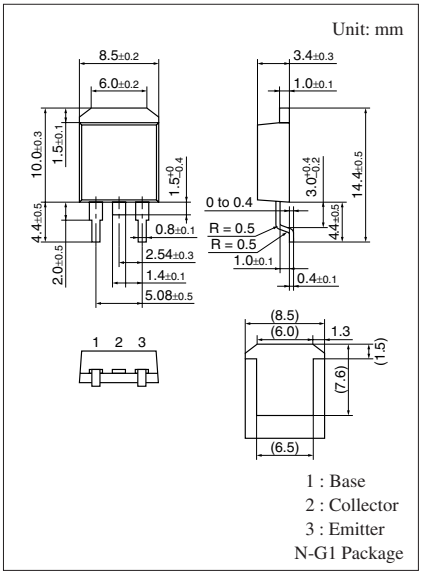
2SB0939 (2SB939), 2SB0939A (2SB939A)

Silicon PNP epitaxial planar type Darlington

For midium-speed power switching
Complementary to 2SD1262, 2SD1262A

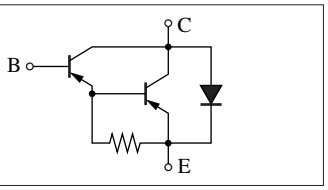
■ Features

- High forward current transfer ratio h_{FE}
- High-speed switching
- N type package enabling direct soldering of the radiating fin to the printed circuit board, etc. of small electronic equipment.



Note) Self-supported type package is also prepared.

Internal Connection



■ Absolute Maximum Ratings $T_C = 25°C$

Parameter		Symbol	Rating	Unit
Collector-base voltage (Emitter open)	2SB0939	V_{CBO}	−60	V
	2SB0939A		−80	
Collector-emitter voltage (Base open)	2SB0939	V_{CEO}	−60	V
	2SB0939A		−80	
Emitter-base voltage (Collector open)		V_{EBO}	−7	V
Collector current		I_C	−8	A
Peak collector current		I_{CP}	−12	A
Collector power dissipation		P_C	45	W
	T_a = 25°C		1.3	
Junction temperature		T_j	150	°C
Storage temperature		T_{stg}	−55 to +150	°C

■ Electrical Characteristics $T_C = 25°C \pm 3°C$

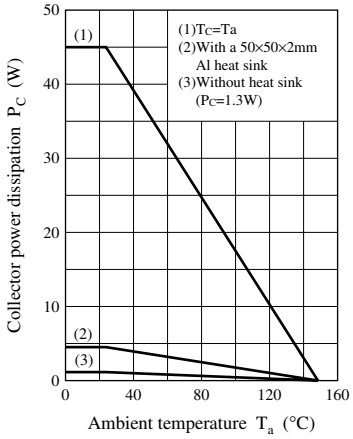
Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Collector-emitter voltage (Base open)	2SB0939	V_{CEO}	I_C = −30 mA, I_B = 0	−60			V
	2SB0939A			−80			
Collector-base cut-off current (Emitter open)	2SB0939	I_{CBO}	V_{CB} = −60 V, I_E = 0			−100	μA
	2SB0939A		V_{CB} = −80 V, I_E = 0			−100	
Emitter-base cutoff current (Collector open)		I_{EBO}	V_{EB} = −7 V, I_C = 0			−2	mA
Forward current transfer ratio		h_{FE1} *	V_{CE} = −3 V, I_C = −4 A	2000		10000	—
		h_{FE2}	V_{CE} = −3 V, I_C = −8 A	500			
Base-emitter saturation voltage		$V_{BE(sat)}$	I_C = −4 A, I_B = −8 mA			−2	V
Collector-emitter saturation voltage		$V_{CE(sat)}$	I_C = −4 A, I_B = −8 mA			−1.5	V
Transition frequency		f_T	V_{CE} = −10 V, I_C = −0.5 A, f = 1 MHz		20		MHz
Turn-on time		t_{on}	I_C = −4 A,		0.5		μs
Strage time		t_{stg}	I_{B1} = −8 mA, I_{B2} = 8 mA		2		μs
Fall time		t_f	V_{CC} = −50 V		1		μs

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.
2. *: Rank classification

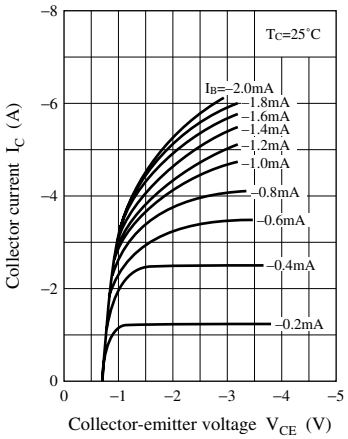
Rank	Q	P
h_{FE1}	2000 to 5000	4000 to 10000

Note) The part number in the parenthesis shows conventional part number.

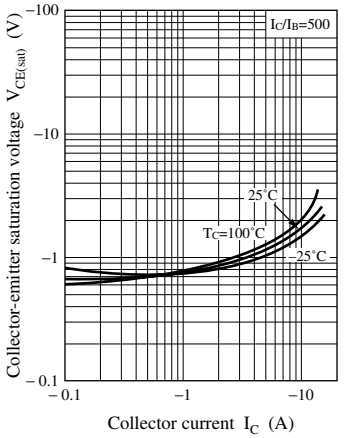
P_C — T_a



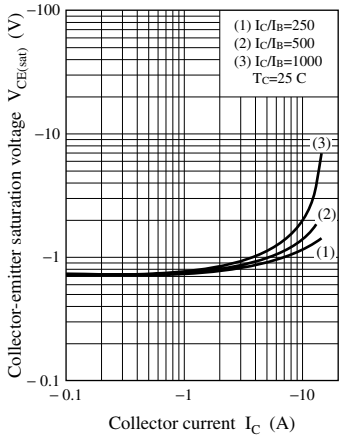
I_C — V_{CE}



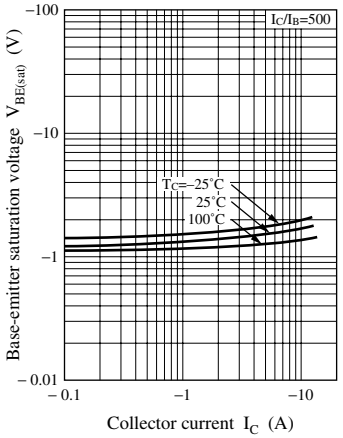
$V_{CE(sat)}$ — I_C



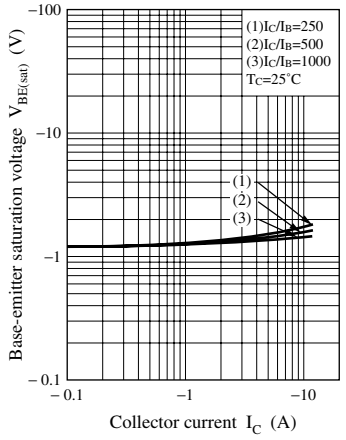
$V_{CE(sat)}$ — I_C



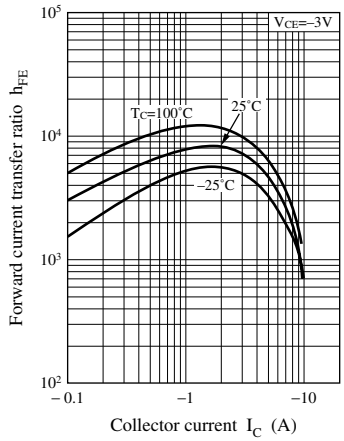
$V_{BE(sat)}$ — I_C



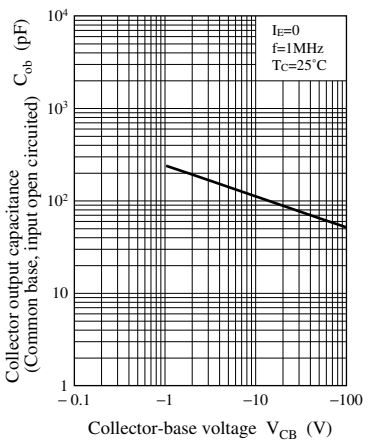
$V_{BE(sat)}$ — I_C



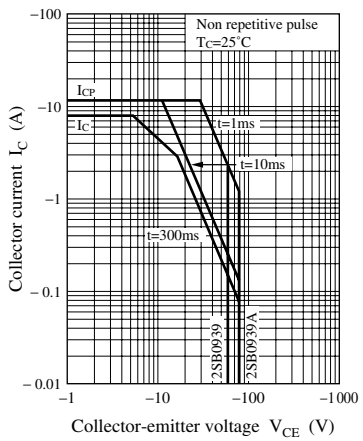
h_{FE} — I_C

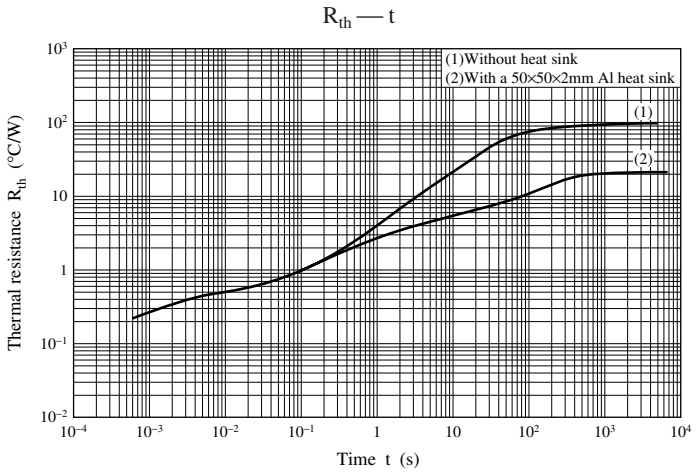


C_{ob} — V_{CB}



Safe operation area




R_{th} — t
(1)Without heat sink
(2)With a 50×50×2mm Al heat sink
(1)
(2)
Thermal resistance R_{th} (°C/W)
10^3
10^2
10
1
10^{-1}
10^{-2}
10^{-4}
10^{-3}
10^{-2}
10^{-1}
1
10
10^2
10^3
10^4
Time t (s)

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