

# NJW0281G (NPN) NJW0302G (PNP)

## 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 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)

### 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	$I_C$	15	Adc
Collector Current - Peak (Note 1)	$I_{CM}$	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 Temperature Range	$T_J, T_{stg}$	- 65 to +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.

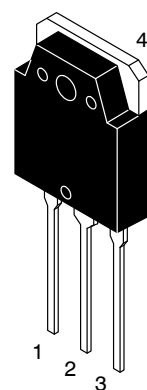
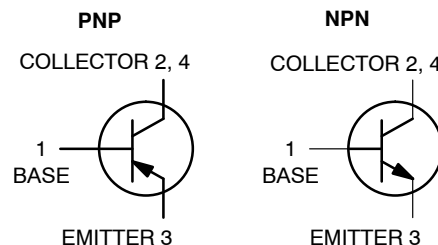
1. Pulse Test: Pulse Width = 5.0 ms, Duty Cycle < 10%.



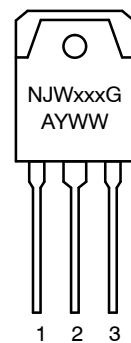
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## 15 AMPERES COMPLEMENTARY SILICON POWER TRANSISTORS 250 VOLTS, 150 WATTS



### MARKING DIAGRAM



**TO-3P  
CASE 340AB  
STYLES 1,2,3**

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

### ORDERING INFORMATION

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

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## 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
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### OFF CHARACTERISTICS

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

### ON CHARACTERISTICS

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

### DYNAMIC CHARACTERISTICS

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

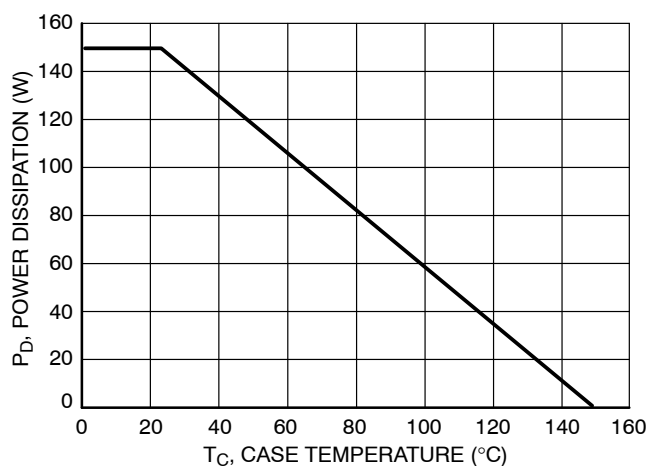


Figure 1. Power Derating

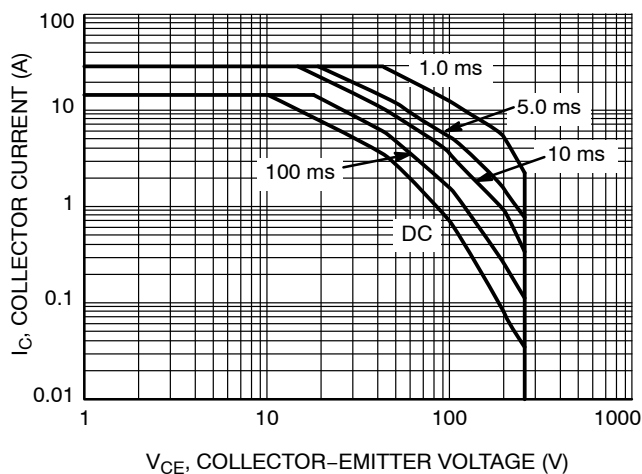


Figure 2. Safe Operating Area

**NJW0281G (NPN) NJW0302G (PNP)**



**Figure 3. NJW0281G DC Current Gain**



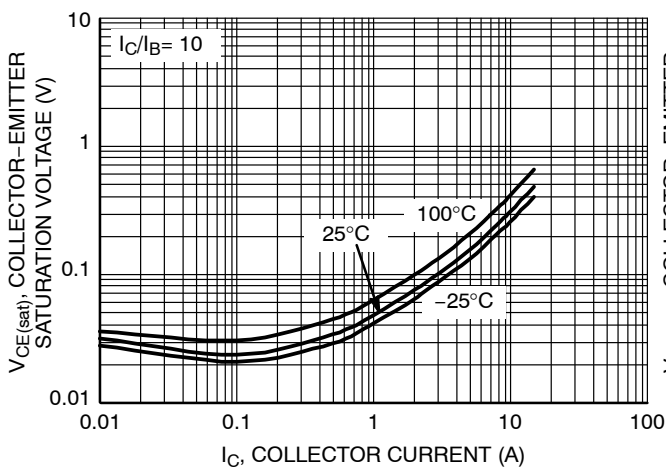
**Figure 4. NJW0302G DC Current Gain**



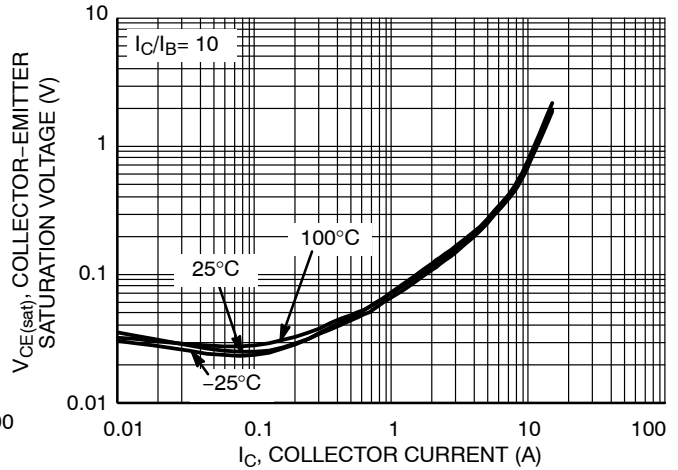
**Figure 5. NJW0281G Base-Emitter Voltage**



**Figure 6. NJW0302G Base-Emitter Voltage**

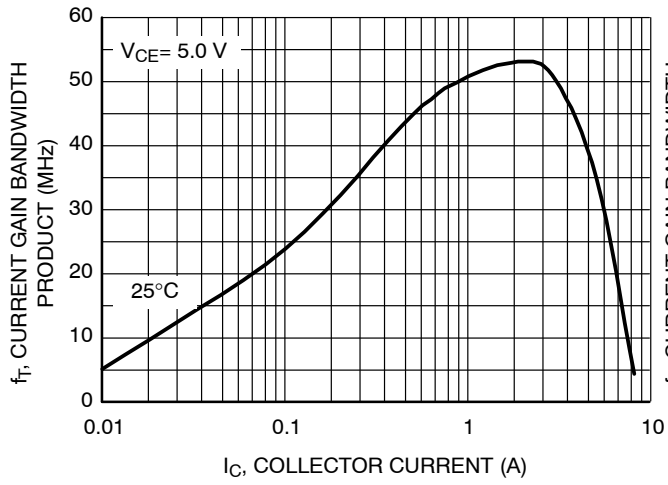


**Figure 7. NJW0281G Saturation Voltage**

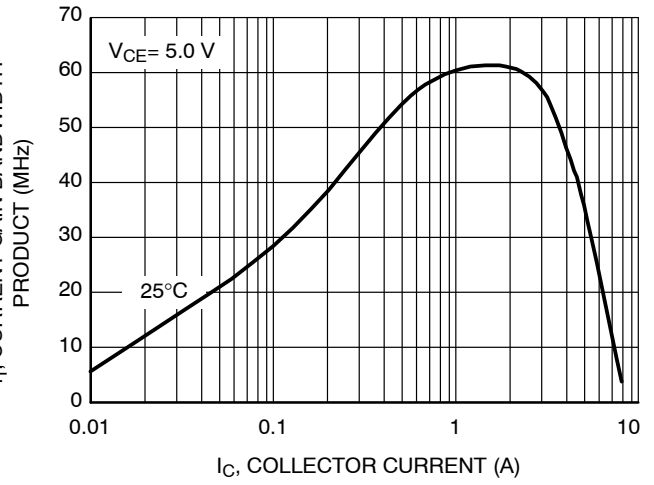


**Figure 8. NJW0302G Saturation Voltage**

# NJW0281G (NPN) NJW0302G (PNP)



**Figure 9. NJW0281G Current Gain Bandwidth Product**

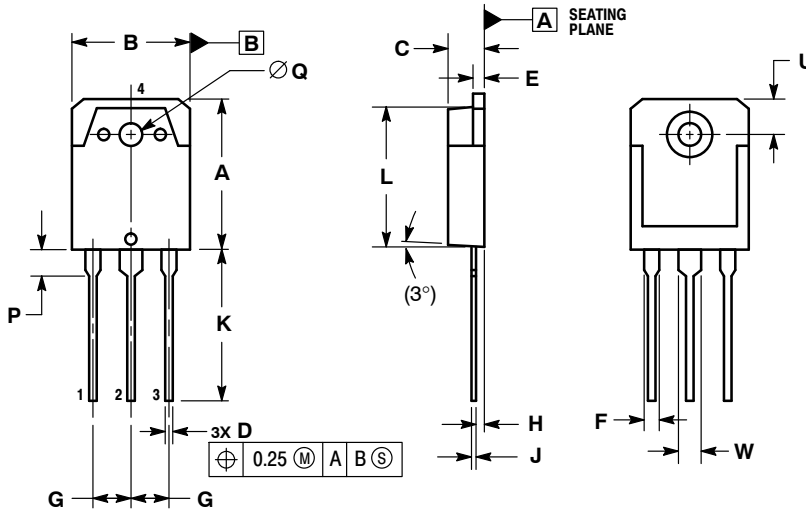


**Figure 10. NJW0302G Current Gain Bandwidth Product**

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## 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

### STYLE 1:

- PIN 1. BASE
- COLLECTOR
- EMITTER
- COLLECTOR

### STYLE 2:

- PIN 1. ANODE
- CATHODE
- ANODE
- CATHODE

### STYLE 3:

- PIN 1. GATE
- DRAIN
- SOURCE
- DRAIN

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