2SD946, 2SD946A, 2SD946B

Silicon PNP Epitaxial Planar Darlington Type

AF Amplifier
Complementary Pair with 2SB895, 2SB895A

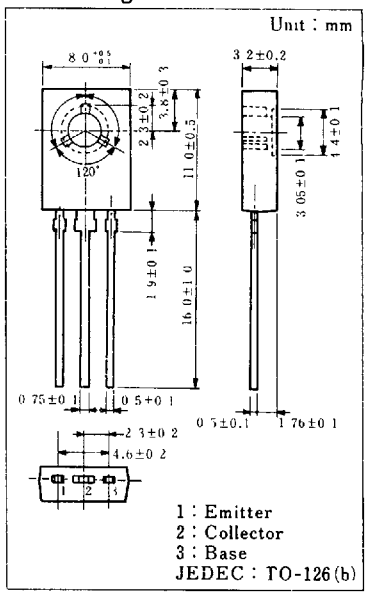
■ Features

- High DC current gain (h_{FE}) design suitable for motor driver and hammer driver
- Driver having no shunt resistor

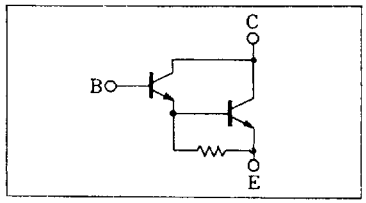
■ Absolute Maximum Ratings (Tc=25°C)

Item		Symbol	Value	Unit
Collector-base voltage	2SD946	V_{CBO}	30	V
	2SD946A		60	
	2SD946B		100	
Collector-emitter voltage	2SD946	V_{CEO}	25	V
	2SD946A		50	
	2SD946B		80	
Emitter-base voltage		V_{EBO}	5	V
Peak collector current		I_{CP}	1.5	A
Collector power dissipation (Tc=25°C)		I_C	1	A
Collector power dissipation		P_C	1.2	W
Junction temperature		T_j	150	°C
Storage temperature		T_{stg}	−55～+150	°C

■ Package Dimensions



■ Inner Circuit



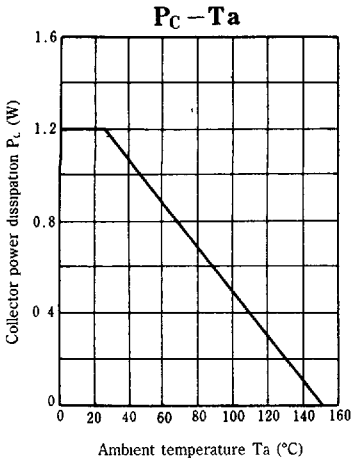
■ Electrical Characteristics (Tc=25°C)

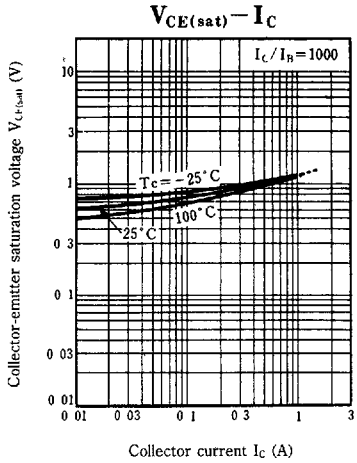
Item		Symbol	Condition	min.	typ.	max.	Unit
Collector cutoff current		I_{CBO}	V_{CB}=25V, I_E=0			100	nA
Emitter cutoff current		I_{EBO}	V_{EB}=4 V, I_C=0			100	nA
Collector-base voltage	2SD946	V_{CBO}	I_C=100 μA, I_E=0	30			V
	2SD946A			60			
	2SD946B			100			
Collector-emitter voltage	2SD946	V_{CEO}	I_C=1 mA, I_B=0	25			V
	2SD946A			50			
	2SD946B			80			
Emitter-base voltage		V_{EBO}	I_E=100 μA, I_C=0	5			V
DC current gain		h_{FE}*1	V_{CE}=10 V, I_C=1A*2	4000		40000	
Collector-emitter saturation voltage		$V_{CE(sat)}$	I_C=1 A, I_B=1mA*2			1.8	V
Base-emitter saturation voltage		$V_{BE(sat)}$	I_C=1 A, I_B=1mA*2			2.2	V
Transition frequency		f_T	V_{CB}=10V, I_E=−50mA, f=200MHz		150		MHz

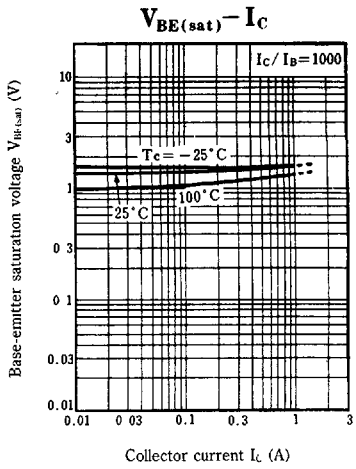
*2 Pulse measurement

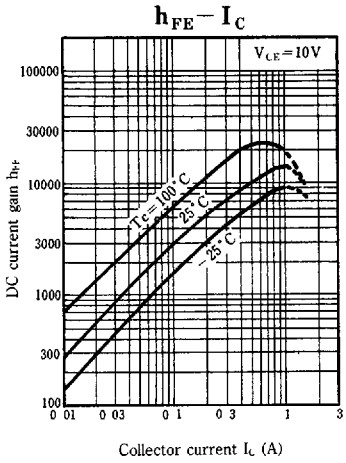
*1 h_{FE} Classifications

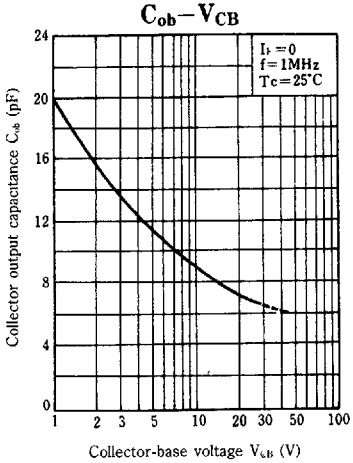
Class	Q	R	S
h_{FE}	4000～10000	8000～20000	16000～40000


$P_C - Ta$
Collector power dissipation P_C (W)
1.6
1.2
0.8
0.4
0
0 20 40 60 80 100 120 140 160
Ambient temperature Ta (°C)


$V_{CE(sat)} - I_C$
$I_C / I_B = 1000$
Collector-emitter saturation voltage $V_{CE(sat)}$ (V)
10
3
1
0.3
0.1
0.03
0.01
Tc = −25°C
100°C
25°C
0.01 0.03 0.1 0.3 1 3
Collector current I_C (A)


$V_{BE(sat)} - I_C$
$I_C / I_B = 1000$
Base-emitter saturation voltage $V_{BE(sat)}$ (V)
10
3
1
0.3
0.1
0.03
0.01
Tc = −25°C
100°C
25°C
0.01 0.03 0.1 0.3 1 3
Collector current I_C (A)


$h_{FE} - I_C$
$V_{CE} = 10V$
DC current gain h_{FE}
100000
30000
10000
3000
1000
300
100
Tc = 100°C
25°C
−25°C
0.01 0.03 0.1 0.3 1 3
Collector current I_C (A)


$C_{ob} - V_{CB}$
$I_E = 0$
f = 1MHz
Tc = 25°C
Collector output capacitance C_{ob} (pF)
24
20
16
12
8
4
0
1 2 3 5 10 20 30 50 100
Collector-base voltage V_{CB} (V)