

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

**ABSOLUTE MAXIMUM RATINGS**

Maximum Temperatures

Storage Temperature . . . . .  $-55 \text{ to } +150^\circ \text{C}$   
 Junction Temperature . . . . .  $150^\circ \text{C Maximum}$

Maximum Power Dissipation ( $T_a = 25^\circ \text{C}$ )

Total Power Dissipation . . . . .  $0.75 \text{ W}$

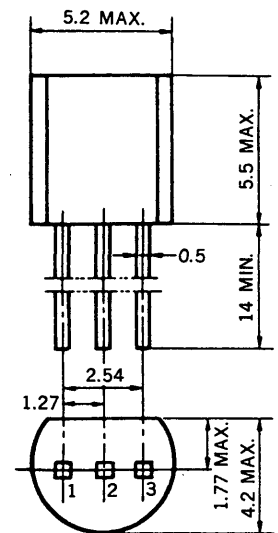
Maximum Voltages and Currents ( $T_a = 25^\circ \text{C}$ )

2SD1616/2SD1616A

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

\*PW  $\leq 10 \text{ ms}$ , Duty Cycle  $\leq 50 \%$

**PACKAGE DIMENSIONS**  
in millimeters



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

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

2SD1616/2SD1616A

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
$h_{FE1}^{**}$	DC Current Gain	135		600	—	$V_{CE} = 2.0 \text{ V, } I_C = 100 \text{ mA}$
$h_{FE2}^{**}$	DC Current Gain	81			—	$V_{CE} = 2.0 \text{ V, } I_C = 1.0 \text{ A}$
$f_T$	Gain Bandwidth Product	100	160		MHz	$V_{CE} = 2.0 \text{ V, } I_C = 100 \text{ mA}$
$C_{ob}$	Output Capacitance		19		pF	$V_{CB} = 10 \text{ V, } I_E = 0, f = 1.0 \text{ MHz}$
$I_{CBO}$	Collector Cutoff Current			100	nA	$V_{CB} = 60 \text{ V/120 V, } I_E = 0$
$I_{EBO}$	Emitter Cutoff Current			100	nA	$V_{EB} = 6.0 \text{ V, } I_C = 0$
$V_{BE}^{**}$	Base to Emitter Voltage	600		700	mV	$V_{CE} = 2.0 \text{ V, } I_C = 50 \text{ mA}$
$V_{CE(sat)}^{**}$	Collector Saturation Voltage		0.15	0.3	V	$I_C = 1.0 \text{ A, } I_B = 50 \text{ mA}$
$V_{BE(sat)}^{**}$	Base Saturation Voltage		0.9	1.2	V	$I_C = 1.0 \text{ A, } I_B = 50 \text{ mA}$
$t_{on}$	Turn-On Time		0.07		$\mu\text{s}$	$V_{CC} = 10 \text{ V, } I_C = 100 \text{ mA}$ $I_{B1} = -I_{B2} = 10 \text{ mA}$ $V_{BE(off)} = -2 \text{ to } 3 \text{ V}$
$t_{stg}$	Storage Time		0.95		$\mu\text{s}$	
$t_f$	Fall Time		0.07		$\mu\text{s}$	

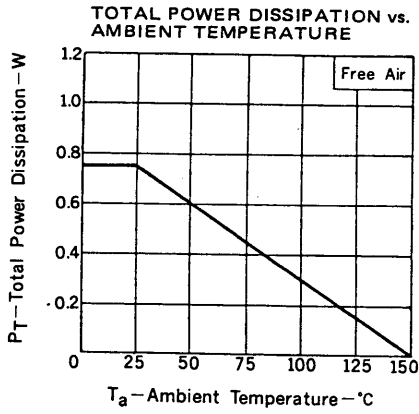
\*\*Pulsed PW  $\leq 350 \mu\text{s}$ , Duty Cycle  $\leq 2 \%$

Classification of  $h_{FE1}$

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

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

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



SAFE OPERATING AREAS (TRANSIENT THERMAL RESISTANCE METHOD)

