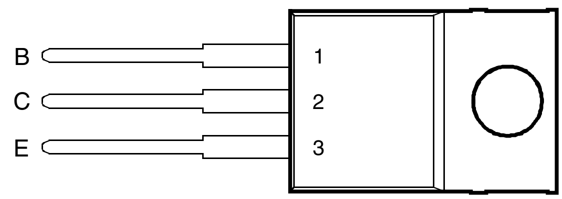
BOURNS®

- **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**

This series is obsolete and not recommended for new designs.

**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)	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.

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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 = 100 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 V	I_B = 0		BDX33			0.5	mA
		V_{CE} = 30 V	I_B = 0		BDX33A			0.5	
		V_{CE} = 40 V	I_B = 0		BDX33B			0.5	
		V_{CE} = 50 V	I_B = 0		BDX33C			0.5	
		V_{CE} = 60 V	I_B = 0		BDX33D			0.5	
		V_{CE} = 30 V	I_B = 0	T_C = 100°C	BDX33			10	
		V_{CE} = 30 V	I_B = 0	T_C = 100°C	BDX33A			10	
		V_{CE} = 40 V	I_B = 0	T_C = 100°C	BDX33B			10	
		V_{CE} = 50 V	I_B = 0	T_C = 100°C	BDX33C			10	
		V_{CE} = 60 V	I_B = 0	T_C = 100°C	BDX33D			10	
I_{CBO}	Collector cut-off current	V_{CB} = 45 V	I_E = 0		BDX33			1	mA
		V_{CB} = 60 V	I_E = 0		BDX33A			1	
		V_{CB} = 80 V	I_E = 0		BDX33B			1	
		V_{CB} = 100 V	I_E = 0		BDX33C			1	
		V_{CB} = 120 V	I_E = 0		BDX33D			1	
		V_{CB} = 45 V	I_E = 0	T_C = 100°C	BDX33			5	
		V_{CB} = 60 V	I_E = 0	T_C = 100°C	BDX33A			5	
		V_{CB} = 80 V	I_E = 0	T_C = 100°C	BDX33B			5	
		V_{CB} = 100 V	I_E = 0	T_C = 100°C	BDX33C			5	
		V_{CB} = 120 V	I_E = 0	T_C = 100°C	BDX33D			5	
I_{EBO}	Emitter cut-off current	V_{EB} = 5 V	I_C = 0					10	mA
h_{FE}	Forward current transfer ratio	V_{CE} = 3 V	I_C = 4 A	(see Notes 3 and 4)	BDX33	750			
		V_{CE} = 3 V	I_C = 4 A		BDX33A	750			
		V_{CE} = 3 V	I_C = 3 A		BDX33B	750			
		V_{CE} = 3 V	I_C = 3 A		BDX33C	750			
		V_{CE} = 3 V	I_C = 3 A		BDX33D	750			
$V_{BE(on)}$	Base-emitter voltage	V_{CE} = 3 V	I_C = 4 A	(see Notes 3 and 4)	BDX33			2.5	V
		V_{CE} = 3 V	I_C = 4 A		BDX33A			2.5	
		V_{CE} = 3 V	I_C = 3 A		BDX33B			2.5	
		V_{CE} = 3 V	I_C = 3 A		BDX33C			2.5	
		V_{CE} = 3 V	I_C = 3 A		BDX33D			2.5	
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_B = 8 mA	I_C = 4 A	(see Notes 3 and 4)	BDX33			2.5	V
		I_B = 8 mA	I_C = 4 A		BDX33A			2.5	
		I_B = 6 mA	I_C = 3 A		BDX33B			2.5	
		I_B = 6 mA	I_C = 3 A		BDX33C			2.5	
		I_B = 6 mA	I_C = 3 A		BDX33D			2.5	
V_{EC}	Parallel diode forward voltage	I_E = 8 A	I_B = 0					4	V

NOTES: 3. These parameters must be measured using pulse techniques, t_p = 300 µs, duty cycle ≤ 2%.
4. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

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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 A	$I_{B(on)}$ = 12 mA	$I_{B(off)}$ = -12 mA		1		µs
t_{off}	Turn-off time	$V_{BE(off)}$ = -3.5 V	R_L = 10 Ω	t_p = 20 µs, dc ≤ 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

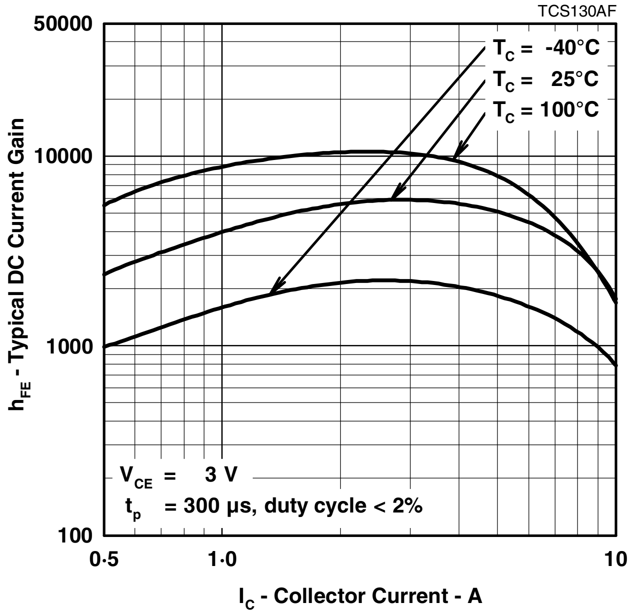

Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

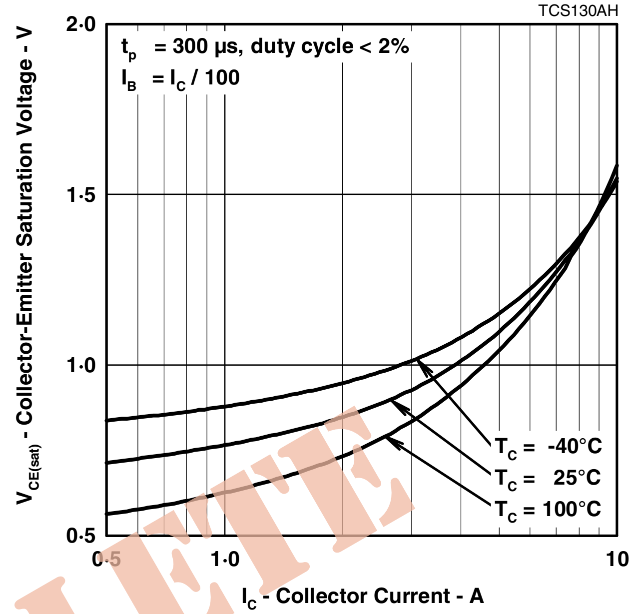

Figure 2.

BASE-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

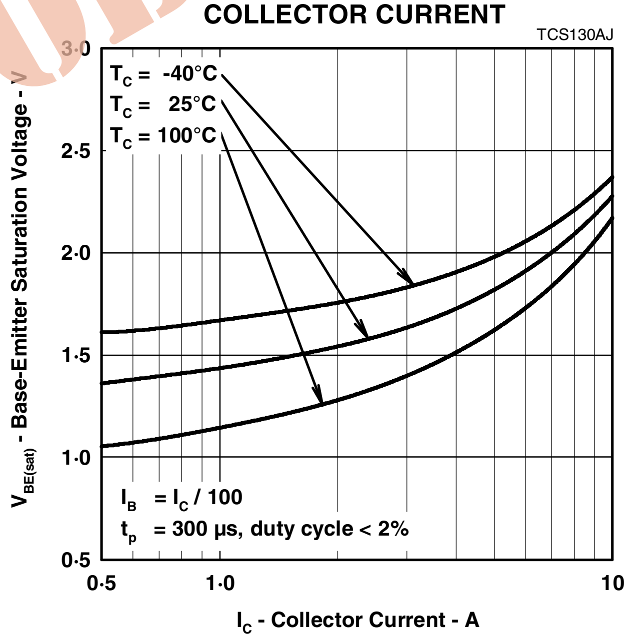

Figure 3.

THERMAL INFORMATION

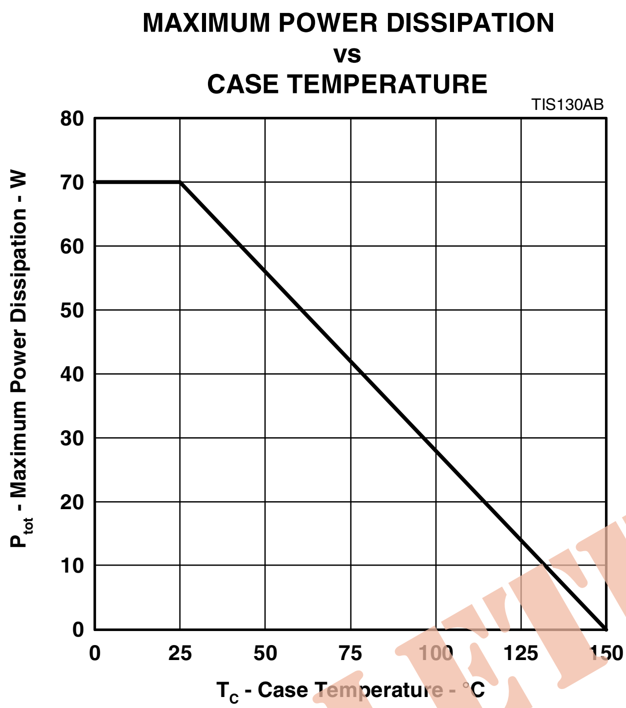

Figure 4.