Complementary Bipolar Power Transistors

MJL3281A (NPN)
MJL1302A (PNP)

15 AMPERES
COMPLEMENTARY
SILICON POWER
TRANSISTORS
260 VOLTS
200 WATTS

Features

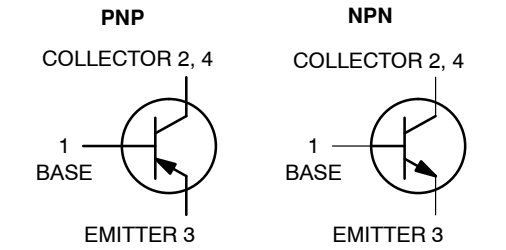
- Exceptional Safe Operating Area
- NPN/PNP Gain Matching within 10% from 50 mA to 5 A
- Excellent Gain Linearity
- High BVCEO
- High Frequency
- These Devices are Pb−Free and are RoHS Compliant*

Benefits

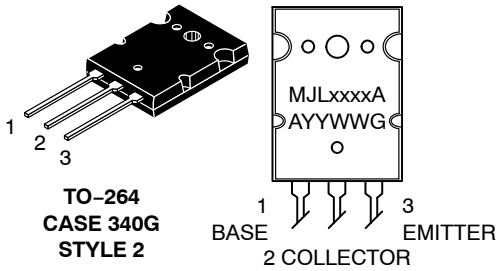
- Reliable Performance at Higher Powers
- Symmetrical Characteristics in Complementary Configurations
- Accurate Reproduction of Input Signal
- Greater Dynamic Range
- High Amplifier Bandwidth

Applications

- High−End Consumer Audio Products
  - Home Amplifiers
  - Home Receivers
- Professional Audio Amplifiers
  - Theater and Stadium Sound Systems
  - Public Address Systems (PAs)



MARKING DIAGRAM



TO−264
CASE 340G
STYLE 2

xxxx	= 3281 or 1302
A	= Location Code
YY	= Year
WW	= Work Week
G	= Pb−Free Package

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

Rating	Symbol	Value	Unit
Collector−Emitter Voltage	V_{CEO}	260	Vdc
Collector−Base Voltage	V_{CBO}	260	Vdc
Emitter−Base Voltage	V_{EBO}	5.0	Vdc
Collector−Emitter Voltage − 1.5 V	V_{CEX}	260	Vdc
Collector Current − Continuous	I_C	15	Adc
Collector Current − Peak (Note 1)	I_{CM}	25	Adc
Base Current − Continuous	I_B	1.5	Adc
Total Power Dissipation @ T_C = 25°C Derate Above 25°C	P_D	200 1.43	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	$R_{\theta JC}$	0.625	°C/W

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.
1. Pulse Test: Pulse Width = 5 ms, Duty Cycle < 10%.

ORDERING INFORMATION

Device	Package	Shipping
MJL3281AG	TO−264 (Pb−Free)	25 Units/Rail
MJL1302AG	TO−264 (Pb−Free)	25 Units/Rail

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

© Semiconductor Components Industries, LLC, 2013

Downloaded from Arrow.com.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector−Emitter Sustaining Voltage (I_C = 100 mAdc, I_B = 0)	$V_{CEO(sus)}$	260	–	Vdc
Collector Cutoff Current (V_{CB} = 260 Vdc, I_E = 0)	I_{CBO}	–	50	μAdc
Emitter Cutoff Current (V_{EB} = 5 Vdc, I_C = 0)	I_{EBO}	–	5	μAdc
SECOND BREAKDOWN				
Second Breakdown Collector with Base Forward Biased (V_{CE} = 50 Vdc, t = 1 s (non−repetitive)) (V_{CE} = 100 Vdc, t = 1 s (non−repetitive))	$I_{S/b}$	4 1	– –	Adc
ON CHARACTERISTICS				
DC Current Gain (I_C = 500 mAdc, V_{CE} = 5 Vdc) (I_C = 1 Adc, V_{CE} = 5 Vdc) (I_C = 3 Adc, V_{CE} = 5 Vdc) (I_C = 5 Adc, V_{CE} = 5 Vdc) (I_C = 8 Adc, V_{CE} = 5 Vdc)	h_{FE}	75 75 75 75 45	150 150 150 150 –	
Collector−Emitter Saturation Voltage (I_C = 10 Adc, I_B = 1 Adc)	$V_{CE(sat)}$	–	3	Vdc
DYNAMIC CHARACTERISTICS				
Current−Gain − Bandwidth Product (I_C = 1 Adc, V_{CE} = 5 Vdc, f_{test} = 1 MHz)	f_T	30	–	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f_{test} = 1 MHz)	C_{ob}	–	600	pF

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

TYPICAL CHARACTERISTICS

PNP MJL1302A

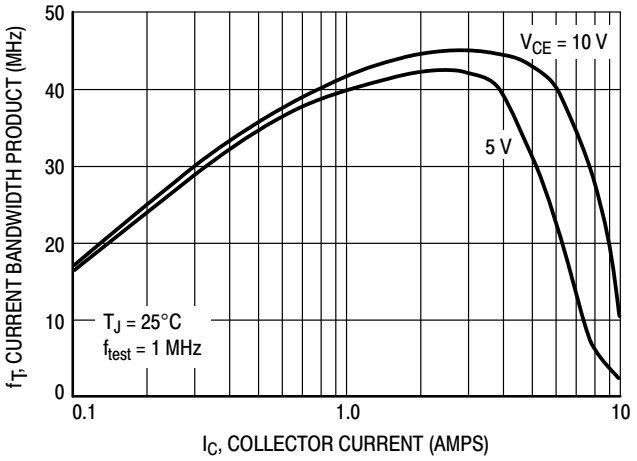


Figure 1. Typical Current Gain Bandwidth Product

NPN MJL3281A

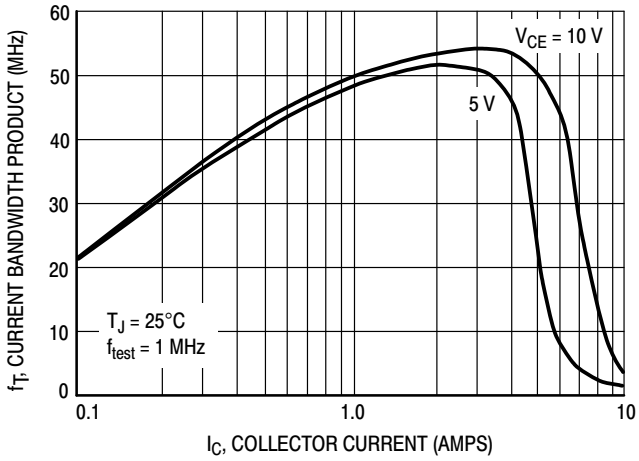


Figure 2. Typical Current Gain Bandwidth Product

PNP MJL1302A

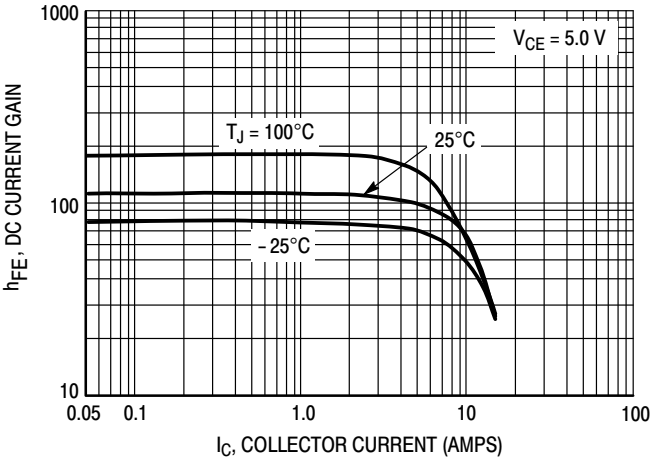


Figure 3. DC Current Gain

NPN MJL3281A

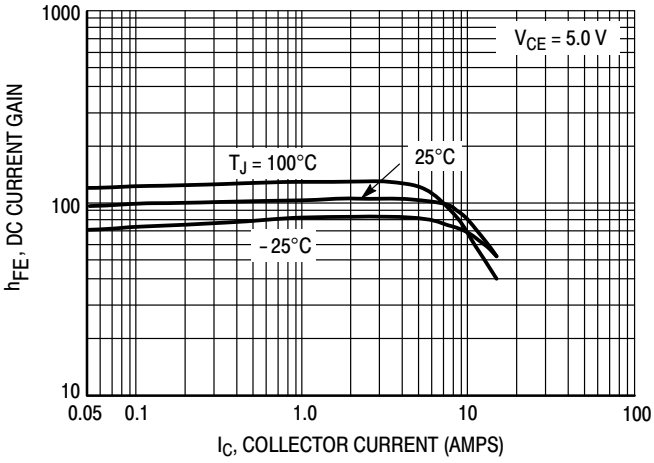


Figure 4. DC Current Gain

PNP MJL1302A

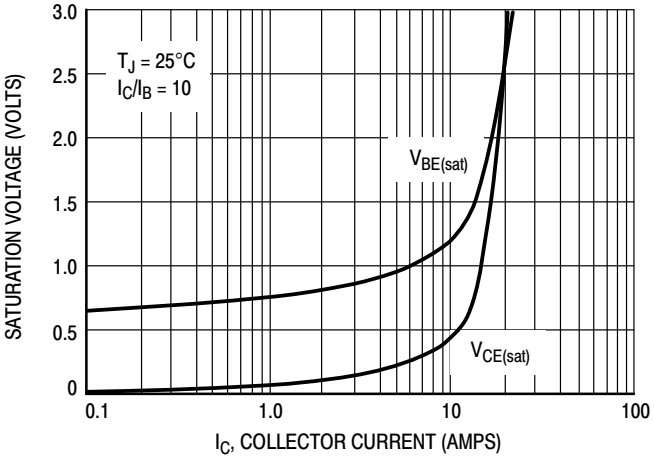


Figure 5. Typical Saturation Voltages

NPN MJL3281A

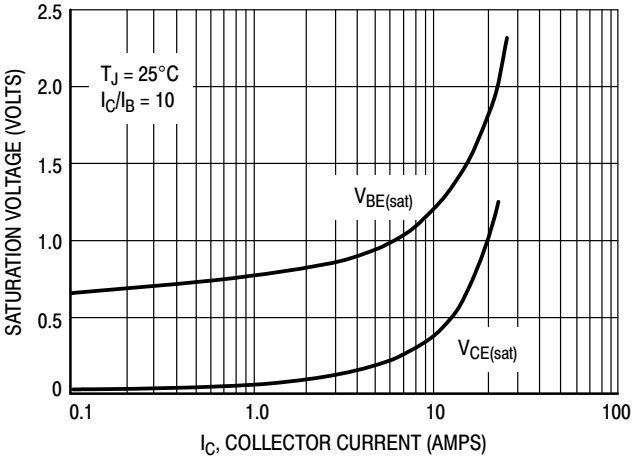


Figure 6. Typical Saturation Voltages

Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

TYPICAL CHARACTERISTICS

PNP MJL1302A

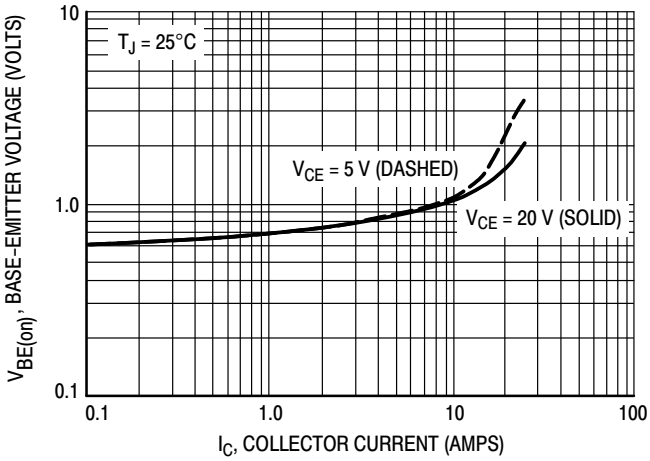


Figure 7. Typical Base−Emitter Voltage

NPN MJL3281A

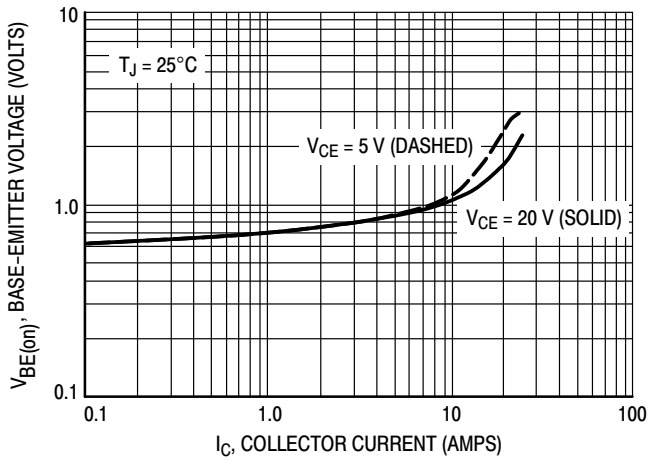


Figure 8. Typical Base−Emitter Voltage

PNP MJL1302A

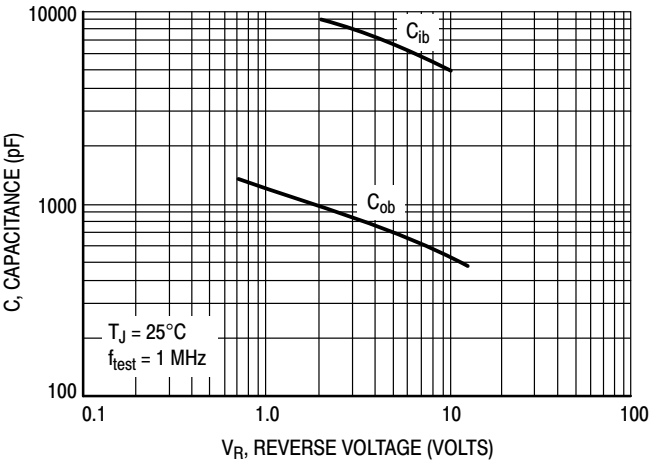


Figure 9. MJL1302A Typical Capacitance

NPN MJL3281A

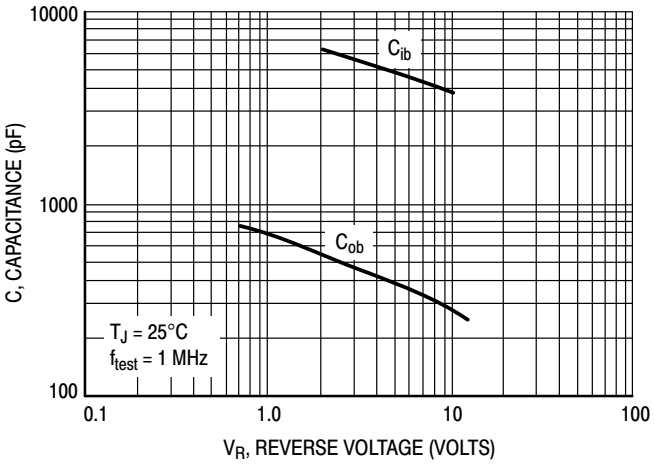


Figure 10. MJL3281A Typical Capacitance

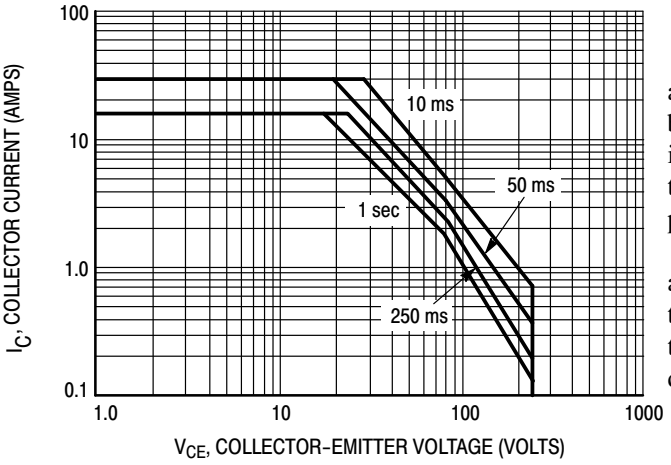


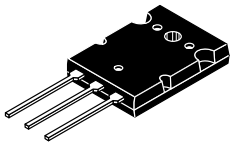
Figure 11. Active Region Safe Operating Area

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 11 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.

Share Feedback
Your Opinion Matters

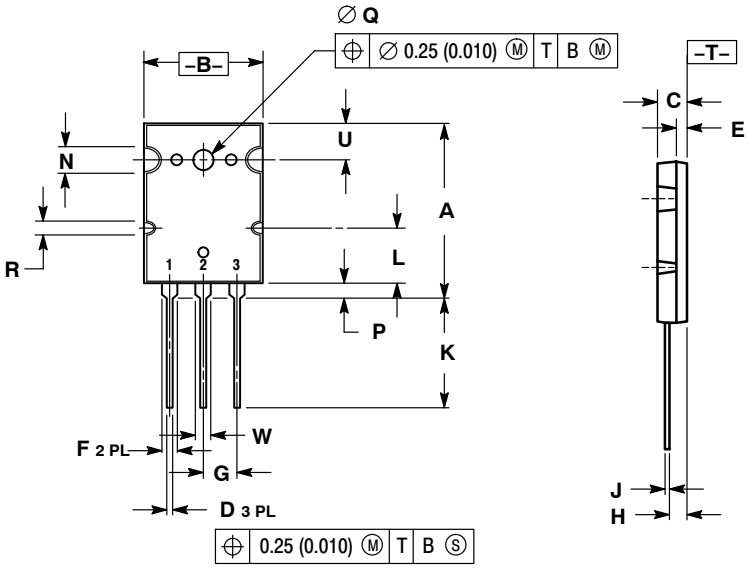
Downloaded from Arrow.com.



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

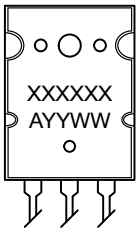
STYLE 2:
PIN 1. BASE
2. COLLECTOR
3. EMITTER

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.

DOCUMENT NUMBER:	**98ASB42780B**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**TO−3BPL (TO−264)**	**PAGE 1 OF 1**

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba **onsemi** or its subsidiaries in the United States and/or other countries. **onsemi** reserves the right to make changes without further notice to any products herein. **onsemi** makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does **onsemi** 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. **onsemi** does not convey any license under its patent rights nor the rights of others.

Downloaded from Arrow.com.

onsemi, ONSEMI , and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as−is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales

◊

Downloaded from Arrow.com.