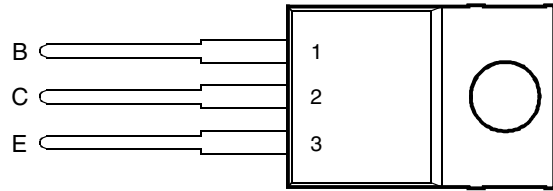


- Designed for Complementary Use with BDW23, BDW23A, BDW23B and BDW23C
- 50 W at 25°C Case Temperature
- 6 A Continuous Collector Current
- Minimum h_{FE} of 750 at 2 A, 3 V

TO-220 PACKAGE
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

MDTRACA



This series is currently available, but not recommended for new designs.

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

| RATING | | SYMBOL | VALUE | UNIT |
|--|--------|-----------|-------------|------|
| Collector-base voltage ($I_E = 0$) | BDW24 | V_{CBO} | -45 | V |
| | BDW24A | | -60 | |
| | BDW24B | | -80 | |
| | BDW24C | | -100 | |
| Collector-emitter voltage ($I_B = 0$) | BDW24 | V_{CEO} | -45 | V |
| | BDW24A | | -60 | |
| | BDW24B | | -80 | |
| | BDW24C | | -100 | |
| Emitter-base voltage | | V_{EBO} | -5 | V |
| Continuous collector current | | I_C | -6 | A |
| Continuous base current | | I_B | -0.2 | A |
| Continuous device dissipation at (or below) 25°C case temperature (see Note 1) | | P_{tot} | 50 | 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 0.4 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) | BDW24 BDW24A BDW24B BDW24C | -45 -60 -80 -100 | | V |
| I_{CEO} Collector-emitter cut-off current | $V_{CE} = -30 \text{ V}$ | $I_B = 0$ | | BDW24 BDW24A BDW24B BDW24C | | -0.5 -0.5 -0.5 -0.5 | mA |
| I_{CBO} Collector cut-off current | $V_{CB} = -45 \text{ V}$ | $I_E = 0$ | | BDW24 BDW24A BDW24B BDW24C | | -0.2 -0.2 -0.2 -0.2 | mA |
| I_{EBO} Emitter cut-off current | $V_{EB} = -5 \text{ V}$ | $I_C = 0$ | | | | -2 | mA |
| h_{FE} Forward current transfer ratio | $V_{CE} = -3 \text{ V}$ | $I_C = -1 \text{ A}$ | (see Notes 3 and 4) | | 1000 750 100 | 20000 | |
| $V_{CE(sat)}$ Collector-emitter saturation voltage | $I_B = -8 \text{ mA}$ | $I_C = -2 \text{ A}$ | (see Notes 3 and 4) | | | -2 -3 | V |
| $V_{BE(sat)}$ Base-emitter saturation voltage | $I_B = -8 \text{ mA}$ | $I_C = -2 \text{ A}$ | (see Notes 3 and 4) | | | -2.5 | V |
| $V_{BE(on)}$ Base-emitter voltage | $V_{CE} = -3 \text{ V}$ | $I_C = -1 \text{ A}$ | (see Notes 3 and 4) | | | -2.5 -3 | V |
| V_{EC} Parallel diode forward voltage | $I_E = -2 \text{ A}$ | $I_B = 0$ | | | | -1.8 | 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 | | | 2.5 | °C/W |
| $R_{\theta JA}$ Junction to free air thermal resistance | | | 62.5 | °C/W |

resistive-load-switching characteristics at 25°C case temperature

| PARAMETER | TEST CONDITIONS † | | | MIN | TYP | MAX | UNIT |
|-------------------------|-------------------------------|------------------------------|--|-----|-----|-----|---------------|
| t_{on} Turn-on time | $I_C = -3 \text{ A}$ | $I_{B(on)} = -12 \text{ mA}$ | $I_{B(off)} = 12 \text{ mA}$ | | 1 | | μs |
| t_{off} Turn-off time | $V_{BE(off)} = 4.5 \text{ V}$ | $R_L = 10 \Omega$ | $t_p = 20 \mu\text{s}$, dc $\leq 2\%$ | | 5 | | μs |

† Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

TYPICAL CHARACTERISTICS

**TYPICAL DC CURRENT GAIN
VS
COLLECTOR CURRENT**

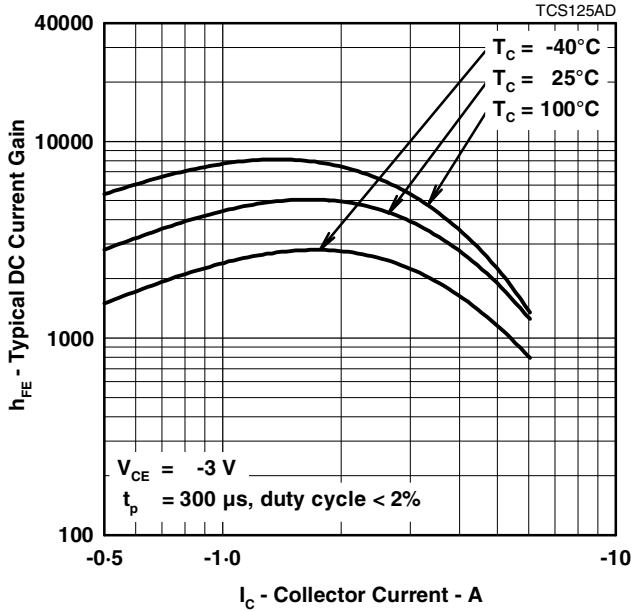


Figure 1.

**COLLECTOR-EMITTER SATURATION VOLTAGE
VS
COLLECTOR CURRENT**

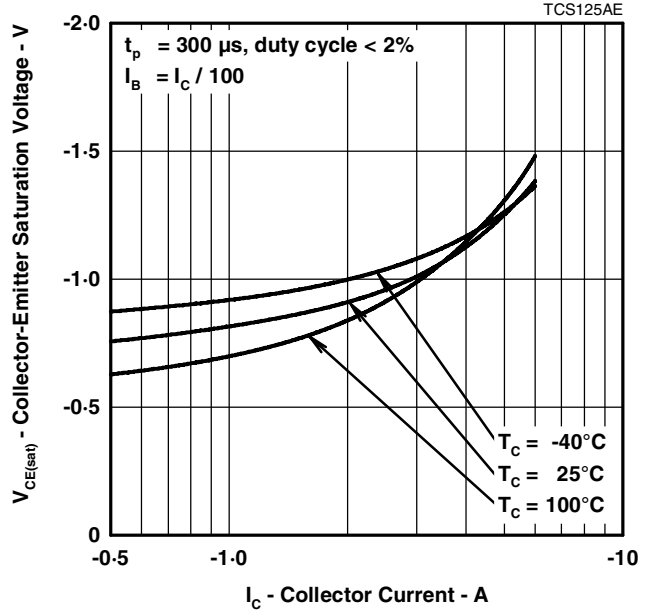


Figure 2.

**BASE-EMITTER SATURATION VOLTAGE
VS
COLLECTOR CURRENT**

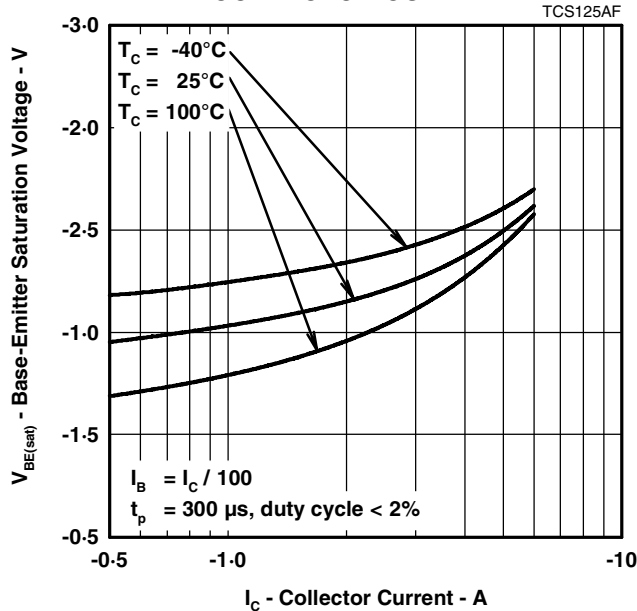


Figure 3.

PRODUCT INFORMATION

MAXIMUM SAFE OPERATING REGIONS

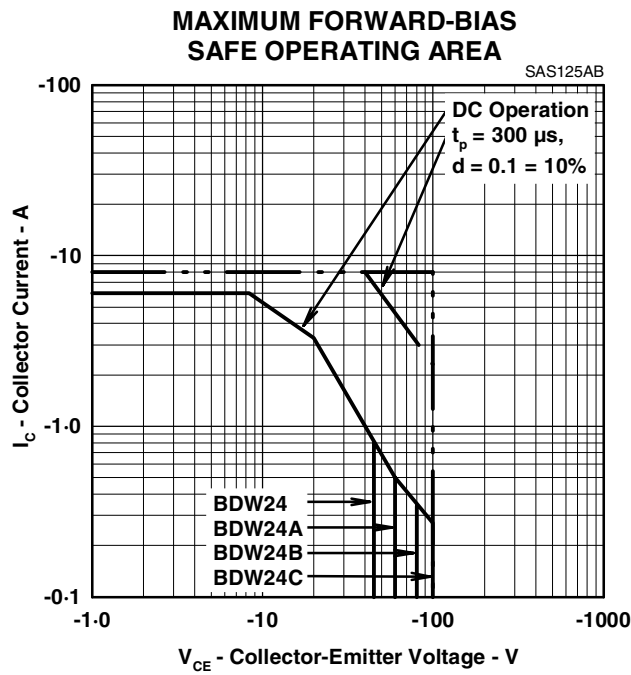


Figure 4.

THERMAL INFORMATION

**MAXIMUM POWER DISSIPATION
vs
CASE TEMPERATURE**

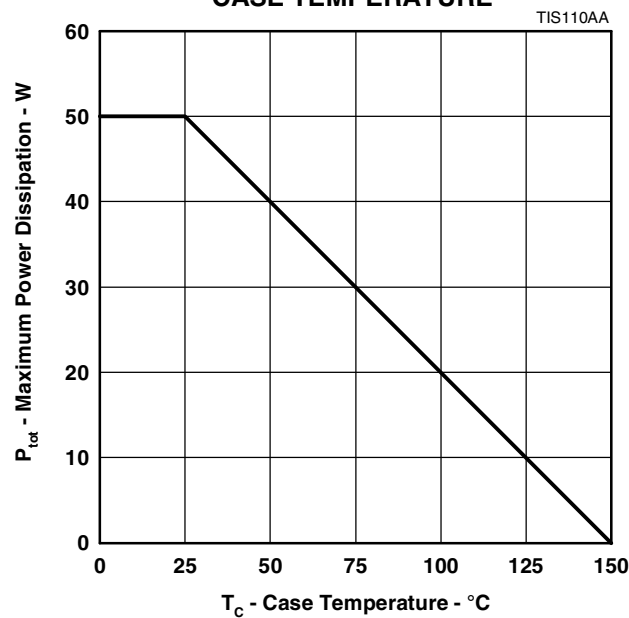


Figure 5.

PRODUCT INFORMATION