



**MJD112**  
**MJD117**

## COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

- STMicroelectronics PREFERRED SALESTYPES
- LOW BASE-DRIVE REQUIREMENTS
- INTEGRATED ANTIPARALLEL COLLECTOR-EMITTER DIODE
- SURFACE-MOUNTING TO-252 (DPAK) POWER PACKAGE IN TAPE & REEL (SUFFIX "T4")
- ELECTRICAL SIMILAR TO TIP112 AND TIP117

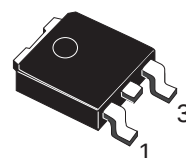
### APPLICATIONS

- GENERAL PURPOSE SWITCHING AND AMPLIFIER

### DESCRIPTION

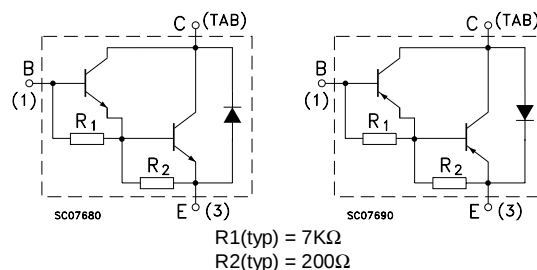
The MJD112 and MJD117 form complementary PNP - NPN pairs.

They are manufactured using Epitaxial Base technology for cost-effective performance.



**DPAK  
TO-252**  
(Suffix "T4")

### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                               | Value      | Unit |
|-----------|-----------------------------------------|------------|------|
| $V_{CBO}$ | Collector-Emitter Voltage ( $I_E = 0$ ) | 100        | V    |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ ) | 100        | V    |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )      | 5          | V    |
| $I_C$     | Collector Current                       | 2          | A    |
| $I_{CM}$  | Collector Peak Current ( $t_p < 5$ ms)  | 4          | A    |
| $I_B$     | Base Current                            | 0.05       | A    |
| $P_{tot}$ | Total Dissipation at $T_c = 25$ °C      | 20         | W    |
| $T_{stg}$ | Storage Temperature                     | -65 to 150 | °C   |
| $T_j$     | Max. Operating Junction Temperature     | 150        | °C   |

For PNP type voltage and current values are negative.

THERMAL DATA

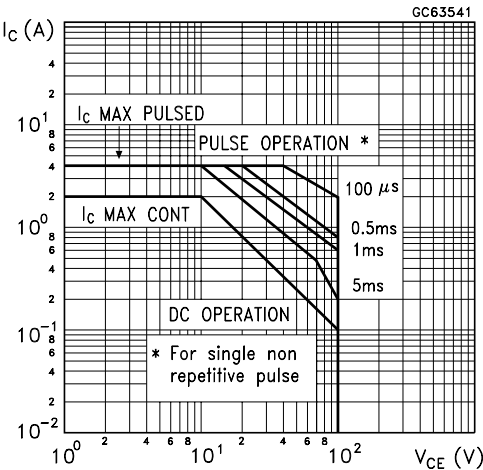
|                       |                                     |     |      |      |
|-----------------------|-------------------------------------|-----|------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case    | Max | 6.25 | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-ambient | Max | 100  | °C/W |

ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

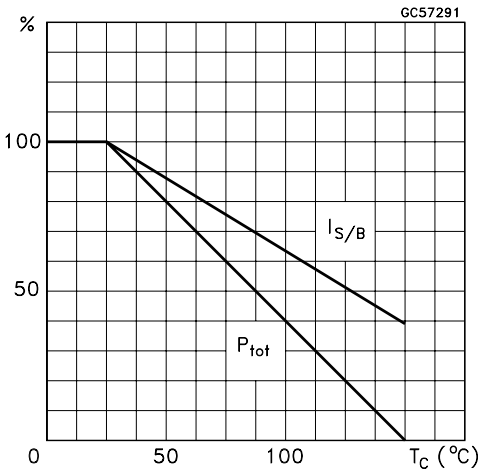
| Symbol                 | Parameter                                                 | Test Conditions                                                                                                                                         | Min.               | Typ. | Max.         | Unit     |
|------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------|--------------|----------|
| I <sub>CBO</sub>       | Collector Cut-off Current (I <sub>E</sub> = 0)            | V <sub>CB</sub> = 100 V<br>V <sub>CB</sub> = 80 V                                                                                                       |                    |      | 0.02<br>0.01 | mA<br>mA |
| I <sub>CEO</sub>       | Collector Cut-off Current (I <sub>B</sub> = 0)            | V <sub>CE</sub> = 50 V                                                                                                                                  |                    |      | 0.02         | mA       |
| I <sub>CEX</sub>       | Collector Cut-off Current (V <sub>BE</sub> = -1.5V)       | V <sub>CE</sub> = 80 V<br>V <sub>CE</sub> = 80 V      T <sub>c</sub> = 125 °C                                                                           |                    |      | 0.01<br>0.5  | mA<br>mA |
| I <sub>EBO</sub>       | Emitter Cut-off Current (I <sub>C</sub> = 0)              | V <sub>EB</sub> = 5 V                                                                                                                                   |                    |      | 2            | mA       |
| V <sub>CEO(sus)*</sub> | Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = 30 mA                                                                                                                                  | 100                |      |              | V        |
| V <sub>CE(sat)*</sub>  | Collector-Emitter Saturation Voltage                      | I <sub>C</sub> = 2 A      I <sub>B</sub> = 8 mA<br>I <sub>C</sub> = 4 A      I <sub>B</sub> = 40 mA                                                     |                    |      | 2<br>3       | V<br>V   |
| V <sub>BE(sat)*</sub>  | Base-Emitter Saturation Voltage                           | I <sub>C</sub> = 4 A      I <sub>B</sub> = 40 mA                                                                                                        |                    |      | 4            | V        |
| V <sub>BE(on)*</sub>   | Base-Emitter On Voltage                                   | I <sub>C</sub> = 2 A      V <sub>CE</sub> = 3 V                                                                                                         |                    |      | 2.8          | V        |
| h <sub>FE</sub> *      | DC Current Gain                                           | I <sub>C</sub> = 0.5 A      V <sub>CE</sub> = 3 V<br>I <sub>C</sub> = 2 A      V <sub>CE</sub> = 3 V<br>I <sub>C</sub> = 4 A      V <sub>CE</sub> = 3 V | 500<br>1000<br>200 |      | 12000        |          |

\* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 2 %  
For PNP types voltage and current values are negative.

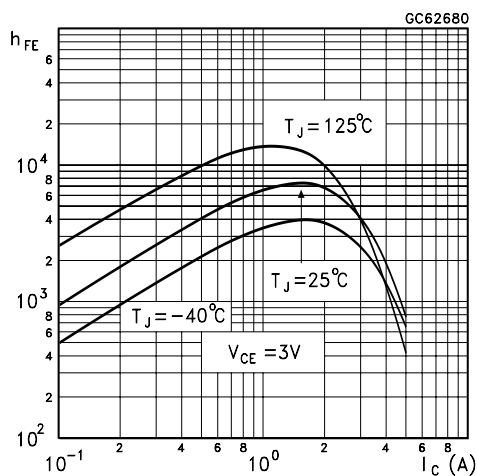
Safe Operating Areas



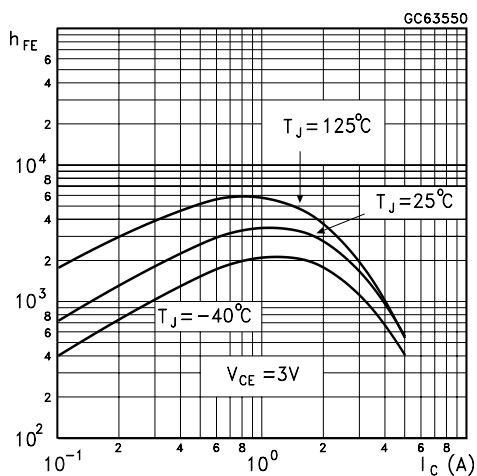
Derating Curve



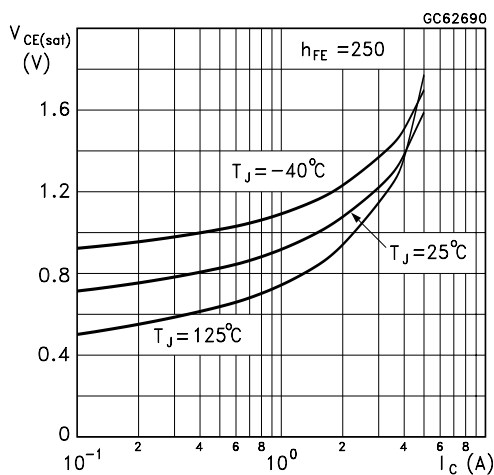
DC Current Gain (NPN type)



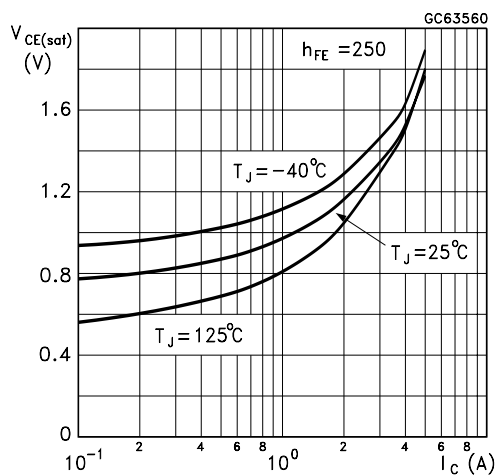
DC Current Gain (NPN type)



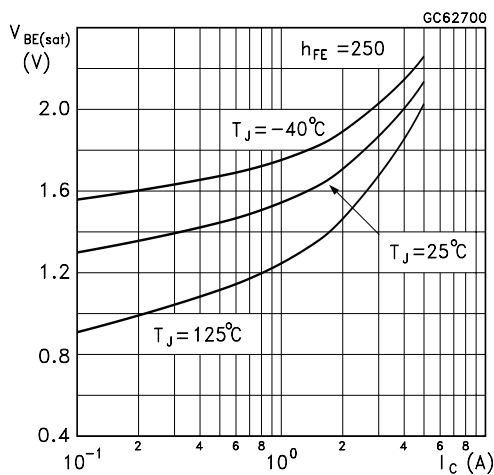
Collector-Emitter Saturation Voltage (NPN type)



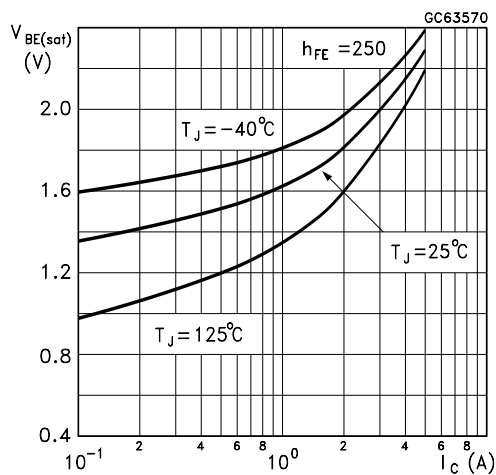
Collector-Emitter Saturation Voltage (PNP type)



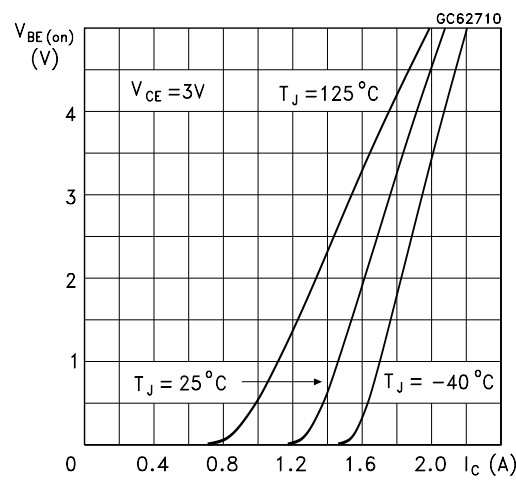
Base-Emitter Saturation Voltage (NPN type)



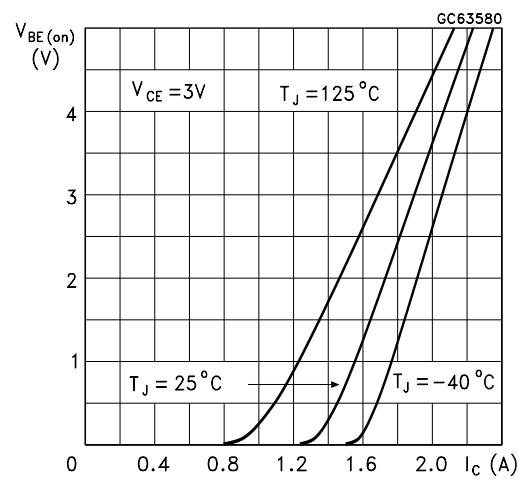
Base-Emitter Saturation Voltage (PNP type)



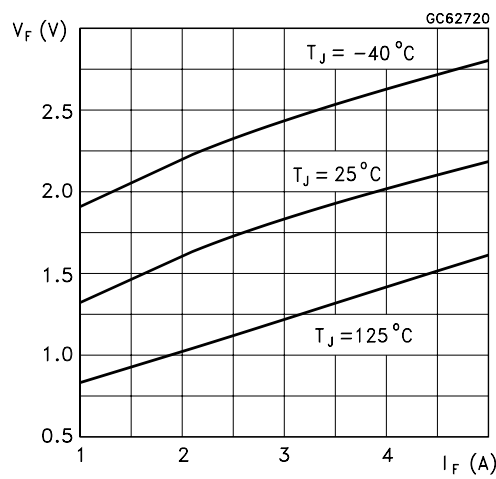
Base-Emitter On Voltage (NPN type)



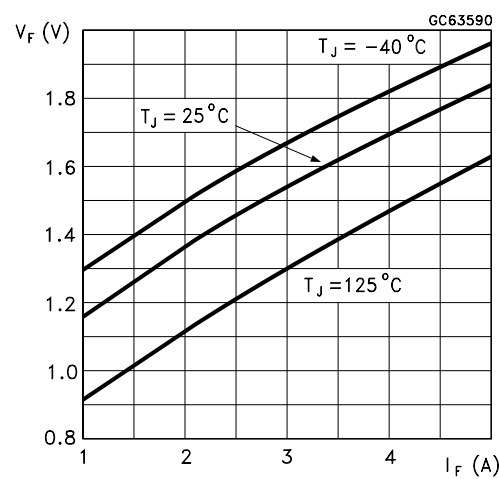
Base-Emitter On Voltage (PNP type)



Freewheel Diode Forward Voltage (NPN types)

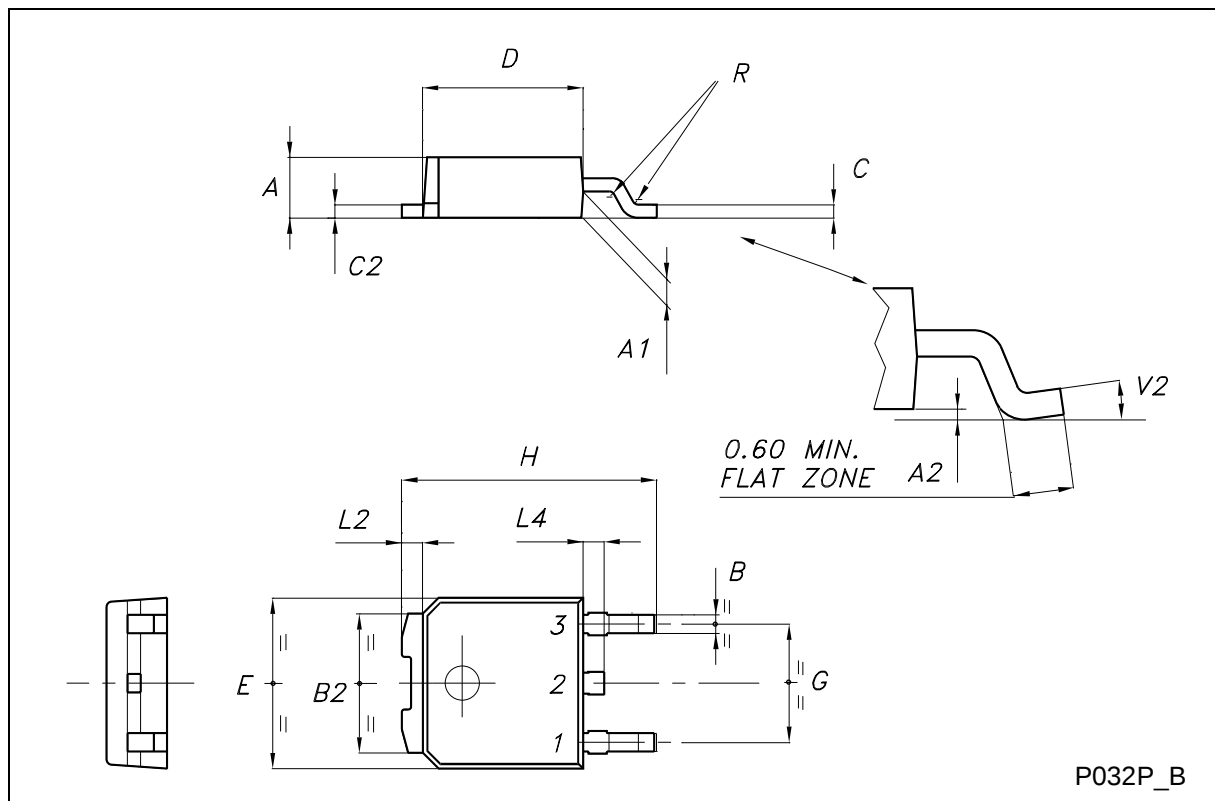


Freewheel Diode Forward Voltage (PNP types)



## TO-252 (DPAK) MECHANICAL DATA

| DIM. | mm   |      |       | inch  |       |       |
|------|------|------|-------|-------|-------|-------|
|      | MIN. | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 2.20 |      | 2.40  | 0.087 |       | 0.094 |
| A1   | 0.90 |      | 1.10  | 0.035 |       | 0.043 |
| A2   | 0.03 |      | 0.23  | 0.001 |       | 0.009 |
| B    | 0.64 |      | 0.90  | 0.025 |       | 0.035 |
| B2   | 5.20 |      | 5.40  | 0.204 |       | 0.213 |
| C    | 0.45 |      | 0.60  | 0.018 |       | 0.024 |
| C2   | 0.48 |      | 0.60  | 0.019 |       | 0.024 |
| D    | 6.00 |      | 6.20  | 0.236 |       | 0.244 |
| E    | 6.40 |      | 6.60  | 0.252 |       | 0.260 |
| G    | 4.40 |      | 4.60  | 0.173 |       | 0.181 |
| H    | 9.35 |      | 10.10 | 0.368 |       | 0.398 |
| L2   |      | 0.8  |       |       | 0.031 |       |
| L4   | 0.60 |      | 1.00  | 0.024 |       | 0.039 |
| V2   | 0°   |      | 8°    | 0°    |       | 0°    |



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