

# MJD31C

## NPN Epitaxial Silicon Transistor

### Features

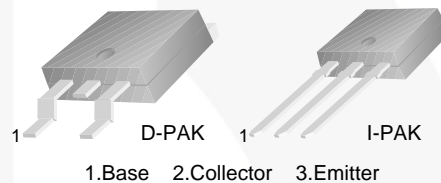
- General-Purpose Amplifier
- Low-Speed Switching Applications
- Lead Formed for Surface Mount Application (No Suffix)
- Straight Lead (I-PAK, “- I” Suffix)
- Electrically Similar to Popular TIP31 and TIP31C

### 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

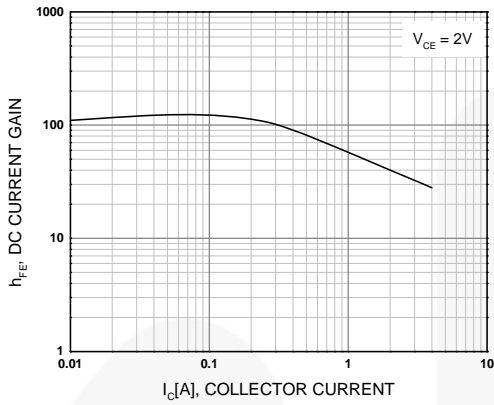
Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

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

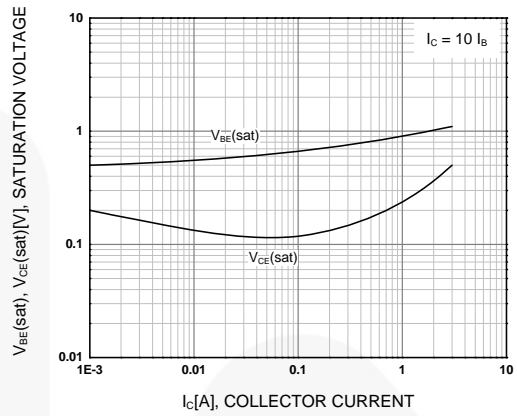
### Note:

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

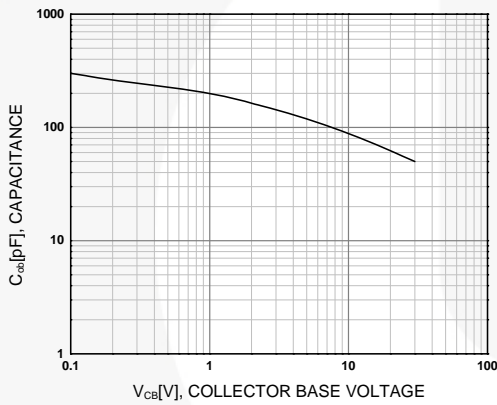
## Typical Performance Characteristics



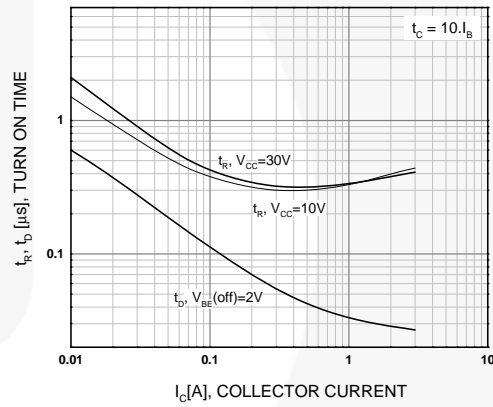
**Figure 1. DC Current Gain**



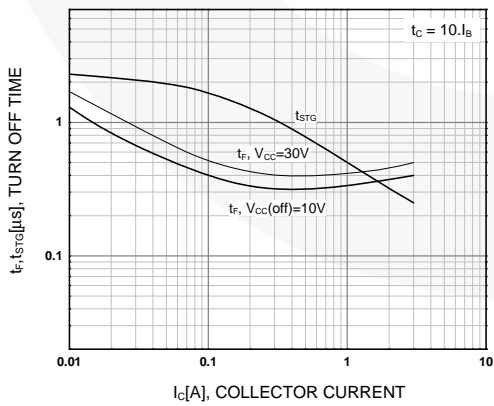
**Figure 2. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage**



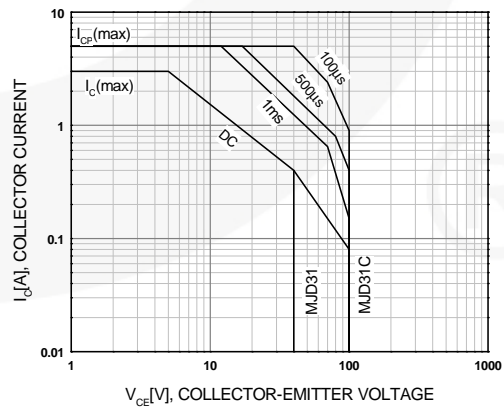
**Figure 3. Collector Capacitance**



**Figure 4. Turn-On Time**



**Figure 5. Turn-Off Time**



**Figure 6. Safe Operating Area**

### Typical Performance Characteristics (Continued)

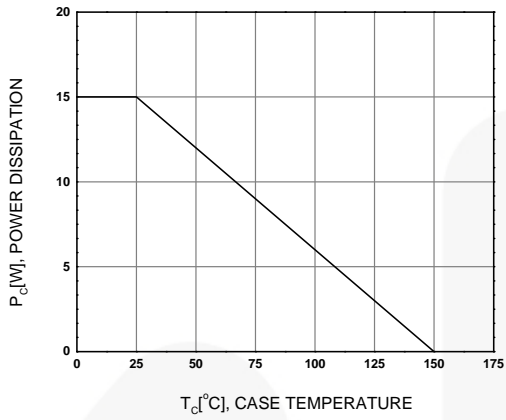
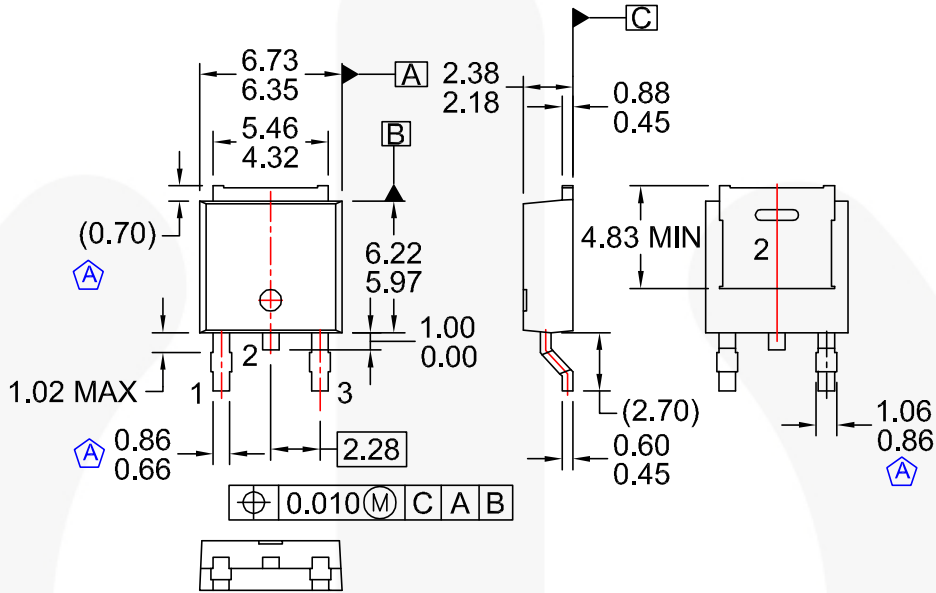


Figure 7. Power Derating



## 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)**

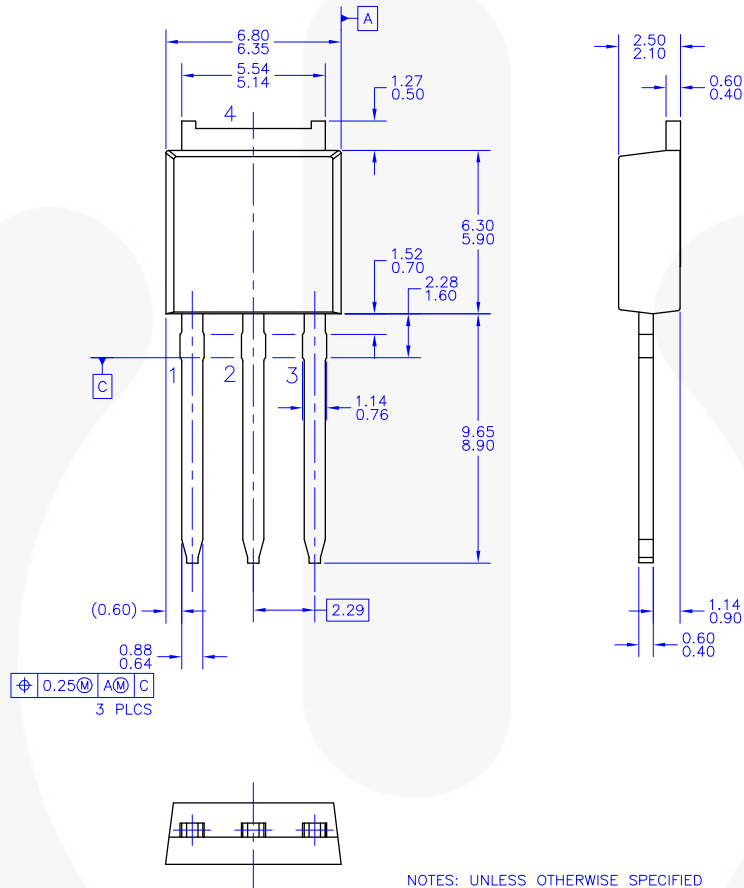
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**Physical Dimensions** (Continued)

**TO-251 3L**



NOTES: UNLESS OTHERWISE SPECIFIED

- A) ALL DIMENSIONS ARE IN MILLIMETERS.
- B) THIS PACKAGE CONFORMS TO JEDEC, TO-251, ISSUE C, VARIATION AA, DATED SEP 1988.
- C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
- D) TO251A03REVA.

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

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