

2SB938, 2SB938A

Silicon PNP epitaxial planar type Darlington

For power amplification and switching

Complementary to 2SD1261 and 2SD1261A

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.

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$)

Parameter		Symbol	Ratings	Unit
Collector to base voltage	2SB938	V_{CBO}	-60	V
	2SB938A		-80	
Collector to emitter voltage	2SB938	V_{CEO}	-60	V
	2SB938A		-80	
Emitter to base voltage		V_{EBO}	-5	V
Peak collector current		I_{CP}	-8	A
Collector current		I_C	-4	A
Collector power dissipation	$T_C=25^{\circ}\text{C}$	P_C	40	W
	$T_a=25^{\circ}\text{C}$		1.3	
Junction temperature		T_j	150	$^{\circ}\text{C}$
Storage temperature		T_{stg}	-55 to +150	$^{\circ}\text{C}$

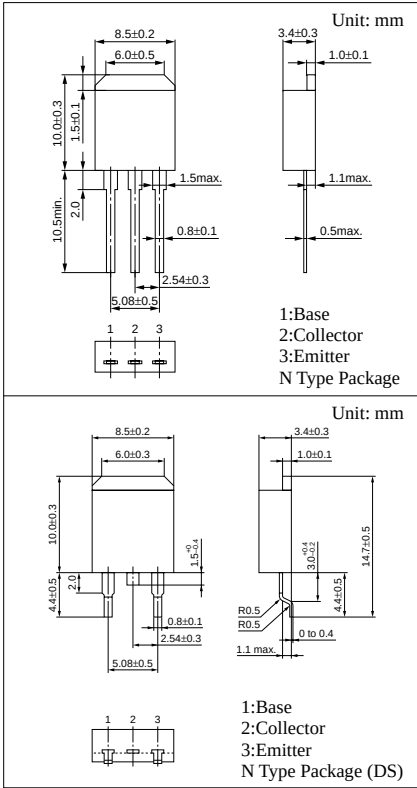
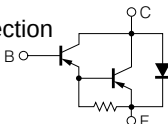
Electrical Characteristics ($T_C=25^\circ\text{C}$)

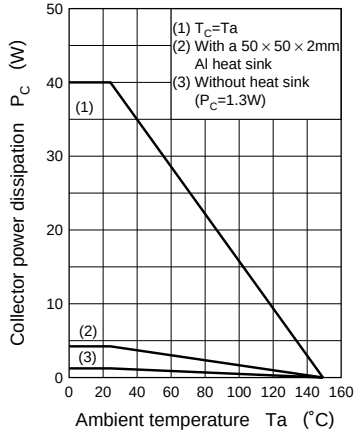
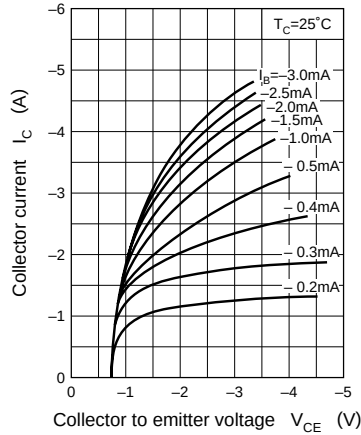
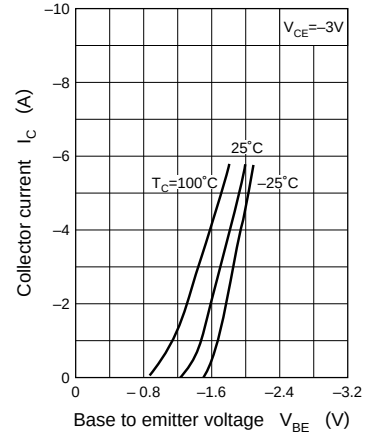
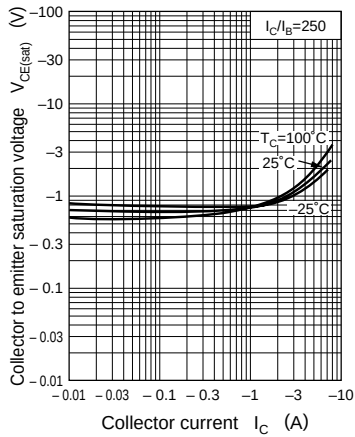
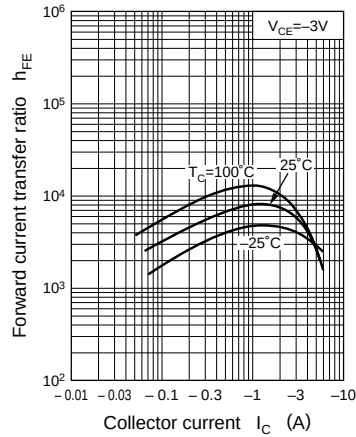
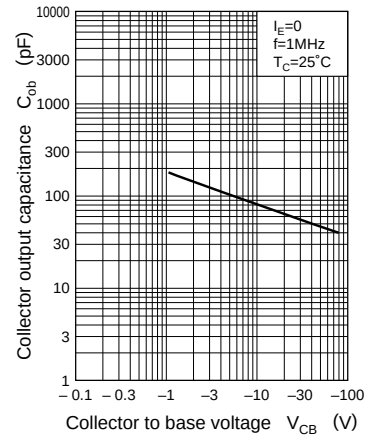
Parameter	Symbol	Conditions	min	typ	max	Unit
Collector cutoff current	I_{CBO}	2SB938 $V_{CB} = -60\text{V}, I_E = 0$			-200	μA
2SB938A $V_{CB} = -80\text{V}, I_E = 0$					-200	
Collector cutoff current	I_{CEO}	2SB938 $V_{CE} = -30\text{V}, I_B = 0$			-500	μA
2SB938A $V_{CE} = -40\text{V}, I_B = 0$					-500	
Emitter cutoff current	I_{EBO}	$V_{EB} = -5\text{V}, I_C = 0$			-2	mA
Collector to emitter voltage	V_{CEO}	2SB938 $I_C = -30\text{mA}, I_B = 0$	-60			V
2SB938A			-80			
Forward current transfer ratio	h_{FE1}	$V_{CE} = -3\text{V}, I_C = -0.5\text{A}$	1000			
	h_{FE2}^*	$V_{CE} = -3\text{V}, I_C = -3\text{A}$	2000		10000	
Base to emitter voltage	V_{BE}	$V_{CE} = -3\text{V}, I_C = -3\text{A}$			-2.5	V
Collector to emitter saturation voltage	$V_{CE(sat)}$	$I_C = -3\text{A}, I_B = -12\text{mA}$			-2	V
		$I_C = -5\text{A}, I_B = -20\text{mA}$			-4	
Transition frequency	f_T	$V_{CE} = -10\text{V}, I_C = -0.5\text{A}, f = 1\text{MHz}$		15		MHz
Turn-on time	t_{on}	$I_C = -3\text{A}, I_{B1} = -12\text{mA}, I_{B2} = 12\text{mA}$		0.3		μs
Storage time	t_{stg}			2		μs
Fall time	t_f			0.5		μs

* h_{FE2} Rank classification

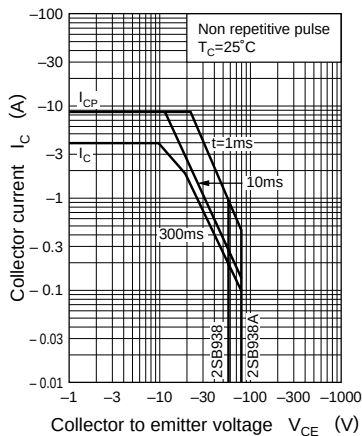
Rank	Q	P
h_{FE2}	2000 to 5000	4000 to 10000

Internal Connection



$P_C - T_a$  $I_C - V_{CE}$  $I_C - V_{BE}$  $V_{CE(sat)} - I_C$  $h_{FE} - I_C$  $C_{ob} - V_{CB}$ 

Area of safe operation (ASO)

 $R_{th(t)} - t$ 