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# MJD31C

## NPN Epitaxial Silicon Transistor

### Features

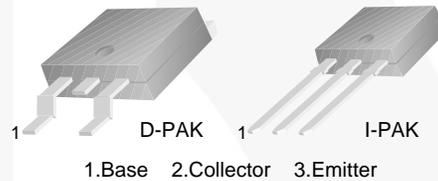
- General-Purpose Amplifier
- Low-Speed Switching Applications
- Lead Formed for Surface Mount Application (No Suffix)
- Straight Lead (I-PAK, “- I” Suffix)
- Electrically Similar to Popular TIP31 and TIP31C

### Applications

- Switching Regulators
- Converters
- Power Amplifiers

### Description

Designed for general-purpose power and switching, such as output or driver stages in applications.



### Ordering Information

| Part Number | Top Mark | Package          | Packing Method |
|-------------|----------|------------------|----------------|
| MJD31CTF    | MJD31C   | TO-252 3L (DPAK) | Tape and Reel  |
| MJD31CITU   | MJD31C-I | TO-251 3L (IPAK) | Rail           |

### Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol    | Parameter  | Value       | Unit             |
|-----------|--|-------------|------------------|
| $V_{CBO}$ | Collector-Base Voltage                             | 100         | V                |
| $V_{CEO}$ | Collector-Emitter Voltage                          | 100         | V                |
| $V_{EBO}$ | Emitter-Base Voltage                               | 5           | V                |
| $I_C$     | Collector Current (DC)                             | 3           | A                |
| $I_{CP}$  | Collector Current (Pulse)                          | 5           | A                |
| $I_B$     | Base Current                                       | 1           | A                |
| $P_C$     | Collector Dissipation ( $T_C = 25^\circ\text{C}$ ) | 15.00       | W                |
|           | Collector Dissipation ( $T_A = 25^\circ\text{C}$ ) | 1.56        |                  |
| $T_J$     | Junction Temperature                               | 150         | $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature                                | - 65 to 150 | $^\circ\text{C}$ |

## Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol         | Parameter   | Conditions                                  | Min. | Typ. | Max. | Unit          |
|----------------|---|---|------|------|------|---------------|
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage <sup>(1)</sup> | $I_C = 30\text{ mA}, I_B = 0$               | 100  |      |      | V             |
| $I_{CEO}$      | Collector Cut-Off Current                           | $V_{CE} = 60\text{ V}, I_B = 0$             |      |      | 50   | $\mu\text{A}$ |
| $I_{CES}$      | Collector Cut-Off Current                           | $V_{CE} = 100\text{ V}, V_{BE} = 0$         |      |      | 20   | $\mu\text{A}$ |
| $I_{EBO}$      | Emitter Cut-Off Current                             | $V_{BE} = 5\text{ V}, I_C = 0$              |      |      | 1    | mA            |
| $h_{FE}$       | DC Current Gain <sup>(1)</sup>                      | $V_{CE} = 4\text{ V}, I_C = 1\text{ A}$     | 25   |      |      |               |
|                |   | $V_{CE} = 4\text{ V}, I_C = 3\text{ A}$     | 10   |      | 50   |               |
| $V_{CE(sat)}$  | Collector-Emitter Saturation Voltage <sup>(1)</sup> | $I_C = 3\text{ A}, I_B = 375\text{ mA}$     |      |      | 1.2  | V             |
| $V_{BE(on)}$   | Base-Emitter On Voltage <sup>(1)</sup>              | $V_{CE} = 4\text{ V}, I_C = 3\text{ A}$     |      |      | 1.8  | V             |
| $f_T$          | Current Gain Bandwidth Product                      | $V_{CE} = 10\text{ V}, I_C = 500\text{ mA}$ | 3    |      |      | MHz           |

### Note:

1. Pulse test:  $p_w \leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .

## Typical Performance Characteristics

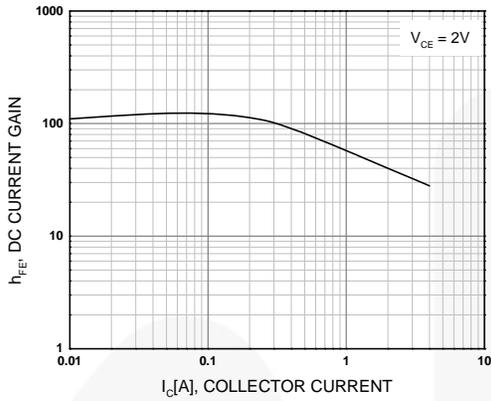


Figure 1. DC Current Gain

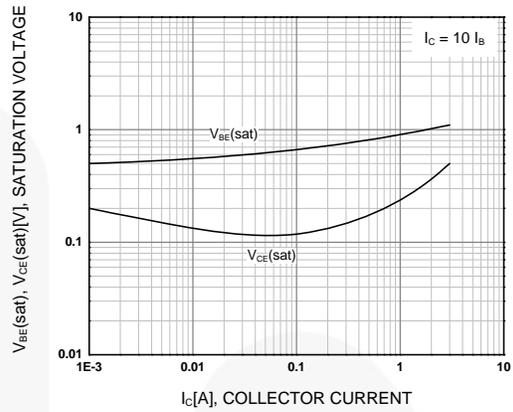


Figure 2. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

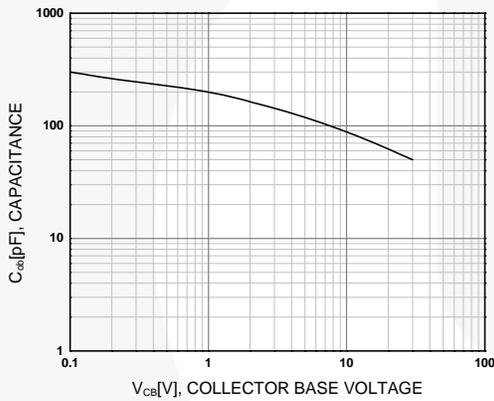


Figure 3. Collector Capacitance

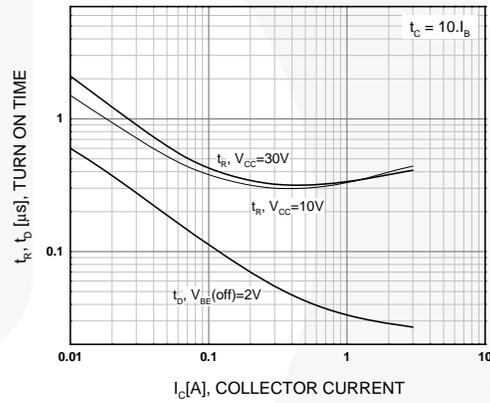


Figure 4. Turn-On Time

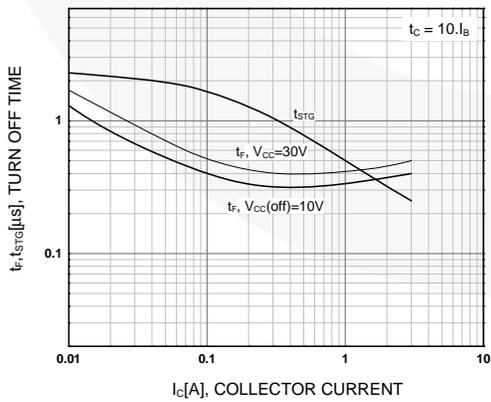


Figure 5. Turn-Off Time

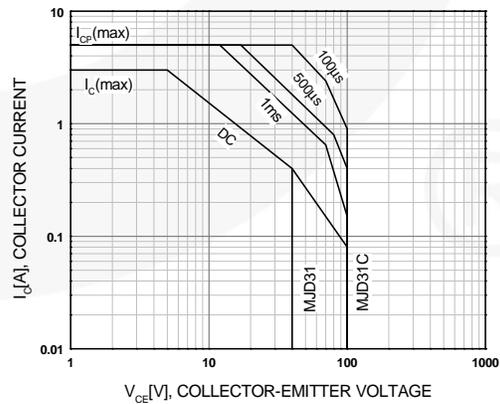


Figure 6. Safe Operating Area

Typical Performance Characteristics (Continued)

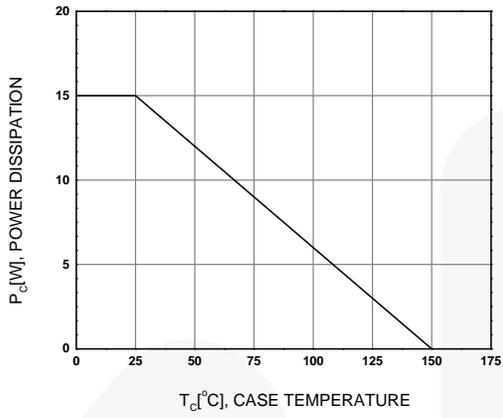
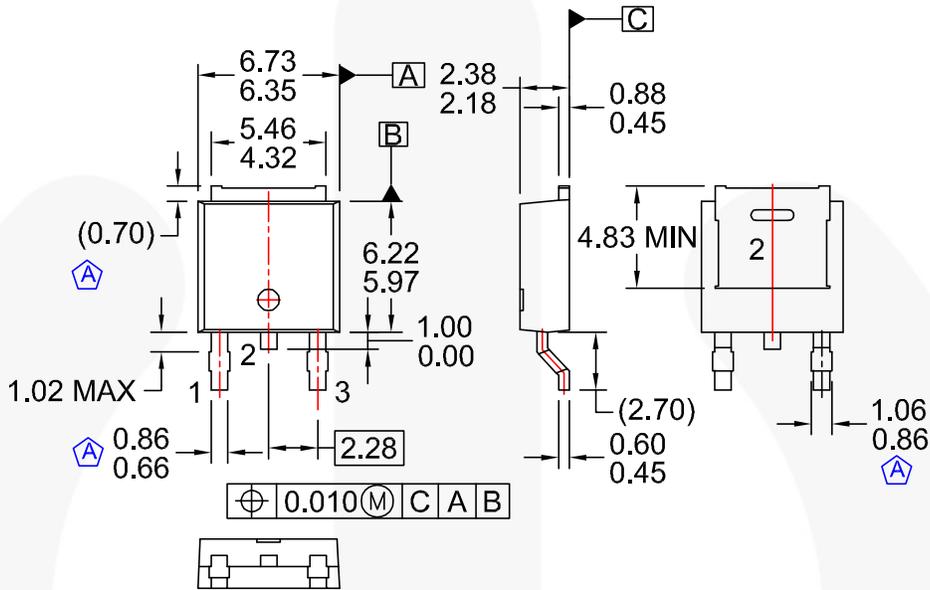


Figure 7. Power Derating



Physical Dimensions

TO-252 3L



- NOTES: UNLESS OTHERWISE SPECIFIED
- A) CONFORMS TO JEDEC TO-252 VARIATION AB EXCEPT WHERE NOTED
  - B) ALL DIMENSIONS ARE IN MILLIMETERS.
  - C) DRAWING CONFORMS TO ASME Y14.5M-1994
  - D) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
  - E) FORMERLY NAMED BD1733
  - F) DRAWING FILE NAME: MKT-TO252D03REV1

Figure 7. 3-LEAD, TO-252, JEDEC TO-252 VAR. AB, SURFACE MOUNT (DPAK) (ACTIVE)

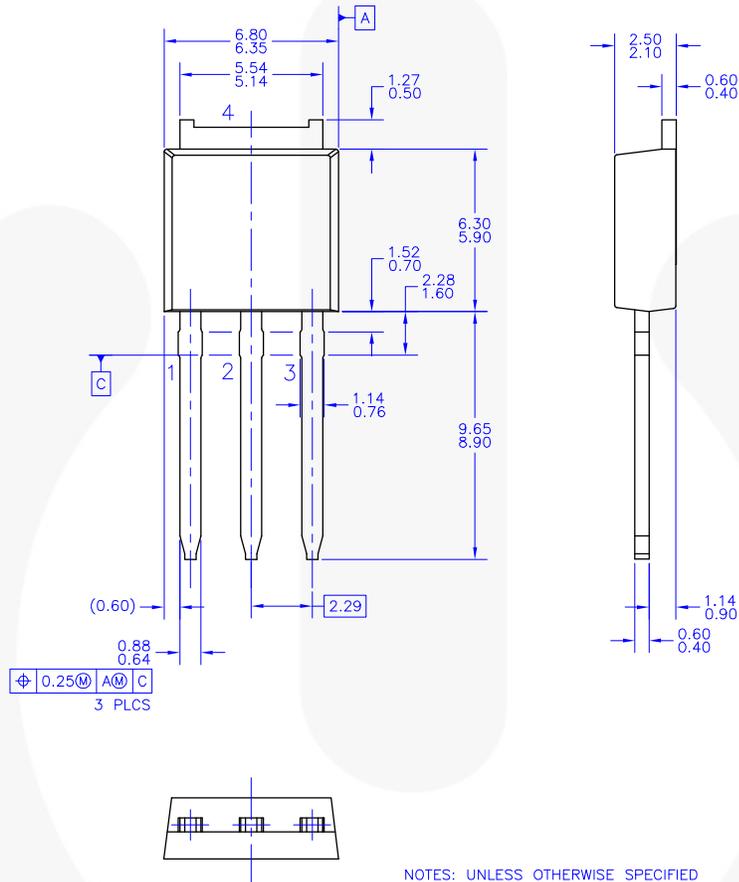
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**Physical Dimensions** (Continued)

**TO-251 3L**



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- D) TO251A03REVA.

**Figure 8. TO-251 (IPAK) MOLDED, 3-LEAD (ACTIVE)**

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