NEC

NPN SILICON TRANSISTOR

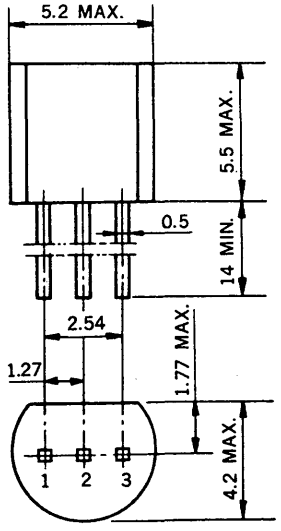
2SC3616

DESCRIPTION The 2SC3616 is designed for general-purpose applications requiring High DC Current Gain.
This is suitable for all kind of driving, instead of Darlington Transistor, or muting.

FEATURES

- High DC Current Gain.
  h_{FE} = 800 to 3200 (@ V_{CE} = 2.0 V, I_C = 300 mA)
- Low Collector Saturation Voltage.
  $V_{CE(sat)}$ = 0.14 V TYP. (@ I_C/I_B = 300 mA/3.0 mA)
- High V_{EBO} : V_{EBO}= 15V
- Large Current : $I_{C(DC)}$ = 700 mA, $I_{C(pulse)}$ = 1.0 A
- High Total Power Dissipation. : P_T = 0.75 W (T_a = 25 °C)

PACKAGE DIMENSIONS
in millimeters (inches)



1. Emitter EIAJ : SC-43B
2. Collector JEDEC : TO-92
3. Base IEC : PA33

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 . . . . . 0.75 W

Maximum Voltages and Currents (T_a = 25 °C)

V_{CBO}	Collector to Base Voltage	25	V
V_{CEO}	Collector to Emitter Voltage	25	V
V_{EBO}	Emitter to Base Voltage	15	V
I_C	Collector Current (DC).	700	mA
I_C	Collector Current (pulse)*.	1.0	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	800		3200	–	V_{CE} = 2.0 V, I_C = 300 mA
h_{FE2}**	DC Current Gain	640			–	V_{CE} = 2.0 V, I_C = 500 mA
f_T	Gain Bandwidth Product	150	250		MHz	V_{CE} = 5.0 V, I_E = −300 mA
C_{ob}	Output Capacitance		10		pF	V_{CB} = 10 V, I_E = 0, f = 1.0 MHz
I_{CBO}	Collector Cutoff Current			100	nA	V_{CB} = 25 V, I_E = 0
I_{EBO}	Emitter Cutoff Current			100	nA	V_{EB} = 10 V, I_C = 0
V_{BE}**	Base to Emitter Voltage	600		700	mV	V_{CE} = 2.0 V, I_C = 50 mA
$V_{CE(sat)}$**	Collector Saturation Voltage		0.14	0.3	V	I_C = 300 mA, I_B = 3.0 mA
$V_{BE(sat)}$**	Base Saturation Voltage		0.77	1.2	V	I_C = 300 mA, I_B = 3.0 mA
t_{on}	Turn-On Time		0.13		μs	V_{CC} = 10 V, $V_{BE(off)} \fallingdotseq -2.7$ V I_C = 200 mA $I_{B1} = -I_{B2}$ = 4.0 mA
t_{stg}	Storage Time		0.90		μs	
t_{off}	Turn-Off Time		1.1		μs	

**Pulsed PW ≦ 350 μs, Duty Cycle ≦ 2 %

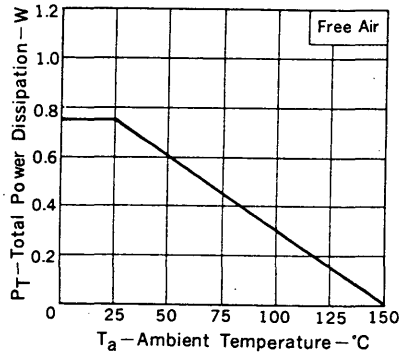
Classification of h_{FE1}

Rank	M	L	K
Range	800 to 1600	1200 to 2400	2000 to 3200

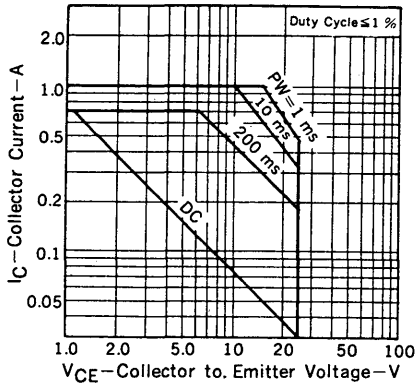
Test Conditions: V_{CE} = 2.0 V, I_C = 300 mA

TYPICAL CHARACTERISTICS (T_a = 25 °C)

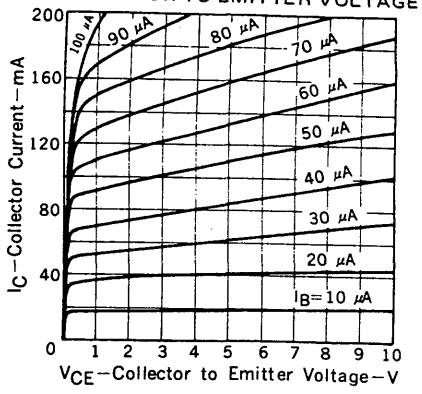
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



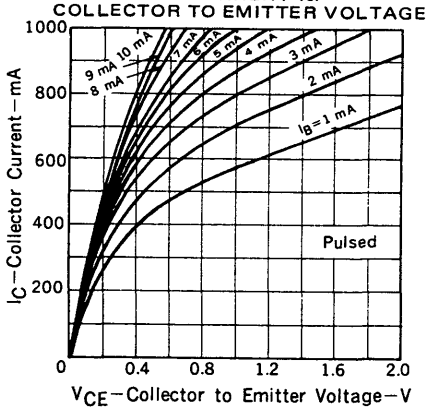
SAFE OPERATING AREAS (TRANSIENT THERMAL RESISTANCE METHOD)



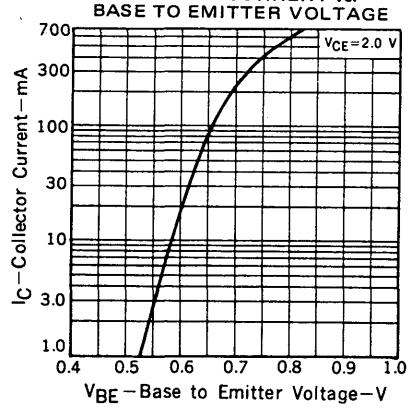
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



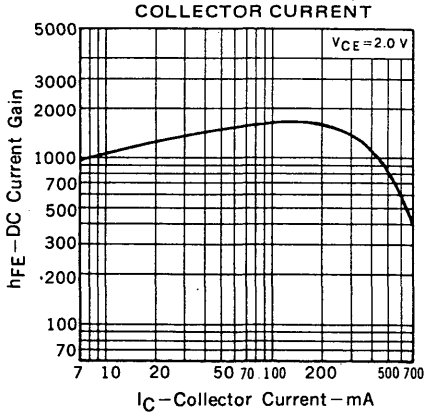
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



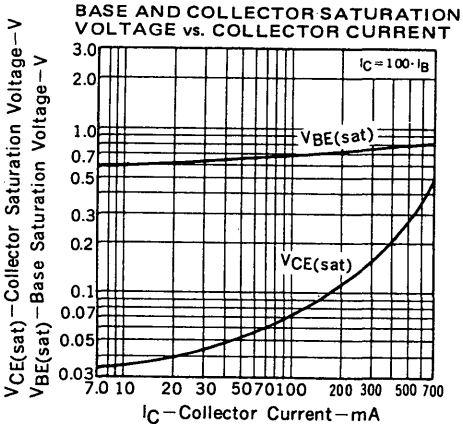
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



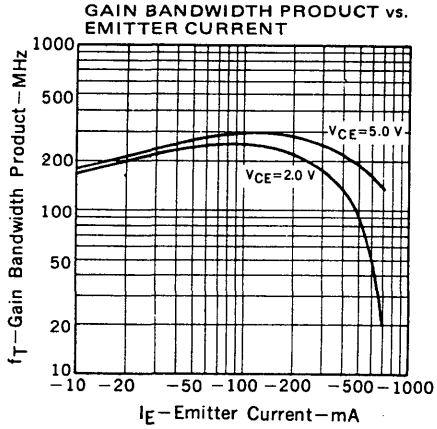
DC CURRENT GAIN vs. COLLECTOR CURRENT



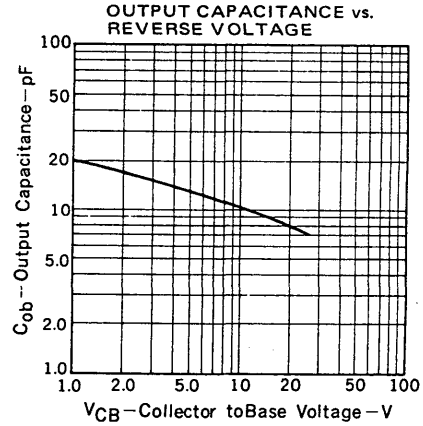
BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



OUTPUT CAPACITANCE vs. REVERSE VOLTAGE



SWITCHING TIME vs.
COLLECTOR CURRENT