
NPN MEDIUM POWER TRANSISTORS

Features

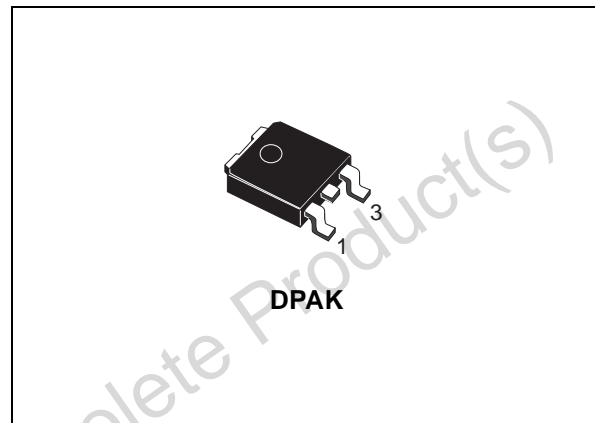
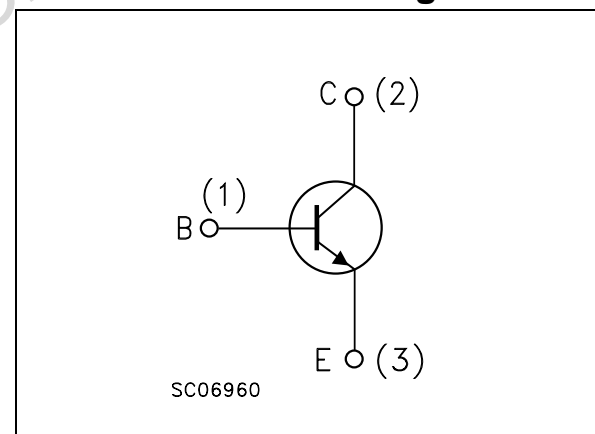
- SURFACE MOUNTING DEVICE IN MEDIUM POWER DPAK POWER PACKAGE
- AVAILABLE IN TAPE & REEL PACKING
- IN COMPLIANCE WITH THE 2002/93/EC EUROPEAN DIRECTIVE

Applications

- VOLTAGE REGULATION
- RELAY DRIVER
- GENERIC SWITCH

Description

The device is a NPN transistor manufactured using planar Technology resulting in rugged high performance devices.


Internal Schematic Diagram

Order codes

| Part Number | Marking | Package | Packing |
|-------------|---------|---------|-------------|
| STD724T4 | D724 | DPAK | Tape & reel |

1 Electrical Ratings

Table 1. Absolute Maximum Rating

| Symbol | Parameter | Value | Unit |
|-----------|---|------------|------|
| V_{CBO} | Collector-Base Voltage ($I_E = 0$) | 60 | V |
| V_{CEO} | Collector-Emitter Voltage ($I_B = 0$) | 30 | V |
| V_{EBO} | Collector-Base Voltage ($I_C = 0$) | 5 | V |
| I_C | Collector Current | 3 | A |
| I_{CM} | Collector Peak Current ($t_p < 5ms$) | 6 | A |
| I_B | Base Current | 1 | A |
| I_{BM} | Base Peak Current ($t_p < 5ms$) | 2 | A |
| P_{TOT} | Total dissipation at $T_c = 25^\circ C$ | 15 | W |
| T_{STG} | Storage Temperature | -65 to 150 | °C |
| T_J | Max. Operating Junction Temperature | 150 | |

Table 2. Thermal Data

| Symbol | Parameter | Value | Unit |
|---------------|--|-------|------|
| $R_{thj-amb}$ | Thermal Resistance Junction-Amb Max | 8.33 | °C/W |

2 Electrical Characteristics

Table 3. Electrical Characteristics ($T_{CASE} = 25^{\circ}C$; unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------------------------|--|--|--|-----------------|-------------------|-------------|
| I_{CES} | Collector Cut-off Current ($V_{BE} = 0$) | $V_{CE} = 60V$ | | | 10 | μA |
| I_{CEO} | Collector Cut-off Current ($I_B = 0$) | $V_{CE} = 30V$ | | | 100 | μA |
| I_{EBO} | Emitter Cut-off Current ($I_C = 0$) | $V_{EB} = 5V$ | | | 10 | μA |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage ($I_E = 0$) | $I_C = 100\mu A$ | 60 | | | V |
| $V_{(BR)CEO}$ <i>Note 1</i> | Collector-Emitter Breakdown Voltage ($I_B = 0$) | $I_C = 10 mA$ | 30 | | | V |
| $V_{(BR)EBO}$ | Collector-Emitter Breakdown Voltage ($I_C = 0$) | $I_E = 100 \mu A$ | 5 | | | V |
| $V_{CE(sat)}$ <i>Note 1</i> | Collector-Emitter Saturation Voltage | $I_C = 1 A$ $I_C = 2 A$ $I_C = 3 A$ | $I_B = 50 mA$ $I_B = 100 mA$ $I_B = 150 mA$ | | 0.4 0.7 1.1 | V V V |
| $V_{BE(sat)}$ <i>Note 1</i> | Base-Emitter Saturation Voltage | $I_C = 2 A$ | $I_B = 100 mA$ | | 1.2 | V |
| h_{FE} | DC Current Gain | $I_C = 100 mA$ $I_C = 1 A$ $I_C = 3 A$ | $V_{CE} = 2 V$ $V_{CE} = 2 V$ $V_{CE} = 2 V$ | 100 80 30 | 300 | |
| f_T | Transistor Frequency | $V_{CE} = 10 V$ | $I_C = 0.1 A$ | | 100 | MHz |

1 Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$.

2.1 Electrical characteristics (curve)

Figure 1. DC Current Gain

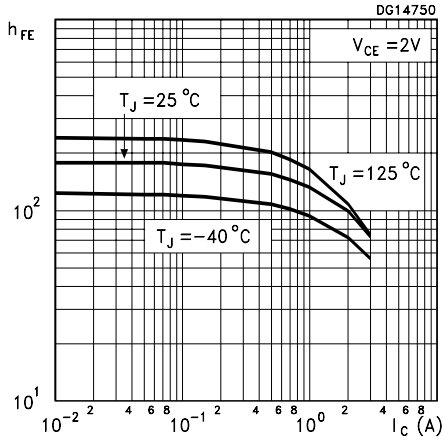


Figure 2. DC Current Gain

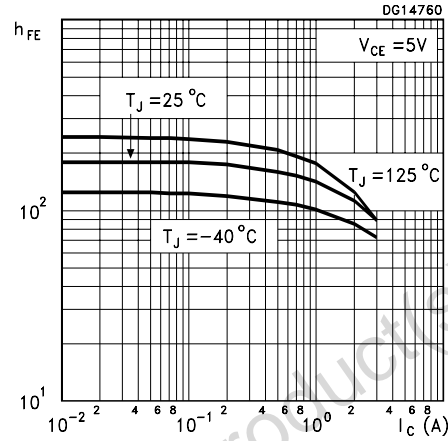


Figure 3. Collector-emitter saturation voltage Figure 4. Base-emitter saturation voltage

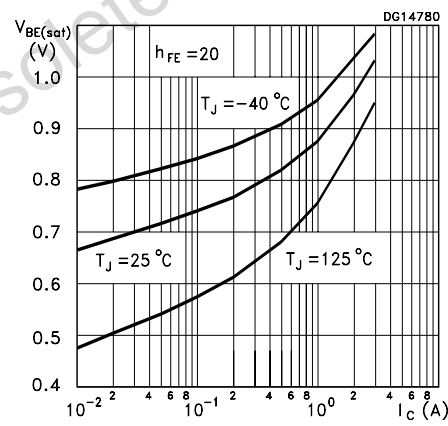
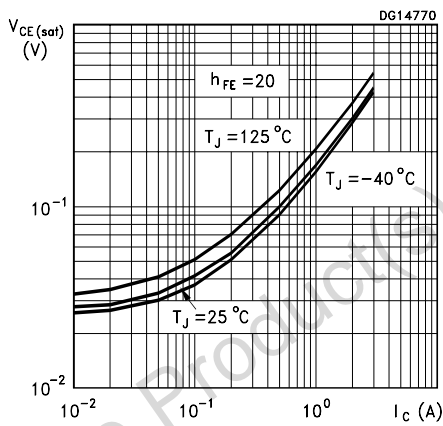


Figure 5. Switching times on resistive load

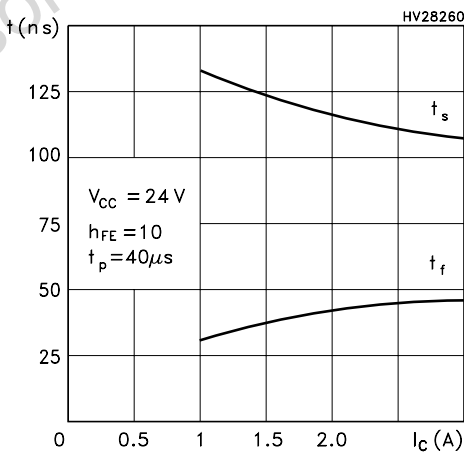


Figure 6. Switching times resistive on load

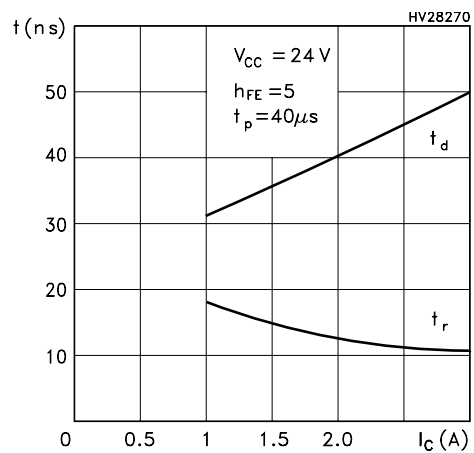
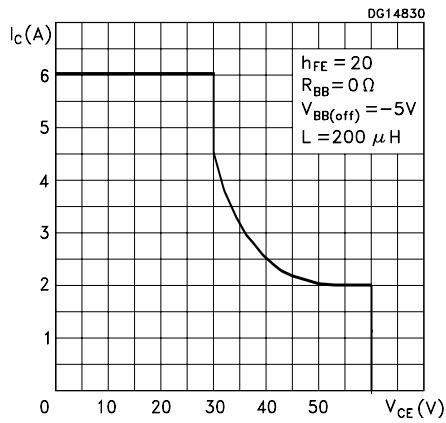


Figure 7. Reverse biased area



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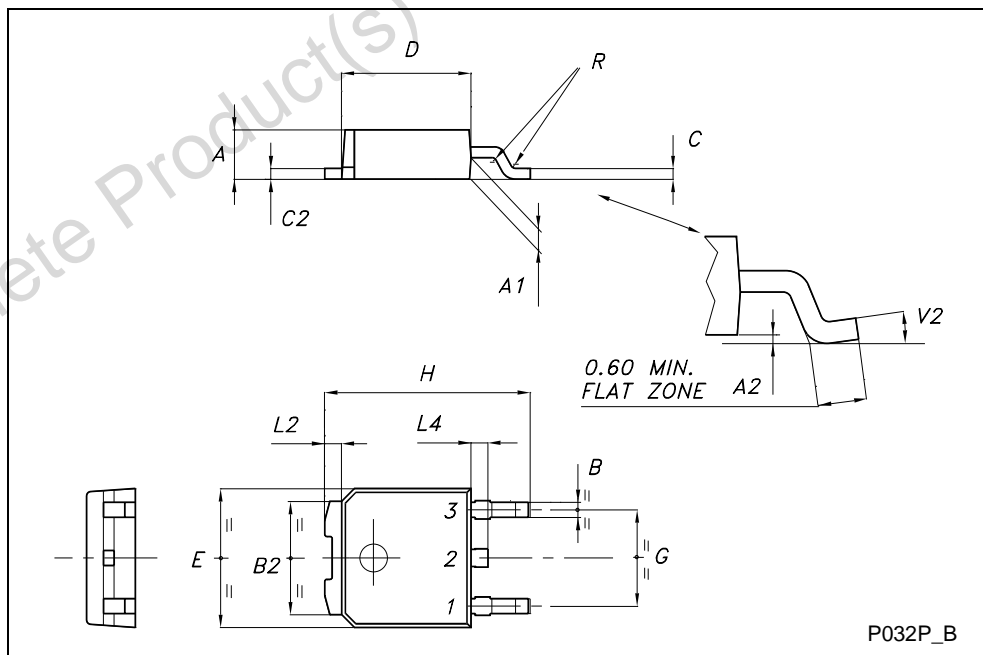
3 Package Mechanical Data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

Obsolete Product(s) - Obsolete Product(s)

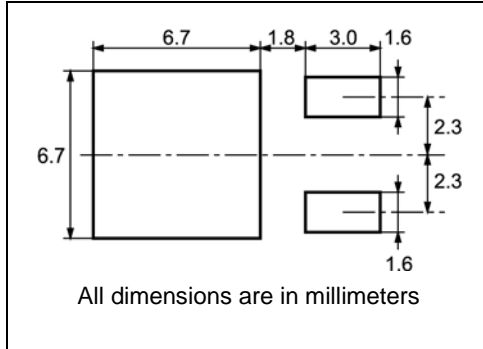
TO-252 (DPAK) MECHANICAL DATA

| 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° |



4 Packing Mechanical Data

DPAK FOOTPRINT



TAPE AND REEL SHIPMENT

40 mm min. Access hole at slot location

Full radius

Tape slot in core for tape start
2.5mm min. width

REEL MECHANICAL DATA

| DIM. | mm | | inch | |
|------|------|------|-------|--------|
| | MIN. | MAX. | MIN. | MAX. |
| A | | 330 | | 12.992 |
| B | 1.5 | | 0.059 | |
| C | 12.8 | 13.2 | 0.504 | 0.520 |
| D | 20.2 | | 0.795 | |
| G | 16.4 | 18.4 | 0.645 | 0.724 |
| N | 50 | | 1.968 | |
| T | | 22.4 | | 0.881 |

| BASE QTY | BULK QTY |
|----------|----------|
| 2500 | 2500 |

TAPE MECHANICAL DATA

| DIM. | mm | | inch | |
|------|------|------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. |
| A0 | 6.8 | 7 | 0.267 | 0.275 |
| B0 | 10.4 | 10.6 | 0.409 | 0.417 |
| B1 | | 12.1 | | 0.476 |
| D | 1.5 | 1.6 | 0.059 | 0.063 |
| D1 | 1.5 | | 0.059 | |
| E | 1.65 | 1.85 | 0.065 | 0.073 |
| F | 7.4 | 7.6 | 0.291 | 0.299 |
| K0 | 2.55 | 2.75 | 0.100 | 0.108 |
| P0 | 3.9 | 4.1 | 0.153 | 0.161 |
| P1 | 7.9 | 8.1 | 0.311 | 0.319 |
| P2 | 1.9 | 2.1 | 0.075 | 0.082 |
| R | 40 | | 1.574 | |
| W | 15.7 | 16.3 | 0.618 | 0.641 |

TOP COVER TAPE

10 pitches cumulative tolerance on tape +/- 0.2 mm

Center line of cavity

For machine ref. only including draft and radii concentric around B0

TRL

FEED DIRECTION

Bending radius R min.

5 Revision History

| Date | Revision | Changes |
|-------------|----------|-----------------|
| 17-Oct-2005 | 2 | Inserted curves |

Obsolete Product(s) - Obsolete Product(s)

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