

# NJW0281G (NPN) NJW0302G (PNP)

Preferred Devices

## Complementary NPN-PNP Power Bipolar Transistors

These complementary devices are lower power versions of the popular NJW3281G and NJW1302G audio output transistors. With superior gain linearity and safe operating area performance, these transistors are ideal for high fidelity audio amplifier output stages and other linear applications.

### Features

- Exceptional Safe Operating Area
- NPN/PNP Gain Matching within 10% from 50 mA to 3 A
- Excellent Gain Linearity
- High BVCEO
- High Frequency
- These are Pb-Free Devices

### 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)

### MAXIMUM RATINGS

| Rating  | Symbol         | Value           | Unit             |
|---|----------------|-----------------|------------------|
| Collector-Emitter Voltage                           | $V_{CEO}$      | 250             | Vdc              |
| Collector-Base Voltage                              | $V_{CBO}$      | 250             | Vdc              |
| Emitter-Base Voltage                                | $V_{EBO}$      | 5.0             | Vdc              |
| Collector-Emitter Voltage - 1.5 V                   | $V_{CEX}$      | 250             | Vdc              |
| Collector Current - Continuous<br>- Peak (Note 1)   | $I_C$          | 15<br>30        | Adc              |
| Base Current - Continuous                           | $I_B$          | 1.5             | Adc              |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$  | $P_D$          | 150             | Watts            |
| Operating and Storage Junction<br>Temperature Range | $T_J, T_{stg}$ | - 65 to<br>+150 | $^\circ\text{C}$ |

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.

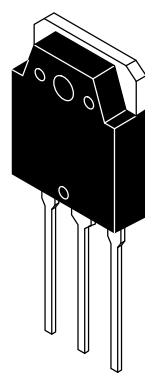
1. Pulse Test: Pulse Width = 5.0 ms, Duty Cycle < 10%.



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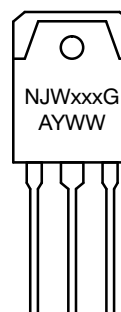
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**15 AMPERES  
COMPLEMENTARY SILICON  
POWER TRANSISTORS  
250 VOLTS, 150 WATTS**



TO-3P  
CASE 340AB

### MARKING DIAGRAM



xxxx = 0281 or 0302  
G = Pb-Free Package  
A = Assembly Location  
Y = Year  
WW = Work Week

### ORDERING INFORMATION

| Device   | Package            | Shipping      |
|----------|--------------------|---------------|
| NJW0281G | TO-3P<br>(Pb-Free) | 30 Units/Rail |
| NJW0302G | TO-3P<br>(Pb-Free) | 30 Units/Rail |

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

# NJW0281G (NPN) NJW0302G (PNP)

## Thermal Characteristics

| Characteristic                       | Symbol          | Value | Unit          |
|--------------------------------------|-----------------|-------|---------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 0.83  | $^{\circ}C/W$ |

## Electrical Characteristics ( $T_C = 25^{\circ}C$ unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

### OFF CHARACTERISTICS

|  |                |     |     |         |
|--|----------------|-----|-----|---------|
| Collector-Emitter Sustaining Voltage<br>( $I_C = 30\text{ mA}$ , $I_B = 0$ ) | $V_{CEO(sus)}$ | 250 | -   | V       |
| Collector Cutoff Current<br>( $V_{CB} = 250\text{ V}$ , $I_E = 0$ )          | $I_{CBO}$      | -   | 10  | $\mu A$ |
| Emitter Cutoff Current<br>( $V_{EB} = 5.0\text{ V}$ , $I_C = 0$ )            | $I_{EBO}$      | -   | 5.0 | $\mu A$ |

### ON CHARACTERISTICS

|   |               |                |                   |   |
|---|---------------|----------------|-------------------|---|
| DC Current Gain<br>( $I_C = 0.5\text{ A}$ , $V_{CE} = 5.0\text{ V}$ )<br>( $I_C = 1.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ )<br>( $I_C = 3.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ ) | $h_{FE}$      | 75<br>75<br>75 | 150<br>150<br>150 | - |
| Collector-Emitter Saturation Voltage<br>( $I_C = 5.0\text{ A}$ , $I_B = 0.5\text{ A}$ )   | $V_{CE(sat)}$ | -              | 1.0               | V |
| Base-Emitter On Voltage<br>( $I_C = 5.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ )   | $V_{BE(on)}$  | -              | 1.2               | V |

### DYNAMIC CHARACTERISTICS

|  |          |    |     |     |
|--|----------|----|-----|-----|
| Current-Gain - Bandwidth Product<br>( $I_C = 1.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ , $f_{test} = 1.0\text{ MHz}$ ) | $f_T$    | 30 | -   | MHz |
| Output Capacitance<br>( $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f_{test} = 1.0\text{ MHz}$ )                           | $C_{ob}$ | -  | 400 | pF  |

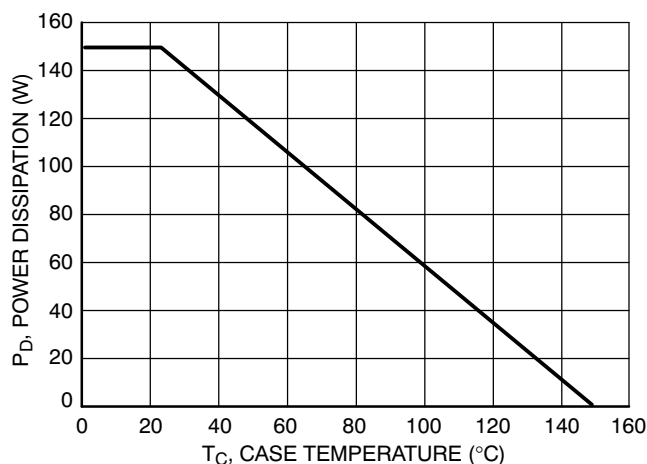


Figure 1. Power Derating

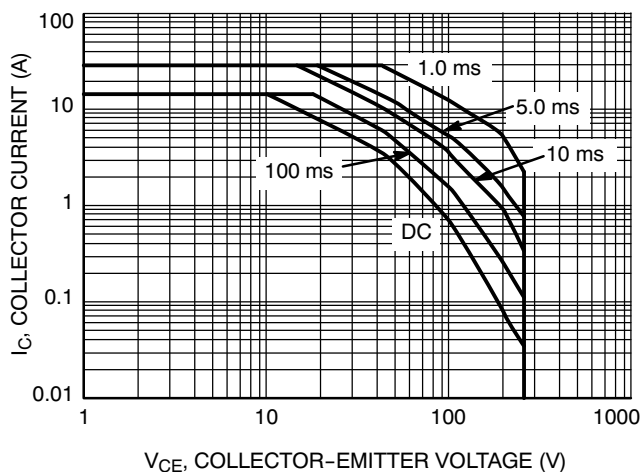


Figure 2. Safe Operating Area

# NJW0281G (NPN) NJW0302G (PNP)

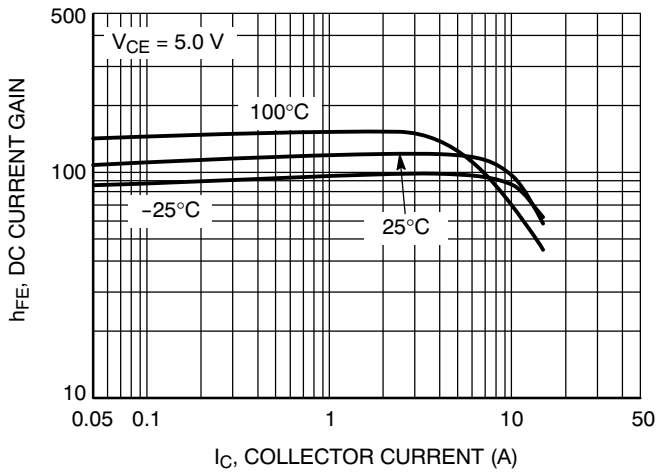


Figure 3. NJW0281G DC Current Gain

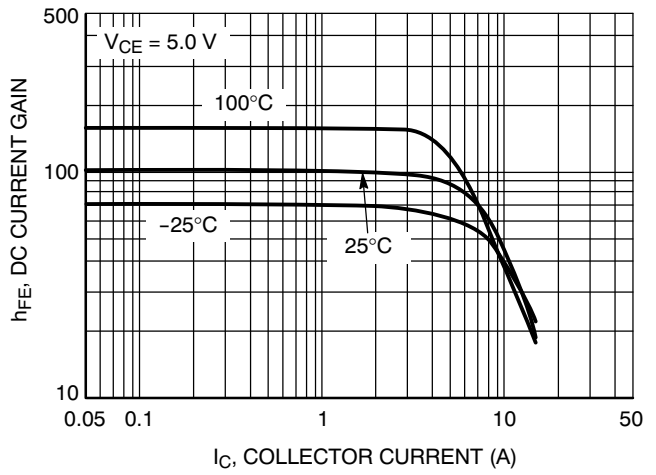


Figure 4. NJW0302G DC Current Gain

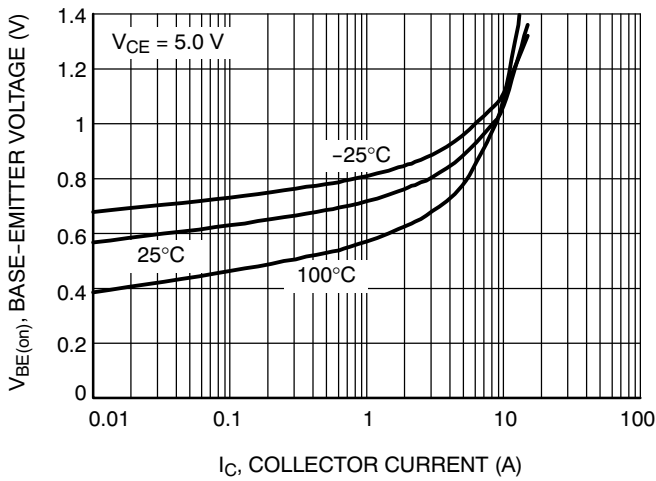


Figure 5. NJW0281G Base-Emitter Voltage

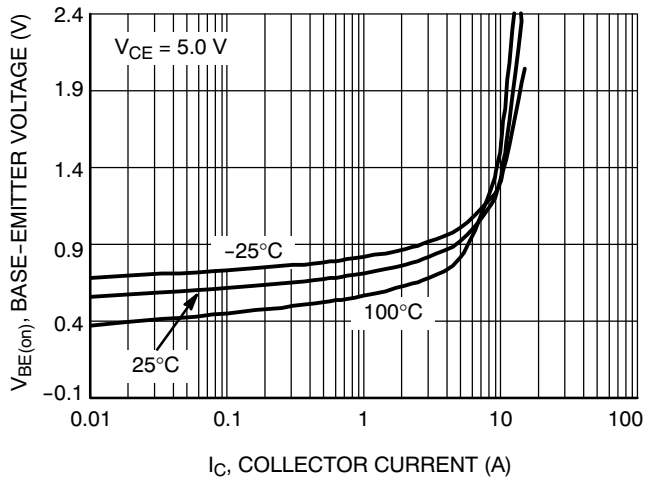


Figure 6. NJW0302G Base-Emitter Voltage

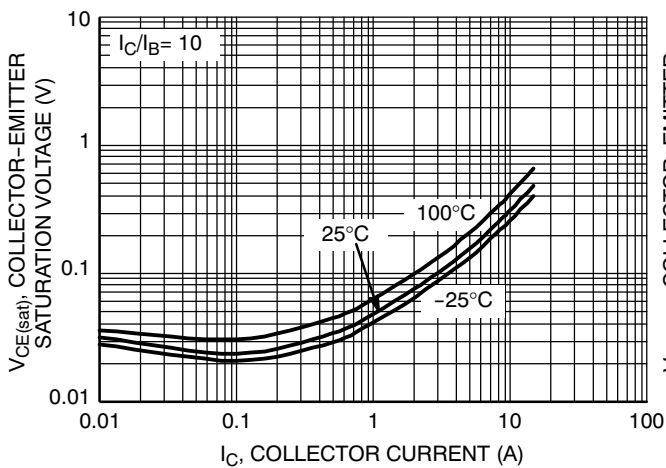


Figure 7. NJW0281G Saturation Voltage

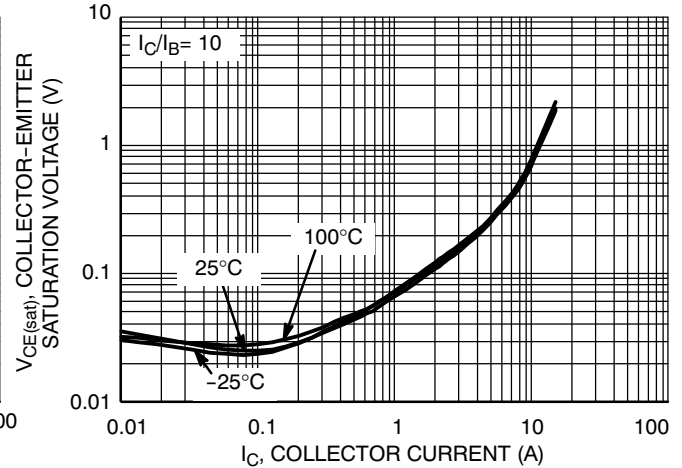


Figure 8. NJW0302G Saturation Voltage

## NJW0281G (NPN) NJW0302G (PNP)

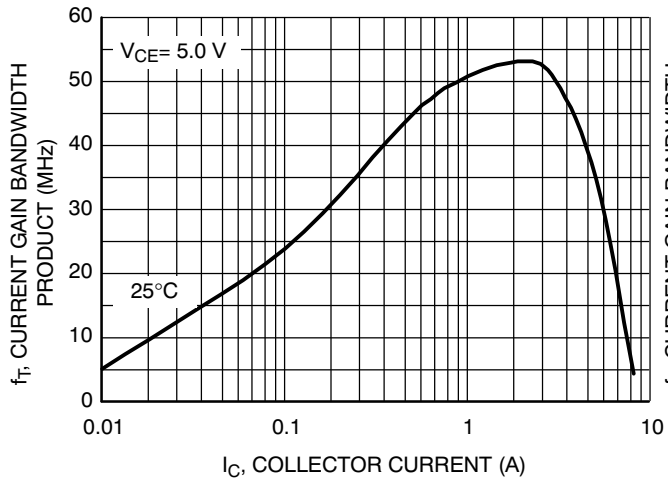


Figure 9. NJW0281G Current Gain Bandwidth Product

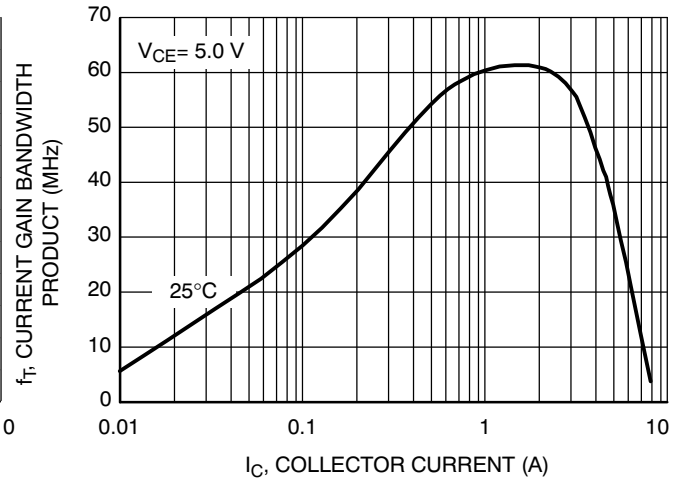
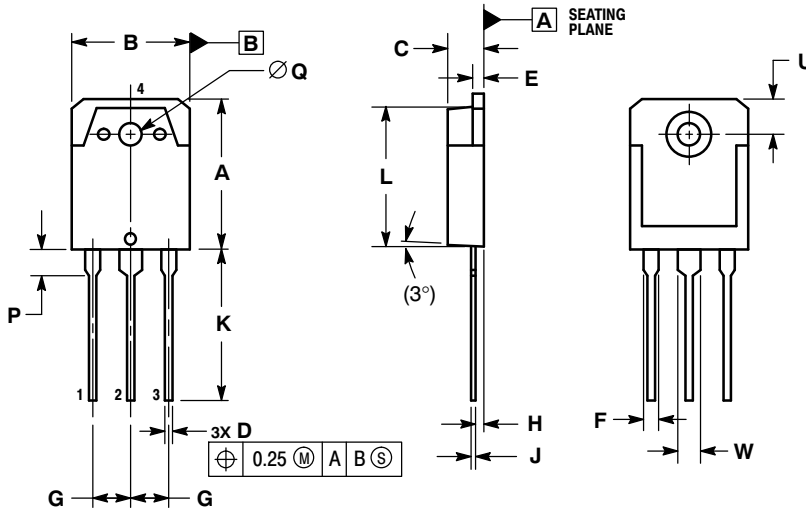


Figure 10. NJW0302G Current Gain Bandwidth Product

# NJW0281G (NPN) NJW0302G (PNP)

## PACKAGE DIMENSIONS

TO-3P-3LD  
CASE 340AB-01  
ISSUE A



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30mm FROM THE TERMINAL TIP.
4. DIMENSION A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| DIM | MILLIMETERS |       |       |
|-----|-------------|-------|-------|
|     | MIN         | NOM   | MAX   |
| A   | 19.70       | 19.90 | 20.10 |
| B   | 15.40       | 15.60 | 15.80 |
| C   | 4.60        | 4.80  | 5.00  |
| D   | 0.80        | 1.00  | 1.20  |
| E   | 1.45        | 1.50  | 1.65  |
| F   | 1.80        | 2.00  | 2.20  |
| G   | 5.45 BSC    |       |       |
| H   | 1.20        | 1.40  | 1.60  |
| J   | 0.55        | 0.60  | 0.75  |
| K   | 19.80       | 20.00 | 20.20 |
| L   | 18.50       | 18.70 | 18.90 |
| P   | 3.30        | 3.50  | 3.70  |
| Q   | 3.10        | 3.20  | 3.50  |
| U   | 5.00 REF    |       |       |
| W   | 2.80        | 3.00  | 3.20  |

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