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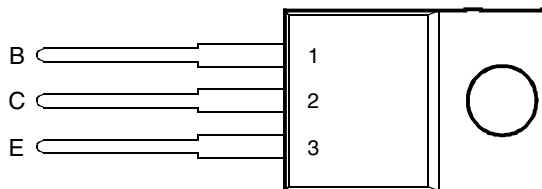
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- Designed for Complementary Use with BDX34, BDX34A, BDX34B, BDX34C and BDX34D
- 70 W at 25°C Case Temperature
- 10 A Continuous Collector Current
- Minimum h_{FE} of 750 at 3V, 3 A

TO-220 PACKAGE
(TOP VIEW)



This series is obsolete and not recommended for new designs.

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 ($I_E = 0$)	BDX33	V_{CBO}	45	V
	BDX33A		60	
	BDX33B		80	
	BDX33C		100	
	BDX33D		120	
Collector-emitter voltage ($I_B = 0$)	BDX33	V_{CEO}	45	V
	BDX33A		60	
	BDX33B		80	
	BDX33C		100	
	BDX33D		120	
Emitter-base voltage		V_{EBO}	5	V
Continuous collector current		I_C	10	A
Continuous base current		I_B	0.3	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 1)		P_{tot}	70	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 2)		P_{tot}	2	W
Operating free air 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 0.56 W/°C.
2. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.

PRODUCT INFORMATION

BDX33, BDX33A, BDX33B, BDX33C, BDX33D
NPN SILICON POWER DARLINGTONS



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)	BDX33	45			V
			BDX33A	60			
			BDX33B	80			
			BDX33C	100			
			BDX33D	120			
I_{CEO} Collector-emitter cut-off current	$V_{CE} = 30 \text{ V}$	$I_B = 0$	BDX33			0.5	mA
			BDX33A			0.5	
			BDX33B			0.5	
			BDX33C			0.5	
			BDX33D			0.5	
			BDX33	$T_C = 100^\circ\text{C}$		10	
			BDX33A	$T_C = 100^\circ\text{C}$		10	
			BDX33B	$T_C = 100^\circ\text{C}$		10	
			BDX33C	$T_C = 100^\circ\text{C}$		10	
			BDX33D	$T_C = 100^\circ\text{C}$		10	
I_{CBO} Collector cut-off current	$V_{CB} = 45 \text{ V}$	$I_E = 0$	BDX33			1	mA
			BDX33A			1	
			BDX33B			1	
			BDX33C			1	
			BDX33D			1	
			BDX33	$T_C = 100^\circ\text{C}$		5	
			BDX33A	$T_C = 100^\circ\text{C}$		5	
			BDX33B	$T_C = 100^\circ\text{C}$		5	
			BDX33C	$T_C = 100^\circ\text{C}$		5	
			BDX33D	$T_C = 100^\circ\text{C}$		5	
I_{EBO} Emitter cut-off current	$V_{EB} = 5 \text{ V}$	$I_C = 0$			10	mA	
h_{FE} Forward current transfer ratio	$V_{CE} = 3 \text{ V}$	$I_C = 4 \text{ A}$	BDX33	750			
			BDX33A	750			
			BDX33B	750			
			BDX33C	750			
			BDX33D	750			
$V_{BE(on)}$ Base-emitter voltage	$V_{CE} = 3 \text{ V}$	$I_C = 4 \text{ A}$	BDX33			2.5	V
			BDX33A			2.5	
			BDX33B	(see Notes 3 and 4)		2.5	
			BDX33C			2.5	
			BDX33D			2.5	
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = 8 \text{ mA}$	$I_C = 4 \text{ A}$	BDX33			2.5	V
			BDX33A			2.5	
			BDX33B	(see Notes 3 and 4)		2.5	
			BDX33C			2.5	
			BDX33D			2.5	
V_{EC} Parallel diode forward voltage	$I_E = 8 \text{ A}$	$I_B = 0$			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.

PRODUCT INFORMATION



thermal characteristics

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to case thermal resistance			1.78	°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	$V_{BE(off)} = -3.5\text{ V}$	$R_L = 10\ \Omega$	$t_p = 20\ \mu\text{s},\text{ dc} \leq 2\%$		5		μs

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

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PRODUCT INFORMATION

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

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN
VS
COLLECTOR CURRENT

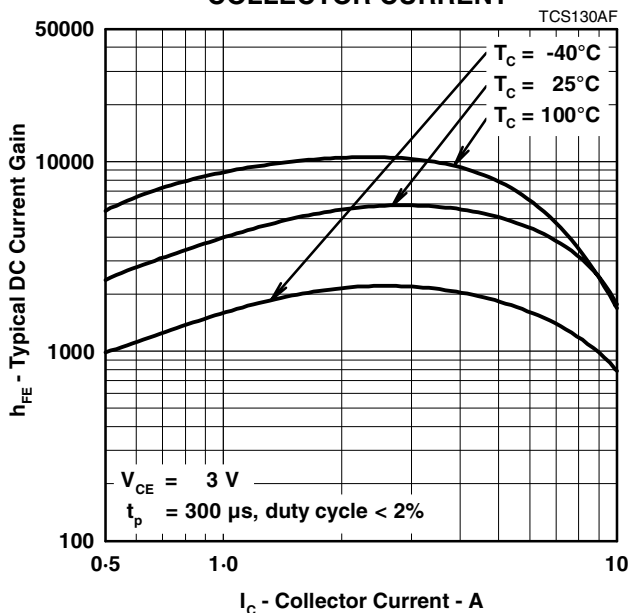


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE
VS
COLLECTOR CURRENT

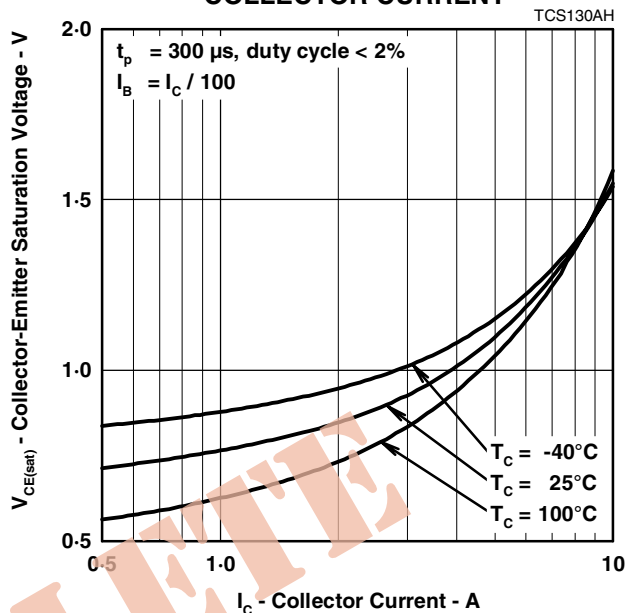


Figure 2.

BASE-EMITTER SATURATION VOLTAGE
VS
COLLECTOR CURRENT

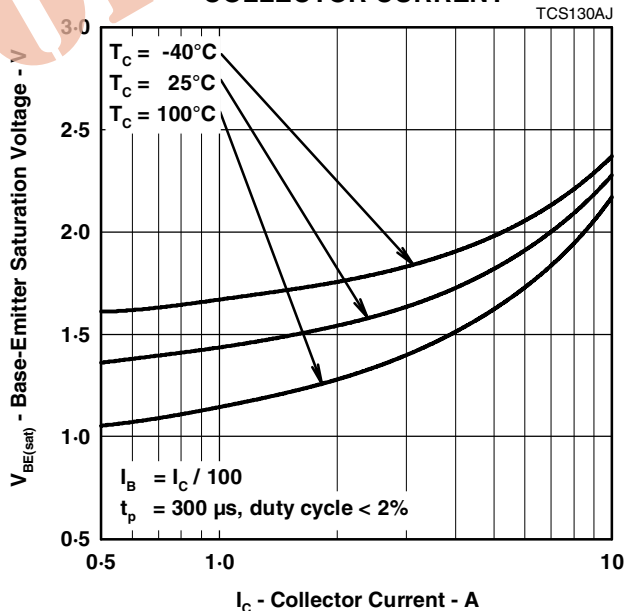


Figure 3.

PRODUCT INFORMATION

THERMAL INFORMATION

**MAXIMUM POWER DISSIPATION
vs
CASE TEMPERATURE**

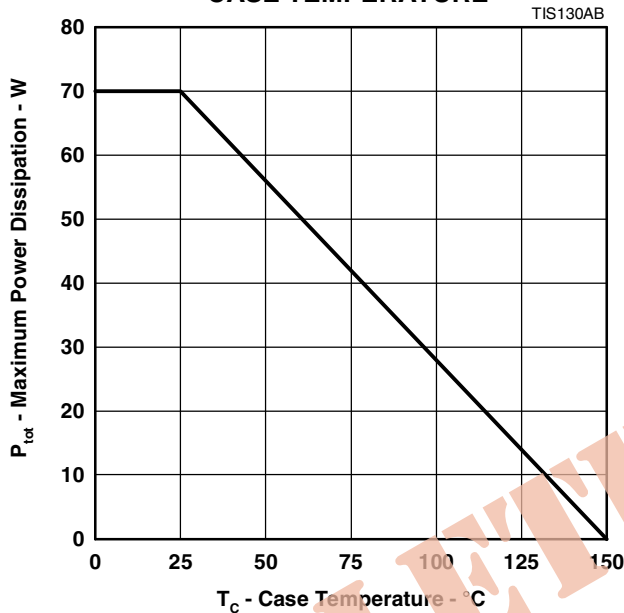


Figure 4.

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