

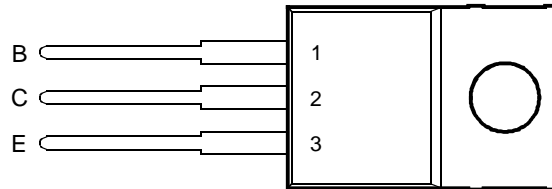
# BD895, BD897, BD899, BD901 NPN SILICON POWER DARLINGTONS

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AUGUST 1993 - REVISED MARCH 1997

- **Designed for Complementary Use with BD896, BD898, BD900 and BD902**
- **70 W at 25°C Case Temperature**
- **8 A Continuous Collector Current**
- **Minimum  $h_{FE}$  of 750 at 3V, 3A**

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 ( $I_E = 0$ )	BD895	$V_{CBO}$	45	V
	BD897		60	
	BD899		80	
	BD901		100	
Collector-emitter voltage ( $I_B = 0$ )	BD895	$V_{CEO}$	45	V
	BD897		60	
	BD899		80	
	BD901		100	
Base-emitter 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 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		$T_A$	-65 to +150	°C
Operating junction temperature range		$T_j$	-65 to +150	°C
Storage temperature range		$T_{stg}$	-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.



# BD895, BD897, BD899, BD901

## 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	$I_C = 100 \text{ mA}$	$I_B = 0$	(see Note 3)	BD895 45 BD897 60 BD899 80 BD901 100			V
$I_{CEO}$ Collector-emitter cut-off current	$V_{CE} = 30 \text{ V}$	$I_B = 0$		BD895		0.5	mA
	$V_{CE} = 30 \text{ V}$	$I_B = 0$		BD897		0.5	
	$V_{CE} = 40 \text{ V}$	$I_B = 0$		BD899		0.5	
	$V_{CE} = 50 \text{ V}$	$I_B = 0$		BD901		0.5	
$I_{CBO}$ Collector cut-off current	$V_{CB} = 45 \text{ V}$	$I_E = 0$		BD895		0.2	mA
	$V_{CB} = 60 \text{ V}$	$I_E = 0$		BD897		0.2	
	$V_{CB} = 80 \text{ V}$	$I_E = 0$		BD899		0.2	
	$V_{CB} = 100 \text{ V}$	$I_E = 0$		BD901		0.2	
	$V_{CB} = 45 \text{ V}$	$I_E = 0$	$T_C = 100^\circ\text{C}$	BD895		2	
	$V_{CB} = 60 \text{ V}$	$I_E = 0$	$T_C = 100^\circ\text{C}$	BD897		2	
	$V_{CB} = 80 \text{ V}$	$I_E = 0$	$T_C = 100^\circ\text{C}$	BD899		2	
	$V_{CB} = 100 \text{ V}$	$I_E = 0$	$T_C = 100^\circ\text{C}$	BD901		2	
$I_{EBO}$ Emitter cut-off current	$V_{EB} = 5 \text{ V}$	$I_C = 0$	(see Notes 3 and 4)			2	mA
$h_{FE}$ Forward current transfer ratio	$V_{CE} = 3 \text{ V}$	$I_C = 3 \text{ A}$	(see Notes 3 and 4)	750			
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = 12 \text{ mA}$	$I_C = 3 \text{ A}$	(see Notes 3 and 4)			2.5	V
$V_{BE(on)}$ Base-emitter voltage	$V_{CE} = 3 \text{ V}$	$I_C = 3 \text{ A}$	(see Notes 3 and 4)			2.5	V
$V_F$ Parallel diode forward voltage	$I_F = 8 \text{ A}$					3.5	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.

### thermal characteristics

PARAMETER	MIN	TYP	MAX	UNIT
$R_{\theta JC}$ Junction to case thermal resistance			1.79	$^\circ\text{C/W}$
$R_{\theta JA}$ 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		$\mu\text{s}$
$t_{off}$ 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.

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN  
 VS  
 COLLECTOR CURRENT

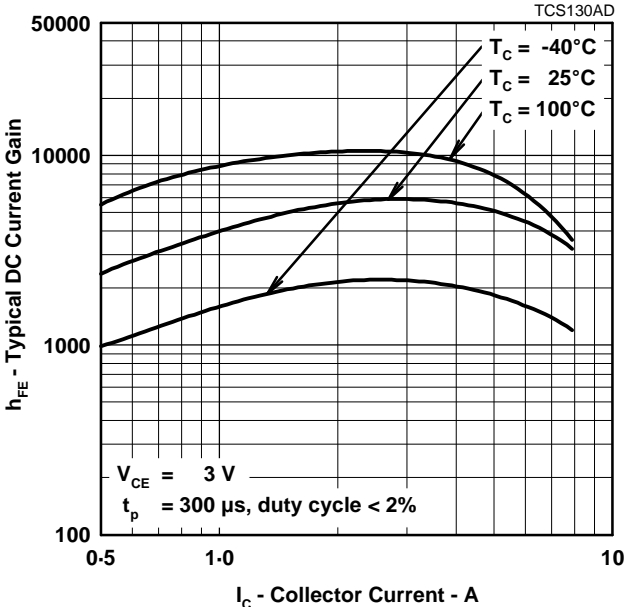


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE  
 VS  
 COLLECTOR CURRENT

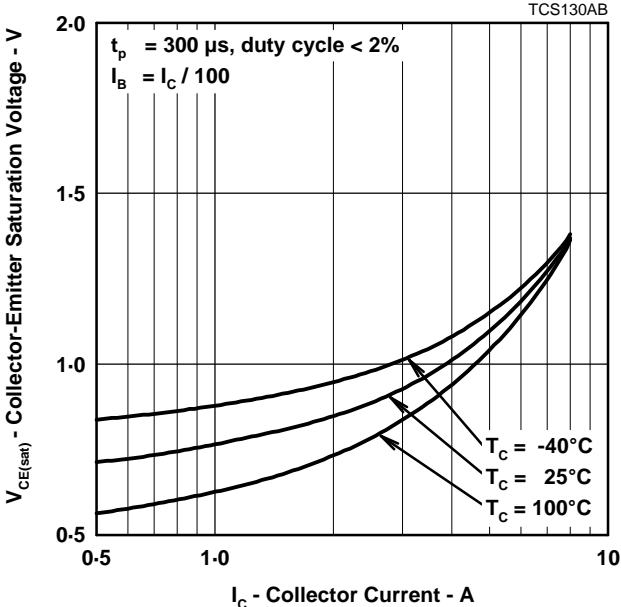


Figure 2.

BASE-EMITTER SATURATION VOLTAGE  
 VS  
 COLLECTOR CURRENT

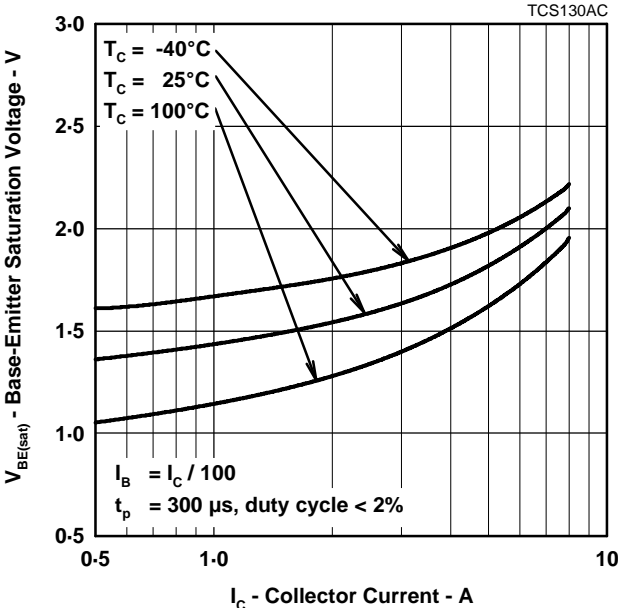


Figure 3.

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## MAXIMUM SAFE OPERATING REGIONS

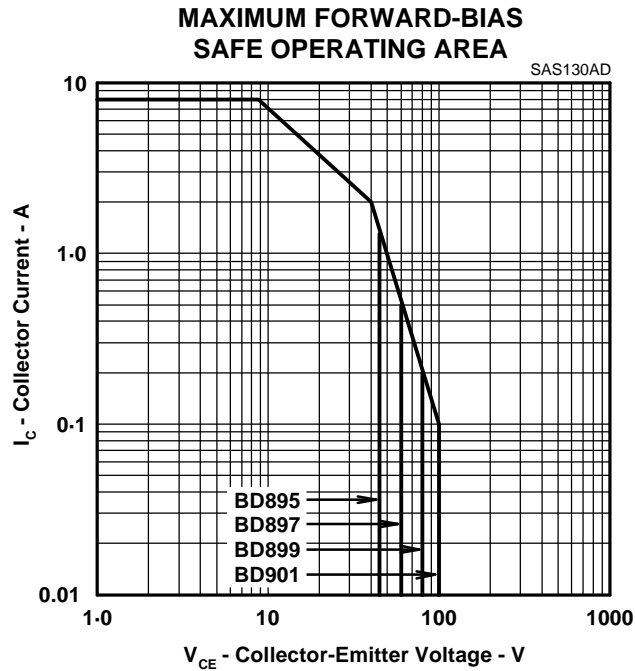


Figure 4.

## THERMAL INFORMATION

### MAXIMUM POWER DISSIPATION VS CASE TEMPERATURE

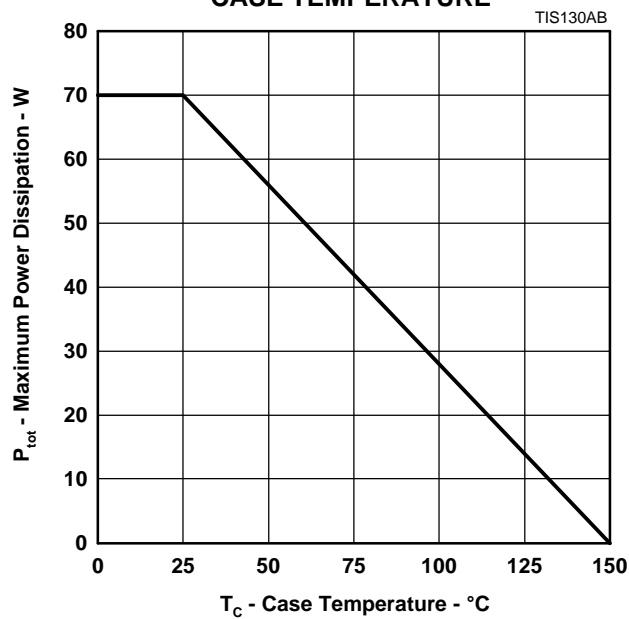


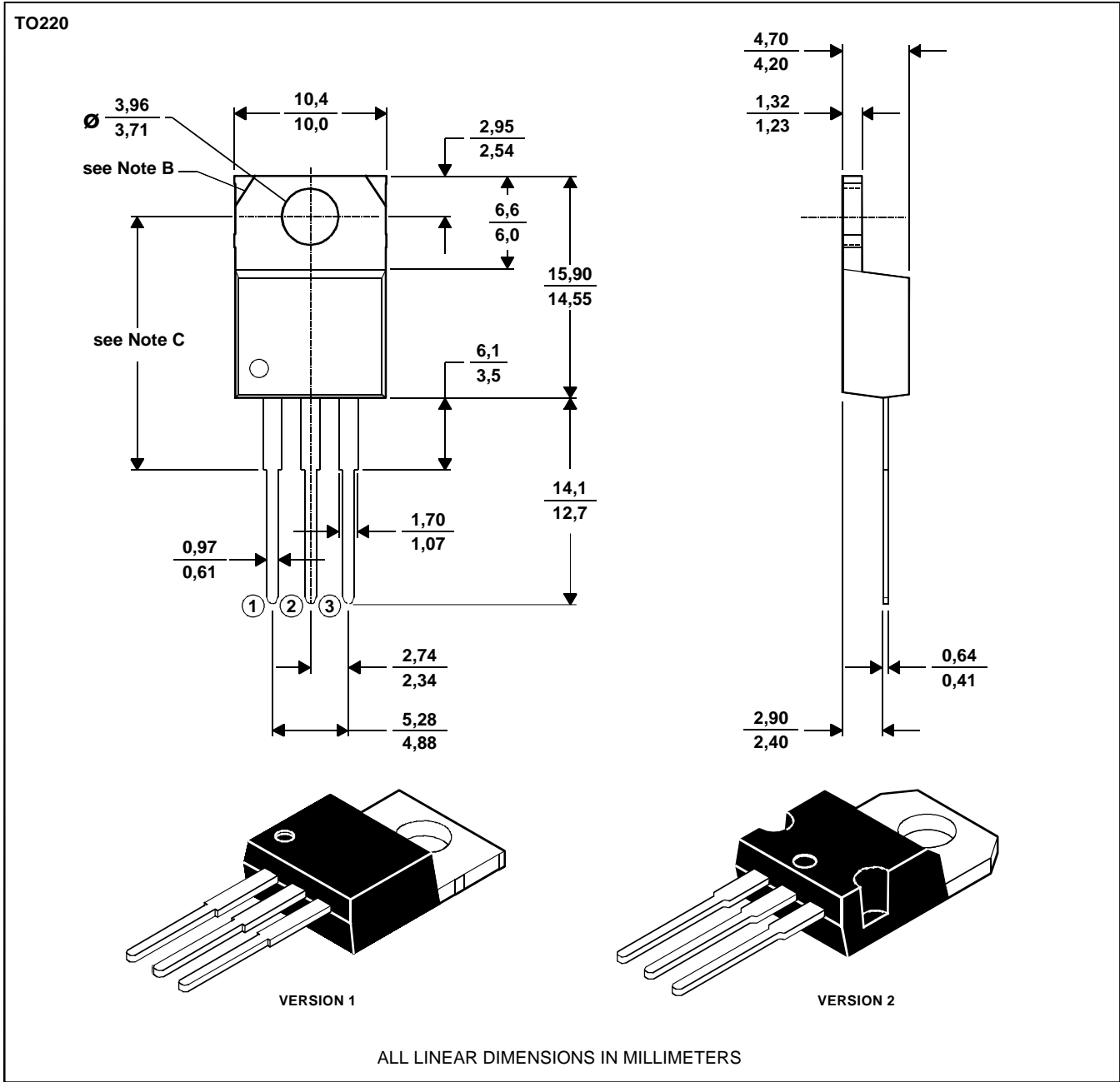
Figure 5.

## PRODUCT INFORMATION

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

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