

NJD35N04G, NJVNJD35N04G, NJVNJD35N04T4G

NPN Darlington Power Transistor

This high voltage power Darlington has been specifically designed for inductive applications such as Electronic Ignition, Switching Regulators and Motor Control.

Features

- Exceptional Safe Operating Area
- High V_{CE} ; High Current Gain
- NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These are Pb-Free Devices*

Benefits

- Reliable Performance at Higher Powers
- Designed for Inductive Loads
- Very Low Current Requirements

Applications

- Internal Combustion Engine Ignition Control
- Switching Regulators
- Motor Controls
- Light Ballast
- Photo Flash

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--|-------------------|-------------|--------------------------|
| Collector-Emitter Sustaining Voltage | V_{CEO} | 350 | Vdc |
| Collector-Base Breakdown Voltage | V_{CBO} | 700 | Vdc |
| Collector-Emitter Breakdown Voltage | V_{CES} | 700 | Vdc |
| Emitter-Base Voltage | V_{EBO} | 5.0 | Vdc |
| Collector Current Continuous Peak | I_C I_{CM} | 4.0 8.0 | Adc |
| Base Current | I_B | 0.5 | Adc |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 45 0.36 | W W/ $^\circ\text{C}$ |
| 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.

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



ON Semiconductor®

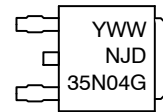
<http://onsemi.com>

**DARLINGTON
POWER TRANSISTORS**
4 AMPERES
350 VOLTS
45 WATTS



DPAK
CASE 369C
STYLE 1

MARKING DIAGRAM



Y = Year
WW = Work Week
NJD35N04 = Device Code
G = Pb-Free Device

ORDERING INFORMATION

| Device | Package | Shipping† |
|----------------|-------------------|------------------------|
| NJD35N04G | DPAK (Pb-Free) | 75 Units / Rail |
| NJVNJD35N04G | DPAK (Pb-Free) | 75 Units / Rail |
| NJD35N04T4G | DPAK (Pb-Free) | 2,500 / Tape & Reel |
| NJVNJD35N04T4G | DPAK (Pb-Free) | 2,500 / Tape & Reel |

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

NJD35N04G, NJVNJD35N04G, NJVNJD35N04T4G

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------|-----------------------------|
| Thermal Resistance Junction-to-Case | $R_{\theta JC}$ | 2.78 | $^{\circ}\text{C}/\text{W}$ |
| Junction-to-Ambient | $R_{\theta JA}$ | 71.4 | |

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

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

OFF CHARACTERISTICS

| | | | | | |
|---|----------------|-----|---|-----------|---------------|
| Collector-Emitter Sustaining Voltage ($I_C = 10\text{ mA}$, $L = 10\text{ mH}$) | $V_{CEO(sus)}$ | 350 | - | - | V |
| Collector Cutoff Current ($V_{CE} = 500\text{ V}$) ($I_B = 0$) ($V_{CE} = 500\text{ V}$, $T_C = 125^{\circ}\text{C}$) | I_{CES} | - | - | 50 250 | μA |
| Collector Cutoff Current ($V_{CE} = 250\text{ V}$) ($I_B = 0$) ($V_{CE} = 200\text{ V}$, $T_C = 125^{\circ}\text{C}$) | I_{CEO} | - | - | 50 250 | μA |
| Emitter Cutoff Current ($V_{BE} = 5.0\text{ Vdc}$) | I_{EBO} | - | - | 5.0 | μA |

ON CHARACTERISTICS

| | | | | | |
|--|---------------|-------------|---|------------|---|
| Collector-Emitter Saturation Voltage ($I_C = 2.0\text{ A}$, $I_B = 20\text{ mA}$) ($I_C = 2.0\text{ A}$, $I_B = 20\text{ mA}$ 125°C) | $V_{CE(sat)}$ | - | - | 1.5 1.5 | V |
| Base-Emitter Saturation Voltage ($I_C = 2.0\text{ A}$, $I_B = 20\text{ mA}$) ($I_C = 2.0\text{ A}$, $I_B = 20\text{ mA}$ 125°C) | $V_{BE(sat)}$ | - | - | 2.0 2.0 | V |
| Base-Emitter On Voltage ($I_C = 2.0\text{ A}$, $V_{CE} = 2.0\text{ V}$) ($I_C = 2.0\text{ A}$, $V_{CE} = 2.0\text{ V}$] 25°C) | $V_{BE(on)}$ | - | - | 2.0 2.0 | V |
| DC Current Gain ($I_C = 2.0\text{ A}$, $V_{CE} = 2.0\text{ V}$) ($I_C = 4.0\text{ A}$, $V_{CE} = 2.0\text{ Vdc}$) | h_{FE} | 2000 300 | - | - | - |

DYNAMIC CHARACTERISTICS

| | | | | | |
|--|----------|----|----|---|-----|
| Current-Gain - Bandwidth Product ($I_C = 2.0\text{ A}$, $V_{CE} = 10\text{ V}$, $f = 1.0\text{ MHz}$) | f_T | 90 | - | - | MHz |
| Output Capacitance ($V_{CB} = 10\text{ V}$, $I_E = 0$, $f = 0.1\text{ MHz}$) | C_{ob} | - | 60 | - | pF |

SWITCHING CHARACTERISTICS

| | | | | | |
|--|----------------|---|-----------|---|-----------------|
| $V_{CC} = 12\text{ V}$, $V_{clamp} = 250\text{ V}$, $L = 4\text{ mH}$ $I_C = 2\text{ A}$, $I_{B1} = 20\text{ mA}$, $I_{B2} = -20\text{ mA}$ | t_s t_f | - | 18 0.8 | - | μSec |
|--|----------------|---|-----------|---|-----------------|

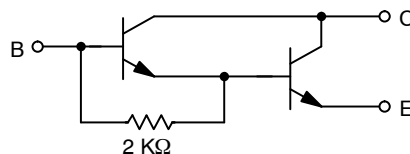


Figure 1. Darlington Circuit Schematic

TYPICAL CHARACTERISTICS

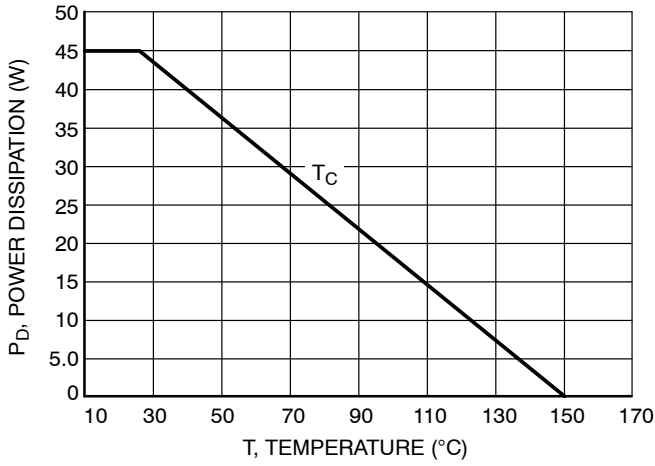


Figure 2. Power Derating

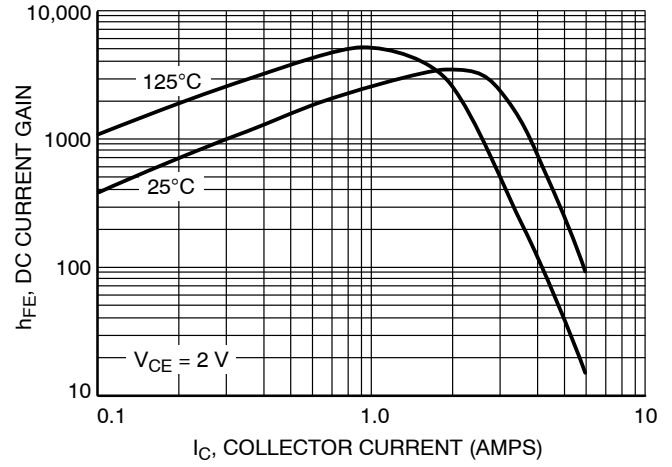


Figure 3. DC Current Gain

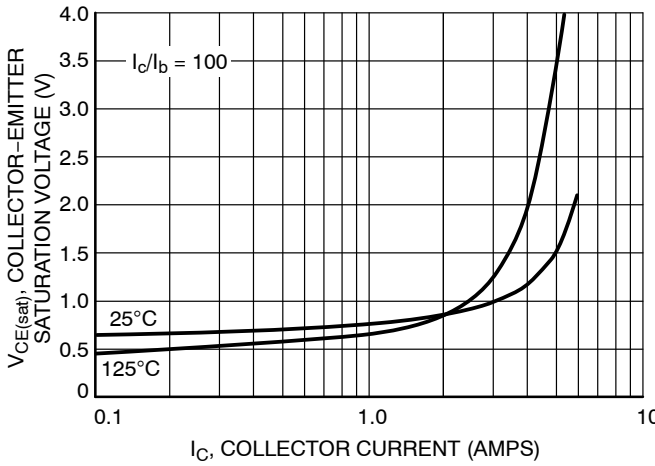


Figure 4. Collector-Emitter Saturation Voltage

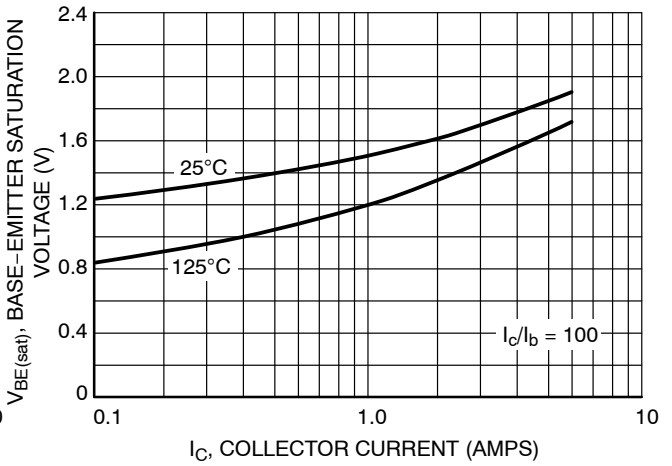


Figure 5. Base-Emitter Saturation Voltage

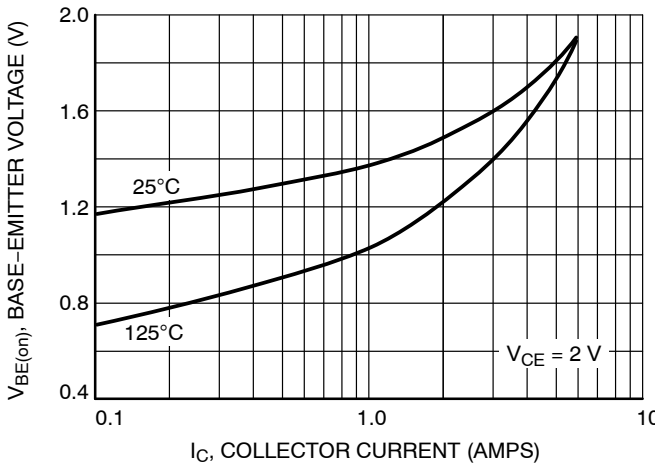


Figure 6. Base-Emitter Voltage

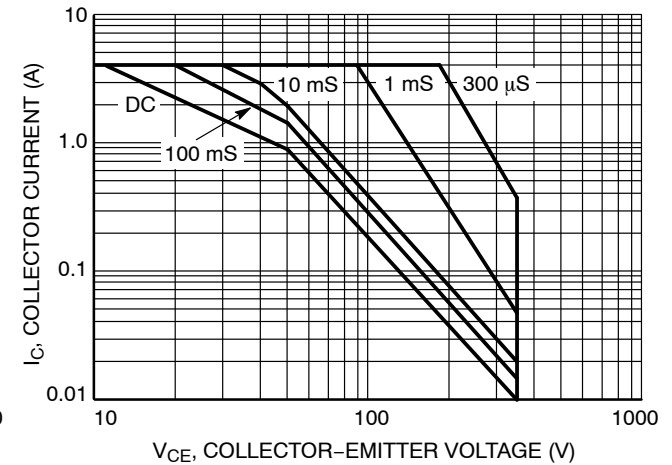
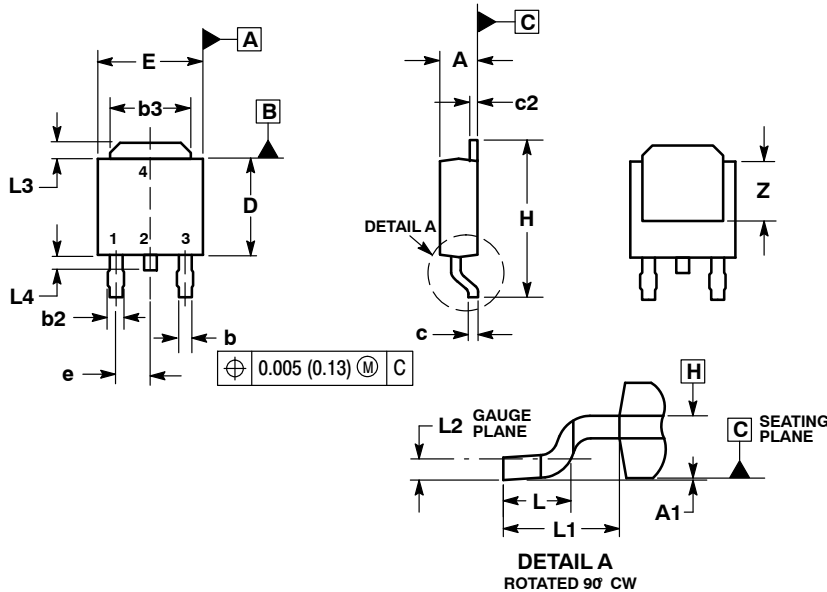


Figure 7. Forward Bias Safe Operating Area (FBSOA)

NJD35N04G, NJVJND35N04G, NJVJND35N04T4G

PACKAGE DIMENSIONS

DPAK
CASE 369C-01
ISSUE D

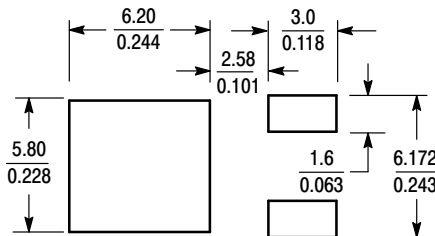


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3 and Z.
4. 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.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.

| 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 | 0.030 | 0.045 | 0.76 | 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 | 0.108 REF | | 2.74 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 | --- |

SOLDERING FOOTPRINT*



SCALE 3:1 (mm/inches)

STYLE 1:

1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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- Техническая поддержка проекта;
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