

NJX1675PDR2G

Complementary 30 V, 6.0 A, Transistor

These devices are designed for use in low voltage, high speed switching applications where affordable efficient energy control is important.

Typical applications are low voltage motor controls in mass storage products such as disc drives and tape drives. In the automotive industry they can be used in air bag deployment and in the instrument cluster.

Features

- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS (T_A = 25°C)

| Rating | | Symbol | Max | Unit |
|--------------------------------|------------|------------------|----------------------------|------|
| Collector-Emitter Voltage | NPN PNP | V _{CEO} | 30 -30 | Vdc |
| Collector-Base Voltage | NPN PNP | V _{CBO} | 30 -30 | Vdc |
| Emitter-Base Voltage | NPN PNP | V _{EBO} | 6.0 -7.0 | Vdc |
| Collector Current - Continuous | NPN PNP | I _C | 3.0 -3.0 | A |
| Collector Current - Peak | NPN PNP | I _{CM} | 6.0 -6.0 | A |
| Electrostatic Discharge | | ESD | HBM Class 3B MM Class C | |

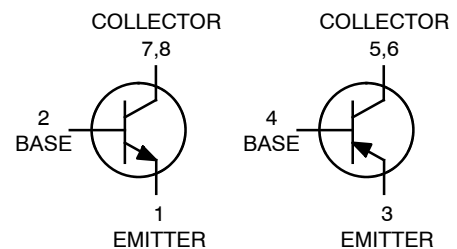
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



ON Semiconductor[®]

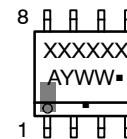
<http://onsemi.com>

**30 VOLTS, 6.0 AMPS
COMPLEMENTARY
TRANSISTOR
EQUIVALENT R_{DS(on)} 80 mΩ**



**SOIC-8
CASE 751
STYLE 16**

DEVICE MARKING



XXXXXX = Specific Device Code
 A = Assembly Location
 Y = Year
 WW = Work Week
 ■ = Pb-Free Package
 (Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|--------------|---------------------|-----------------------|
| NJX1675PDR2G | SOIC-8 (Pb-Free) | 2500 / 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.

NJX1675PDR2G

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|--|-----------------|-------------|---------------------------|
| Total Device Dissipation (Note 1) $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 2.0 16 | W mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 62 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

- FR-4 @ 100 mm², 1 oz. copper traces, still air, $t \leq 10$ sec.
- Dual heated values assume total power is the sum of two equally powered devices.

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

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

OFF CHARACTERISTICS

| | | | | | |
|---|---------------|-----|---|-----|---------------|
| Collector - Emitter Breakdown Voltage ($I_C = 10$ mA, $I_B = 0$) | $V_{(BR)CEO}$ | 30 | - | - | Vdc |
| Collector - Base Breakdown Voltage ($I_C = 0.1$ mA, $I_E = 0$) | $V_{(BR)CBO}$ | 30 | - | - | Vdc |
| Emitter - Base Breakdown Voltage ($I_E = 1.0$ mA, $I_C = 0$) | $V_{(BR)EBO}$ | 6.0 | - | - | Vdc |
| Collector Cutoff Current ($V_{CB} = 30$ Vdc, $I_E = 0$) | I_{CBO} | - | - | 0.1 | μA |
| Emitter Cutoff Current ($V_{EB} = 5.0$ Vdc) | I_{EBO} | - | - | 0.1 | μA |

ON CHARACTERISTICS

| | | | | | |
|---|---------------|--------------------------|----------------------------------|----------------------------------|-----|
| DC Current Gain (Note 4) ($I_C = 10$ mA, $V_{CE} = 2.0$ V) ($I_C = 500$ mA, $V_{CE} = 2.0$ V) ($I_C = 1.0$ A, $V_{CE} = 2.0$ V) ($I_C = 2.0$ A, $V_{CE} = 2.0$ V) | h_{FE} | 100 100 180 180 | 400 350 340 320 | - - - - | |
| Collector - Emitter Saturation Voltage (Note 4) ($I_C = 0.1$ A, $I_B = 0.010$ A) ($I_C = 1.0$ A, $I_B = 0.100$ A) ($I_C = 1.0$ A, $I_B = 0.010$ A) ($I_C = 2.0$ A, $I_B = 0.200$ A) | $V_{CE(sat)}$ | - - - - | 0.008 0.044 0.080 0.082 | 0.011 0.060 0.115 0.115 | V |
| Base - Emitter Saturation Voltage (Note 4) ($I_C = 1.0$ A, $I_B = 0.01$ A) | $V_{BE(sat)}$ | - | 0.780 | 0.900 | V |
| Base - Emitter Turn-on Voltage (Note 4) ($I_C = 0.1$ A, $V_{CE} = 2.0$ V) | $V_{BE(on)}$ | - | 0.650 | 0.750 | V |
| Cutoff Frequency ($I_C = 100$ mA, $V_{CE} = 5.0$ V, $f = 100$ MHz) | f_T | 100 | - | - | MHz |
| Input Capacitance ($V_{EB} = 0.5$ V, $f = 1.0$ MHz) | C_{ibo} | - | 320 | 450 | pF |
| Output Capacitance ($V_{CB} = 3.0$ V, $f = 1.0$ MHz) | C_{obo} | - | 40 | - | pF |

SWITCHING CHARACTERISTICS

| | | | | | |
|--|-------|---|---|-----|----|
| Delay ($V_{CC} = 30$ V, $I_C = 750$ mA, $I_{B1} = 15$ mA) | t_d | - | - | 100 | ns |
| Rise ($V_{CC} = 30$ V, $I_C = 750$ mA, $I_{B1} = 15$ mA) | t_r | - | - | 100 | ns |
| Storage ($V_{CC} = 30$ V, $I_C = 750$ mA, $I_{B1} = 15$ mA) | t_s | - | - | 780 | ns |
| Fall ($V_{CC} = 30$ V, $I_C = 750$ mA, $I_{B1} = 15$ mA) | t_f | - | - | 110 | ns |

- Pulsed Condition: Pulse Width = 300 μsec , Duty Cycle $\leq 2\%$.

NJX1675PDR2G

PNP ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

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

OFF CHARACTERISTICS

| | | | | | |
|--|----------------------|------|---|------|------------------|
| Collector - Emitter Breakdown Voltage (I _C = -10 mA, I _B = 0) | V _{(BR)CEO} | -30 | - | - | Vdc |
| Collector - Base Breakdown Voltage (I _C = -0.1 mA, I _E = 0) | V _{(BR)CBO} | -30 | - | - | Vdc |
| Emitter - Base Breakdown Voltage (I _E = -1.0 mA, I _C = 0) | V _{(BR)EBO} | -7.0 | - | - | Vdc |
| Collector Cutoff Current (V _{CB} = -30 Vdc, I _E = 0) | I _{CBO} | - | - | -0.1 | μA _{dc} |
| Emitter Cutoff Current (V _{EB} = -5.0 Vdc) | I _{EBO} | - | - | -0.1 | μA _{dc} |

ON CHARACTERISTICS

| | | | | | |
|---|----------------------|-----|--------|--------|-----|
| DC Current Gain (Note 4) (I _C = -10 mA, V _{CE} = -2.0 V) (I _C = -500 mA, V _{CE} = -2.0 V) (I _C = -1.0 A, V _{CE} = -2.0 V) (I _C = -2.0 A, V _{CE} = -2.0 V) | h _{FE} | 100 | 380 | - | |
| | | 100 | 340 | - | |
| | | 180 | 300 | - | |
| | | 150 | 230 | - | |
| Collector - Emitter Saturation Voltage (Note 4) (I _C = -0.1 A, I _B = -0.010 A) (I _C = -1.0 A, I _B = -0.100 A) (I _C = -1.0 A, I _B = -0.010 A) (I _C = -2.0 A, I _B = -0.200 A) | V _{CE(sat)} | - | -0.013 | -0.017 | V |
| | | - | -0.075 | -0.095 | |
| | | - | -0.130 | -0.170 | |
| | | - | -0.135 | -0.170 | |
| Base - Emitter Saturation Voltage (Note 4) (I _C = -1.0 A, I _B = -0.01 A) | V _{BE(sat)} | - | -0.780 | -0.900 | V |
| Base - Emitter Turn-on Voltage (Note 4) (I _C = -0.1 A, V _{CE} = -2.0 V) | V _{BE(on)} | - | -0.660 | -0.750 | V |
| Cutoff Frequency (I _C = -100 mA, V _{CE} = -5.0 V, f = 100 MHz) | f _T | 100 | 120 | - | MHz |
| Input Capacitance (V _{EB} = -0.5 V, f = 1.0 MHz) | C _{ibo} | - | 250 | 300 | pF |
| Output Capacitance (V _{CB} = -3.0 V, f = 1.0 MHz) | C _{obo} | - | 50 | - | pF |

SWITCHING CHARACTERISTICS

| | | | | | |
|---|----------------|---|---|-----|----|
| Delay (V _{CC} = -30 V, I _C = -750 mA, I _{B1} = -15 mA) | t _d | - | - | 60 | ns |
| Rise (V _{CC} = -30 V, I _C = -750 mA, I _{B1} = -15 mA) | t _r | - | - | 120 | ns |
| Storage (V _{CC} = -30 V, I _C = -750 mA, I _{B1} = -15 mA) | t _s | - | - | 400 | ns |
| Fall (V _{CC} = -30 V, I _C = -750 mA, I _{B1} = -15 mA) | t _f | - | - | 130 | ns |

4. Pulsed Condition: Pulse Width = 300 μsec, Duty Cycle ≤ 2%.

NPN TYPICAL CHARACTERISTICS

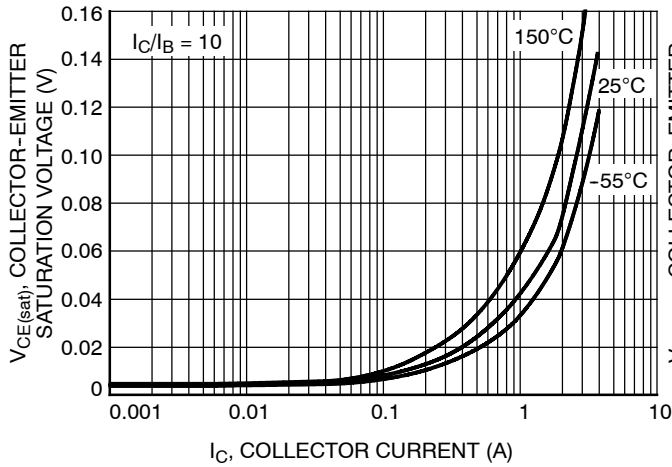


Figure 1. Collector Emitter Saturation Voltage vs. Collector Current

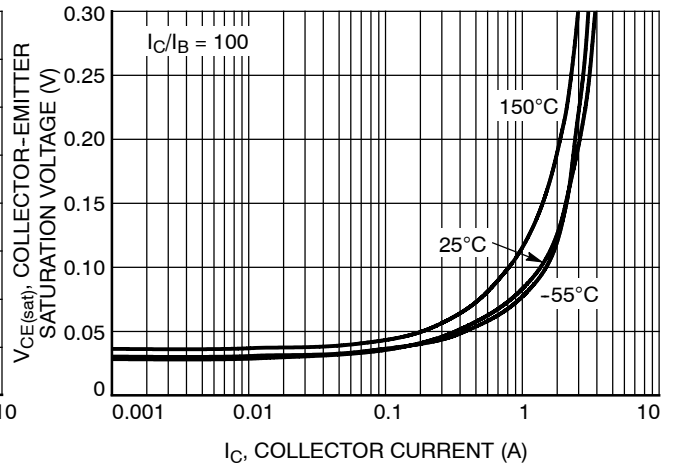


Figure 2. Collector Emitter Saturation Voltage vs. Collector Current

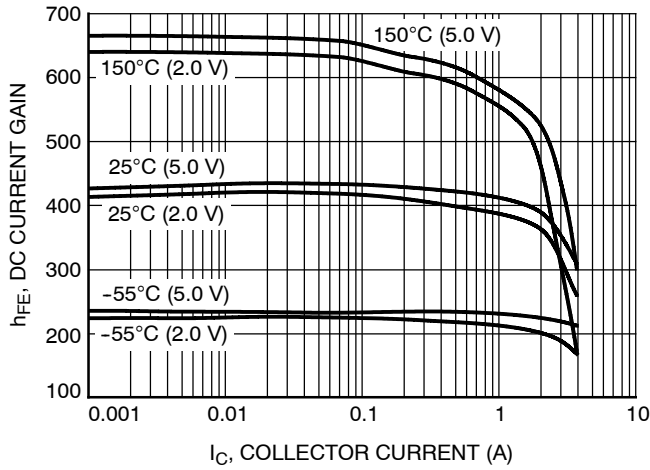


Figure 3. DC Current Gain vs. Collector Current

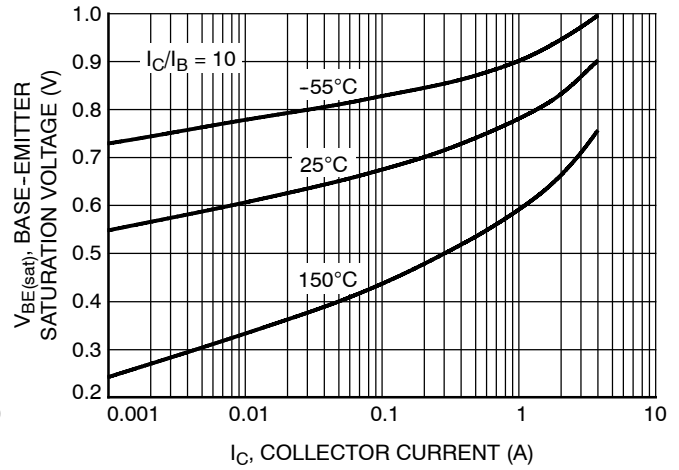


Figure 4. Base Emitter Saturation Voltage vs. Collector Current

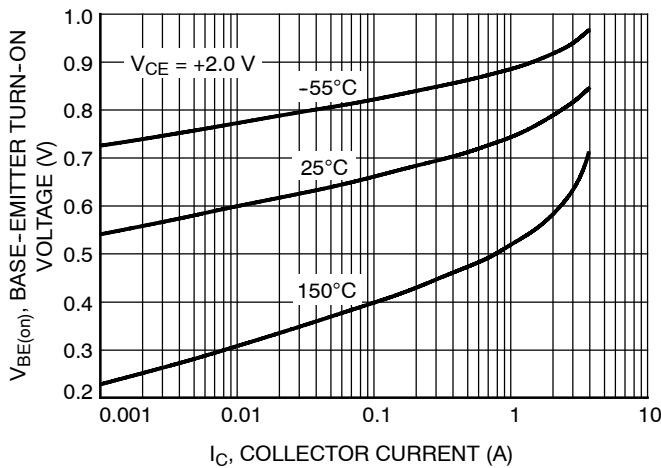


Figure 5. Base Emitter Turn-On Voltage vs. Collector Current

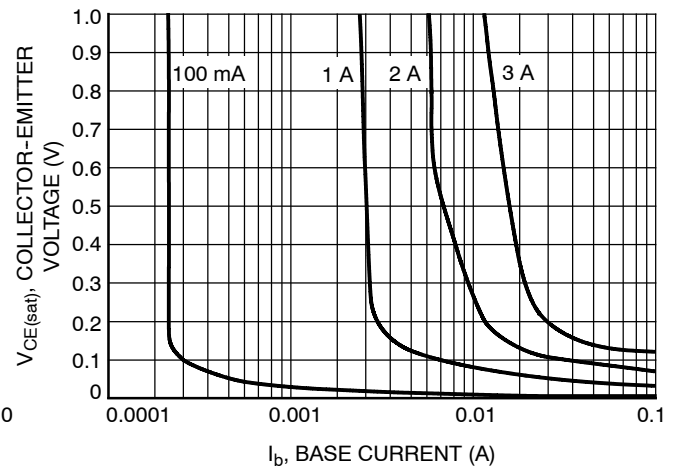


Figure 6. Saturation Region

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NPN TYPICAL CHARACTERISTICS

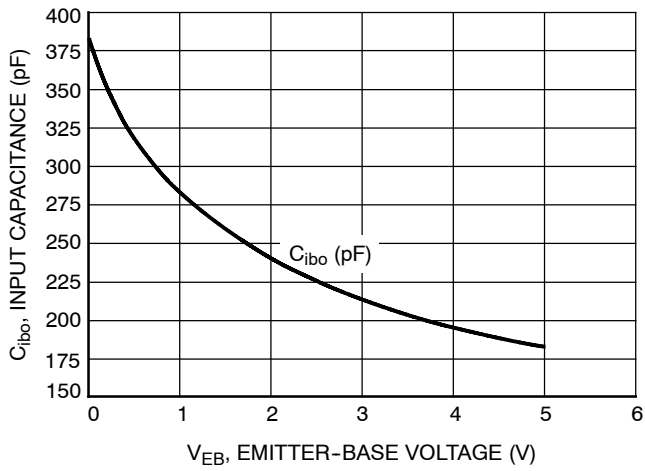


Figure 7. Input Capacitance

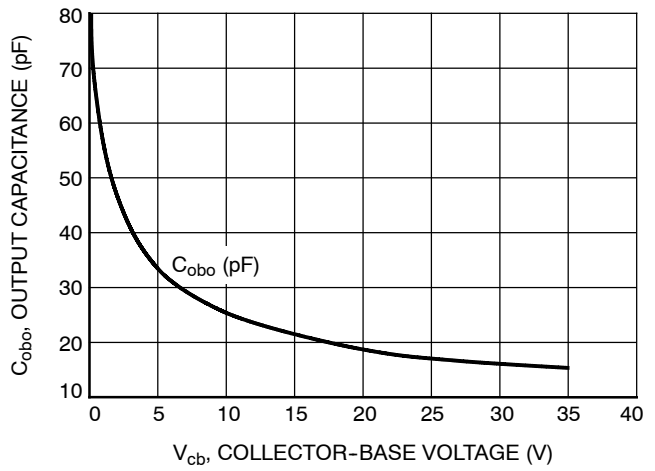


Figure 8. Output Capacitance

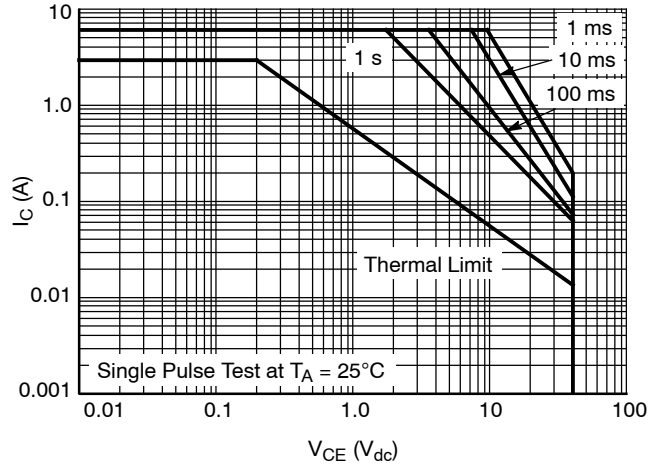


Figure 9. Safe Operating Area

PNP TYPICAL CHARACTERISTICS

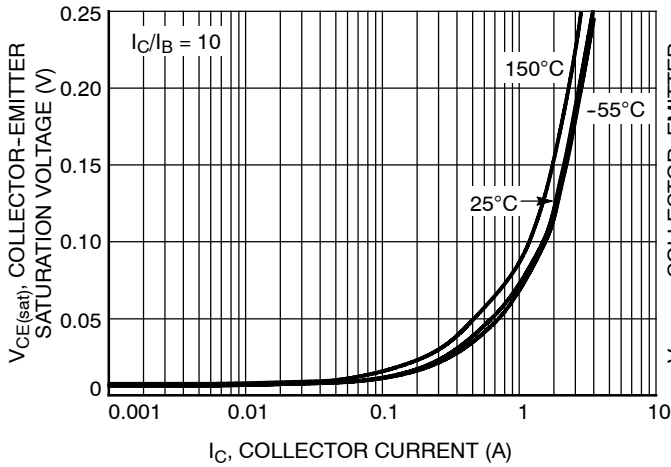


Figure 10. Collector Emitter Saturation Voltage vs. Collector Current

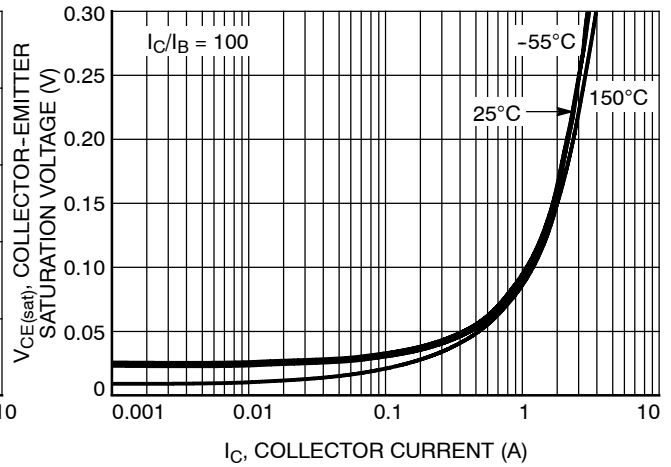


Figure 11. Collector Emitter Saturation Voltage vs. Collector Current

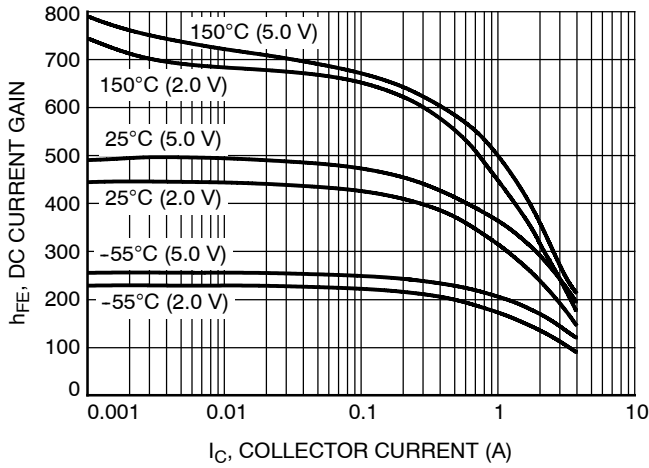


Figure 12. DC Current Gain vs. Collector Current

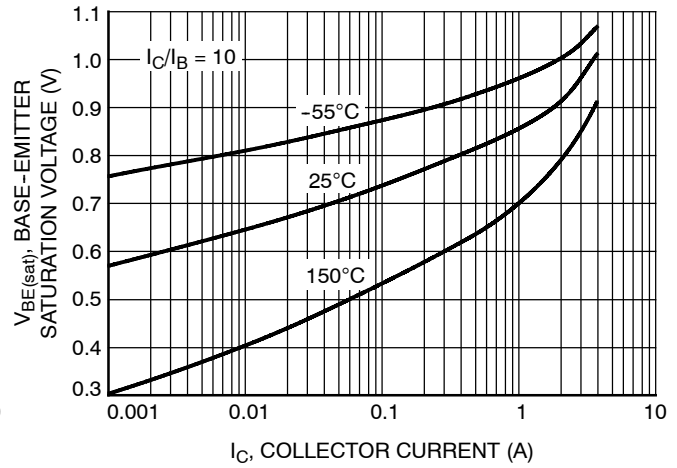


Figure 13. Base Emitter Saturation Voltage vs. Collector Current

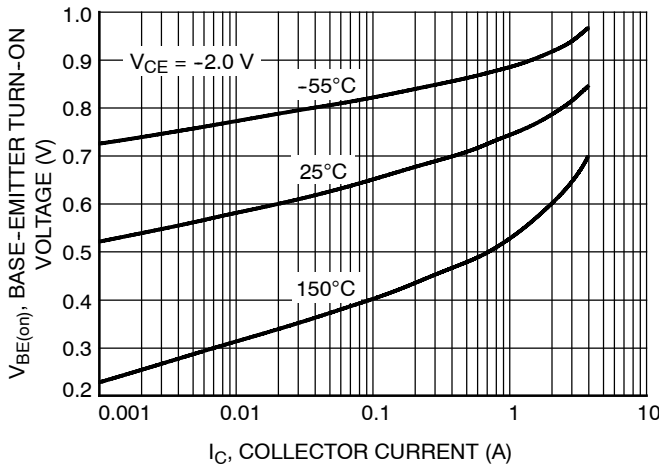


Figure 14. Base Emitter Turn-On Voltage vs. Collector Current

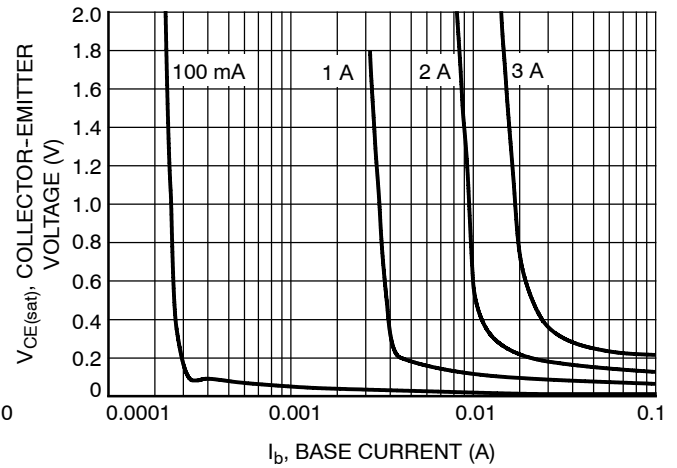


Figure 15. Saturation Region

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PNP TYPICAL CHARACTERISTICS

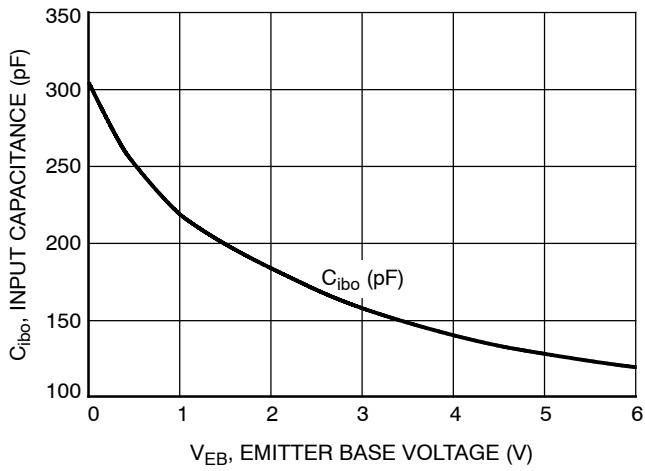


Figure 16. Input Capacitance

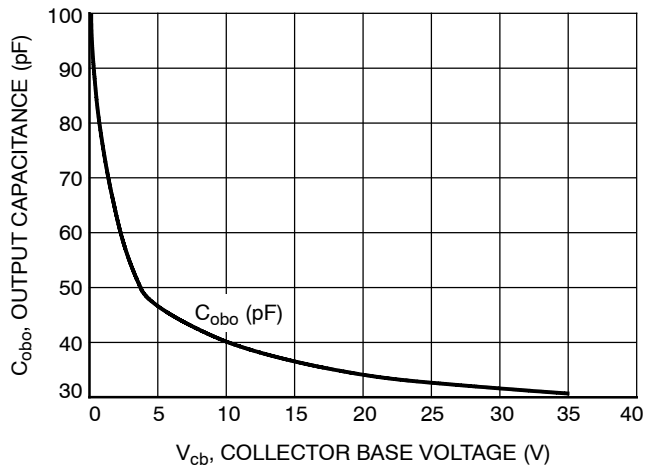


Figure 17. Output Capacitance

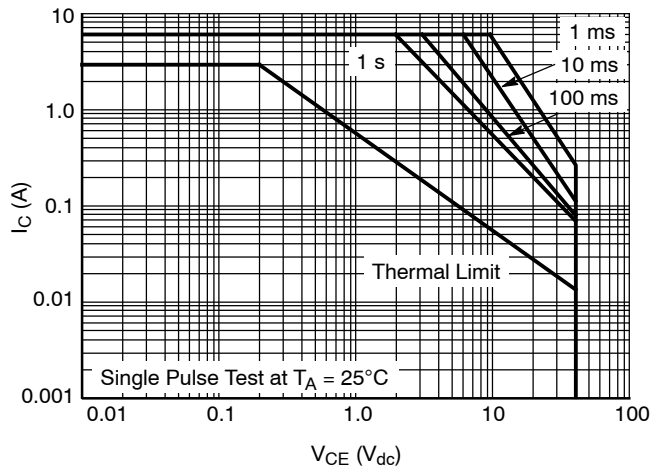
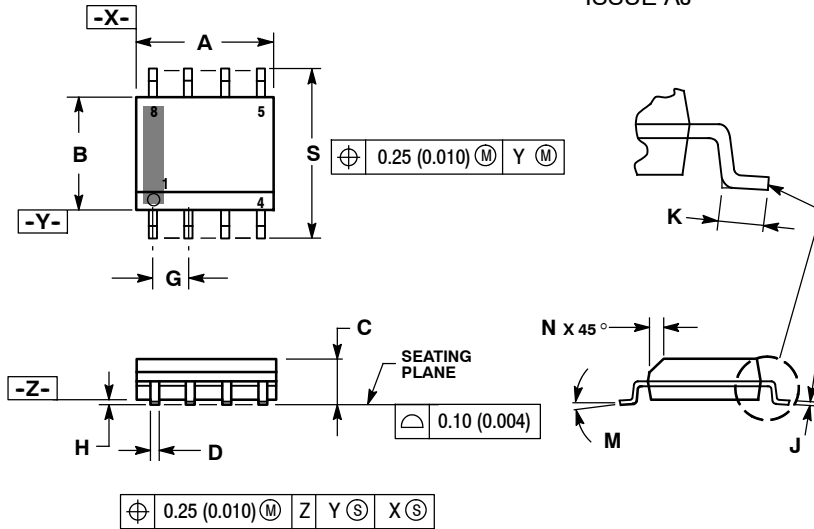


Figure 18. Safe Operating Area

NJX1675PDR2G

PACKAGE DIMENSIONS

SOIC-8 NB
CASE 751-07
ISSUE AJ

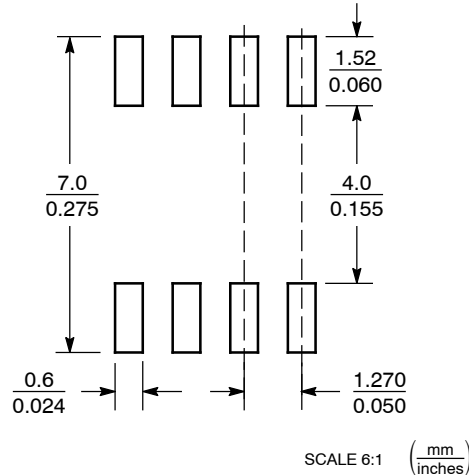


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 4.80 | 5.00 | 0.189 | 0.197 |
| B | 3.80 | 4.00 | 0.150 | 0.157 |
| C | 1.35 | 1.75 | 0.053 | 0.069 |
| D | 0.33 | 0.51 | 0.013 | 0.020 |
| G | 1.27 BSC | | 0.050 BSC | |
| H | 0.10 | 0.25 | 0.004 | 0.010 |
| J | 0.19 | 0.25 | 0.007 | 0.010 |
| K | 0.40 | 1.27 | 0.016 | 0.050 |
| M | 0° | 8° | 0° | 8° |
| N | 0.25 | 0.50 | 0.010 | 0.020 |
| S | 5.80 | 6.20 | 0.228 | 0.244 |

SOLDERING FOOTPRINT*



STYLE 16:

1. EMITTER, DIE #1
2. BASE, DIE #1
3. EMITTER, DIE #2
4. BASE, DIE #2
5. COLLECTOR, DIE #2
6. COLLECTOR, DIE #1
7. COLLECTOR, DIE #1
8. COLLECTOR, DIE #1

*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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