Pb Free Plating Product

MJL21196A

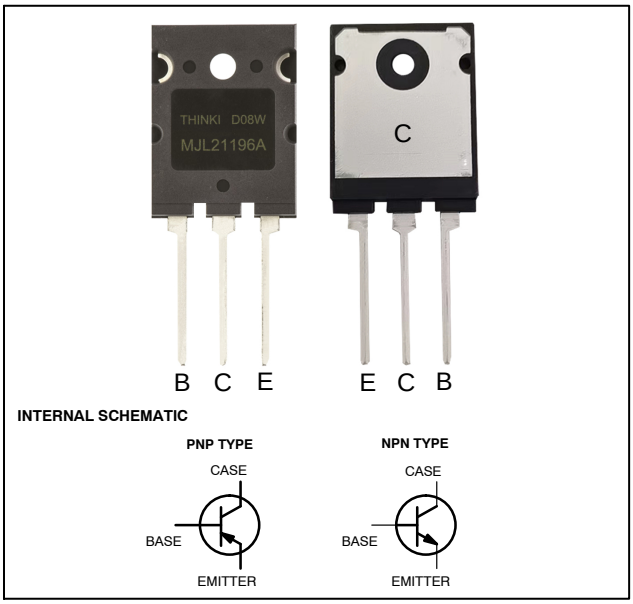
200 Watt Silicon Epitaxial Planar NPN Type Power Transistor

DESCRIPTION

- With TO-3PL-SQ(TO-3PBL/TO-3BPL) pkg
- Complement to type MJL21195A

APPLICATIONS

- Power amplifier applications
- Recommended for 100W high fidelity audio frequency amplifier output stage



PINNING

PIN	DESCRIPTION
E	Emitter
C	Collector;connected to mounting base
B	Base

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−Emitter Voltage	V_{CEO}	250	Vdc
Collector−Base Voltage	V_{CBO}	400	Vdc
Emitter−Base Voltage	V_{EBO}	5	Vdc
Collector−Emitter Voltage − 1.5 V	V_{CEX}	400	Vdc
Collector Current − Continuous	I_C	16	Adc
Collector Current − Peak (Note 1)	I_{CM}	30	Adc
Base Current − Continuous	I_B	5	Adc
Total Power Dissipation @ T_C = 25°C Derate Above 25°C	P_D	 200 1.43	 W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	− 65 to +150	°C
ESD − Human Body Model	HBM	3B	V
ESD − Machine Model	MM	C	V

1. Pulse Test: Pulse Width = 5.0 μs, Duty Cycle ≤10%.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	0.7	°C/W

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ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typical	Max	Unit
OFF CHARACTERISTICS (Note 2)					
Collector−Emitter Sustaining Voltage (I_C= 100 mAdc, I_B = 0)	$V_{CEO(sus)}$	250	–	–	Vdc
Collector Cutoff Current (V_{CE} = 200 Vdc, I_B = 0)	I_{CEO}	–	–	100	μAdc
OFF CHARACTERISTICS (Note 3)					
Emitter Cutoff Current (V_{CE} = 5 Vdc, I_C = 0)	I_{EBO}	–	–	100	μAdc
Collector Cutoff Current (V_{CE} = 250 Vdc, $V_{BE(off)}$ = 1.5 Vdc)	I_{CEX}	–	–	100	μAdc
SECOND BREAKDOWN (Note 3)					
Second Breakdown Collector Current with Base Forward Biased (V_{CE} = 50 Vdc, t = 1 s (Nonrepetitive)) (V_{CE} = 80 Vdc, t = 1 s (Nonrepetitive))	$I_{S/b}$	 4.0 2.25	 – –	 – –	Adc
ON CHARACTERISTICS (Note 3)					
DC Current Gain (I_C = 8 Adc, V_{CE} = 5 Vdc) (I_C = 16 Adc, I_B = 5 Adc)	h_{FE}	 25 8.0	 – –	 100 –	–
Base−Emitter On Voltage (I_C = 8 Adc, V_{CE} = 5 Vdc)	$V_{BE(on)}$	–	–	2.2	Vdc
Collector−Emitter Saturation Voltage (I_C = 8 Adc, I_B = 0.8 Adc) (I_C = 16 Adc, I_B = 3.2 Adc)	$V_{CE(sat)}$	 – –	 – –	 1.4 4	Vdc
DYNAMIC CHARACTERISTICS (Note 3)					
Total Harmonic Distortion at the Output (V_{RMS} = 28.3 V, f = 1 kHz, P_{LOAD} = 100 W_{RMS}) h_{FE} unmatched (Matched pair h_{FE} = 50 @ 5 A/5 V) h_{FE} matched	T_{HD}	 – –	 0.8 0.08	 – –	%
Current Gain Bandwidth Product (I_C = 1 Adc, V_{CE} = 10 Vdc, f_{test} = 1 MHz)	f_T	4	–	–	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f_{test} = 1 MHz)	C_{ob}	–	–	500	pF

2. Pulse Test: Pulse Width = 5.0 μs, Duty Cycle ≤10%.
3. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤2%.

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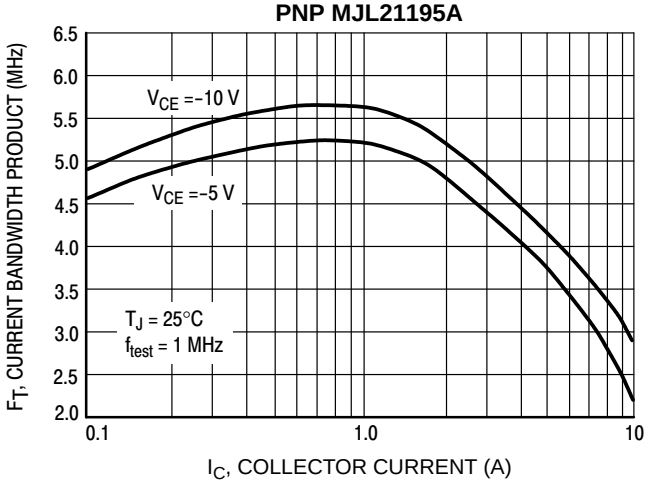


Figure 1. Typical Current Gain Bandwidth Product

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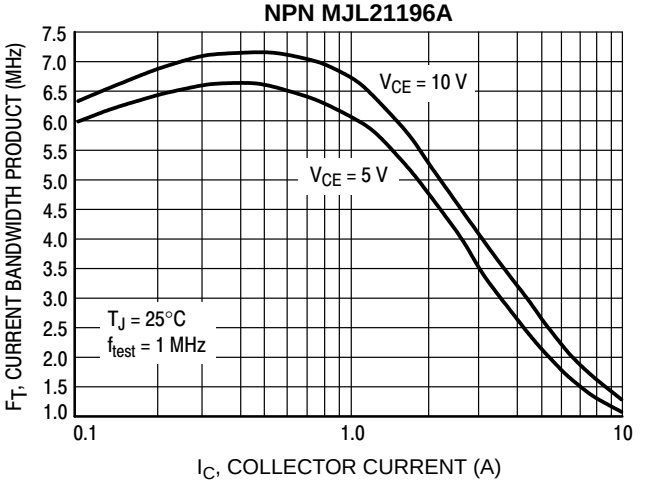


Figure 2. Typical Current Gain Bandwidth Product

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TYPICAL CHARACTERISTICS

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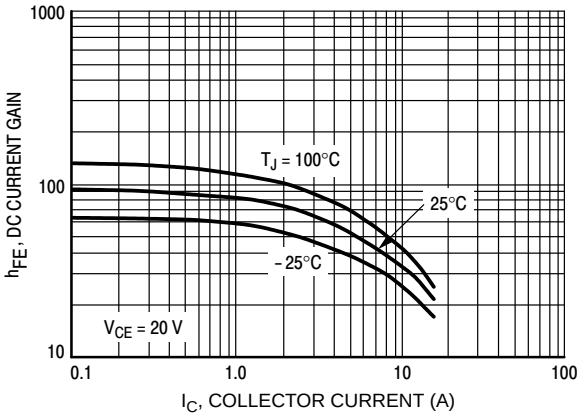


Figure 3. DC Current Gain, V_{CE} = 20 V

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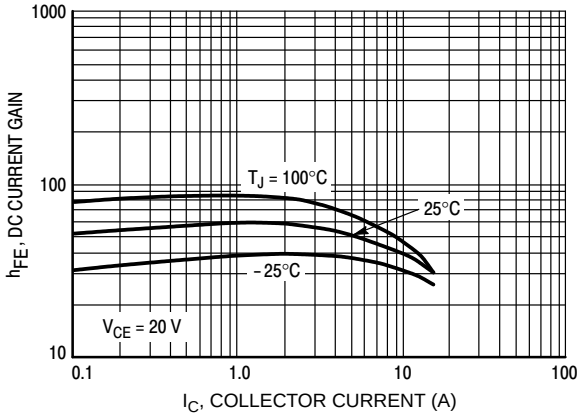


Figure 4. DC Current Gain, V_{CE} = 20 V

PNP MJL21195A

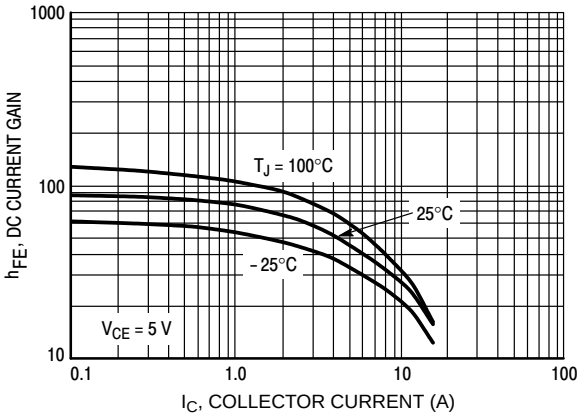


Figure 5. DC Current Gain, V_{CE} = 5 V

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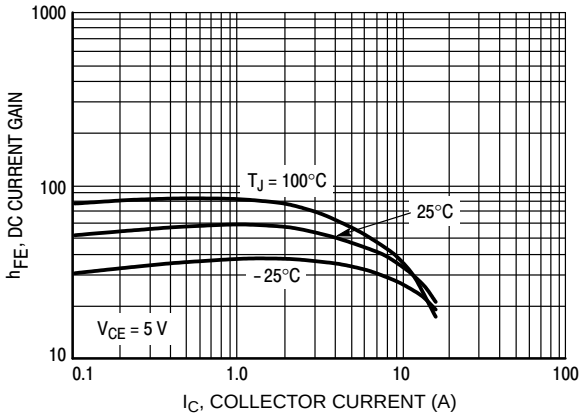


Figure 6. DC Current Gain, V_{CE} = 5 V

PNP MJL21195A

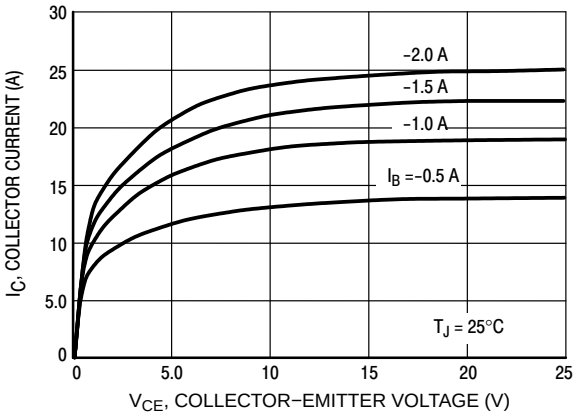


Figure 7. Typical Output Characteristics

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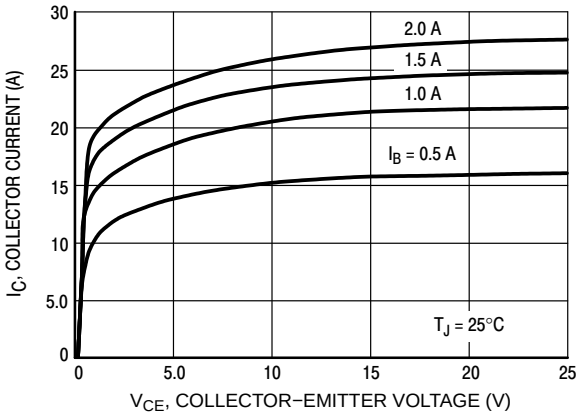


Figure 8. Typical Output Characteristics

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TYPICAL CHARACTERISTICS

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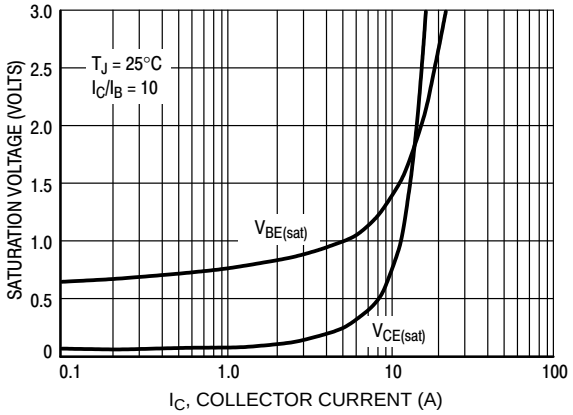


Figure 9. Typical Saturation Voltages

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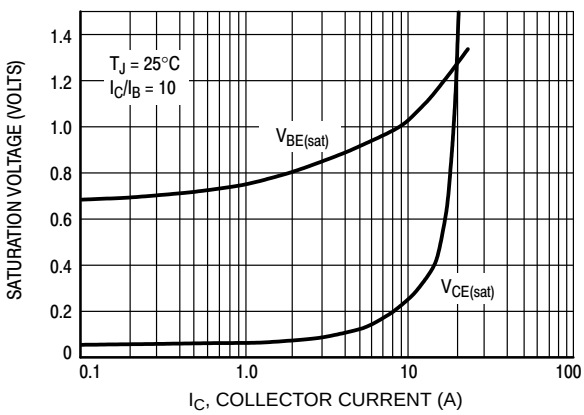


Figure 10. Typical Saturation Voltages

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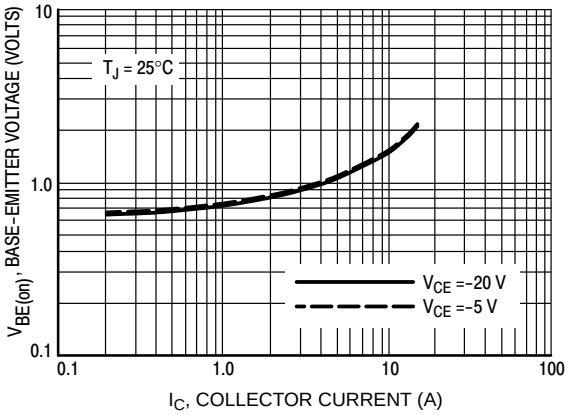


Figure 11. Typical Base−Emitter Voltage

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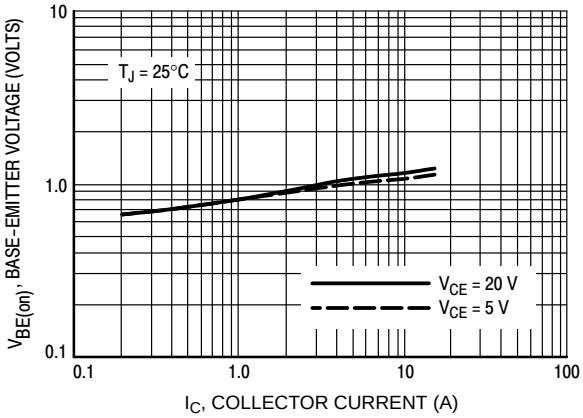


Figure 12. Typical Base−Emitter Voltage

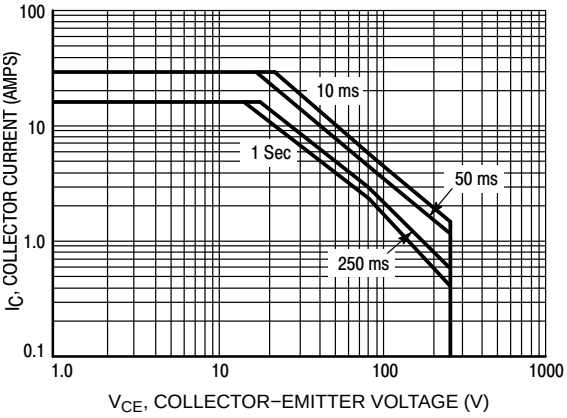


Figure 13. Active Region Safe Operating Area

There are two limitations on the power handling ability of a transistor; average junction temperature and secondary breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 13 is based on $T_{J(pk)}$ = 150°C; T_C is variable depending on conditions. At high case temperatures, thermal limitations will reduce the power than can be handled to values less than the limitations imposed by second breakdown.

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TYPICAL CHARACTERISTICS

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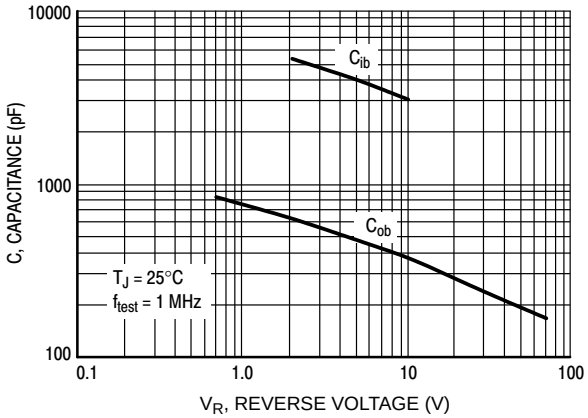


Figure 14. Typical Capacitance

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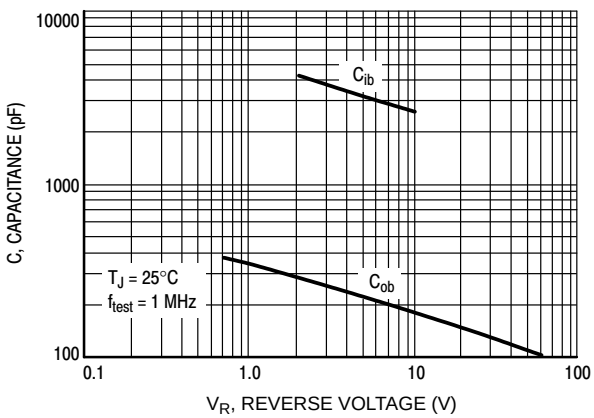


Figure 15. Typical Capacitance

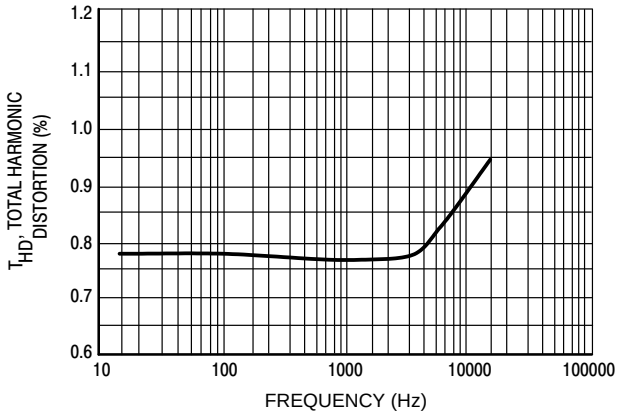


Figure 16. Typical Total Harmonic Distortion

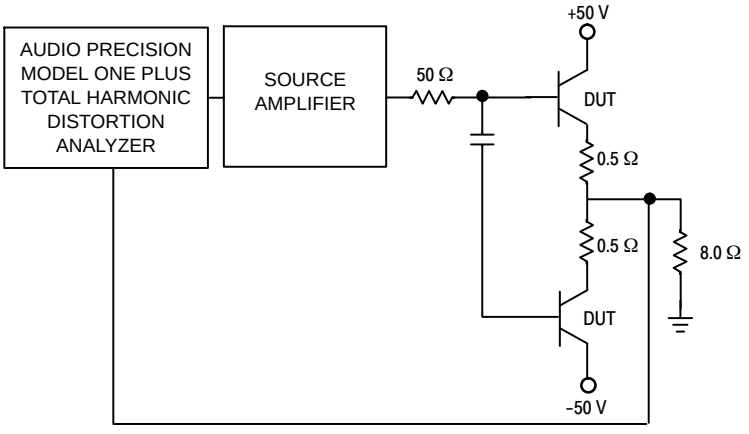
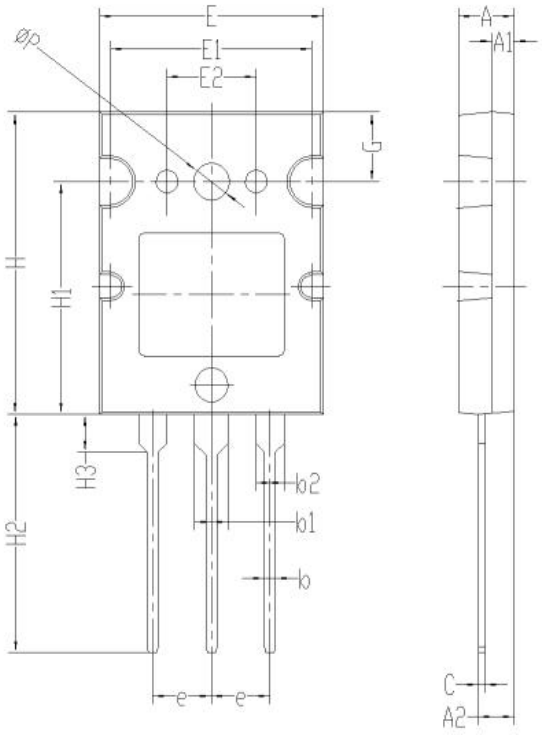


Figure 17. Total Harmonic Distortion Test Circuit

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THINKI TO-3PL-SQ(TO-3PBL/TO-3BPL) Package Outline



Symbol	Dimensions(millimeters)	
	Min.	Max.
A	4.80	5.20
A1	1.80	2.20
A2	3.00	3.40
b	0.80	1.20
b1	2.80	3.20
b2	2.30	2.70
c	0.40	0.80
e	5.25	5.65
E	19.8	20.2
E1	17.8	18.2
E2	7.8	8.2
H	25.8	26.2
H1	19.8	20.2
H2	20.0	21.0
H3	3.05	3.45
G	5.80	6.20
ΦP	3.10	3.50
J	4.80	5.20
K	1.80	2.20

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