

# BDX34, BDX34A, BDX34B, BDX34C, BDX34D PNP SILICON POWER DARLINGTONS

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- **Designed for Complementary Use with BDX33, BDX33A, BDX33B, BDX33C and BDX33D**
- **70 W at 25°C Case Temperature**
- **10 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 ( $I_E = 0$ )	BDX34	$V_{CBO}$	-45	V
	BDX34A		-60	
	BDX34B		-80	
	BDX34C		-100	
	BDX34D		-120	
Collector-emitter voltage ( $I_B = 0$ )	BDX34	$V_{CEO}$	-45	V
	BDX34A		-60	
	BDX34B		-80	
	BDX34C		-100	
	BDX34D		-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

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.

# BDX34, BDX34A, BDX34B, BDX34C, BDX34D

## PNP 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	$I_C = -100 \text{ mA}$	$I_B = 0$ (see Note 3)	BDX34 BDX34A BDX34B BDX34C BDX34D	-45 -60 -80 -100 -120			V	
$I_{CEO}$ Collector-emitter cut-off current	$V_{CE} = -30 \text{ V}$ $V_{CE} = -30 \text{ V}$ $V_{CE} = -40 \text{ V}$ $V_{CE} = -50 \text{ V}$ $V_{CE} = -60 \text{ V}$ $V_{CE} = -30 \text{ V}$ $V_{CE} = -30 \text{ V}$ $V_{CE} = -40 \text{ V}$ $V_{CE} = -50 \text{ V}$ $V_{CE} = -60 \text{ V}$	$I_B = 0$ $I_B = 0$ $I_B = 0$ $I_B = 0$ $I_B = 0$ $I_B = 0$ $I_B = 0$ $I_B = 0$ $I_B = 0$ $I_B = 0$ $I_B = 0$	$T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$	BDX34 BDX34A BDX34B BDX34C BDX34D BDX34 BDX34A BDX34B BDX34C BDX34D			-0.5 -0.5 -0.5 -0.5 -0.5 -10 -10 -10 -10 -10	mA
$I_{CBO}$ Collector cut-off current	$V_{CB} = -45 \text{ V}$ $V_{CB} = -60 \text{ V}$ $V_{CB} = -80 \text{ V}$ $V_{CB} = -100 \text{ V}$ $V_{CB} = -120 \text{ V}$ $V_{CB} = -45 \text{ V}$ $V_{CB} = -60 \text{ V}$ $V_{CB} = -80 \text{ V}$ $V_{CB} = -100 \text{ V}$ $V_{CB} = -120 \text{ V}$	$I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$	$T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$ $T_C = 100^\circ\text{C}$	BDX34 BDX34A BDX34B BDX34C BDX34D BDX34 BDX34A BDX34B BDX34C BDX34D			-1 -1 -1 -1 -1 -5 -5 -5 -5 -5	mA
$I_{EBO}$ Emitter cut-off current	$V_{EB} = -5 \text{ V}$	$I_C = 0$				-10	mA	
$h_{FE}$ Forward current transfer ratio	$V_{CE} = -3 \text{ V}$ $V_{CE} = -3 \text{ V}$ $V_{CE} = -3 \text{ V}$ $V_{CE} = -3 \text{ V}$ $V_{CE} = -3 \text{ V}$	$I_C = -4 \text{ A}$ $I_C = -4 \text{ A}$ $I_C = -3 \text{ A}$ $I_C = -3 \text{ A}$ $I_C = -3 \text{ A}$	(see Notes 3 and 4)	BDX34 BDX34A BDX34B BDX34C BDX34D	750 750 750 750 750			
$V_{BE(on)}$ Base-emitter voltage	$V_{CE} = -3 \text{ V}$ $V_{CE} = -3 \text{ V}$ $V_{CE} = -3 \text{ V}$ $V_{CE} = -3 \text{ V}$ $V_{CE} = -3 \text{ V}$	$I_C = -4 \text{ A}$ $I_C = -4 \text{ A}$ $I_C = -3 \text{ A}$ $I_C = -3 \text{ A}$ $I_C = -3 \text{ A}$	(see Notes 3 and 4)	BDX34 BDX34A BDX34B BDX34C BDX34D			-2.5 -2.5 -2.5 -2.5 -2.5	V
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = -8 \text{ mA}$ $I_B = -8 \text{ mA}$ $I_B = -6 \text{ mA}$ $I_B = -6 \text{ mA}$ $I_B = -6 \text{ mA}$	$I_C = -4 \text{ A}$ $I_C = -4 \text{ A}$ $I_C = -3 \text{ A}$ $I_C = -3 \text{ A}$ $I_C = -3 \text{ A}$	(see Notes 3 and 4)	BDX34 BDX34A BDX34B BDX34C BDX34D			-2.5 -2.5 -2.5 -2.5 -2.5	V
$V_{EC}$ 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

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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	$I_C = -3\text{ A}$	$I_{B(on)} = -12\text{ mA}$	$I_{B(off)} = 12\text{ mA}$		1		$\mu\text{s}$
$t_{off}$ Turn-off time	$V_{BE(off)} = 3.5\text{ V}$	$R_L = 10\ \Omega$	$t_p = 20\ \mu\text{s}, dc \leq 2\%$		5		$\mu\text{s}$

† 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**

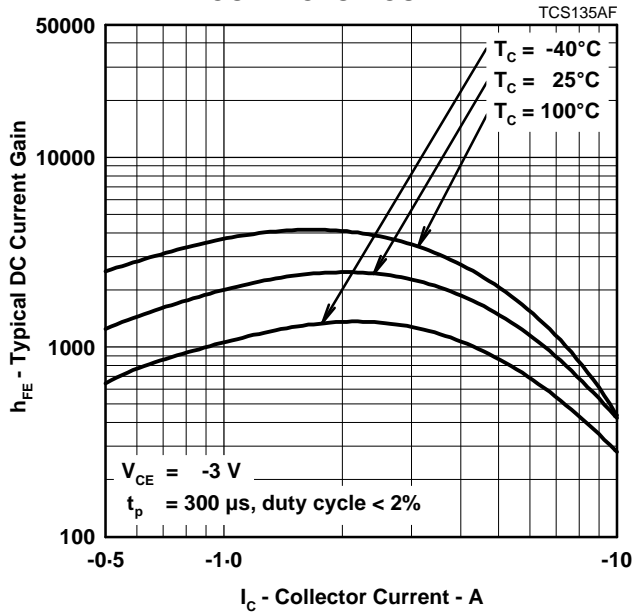


Figure 1.

**COLLECTOR-EMITTER SATURATION VOLTAGE  
vs  
COLLECTOR CURRENT**

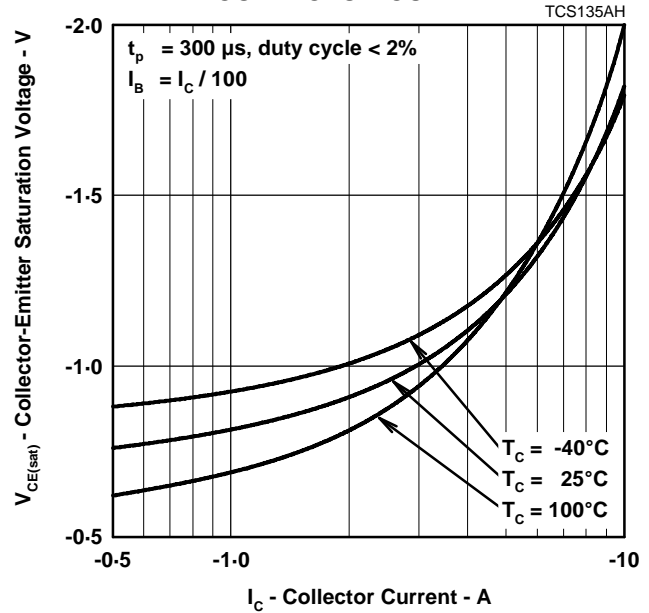


Figure 2.

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

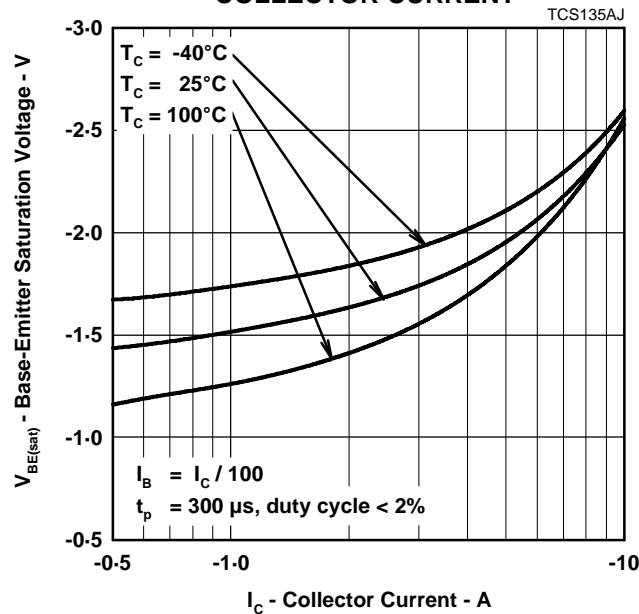


Figure 3.

THERMAL INFORMATION

MAXIMUM POWER DISSIPATION  
VS  
CASE TEMPERATURE

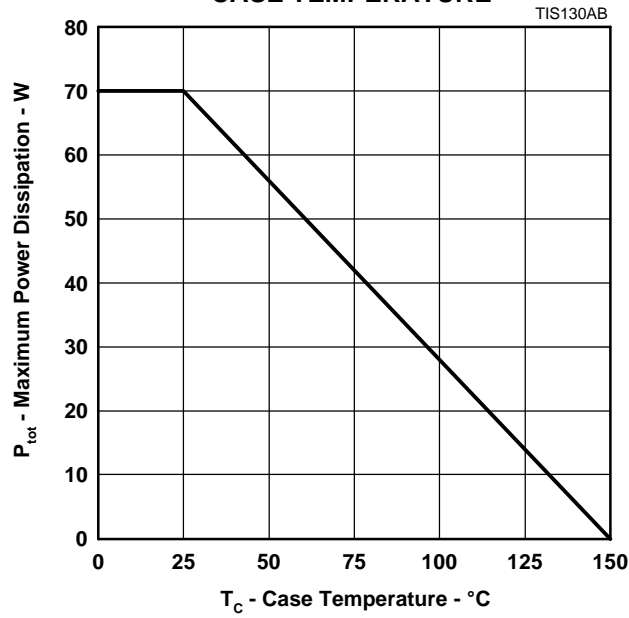


Figure 4.

# BDX34, BDX34A, BDX34B, BDX34C, BDX34D PNP SILICON POWER DARLINGTONS

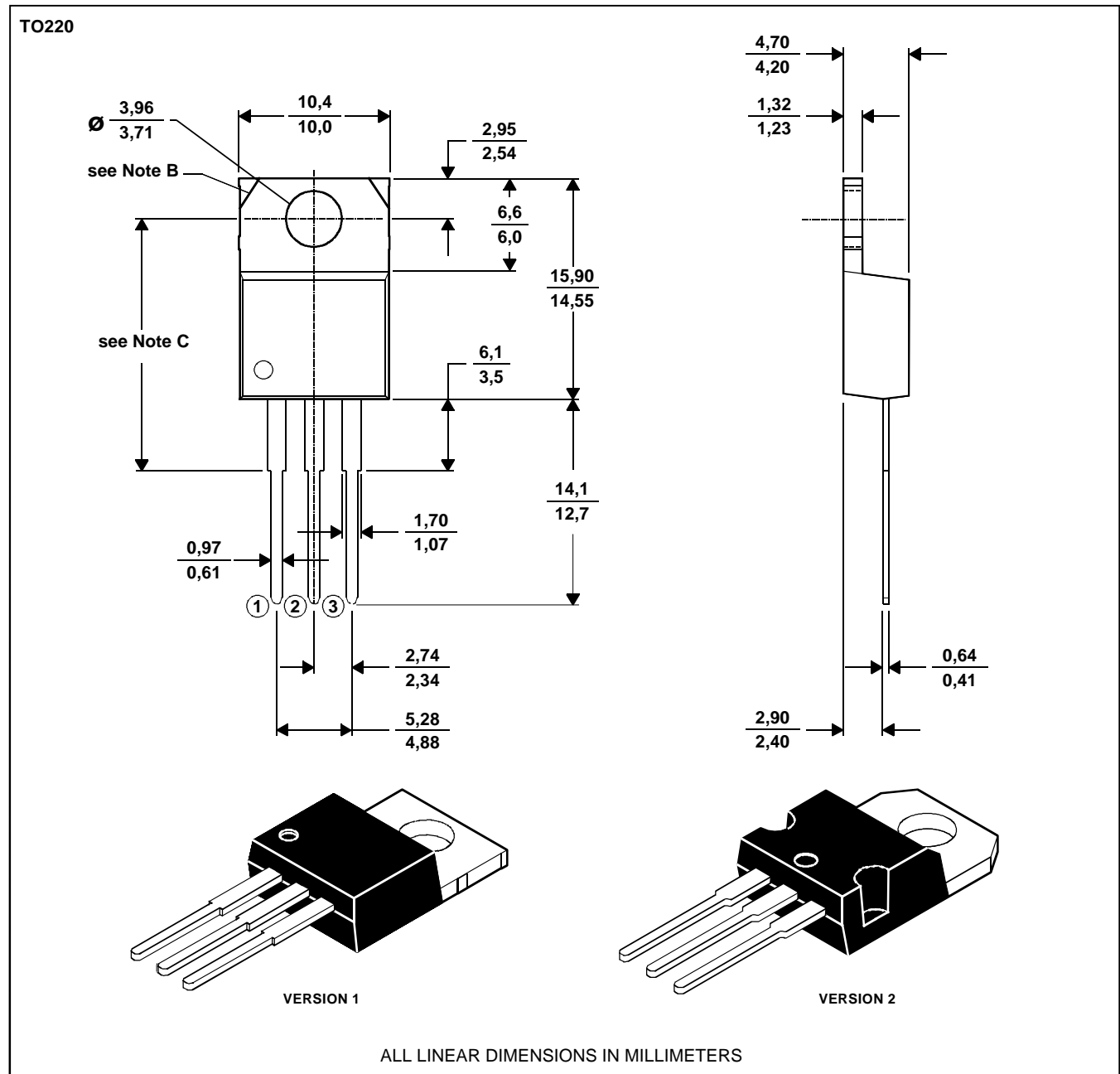
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## MECHANICAL DATA

### 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.

MDXXBE

## PRODUCT INFORMATION

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