

## NPN SILICON EPITAXIAL TRANSISTOR FOR LOW-FREQUENCY POWER AMPLIFIERS AND MID-SPEED SWITCHING

### FEATURES

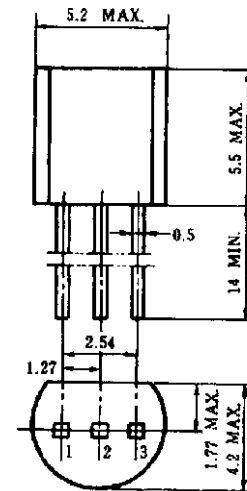
- Low  $V_{CE(sat)}$ :  
 $V_{CE(sat)} = 0.15 \text{ V TYP. (} I_C = 1.0 \text{ A, } I_B = 50 \text{ mA)}$
- Large  $P_T$  in small dimension with versatility  
 $P_T = 0.75 \text{ W, } V_{CEO} = 50/60 \text{ V, } I_{C(DC)} = 1.0 \text{ A}$
- Complementary transistor with the 2SB1116 and 1116A

### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Ratings		Unit
		2SD1616	2SD1616A	
Collector to base voltage	$V_{CBO}$	60	120	V
Collector to emitter voltage	$V_{CEO}$	50	60	V
Emitter to base voltage	$V_{EBO}$	6.0		V
Collector current (DC)	$I_{C(DC)}$	1.0		A
Collector current (pulse)	$I_{C(Pulse)^*}$	2.0		A
Total power dissipation	$P_T$	0.75		W
Junction temperature	$T_j$	150		$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150		$^\circ\text{C}$

\*  $PW \leq 10 \text{ ms, duty cycle} \leq 50\%$

### PACKAGE DRAWING (UNIT: mm)



Electrode Connection

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

### ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

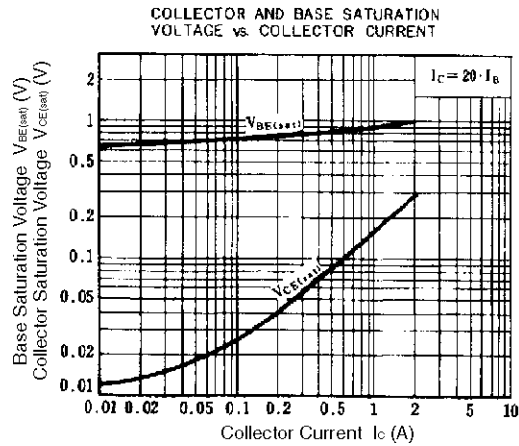
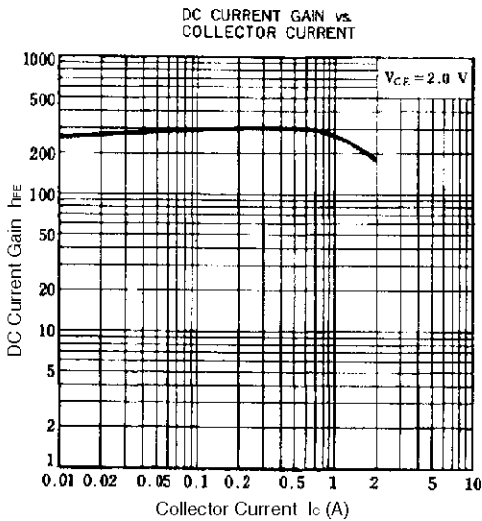
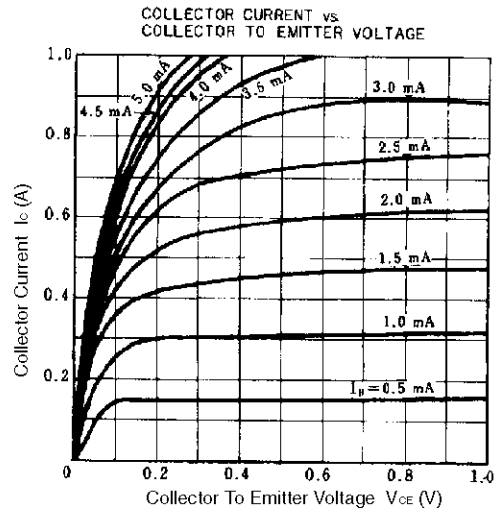
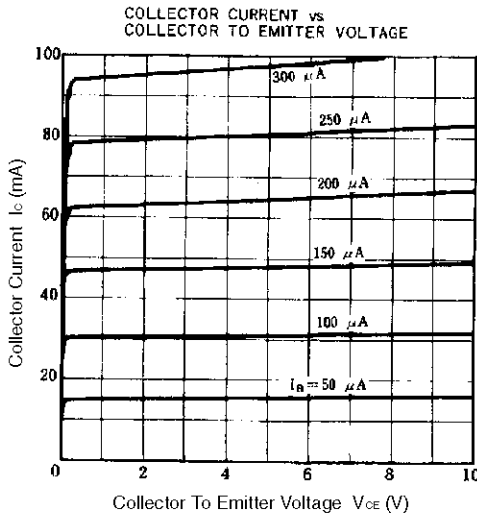
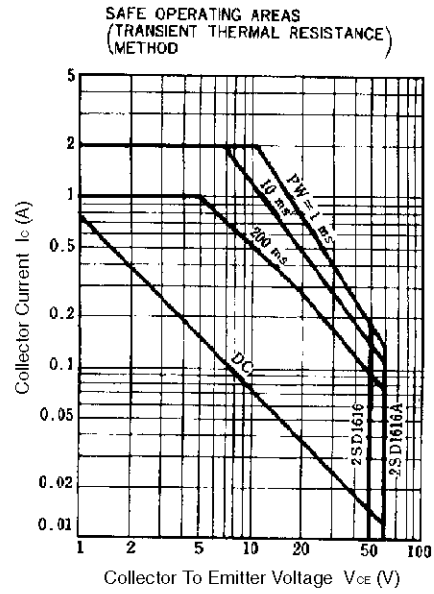
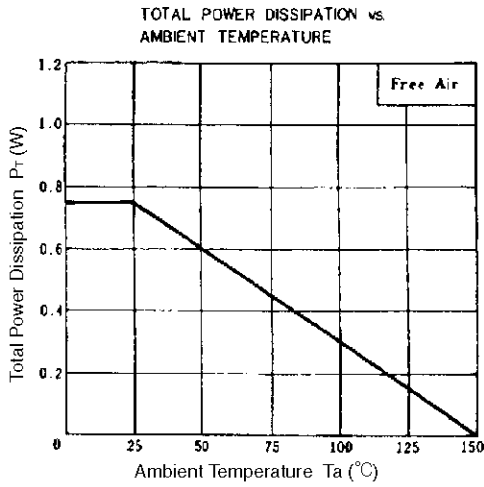
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = 60 \text{ V, } I_E = 0$			100	nA
Emitter cutoff current	$I_{EBO}$	$V_{EB} = 6.0 \text{ V, } I_C = 0$			100	nA
DC current gain	$h_{FE1}^{**}$	$V_{CE} = 2.0 \text{ V, } I_C = 100 \text{ mA}$	135		600/400	-
DC current gain	$h_{FE2}^{**}$	$V_{CE} = 2.0 \text{ V, } I_C = 1.0 \text{ A}$	81			-
DC base voltage	$V_{BE}^{**}$	$V_{CE} = 2.0 \text{ V, } I_C = 50 \text{ mA}$	600	640	700	mV
Collector saturation voltage	$V_{CE(sat)}^{**}$	$I_C = 1.0 \text{ A, } I_B = 50 \text{ mA}$		0.15	0.3	V
Base saturation voltage	$V_{BE(sat)}^{**}$	$I_C = 1.0 \text{ A, } I_B = 50 \text{ mA}$		0.9	1.2	V
Output capacitance	$C_{ob}$	$V_{CB} = 10 \text{ V, } I_E = 0, f = 1.0 \text{ MHz}$		19		pF
Gain bandwidth product	$f_r$	$V_{CE} = 2.0 \text{ V, } I_C = 100 \text{ mA}$	100	160		MHz
Turn-on time	$t_{on}$	$V_{CC} = 10 \text{ V, } I_C = 100 \text{ mA}$		0.07		$\mu\text{s}$
Storage time	$t_{stg}$	$I_{B1} = -I_{B2} = 10 \text{ mA}$		0.95		$\mu\text{s}$
Fall time	$t_f$	$V_{BE(off)} = -2 \text{ to } -3 \text{ V}$		0.07		$\mu\text{s}$

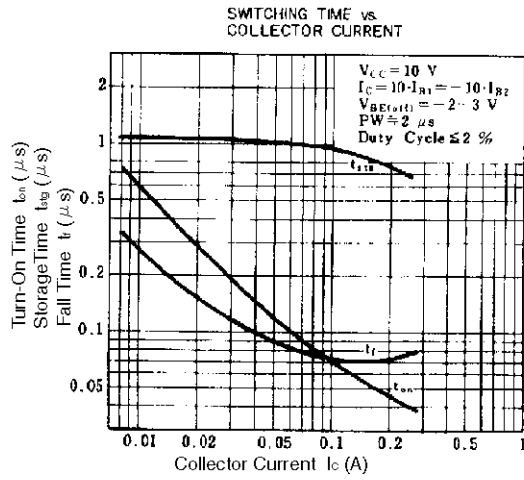
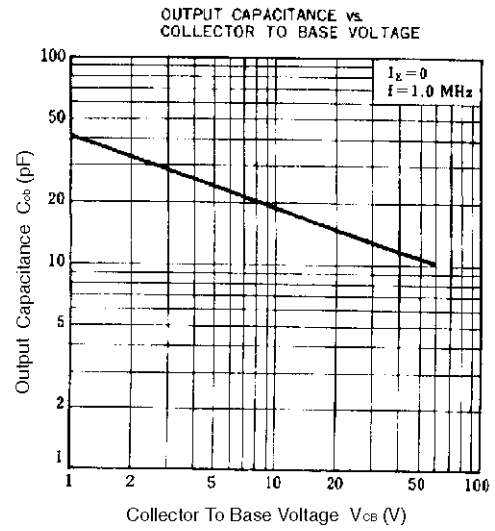
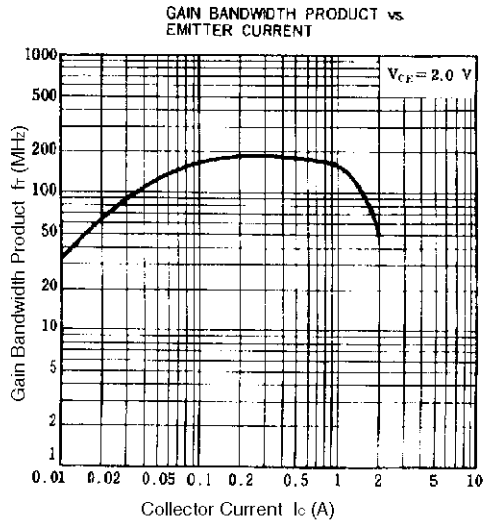
\*\* Pulse test  $PW \leq 350 \mu\text{s, duty cycle} \leq 2\%$  per pulsed

$h_{FE1}/h_{FE}$  CLASSIFICATION L : 135 to 270 K : 200 to 400 U : 300 to 600 (U rank is not available for the 2SD1616A.)

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TYPICAL CHARACTERISTICS (Ta = 25°C)





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