

MJW3281A (NPN) MJW1302A (PNP)

Preferred Devices

Complementary NPN-PNP Silicon Power Bipolar Transistors

The MJW3281A and MJW1302A are PowerBase™ power transistors for high power audio, disk head positioners and other linear applications.

- Designed for 100 W Audio Frequency
- Gain Complementary:
Gain Linearity from 100 mA to 7 A
 $h_{FE} = 45$ (Min) @ $I_C = 8$ A
- Low Harmonic Distortion
- High Safe Operation Area – 1 A/100 V @ 1 Second
- High f_T – 30 MHz Typical

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	230	Vdc
Collector–Base Voltage	V_{CBO}	230	Vdc
Emitter–Base Voltage	V_{EBO}	5.0	Vdc
Collector–Emitter Voltage – 1.5 V	V_{CEX}	230	Vdc
Collector Current – Continuous – Peak (Note 1)	I_C	15 25	Adc
Base Current – Continuous	I_B	1.5	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate Above 25°C	P_D	200 1.43	Watts W/ $^\circ\text{C}$
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	$R_{\theta JC}$	0.7	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	40	$^\circ\text{C/W}$

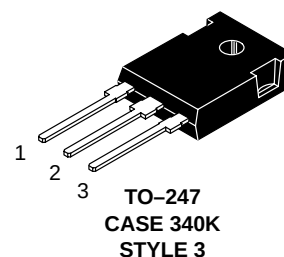
1. Pulse Test: Pulse Width = 5 ms, Duty Cycle < 10%.



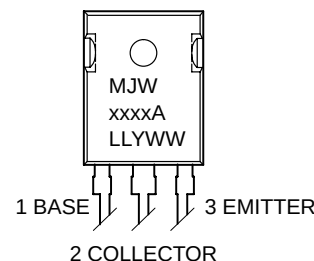
ON Semiconductor™

<http://onsemi.com>

**15 AMPERES
COMPLEMENTARY
SILICON POWER
TRANSISTORS
230 VOLTS
200 WATTS**



MARKING DIAGRAM



MJWxxxxA = Device Code
xxxx = 3281 OR 1302
LL = Location Code
Y = Year
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping
MJW3281A	TO-247	30 Units/Rail
MJW1302A	TO-247	30 Units/Rail

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

MJW3281A (NPN) MJW1302A (PNP)

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

Collector–Emitter Sustaining Voltage ($I_C = 100\text{ mAdc}$, $I_B = 0$)	$V_{CEO(sus)}$	230	–	–	Vdc
Collector Cutoff Current ($V_{CB} = 230\text{ Vdc}$, $I_E = 0$)	I_{CBO}	–	–	50	μAdc
Emitter Cutoff Current ($V_{EB} = 5\text{ Vdc}$, $I_C = 0$)	I_{EBO}	–	–	5	μAdc

SECOND BREAKDOWN

Second Breakdown Collector with Base Forward Biased ($V_{CE} = 50\text{ Vdc}$, $t = 1\text{ s}$ (non–repetitive)) ($V_{CE} = 100\text{ Vdc}$, $t = 1\text{ s}$ (non–repetitive))	$I_{S/b}$	4 1	– –	– –	Adc
--	-----------	--------	--------	--------	-----

ON CHARACTERISTICS

DC Current Gain ($I_C = 100\text{ mAdc}$, $V_{CE} = 5\text{ Vdc}$) ($I_C = 1\text{ Adc}$, $V_{CE} = 5\text{ Vdc}$) ($I_C = 3\text{ Adc}$, $V_{CE} = 5\text{ Vdc}$) ($I_C = 5\text{ Adc}$, $V_{CE} = 5\text{ Vdc}$) ($I_C = 7\text{ Adc}$, $V_{CE} = 5\text{ Vdc}$) ($I_C = 8\text{ Adc}$, $V_{CE} = 5\text{ Vdc}$) ($I_C = 15\text{ Adc}$, $V_{CE} = 5\text{ Vdc}$)	h_{FE}	50 50 50 50 50 45 12	125 – – – 115 – 35	200 200 200 200 200 – –	–
Collector–Emitter Saturation Voltage ($I_C = 10\text{ Adc}$, $I_B = 1\text{ Adc}$)	$V_{CE(sat)}$	–	0.4	2	Vdc
Base–Emitter On Voltage ($I_C = 8\text{ Adc}$, $V_{CE} = 5\text{ Vdc}$)	$V_{BE(on)}$	–	–	2	Vdc

DYNAMIC CHARACTERISTICS

Current–Gain – Bandwidth Product ($I_C = 1\text{ Adc}$, $V_{CE} = 5\text{ Vdc}$, $f_{test} = 1\text{ MHz}$)	f_T	–	30	–	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f_{test} = 1\text{ MHz}$)	C_{ob}	–	–	600	pF

PNP MJW1302A

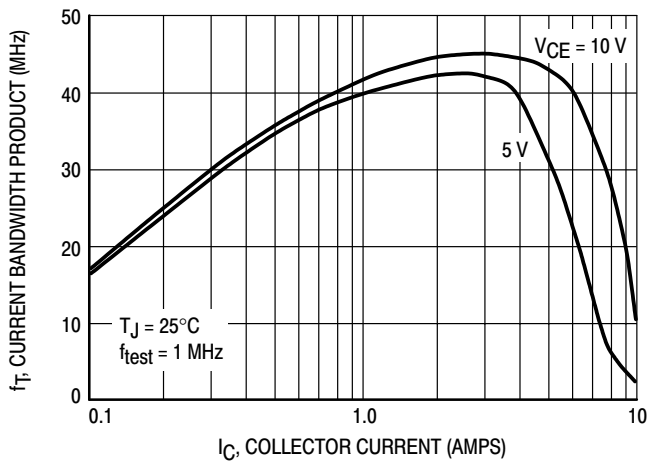


Figure 1. Typical Current Gain Bandwidth Product

NPN MJW3281A

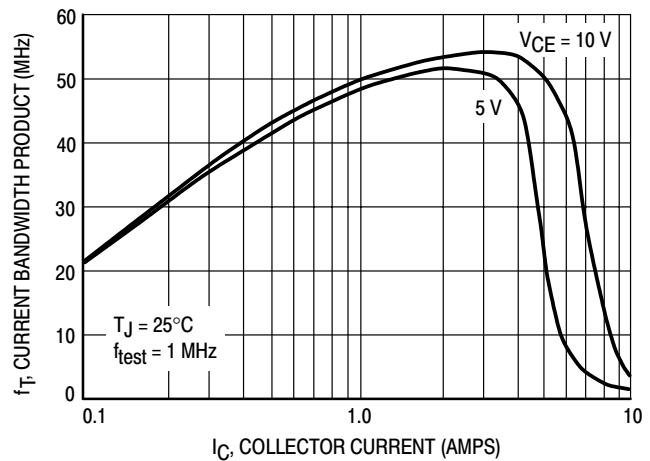


Figure 2. Typical Current Gain Bandwidth Product

MJW3281A (NPN) MJW1302A (PNP)

TYPICAL CHARACTERISTICS

PNP MJW1302A

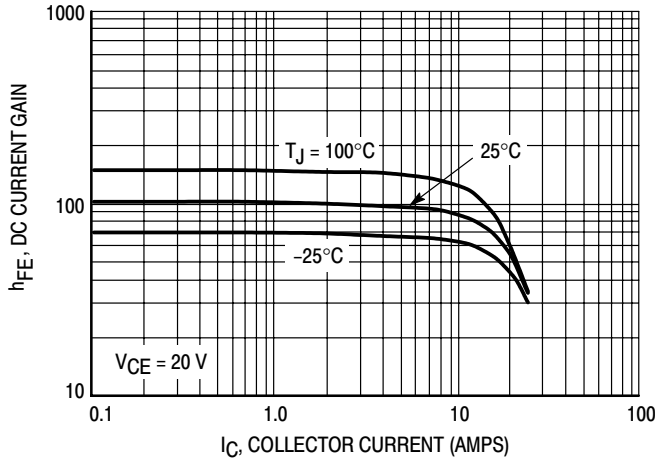


Figure 3. DC Current Gain, $V_{CE} = 20 \text{ V}$

NPN MJW3281A

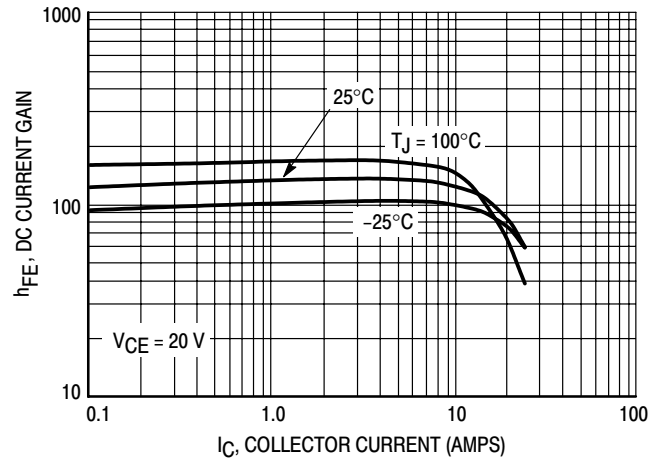


Figure 4. DC Current Gain, $V_{CE} = 20 \text{ V}$

PNP MJW1302A

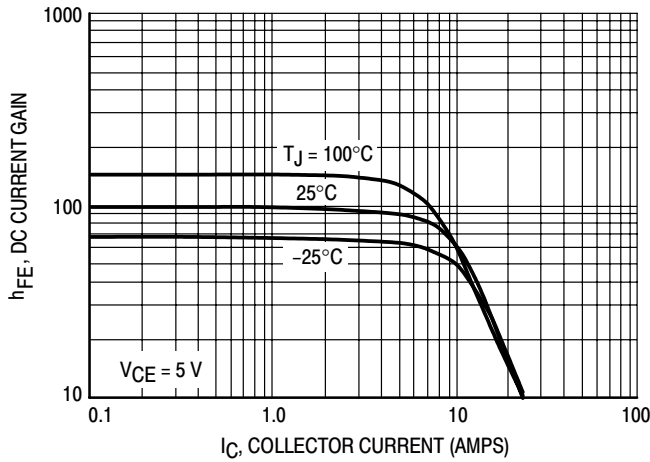


Figure 5. DC Current Gain, $V_{CE} = 5 \text{ V}$

NPN MJW3281A

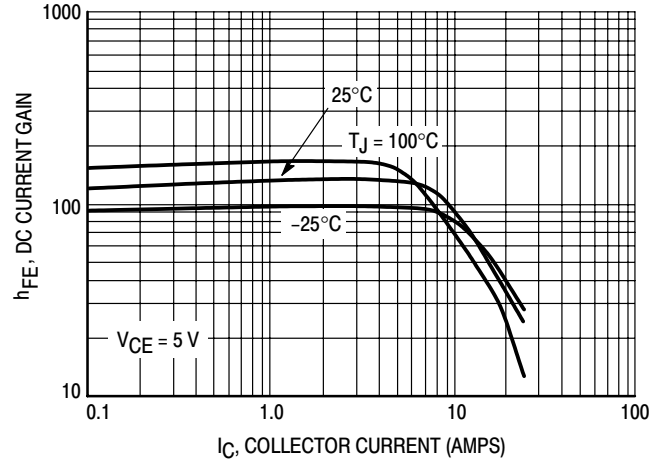


Figure 6. DC Current Gain, $V_{CE} = 5 \text{ V}$

PNP MJW1302A

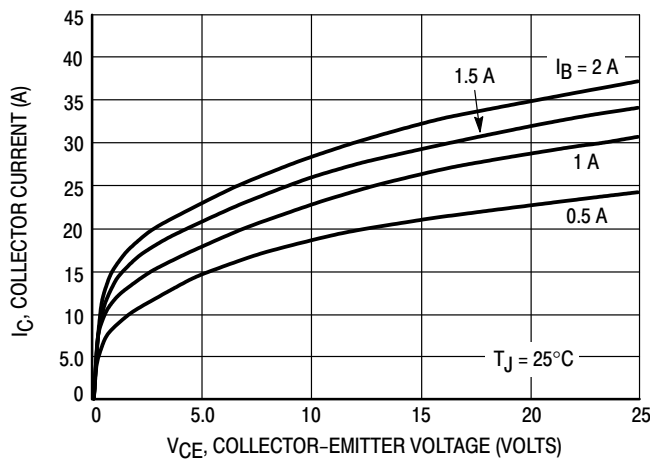


Figure 7. Typical Output Characteristics

NPN MJW3281A

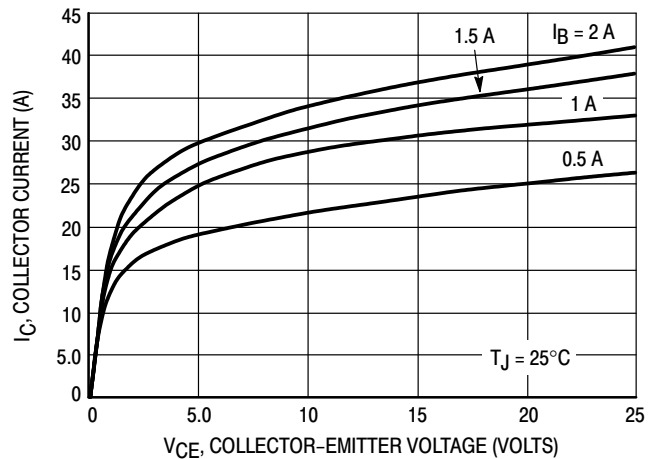


Figure 8. Typical Output Characteristics

MJW3281A (NPN) MJW1302A (PNP)

TYPICAL CHARACTERISTICS

PNP MJW1302A

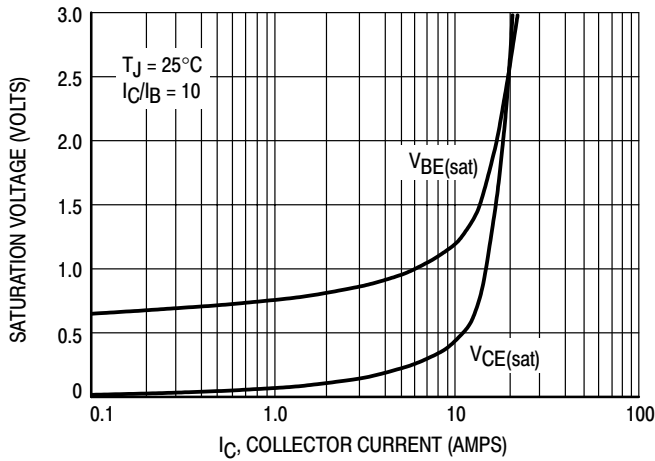


Figure 9. Typical Saturation Voltages

NPN MJW3281A

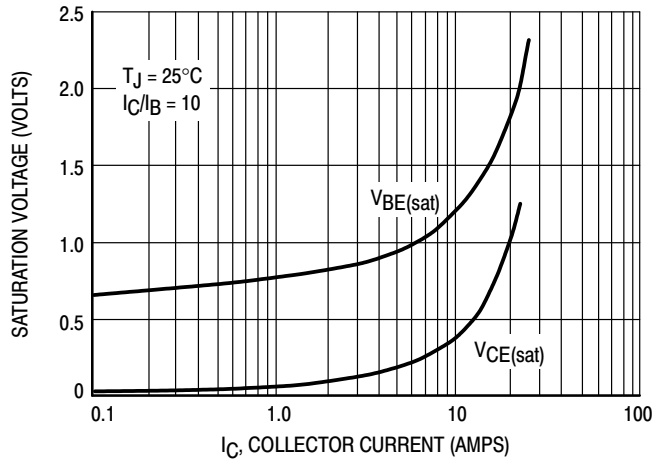


Figure 10. Typical Saturation Voltages

PNP MJW1302A

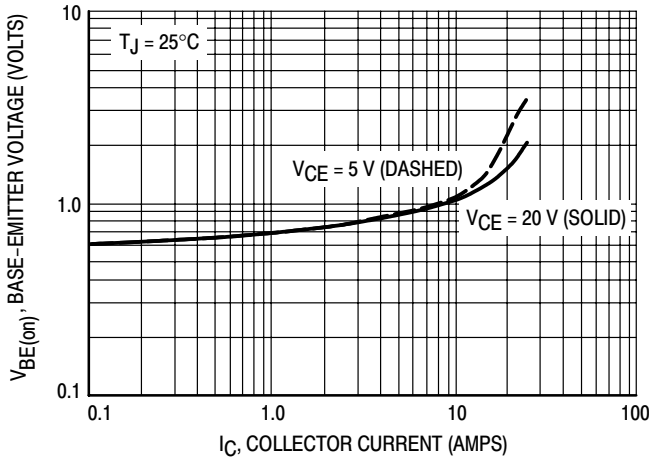


Figure 11. Typical Base-Emitter Voltage

NPN MJW3281A

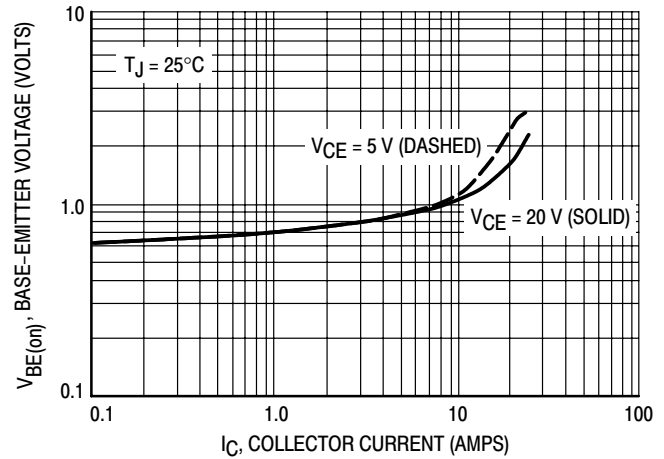


Figure 12. Typical Base-Emitter Voltage

PNP MJW1302A

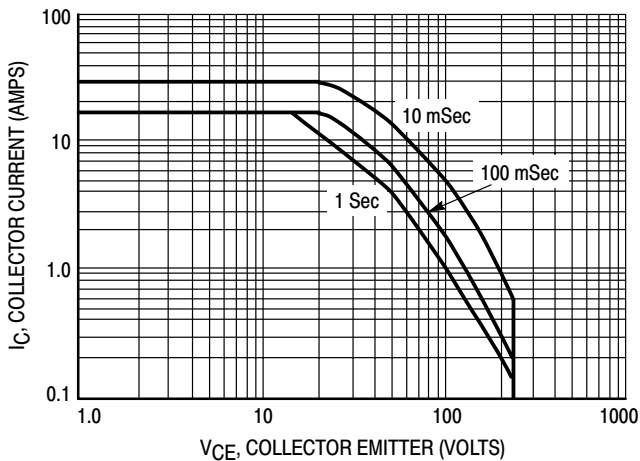


Figure 13. Active Region Safe Operating Area

NPN MJW3281A

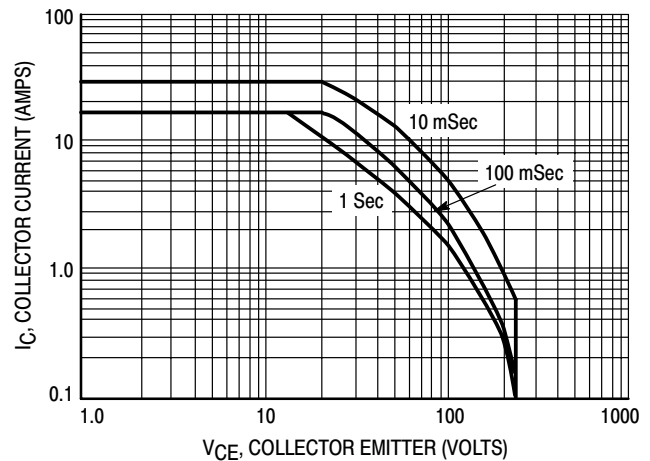


Figure 14. Active Region Safe Operating Area

MJW3281A (NPN) MJW1302A (PNP)

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 Figures 13 and 14 is based on $T_{J(pk)} = 150^\circ\text{C}$; 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.

TYPICAL CHARACTERISTICS

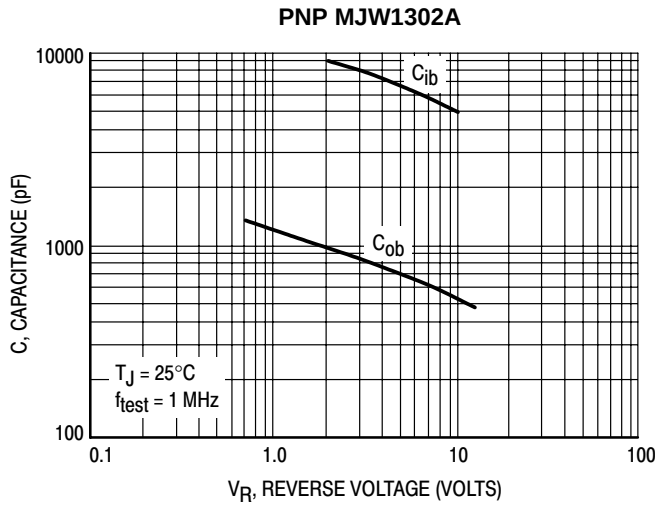


Figure 15. MJW1302A Typical Capacitance

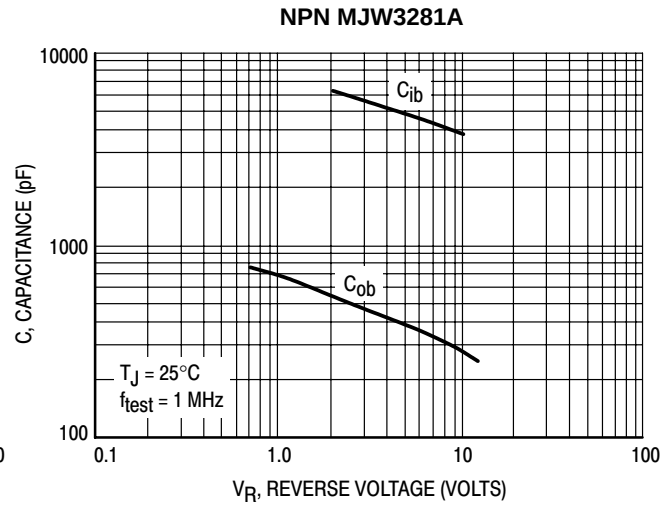
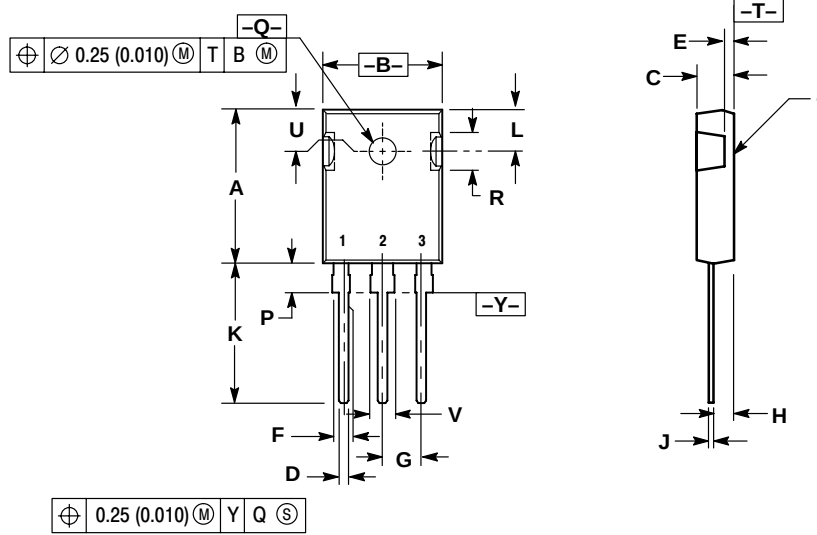


Figure 16. MJW3281A Typical Capacitance

MJW3281A (NPN) MJW1302A (PNP)

PACKAGE DIMENSIONS

TO-247
CASE 340K-01
ISSUE C



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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	19.7	20.3	0.776	0.799
B	15.3	15.9	0.602	0.626
C	4.7	5.3	0.185	0.209
D	1.0	1.4	0.039	0.055
E	1.27 REF		0.050 REF	
F	2.0	2.4	0.079	0.094
G	5.5 BSC		0.216 BSC	
H	2.2	2.6	0.087	0.102
J	0.4	0.8	0.016	0.031
K	14.2	14.8	0.559	0.583
L	5.5 NOM		0.217 NOM	
P	3.7	4.3	0.146	0.169
Q	3.55	3.65	0.140	0.144
R	5.0 NOM		0.197 NOM	
U	5.5 BSC		0.217 BSC	
V	3.0	3.4	0.118	0.134

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

Notes

MJW3281A (NPN) MJW1302A (PNP)

PowerBase is a trademark of Semiconductor Components Industries, LLC.

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC (SCILLC). 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.

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: ONlit@hibbertco.com

N. American Technical Support: 800-282-9855 Toll Free USA/Canada

JAPAN: ON Semiconductor, Japan Customer Focus Center
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031
Phone: 81-3-5740-2700
Email: r14525@onsemi.com

ON Semiconductor Website: <http://onsemi.com>

For additional information, please contact your local Sales Representative.