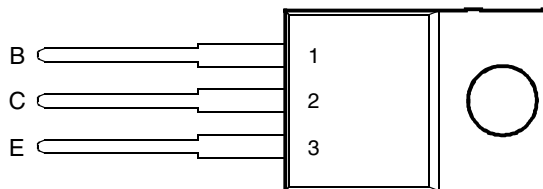




- Designed for Complementary Use with BDW94, BDW94A, BDW94B and BDW94C
- 80 W at 25°C Case Temperature
- 12 A Continuous Collector Current
- Minimum  $h_{FE}$  of 750 at 3V, 5 A

TO-220 PACKAGE  
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

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**absolute maximum ratings at 25°C case temperature (unless otherwise noted)**

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage ( $I_E = 0$ )	BDW93	$V_{CBO}$	45	V
	BDW93A		60	
	BDW93B		80	
	BDW93C		100	
Collector-emitter voltage ( $I_B = 0$ )	BDW93	$V_{CEO}$	45	V
	BDW93A		60	
	BDW93B		80	
	BDW93C		100	
Emitter-base voltage		$V_{EBO}$	5	V
Continuous collector current		$I_C$	12	A
Continuous base current		$I_B$	0.3	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 1)		$P_{tot}$	80	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 2)		$P_{tot}$	2	W
Operating junction 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 0.64 W/°C.  
2. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.

**PRODUCT INFORMATION**

**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)	BDW93	45		V	
			BDW93A	60			
			BDW93B	80			
			BDW93C	100			
$I_{CEO}$ Collector-emitter cut-off current	$V_{CB} = 40 \text{ V}$	$I_B = 0$	BDW93		1	mA	
			BDW93A		1		
			BDW93B		1		
			BDW93C		1		
$I_{CBO}$ Collector cut-off current	$V_{CB} = 45 \text{ V}$	$I_E = 0$	BDW93		0.1	mA	
			BDW93A		0.1		
			BDW93B		0.1		
			BDW93C		0.1		
	$V_{CB} = 60 \text{ V}$	$I_E = 0$	BDW93		5		
			BDW93A		5		
			BDW93B		5		
			BDW93C		5		
$V_{CB} = 80 \text{ V}$	$I_E = 0$	BDW93		5			
		BDW93A		5			
		BDW93B		5			
		BDW93C		5			
$V_{CB} = 100 \text{ V}$	$I_E = 0$	BDW93		5			
		BDW93A		5			
		BDW93B		5			
		BDW93C		5			
$I_{EBO}$ Emitter cut-off current	$V_{EB} = 5 \text{ V}$	$I_C = 0$			2	mA	
$h_{FE}$ Forward current transfer ratio	$V_{CE} = 3 \text{ V}$	$I_C = 3 \text{ A}$		1000			
			(see Notes 3 and 4)	$I_C = 10 \text{ A}$	100		
					$I_C = 5 \text{ A}$		750
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = 20 \text{ mA}$	$I_C = 5 \text{ A}$	(see Notes 3 and 4)		2	V	
				$I_C = 10 \text{ A}$	3		
$V_{BE(sat)}$ Base-emitter saturation voltage	$I_B = 20 \text{ mA}$	$I_C = 5 \text{ A}$	(see Notes 3 and 4)		2.5	V	
				$I_C = 10 \text{ A}$	4		
$V_{EC}$ Parallel diode forward voltage	$I_E = 5 \text{ A}$	$I_B = 0$			2	V	
			$I_E = 10 \text{ A}$		4		

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			1.56	°C/W
$R_{\theta JA}$ Junction to free air thermal resistance			62.5	°C/W



TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN  
VS  
COLLECTOR CURRENT

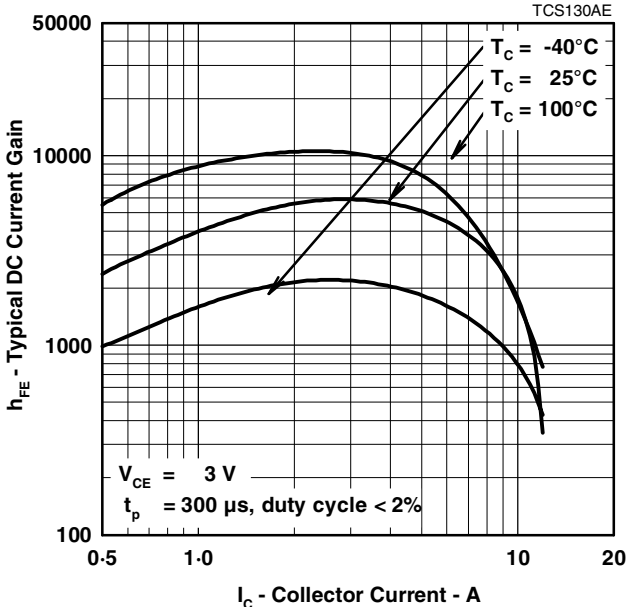


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE  
VS  
COLLECTOR CURRENT

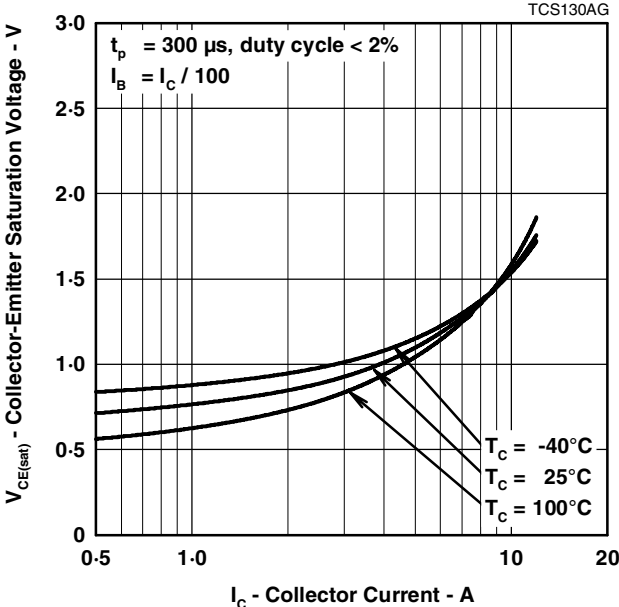


Figure 2.

BASE-EMITTER SATURATION VOLTAGE  
VS  
COLLECTOR CURRENT

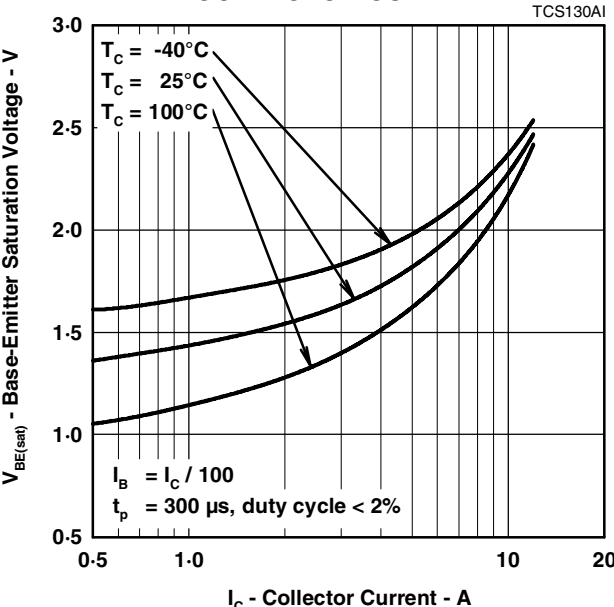
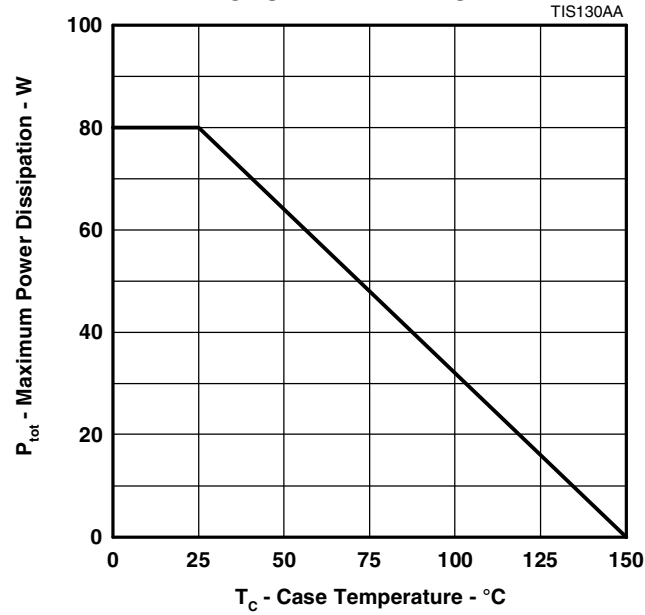


Figure 3.

PRODUCT INFORMATION

**THERMAL INFORMATION**

**MAXIMUM POWER DISSIPATION  
VS  
CASE TEMPERATURE**



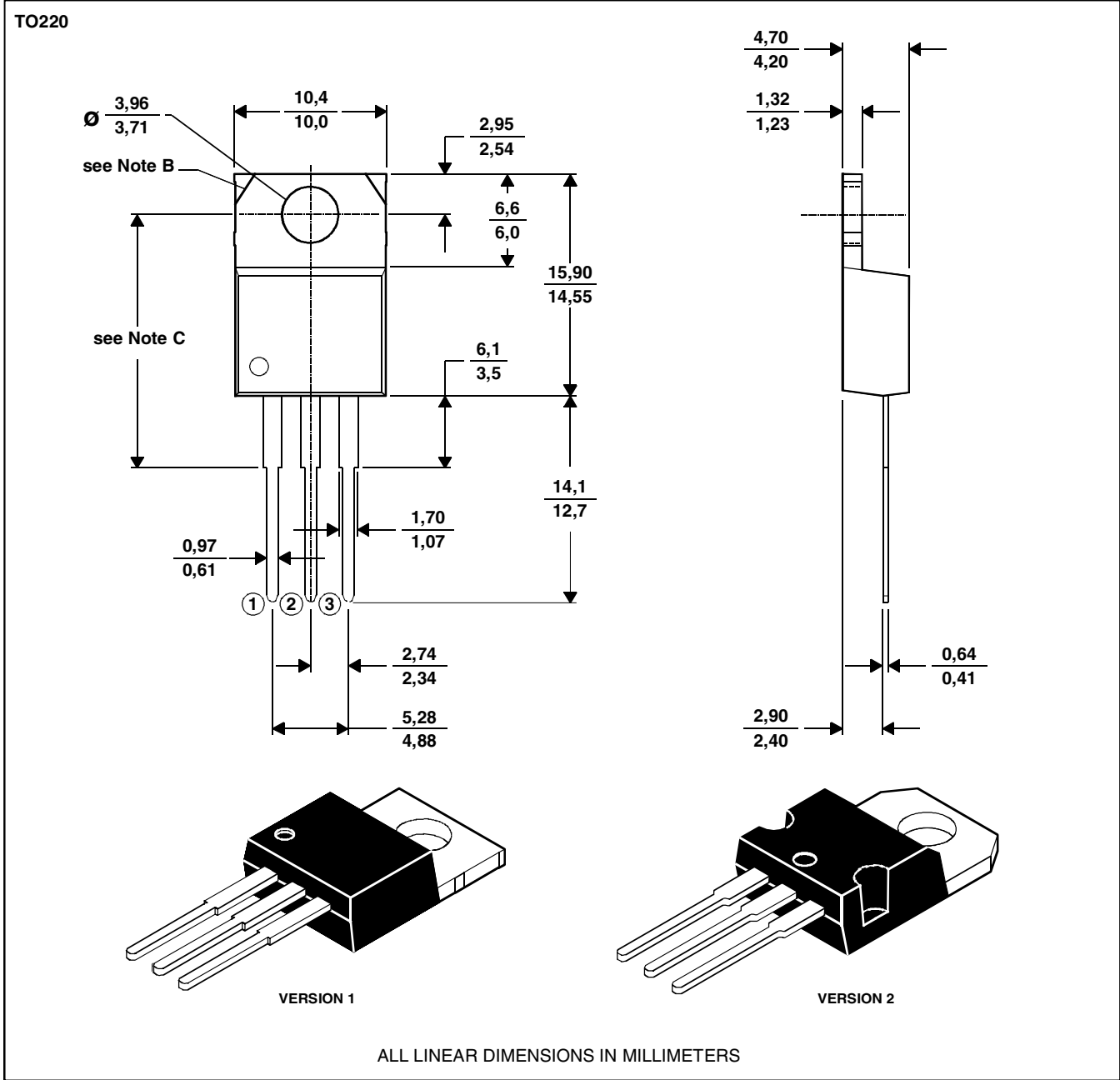
**Figure 4.**



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.

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PRODUCT INFORMATION

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