

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 ($T_J = 25^\circ\text{C}$ 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 @ $T_C = 25^\circ\text{C}$ Derate Above 25°C	P_D	230 1.84	W $^\circ\text{C/W}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction–to–Case	$R_{\theta JC}$	0.54	$^\circ\text{C/W}$

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%.

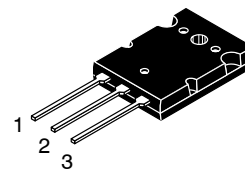
*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



ON Semiconductor®

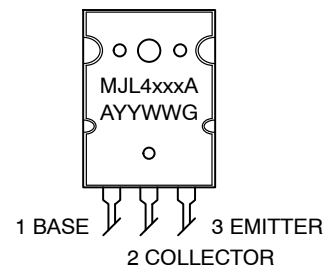
<http://onsemi.com>

**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

MJL4281A (NPN) MJL4302A (PNP)

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

MJL4281A (NPN) MJL4302A (PNP)

TYPICAL CHARACTERISTICS

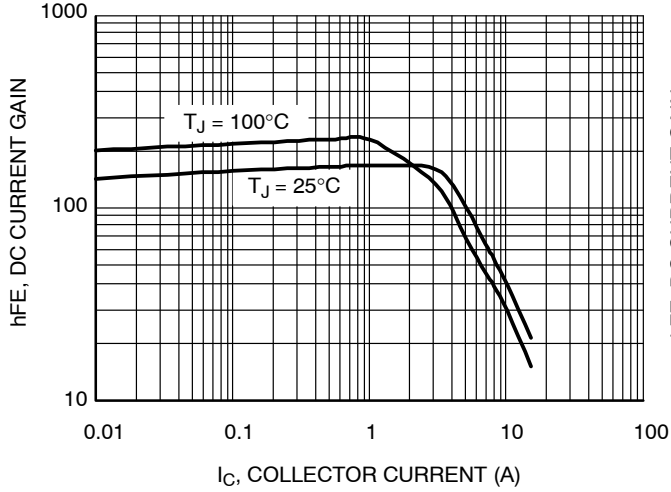


Figure 1. DC Current Gain, $V_{CE} = 5\text{ V}$, NPN MJL4281A

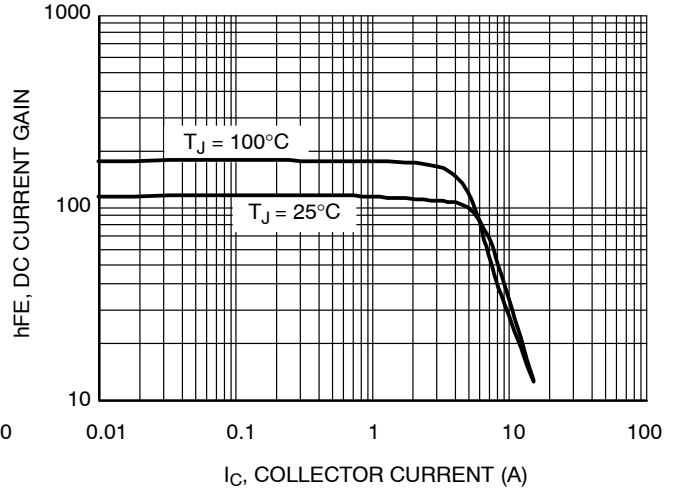


Figure 2. DC Current Gain, $V_{CE} = 5\text{ V}$, PNP MJL4302A

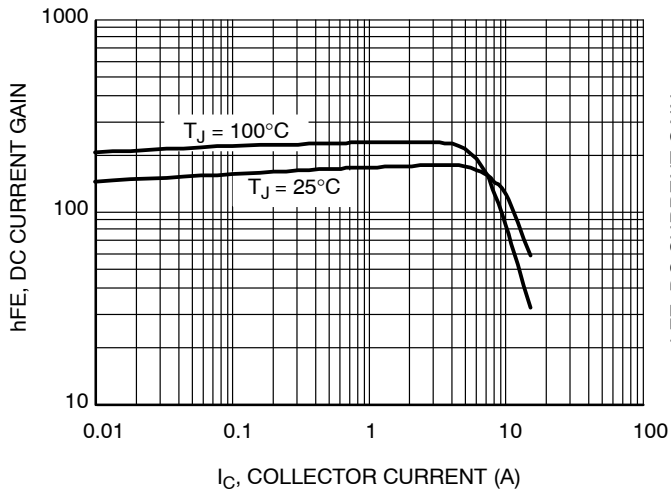


Figure 3. DC Current Gain, $V_{CE} = 20\text{ V}$, NPN MJL4281A

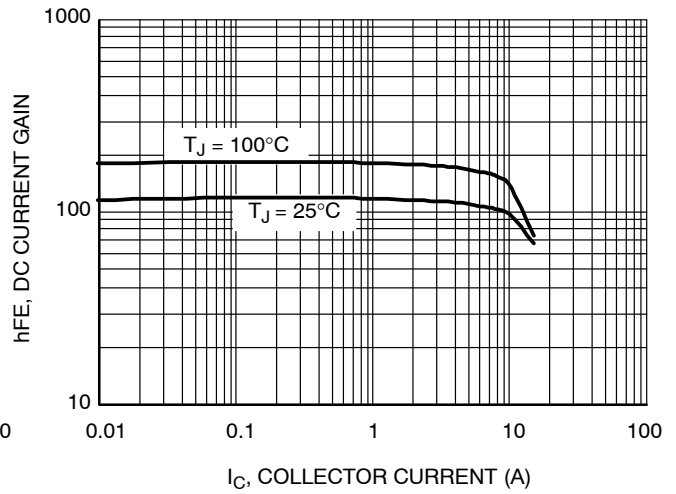


Figure 4. DC Current Gain, $V_{CE} = 20\text{ V}$, PNP MJL4302A

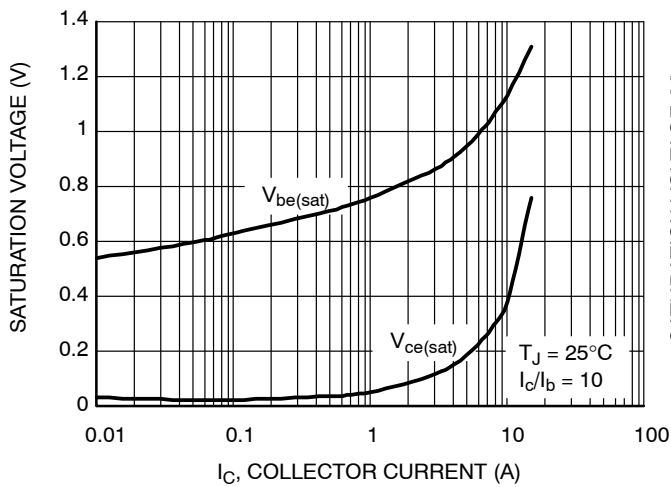


Figure 5. Typical Saturation Voltage, NPN MJL4281A

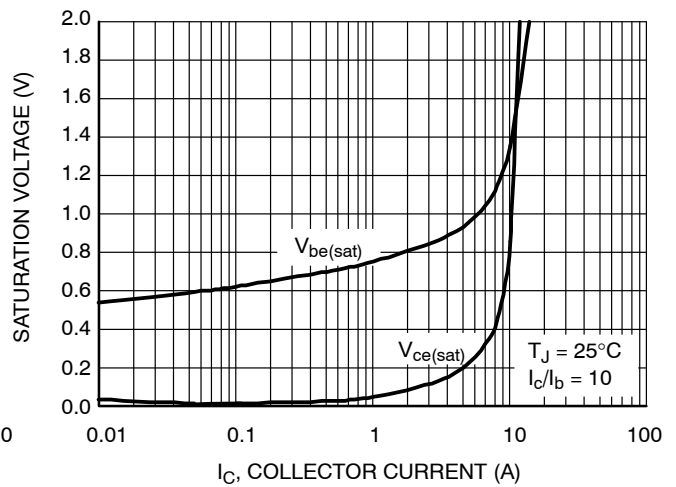


Figure 6. Typical Saturation Voltage, PNP MJL4302A

MJL4281A (NPN) MJL4302A (PNP)

TYPICAL CHARACTERISTICS

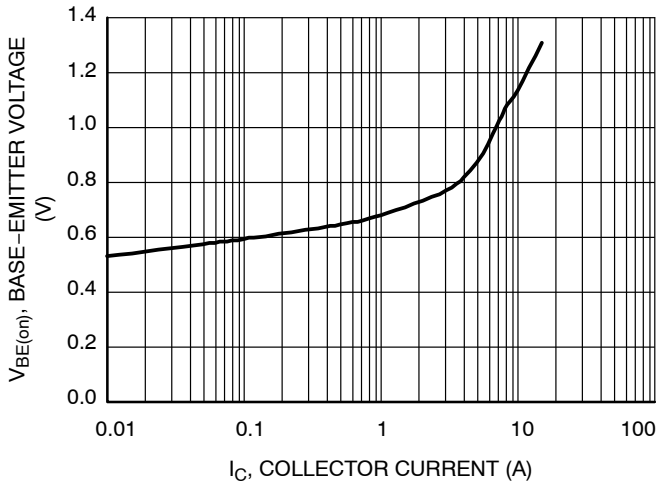


Figure 7. Typical Base-Emitter Voltages, NPN MJL4281A

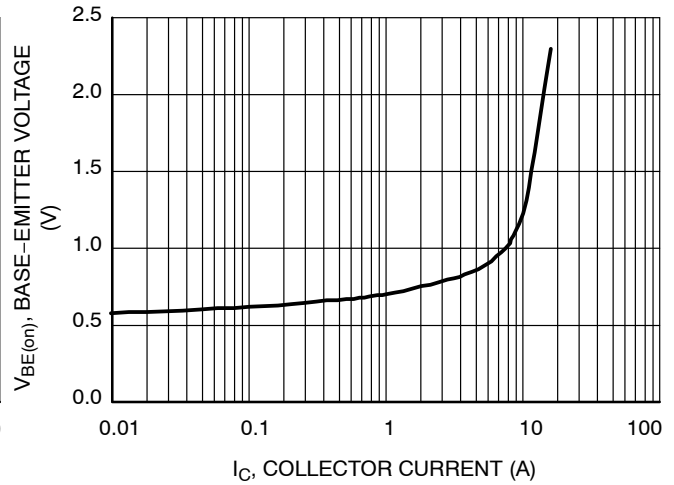


Figure 8. Typical Base-Emitter Voltages, PNP MJL4302A

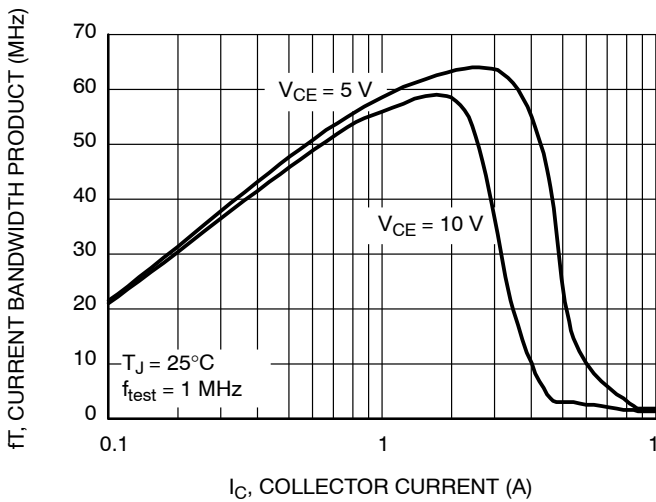


Figure 9. Typical Current Gain Bandwidth Product, NPN MJL4281A

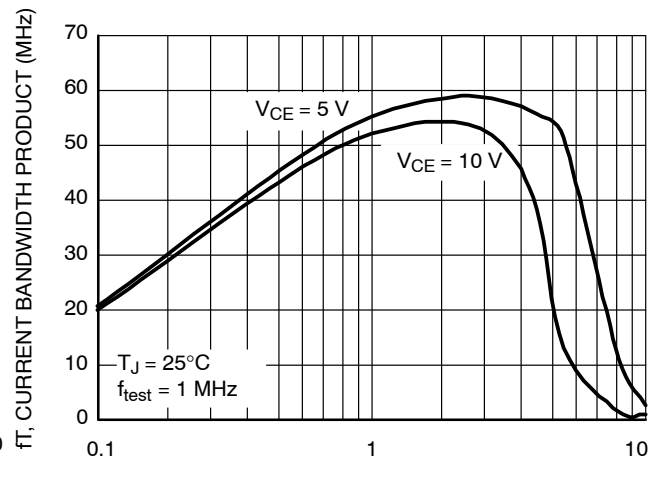


Figure 10. Typical Current Gain Bandwidth Product, PNP MJL4302A

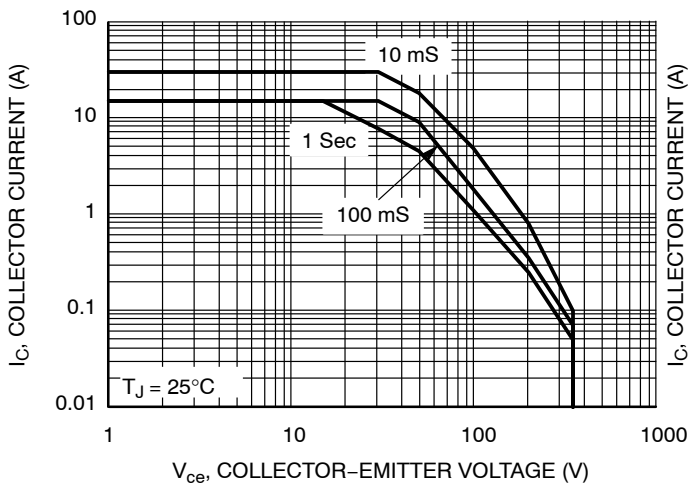


Figure 11. Active Region Safe Operating Area, NPN MJL4281A

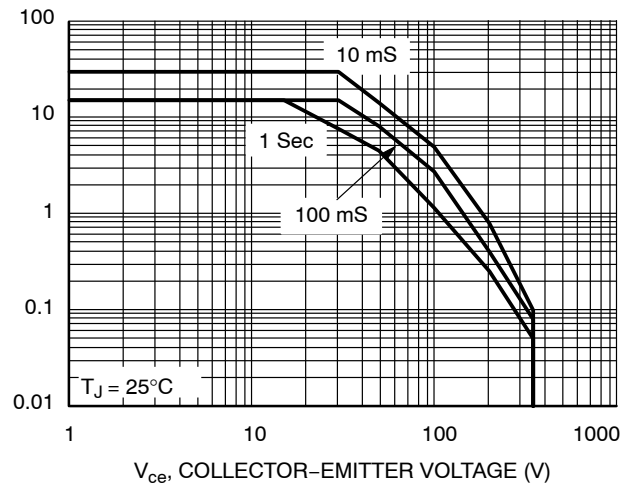
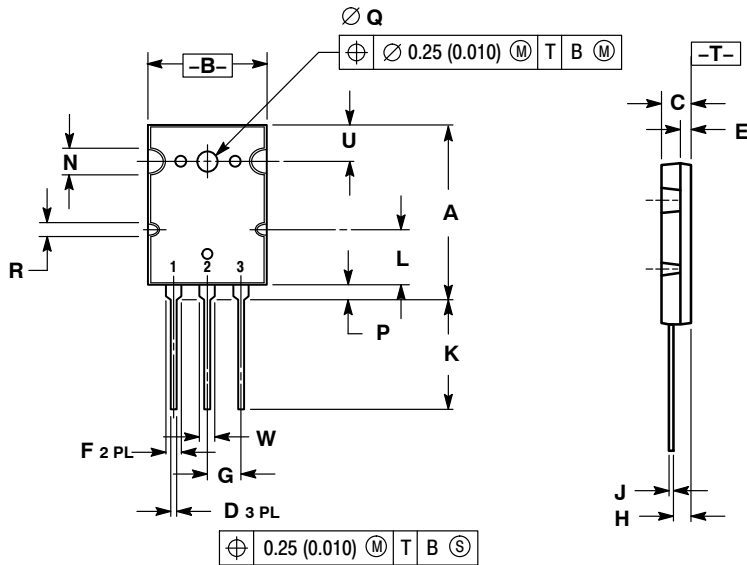


Figure 12. Active Region Safe Operating Area, PNP MJL4302A

MJL4281A (NPN) MJL4302A (PNP)

PACKAGE DIMENSIONS

TO-3BPL (TO-264)
CASE 340G-02
ISSUE J



- 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	11.2 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 2:
PIN 1. BASE
2. COLLECTOR
3. EMITTER

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local Sales Representative

MJL4281A/D