

MJL31193 (PNP) MJL31194 (NPN)

Preferred Devices

Product Preview

Complementary PNP-NPN Silicon Power Transistors

The MJL31193 and MJL31194 are PowerBase™ transistors that are specifically designed for high power audio output.

Features

- High DC Current Gain –
 $h_{FE} = 25 \text{ Min @ } I_C = 10 \text{ A}$
- Excellent Gain Linearity
- Low Harmonic Distortion
- Ultra High Safe Operation Area

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V _{CEO}	250	Vdc
Collector–Base Voltage	V _{CBO}	400	Vdc
Emitter–Base Voltage	V _{EBO}	5.0	Vdc
Collector–Emitter Voltage – 1.5 V	V _{CEX}	400	Vdc
Collector Current – Continuous – Peak (Note 1)	I _C	20 40	Adc
Base Current – Continuous	I _B	5.0	Adc
Total Power Dissipation @ T _C = 25°C Derate Above 25°C	P _D	250 1.84	Watts W/°C
Operating and Storage Junction Temperature Range	T _J , T _{stg}	– 65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction–to–Case	R _{θJC}	0.50	°C/W

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

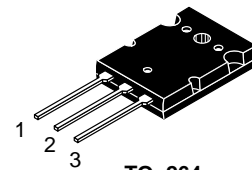
1. Pulse Test: Pulse Width = 5 μs, Duty Cycle ≤ 10%.



ON Semiconductor®

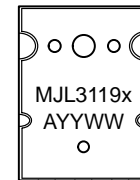
<http://onsemi.com>

**20 AMPERE
COMPLEMENTARY
SILICON POWER
TRANSISTORS
250 VOLTS
250 WATTS**



TO-264
CASE 340G
STYLE 2

MARKING DIAGRAM



1 BASE
2 COLLECTOR
3 EMITTER

x = 3 or 4
A = Location Code
YY = Year
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping
MJL31193	TO-264	30 Units/Rail
MJL31194	TO-264	30 Units/Rail

Preferred devices are recommended choices for future use and best overall value.

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

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ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typical	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Sustaining Voltage ($I_C = 100\text{ mA}$, $I_B = 0\text{ A}$)	$V_{CEO(sus)}$	250	–	–	Vdc
Collector Cutoff Current ($V_{CE} = 200\text{ Vdc}$, $I_B = 0\text{ A}$)	I_{CEO}	–	–	100	μA
Emitter Cutoff Current ($V_{CE} = 5.0\text{ Vdc}$, $I_C = 0\text{ A}$)	I_{EBO}	–	–	10	μA
Collector Cutoff Current ($V_{CE} = 250\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$)	I_{CEX}	–	–	50	μA

ON CHARACTERISTICS

DC Current Gain ($I_C = 10\text{ A}$, $V_{CE} = 5.0\text{ Vdc}$) ($I_C = 20\text{ A}$, $I_B = 5.0\text{ A}$)	h_{FE}	25 10	– –	75 –	
Base–Emitter On Voltage ($I_C = 10\text{ A}$, $V_{CE} = 5.0\text{ Vdc}$)	$V_{BE(on)}$	–	–	1.8	Vdc
Collector–Emitter Saturation Voltage ($I_C = 10\text{ A}$, $I_B = 1.0\text{ A}$)	$V_{CE(sat)}$	–	–	1.2	Vdc

DYNAMIC CHARACTERISTICS

Total Harmonic Distortion at the Output $V_{RMS} = 28.3\text{ V}$, $f = 1\text{ kHz}$, $P_{LOAD} = 100\text{ W}_{RMS}$ (Matched pair $h_{FE} = 50 @ 5\text{ A}/5\text{ V}$)	T_{HD}				%
h_{FE} unmatched		–	0.8	–	
h_{FE} matched		–	0.08	–	
Current Gain Bandwidth Product ($I_C = 1.0\text{ A}$, $V_{CE} = 10\text{ Vdc}$, $f_{test} = 1.0\text{ MHz}$)	f_T	4.0	–	–	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f_{test} = 1.0\text{ MHz}$)	C_{ob}	–	–	700	pF

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TYPICAL CHARACTERISTICS

PNP MJL31193

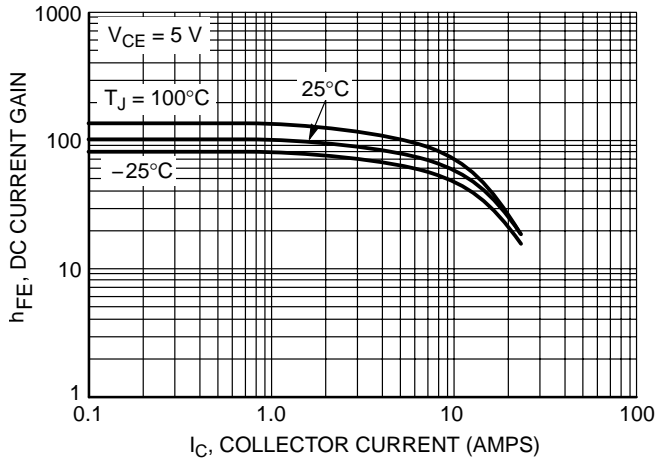


Figure 1. DC Current Gain, $V_{CE} = 5\text{ V}$

NPN MJL31194

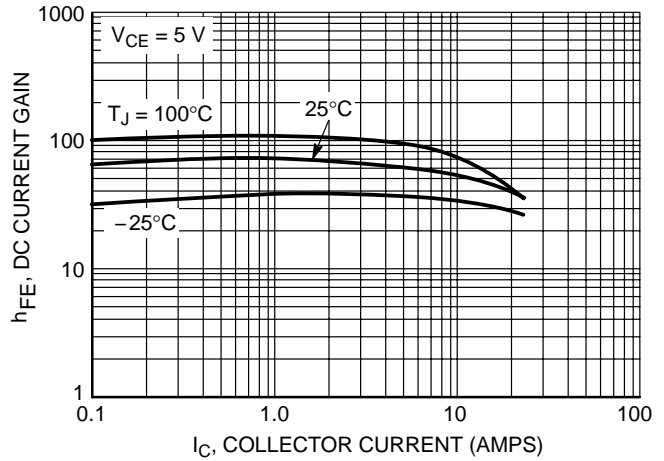


Figure 2. DC Current Gain, $V_{CE} = 5\text{ V}$

PNP MJL31193

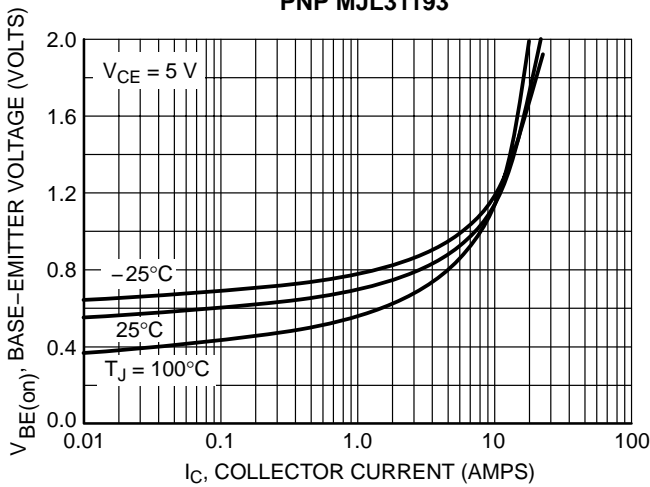


Figure 3. Typical Base-Emitter Voltage

NPN MJL31194

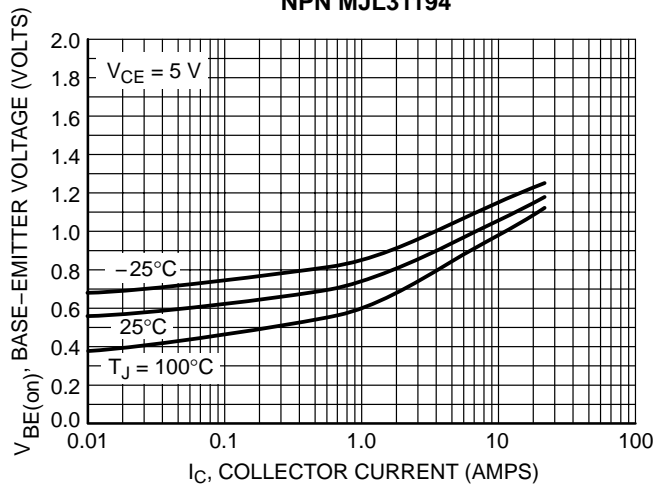


Figure 4. Typical Base-Emitter Voltage

PNP MJL31193

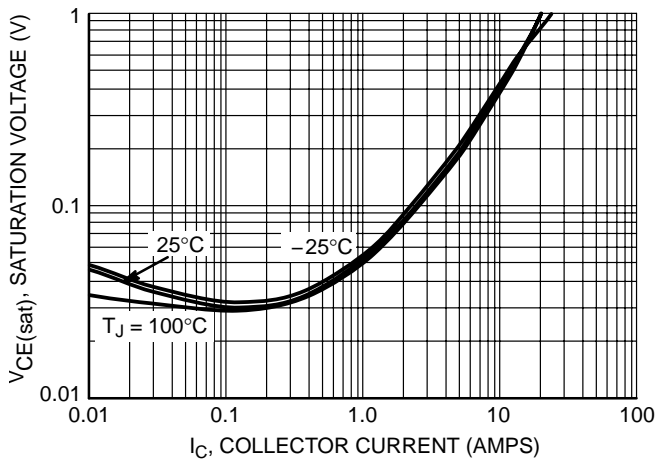


Figure 5. Typical Saturation Voltages

NPN MJL31194

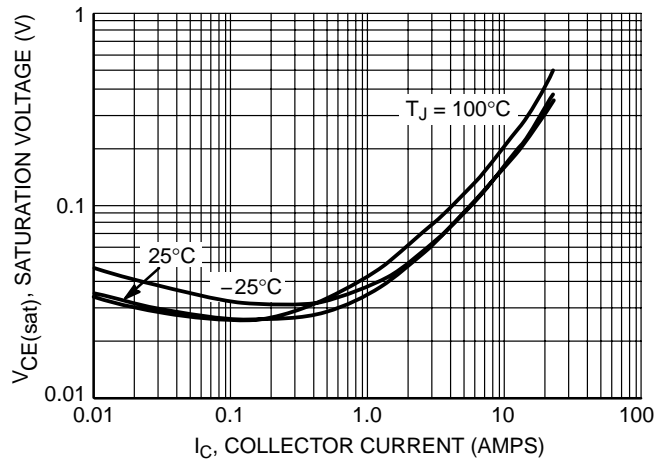


Figure 6. Typical Saturation Voltages

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TYPICAL CHARACTERISTICS

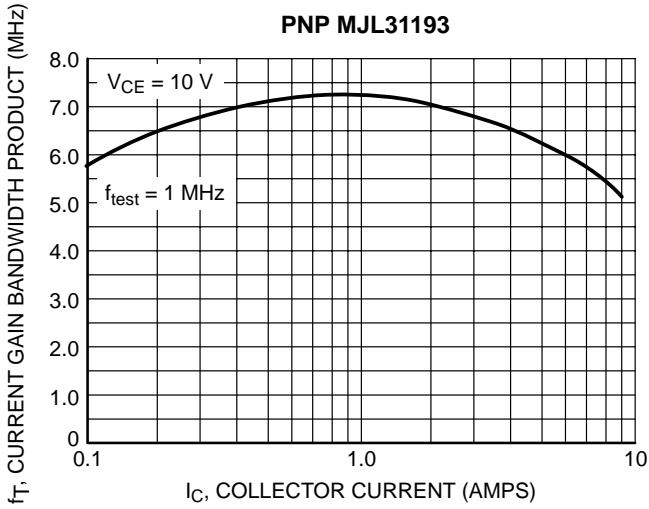


Figure 7. Typical Current Gain Bandwidth Product

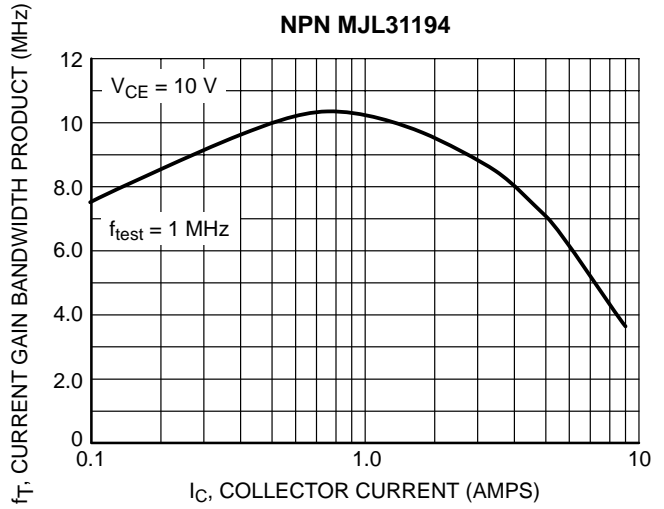


Figure 8. Typical Current Gain Bandwidth Product

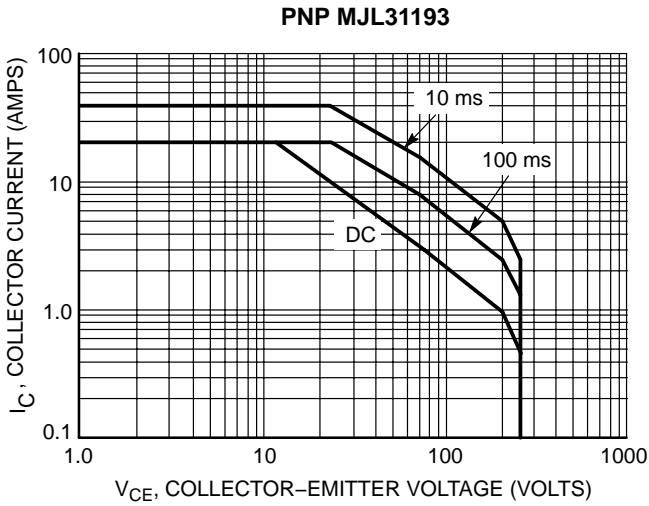


Figure 9. Safe Operating Area

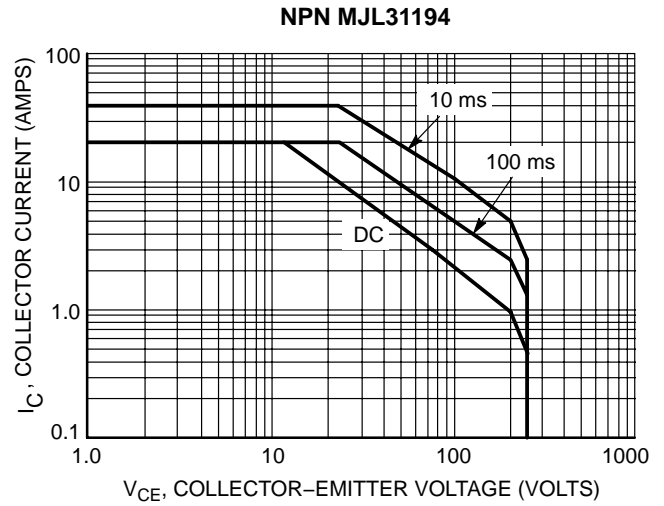


Figure 10. Safe Operating Area

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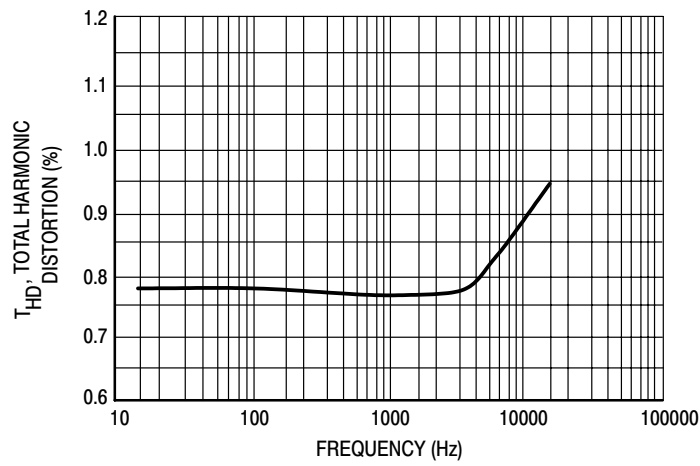


Figure 11. Typical Total Harmonic Distortion

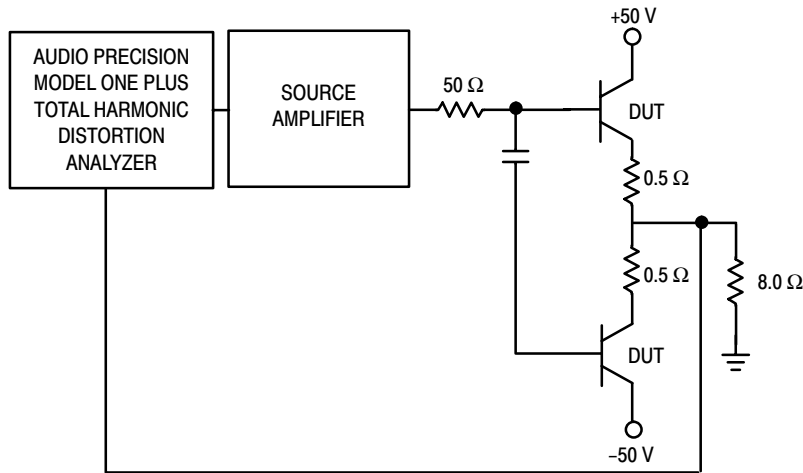
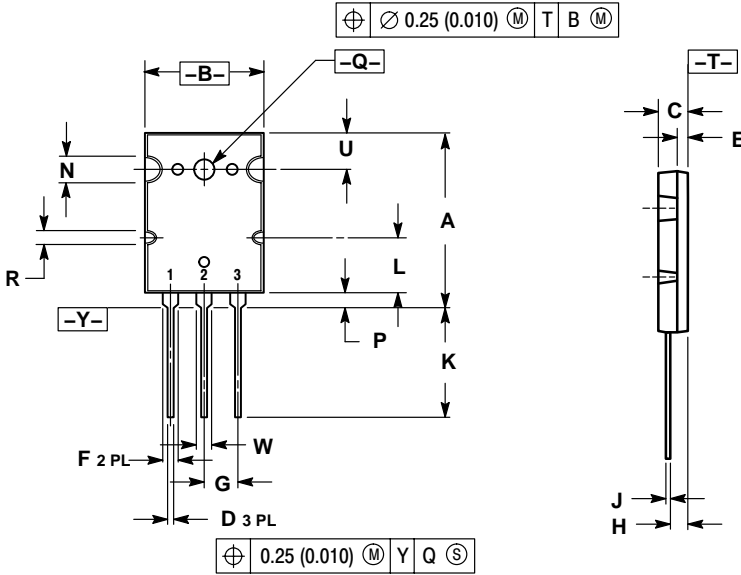


Figure 12. Total Harmonic Distortion Test Circuit

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PACKAGE DIMENSIONS

TO-3PBL (TO-264)
CASE 340G-02
ISSUE H



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	28.0	29.0	1.102	1.142
B	19.3	20.3	0.760	0.800
C	4.7	5.3	0.185	0.209
D	0.93	1.48	0.037	0.058
E	1.9	2.1	0.075	0.083
F	2.2	2.4	0.087	0.102
G	5.45 BSC		0.215 BSC	
H	2.6	3.0	0.102	0.118
J	0.43	0.78	0.017	0.031
K	17.6	18.8	0.693	0.740
L	11.0	11.4	0.433	0.449
N	3.95	4.75	0.156	0.187
P	2.2	2.6	0.087	0.102
Q	3.1	3.5	0.122	0.137
R	2.15	2.35	0.085	0.093
U	6.1	6.5	0.240	0.256
W	2.8	3.2	0.110	0.125

- STYLE 2:
PIN 1. BASE
2. COLLECTOR
3. EMITTER

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