

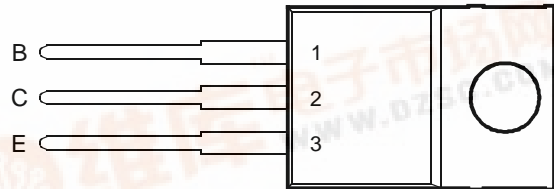
BDW73, BDW73A, BDW73B, BDW73C, BDW73D NPN SILICON POWER DARLINGTONS

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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 ($I_E = 0$)	BDW73	V_{CBO}	45	V
	BDW73A		60	
	BDW73B		80	
	BDW73C		100	
	BDW73D		120	
Collector-emitter voltage ($I_B = 0$) (see Note 1)	BDW73	V_{CEO}	45	V
	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: $L = 20$ mH, $I_{B(on)} = 5$ mA, $R_{BE} = 100 \Omega$, $V_{BE(off)} = 0$, $R_S = 0.1 \Omega$, $V_{CC} = 20$ V.



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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 45 BDW73A 60 BDW73B 80 BDW73C 100 BDW73D 120			V
I_{CEO} Collector-emitter cut-off current	$V_{CE} = 30 \text{ V}$	$I_B = 0$		BDW73 BDW73A BDW73B BDW73C BDW73D		0.5 0.5 0.5 0.5 0.5	mA
I_{CBO} Collector cut-off current	$V_{CB} = 45 \text{ V}$	$I_E = 0$		BDW73 BDW73A BDW73B BDW73C BDW73D		0.2 0.2 0.2 0.2 0.2	mA
	$V_{CB} = 45 \text{ V}$	$I_E = 0$	$T_C = 150^\circ\text{C}$	BDW73 BDW73A BDW73B BDW73C BDW73D		5 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	$V_{CE} = 3 \text{ V}$	$I_C = 3 \text{ A}$	(see Notes 5 and 6)	750 100		20000	
$V_{BE(on)}$ 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 4	V
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	$^\circ\text{C/W}$
$R_{\theta JA}$ Junction to free air thermal resistance			62.5	$^\circ\text{C/W}$

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.

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TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN
VS
COLLECTOR CURRENT

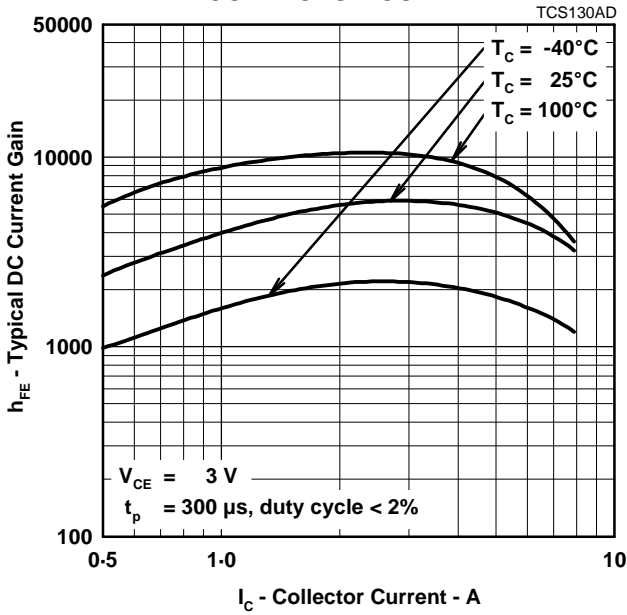


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE
VS
COLLECTOR CURRENT

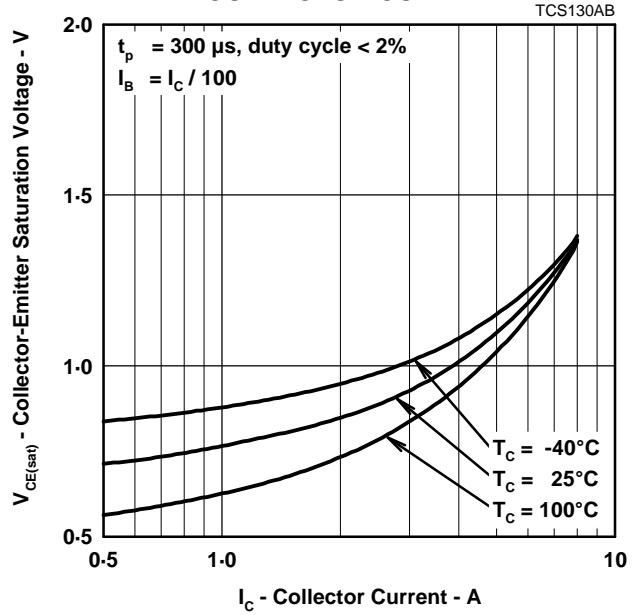


Figure 2.

BASE-EMITTER SATURATION VOLTAGE
VS
COLLECTOR CURRENT

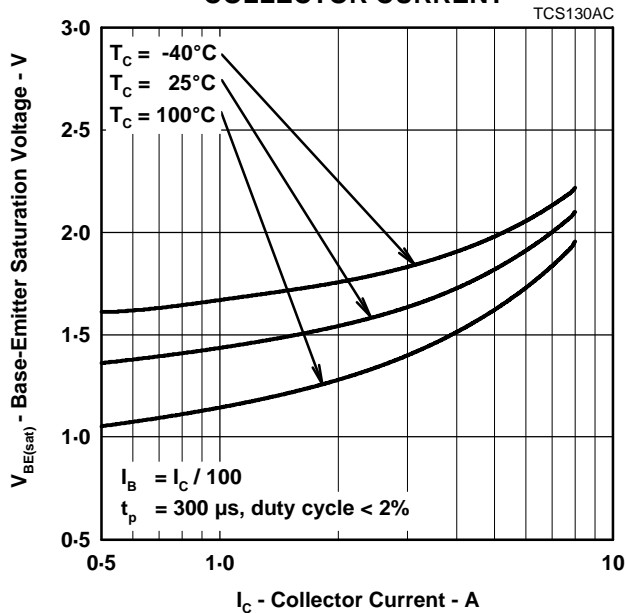


Figure 3.

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MAXIMUM SAFE OPERATING REGIONS

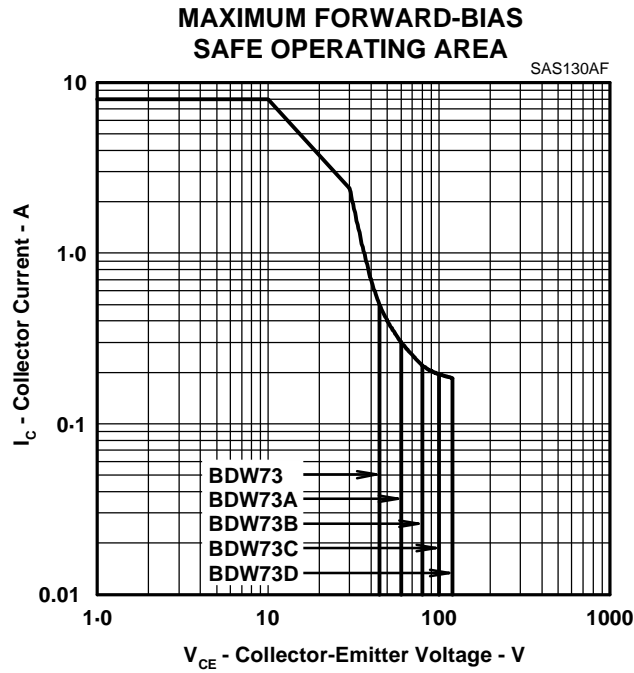


Figure 4.

THERMAL INFORMATION

MAXIMUM POWER DISSIPATION vs CASE TEMPERATURE

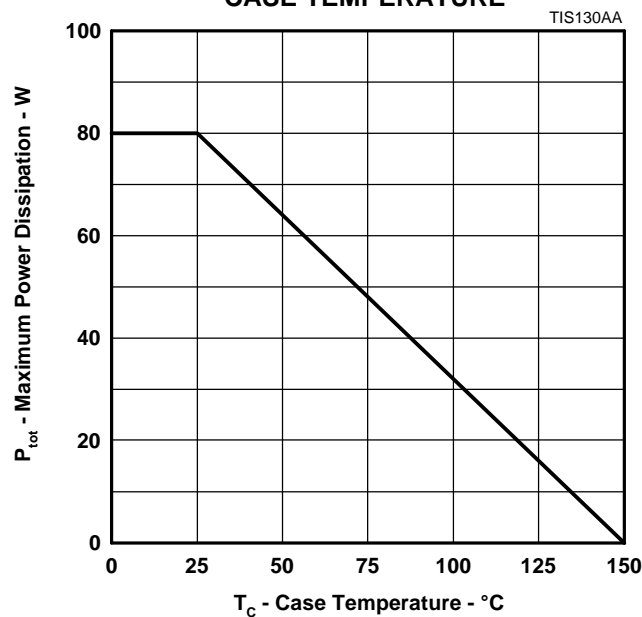


Figure 5.

BDW73, BDW73A, BDW73B, BDW73C, BDW73D

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