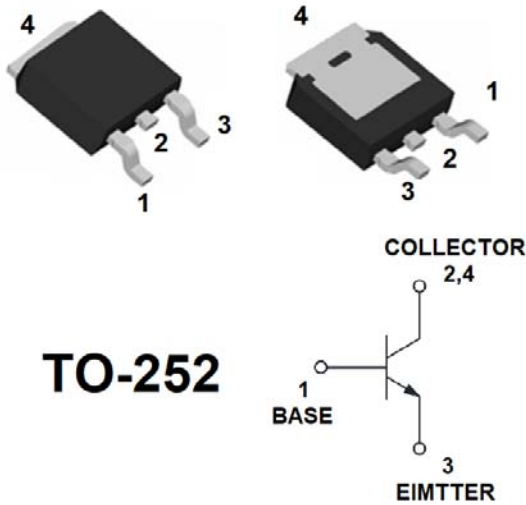


## NPN Power Transistors



### Features

- Epoxy meets UL-94 V-0 flammability rating and halogen free
- Moisture Sensitivity Level 1
- Part no. with suffix "Q" means AEC-Q101 qualified

### Applications

- Designed for general purpose amplifier and low speed switching applications.

### Mechanical Data

- Case: TO-252
- Terminals: Tin plated leads, solderable per J-STD-002 and JEDEC22-B102

### ■ Maximum Ratings (Ta=25°C unless otherwise noted)

| Item                          | Symbol    | Unit | Value       |
|-------------------------------|-----------|------|-------------|
| Collector-Base Voltage        | $V_{CBO}$ | V    | 100         |
| Collector-Emitter Voltage     | $V_{CEO}$ | V    | 100         |
| Emitter-Base Voltage          | $V_{EBO}$ | V    | 5           |
| Collector Current -Continuous | $I_C$     | A    | 3           |
| Total Device Dissipation      | $P_D$     | W    | 1.25        |
| Junction Temperature          | $T_J$     | °C   | -55 to +150 |
| Storage Temperature           | $T_{STG}$ | °C   | -55 to +150 |

### ■ Electrical Characteristics (Ta=25°C unless otherwise noted)

| Item                                 | Symbol        | Unit | Conditions                  | Min | Typ | Max |
|--------------------------------------|---------------|------|-----------------------------|-----|-----|-----|
| Collector-base breakdown voltage     | $V_{CBO}$     | V    | $I_C = 1mA, I_E = 0$        | 100 |     |     |
| Collector-emitter breakdown voltage  | $V_{CEO}$     | V    | $I_C = 30mA, I_B = 0$       | 100 |     |     |
| Emitter-base breakdown voltage       | $V_{EBO}$     | V    | $I_E = 1mA, I_C = 0$        | 5   |     |     |
| Collector-base cut-off current       | $I_{CEO}$     | uA   | $V_{CE} = 60V, I_B = 0$     |     |     | 50  |
| Collector-base cut-off current       | $I_{CES}$     | uA   | $V_{CE} = 100V, V_{EB} = 0$ |     |     | 20  |
| Emitter-base cut-off current         | $I_{EBO}$     | mA   | $V_{EB} = 5V, I_C = 0$      |     |     | 1   |
| DC current gain                      | $h_{FE}$      |      | $V_{CE} = 4V, I_C = 1A$     | 25  |     |     |
|                                      |               |      | $V_{CE} = 4V, I_C = 3A$     | 10  |     | 75  |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | V    | $I_C = 3A, I_B = 0.375A$    |     |     | 1.2 |
| Base-emitter voltage                 | $V_{BE}$      | V    | $I_C = 3A, V_{CE} = 4V$     |     |     | 1.8 |



## MJD31CQ

### ■ Other Characteristics (Ta=25℃ unless otherwise noted)

| Item                 | Symbol | Unit | Conditions                     | Min | Typ | Max |
|----------------------|--------|------|--------------------------------|-----|-----|-----|
| Transition frequency | $f_T$  | MHz  | $V_{CE}=10V, I_C=0.5A, f=1KHz$ | 3   |     |     |

### ■ Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|---------|----------------------|-------------------------|----------------------------|---------------|
| MJD31CQ       | F1           | MJD31C  | 2500                 | 2500                    | 25000                      | 13"Reel       |

### ■ Characteristics(Typical)

Fig.1 - Collector Saturation Region

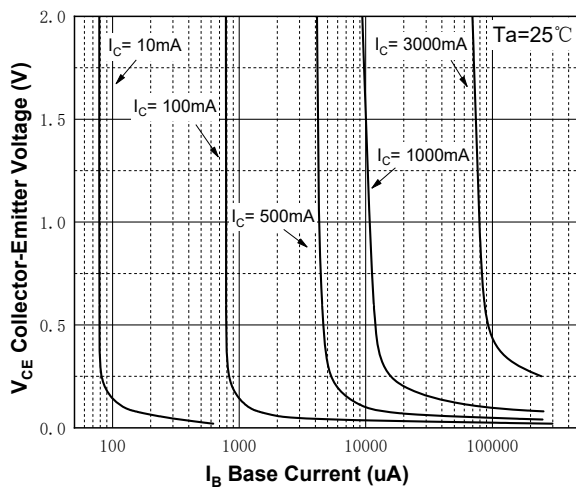


Fig.2 - DC Current Gain

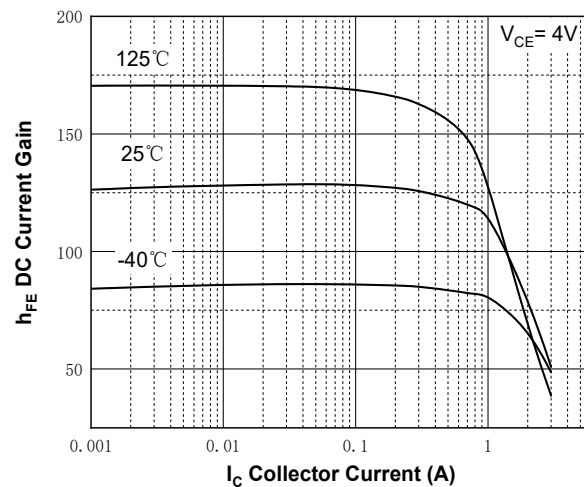


Fig.3 - DC Current Gain

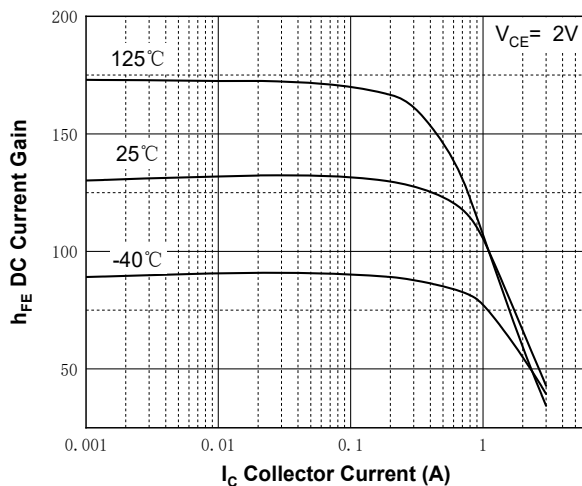


Fig.4 - Collector-Emitter Saturation Voltage vs. Collector Current

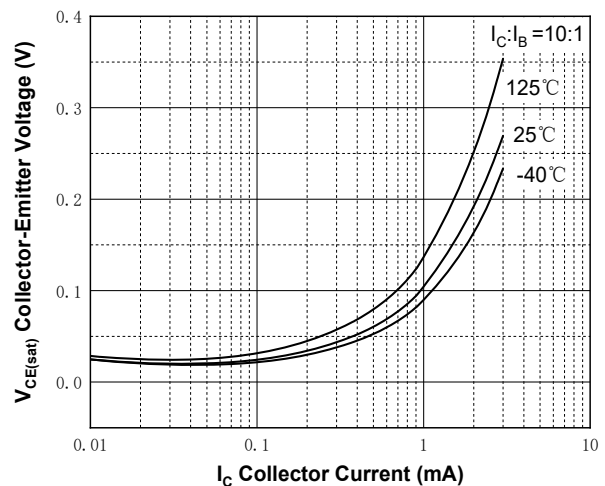




Fig.5 - Base-Emitter Saturation Voltage vs. Collector Current

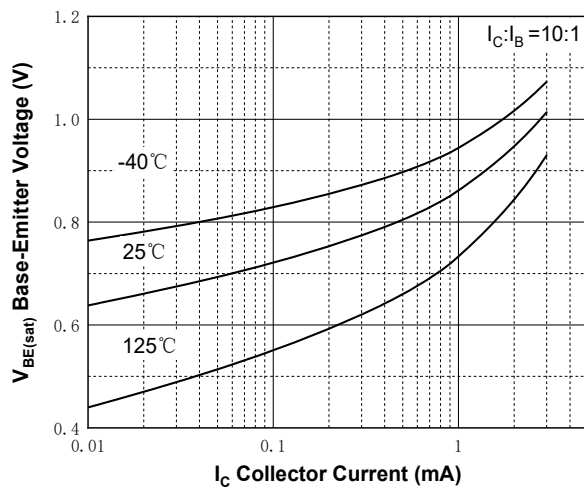
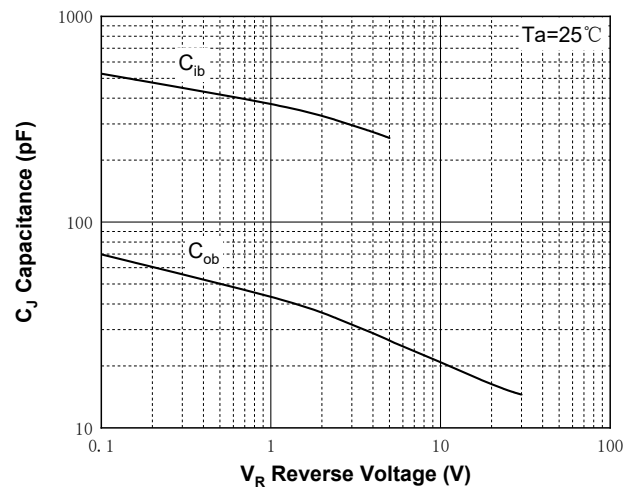


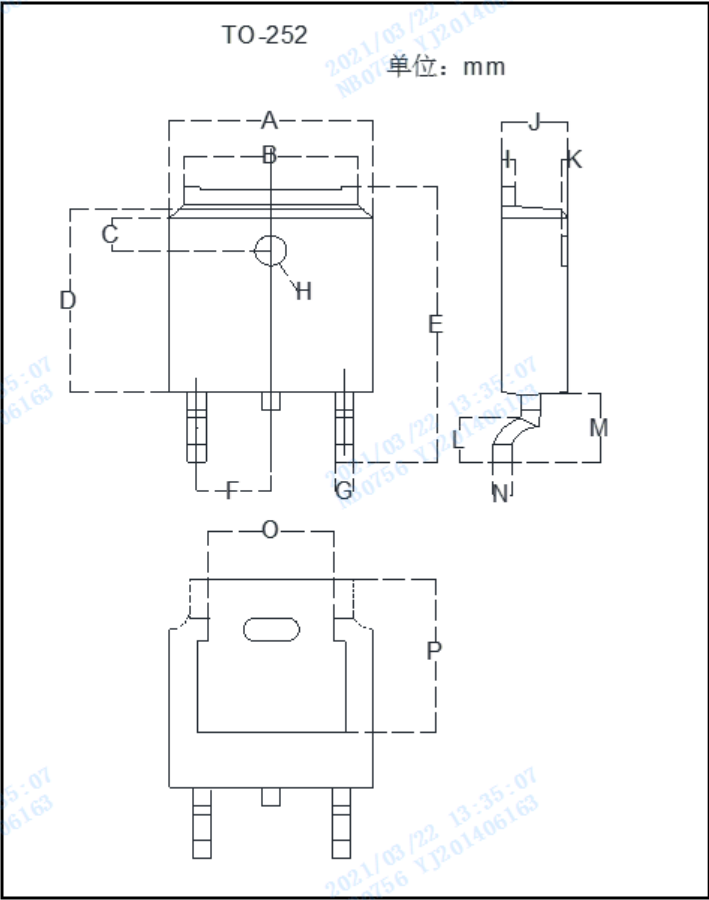
Fig.6 - Capacitance





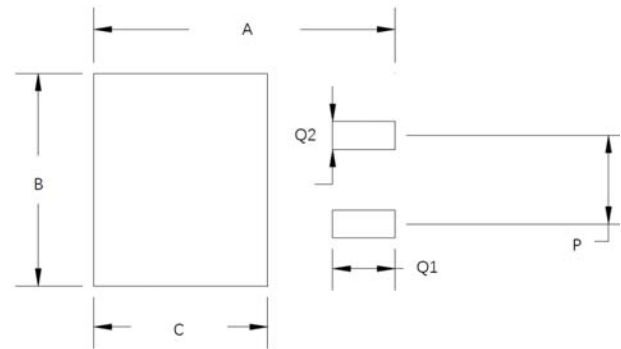
# MJD31CQ

## TO-252 Package information



| DIM | INCHES |        | MM     |        | NOTE |
|-----|--------|--------|--------|--------|------|
|     | MIN    | MAX    | MIN    | MAX    |      |
| A   | 0.256  | 0.264  | 6.50   | 6.70   |      |
| B   | 0.201  | 0.215  | 5.10   | 5.46   |      |
| C   | 0.055  | 0.071  | 1.40   | 1.80   |      |
| D   | 0.236  | 0.244  | 6.00   | 6.20   |      |
| E   | 0.394  | 0.409  | 10.00  | 10.40  |      |
| F   | 0.085  | 0.093  | 2.17   | 2.37   |      |
| G   | 0.026  | 0.034  | 0.66   | 0.86   |      |
| H   | Φ0.041 | Φ0.531 | Φ1.050 | Φ1.350 |      |
| I   | 0.018  | 0.023  | 0.46   | 0.58   |      |
| J   | 0.087  | 0.094  | 2.20   | 2.40   |      |
| K   | 0.000  | 0.012  | 0.00   | 0.30   |      |
| L   | 0.035  | 0.090  | 0.89   | 2.29   |      |
| M   | 0.107  | 0.121  | 2.73   | 3.08   |      |
| N   | 0.017  | 0.023  | 0.43   | 0.58   |      |
| O   | 0.165  | 0.195  | 4.20   | 4.95   |      |
| P   | 0.203  | 0.215  | 5.15   | 5.45   |      |

## Suggested Pad Layout



| Dim | Millimeters |
|-----|-------------|
| A   | 11.4        |
| B   | 6.74        |
| C   | 6.23        |
| P   | 4.56        |
| Q1  | 2.28        |
| Q2  | 1.52        |



## MJD31CQ

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## MJD31CQ

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| Rev | Date      | Revision      |
|-----|-----------|---------------|
| 1.0 | 07-Apr-21 | Add Datasheet |
| 1.1 | 13-Oct-21 | Amend Marking |