

# NJD1718, NJVNJD1718

## Power Transistors

### PNP Silicon DPAK For Surface Mount Applications

Designed for high-gain audio amplifier and power switching applications.

#### Features

- Low Collector-Emitter Saturation Voltage
- High Switching Speed
- Epoxy Meets UL 94 V-0 @ 0.125 in
- NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### MAXIMUM RATINGS

| Rating   | Symbol         | Value         | Unit                     |
|--|----------------|---------------|--------------------------|
| Collector-Base Voltage   | $V_{CB}$       | -50           | Vdc                      |
| Collector-Emitter Voltage  | $V_{CEO}$      | -50           | Vdc                      |
| Emitter-Base Voltage   | $V_{EB}$       | -5            | Vdc                      |
| Collector Current - Continuous   | $I_C$          | -2            | Adc                      |
| Collector Current - Peak   | $I_{CM}$       | -3            | Adc                      |
| Base Current   | $I_B$          | -0.4          | Adc                      |
| Total Device Dissipation<br>@ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$          | $P_D$          | 15<br>0.1     | W<br>W/ $^\circ\text{C}$ |
| Total Device Dissipation<br>@ $T_A = 25^\circ\text{C}$ (Note 1)<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.68<br>0.011 | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range  | $T_J, T_{stg}$ | -65 to +150   | $^\circ\text{C}$         |
| ESD - Human Body Model   | HBM            | 3B            | V                        |
| ESD - Machine Model  | MM             | C             | V                        |

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. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

#### THERMAL CHARACTERISTICS

| Characteristic   | Symbol                             | Max        | Unit                      |
|--|------------------------------------|------------|---------------------------|
| Thermal Resistance<br>Junction-to-Case<br>Junction-to-Ambient (Note 2) | $R_{\theta JC}$<br>$R_{\theta JA}$ | 10<br>89.3 | $^\circ\text{C}/\text{W}$ |

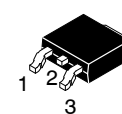
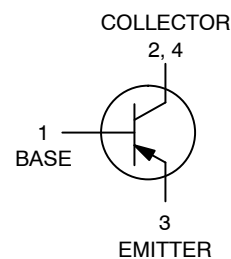
2. These ratings are applicable when surface mounted on the minimum pad sizes recommended.



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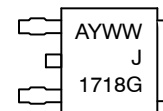
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**SILICON  
POWER TRANSISTORS  
2 AMPERES  
50 VOLTS  
15 WATTS**



**DPAK  
CASE 369C  
STYLE 1**

#### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Device

#### ORDERING INFORMATION

| Device        | Package           | Shipping <sup>†</sup> |
|---------------|-------------------|-----------------------|
| NJD1718T4G    | DPAK<br>(Pb-Free) | 2500 / Tape & Reel    |
| NJVNJD1718T4G | DPAK<br>(Pb-Free) | 2500 / Tape & Reel    |

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

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

### OFF CHARACTERISTICS

|   |                   |     |  |      |      |
|---|-------------------|-----|--|------|------|
| Collector-Emitter Breakdown Voltage (Note 3)<br>(I <sub>C</sub> = -10 mAdc, I <sub>B</sub> = 0) | BV <sub>CEO</sub> | -50 |  | -    | Vdc  |
| Collector Cutoff Current<br>(V <sub>CB</sub> = -50 Vdc, I <sub>E</sub> = 0)                     | I <sub>CBO</sub>  | -   |  | -100 | nAdc |
| Emitter Cutoff Current (V <sub>BE</sub> = -5 Vdc, I <sub>C</sub> = 0)                           | I <sub>EBO</sub>  | -   |  | -100 | nAdc |

### ON CHARACTERISTICS

|  |                      |          |      |          |     |
|--|----------------------|----------|------|----------|-----|
| DC Current Gain (Note 3)<br>(I <sub>C</sub> = -0.5 A, V <sub>CE</sub> = 2 V)<br>(I <sub>C</sub> = -1.5 Adc, V <sub>CE</sub> = 2 Vdc) | h <sub>FE</sub>      | 70<br>40 |      | 240<br>- | -   |
| Collector-Emitter Saturation Voltage (Note 3)<br>(I <sub>C</sub> = -1 A, I <sub>B</sub> = -0.05 A)                                   | V <sub>CE(sat)</sub> | -        | -0.2 | -0.5     | Vdc |
| Base-Emitter Saturation Voltage (Note 3)<br>(I <sub>C</sub> = -1 A, I <sub>B</sub> = -0.05 Adc)                                      | V <sub>BE(sat)</sub> | -        | -    | -1.2     | Vdc |
| Base-Emitter On Voltage (Note 3)<br>(I <sub>C</sub> = -1 Adc, V <sub>CE</sub> = -2 Vdc)  | V <sub>BE(on)</sub>  | -        | -    | -1.2     | Vdc |

### DYNAMIC CHARACTERISTICS

|   |                  |   |     |   |     |
|---|------------------|---|-----|---|-----|
| Current-Gain - Bandwidth Product (Note 4)<br>(I <sub>C</sub> = -500 mAdc, V <sub>CE</sub> = -2 Vdc, f <sub>test</sub> = 10 MHz) | f <sub>T</sub>   | - | 80  | - | MHz |
| Output Capacitance<br>(V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, f = 0.1 MHz)   | C <sub>ob</sub>  | - | 33  | - | pF  |
| Switching Timers<br>V <sub>CC</sub> = -30 V, I <sub>C</sub> = -1 A  | t <sub>ON</sub>  | - | 55  | - | ns  |
|   | t <sub>STG</sub> | - | 320 | - |     |
|   | t <sub>f</sub>   | - | 40  | - |     |

3. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≈ 2%.

4. f<sub>T</sub> = |h<sub>fe</sub>| • f<sub>test</sub>.

TYPICAL CHARACTERISTICS

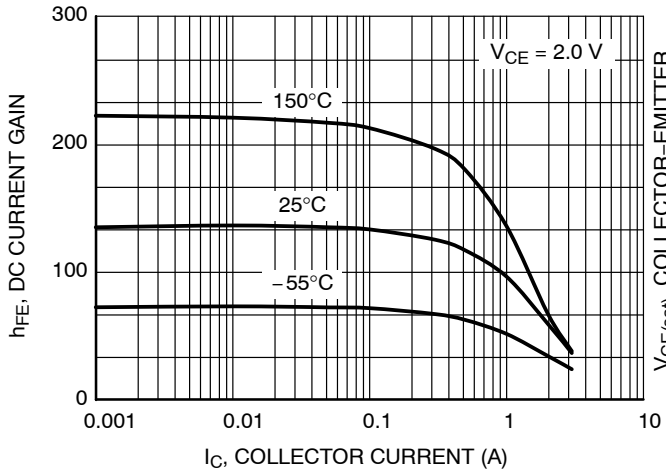


Figure 1. DC Current Gain

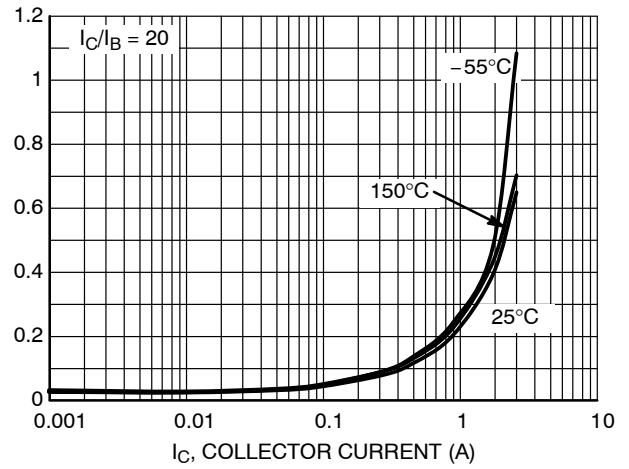


Figure 2. Collector-Emitter Saturation Voltage

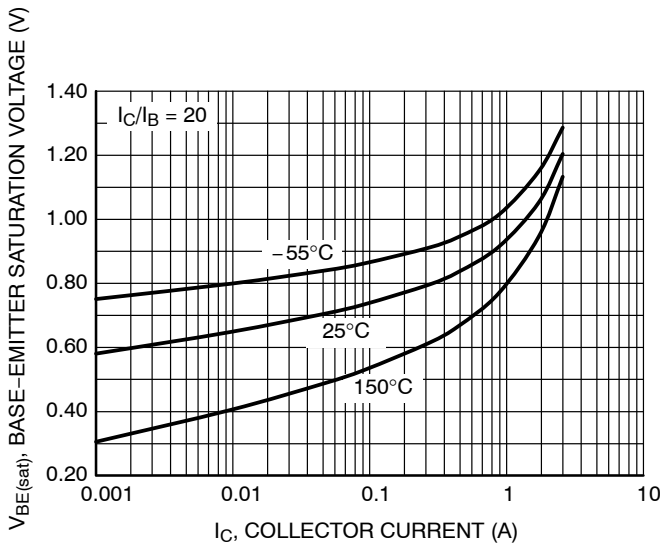


Figure 3. Base-Emitter Saturation Voltage

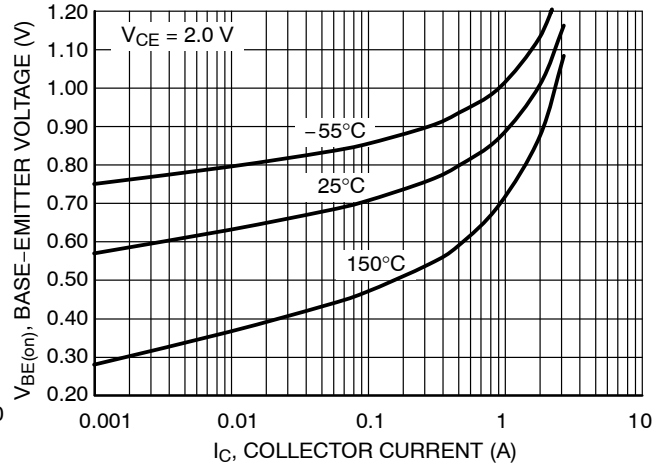


Figure 4. Base-Emitter Voltage

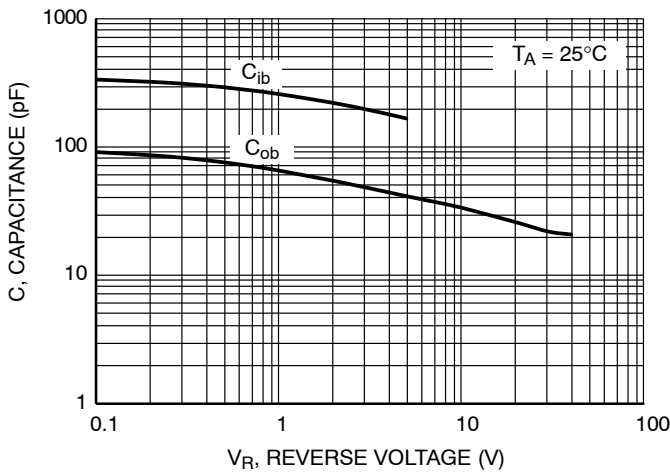


Figure 5. Capacitance

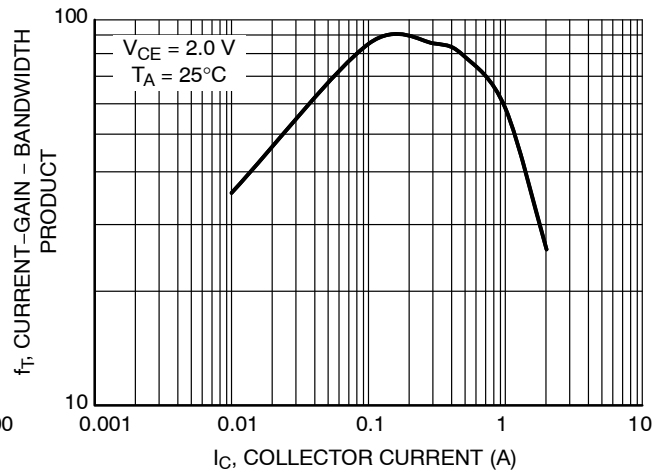


Figure 6. Current-Gain-Bandwidth Product

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## TYPICAL CHARACTERISTICS

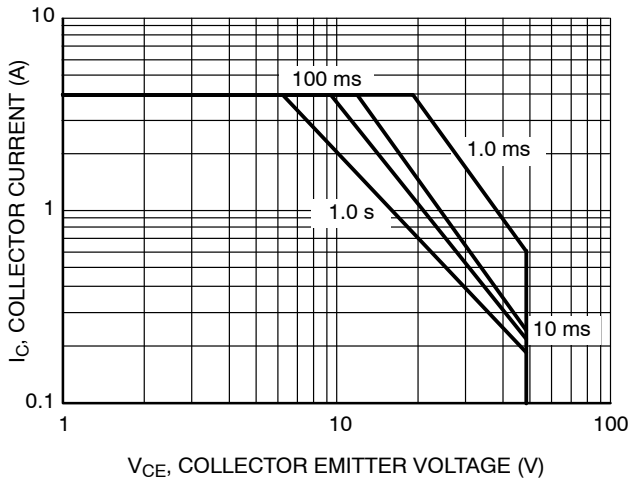


Figure 7. State Operating Area

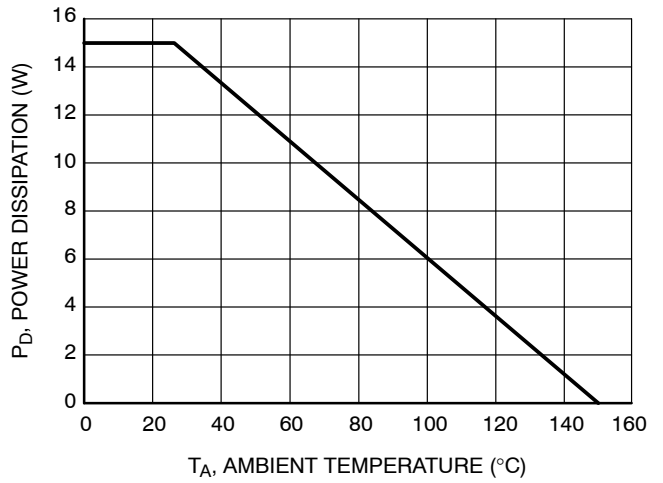


Figure 8. Power Derating

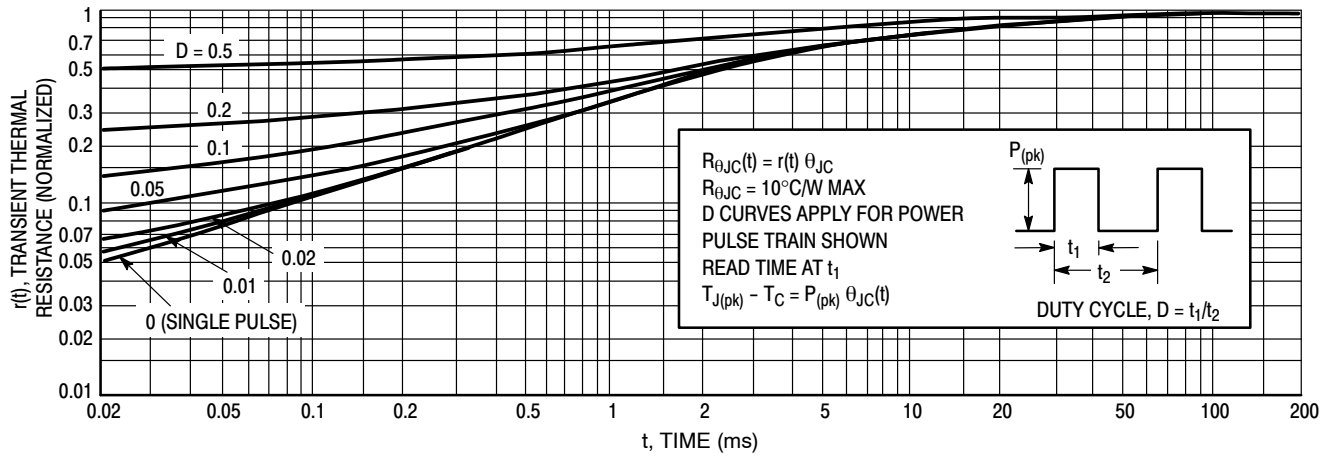


Figure 9. Thermal Response

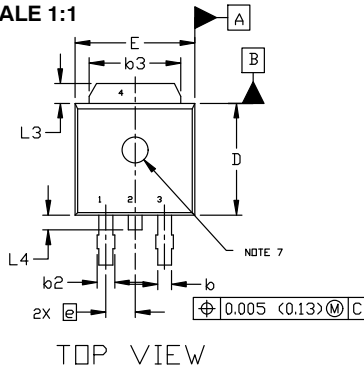
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



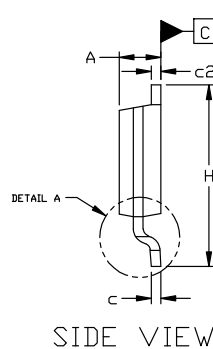
## DPAK (SINGLE GAUGE) CASE 369C ISSUE G

DATE 31 MAY 2023

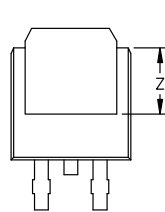
SCALE 1:1



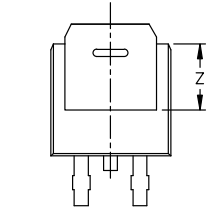
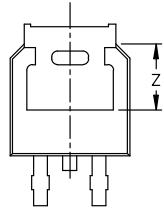
TOP VIEW



SIDE VIEW



BOTTOM VIEW



BOTTOM VIEW

ALTERNATE CONSTRUCTIONS



### RECOMMENDED MOUNTING FOOTPRINT\*

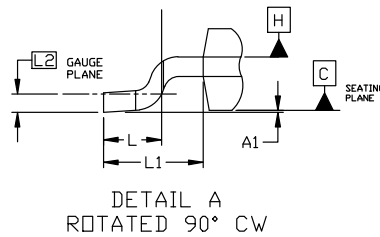
\*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERM/D.

- |  |  |   |   |  |
|--|--|---|---|--|
| <b>STYLE 1:</b><br>PIN 1. BASE<br>2. COLLECTOR<br>3. EMITTER<br>4. COLLECTOR | <b>STYLE 2:</b><br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE<br>4. DRAIN          | <b>STYLE 3:</b><br>PIN 1. ANODE<br>2. CATHODE<br>3. ANODE<br>4. CATHODE | <b>STYLE 4:</b><br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE<br>4. ANODE              | <b>STYLE 5:</b><br>PIN 1. GATE<br>2. ANODE<br>3. CATHODE<br>4. ANODE     |
| <b>STYLE 6:</b><br>PIN 1. MT1<br>2. MT2<br>3. GATE<br>4. MT2                 | <b>STYLE 7:</b><br>PIN 1. GATE<br>2. COLLECTOR<br>3. EMITTER<br>4. COLLECTOR | <b>STYLE 8:</b><br>PIN 1. N/C<br>2. CATHODE<br>3. ANODE<br>4. CATHODE   | <b>STYLE 9:</b><br>PIN 1. ANODE<br>2. CATHODE<br>3. RESISTOR ADJUST<br>4. CATHODE | <b>STYLE 10:</b><br>PIN 1. CATHODE<br>2. ANODE<br>3. CATHODE<br>4. ANODE |

### NOTES:

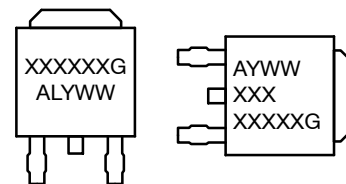
- DIMENSIONING AND TOLERANCING ASME Y14.5M, 1994.
- CONTROLLING DIMENSION: INCHES
- THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3, AND Z.
- DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
- DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
- DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.
- OPTIONAL MOLD FEATURE.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN.   | MAX.  | MIN.        | MAX.  |
| A   | 0.086  | 0.094 | 2.18        | 2.38  |
| A1  | 0.000  | 0.005 | 0.00        | 0.13  |
| b   | 0.025  | 0.035 | 0.63        | 0.89  |
| b2  | 0.028  | 0.045 | 0.72        | 1.14  |
| b3  | 0.180  | 0.215 | 4.57        | 5.46  |
| c   | 0.018  | 0.024 | 0.46        | 0.61  |
| c2  | 0.018  | 0.024 | 0.46        | 0.61  |
| D   | 0.235  | 0.245 | 5.97        | 6.22  |
| E   | 0.250  | 0.265 | 6.35        | 6.73  |
| e   | 0.090  | BSC   | 2.29        | BSC   |
| H   | 0.370  | 0.410 | 9.40        | 10.41 |
| L   | 0.055  | 0.070 | 1.40        | 1.78  |
| L1  | 0.114  | REF   | 2.90        | REF   |
| L2  | 0.020  | BSC   | 0.51        | BSC   |
| L3  | 0.035  | 0.050 | 0.89        | 1.27  |
| L4  | ----   | 0.040 | ---         | 1.01  |
| Z   | 0.155  | ----  | 3.93        | ---   |



DETAIL A  
ROTATED 90° CW

### GENERIC MARKING DIAGRAM\*



- IC**  
 XXXXXX = Device Code  
 A = Assembly Location  
 L = Wafer Lot  
 Y = Year  
 WW = Work Week  
 G = Pb-Free Package
- Discrete**  
 AYWW  
 XXX  
 XXXXXG

\*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. Some products may not follow the Generic Marking.

|                         |                            |   |
|-------------------------|----------------------------|---|
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| <b>DESCRIPTION:</b>     | <b>DPAK (SINGLE GAUGE)</b> | <b>PAGE 1 OF 1</b>  |

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