

### Features

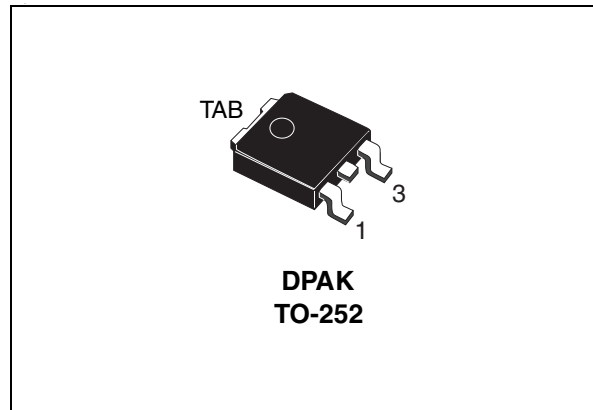
- Low collector-emitter saturation voltage
- Fast switching speed
- Surface-mounting TO-252 (DPAK) power package in tape and reel (suffix "T4")

### Applications

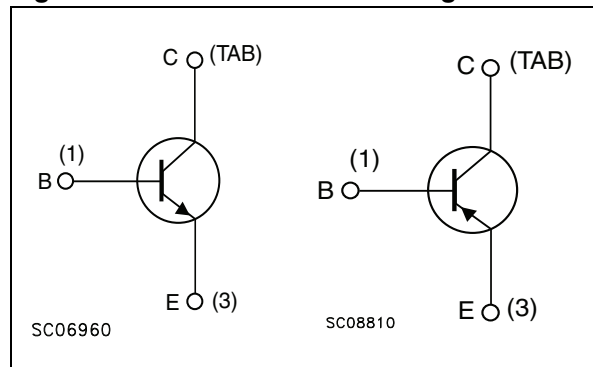
- Power amplifier
- Switching circuits

### Description

These devices are manufactured using low voltage multi epitaxial planar technology. They are intended for general-purpose linear and switching applications.



**Figure 1. Internal schematic diagram**



**Table 1. Device summary**

| Order codes | Marking  | Polarity | Package | Packaging     |
|-------------|----------|----------|---------|---------------|
| MJD44H11T4  | MJD44H11 | NPN      | DPAK    | Tape and reel |
| MJD45H11T4  | MJD45H11 | PNP      | DPAK    | Tape and reel |

# 1 Absolute maximum ratings

**Table 2. Absolute maximum ratings**

| Symbol    | Parameter  | Value      | Unit             |
|-----------|--|------------|------------------|
| $V_{CEO}$ | Collector-emitter voltage ( $I_B = 0$ )            | 80         | V                |
| $V_{EBO}$ | Emitter-base voltage ( $I_C = 0$ )                 | 5          | V                |
| $I_C$     | Collector current                                  | 8          | A                |
| $I_{CM}$  | Collector peak current                             | 16         | A                |
| $P_{TOT}$ | Total dissipation at $T_{case} = 25^\circ\text{C}$ | 20         | W                |
| $T_{STG}$ | Storage temperature                                | -55 to 150 | $^\circ\text{C}$ |
| $T_J$     | Max. operating junction temperature                | 150        | $^\circ\text{C}$ |

*Note:* For PNP types voltage and current values are negative.

**Table 3. Thermal data**

| Symbol     | Parameter                            | Value | Unit               |
|------------|--------------------------------------|-------|--------------------|
| $R_{thJC}$ | Thermal resistance junction-case max | 6.25  | $^\circ\text{C/W}$ |

## 2 Electrical characteristics

$T_{case} = 25\text{ }^{\circ}\text{C}$ ; unless otherwise specified.

**Table 4. Electrical characteristics**

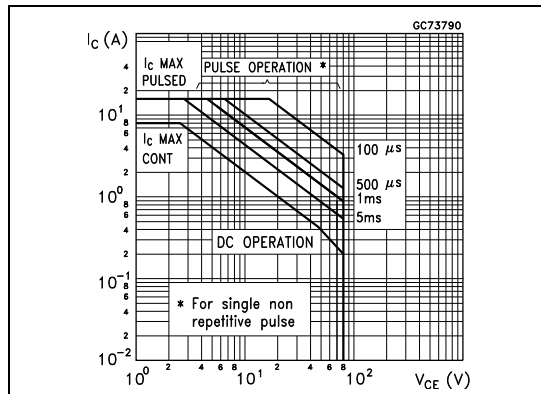
| Symbol               | Parameter  | Test conditions                          | Min. | Typ. | Max. | Unit          |
|----------------------|--|--|------|------|------|---------------|
| $V_{CEO(sus)}^{(1)}$ | Collector-emitter sustaining voltage ( $I_B = 0$ ) | $I_C = 30\text{ mA}$                     | 80   | -    |      | V             |
| $I_{CES}$            | Collector cut-off current ( $V_{BE} = 0$ )         | $V_{CE} = 80\text{ V}$                   |      | -    | 10   | $\mu\text{A}$ |
| $I_{EBO}$            | Emitter cut-off current ( $I_C = 0$ )              | $V_{EB} = 5\text{ V}$                    |      | -    | 50   | $\mu\text{A}$ |
| $V_{CE(sat)}^{(1)}$  | Collector-emitter saturation voltage               | $I_C = 8\text{ A}$ $I_B = 0.4\text{ A}$  |      | -    | 1    | V             |
| $V_{BE(sat)}^{(1)}$  | Base-emitter saturation voltage                    | $I_C = 8\text{ A}$ $I_B = 0.8\text{ A}$  |      | -    | 1.5  | V             |
| $h_{FE}^{(1)}$       | DC current gain                                    | $I_C = 2\text{ A}$ $V_{CE} = 1\text{ V}$ | 60   | -    |      |               |
|                      |  | $I_C = 4\text{ A}$ $V_{CE} = 1\text{ V}$ | 40   | -    |      |               |

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

Note: For PNP types voltage and current values are negative.

### 2.1 Typical characteristic (curves)

**Figure 2. Safe operating area**



**Figure 3. Derating curves**

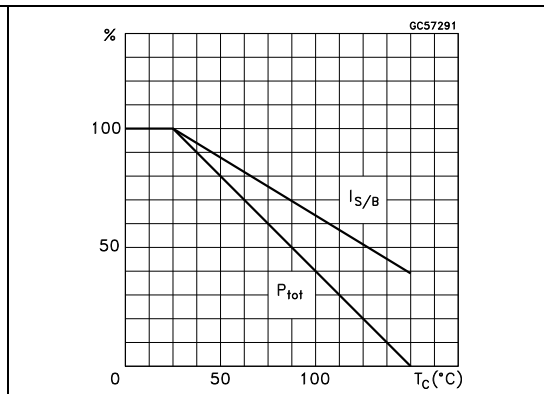


Figure 4. DC current gain (NPN)

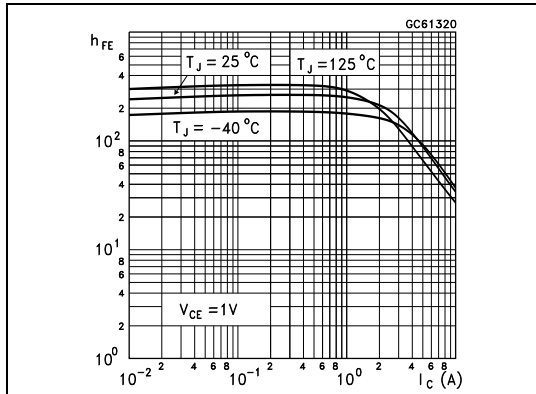


Figure 5. DC current gain (PNP)

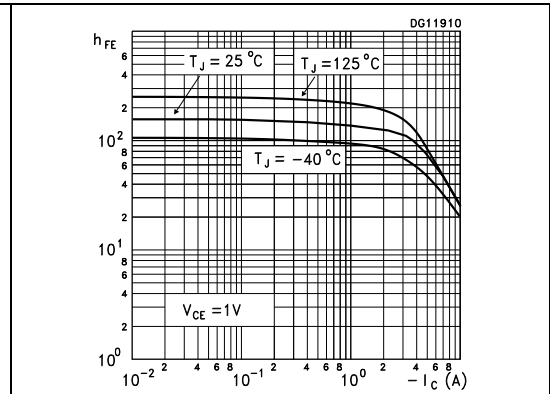


Figure 6. Collector-emitter saturation voltage (NPN)

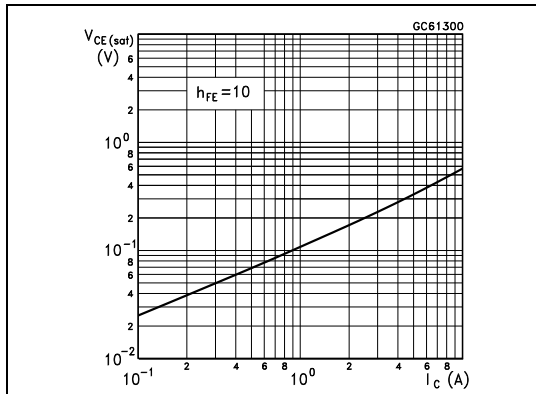
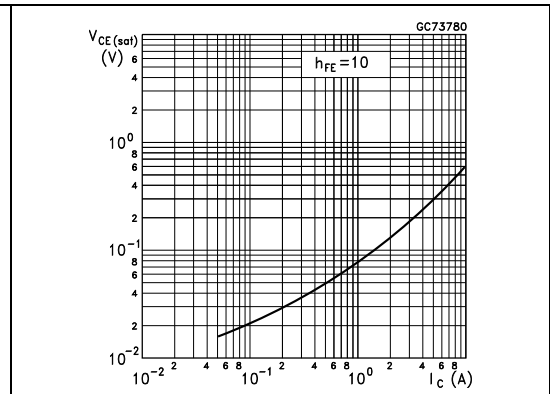


Figure 7. Collector-emitter saturation voltage (PNP)



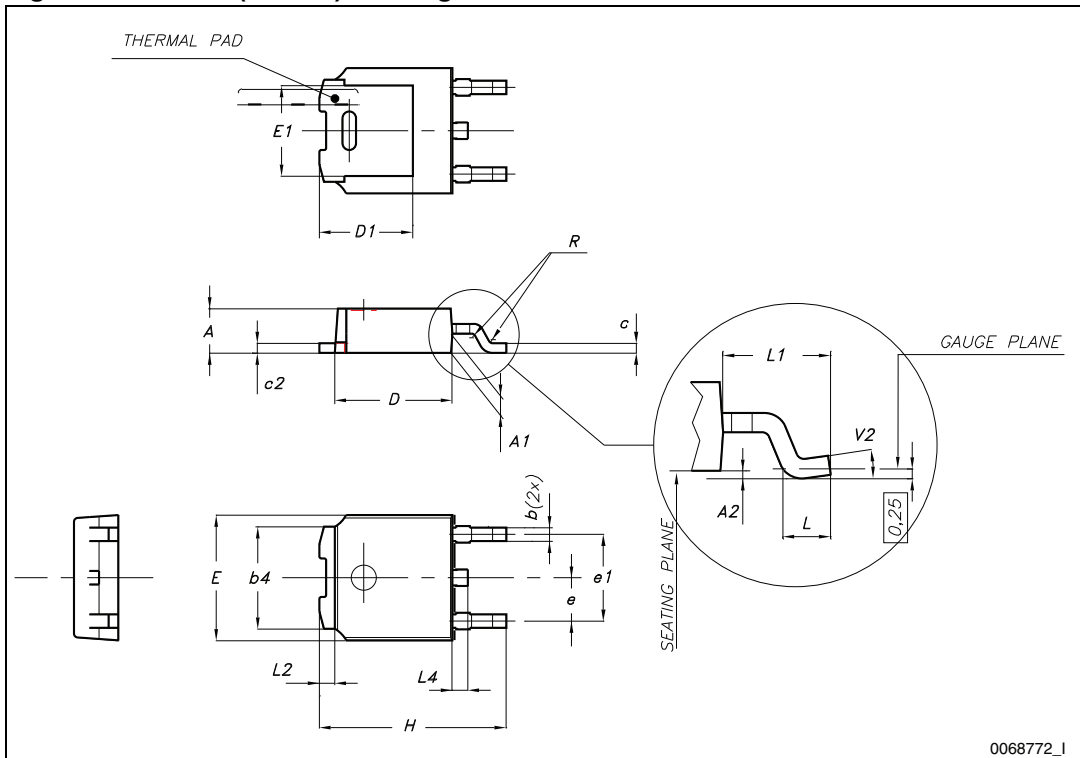
### 3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

Table 5. DPAK (TO-252) mechanical data

| Dim. | mm   |      |       |
|------|------|------|-------|
|      | Min. | Typ. | Max.  |
| A    | 2.20 |      | 2.40  |
| A1   | 0.90 |      | 1.10  |
| A2   | 0.03 |      | 0.23  |
| b    | 0.64 |      | 0.90  |
| b4   | 5.20 |      | 5.40  |
| c    | 0.45 |      | 0.60  |
| c2   | 0.48 |      | 0.60  |
| D    | 6.00 |      | 6.20  |
| D1   |      | 5.10 |       |
| E    | 6.40 |      | 6.60  |
| E1   |      | 4.70 |       |
| e    |      | 2.28 |       |
| e1   | 4.40 |      | 4.60  |
| H    | 9.35 |      | 10.10 |
| L    | 1    |      | 1.50  |
| L1   |      | 2.80 |       |
| L2   |      | 0.80 |       |
| L4   | 0.60 |      | 1     |
| R    |      | 0.20 |       |
| V2   | 0°   |      | 8°    |

Figure 8. DPAK (TO-252) drawing

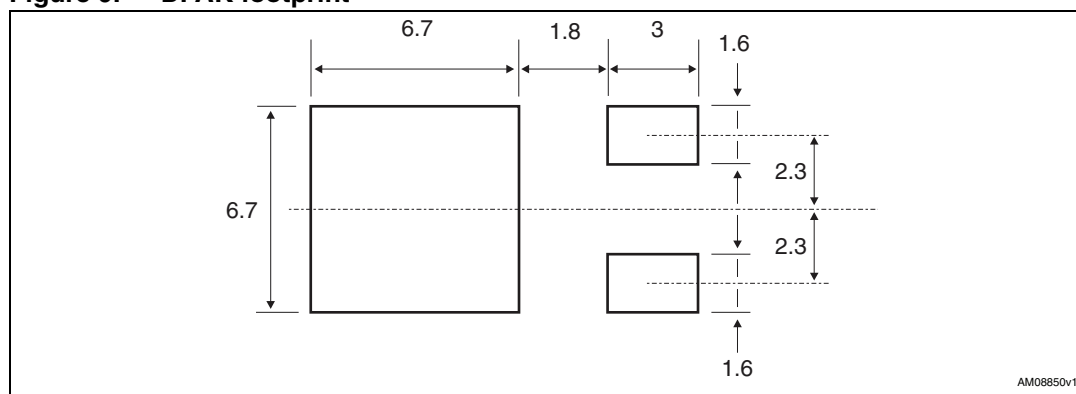


## 4 Packaging mechanical data

**Table 6. DPAK (TO-252) tape and reel mechanical data**

| Tape |      |      | Reel      |      |      |
|------|------|------|-----------|------|------|
| Dim. | mm   |      | Dim.      | mm   |      |
|      | Min. | Max. |           | Min. | Max. |
| A0   | 6.8  | 7    | A         |      | 330  |
| B0   | 10.4 | 10.6 | B         | 1.5  |      |
| B1   |      | 12.1 | C         | 12.8 | 13.2 |
| D    | 1.5  | 1.6  | D         | 20.2 |      |
| D1   | 1.5  |      | G         | 16.4 | 18.4 |
| E    | 1.65 | 1.85 | N         | 50   |      |
| F    | 7.4  | 7.6  | T         |      | 22.4 |
| K0   | 2.55 | 2.75 |           |      |      |
| P0   | 3.9  | 4.1  | Base qty. | 2500 |      |
| P1   | 7.9  | 8.1  | Bulk qty. | 2500 |      |
| P2   | 1.9  | 2.1  |           |      |      |
| R    | 40   |      |           |      |      |
| T    | 0.25 | 0.35 |           |      |      |
| W    | 15.7 | 16.3 |           |      |      |

**Figure 9. DPAK footprint<sup>(a)</sup>**



a. All dimensions are in millimeters



Figure 10. Tape for DPAK (TO-252)

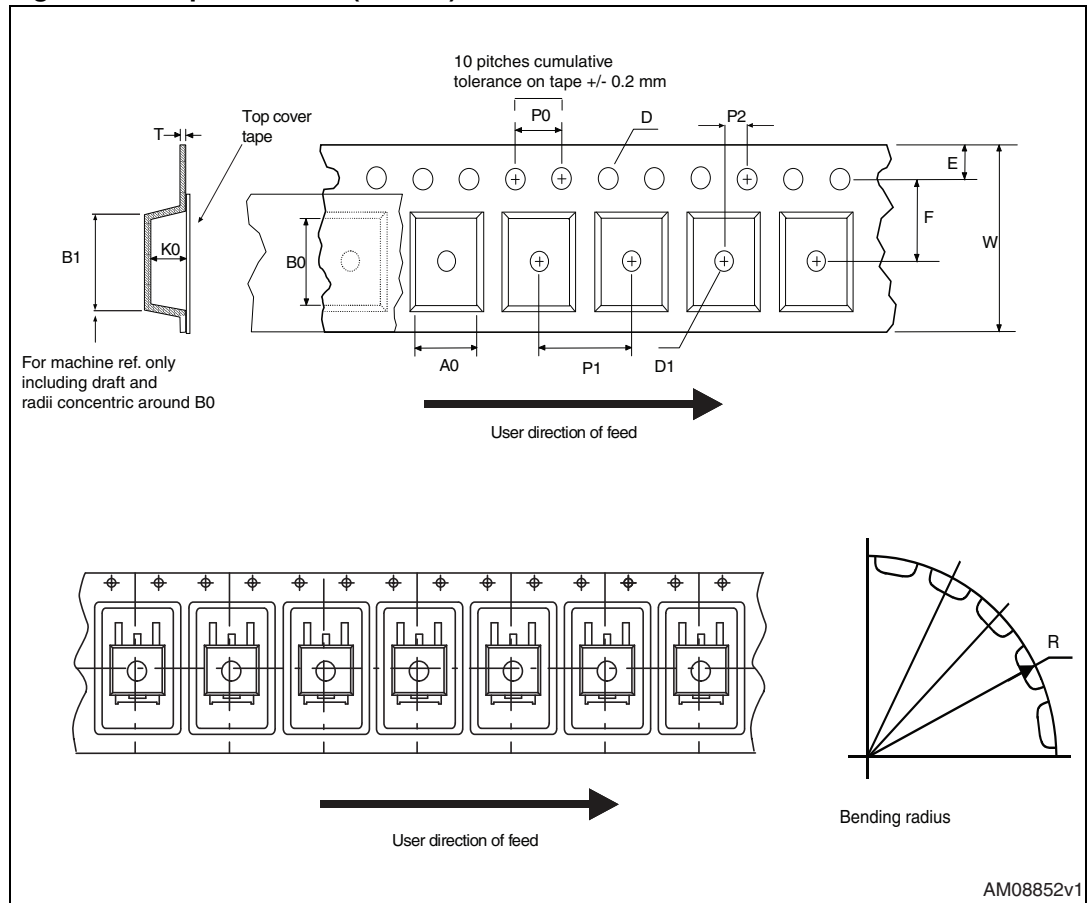
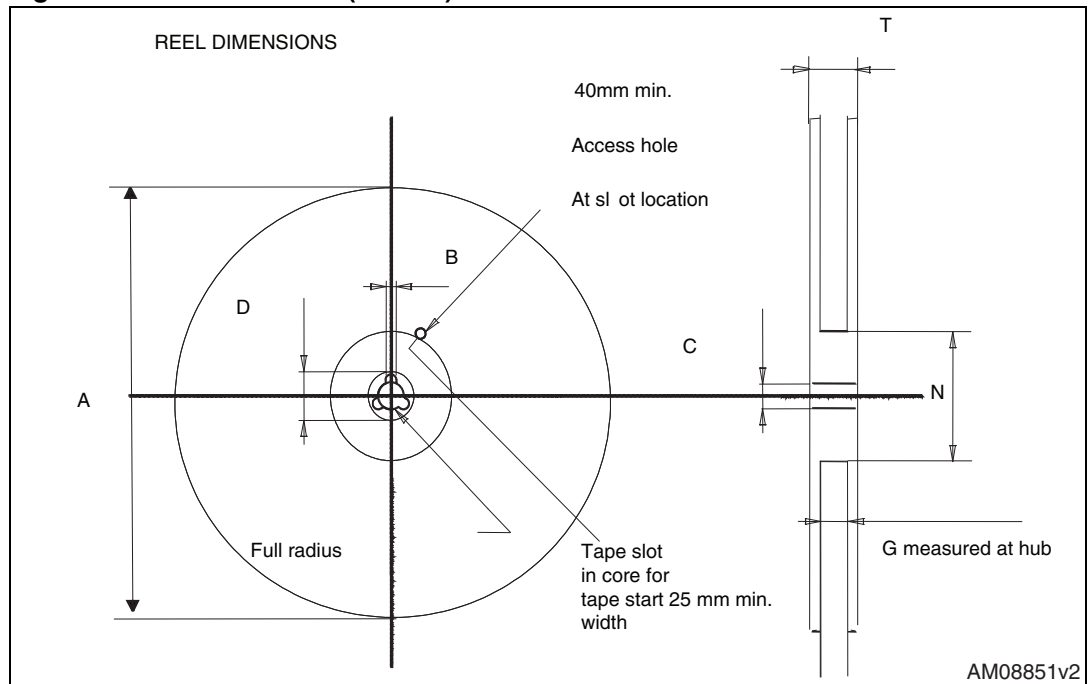


Figure 11. Reel for DPAK (TO-252)



## 5 Revision history

**Table 7. Document revision history**

| <b>Date</b> | <b>Revision</b> | <b>Changes</b>  |
|-------------|-----------------|---|
| 21-Jun-2004 | 2               | Document migration, no content change.                          |
| 06-Aug-2009 | 3               | Updated mechanical data.  |
| 18-May-2012 | 4               | Updated: mechanical data<br>Inserted: packaging mechanical data |

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