NEC

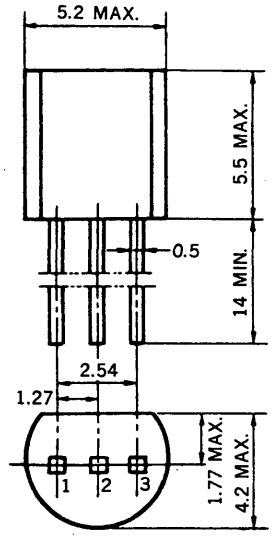
NPN SILICON TRANSISTORS
2SD1616, 2SD1616A

DESCRIPTION The 2SD1616/2SD1616A are designed for use in driver and output stages of AF amplifier, general purpose application.

FEATURES

- Low Collector Saturation Voltage.
  $V_{CE(sat)}$ = 0.15 V TYP. (@ I_C = 1.0 A, I_B = 50 mA)
- High Break Down Voltage.
  V_{CEO} = 50 V/60 V (2SD1616/2SD1616A)
- High Total Power Dissipation. : P_T = 0.75 W (T_a = 25 °C)
- Complementary to the NEC 2SB1116/2SB1116A PNP Transistor.

PACKAGE DIMENSIONS
in millimeters



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) 2SD1616/2SD1616A

V_{CBO}	Collector to Base Voltage	60 V/120 V
V_{CEO}	Collector to Emitter Voltage	50 V/60 V
V_{EBO}	Emitter to Base Voltage	6.0 V
I_C	Collector Current (DC)	1.0 A
I_C	Collector Current (pulse)*	2.0 A

*PW ≦ 10 ms, Duty Cycle ≦ 50 %

ELECTRICAL CHARACTERISTICS (T_a = 25 °C) 2SD1616/2SD1616A

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
h_{FE1}**	DC Current Gain	135		600	—	V_{CE} = 2.0 V, I_C = 100 mA
h_{FE2}**	DC Current Gain	81			—	V_{CE} = 2.0 V, I_C = 1.0 A
f_T	Gain Bandwidth Product	100	160		MHz	V_{CE} = 2.0 V, I_C = 100 mA
C_{ob}	Output Capacitance		19		pF	V_{CB} = 10 V, I_E = 0, f = 1.0 MHz
I_{CBO}	Collector Cutoff Current			100	nA	V_{CB} = 60 V/120 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		700	mV	V_{CE} = 2.0 V, I_C = 50 mA
$V_{CE(sat)}$**	Collector Saturation Voltage		0.15	0.3	V	I_C = 1.0 A, I_B = 50 mA
$V_{BE(sat)}$**	Base Saturation Voltage		0.9	1.2	V	I_C = 1.0 A, I_B = 50 mA
t_{on}	Turn-On Time		0.07		μs	(V_{CC} = 10 V, I_C = 100 mA
t_{stg}	Storage Time		0.95		μs	$I_{B1} = -I_{B2}$ = 10 mA
t_f	Fall Time		0.07		μs	$V_{BE(off)}$ = −2 to 3 V)

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

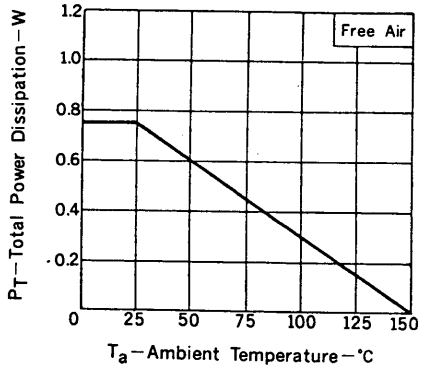
Classification of h_{FE1}

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

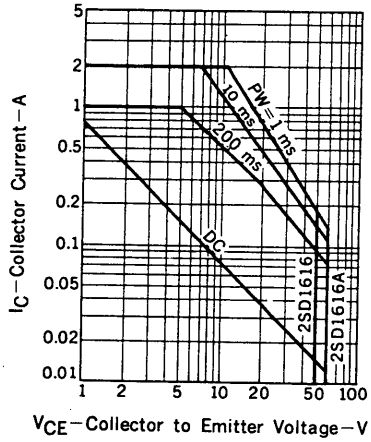
Test Conditions: V_{CE} = 2.0 V, I_C = 100 mA

TYPICAL CHARACTERISTICS (T_a = 25 °C)

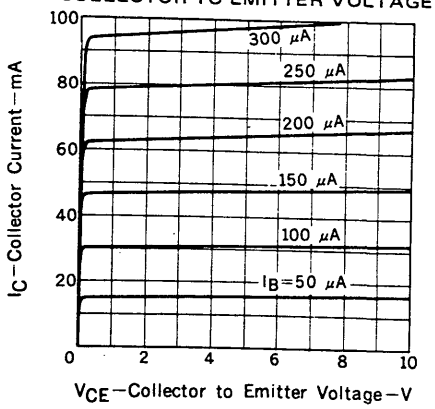
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



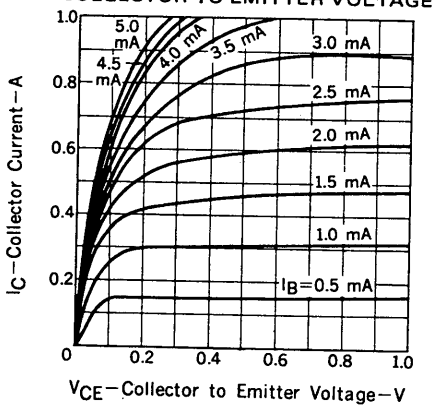
SAFE OPERATING AREAS (TRANSIENT THERMAL RESISTANCE METHOD)



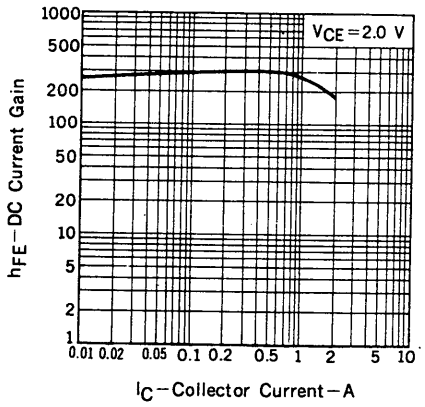
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



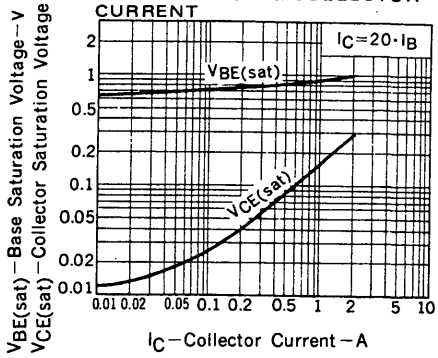
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



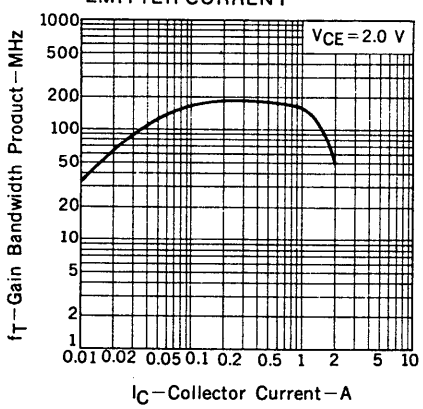
DC CURRENT GAIN vs. COLLECTOR CURRENT



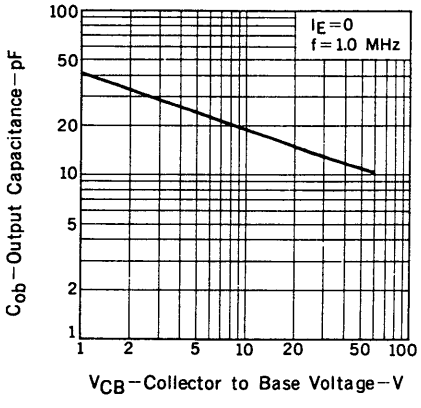
COLLECTOR AND BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



SWITCHING TIME vs. COLLECTOR CURRENT