



## Description

The MJ10021 is a darlington transistor in a TO-3 type package designed for high-voltage, high-speed, power switching in inductive circuits where fall time is critical. This device is particularly suited for line operated switchmode applications

## Feature

- Continuous collector current -  $I_C = 60A$

## Applications

- Switching regulators
- Inverters
- Solenoid and relay drivers
- AC and DC motor controls

## Absolute Maximum Ratings

| Parameter                                                                                        | Symbol            | Values             | Unit                |
|--------------------------------------------------------------------------------------------------|-------------------|--------------------|---------------------|
| Collector-Emitter Voltage                                                                        | $V_{CBS}$         | 250                | V                   |
| Collector-Emitter Voltage                                                                        | $V_{CEO}$         | 350                |                     |
| Emitter-Base Voltage                                                                             | $V_{EBO}$         | 8                  |                     |
| Collector Current - Continuous<br>- Peak                                                         | $I_C$<br>$I_{CM}$ | 60<br>100          | A                   |
| Base Current                                                                                     | $I_B$             | 20                 |                     |
| Total Power Dissipation $T_C = 25^\circ C$<br>$T_C = +100^\circ C$<br>Derate above $+25^\circ C$ | $P_D$             | 250<br>143<br>1.43 | W<br>W / $^\circ C$ |
| Operating and Storage Junction Temperature Range                                                 | $T_J, T_{STG}$    | 65 to $+200$       | $^\circ C$          |
| Thermal Resistance, Junction-to-Case                                                             | $R_{THJC}$        | 0.7                | $^\circ C/W$        |

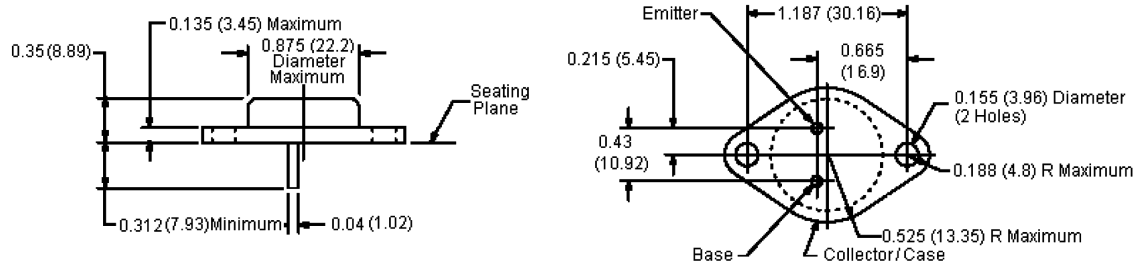
## Electrical Characteristics ( $T_{CASE} = 25^\circ C$ unless otherwise specified)

| Parameter                            | Test Conditions                                         | Symbol          | Minimum | Maximum | Unit |
|--------------------------------------|---------------------------------------------------------|-----------------|---------|---------|------|
| <b>Off Characteristics</b>           |                                                         |                 |         |         |      |
| Collector-Emitter Sustaining Voltage | $I_C = 100mA, I_B = 0$                                  | $V_{CEO (SUS)}$ | 250     | -       | V    |
| Collector Cut off Current            | $V_{CEV} = 250V,$<br>$V_{BE (OFF)} = 1.5V$              | $I_{CEV}$       | -       | 0.25    | mA   |
|                                      | $T_C = 150^\circ C$                                     |                 | -       | 5       |      |
|                                      | $V_{CEV} = 250V, R_{BE} = 50\Omega, T_C = +100^\circ C$ | $I_{CER}$       | -       | -       |      |
| Emitter Cut off Current              | $V_{EB} = 2V, I_C = 0$                                  | $I_{EBO}$       | -       | 175     |      |

| Parameter                            | Test Conditions                                                                                        | Symbol        | Minimum | Maximum | Unit    |
|--------------------------------------|--------------------------------------------------------------------------------------------------------|---------------|---------|---------|---------|
| <b>On Characteristics (1)</b>        |                                                                                                        |               |         |         |         |
| DC Current Gain                      | $I_C = 15A, V_{CE} = 5V$                                                                               | $h_{FE}$      | 75      | 1,000   | -       |
| Collector-Emitter Saturation Voltage | $I_C = 30A, I_B = 1.2A$                                                                                | $V_{CE(sat)}$ | -       | 2.2     | V       |
|                                      | $I_C = 60A, I_B = 4A$                                                                                  |               | -       | 4       |         |
|                                      | $I_C = 30A, I_B = 1.2A, T_C = +100^\circ C$                                                            |               | -       | 2.4     |         |
| Base-Emitter Saturation Voltage      | $I_C = 30A, I_B = 1.2A$                                                                                | $V_{BE(sat)}$ | -       | 3       |         |
|                                      |                                                                                                        |               | -       | 3.5     |         |
| Diode Forward Voltage                | $I_F = 30A$                                                                                            | $V_F$         | -       | 5       |         |
| <b>Dynamic Characteristics</b>       |                                                                                                        |               |         |         |         |
| Output Capacitance                   | $V_{CB} = 10V, I_E = 0, f = kHz$                                                                       | $C_{ob}$      | 160     | 750     | pF      |
| <b>Switching Characteristics</b>     |                                                                                                        |               |         |         |         |
| Delay Time                           | $V_{CC} = 175V, I_C = 30A, I_{B1} = 1.2A, V_{BE(off)} = 5V, t_p = 25\mu s, \text{Duty Cycle} \leq 2\%$ | $t_d$         | -       | 0.2     | $\mu s$ |
| Rise Time                            |                                                                                                        | $t_r$         | -       | 1       |         |
| Storage Time                         |                                                                                                        | $t_s$         | -       | 3.5     |         |
| Fall Time                            |                                                                                                        | $t_f$         | -       | 0.8     |         |

(1) Pulse Test : Pulse Width = 300 $\mu$ s, Duty Cycle  $\leq$ 2%

## Diagram



Dimensions : Inches (Millimetres)

## Part Number Table

| Description                      | Part Number |
|----------------------------------|-------------|
| Darlington Transistor, NPN, TO-3 | MJ10021     |

**Important Notice :** This data sheet and its contents (the "Information") belong to the members of the AVNET group of companies (the "Group") or are licensed to it. No licence is granted for the use of it other than for information purposes in connection with the products to which it relates. No licence of any intellectual property rights is granted. The Information is subject to change without notice and replaces all data sheets previously supplied. The Information supplied is believed to be accurate but the Group assumes no responsibility for its accuracy or completeness, any error in or omission from it or for any use made of it. Users of this data sheet should check for themselves the Information and the suitability of the products for their purpose and not make any assumptions based on information included or omitted. Liability for loss or damage resulting from any reliance on the Information or use of it (including liability resulting from negligence or where the Group was aware of the possibility of such loss or damage arising) is excluded. This will not operate to limit or restrict the Group's liability for death or personal injury resulting from its negligence. Multicomp Pro is the registered trademark of Premier Farnell Limited 2019.