

**DESCRIPTION** The 2SC2785 is designed for use in driver stage of AF amplifier and low speed switching.

- FEATURES**
- High Voltage  $V_{CE0} : 50 \text{ V MIN.}$
  - Excellent  $h_{FE}$  Linearity : 0.92 TYP.  
 $h_{FE1} (0.1 \text{ mA})/h_{FE2} (1.0 \text{ mA})$
  - Complementary to the NEC 2SA1175 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 ..... 250 mW

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

$V_{CBO}$  Collector to Base Voltage ..... 60 V

$V_{CEO}$  Collector to Emitter Voltage ..... 50 V

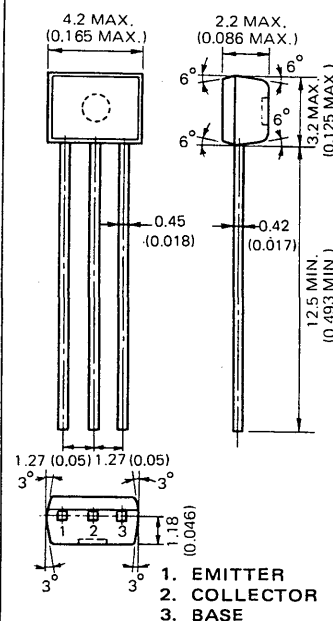
$V_{EBO}$  Emitter to Base Voltage ..... 5.0 V

$I_C$  Collector Current ..... 100 mA

$I_B$  Base Current ..... 20 mA

## PACKAGE DIMENSIONS

in millimeters (inches)



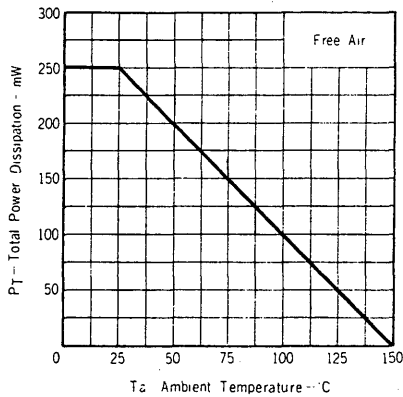
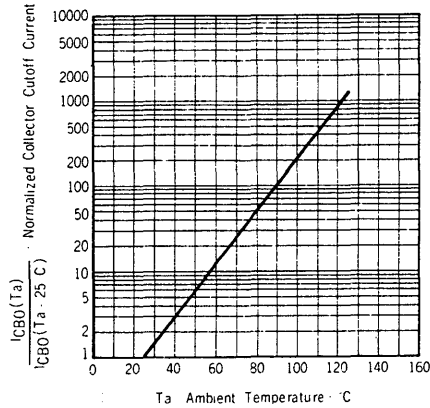
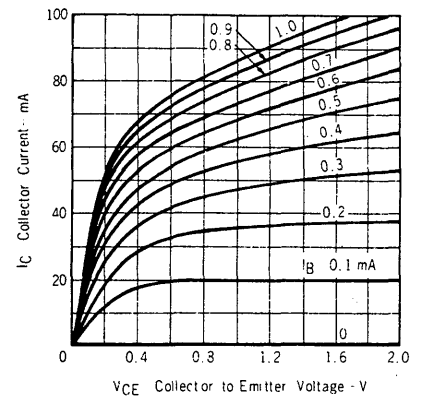
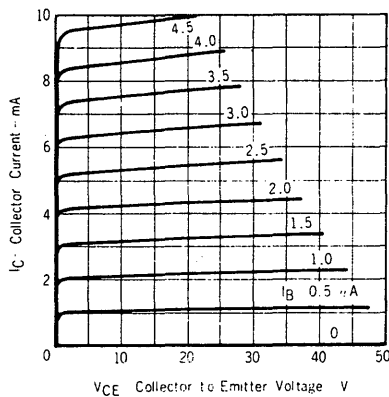
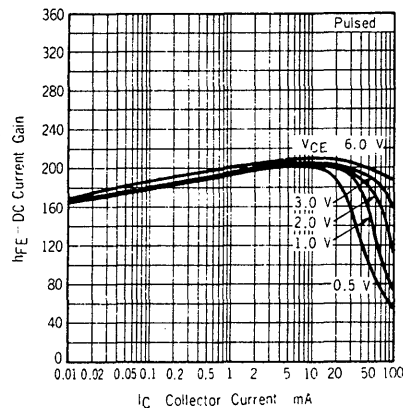
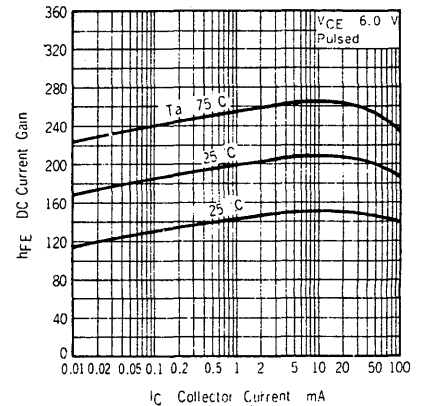
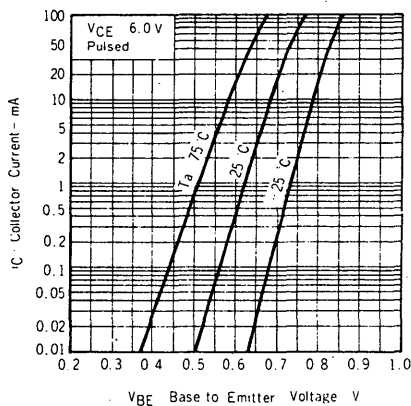
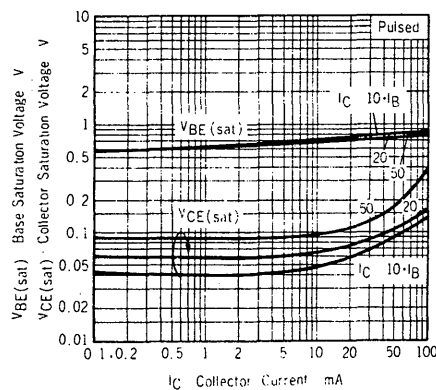
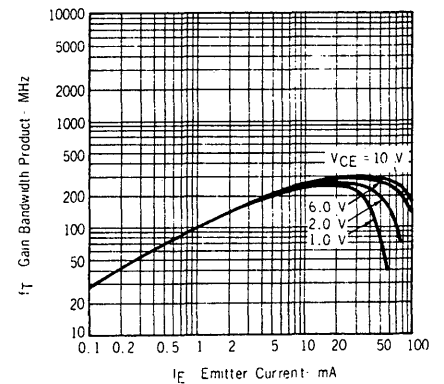
## ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

| SYMBOL        | CHARACTERISTIC                | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS  |
|---------------|-------------------------------|------|------|------|------|--|
| $h_{FE1}$     | DC Current Gain               | 50   | 185  |      |      | $V_{CE}=6.0 \text{ V}, I_C=0.1 \text{ mA}$   |
| $h_{FE2}$     | DC Current Gain               | 110  | 200  | 600  |      | $V_{CE}=6.0 \text{ V}, I_C=1.0 \text{ mA}$   |
| NF            | Noise Figure                  |      | 0.8  | 15   | dB   | $V_{CE}=6.0 \text{ V}, I_C=0.1 \text{ mA}, R_G=2.0 \text{ k}\Omega, f=1.0 \text{ kHz}$ |
| $f_T$         | Gain Bandwidth Product        | 150  | 250  | 450  | MHz  | $V_{CE}=6.0 \text{ V}, I_E=-10 \text{ mA}$   |
| $C_{ob}$      | Collector to Base Capacitance |      | 3.0  | 4.0  | pF   | $V_{CB}=6.0 \text{ V}, I_E=0, f=1.0 \text{ MHz}$                                       |
| $I_{CBO}$     | Collector Cutoff Current      |      |      | 100  | nA   | $V_{CB}=60 \text{ V}, I_E=0$   |
| $I_{EBO}$     | Emitter Cutoff Current        |      |      | 100  | nA   | $V_{EB}=5.0 \text{ V}, I_C=0$  |
| $V_{BE}$      | Base to Emitter Voltage       | 0.55 | 0.62 | 0.65 | V    | $V_{CE}=6.0 \text{ V}, I_C=1.0 \text{ mA}$   |
| $V_{CE(sat)}$ | Collector Saturation Voltage  |      | 0.15 | 0.3  | V    | $I_C=100 \text{ mA}, I_B=10 \text{ mA}$  |
| $V_{BE(sat)}$ | Base Saturation Voltage       |      | 0.86 | 1.0  | V    | $I_C=100 \text{ mA}, I_B=10 \text{ mA}$  |

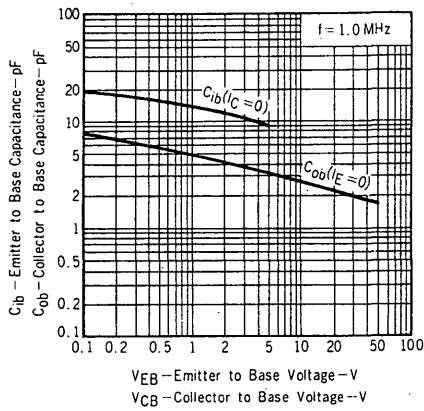
### Classification of $h_{FE2}$

| Rank  | RF        | JF        | HF        | FF        | EF        | KF        |
|-------|-----------|-----------|-----------|-----------|-----------|-----------|
| Range | 110 - 180 | 135 - 220 | 170 - 270 | 200 - 320 | 250 - 400 | 300 - 600 |

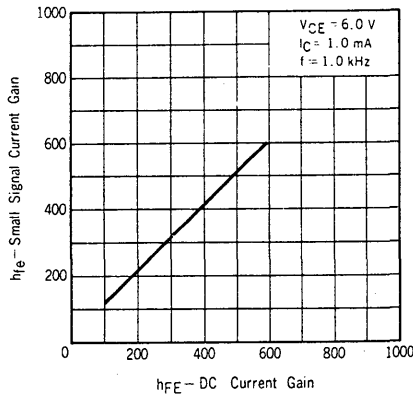
$h_{FE2}$  Test Conditions :  $V_{CE}=6.0 \text{ V}, I_C=1.0 \text{ mA}$

TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$  unless otherwise noted)TOTAL POWER DISSIPATION  
vs. AMBIENT TEMPERATURENORMALIZED COLLECTOR CUTOFF  
CURRENT vs. AMBIENT TEMPERATURECOLLECTOR CURRENT  
vs. COLLECTOR TO EMITTER VOLTAGECOLLECTOR CURRENT  
vs. COLLECTOR TO EMITTER VOLTAGEDC CURRENT GAIN  
vs. COLLECTOR CURRENTDC CURRENT GAIN  
vs. COLLECTOR CURRENTCOLLECTOR CURRENT  
vs. BASE TO EMITTER VOLTAGECOLLECTOR AND BASE SATURATION  
VOLTAGE vs. COLLECTOR CURRENTGAIN BANDWIDTH PRODUCT  
vs. EMITTER CURRENT

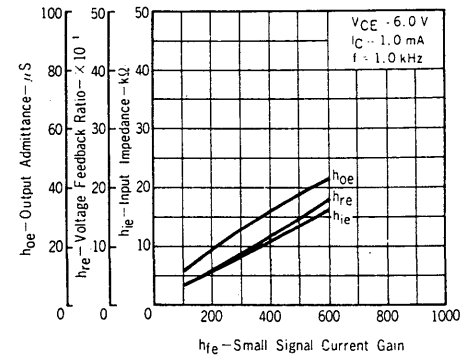
EMITTER TO BASE AND COLLECTOR TO BASE CAPACITANCE vs. REVERSE VOLTAGE



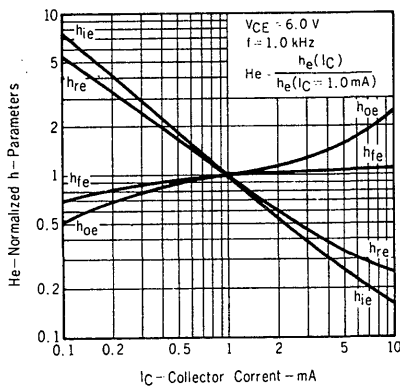
SMALL SIGNAL CURRENT GAIN vs. DC CURRENT GAIN



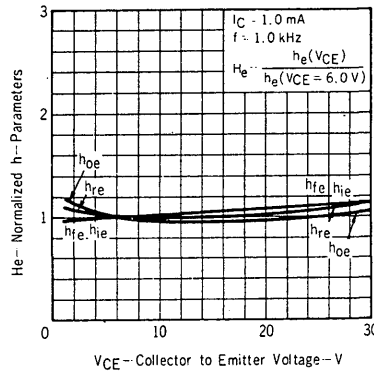
INPUT IMPEDANCE, VOLTAGE FEEDBACK RATIO AND OUTPUT ADMITTANCE vs. SMALL SIGNAL CURRENT GAIN



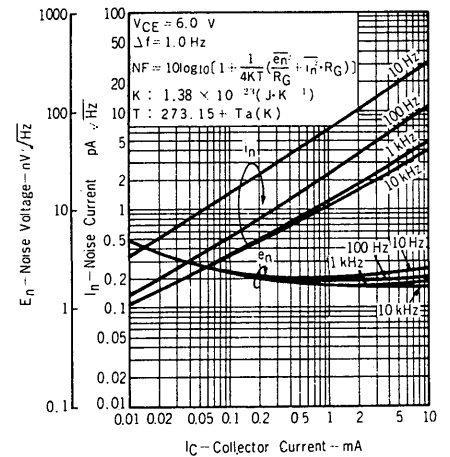
NORMALIZED h-PARAMETERS vs. COLLECTOR CURRENT



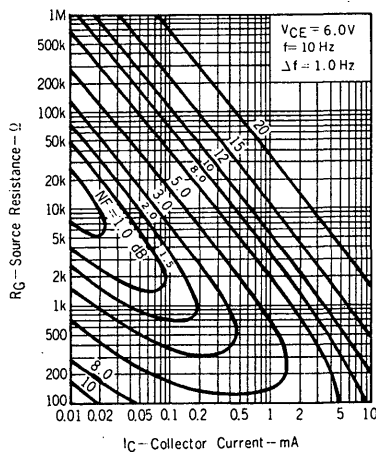
NORMALIZED h-PARAMETERS vs. COLLECTOR TO EMITTER VOLTAGE



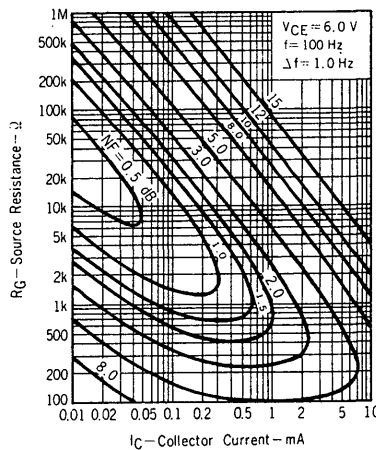
$E_n$  AND  $I_n$  vs. COLLECTOR CURRENT



NOISE FIGURE MAP 1



NOISE FIGURE MAP 2



NOISE FIGURE MAP 3

