

**2SB1302****High-Current Switching Applications****Applications**

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

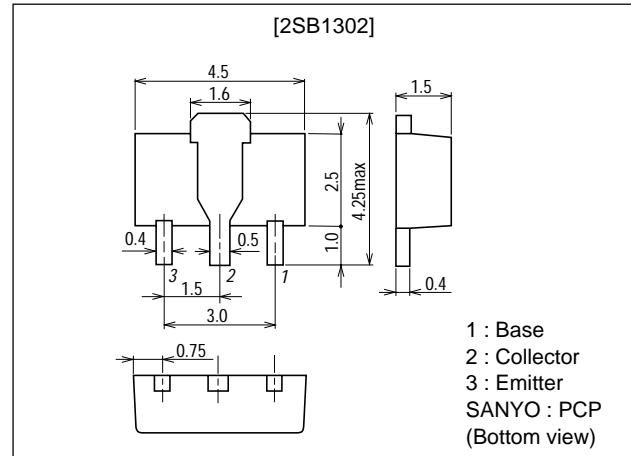
Features

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

Package Dimensions

unit:mm

2038A

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CB0}		-25	V
Collector-to-Emitter Voltage	V_{CEO}		-20	V
Emitter-to-Base Voltage	V_{EBO}		-5	V
Collector Current	I_C		-5	A
Collector Current (Pulse)	I_{CP}		-8	A
Collector Dissipation	P_C	Mounted on ceramic board (250mm \times 0.8mm)	1.3	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_{CBO}	$V_{CB}=-20\text{V}, I_E=0$			-500	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=-4\text{V}, I_C=0$			-500	nA
DC Current Gain	h_{FE1}	$V_{CE}=-2\text{V}, I_C=500\text{mA}$	100*		400*	
	h_{FE2}	$V_{CE}=-2\text{V}, I_C=4\text{A}$	60			
Gain-Bandwidth Product	f_T	$V_{CE}=-5\text{V}, I_C=200\text{mA}$		320		MHz
Output Capacitance	C_{ob}	$V_{CB}=-10\text{V}, f=1\text{MHz}$		60		pF

* : The 2SB1302 is classified by 500mA h_{FE} as follows :

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Marking : BJ

 h_{FE} rank : R, S, T

Rank	R	S	T
h_{FE}	100 to 200	140 to 280	200 to 400

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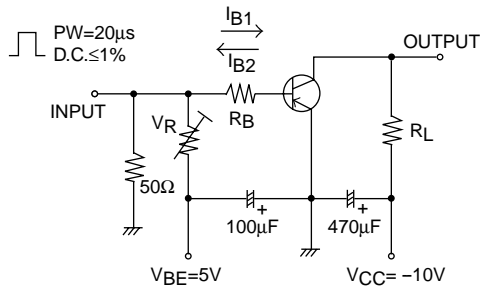
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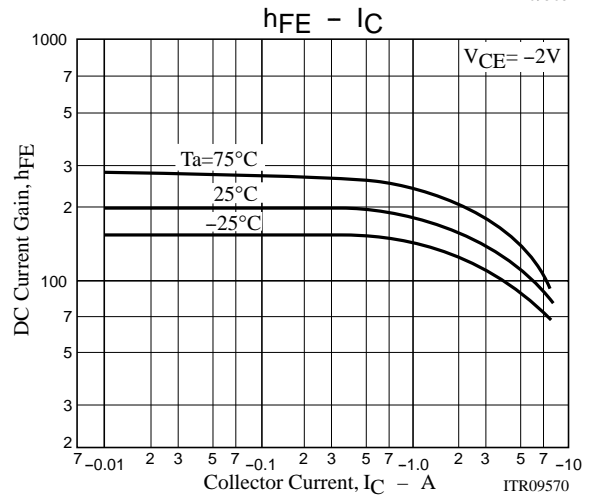
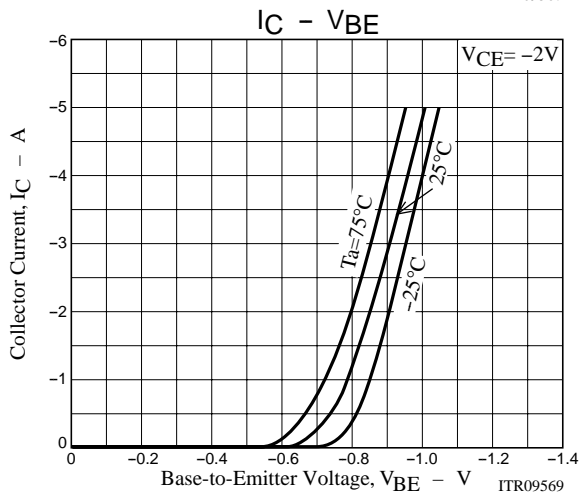
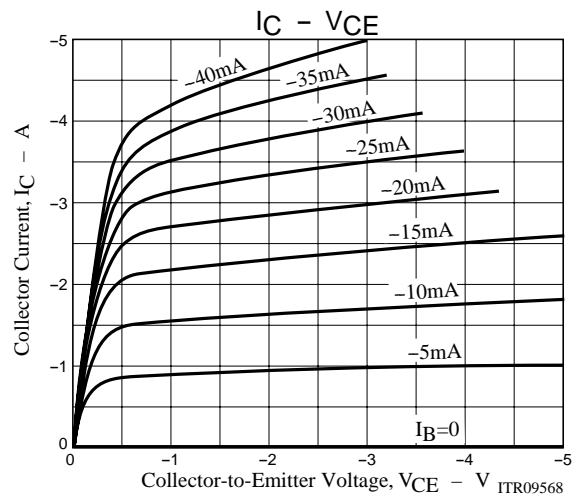
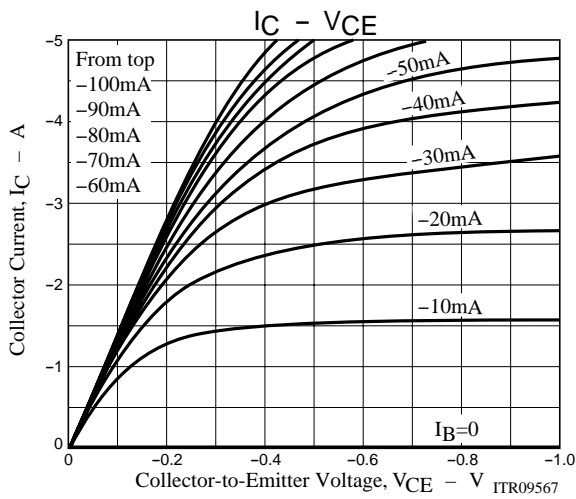
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = -3A, I_B = -60mA$		-250	-500	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = -3A, I_B = -60mA$		-1.0	-1.3	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = -10\mu A, I_E = 0$	-25			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = -1mA, R_{BE} = \infty$	-20			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = -10\mu A, I_C = 0$	-5			V
Turn-ON Time	t_{on}	See specified test circuit.		40		ns
Storage Time	t_{stg}	See specified test circuit.		200		ns
Fall Time	t_f	See specified test circuit.		10		ns

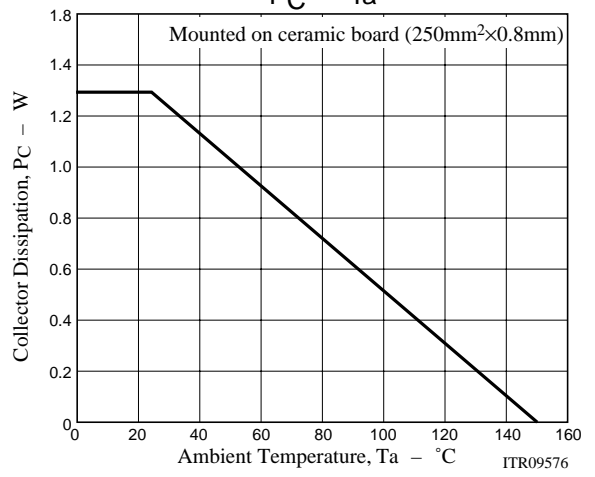
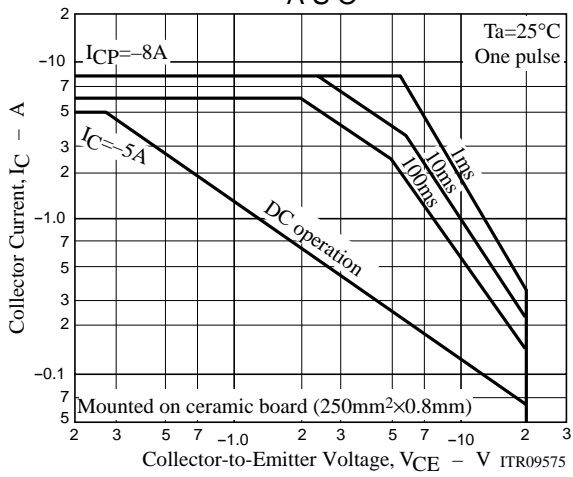
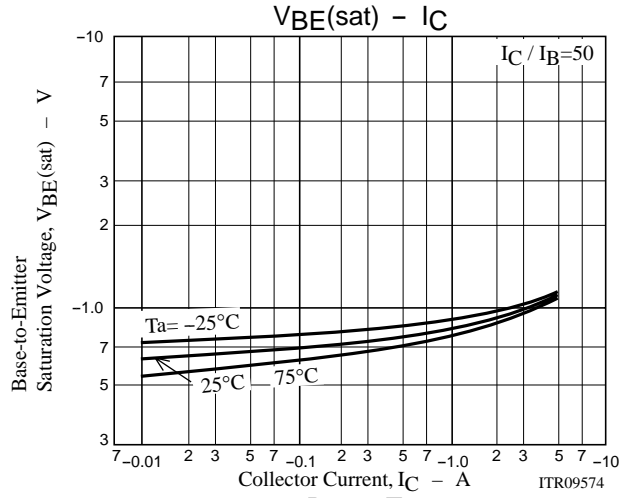
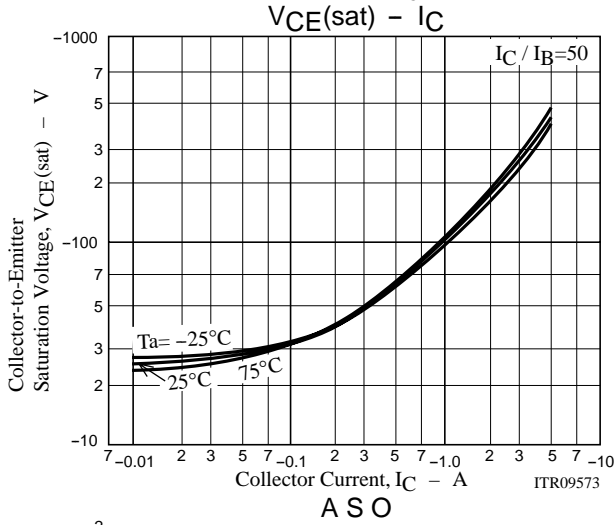
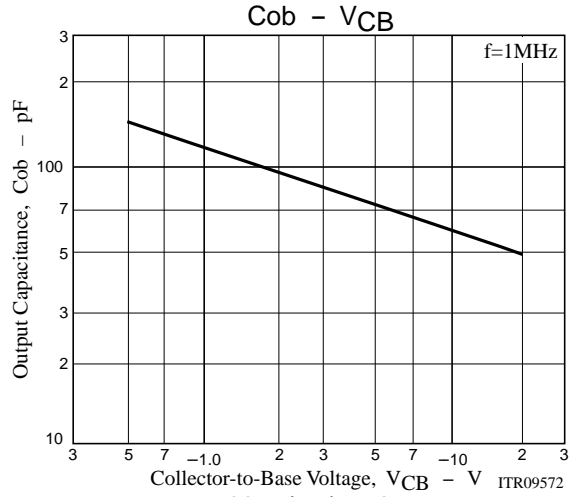
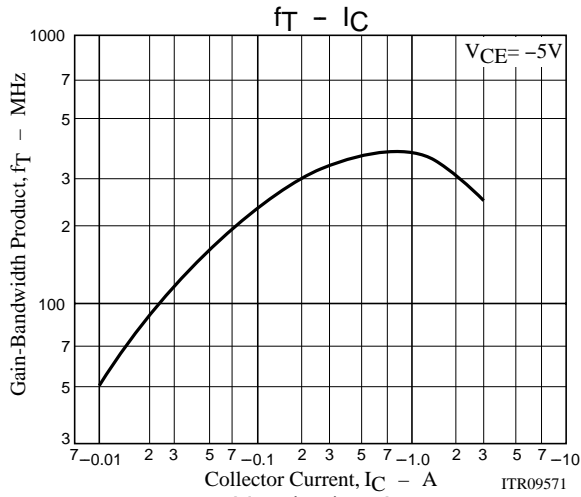
Switching Time Test Circuit



$$I_C = 10I_{B1} = -10I_{B2} = -2A$$



2SB1302



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