

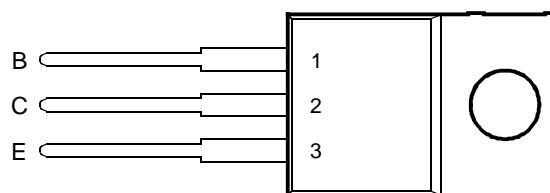
BDW73, BDW73A, BDW73B, BDW73C, BDW73D NPN SILICON POWER DARLINGTONS

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AUGUST 1978 - REVISED MARCH 1997

- **Designed for Complementary Use with BDW74, BDW74A, BDW74B, BDW74C and BDW74D**
- **80 W at 25°C Case Temperature**
- **8 A Continuous Collector Current**
- **Minimum h_{FE} of 750 at 3 V, 3 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 ($I_E = 0$)	V_{CBO}	BDW73	45
		BDW73A	60
		BDW73B	80
		BDW73C	100
		BDW73D	120
Collector-emitter voltage ($I_B = 0$) (see Note 1)	V_{CEO}	BDW73	45
		BDW73A	60
		BDW73B	80
		BDW73C	100
		BDW73D	120
Emitter-base voltage	V_{EBO}	5	V
Continuous collector current	I_C	8	A
Continuous base current	I_B	0.3	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)	P_{tot}	80	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)	P_{tot}	2	W
Unclamped inductive load energy (see Note 4)	$\frac{1}{2}LI_C^2$	75	mJ
Operating junction temperature range	T_j	-65 to +150	°C
Operating temperature range	T_{stg}	-65 to +150	°C
Operating free-air temperature range	T_A	-65 to +150	°C

NOTES: 1. These values apply when the base-emitter diode is open circuited.

2. Derate linearly to 150°C case temperature at the rate of 0.64 W/°C.

3. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.

4. This rating is based on the capability of the transistor to operate safely in a circuit of: $L = 20 \text{ mH}$, $I_{B(on)} = 5 \text{ mA}$, $R_{BE} = 100 \Omega$, $V_{BE(off)} = 0$, $R_S = 0.1 \Omega$, $V_{CC} = 20 \text{ V}$.

PRODUCT INFORMATION

Information is current as of publication date. Products conform to specifications in accordance with the terms of Power Innovations standard warranty. Production processing does not necessarily include testing of all parameters.

Power
INNOVATIONS

BDW73, BDW73A, BDW73B, BDW73C, BDW73D NPN SILICON POWER DARLINGTONS

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

PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	$I_C = 30 \text{ mA}$	$I_B = 0$	(see Note 5)	BDW73 BDW73A BDW73B BDW73C BDW73D	45 60 80 100 120		V
I_{CEO}	Collector-emitter cut-off current	$V_{CE} = 30 \text{ V}$	$I_B = 0$		BDW73		0.5	
		$V_{CE} = 30 \text{ V}$	$I_B = 0$		BDW73A		0.5	
		$V_{CE} = 40 \text{ V}$	$I_B = 0$		BDW73B		0.5	
		$V_{CE} = 50 \text{ V}$	$I_B = 0$		BDW73C		0.5	
		$V_{CE} = 60 \text{ V}$	$I_B = 0$		BDW73D		0.5	
I_{CBO}	Collector cut-off current	$V_{CB} = 45 \text{ V}$	$I_E = 0$		BDW73		0.2	
		$V_{CB} = 60 \text{ V}$	$I_E = 0$		BDW73A		0.2	
		$V_{CB} = 80 \text{ V}$	$I_E = 0$		BDW73B		0.2	
		$V_{CB} = 100 \text{ V}$	$I_E = 0$		BDW73C		0.2	
		$V_{CB} = 120 \text{ V}$	$I_E = 0$		BDW73D		0.2	
		$V_{CB} = 45 \text{ V}$	$I_E = 0$	$T_C = 150^\circ\text{C}$	BDW73		5	
		$V_{CB} = 60 \text{ V}$	$I_E = 0$	$T_C = 150^\circ\text{C}$	BDW73A		5	
		$V_{CB} = 80 \text{ V}$	$I_E = 0$	$T_C = 150^\circ\text{C}$	BDW73B		5	
		$V_{CB} = 100 \text{ V}$	$I_E = 0$	$T_C = 150^\circ\text{C}$	BDW73C		5	
		$V_{CB} = 120 \text{ V}$	$I_E = 0$	$T_C = 150^\circ\text{C}$	BDW73D		5	
I_{EBO}	Emitter cut-off current	$V_{EB} = 5 \text{ V}$	$I_C = 0$				2	mA
h_{FE}	Forward current transfer ratio	$V_{CE} = 3 \text{ V}$	$I_C = 3 \text{ A}$	(see Notes 5 and 6)	750		20000	
		$V_{CE} = 3 \text{ V}$	$I_C = 8 \text{ A}$		100			
$V_{BE(on)}$	Base-emitter voltage	$V_{CE} = 3 \text{ V}$	$I_C = 3 \text{ A}$	(see Notes 5 and 6)			2.5	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_B = 12 \text{ mA}$	$I_C = 3 \text{ A}$	(see Notes 5 and 6)			2.5	V
		$I_B = 80 \text{ mA}$	$I_C = 8 \text{ A}$				4	
V_{EC}	Parallel diode forward voltage	$I_E = 8 \text{ A}$	$I_B = 0$				3.5	V

NOTES: 5. These parameters must be measured using pulse techniques, $t_p = 300 \mu\text{s}$, duty cycle $\leq 2\%$.

6. 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	°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	$V_{BE(off)} = -3.5 \text{ V}$	$R_L = 10 \Omega$	$t_p = 20 \mu\text{s}$, dc $\leq 2\%$	5		μs

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

TYPICAL CHARACTERISTICS

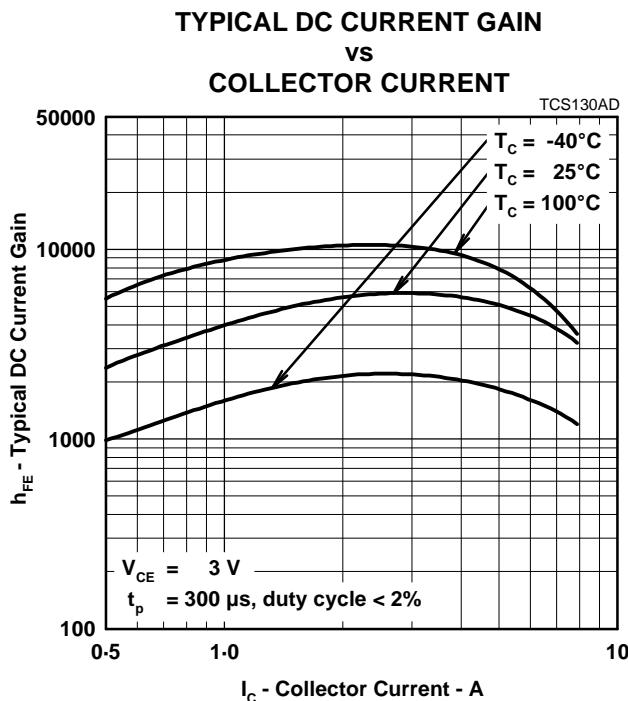


Figure 1.

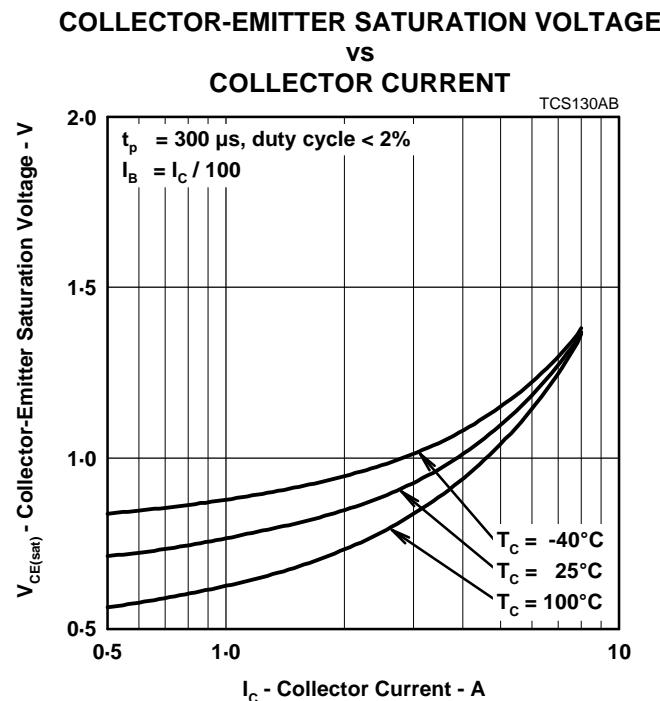


Figure 2.

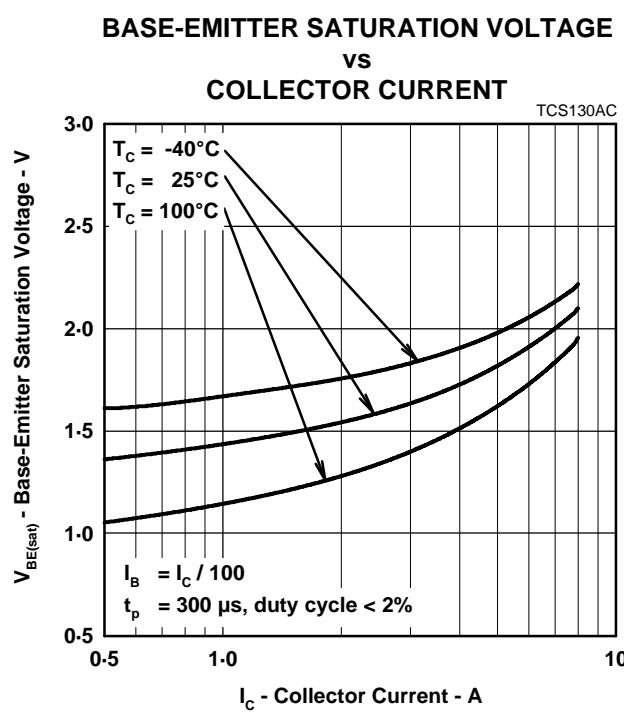


Figure 3.

BDW73, BDW73A, BDW73B, BDW73C, BDW73D NPN SILICON POWER DARLINGTONS

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MAXIMUM SAFE OPERATING REGIONS

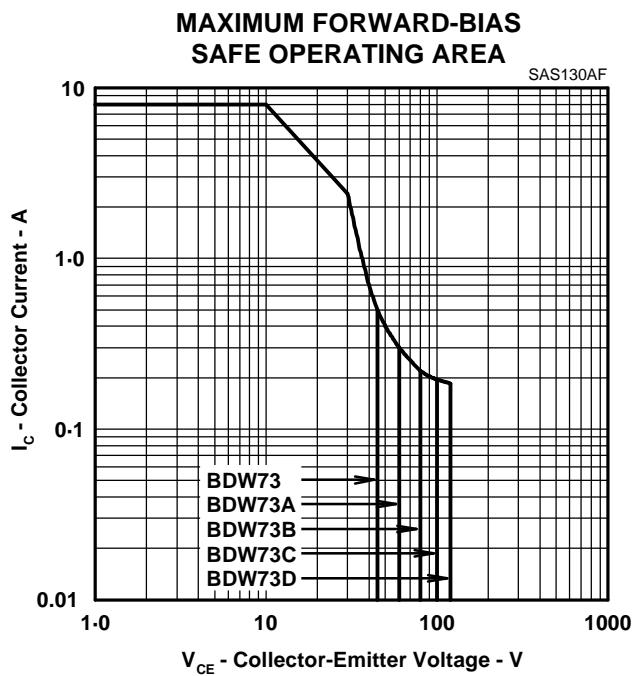


Figure 4.

THERMAL INFORMATION

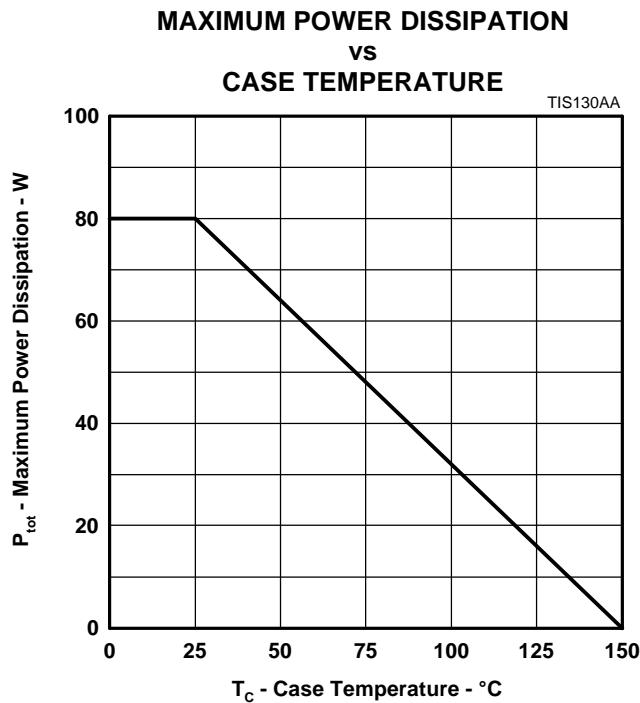


Figure 5.

PRODUCT INFORMATION

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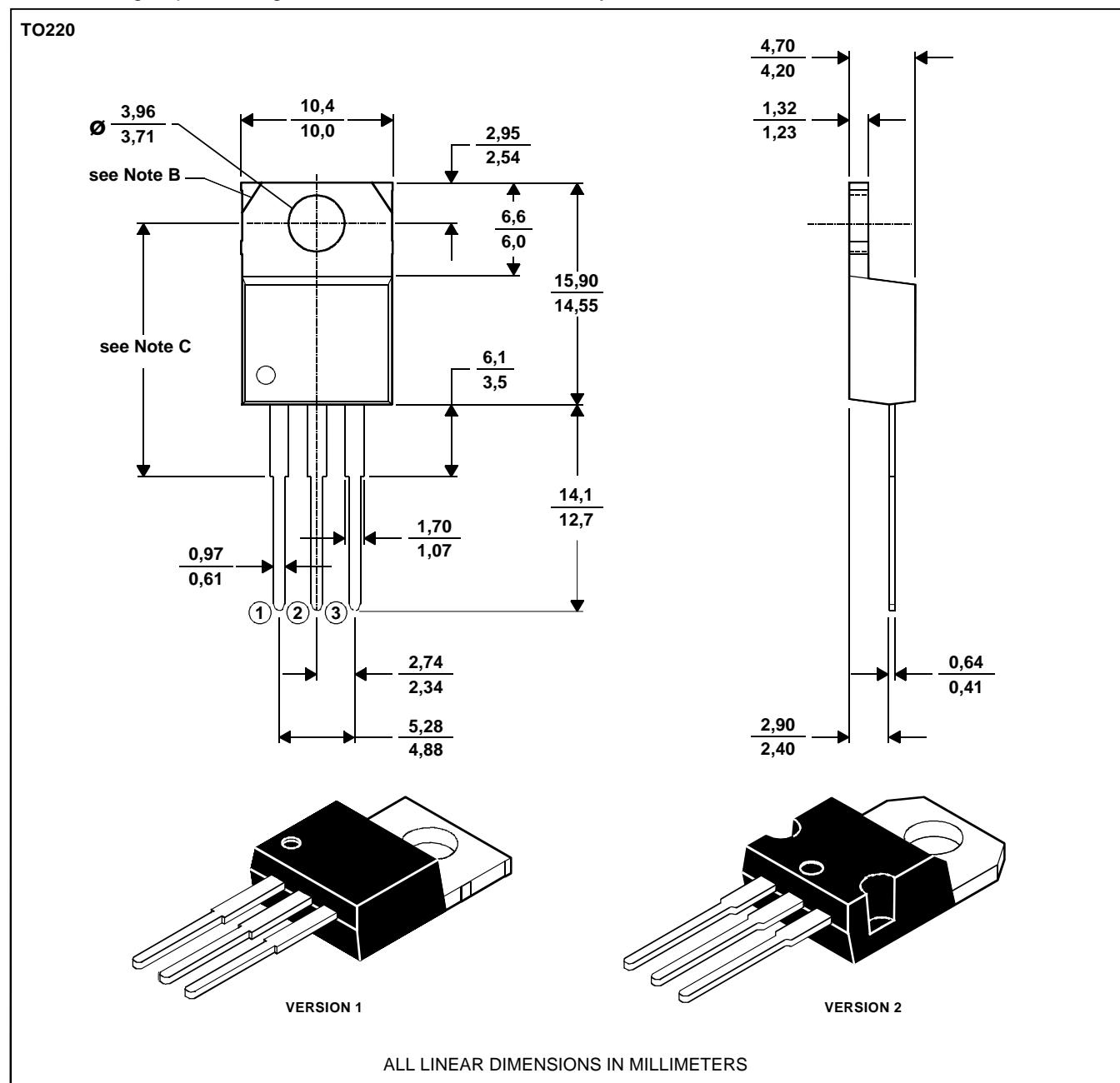
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MECHANICAL DATA

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.

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