

DATA SHEET

BUJ106A

Silicon Diffused Power Transistor

Product specification

March 1999



Silicon Diffused Power Transistor

BUJ106A

GENERAL DESCRIPTION

High-voltage, high-speed planar-passivated npn power switching transistor in TO220AB envelope intended for use in high frequency electronic lighting ballast applications, converters, inverters, switching regulators, motor control systems, etc.

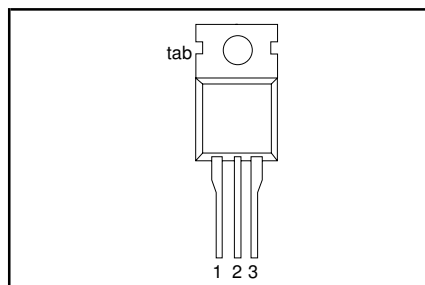
QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | TYP. | MAX. | UNIT |
|-------------|---------------------------------------|---|------|------|------|
| V_{CESM} | Collector-emitter voltage peak value | $V_{BE} = 0\text{ V}$ | - | 700 | V |
| V_{CBO} | Collector-Base voltage (open emitter) | | - | 700 | V |
| V_{CEO} | Collector-emitter voltage (open base) | | - | 400 | V |
| I_C | Collector current (DC) | | - | 10 | A |
| I_{CM} | Collector current peak value | | - | 20 | A |
| P_{tot} | Total power dissipation | $T_{mb} \leq 25\text{ °C}$ | - | 80 | W |
| V_{CEsat} | Collector-emitter saturation voltage | $I_C = 6.0\text{ A}; I_B = 1.2\text{ A}$ | 0.4 | 1.0 | V |
| h_{FEsat} | | $I_C = 6.0\text{ A}; V_{CE} = 5\text{ V}$ | 10 | 15 | |
| t_f | Fall time | $I_C = 5.0\text{ A}; I_{B1} = 1\text{ A}$ | 20 | 50 | ns |

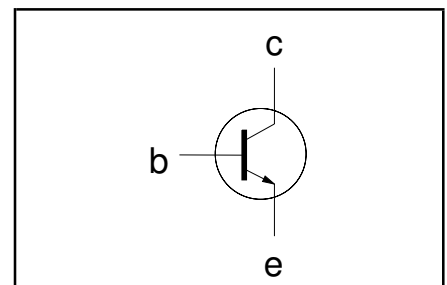
PINNING - TO220AB

| PIN | DESCRIPTION |
|-----|-------------|
| 1 | base |
| 2 | collector |
| 3 | emitter |
| tab | collector |

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum Rating System (IEC 134)

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|------------|--|----------------------------|------|------|------|
| V_{CESM} | Collector to emitter voltage | $V_{BE} = 0\text{ V}$ | - | 700 | V |
| V_{CEO} | Collector to emitter voltage (open base) | | - | 400 | V |
| V_{CBO} | Collector to base voltage (open emitter) | | - | 700 | V |
| I_C | Collector current (DC) | | - | 10 | A |
| I_{CM} | Collector current peak value | | - | 20 | A |
| I_B | Base current (DC) | | - | 5 | A |
| I_{BM} | Base current peak value | | - | 10 | A |
| P_{tot} | Total power dissipation | $T_{mb} \leq 25\text{ °C}$ | - | 80 | W |
| T_{stg} | Storage temperature | | -65 | 150 | °C |
| T_j | Junction temperature | | - | 150 | °C |

THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | TYP. | MAX. | UNIT |
|----------------|---------------------------|-------------|------|------|------|
| $R_{th\ j-mb}$ | Junction to mounting base | | - | 1.56 | K/W |
| $R_{th\ j-a}$ | Junction to ambient | in free air | 60 | - | K/W |

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BUJ106A

STATIC CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--|--|---|---------------|----------------|----------------|---------------|
| I _{CES} , I _{CBO} I _{CES} | Collector cut-off current ¹ | V _{BE} = 0 V; V _{CE} = V _{CESMmax} V _{BE} = 0 V; V _{CE} = V _{CESMmax} T _j = 125 °C | - - | - - | 0.2 0.5 | mA mA |
| I _{CEO} I _{EBO} V _{CEOsust} | Collector cut-off current Emitter cut-off current Collector-emitter sustaining voltage | V _{CEO} = V _{CEOMmax} (400V) V _{EB} = 9 V; I _C = 0 A I _B = 0 A; I _C = 10 mA; L = 25 mH | - - 400 | - - - | 0.1 1 - | mA mA V |
| V _{CEsat} V _{BEsat} | Collector-emitter saturation voltage Base-emitter saturation voltage | I _C = 6.0 A; I _B = 1.2 A I _C = 6.0 A; I _B = 1.2 A | - - | 0.4 1.0 | 1.0 1.5 | V V |
| h _{FE} h _{FE} h _{FEsat} | DC current gain | I _C = 5 mA; V _{CE} = 5 V I _C = 500 mA; V _{CE} = 5 V I _C = 6.0 A; V _{CE} = 5 V | 10 14 8 | 17 21 11 | 32 33 15 | |

DYNAMIC CHARACTERISTICS

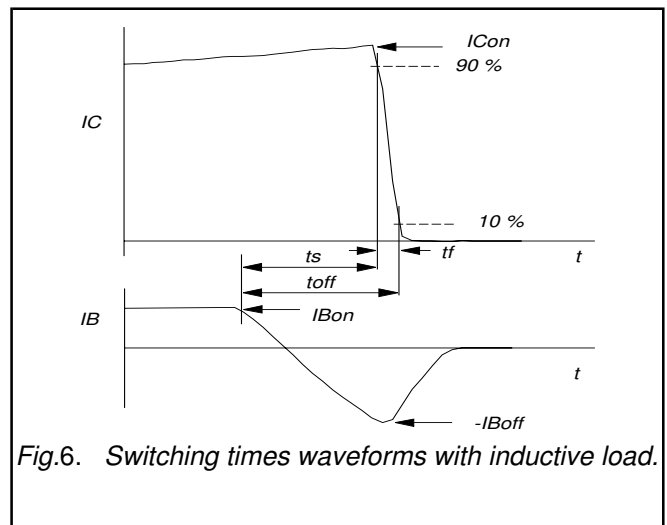
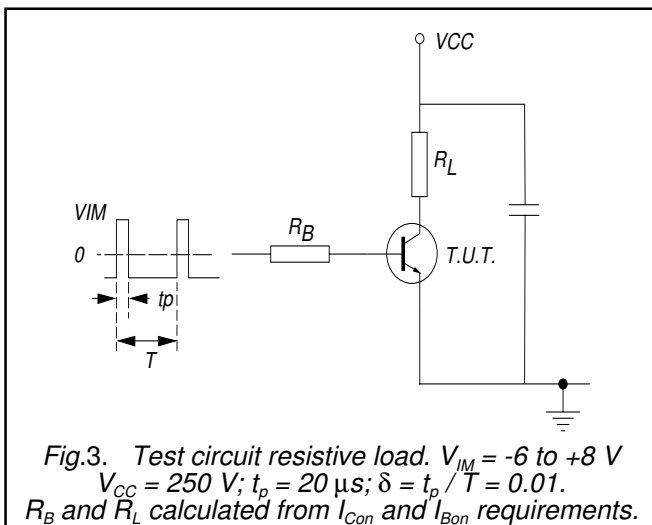
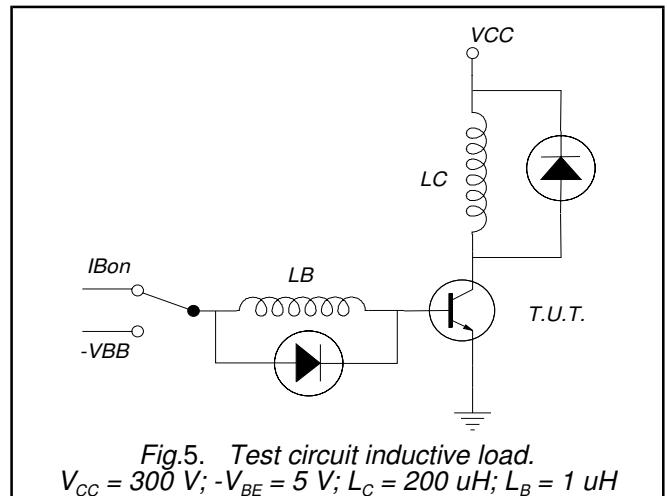
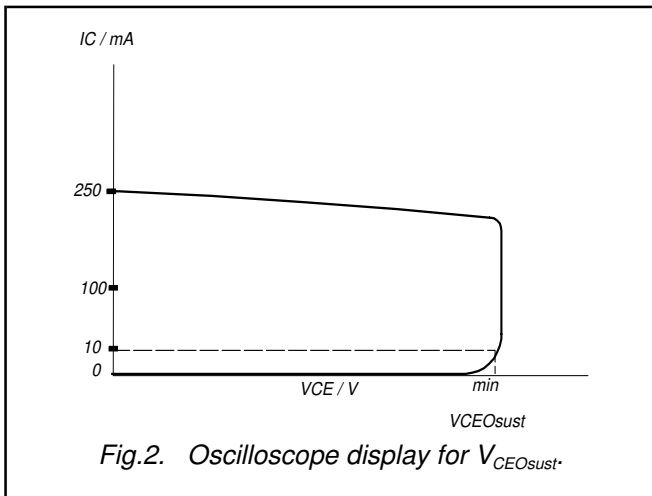
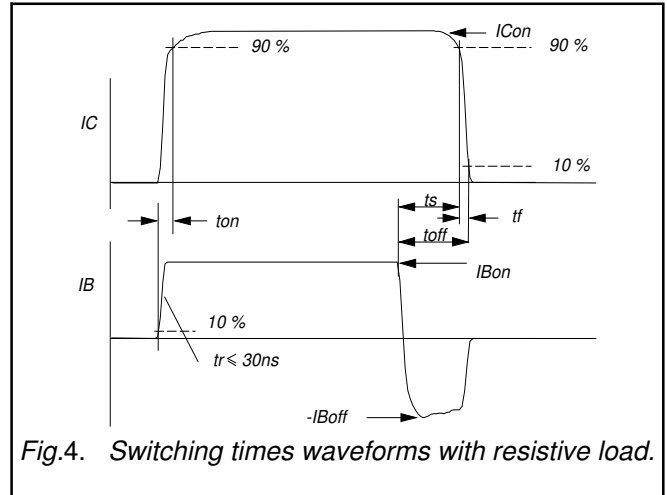
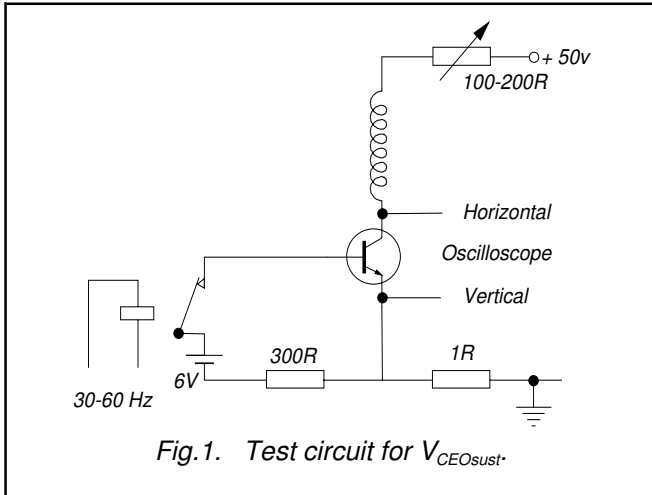
T_{mb} = 25 °C unless otherwise specified

| SYMBOL | PARAMETER | CONDITIONS | TYP. | MAX. | UNIT |
|---|---|---|--------------------|--------------------|----------------|
| t _{on} t _s t _f | Switching times (resistive load) Turn-on time Turn-off storage time Turn-off fall time | I _{Con} = 5 A; I _{Bon} = -I _{Boff} = 1 A; R _L = 75 ohms; V _{BB2} = 4 V; | 0.56 2.2 260 | 0.75 3.3 350 | μs μs ns |
| t _s t _f | Switching times (inductive load) Turn-off storage time Turn-off fall time | I _{Con} = 5 A; I _{Bon} = 1 A; L _B = 1 μH; -V _{BB} = 5 V | 1.35 20 | 1.60 50 | μs ns |
| t _s t _f | Switching times (inductive load) Turn-off storage time Turn-off fall time | I _{Con} = 5A; I _{Bon} = 1 A; L _B = 1 μH; -V _{BB} = 5 V; T _j = 100 °C | - - | 3.2 100 | μs ns |

¹ Measured with half sine-wave voltage (curve tracer).

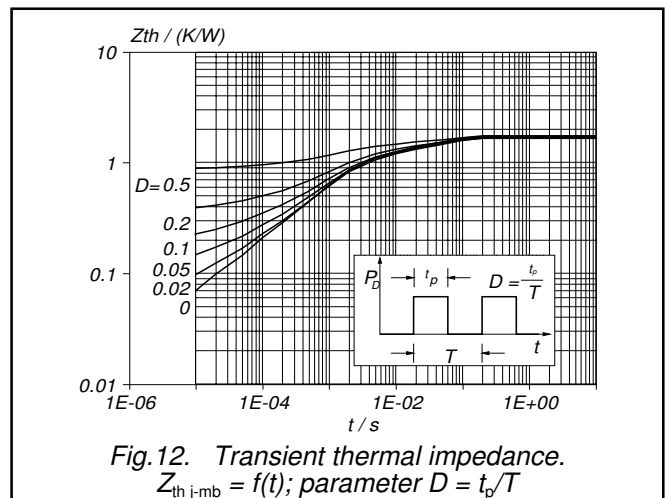
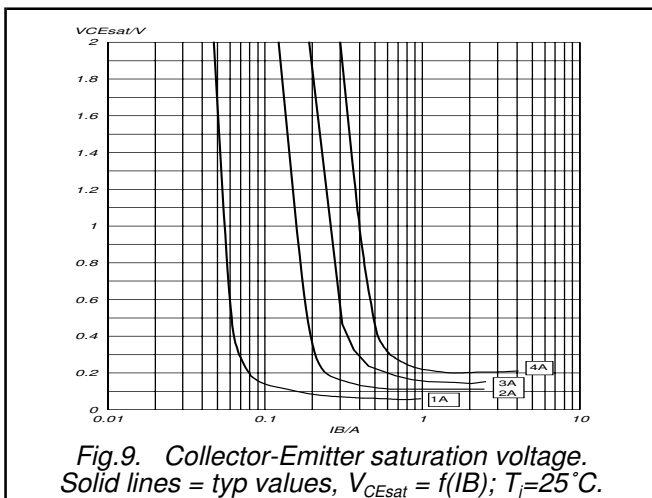
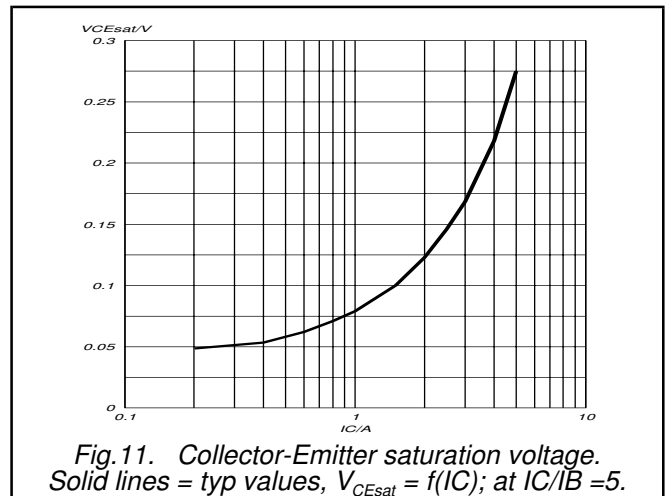
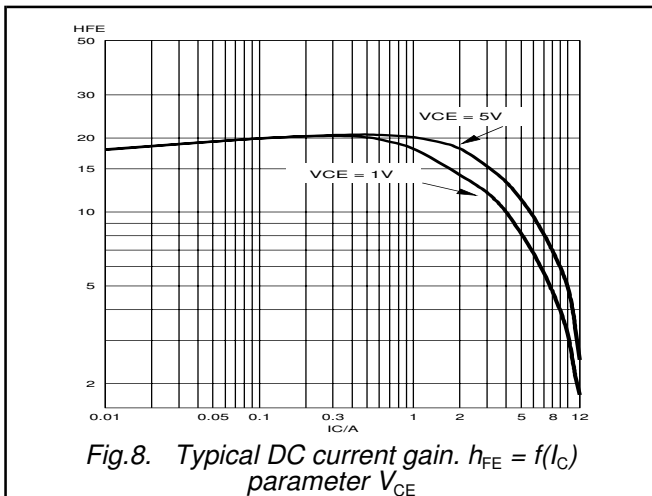
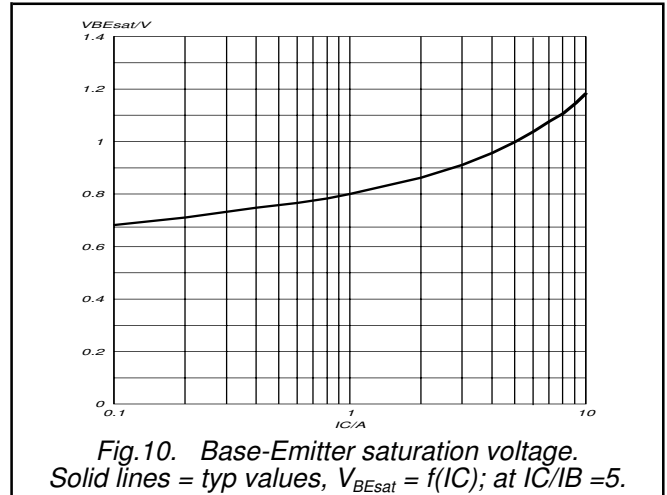
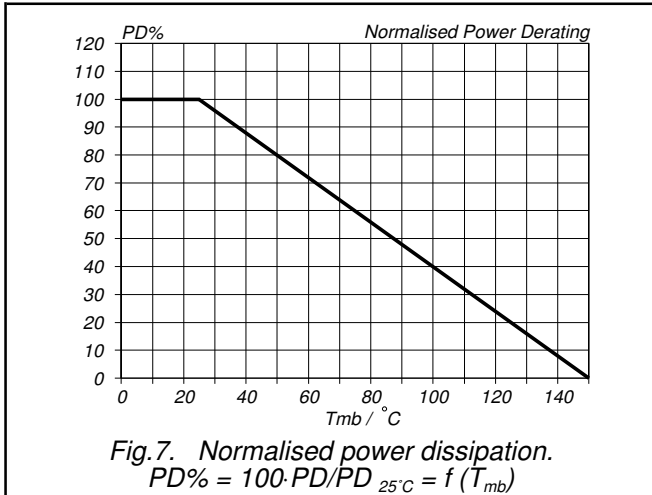
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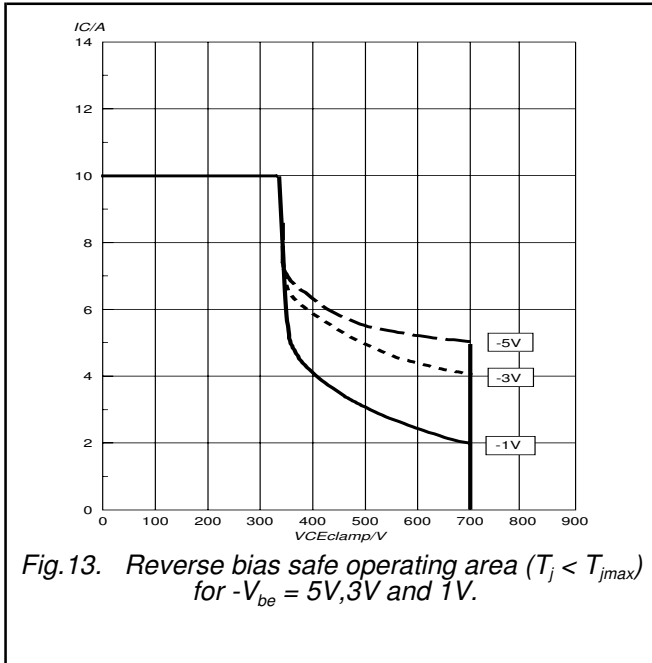


Fig.13. Reverse bias safe operating area ($T_j < T_{jmax}$) for $-V_{be} = 5V, 3V$ and $1V$.

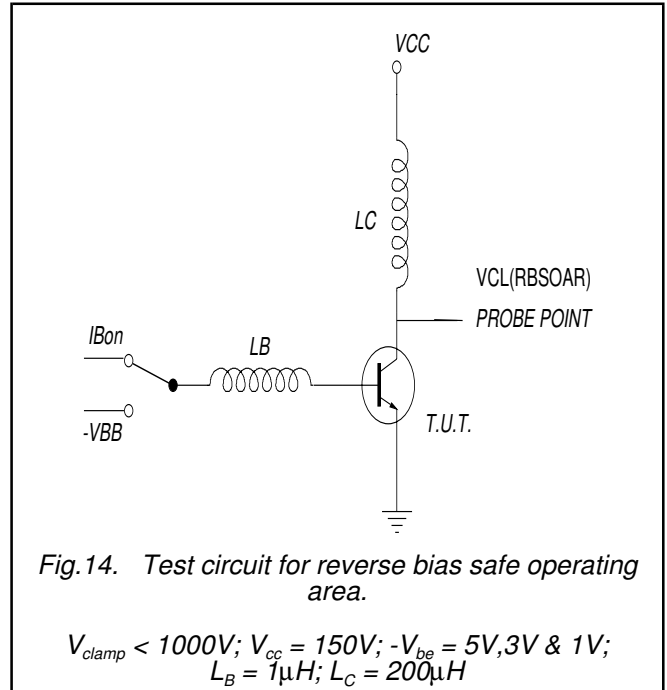


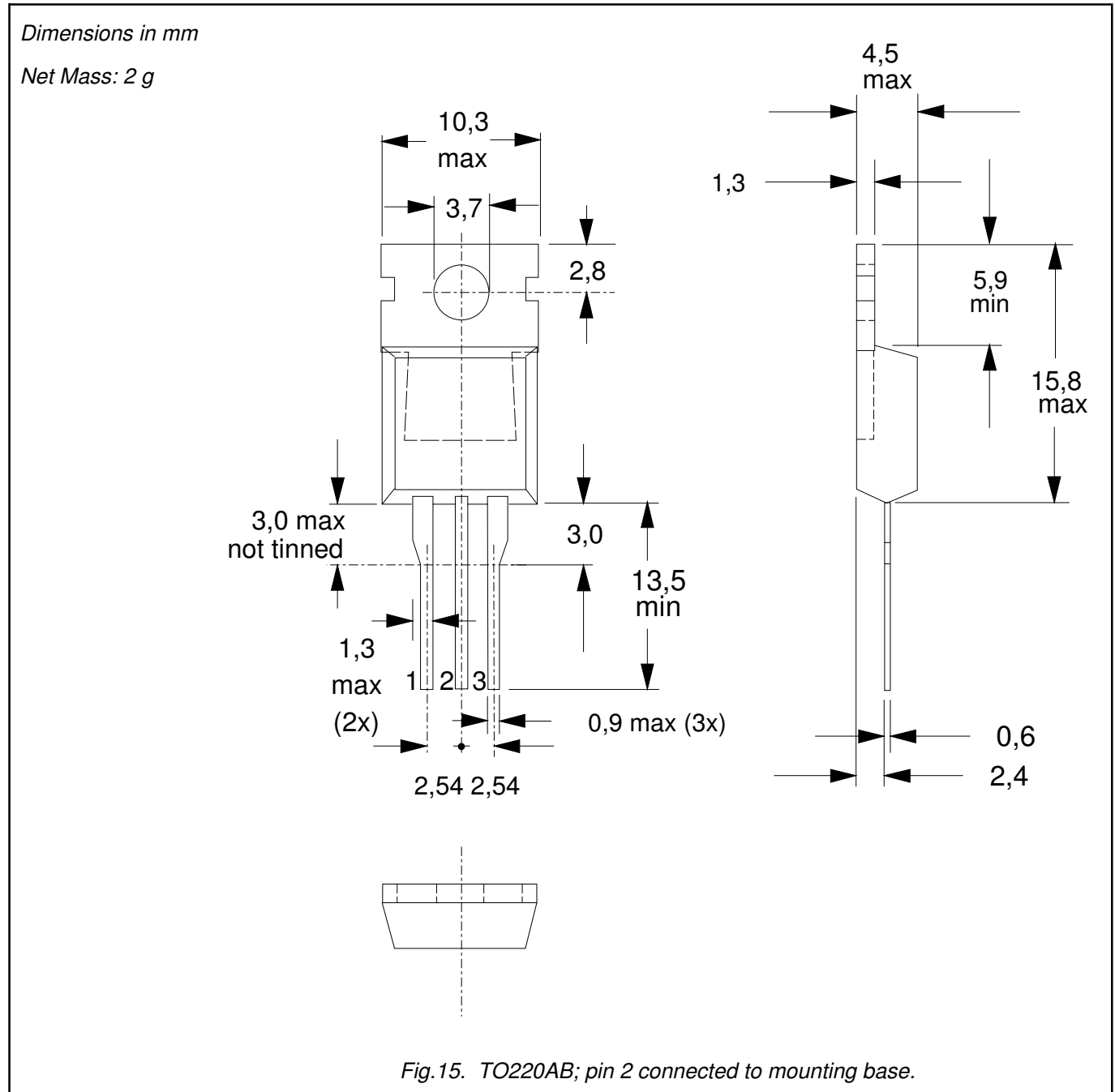
Fig.14. Test circuit for reverse bias safe operating area.

$V_{clamp} < 1000V$; $V_{cc} = 150V$; $-V_{be} = 5V, 3V$ & $1V$;
 $L_B = 1\mu H$; $L_C = 200\mu H$

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MECHANICAL DATA



Notes

1. Refer to mounting instructions for TO220 envelopes.
2. Epoxy meets UL94 V0 at 1/8".

Legal information

DATA SHEET STATUS

| DOCUMENT STATUS ⁽¹⁾ | PRODUCT STATUS ⁽²⁾ | DEFINITION |
|--------------------------------|-------------------------------|---|
| Objective data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary data sheet | Qualification | This document contains data from the preliminary specification. |
| Product data sheet | Production | This document contains the product specification. |

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