

Power Transistor, NPN, Dual General Purpose

100 V, 3 A

MJK31C

These Bipolar Junction Transistors are designed for general purpose power and switching applications such as regulators, converters and power amplifiers. Housed in advanced LFPACK package (5 x 6 mm) with excellent thermal conduction. Automotive end applications include air bag deployment, power train control units, and instrument clusters.

Features

- Complementary PNP: MJK32C
- 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 (T_A = 25°C)

| Rating | Symbol | Max | Unit |
|--|-----------------------------------|-------------|------|
| Collector-Emitter Voltage | V _{CEO} | 100 | Vdc |
| Emitter-Base Voltage | V _{EBO} | 5 | Vdc |
| Collector Current – Continuous | I _C | 3 | A |
| Collector Current – Peak | I _{CM} | 5 | A |
| Junction and Storage Temperature Range | T _J , T _{stg} | –65 to +150 | °C |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

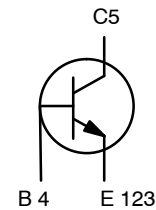
THERMAL CHARACTERISTICS

| Characteristics | Symbol | Max | Unit |
|---|------------------|-----|------|
| Thermal Resistance, Junction-to-Case per Device (Note 1) | R _{θJC} | 2.4 | °C/W |
| Thermal Resistance, Junction-to-Ambient per Device (Note 1) | R _{θJA} | 45 | °C/W |
| Total Power Dissipation @ T _A = 25°C (Note 1) | P _D | 2.7 | W |

1. Surface-mounted on FR4 board using a 6 cm², 2 oz. Cu collector pad.

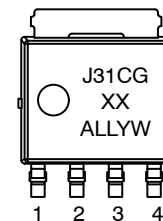
NPN TRANSISTOR

100 V, 3 A



LFPACK 5x6
CASE 760AB

MARKING DIAGRAM



(Top View)

J31CG = Specific Device Code
 A = Assembly Location
 LL = Wafer Lot
 Y = Year
 W = Work Week

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|--------------|-----------------------|-----------------------|
| MJK31CTWG | LFPACK4 5x6 (Pb-Free) | 3000 / Tape & Reel |
| NJVMJK31CTWG | LFPACK4 5x6 (Pb-Free) | 3000 / 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.

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

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

OFF CHARACTERISTICS

| | | | | | |
|---|----------------|-----|---|-----|---------------|
| Collector–Emitter Sustaining Voltage ($I_C = 30\text{ mA}$, $I_B = 0$) | $V_{CEO(sus)}$ | 100 | – | – | Vdc |
| Collector Cutoff Current ($V_{CE} = \text{Rated } V_{CEO}$, $V_{BE} = 0$) | I_{CES} | – | – | 20 | μA |
| Collector Cutoff Current ($V_{CE} = \text{Rated } V_{CEO}$, $I_B = 0$) | I_{CEO} | – | – | 50 | μA |
| Emitter Cutoff Current ($V_{EB} = 5\text{ Vdc}$) | I_{EBO} | – | – | 1.0 | mA |

ON CHARACTERISTICS

| | | | | | |
|---|---------------|----------|--------|---------|-----|
| Collector–Emitter Saturation Voltage ($I_C = 3\text{ Adc}$, $I_B = 0.375\text{ Adc}$) | $V_{CE(sat)}$ | – | – | 1.2 | Vdc |
| Base–Emitter Saturation Voltage ($I_C = 3\text{ Adc}$, $V_{CE} = 4\text{ Vdc}$) | $V_{BE(on)}$ | – | – | 1.8 | Vdc |
| DC Current Gain ($V_{CE} = 4\text{ Vdc}$, $I_C = 1\text{ Adc}$) ($V_{CE} = 4\text{ Vdc}$, $I_C = 3\text{ Adc}$) | h_{FE} | 25 10 | – – | – 60 | – |

DYNAMIC CHARACTERISTICS

| | | | | | |
|--|-------|---|---|---|-----|
| Gain Bandwidth Product ($I_C = 0.5\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1\text{ MHz}$) | f_T | – | 3 | – | MHz |
|--|-------|---|---|---|-----|

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

TYPICAL CHARACTERISTICS

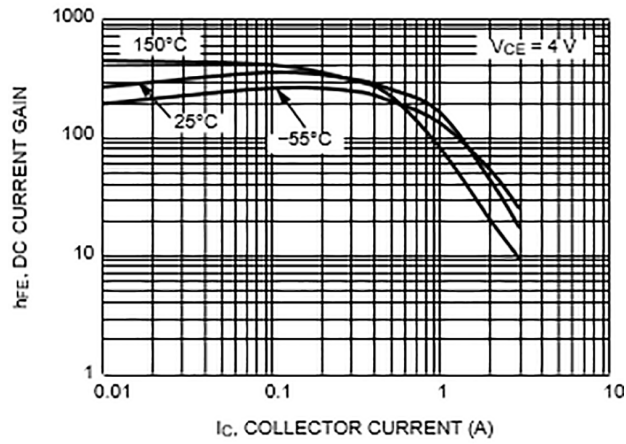


Figure 1. DC Current Gain

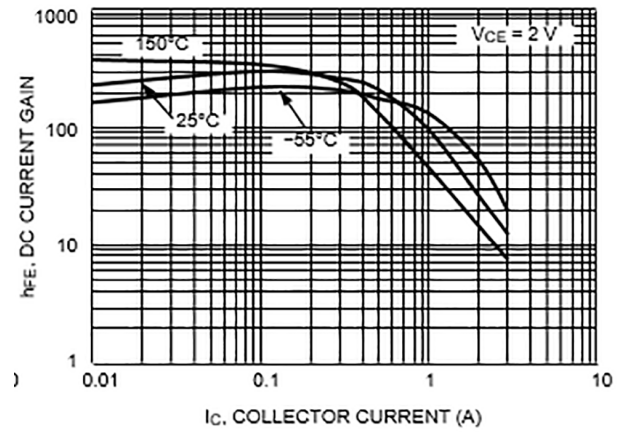


Figure 2. DC Current Gain

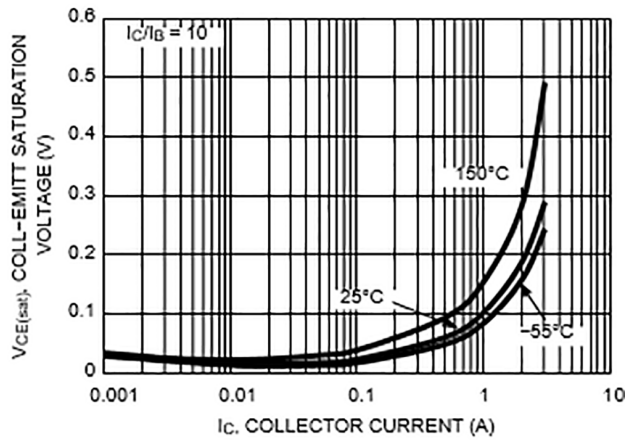


Figure 3. Saturation Voltage $V_{CE(sat)}$

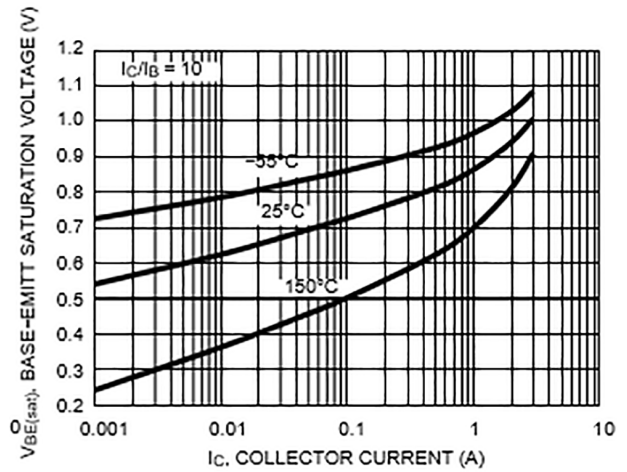


Figure 4. Saturation Voltage $V_{BE(sat)}$

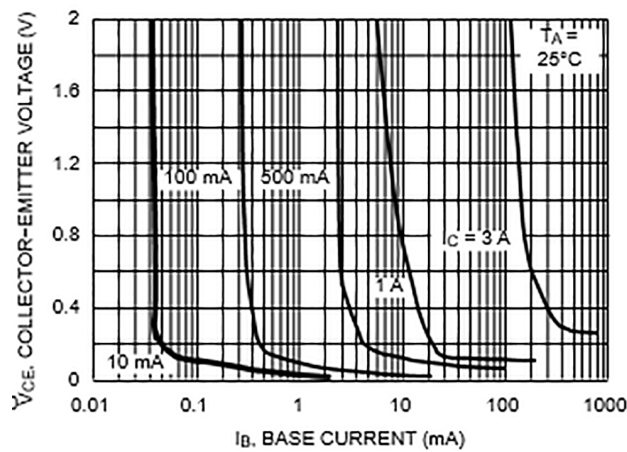


Figure 5. Collector Saturation Region

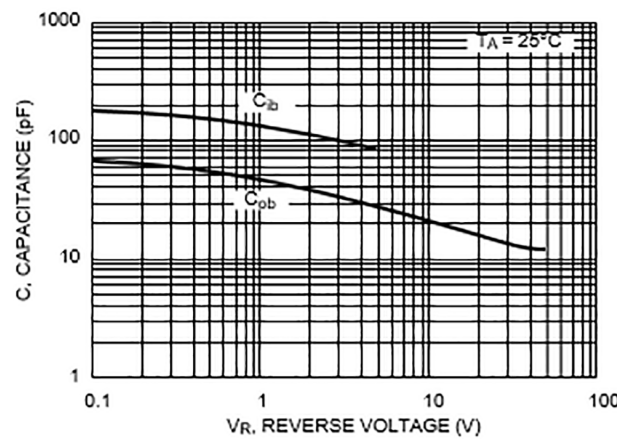


Figure 6. Capacitance

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TYPICAL CHARACTERISTICS (continued)

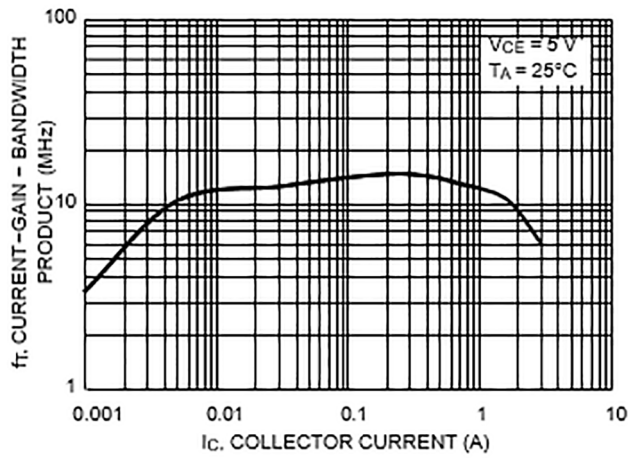


Figure 7. Current-Gain-Bandwidth Product

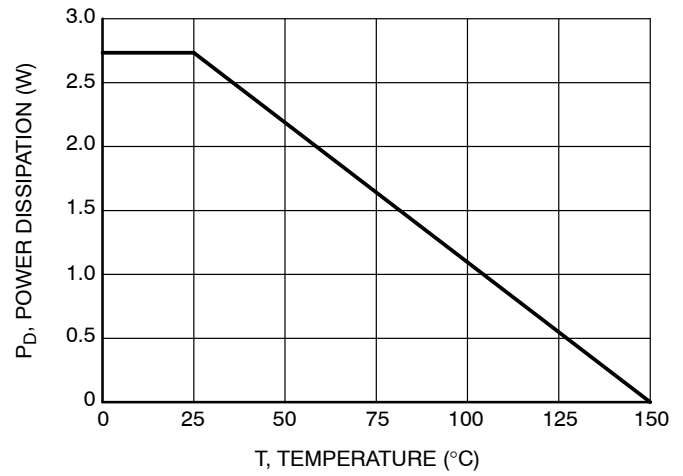


Figure 8. Power Derating

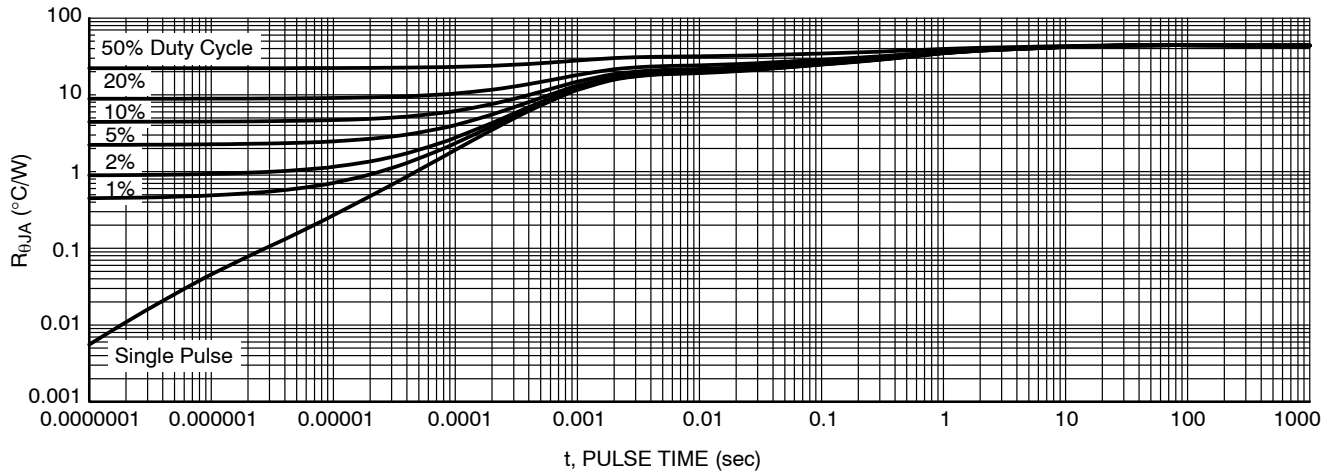
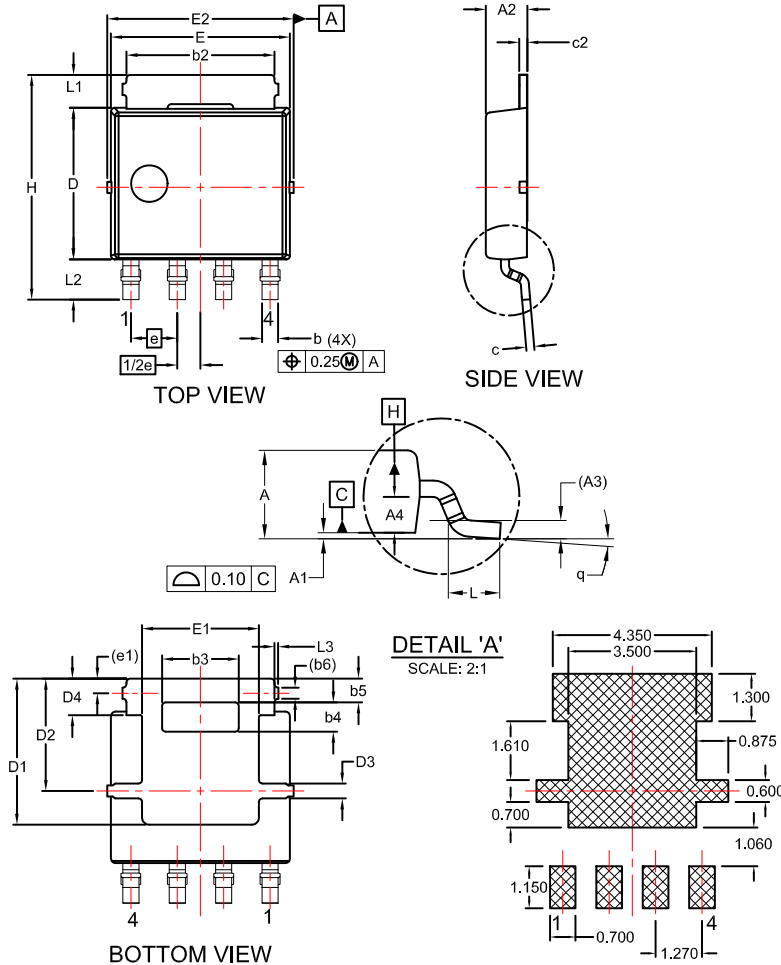


Figure 9. Typical Transient Thermal Response, Junction-to-Case

MJK31C

PACKAGE DIMENSIONS

LFP4K4 5x6
CASE 760AB
ISSUE C



RECOMMENDED LAND PATTERN

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

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.150mm PER SIDE.
4. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
5. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.

| UNIT IN MILLIMETER | | | |
|--------------------|-----------|------|------|
| DIM | MIN | NOM | MAX |
| A | 1.10 | 1.20 | 1.30 |
| A1 | 0.00 | 0.08 | 0.15 |
| A2 | 1.10 | 1.15 | 1.20 |
| A3 | 0.25 REF | | |
| A4 | 0.45 | 0.50 | 0.55 |
| b | 0.40 | 0.45 | 0.50 |
| b2 | 3.80 | 4.10 | 4.40 |
| b3 | 2.00 | 2.10 | 2.20 |
| b4 | 0.70 | 0.80 | 0.90 |
| b5 | 0.55 | 0.65 | 0.75 |
| b6 | 0.31 REF | | |
| c | 0.19 | 0.22 | 0.25 |
| c2 | 0.19 | 0.22 | 0.25 |
| D | 4.05 | 4.15 | 4.25 |
| D1 | 3.80 | 4.00 | 4.20 |
| D2 | 3.00 | 3.10 | 3.20 |
| D3 | 0.30 | 0.40 | 0.50 |
| D4 | 0.90 | 1.00 | 1.10 |
| E | 4.80 | 4.90 | 5.00 |
| E1 | 3.10 | 3.20 | 3.30 |
| E2 | 5.00 | 5.15 | 5.30 |
| e | 1.27 BSC | | |
| 1/2e | 0.635 BSC | | |
| e1 | 0.40 REF | | |
| H | 6.00 | 6.15 | 6.30 |
| L | 0.40 | 0.65 | 0.85 |
| L1 | 0.80 | 0.90 | 1.00 |
| L2 | 0.90 | 1.10 | 1.30 |
| L3 | 0.00 | 0.10 | 0.20 |
| q | 0° | 4° | 8° |

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