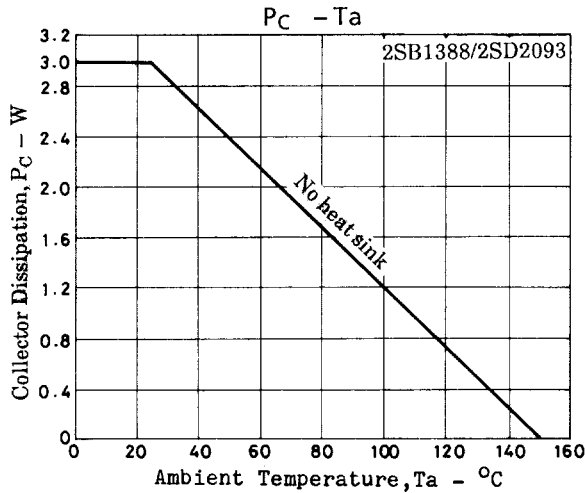
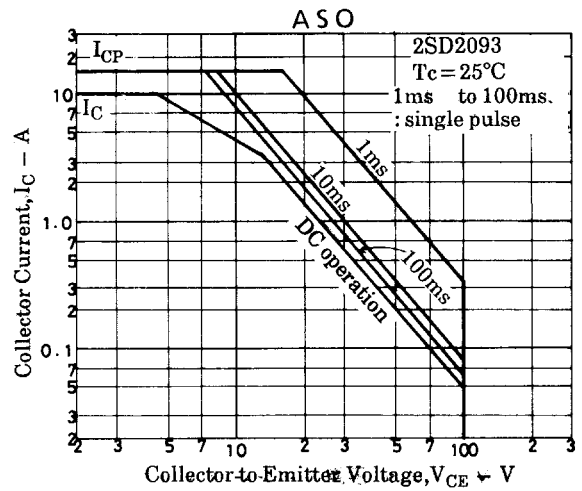
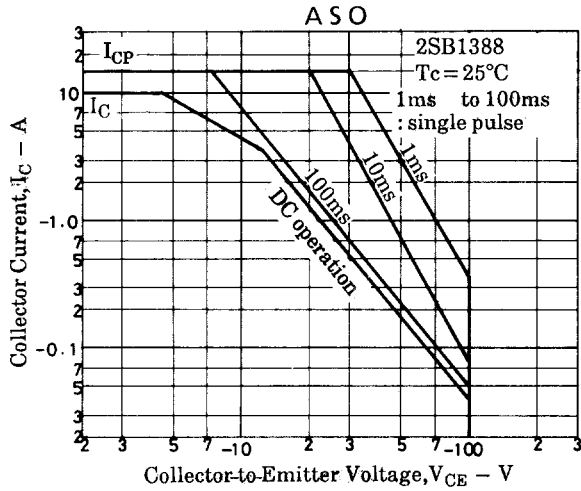
Unit (resistance :  $\Omega$ , capacitance : F)



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