



# **High-Current Switching Applications**

### **Applications**

· DC-DC converters, motor drivers, relay drivers, lamp drivers.

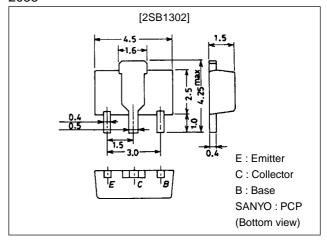
#### **Features**

- · Adoption of FBET, MBIT processes.
- · Low collector-to-emitter saturation voltage.
- · Large current capacity.
- · Fast switching speed.
- · Very small size making it easy to provide highdensity, small-sized hybrid ICs.

## **Package Dimensions**

unit:mm

2038



### **Specifications**

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V <sub>CBO</sub>		-25	V
Collector-to-Emitter Voltage	VCEO		-20	V
Emitter-to-Base Voltage	V <sub>EBO</sub>		-5	V
Collector Current	IC		-5	А
Collector Current (Pulse)	ICP		-8	Α
Collector Dissipation	PC	Mounted on ceramic board (250mm²×0.8mm)	1.3	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	O IIII
Collector Cutoff Current	I <sub>CBO</sub>	V <sub>CB</sub> =-20V, I <sub>E</sub> =0			-500	nA
Emitter Cutoff Current	I <sub>EBO</sub>	V <sub>EB</sub> =-4V, I <sub>C</sub> =0			-500	nA
DC Current Gain	h <sub>FE</sub> 1	V <sub>CE</sub> =-2V, I <sub>C</sub> =-500mA	100*		400*	
	h <sub>FE</sub> 2	V <sub>CE</sub> =-2V, I <sub>C</sub> =-4A	60			
Gain-Bandwidth Product	fT	V <sub>CE</sub> =-5V, I <sub>C</sub> =-200mA		320		MHz
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =-10V, f=1MHz		60		pF

280 200

400

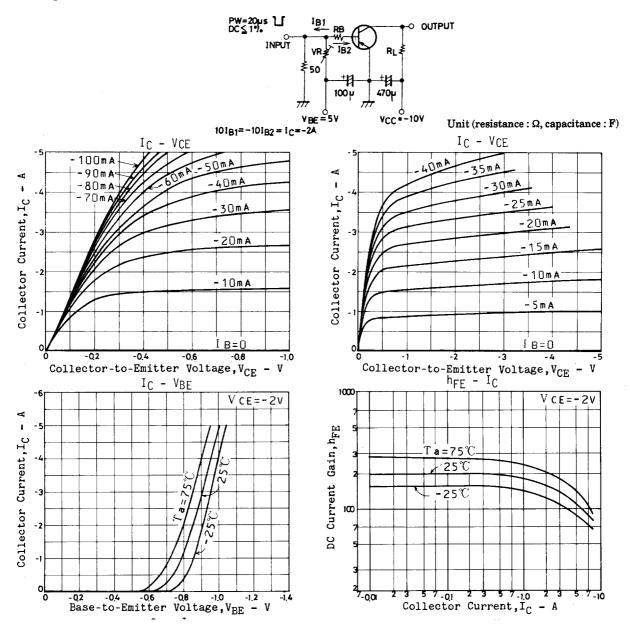
\* : The 2SB1302 is classified by 500mA  $h_{FE}$  as follows : 100 R 200

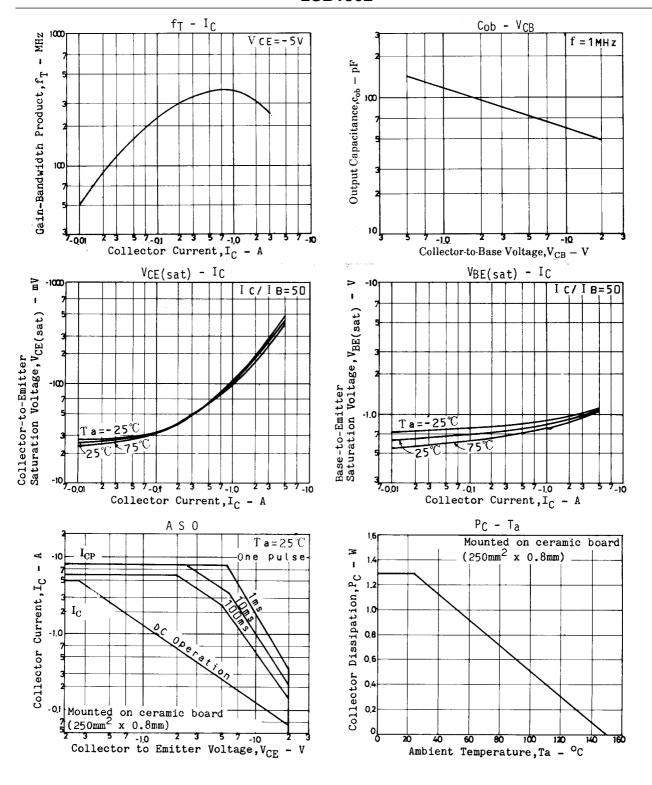
Marking: BJ h<sub>FE</sub> rank: R, S, T

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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	O'III
Collector-to-Emitter Saturation Voltage	VCE(sat)	I <sub>C</sub> =-3A, I <sub>B</sub> =-60mA		-250	-500	mV
Base-to-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> =-3A, I <sub>B</sub> =-60mA		-1.0	-1.3	V
Collector-to-Base Breakdown Voltage	V(BR)CBO	I <sub>C</sub> =-10μA, I <sub>E</sub> =0	-25			V
Collector-to-Emitter Breakdown Voltage	V(BR)CEO	I <sub>C</sub> =-1mA, R <sub>BE</sub> =∞	-20			V
Emitter-to-Base Breakdown Voltage	V(BR)EBO	I <sub>E</sub> =-10μA, I <sub>C</sub> =0	-5			V
Turn-ON Time	ton	See specified test circuit.		40		ns
Storage Time	t <sub>stg</sub>	See specified test circuit.		200		ns
Fall Time	t <sub>f</sub>	See specified test circuit.		10		ns

### **Switching Time Test Circuit**





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