NEC

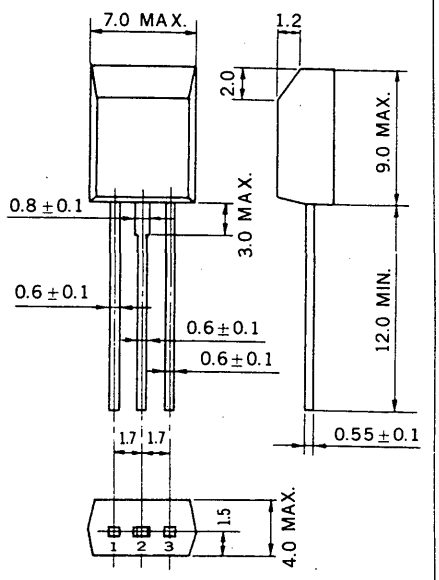
PNP SILICON TRANSISTOR
2SB1117

DESCRIPTION The 2SB1117 is a Low $V_{CE(sat)}$ transistor which has a large current capability and wide ASO.
It is suitable for driver of solenoid or motor, or electronic flash.

FEATURES

- Low Collector Saturation Voltage.
  $V_{CE(sat)}$ = −0.2 V TYP. (@ I_C/I_B = −2.0 A/−0.2 A)
- Large Current.
  $I_{C(DC)}$ = −3.0 A, $I_{C(pulse)}$ = −5.0 A
- High DC Current Gain. :
  h_{FE} = 300 TYP. (@ V_{CE} = −2.0 V, I_C = −1.0 A)
- High Total Power Dissipation. : P_T = 1.0 W
- Complementary to the NEC 2SD1617 NPN Transistor.

PACKAGE DIMENSIONS
in millimeters



1. Emitter
2. Collector
3. Base

ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures
- Storage Temperature . . . . . −55 to +150 °C
- Junction Temperature . . . . . 150 °C Maximum

Maximum Power Dissipation (T_a = 25 °C)
- Total Power Dissipation . . . . . 1.0 W

Maximum Voltages and Currents (T_a = 25 °C)
- V_{CBO} Collector to Base Voltage . . . . . −30 V
- V_{CEO} Collector to Emitter Voltage . . . . . −25 V
- V_{EBO} Emitter to Base Voltage . . . . . −6.0 V
- I_C Collector Current (DC) . . . . . −3.0 A
- I_C Collector Current (pulse)* . . . . . −5.0 A

*PW ≦ 10 ms, Duty Cycle ≦ 50 %

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
h_{FE1}**	DC Current Gain	135	300	600	—	V_{CE} = −2.0 V, I_C = −1.0 A
h_{FE2}**	DC Current Gain	81			—	V_{CE} = −2.0 V, I_C = −2.0 A
f_T	Gain Bandwidth Product	100	280		MHz	V_{CE} = −5.0 V, I_E = 1.0 A
C_{ob}	Output Capacitance		90		pF	V_{CB} = −10 V, I_E = 0, f = 1.0 MHz
I_{CBO}	Collector Cutoff Current			−100	nA	V_{CB} = −30 V, I_E = 0
I_{EBO}	Emitter Cutoff Current			−100	nA	V_{EB} = −6.0 V, I_C = 0
V_{BE}**	Base to Emitter Voltage	−600	−660	−700	mV	V_{CE} = −2.0 V, I_C = −0.1 A
$V_{CE(sat)1}$**	Collector Saturation Voltage		−0.2	−0.3	V	I_C = −2.0 A, I_B = −0.2 A
$V_{CE(sat)2}$**	Collector Saturation Voltage		−0.3	−0.5	V	I_C = −3.0 A, I_B = −0.3 A
$V_{BE(sat)}$**	Base Saturation Voltage		−1.0	−1.2	V	I_C = −2.0 A, I_B = −0.2 A
t_{on}	Turn On Time		80		ns	(V_{CE} = −10 V, I_C = −500 mA
t_{stg}	Storage Time		500		ns	I_{B1} = −I_{B2} = −50 mA
t_f	Fall Time		70		ns	$V_{BE(off)}$ = 2 to 3 V)

**Pulsed PW ≦ 350 μs, Duty Cycle ≦ 2%

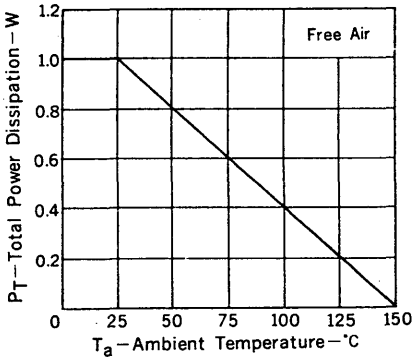
Classification of h_{FE1}

Rank	L	K	U
Range	135 to 270	200 to 400	300 to 600

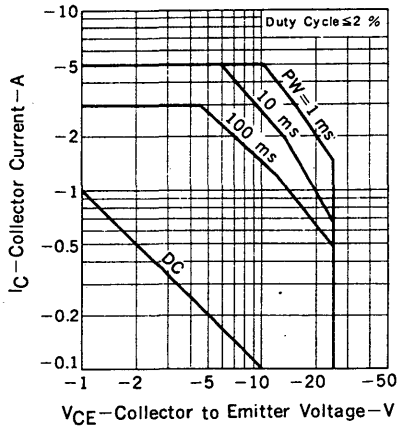
Test Conditions: V_{CE} = −2.0 V, I_C = −1.0 A

TYPICAL CHARACTERISTICS (T_a = 25 °C)

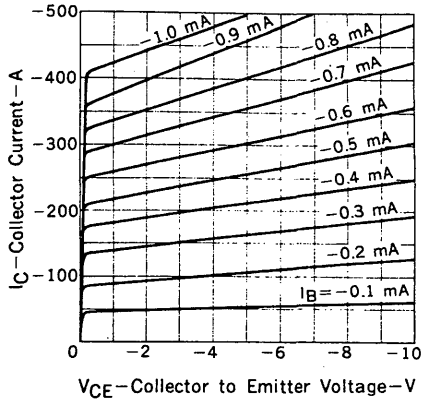
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



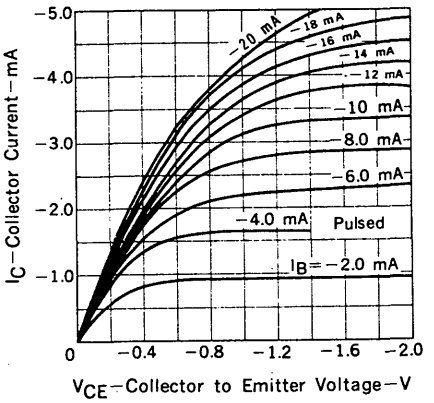
SAFE OPERATING AREAS (TRANSIENT THERMAL RESISTANCE METHOD)



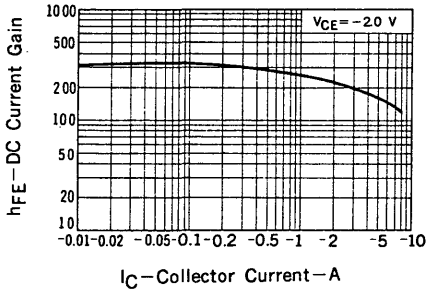
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



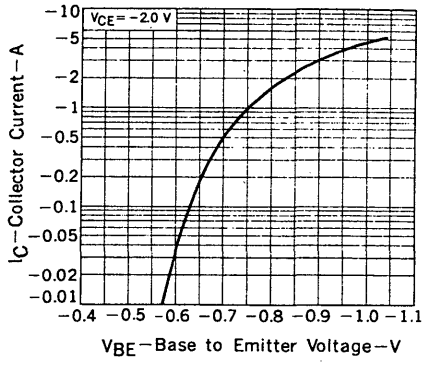
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



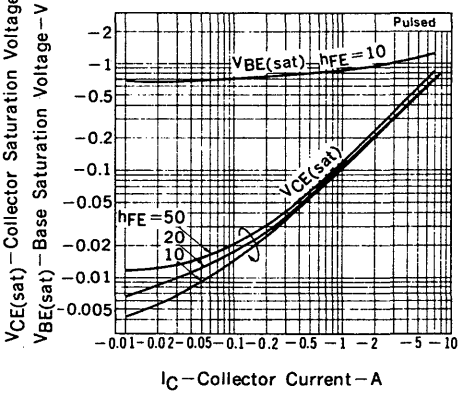
DC CURRENT GAIN vs. COLLECTOR CURRENT



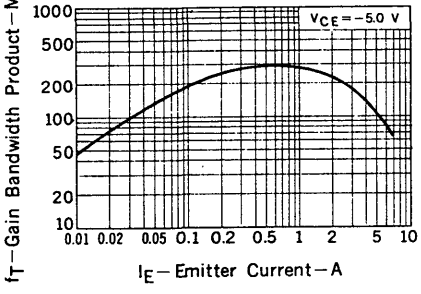
BASE TO EMITTER VOLTAGE vs. COLLECTOR CURRENT



BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



OUTPUT CAPACITANCE vs. REVERSE VOLTAGE