

**MJE172****PNP EPITAXIAL SILICON TRANSISTOR**

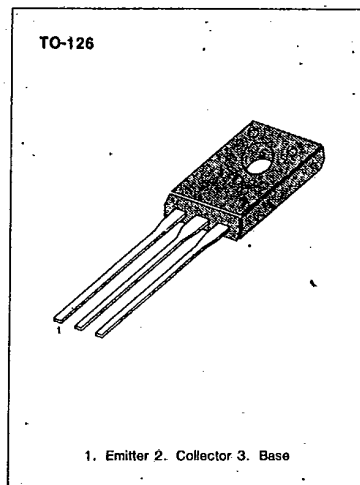
T-33-17

**LOW FREQUENCY AMPLIFIER  
LOW CURRENT, HIGH SPEED  
SWITCHING APPLICATION**

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

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CB0}$	-100	V
Collector-Emitter Voltage	$V_{CE0}$	-80	V
Emitter-Base Voltage	$V_{EB0}$	-7	V
Base Current	$I_b$	-1	A
Collector Current (DC)	$I_c$	-3	A
Collector Current (Pulse)	$I_c$	-6	A
Collector Dissipation ( $T_a=25^\circ\text{C}$ )	$P_c$	1.5	W
Derate above $25^\circ\text{C}$		0.012	W/ $^\circ\text{C}$
Collector Dissipation ( $T_c=25^\circ\text{C}$ )	$P_c$	12.5	W
Derate above $25^\circ\text{C}$		0.1	W/ $^\circ\text{C}$
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-65~150	$^\circ\text{C}$

\* Refer to MJE170 for graphs

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

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Sustaining Voltage	$V_{CE(sus)}$	$I_c=-10\text{mA}, I_b=0$	-80		V
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=-100\text{V}, I_E=0$		-0.1	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{CB}=-100\text{V}, I_E=0, T_c=150^\circ\text{C}$		-0.1	mA
DC Current Gain	$h_{FE}$	$V_{EB}=-7\text{V}, I_c=0$		-0.1	$\mu\text{A}$
		$V_{CE}=-1\text{V}, I_c=-100\text{mA}$	50	250	
		$V_{CE}=-1\text{V}, I_c=-500\text{mA}$	30		
		$V_{CE}=-1\text{V}, I_c=-1.5\text{A}$	12		
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$I_c=-500\text{mA}, I_b=-50\text{mA}$		-0.3	V
		$I_c=-1.5\text{A}, I_b=-150\text{mA}$		-0.9	V
		$I_c=-3.0\text{A}, I_b=-600\text{mA}$		-1.7	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_c=-1.5\text{A}, I_b=-150\text{mA}$		-1.5	V
		$I_c=-3.0\text{A}, I_b=-600\text{mA}$		-2.0	V
Base-Emitter On Voltage	$V_{BE(on)}$	$V_{CE}=-1\text{V}, I_c=-500\text{mA}$		-1.2	V
Current Gain Bandwidth Product	$f_T$	$V_{CE}=-10\text{V}, I_c=-100\text{mA}, f=10\text{MHz}$	50		MHz
Collector Output Capacitance	$C_{ob}$	$V_{CB}=-10\text{V}, I_E=0, f=0.1\text{MHz}$		50	pF

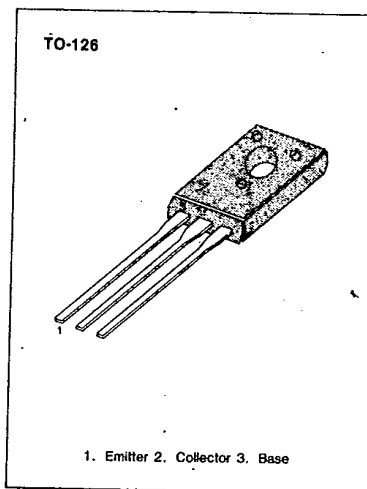
**MJE180/181/182****NPN EPITAXIAL SILICON TRANSISTOR**

T-33-07

DESIGNED FOR LOW POWER AUDIO  
AMPLIFIER AND LOW CURRENT  
HIGH SPEED SWITCHING APPLICATIONS

**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub>=25°C)**

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage: MJE180	V <sub>CB0</sub>	80	V
: MJE181		80	V
: MJE182		100	V
Collector-Emitter Voltage	V <sub>CEO</sub>	40	V
: MJE180		60	V
: MJE181		80	V
Emitter-Base Voltage	V <sub>EB0</sub>	7	V
Collector Current (DC)	I <sub>C</sub>	3	A
Collector Current (Pulse)	I <sub>C</sub>	6	A
Base Current (DC)	I <sub>B</sub>	1	A
Collector Dissipation (T <sub>a</sub> =25°C)	P <sub>C</sub>	1.5	W
Collector Dissipation (T <sub>C</sub> =25°C)	P <sub>C</sub>	12.5	W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-65~150	°C



3

**ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C)**

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Emitter Sustaining Voltage	V <sub>CEO(sus)</sub>	I <sub>C</sub> =10mA, I <sub>B</sub> =0	40		V
: MJE180			60		V
: MJE181			80		V
Collector Cutoff Current	I <sub>CB0</sub>	V <sub>CB</sub> =60V, I <sub>B</sub> =0		0.1	μA
: MJE180		V <sub>CB</sub> =80V, I <sub>E</sub> =0		0.1	μA
: MJE181		V <sub>CB</sub> =100V, I <sub>E</sub> =0		0.1	μA
: MJE182		V <sub>CB</sub> =60V, I <sub>E</sub> =0, T <sub>C</sub> =150°C		0.1	μA
: MJE180		V <sub>CB</sub> =80V, I <sub>E</sub> =0, T <sub>C</sub> =150°C		0.1	μA
: MJE181		V <sub>CB</sub> =100V, I <sub>E</sub> =0, T <sub>C</sub> =150°C		0.1	μA
Emitter Cutoff Current	I <sub>EB0</sub>	V <sub>BE</sub> =7V, I <sub>C</sub> =0		0.1	μA
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> =1V, I <sub>C</sub> =100mA	50	250	
: MJE180		V <sub>CE</sub> =1V, I <sub>C</sub> =500mA	30		
: MJE181		V <sub>CE</sub> =1V, I <sub>C</sub> =1.5A	12		
Collector Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =500mA, I <sub>B</sub> =50mA		0.3	V
: MJE180		I <sub>C</sub> =1.5A, I <sub>B</sub> =150mA		0.9	V
: MJE181		I <sub>C</sub> =3A, I <sub>B</sub> =600mA		1.7	V
Base Emitter Saturation Voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> =1.5A, I <sub>B</sub> =150mA		1.5	V
: MJE180		I <sub>C</sub> =3A, I <sub>B</sub> =600mA		2.0	V
Base Emitter On Voltage	V <sub>BE(on)</sub>	V <sub>CE</sub> =1V, I <sub>C</sub> =500mA		1.2	V
Current Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> =10V, I <sub>C</sub> =100mA, f=10MHz	50		MHz
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =10V, I <sub>E</sub> =0, f=0.1MHz		30	pF

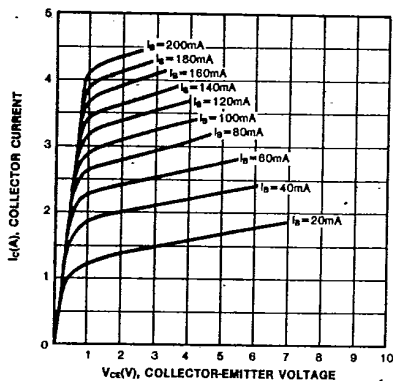


MJE180/181/182

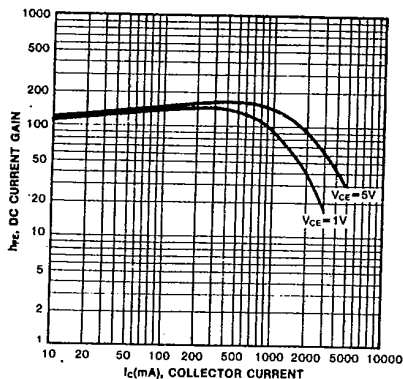
NPN EPITAXIAL SILICON TRANSISTOR

T-33-07

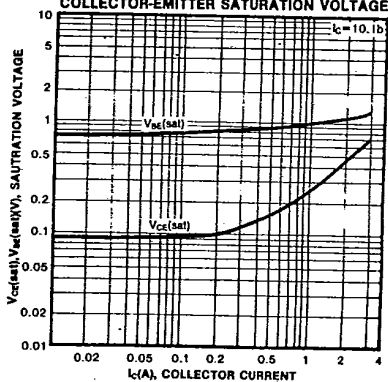
STATIC CHARACTERISTIC



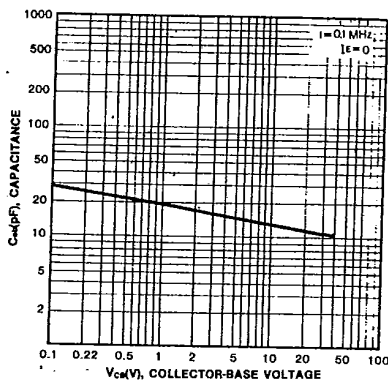
DC CURRENT GAIN



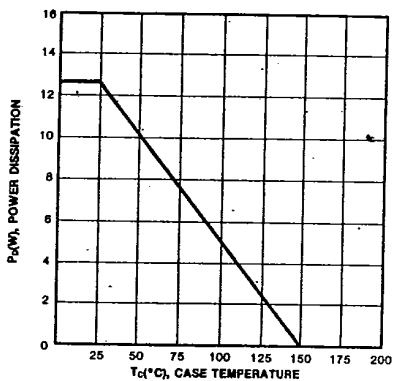
BASE-EMITTER SATURATION VOLTAGE  
COLLECTOR-EMITTER SATURATION VOLTAGE



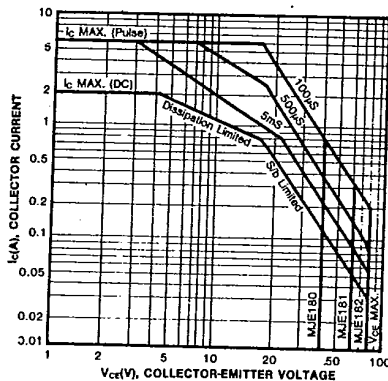
COLLECTOR OUTPUT CAPACITANCE



POWER DERATING



SAFE OPERATING AREA



**MJE200****NPN EPITAXIAL SILICON TRANSISTOR**

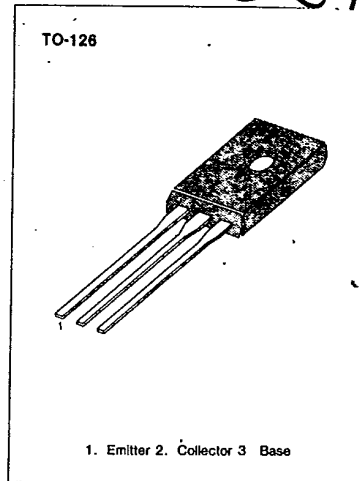
COLLECTOR-EMITTER SUSTAINING VOLTAGE  
LOW COLLECTOR-EMITTER SATURATION  
VOLTAGE

HIGH CURRENT GAIN-BANDWIDTH  
PRODUCT-MIN  $f_T=65\text{MHz}$  @  $I_C=100\text{mA}$

Complementary to MJE210

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

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CBO}$	40	V
Collector-Emitter Voltage	$V_{CEO}$	25	V
Emitter-Base Voltage	$V_{EBO}$	8	V
Collector Current	$I_C$	5	A
Collector Dissipation	$P_C$	15	W
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-65~150	$^\circ\text{C}$



3

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

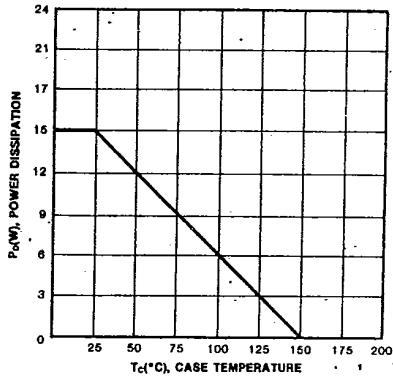
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Emitter Sustaining Voltage	$V_{CEO(sus)}$	$I_C=10\text{mA}, I_B=0$	25		V
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=40\text{V}, I_E=0$		100	nA
Emitter Cutoff Current	$I_{EBO}$	$V_{CB}=40\text{V}, I_E=0, T_J=125^\circ\text{C}$		100	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{BE}=8\text{V}, I_C=0$	70	100	nA
		$V_{CE}=1\text{V}, I_C=500\text{mA}$	45	180	
		$V_{CE}=1\text{V}, I_C=2\text{A}$	10		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{CE}=2\text{V}, I_C=5\text{A}$		0.3	V
		$I_C=500\text{mA}, I_B=50\text{mA}$		0.75	V
		$I_C=2\text{A}, I_B=200\text{mA}$		1.8	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=5\text{A}, I_B=1\text{A}$		2.5	V
Base-Emitter On Voltage	$V_{BE(on)}$	$I_C=5\text{A}, I_B=1\text{A}$		1.6	V
Current Gain-Bandwidth Product	$f_T$	$V_{CE}=1\text{V}, I_C=2\text{A}$	65		MHz
Output Capacitance	$C_{ob}$	$V_{CE}=10\text{V}, I_C=100\text{mA}, f=10\text{MHz}$		80	pF
		$V_{CB}=10\text{V}, I_E=0, f=0.1\text{MHz}$			

**MJE200**

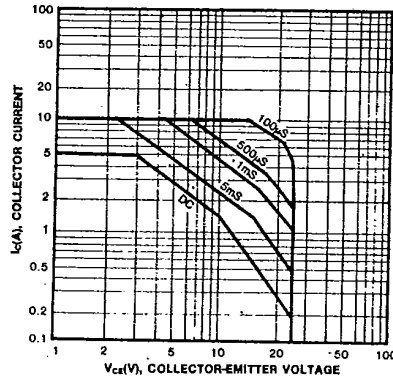
**NPN EPITAXIAL SILICON TRANSISTOR**

T-33-07

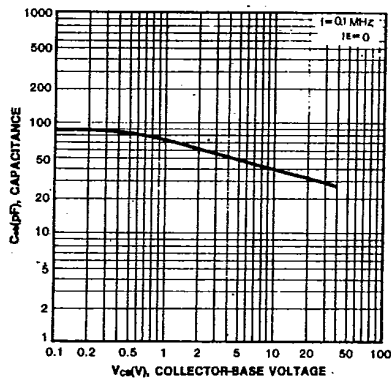
POWER DERATING



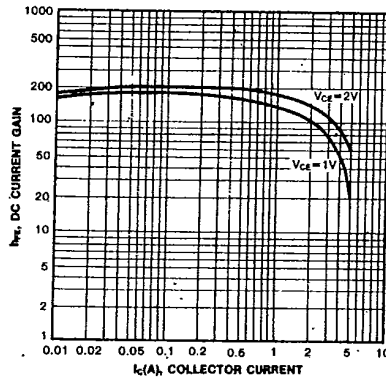
FORWARD BIAS SAFE OPERATING AREA



COLLECTOR OUTPUT CAPACITANCE



DC CURRENT GAIN



COLLECTOR-EMITTER SATURATION VOLTAGE  
BASE-EMITTER SATURATION VOLTAGE

