

**2N5781, 2N5782, 2N5783, 2N5784, 2N5785, 2N5786**

**Silicon N-P-N and P-N-P Epitaxial-Base Complementary-Symmetry Transistors**

General-Purpose Types for Switching and Linear-Amplifier Applications

**Features:**

- Low saturation voltages
- Maximum safe-area-of-operation curves
- High gain at high current
- High breakdown voltages

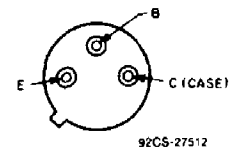
The 2N5781, 2N5782, and 2N5783 are epitaxial-base silicon p-n-p transistors — complements of the silicon n-p-n types 2N5784, 2N5785, and 2N5786, respectively.

The three types in each family differ primarily in voltage ratings and saturation characteristics.

These transistors are intended for medium-power switching and complementary-symmetry audio amplifier applications.

All types are supplied in the JEDEC TO-205AD package.

**TERMINAL DESIGNATIONS**

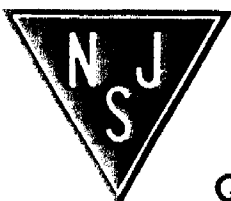


**JEDEC TO-205AD**

**MAXIMUM RATINGS, Absolute-Maximum Values:**

- \*COLLECTOR-TO-BASE VOLTAGE .....  $V_{CBO}$
- COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:
  - \* With external base-to-emitter resistance ( $R_{BE}$ ) = 100  $\Omega$  .....  $V_{CER(sus)}$
  - With base open .....  $V_{CEO(sus)}$
- \*EMITTER-TO-BASE VOLTAGE .....  $V_{EBO}$
- \*CONTINUOUS COLLECTOR CURRENT .....  $I_C$
- \*CONTINUOUS BASE CURRENT .....  $I_B$
- \*TRANSISTOR DISSIPATION:  $P_T$ 
  - At case temperatures up to 25°C ..... W
  - At ambient temperatures up to 25°C ..... W
  - At case temperatures above 25°C ..... Derate linearly
  - At ambient temperatures above 25°C ..... Derate linearly
- \*TEMPERATURE RANGE:
  - Storage and operating (Junction) ..... °C
- \*LEAD TEMPERATURE (During soldering):
  - At distance  $\geq$  1/32 in. (0.8 mm) from seating plane for 10 s max. .... °C

P-N-P	2N5781*	2N5782*	2N5783*	
N-P-N	2N5784	2N5785	2N5786	
$V_{CBO}$	80	65	45	V
$V_{CER(sus)}$	80	65	45	V
$V_{CEO(sus)}$	65	50	40	V
$V_{EBO}$	5	5	3.5	V
$I_C$	3.5	3.5	3.5	A
$I_B$	1	1	1	A
$P_T$				
	10	10	10	W
	1	1	1	W
	0.057 W/°C, or see Fig. 7.			
	0.0057			W/°C
	— 65 to +200 —			°C
	230			°C



**Quality Semi-Conductors**

## 2N5781, 2N5782, 2N5783, 2N5784, 2N5785, 2N5786

ELECTRICAL CHARACTERISTICS. At Case Temperature ( $T_C$ ) = 25°C unless otherwise specified

CHARACTERISTIC	SYMBOL	TEST CONDITIONS <sup>†</sup>				LIMITS				UNITS
		VOLTAGE V dc		CURRENT A dc		2N5783 p-n-p		2N5786 n-p-n		
		V <sub>CE</sub>	V <sub>BE</sub>	I <sub>C</sub>	I <sub>B</sub>	Min.	Max.	Min.	Max.	
Collector Cutoff Current: With external base-to-emitter resistance (R <sub>BE</sub> ) = 100 Ω	I <sub>CER</sub>	40				–	–10	–	10	μA
		At T <sub>C</sub> = 150°C								
With base-emitter junction reverse- biased and external base-to-emitter resistance (R <sub>BE</sub> ) = 100 Ω	I <sub>CEX</sub>	–45	1.5			–	–10	–	–	μA
		45	–1.5			–	–	–	10	
At T <sub>C</sub> = 150°C	I <sub>CEX</sub>	–45	1.5			–	–1	–	–	mA
		45	–1.5			–	–	–	1	
With base open	I <sub>CEO</sub>	25			0	–	–100	–	100	μA
Emitter Cutoff Current	I <sub>EBO</sub>		–3.5	0		–	–10	–	10	μA
DC Forward-Current Transfer Ratio	h <sub>FE</sub>	2		1.6 <sup>a</sup>		20	100	20	100	
		2		3.2 <sup>a</sup>		4	–	4	–	
Collector-to-Emitter Sustaining Voltage (see Figs. 2 and 3): With base open	V <sub>CEO(sus)</sub>			0.1 <sup>a</sup>	0	–40 <sup>b</sup>	–	40 <sup>b</sup>	–	V
	V <sub>CER(sus)</sub>			0.1 <sup>a</sup>		–45 <sup>b</sup>	–	45 <sup>b</sup>	–	
Base-to-Emitter Voltage	V <sub>BE</sub>	2		1.6 <sup>a</sup>		–	–1.5	–	1.5	V
Collector-to-Emitter Saturation Voltage (measured 0.25 in (6.35 mm) from case) <sup>c</sup>	V <sub>CE(sat)</sub>			1.6 <sup>a</sup>	0.16	–	–1	–	1	V
				3.2 <sup>a</sup>	0.8	–	–2	–	2	
Magnitude of Common-Emitter, Small-Signal, Short-Circuit, Forward-Current Transfer Ratio <sup>d</sup> f = 4 MHz	h <sub>fe</sub>	–2		–0.1		2	15	–	–	
		2		0.1		–	–	5	20	
f = 200 kHz										
Common-Emitter, Small-Signal, Short-Circuit, Forward-Current Transfer Ratio (f = 1 kHz)	h <sub>fe</sub>	2		0.1		25	–	25	–	
Saturated Switching Time (V <sub>CC</sub> = 30 V, I <sub>B1</sub> = I <sub>B2</sub> ): Turn-on (t <sub>d</sub> + t <sub>r</sub> )	t <sub>ON</sub>			–1	–0.1	–	0.5	–	–	μs
				1	0.1	–	–	–	5	
Turn-off (t <sub>s</sub> + t <sub>f</sub> )	t <sub>OFF</sub>			–1	–0.1	–	2.5	–	–	
				1	0.1	–	–	–	15	
Thermal Resistance: Junction-to-case	R <sub>θJC</sub>						17.5	–	17.5	°C/W
						–	175	–	175	
Junction-to-ambient	R <sub>θJA</sub>									