

High voltage fast-switching NPN power transistor

Preliminary data

Features

- High voltage capability
- Low spread of dynamic parameters
- Very high switching speed
- Integrated free-wheeling diode

Application

- Compact fluorescent lamps (CFLs)

Description

The device is manufactured using high voltage multi epitaxial planar technology for high switching speeds and high voltage capability. It uses a cellular emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.

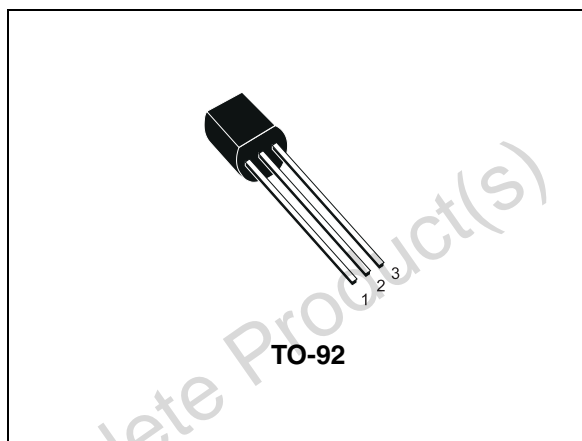


Figure 1. Internal schematic diagram

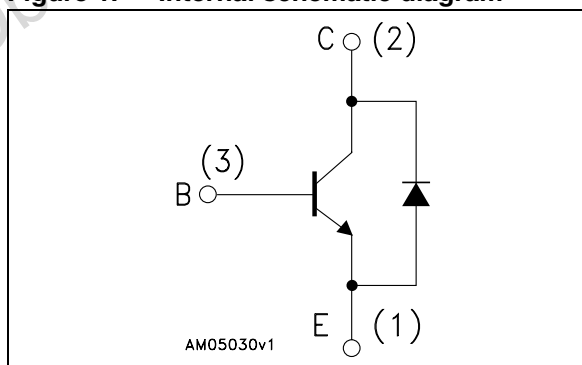


Table 1. Device summary

| Order code | Marking | Package | Packaging |
|------------|---------|---------|-----------|
| STBV42D | BV42D | TO-92 | BAG |

1 Electrical ratings

Table 2. Absolute maximum ratings

| Symbol | Parameter | Value | Unit |
|-----------|--|-------------|------|
| V_{CES} | Collector-emitter voltage ($V_{BE} = 0$) | 700 | V |
| V_{CEO} | Collector-emitter voltage ($I_B = 0$) | 400 | V |
| V_{EBO} | Collector-base voltage ($I_C = 0$) | 9 | V |
| I_C | Collector current | 1 | A |
| I_{CM} | Collector peak current ($t_p < 5$ ms) | 2 | A |
| I_B | Base current | 0.5 | A |
| I_{BM} | Base peak current ($t_p < 5$ ms) | 1 | A |
| P_{TOT} | Total dissipation at $T_c = 25$ °C | 1 | W |
| T_{STG} | Storage temperature | - 65 to 150 | °C |
| T_J | Max. operating junction temperature | 150 | |

Table 3. Thermal data

| Symbol | Parameter | Value | Unit |
|------------|----------------------------------|-------|------|
| R_{thJC} | Thermal resistance junction-case | 125 | °C/W |

2 Electrical characteristics

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

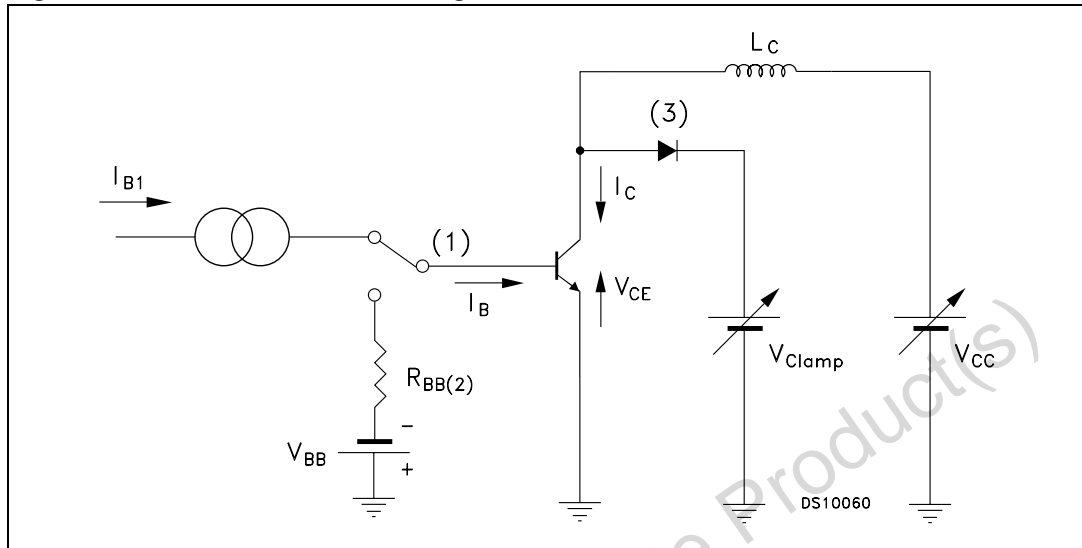
Table 4. Electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------------------------|--|---|---------------|-------------------|-----------------|---------------|
| I_{CES} | Collector cut-off current ($V_{\text{BE}} = 0$) | $V_{\text{CE}} = 700\text{ V}$ $V_{\text{CE}} = 700\text{ V}$ $T_{\text{C}} = 125\text{ °C}$ | | | 1 5 | mA mA |
| I_{EBO} | Emitter cut-off current ($I_{\text{C}} = 0$) | $V_{\text{EB}} = 9\text{ V}$ | | | 1 | mA |
| $V_{\text{CEO(sus)}}^{(1)}$ | Collector-emitter sustaining voltage ($I_{\text{B}} = 0$) | $I_{\text{C}} = 1\text{ mA}$ | 400 | | | V |
| $V_{\text{CE(sat)}}^{(1)}$ | Collector-emitter saturation voltage | $I_{\text{C}} = 0.25\text{ A}$ $I_{\text{B}} = 50\text{ mA}$ $I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 125\text{ mA}$ $I_{\text{C}} = 0.75\text{ A}$ $I_{\text{B}} = 250\text{ mA}$ | | 0.2 0.3 0.4 | 0.5 1 1.5 | V V V |
| $V_{\text{BE(sat)}}^{(1)}$ | Base-emitter saturation voltage | $I_{\text{C}} = 0.25\text{ A}$ $I_{\text{B}} = 50\text{ mA}$ $I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 125\text{ mA}$ | | | 1 1.2 | V V |
| $h_{\text{FE}}^{(1)}$ | DC current gain | $I_{\text{C}} = 5\text{ mA}$, $V_{\text{CE}} = 2\text{ V}$ $I_{\text{C}} = 0.4\text{ A}$, $V_{\text{CE}} = 5\text{ V}$ $I_{\text{C}} = 0.8\text{ A}$ $V_{\text{CE}} = 5\text{ V}$ | 12 10 5 | | 30 20 | |
| t_{f} | Inductive Load Fall time | $I_{\text{C}} = 0.25\text{ A}$ $V_{\text{clamp}} = 300\text{ V}$ $I_{\text{B(on)}} = -I_{\text{B(off)}} = 50\text{ mA}$ $L = 3\text{ mH}$ <i>Figure 2</i> | | 0.3 | | μs |
| V_{F} | Diode forward voltage | $I_{\text{F}} = 350\text{ mA}$ | | | 1.7 | V |

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

2.1 Test circuit

Figure 2. Inductive load switching test circuit



- 1. Fast electronic switch
- 2. Non-inductive resistor
- 3. Fast recovery rectifier

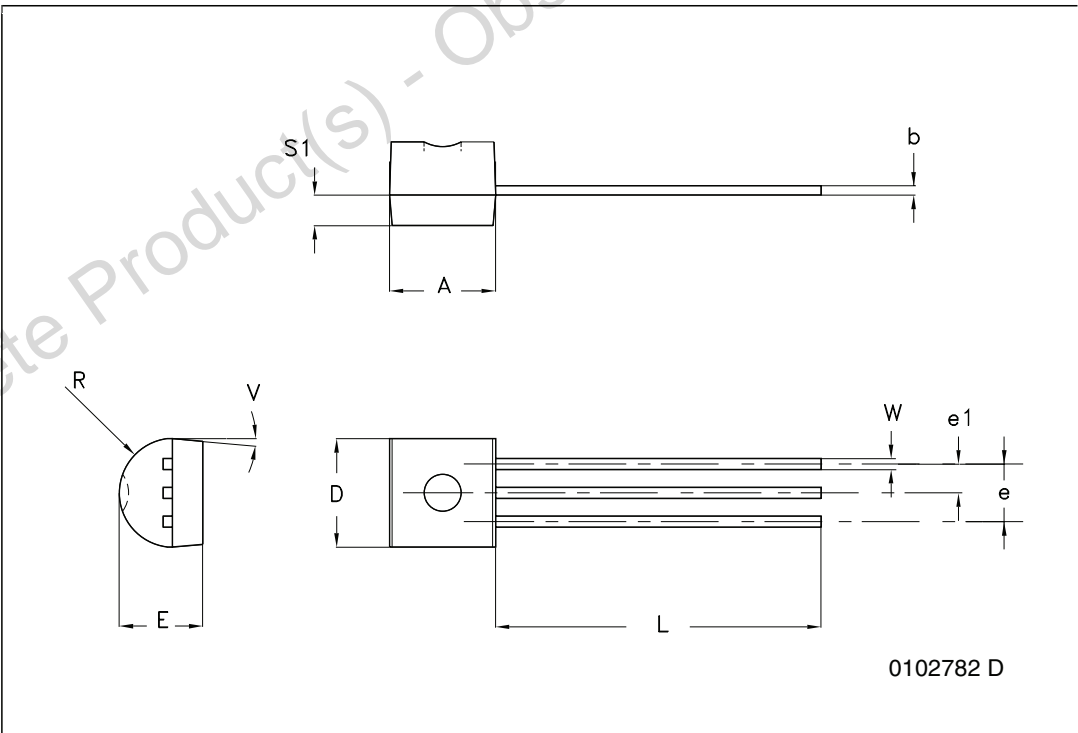
3 Package mechanical data

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Obsolete Product(s) - Obsolete Product(s)

TO-92 bulk shipment mechanical data

| DIM. | mm. | | |
|------|-------|-----|-------|
| | MIN. | TYP | MAX. |
| A | 4.32 | | 4.95 |
| b | 0.36 | | 0.51 |
| D | 4.45 | | 4.95 |
| E | 3.30 | | 3.94 |
| e | 2.41 | | 2.67 |
| e1 | 1.14 | | 1.40 |
| L | 12.70 | | 15.49 |
| R | 2.16 | | 2.41 |
| S1 | 0.92 | | 1.52 |
| W | 0.41 | | 0.56 |
| V | | 5° | |



4 Revision history

Table 5. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 08-Mar-2010 | 1 | First release. |
| 28-Apr-2010 | 2 | Inserted V_F maximum value Table 4 on page 3 . |

Obsolete Product(s) - Obsolete Product(s)

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