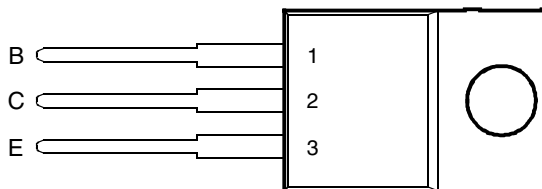




- Designed for Complementary Use with BDW94, BDW94A, BDW94B and BDW94C
- 80 W at 25°C Case Temperature
- 12 A Continuous Collector Current
- Minimum h_{FE} of 750 at 3V, 5 A

TO-220 PACKAGE
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

MDTRACA

absolute maximum ratings at 25°C case temperature (unless otherwise noted)

| RATING | | SYMBOL | VALUE | UNIT |
|------------------------------------------------------------------------------------|--------|-----------|-------------|------|
| Collector-base voltage ($I_E = 0$) | BDW93 | V_{CBO} | 45 | V |
| | BDW93A | | 60 | |
| | BDW93B | | 80 | |
| | BDW93C | | 100 | |
| Collector-emitter voltage ($I_B = 0$) | BDW93 | V_{CEO} | 45 | V |
| | BDW93A | | 60 | |
| | BDW93B | | 80 | |
| | BDW93C | | 100 | |
| Emitter-base voltage | | V_{EBO} | 5 | V |
| Continuous collector current | | I_C | 12 | A |
| Continuous base current | | I_B | 0.3 | A |
| Continuous device dissipation at (or below) 25°C case temperature (see Note 1) | | P_{tot} | 80 | W |
| Continuous device dissipation at (or below) 25°C free air temperature (see Note 2) | | P_{tot} | 2 | W |
| Operating junction temperature range | | T_j | -65 to +150 | °C |
| Storage temperature range | | T_{stg} | -65 to +150 | °C |
| Operating free-air temperature range | | T_A | -65 to +150 | °C |

NOTES: 1. Derate linearly to 150°C case temperature at the rate of 0.64 W/°C.
2. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.

PRODUCT INFORMATION

electrical characteristics at 25°C case temperature (unless otherwise noted)

| PARAMETER | TEST CONDITIONS | | | MIN | TYP | MAX | UNIT |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------|----------------------------------------------|------|
| $V_{(BR)CEO}$ Collector-emitter breakdown voltage | $I_C = 100 \text{ mA}$ | $I_B = 0$ | (see Note 3) | BDW93 BDW93A BDW93B BDW93C | 45 60 80 100 | | V |
| I_{CEO} Collector-emitter cut-off current | $V_{CB} = 40 \text{ V}$ $V_{CB} = 60 \text{ V}$ $V_{CB} = 80 \text{ V}$ $V_{CB} = 80 \text{ V}$ | $I_B = 0$ $I_B = 0$ $I_B = 0$ $I_B = 0$ | | BDW93 BDW93A BDW93B BDW93C | | 1 1 1 1 | mA |
| I_{CBO} Collector cut-off current | $V_{CB} = 45 \text{ V}$ $V_{CB} = 60 \text{ V}$ $V_{CB} = 80 \text{ V}$ $V_{CB} = 100 \text{ V}$ $V_{CB} = 45 \text{ V}$ $V_{CB} = 60 \text{ V}$ $V_{CB} = 80 \text{ V}$ $V_{CB} = 100 \text{ V}$ | $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ | $T_C = 150^\circ\text{C}$ $T_C = 150^\circ\text{C}$ $T_C = 150^\circ\text{C}$ $T_C = 150^\circ\text{C}$ | BDW93 BDW93A BDW93B BDW93C BDW93 BDW93A BDW93B BDW93C | | 0.1 0.1 0.1 0.1 5 5 5 5 | mA |
| I_{EBO} Emitter cut-off current | $V_{EB} = 5 \text{ V}$ | $I_C = 0$ | | | | 2 | mA |
| h_{FE} Forward current transfer ratio | $V_{CE} = 3 \text{ V}$ $V_{CE} = 3 \text{ V}$ $V_{CE} = 3 \text{ V}$ | $I_C = 3 \text{ A}$ $I_C = 10 \text{ A}$ $I_C = 5 \text{ A}$ | (see Notes 3 and 4) | | 1000 100 750 | 20000 | |
| $V_{CE(sat)}$ Collector-emitter saturation voltage | $I_B = 20 \text{ mA}$ $I_B = 100 \text{ mA}$ | $I_C = 5 \text{ A}$ $I_C = 10 \text{ A}$ | (see Notes 3 and 4) | | | 2 3 | V |
| $V_{BE(sat)}$ Base-emitter saturation voltage | $I_B = 20 \text{ mA}$ $I_B = 100 \text{ mA}$ | $I_C = 5 \text{ A}$ $I_C = 10 \text{ A}$ | (see Notes 3 and 4) | | | 2.5 4 | V |
| V_{EC} Parallel diode forward voltage | $I_E = 5 \text{ A}$ $I_E = 10 \text{ A}$ | $I_B = 0$ $I_B = 0$ | | | | 2 4 | V |

NOTES: 3. These parameters must be measured using pulse techniques, $t_p = 300 \mu\text{s}$, duty cycle $\leq 2\%$.

4. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

thermal characteristics

| PARAMETER | MIN | TYP | MAX | UNIT |
|---------------------------------------------------------|-----|-----|------|--------------------|
| $R_{\theta JC}$ Junction to case thermal resistance | | | 1.56 | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ Junction to free air thermal resistance | | | 62.5 | $^\circ\text{C/W}$ |

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN
VS
COLLECTOR CURRENT

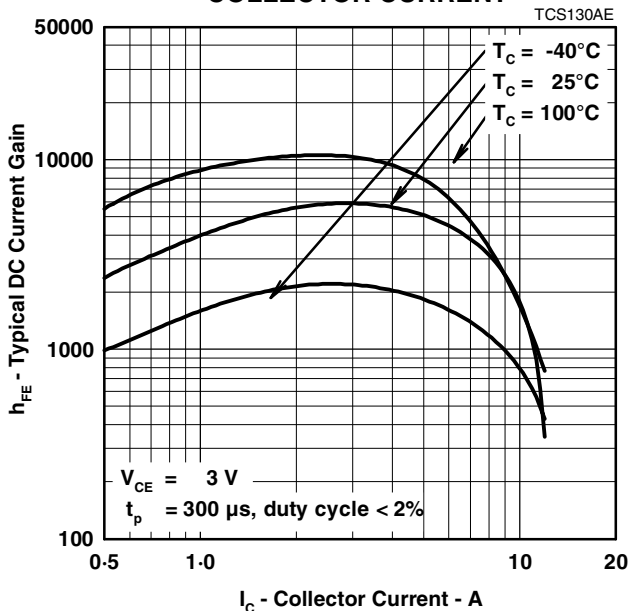


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE
VS
COLLECTOR CURRENT

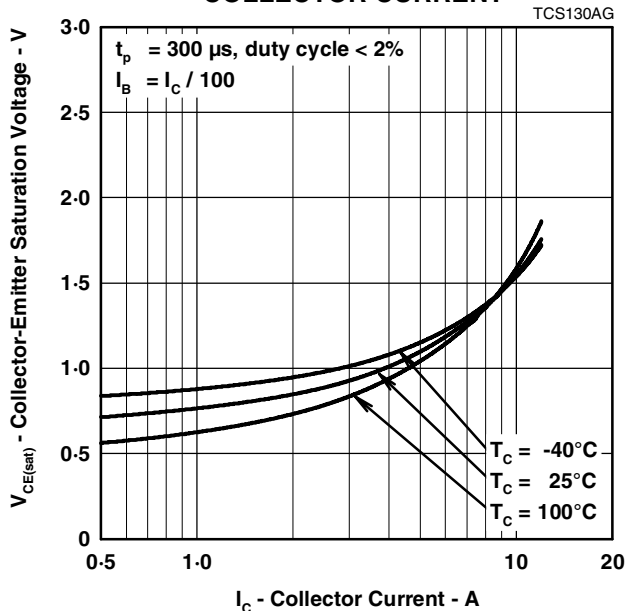


Figure 2.

BASE-EMITTER SATURATION VOLTAGE
VS
COLLECTOR CURRENT

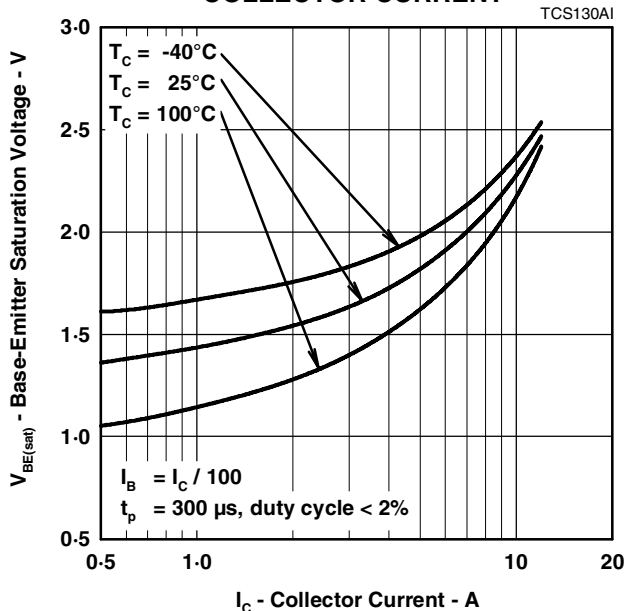


Figure 3.

PRODUCT INFORMATION

THERMAL INFORMATION

**MAXIMUM POWER DISSIPATION
VS
CASE TEMPERATURE**

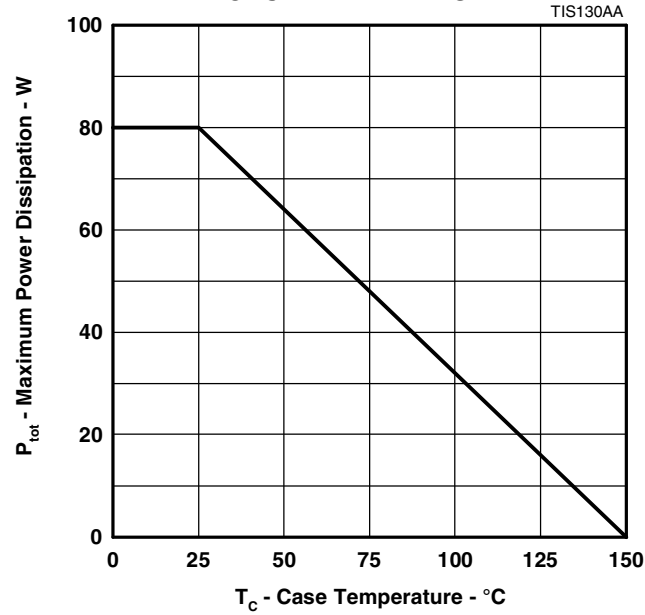


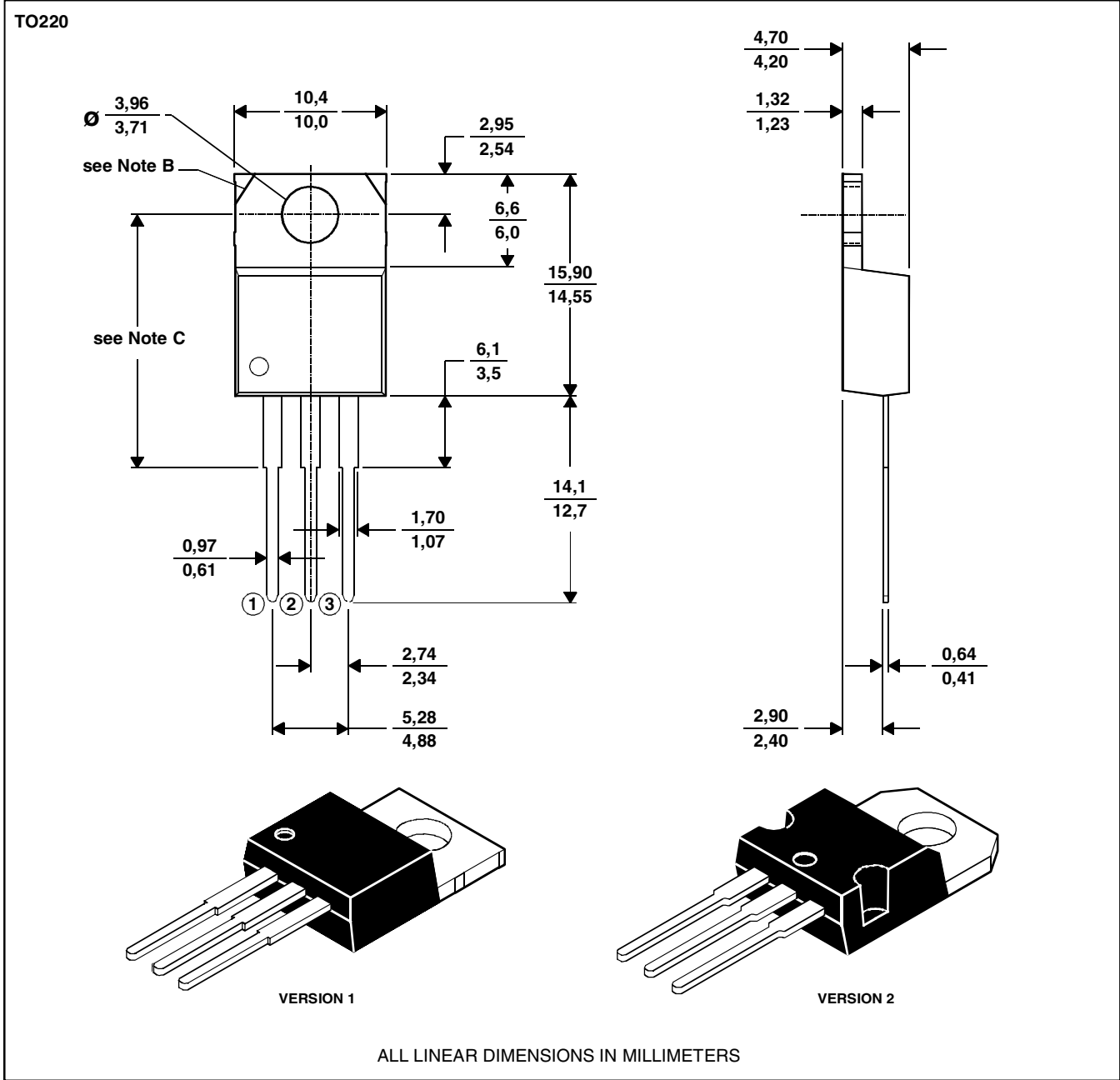
Figure 4.



MECHANICAL DATA

TO-220
3-pin plastic flange-mount package

This single-in-line package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



NOTES: A. The centre pin is in electrical contact with the mounting tab.
 B. Mounting tab corner profile according to package version.
 C. Typical fixing hole centre stand off height according to package version.
 Version 1, 18.0 mm. Version 2, 17.6 mm.

MDXXBE

PRODUCT INFORMATION

SEPTEMBER 1993 - REVISED SEPTEMBER 2002
 Specifications are subject to change without notice.