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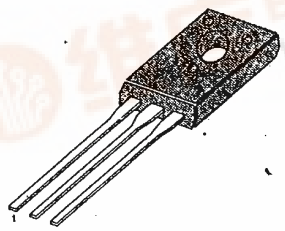
MJE172 PNP EPITAXIAL SILICON TRANSISTOR

T-33-17

LOW FREQUENCY AMPLIFIER
LOW CURRENT, HIGH SPEED
SWITCHING APPLICATION

TO-126



1. Emitter 2. Collector 3. Base

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	−100	V
Collector-Emitter Voltage	V_{CEO}	−80	V
Emitter-Base Voltage	V_{EBO}	−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°C)	P_C	1.5	W
Derate above 25°C		0.012	W/°C
Collector Dissipation (T_C=25°C)	P_C	12.5	W
Derate above 25°C		0.1	W/°C
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−65~150	°C

* Refer to MJE170 for graphs

ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Sustaining Voltage	V_{CEO}(sus)	I_C=−10mA, I_B=0	−80		V
Collector Cutoff Current	I_{CBO}	V_{CB}=−100V, I_E=0		−0.1	μA
		V_{CB}=−100V, I_E=0, T_C=150°C		−0.1	mA
Emitter Cutoff Current	I_{EBO}	V_{EB}=−7V, I_C=0		−0.1	μA
DC Current Gain	h_{FE}	V_{CE}=−1V, I_C=−100mA	50	250	
		V_{CE}=−1V, I_C=−500mA	30		
		V_{CE}=−1V, I_C=−1.5A	12		
Collector Emitter Saturation Voltage	V_{CE} (sat)	I_C=−500mA, I_B=−50mA		−0.3	V
		I_C=−1.5A, I_B=−150mA		−0.9	V
		I_C=−3.0A, I_B=−600mA		−1.7	V
Base-Emitter Saturation Voltage	V_{BE} (sat)	I_C=−1.5A, I_B=−150mA		−1.5	V
		I_C=−3.0A, I_B=−600mA		−2.0	V
Base-Emitter On Voltage	V_{BE}(on)	V_{CE}=−1V, I_C=−500mA		−1 2	V
Current Gain Bandwidth Product	f_T	V_{CE}=−10V, I_C=−100mA, f=10MHz	50		MHz
Collector Output Capacitance	Cob	V_{CB}=−10V, I_E=0, f=0.1MHz		50	pF

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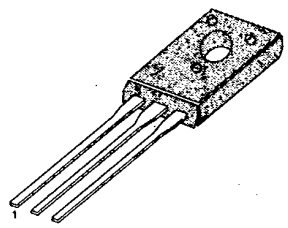
MJE180/181/182 NPN EPITAXIAL SILICON TRANSISTOR

T-33-07

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

TO-126



1. Emitter 2. Collector 3. Base

3

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage: MJE180	V_{CBO}	60	V
: MJE181		80	V
: MJE182		100	V
Collector-Emitter Voltage			
: MJE180	V_{CEO}	40	V
: MJE181		60	V
: MJE182		80	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	3	A
Collector Current (Pulse)	I_C	6	A
Base Current (DC)	I_B	1	A
Collector Dissipation (T_a=25°C)	P_C	1.5	W
Collector Dissipation (T_C=25°C)	P_C	12.5	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−65~150	°C

ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Emitter Sustaining Voltage	V_{CEO}(sus)				
: MJE180		I_C=10mA, I_B=0	40		V
: MJE181			60		V
: MJE182			80		V
Collector Cutoff Current : MJE180	I_{CBO}	V_{CB}=60V, I_B=0		0.1	μA
: MJE181		V_{CB}=80V, I_E=0		0.1	μA
: MJE182		V_{CB}=100V, I_E=0		0.1	μA
: MJE180		V_{CB}=60V, I_E=0, T_C=150°C		0.1	μA
: MJE181		V_{CB}=80V, I_E=0, T_C=150°C		0.1	μA
: MJE182		V_{CB}=100V, I_E=0, T_C=150°C		0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{BE}=7V, I_C=0		0.1	μA
DC Current Gain	h_{FE}	V_{CE}=1V, I_C=100mA	50	250	
		V_{CE}=1V, I_C=500mA	30		
		V_{CE}=1V, I_C=1.5A	12		
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=500mA, I_B=50mA		0.3	V
		I_C=1.5A, I_B=150mA		0.9	V
		I_C=3A, I_B=600mA		1.7	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=1.5A, I_B=150mA		1 5	V
		I_C=3A, I_B=600mA		2.0	V
Base Emitter On Voltage	V_{BE}(on)	V_{CE}=1V, I_C=500mA		1.2	V
Current Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=100mA, f=10MHz	50		MHz
Output Capacitance	C_{ob}	V_{CB}=10V, I_E=0, f=0.1MHz		30	pF

MJE180/181/182 NPN EPITAXIAL SILICON TRANSISTOR

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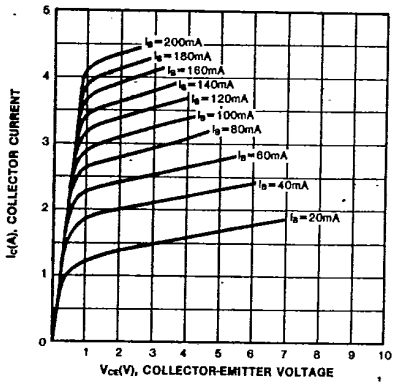
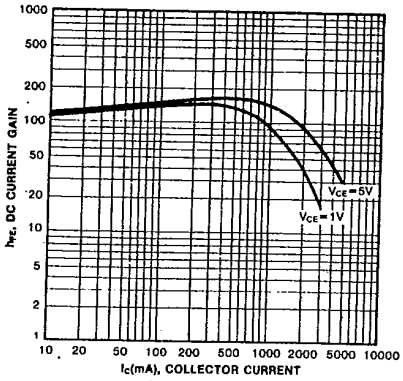
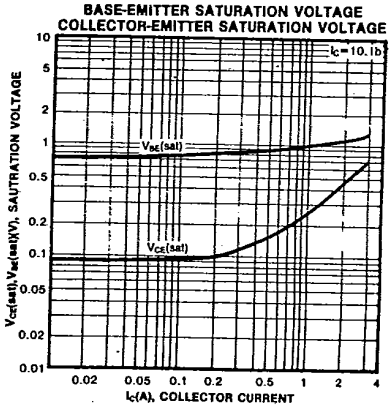
STATIC CHARACTERISTIC



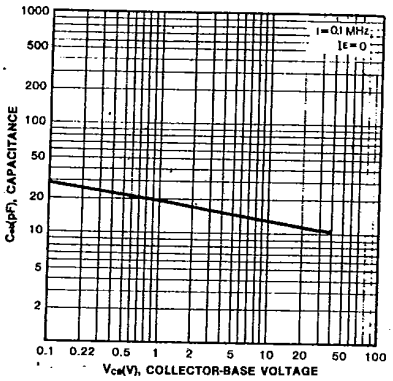
DC CURRENT GAIN



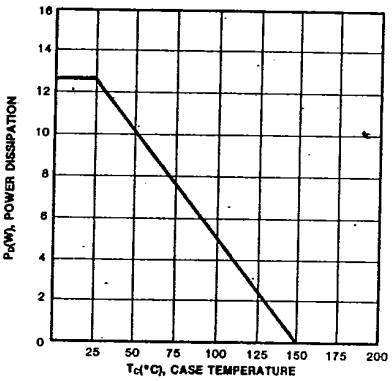
BASE-EMITTER SATURATION VOLTAGE
COLLECTOR-EMITTER SATURATION VOLTAGE



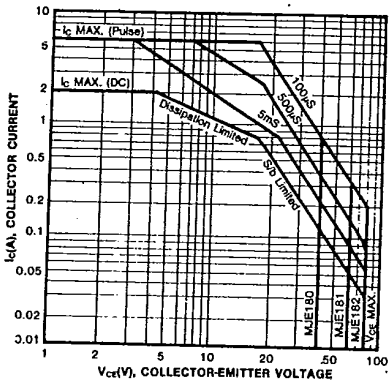
COLLECTOR OUTPUT CAPACITANCE



POWER DERATING



SAFE OPERATING AREA



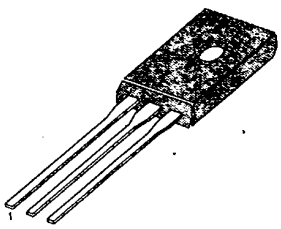
MJE200 NPN EPITAXIAL SILICON TRANSISTOR

T-33-07

COLLECTOR-EMITTER SUSTAINING VOLTAGE
LOW COLLECTOR-EMITTER SATURATION VOLTAGE
HIGH CURRENT GAIN-BANDWIDTH PRODUCT-MIN fT=65MHz @ Ic=100mA

Complementary to MJE210

TO-126



1. Emitter 2. Collector 3 Base

ABSOLUTE MAXIMUM RATINGS (T_a=25°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	Tj	150	°C
Storage Temperature	Tstg	−65~150	°C

ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Emitter Sustaining Voltage	V_{CEO}(sus)	I_C=10mA, I_B=0	25		V
Collector Cutoff Current	I_{CBO}	V_{CB}=40V, I_E=0		100	nA
		V_{CB}=40V, I_E=0, T_j=125°C		100	μA
Emitter Cutoff Current	I_{EBO}	V_{BE}=8V, I_C=0		100	nA
DC Current Gain	h_{FE}	V_{CE}=1V, I_C=500mA	70		
		V_{CE}=1V, I_C=2A	45	180	
		V_{CE}=2V, I_C=5A	10		
Collector-Emitter Saturation Voltage	V_{CE}(sat)	I_C=500mA, I_B=50mA		0.3	V
		I_C=2A, I_B=200mA		0 75	V
		I_C=5A, I_B=1A		1.8	V
Base-Emitter Saturation Voltage	V_{BE}(sat)	I_C=5A, I_B=1A		2.5	V
Base-Emitter On Voltage	V_{BE}(on)	V_{CE}=1V, I_C=2A		1.6	V
Current Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=100mA, f=10MHz	65		MHz
Output Capacitance	Cob	V_{CB}=10V, I_E=0, f=0.1MHz		80	pF

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MJE200 NPN EPITAXIAL SILICON TRANSISTOR

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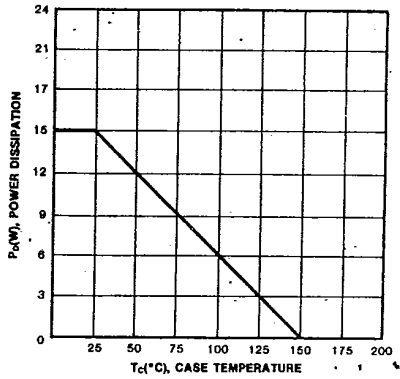
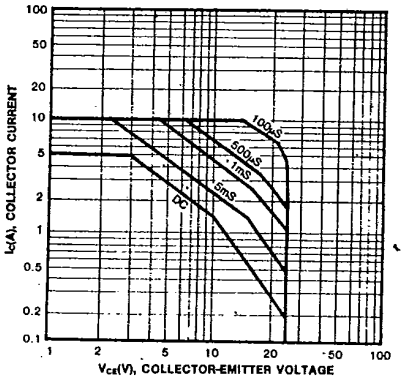
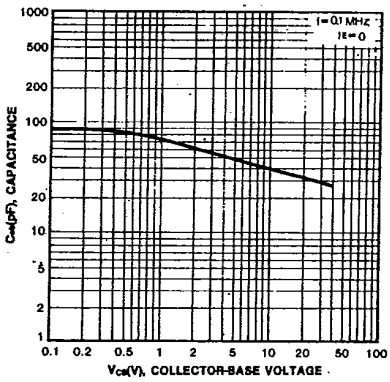
POWER DERATING



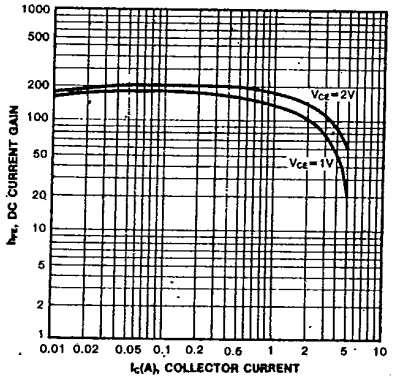
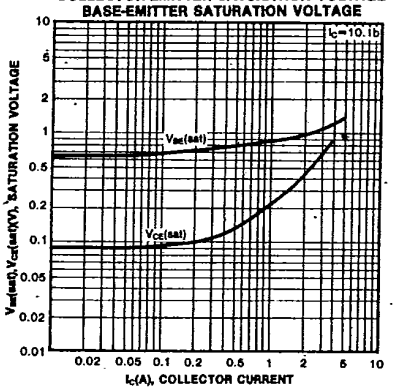
FORWARD BIAS SAFE OPERATING AREA



COLLECTOR OUTPUT CAPACITANCE



DC CURRENT GAIN



COLLECTOR-EMITTER SATURATION VOLTAGE
BASE-EMITTER SATURATION VOLTAGE