MJL4281A (NPN)
MJL4302A (PNP)

Complementary NPN-PNP Silicon Power Bipolar Transistors

The MJL4281A and MJL4302A are power transistors for high power audio.

Features

- 350 V Collector−Emitter Sustaining Voltage
- Gain Complementary:
  Gain Linearity from 100 mA to 5 A
  High Gain − 80 to 240
  h_{FE} = 50 (min) @ I_C = 8 A
- Low Harmonic Distortion
- High Safe Operation Area − 1.0 A/100 V @ 1 Second
- High f_T
- Pb−Free Packages are Available*

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

Rating	Symbol	Value	Unit
Collector−Emitter Voltage	V_{CEO}	350	Vdc
Collector−Base Voltage	V_{CBO}	350	Vdc
Emitter−Base Voltage	V_{EBO}	5.0	Vdc
Collector−Emitter Voltage − 1.5 V	V_{CEX}	350	Vdc
Collector Current − Continuous − Peak (Note 1)	I_C	15 30	Adc
Base Current − Continuous	I_B	1.5	Adc
Total Power Dissipation @ T_C = 25°C Derate Above 25°C	P_D	230 1.84	W °C/W
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	$R_{\theta JC}$	0.54	°C/W

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Pulse Test: Pulse Width = 5 ms, Duty Cycle < 10%.

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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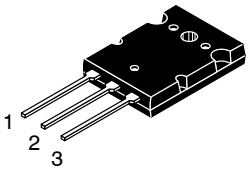
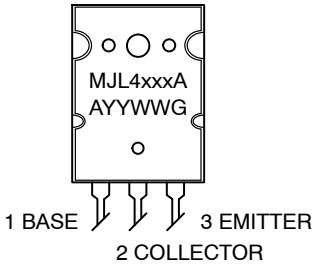
15 AMPERES
COMPLEMENTARY SILICON
POWER TRANSISTORS
350 VOLTS, 230 WATTS



TO−264
CASE 340G
STYLE 2

MARKING DIAGRAM



xxx = 281 or 302
A = Assembly Location
YY = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping
MJL4281A	TO−264	25 Units/Rail
MJL4281AG	TO−264 (Pb−Free)	25 Units/Rail
MJL4302A	TO−264	25 Units/Rail
MJL4302AG	TO−264 (Pb−Free)	25 Units/Rail

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector Emitter Sustaining Voltage (I_C = 50 mA, I_B = 0)	$V_{CE(sus)}$	350		Vdc
Collector Cut−off Current (V_{CE} = 200 V, I_B = 0)	I_{CEO}		100	μAdc
Collector Cutoff Current (V_{CB} = 350 Vdc, I_E = 0)	I_{CBO}	–	50	μAdc
Emitter Cutoff Current (V_{EB} = 5.0 Vdc, I_C = 0)	I_{EBO}	–	5.0	μAdc
SECOND BREAKDOWN				
Second Breakdown Collector with Base Forward Biased (V_{CE} = 50 Vdc, t = 1.0 s (non−repetitive) (V_{CE} = 100 Vdc, t = 1.0 s (non−repetitive)	$I_{S/b}$	 4.5 1.0	 – –	Adc
ON CHARACTERISTICS				
DC Current Gain (I_C = 100 mAdc, V_{CE} = 5.0 Vdc) (I_C = 1.0 Adc, V_{CE} = 5.0 Vdc) (I_C = 3.0 Adc, V_{CE} = 5.0 Vdc) (I_C = 5.0 Adc, V_{CE} = 5.0 Vdc) (I_C = 8.0 Adc, V_{CE} = 5.0 Vdc) (I_C = 15 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	 80 80 80 80 50 10	 250 250 250 250 – –	–
Collector−Emitter Saturation Voltage (I_C = 8.0 Adc, I_B = 0.8 Adc)	$V_{CE(sat)}$	–	1.0	Vdc
Emitter−Base Saturation Voltage (I_C = 8.0 Adc, I_B = 0.8 A)	$V_{BE(sat)}$	–	1.4	Vdc
Base−Emitter ON Voltage (I_C = 8.0 Adc, V_{CE} = 5.0 Vdc)	$V_{BE(on)}$	–	1.5	Vdc
DYNAMIC CHARACTERISTICS				
Current−Gain − Bandwidth Product (I_C = 1.0 Adc, V_{CE} = 5.0 Vdc, f_{test} = 1.0 MHz)	f_T	35	–	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f_{test} = 1.0 MHz)	C_{ob}	–	600	pF

TYPICAL CHARACTERISTICS

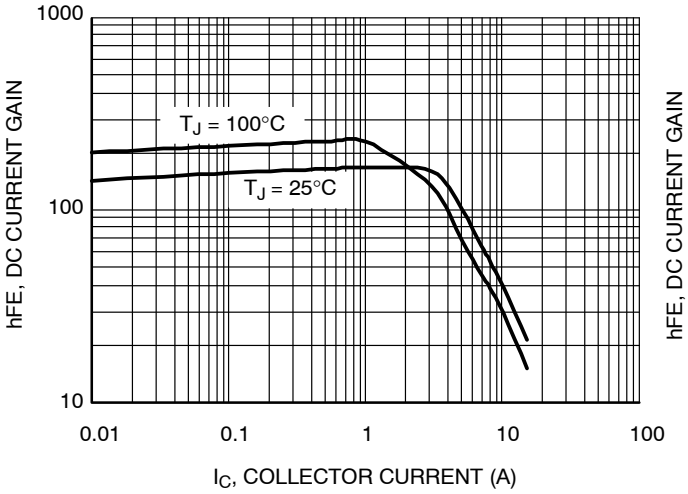


Figure 1. DC Current Gain, V_{CE} = 5 V, NPN MJL4281A

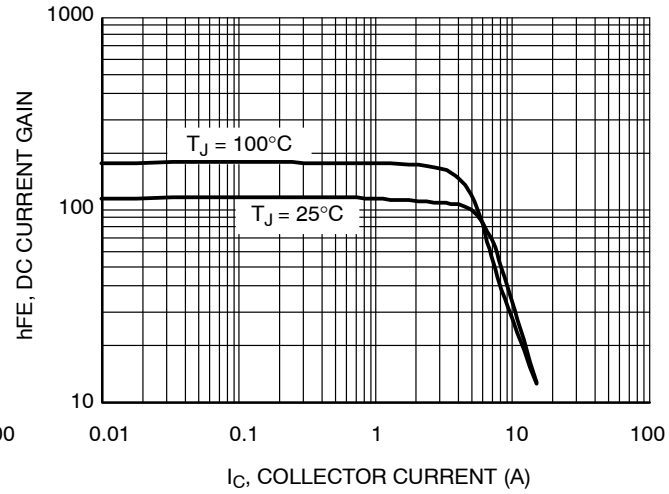


Figure 2. DC Current Gain, V_{CE} = 5 V, PNP MJL4302A

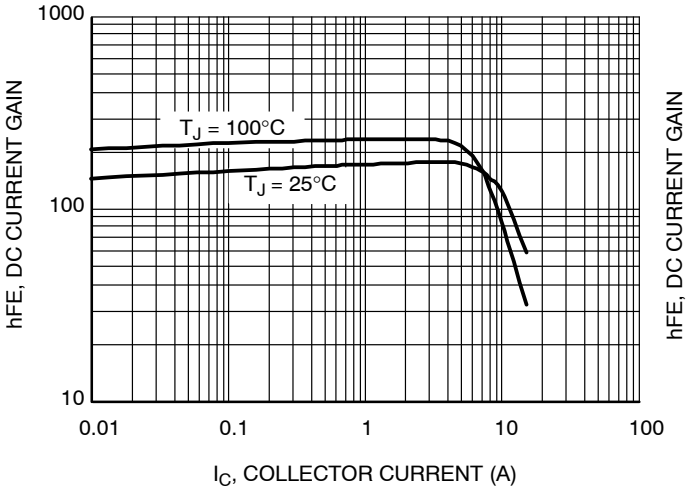


Figure 3. DC Current Gain, V_{CE} = 20 V, NPN MJL4281A

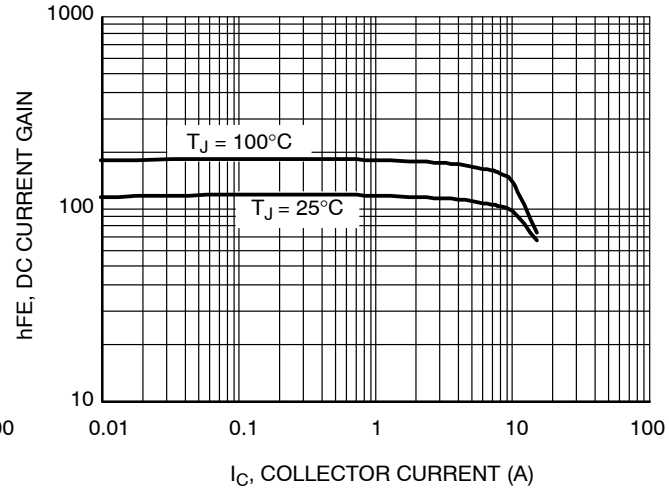


Figure 4. DC Current Gain, V_{CE} = 20 V, PNP MJL4302A

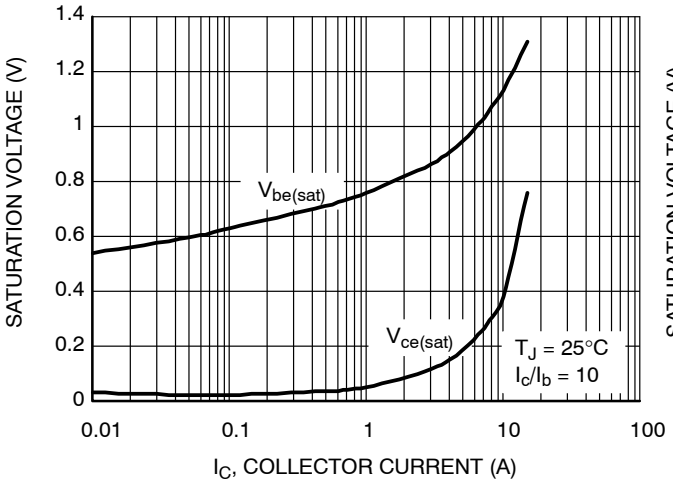


Figure 5. Typical Saturation Voltage, NPN MJL4281A

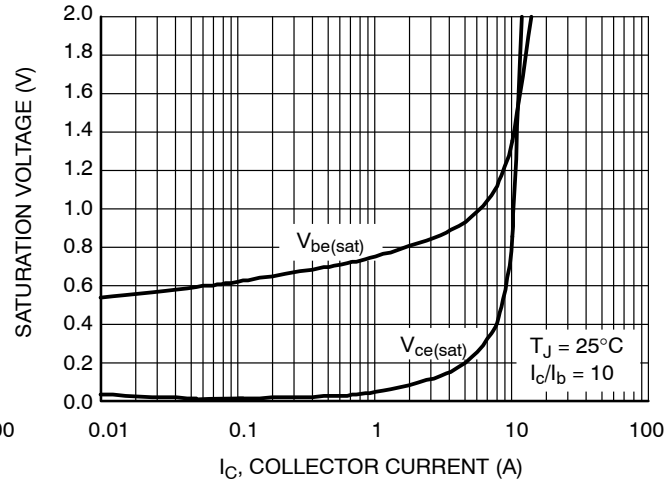


Figure 6. Typical Saturation Voltage, PNP MJL4302A

TYPICAL CHARACTERISTICS

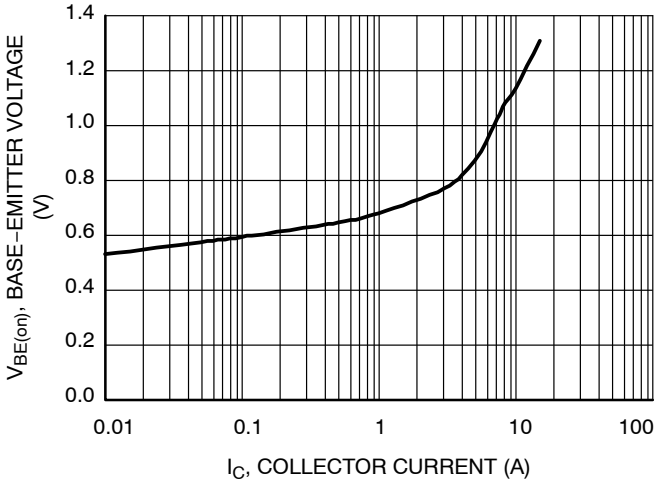


Figure 7. Typical Base−Emitter Voltages, NPN MJL4281A

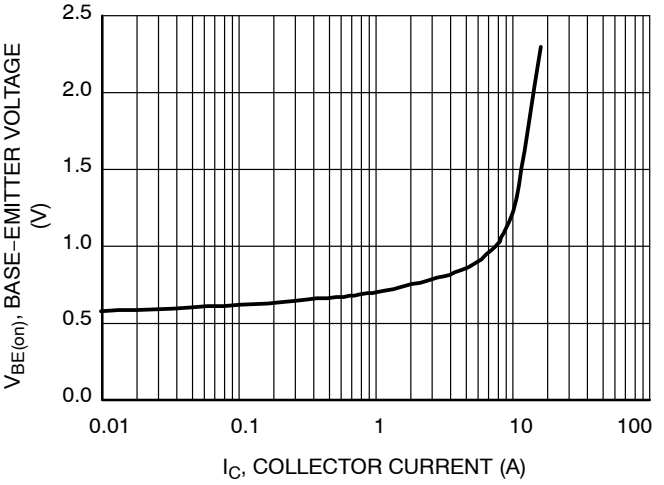


Figure 8. Typical Base−Emitter Voltages, PNP MJL4302A

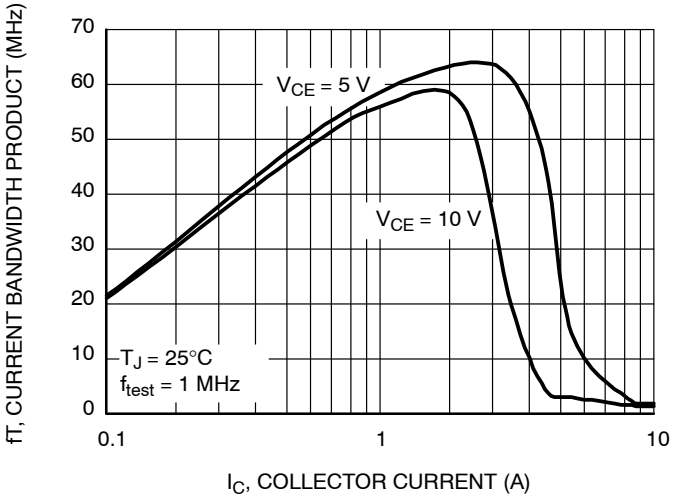


Figure 9. Typical Current Gain Bandwidth Product, NPN MJL4281A

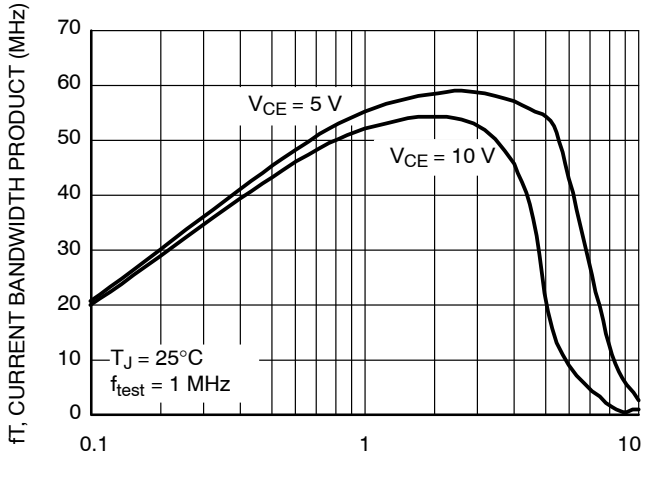


Figure 10. Typical Current Gain Bandwidth Product, PNP MJL4302A

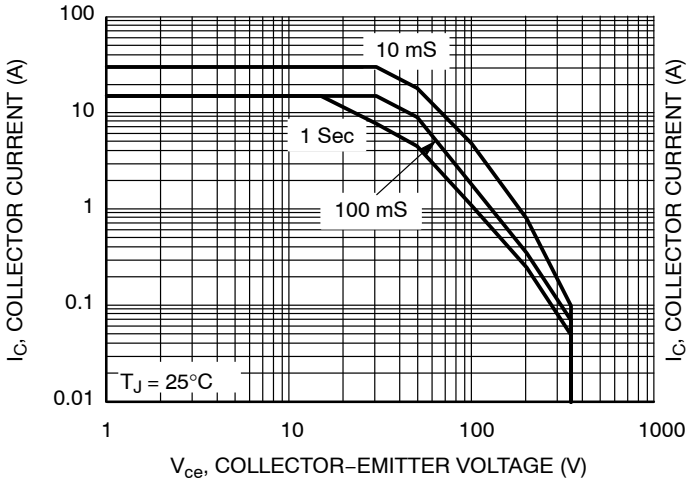


Figure 11. Active Region Safe Operating Area, NPN MJL4281A

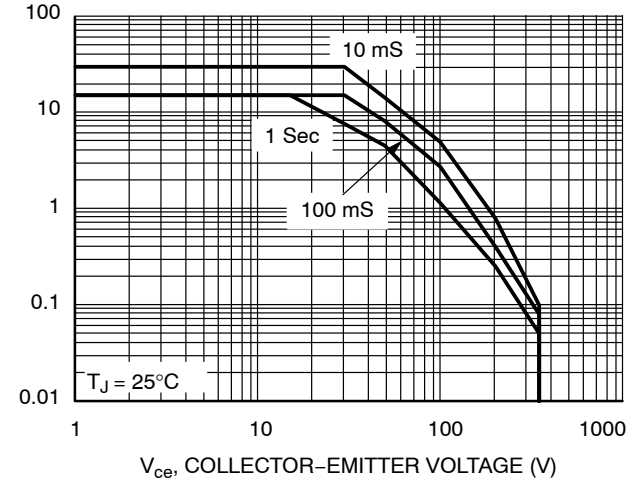
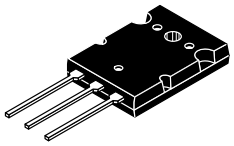


Figure 12. Active Region Safe Operating Area, PNP MJL4302A

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

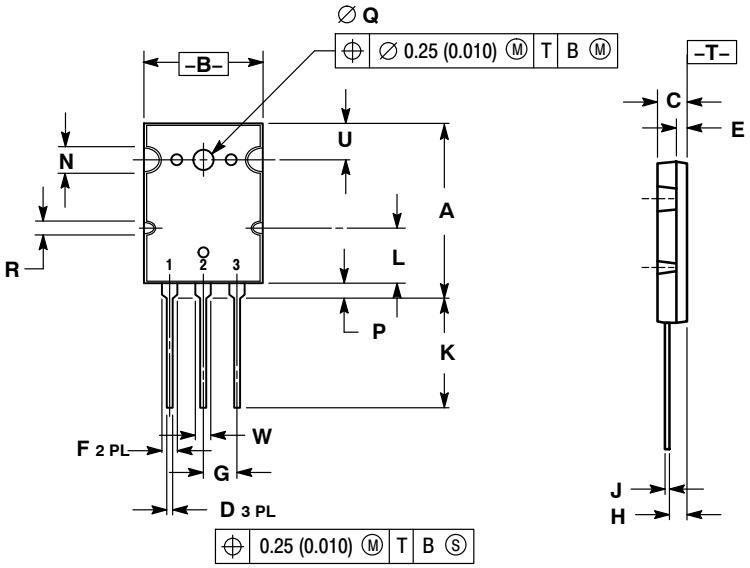
ON Semiconductor®



TO−3BPL (TO−264)
CASE 340G−02
ISSUE J

DATE 17 DEC 2004

SCALE 1:2



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

	MILLIMETERS		INCHES	
DIM	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	11.2 REF		0.411 REF	
N	4.35 REF		0.172 REF	
P	2.2	2.6	0.087	0.102
Q	3.1	3.5	0.122	0.137
R	2.25 REF		0.089 REF	
U	6.3 REF		0.248 REF	
W	2.8	3.2	0.110	0.125

STYLE 1:
PIN 1. GATE
2. DRAIN
3. SOURCE

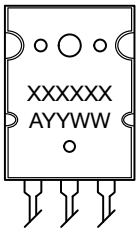
STYLE 2:
PIN 1. BASE
2. COLLECTOR
3. EMITTER

STYLE 3:
PIN 1. GATE
2. SOURCE
3. DRAIN

STYLE 4:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 5:
PIN 1. GATE
2. COLLECTOR
3. EMITTER

GENERIC MARKING DIAGRAM*



XXXXXX = Specific Device Code
A = Location Code
YY = Year
WW = Work Week

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

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