

# 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 $25^\circ\text{C}$	$P_D$	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	$^\circ\text{C/W}$

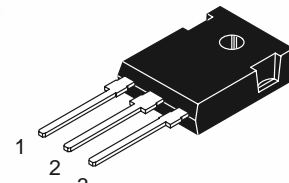
1. Pulse Test: Pulse Width = 5 ms, Duty Cycle < 10%.



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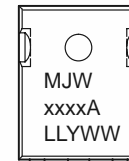
<http://onsemi.com>

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



TO-247  
CASE 340K  
STYLE 3

### MARKING DIAGRAM



1 BASE  
2 COLLECTOR  
3 EMITTER

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
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#### 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	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{EB} = 5\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	–	–	5	$\mu\text{Adc}$

#### 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
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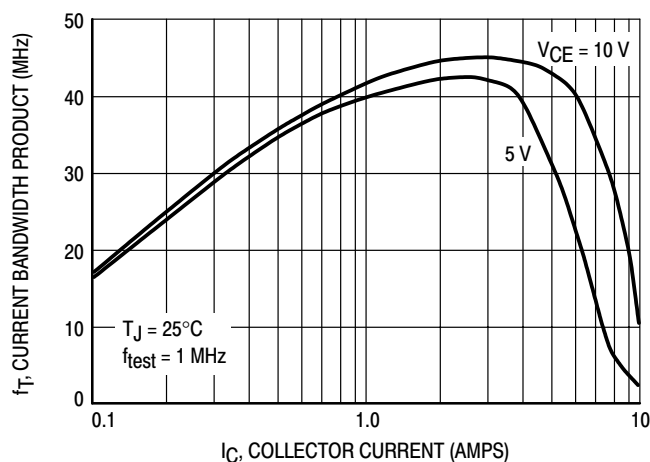
#### ON CHARACTERISTICS

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

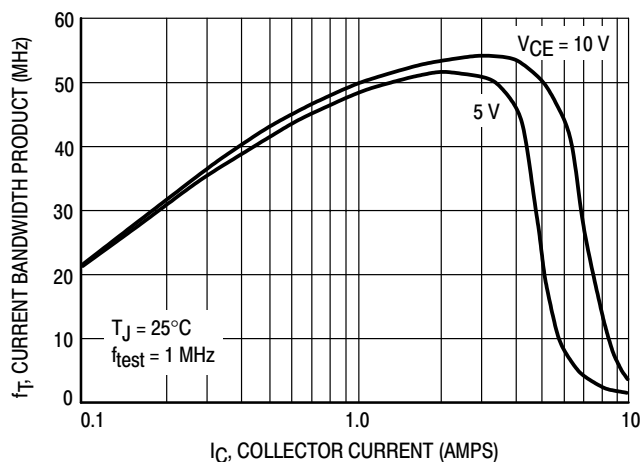
Current–Gain – Bandwidth Product ( $I_C = 1\text{ Adc}$ , $V_{CE} = 5\text{ Vdc}$ , $f_{test} = 1\text{ MHz}$ )	$f_T$	–	30	–	MHz
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f_{test} = 1\text{ MHz}$ )	$C_{ob}$	–	–	600	pF

**PNP MJW1302A**



**Figure 1. Typical Current Gain Bandwidth Product**

**NPN MJW3281A**

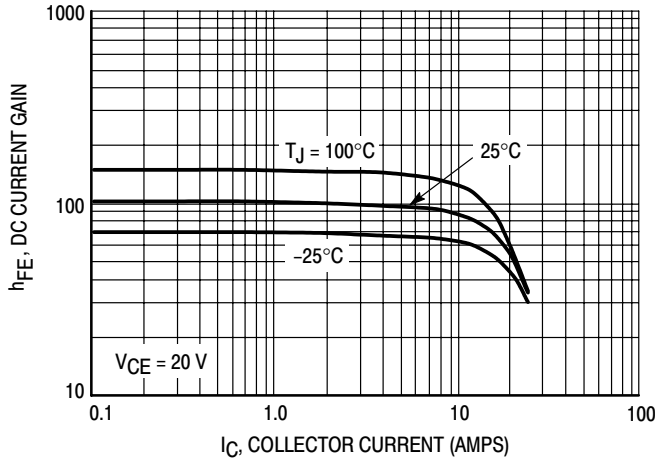


**Figure 2. Typical Current Gain Bandwidth Product**

# MJW3281A (NPN) MJW1302A (PNP)

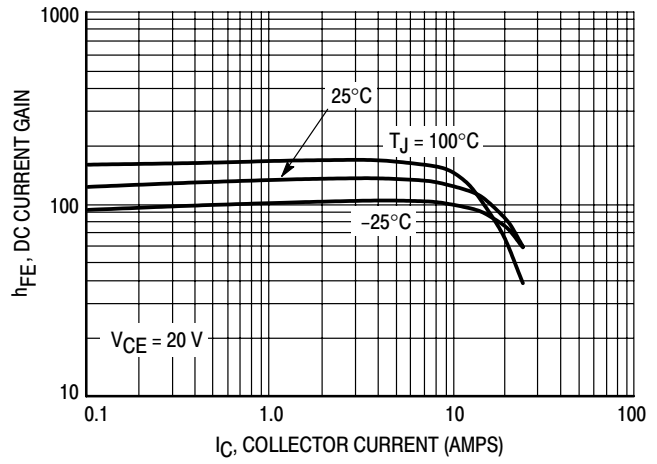
## TYPICAL CHARACTERISTICS

**PNP MJW1302A**



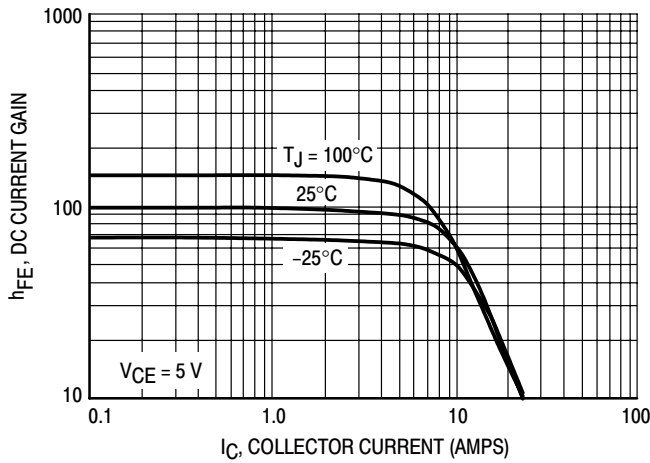
**Figure 3. DC Current Gain,  $V_{CE} = 20\text{ V}$**

**NPN MJW3281A**



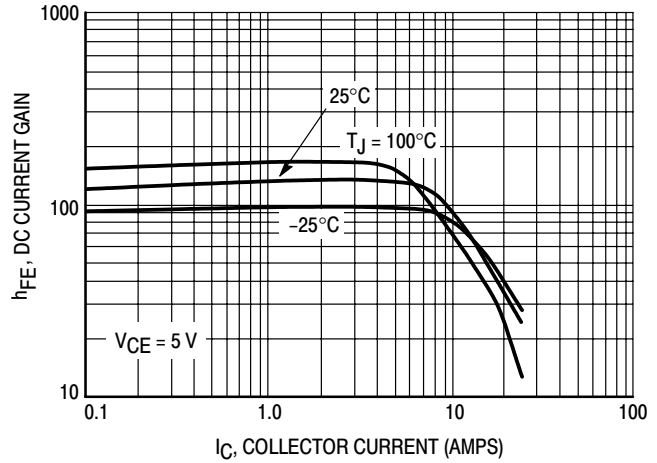
**Figure 4. DC Current Gain,  $V_{CE} = 20\text{ V}$**

**PNP MJW1302A**



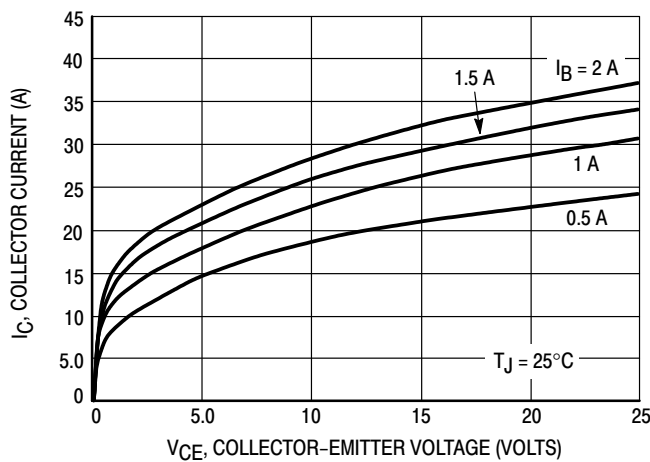
**Figure 5. DC Current Gain,  $V_{CE} = 5\text{ V}$**

**NPN MJW3281A**



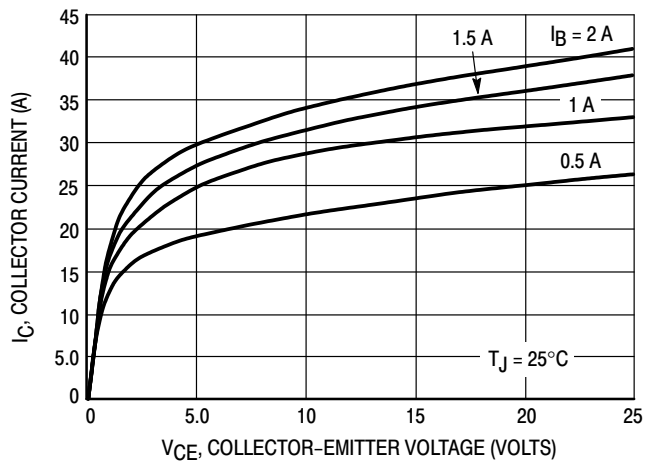
**Figure 6. DC Current Gain,  $V_{CE} = 5\text{ V}$**

**PNP MJW1302A**



**Figure 7. Typical Output Characteristics**

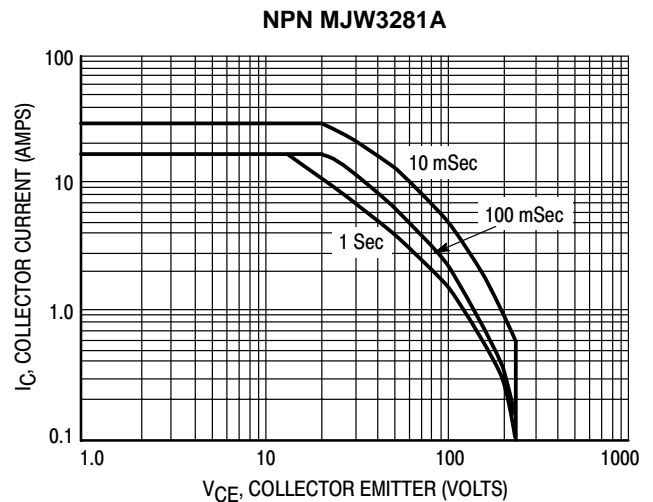
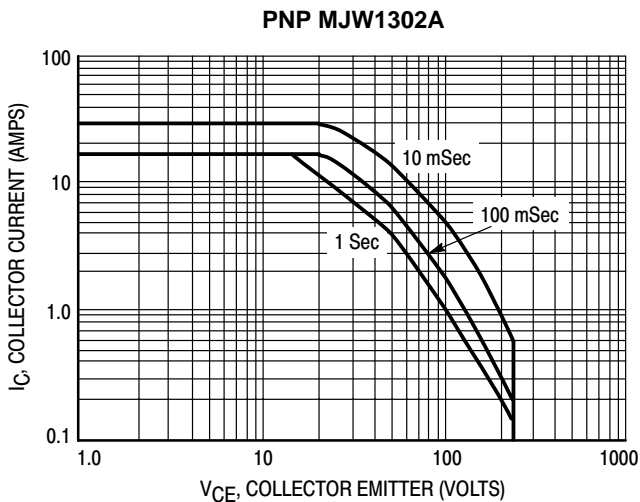
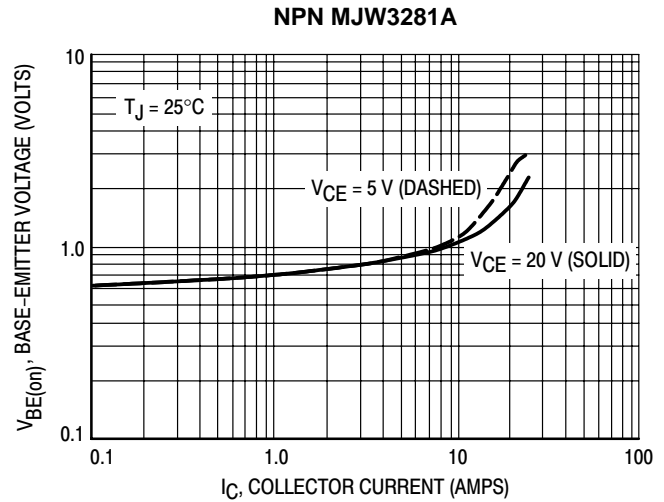
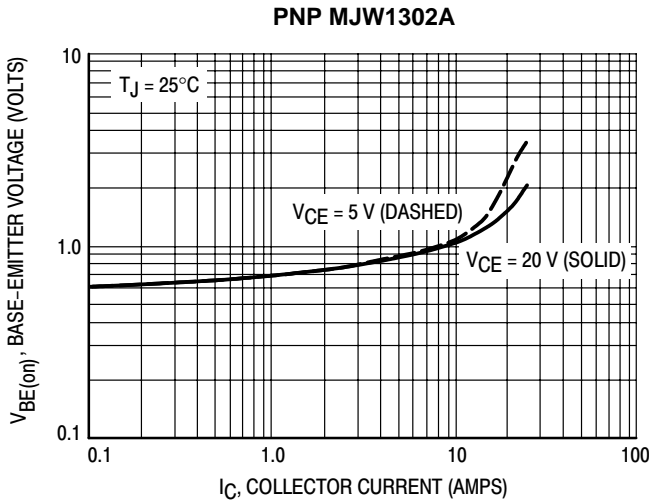
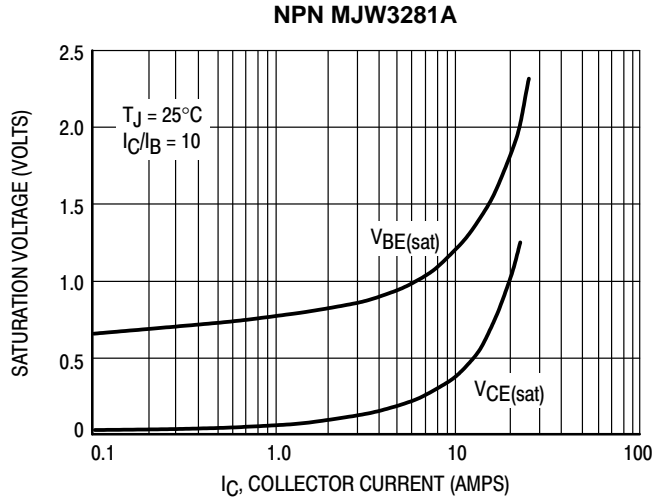
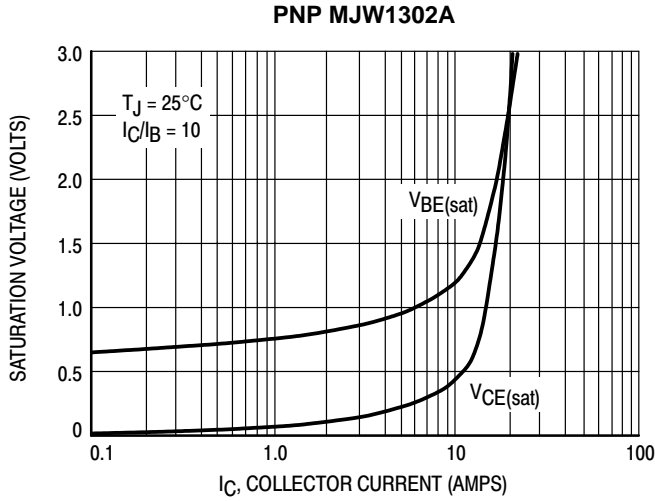
**NPN MJW3281A**



**Figure 8. Typical Output Characteristics**

# MJW3281A (NPN) MJW1302A (PNP)

## TYPICAL CHARACTERISTICS



## 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 that can be handled to values less than the limitations imposed by second breakdown.

### TYPICAL CHARACTERISTICS

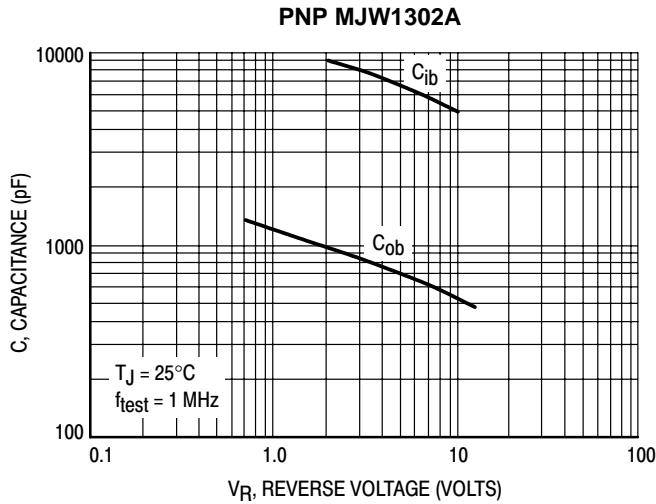


Figure 15. MJW1302A Typical Capacitance

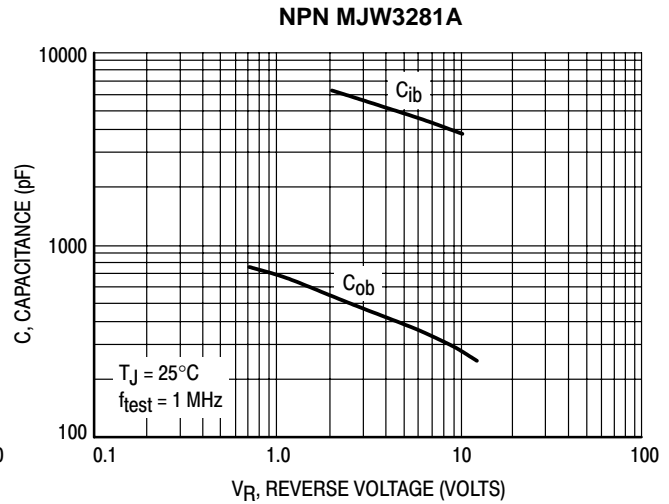
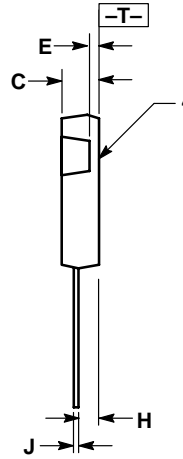
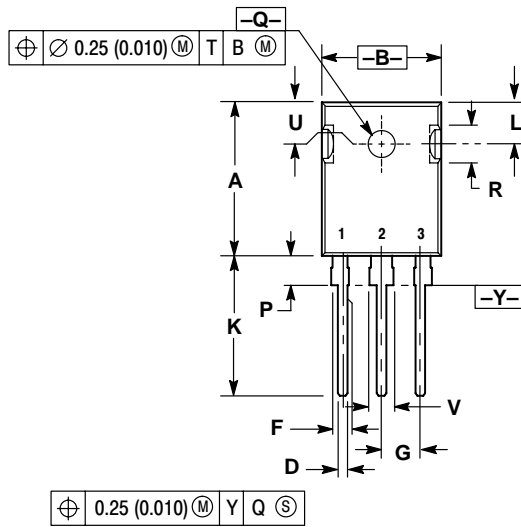


Figure 16. MJW3281A Typical Capacitance

# 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
- COLLECTOR
- EMITTER

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## Notes

## MJW3281A (NPN) MJW1302A (PNP)

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