

# BDW93, BDW94 Series

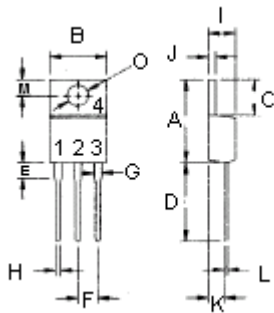
## Darlington Transistors



### Features:

Designed for general-purpose amplifier and low speed switching applications.

- Collector-emitter sustaining voltage- $V_{CEO(sus)} = 80V$  (Minimum) - BDW93B, BDW94B  
100V (Minimum) - BDW93C, BDW94C
- Collector-emitter saturation voltage- $V_{CE(sat)} = 2.0V$  (Maximum) at  $I_C = 5.0A$ .
- Monolithic construction with built-in-base-emitter shunt resistor.



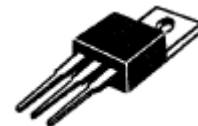
- Pin 1. Base  
2. Collector  
3. Emitter  
4. Collector (Case)

Dimension	Minimum	Maximum
A	14.68	15.31
B	9.78	10.42
C	5.01	6.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.70	3.90

Dimensions : Millimetres

NPN	PNP
BDW93B	BDW94B
BDW93C	BDW94C

12 Ampere  
Darlington  
Complementary Silicon  
Power Transistors  
45 - 100 Volts  
80 Watts



TO-220

### Maximum Ratings

Characteristic	Symbol	BDW93B BDW94B	BDW93C BDW94C	Unit
Collector-Emitter Voltage	$V_{CEO}$	80	100	V
Collector-Base Voltage	$V_{CBO}$			
Emitter-Base Voltage	$V_{EBO}$	5.0		
Collector Current-Continuous Peak	$I_C$ $I_{CM}$	12 15		A
Base Current	$I_B$	0.2		A
Total Power Dissipation at $T_C = 25^\circ C$ Derate Above $25^\circ C$	$P_D$	80 0.64		W W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-65 to +150		$^\circ C$

### Thermal Characteristics

Characteristic	Symbol	Maximum	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.56	$^\circ C/W$

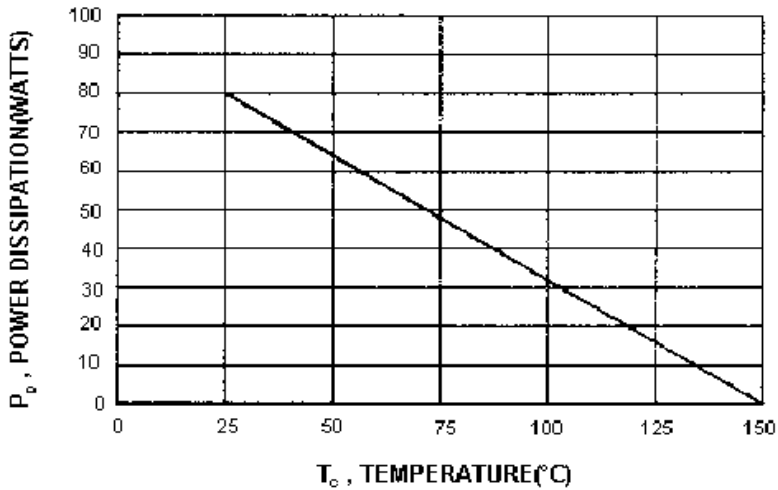


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Figure1 Power Derating



### Electrical Characteristics ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Minimum	Maximum	Unit
<b>OFF Characteristics</b>				
Collector-Emitter Sustaining Voltage (1) ( $I_C = 100\text{mA}$ , $I_B = 0$ )	BDW93B,BDW94B BDW93C,BDW94C	$V_{CEO(sus)}$	80 100	- V
Collector Cut off Current ( $V_{CE} = 80\text{V}$ , $I_B = 0$ )	BDW93B,BDW94B BDW93C,BDW94C	$I_{CEO}$	-	1.0 mA
Collector-Base Cut off Current ( $V_{CB} = \text{Rated } V_{CB}$ , $I_E = 0$ )		$I_{CBO}$	-	100 $\mu\text{A}$
Emitter-Base Cut off Current ( $V_{EB} = 5.0\text{V}$ , $I_C = 0$ )		$I_{EBO}$	-	2.0 mA
<b>ON Characteristics (1)</b>				
DC Current Gain ( $I_C = 3.0\text{A}$ , $V_{CE} = 3.0\text{V}$ ) ( $I_C = 5.0\text{A}$ , $V_{CE} = 3.0\text{V}$ ) ( $I_C = 10\text{A}$ , $V_{CE} = 3.0\text{V}$ )		$h_{FE}$	1000 750 100	20,000 -
Collector-Emitter Saturation Voltage ( $I_C = 5.0\text{A}$ , $I_B = 20\text{mA}$ ) ( $I_C = 10\text{A}$ , $I_B = 100\text{mA}$ )		$V_{CE(sat)}$	-	2.0 3.0 V
Base-Emitter Saturation Voltage ( $I_C = 5.0\text{A}$ , $I_B = 20\text{mA}$ ) ( $I_C = 10\text{A}$ , $I_B = 100\text{mA}$ )		$V_{BE(sat)}$	-	2.5 4.0 V

(1) Pulse Test: Pulse Width =  $300\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

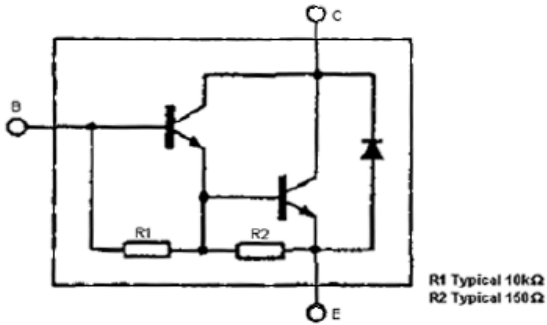


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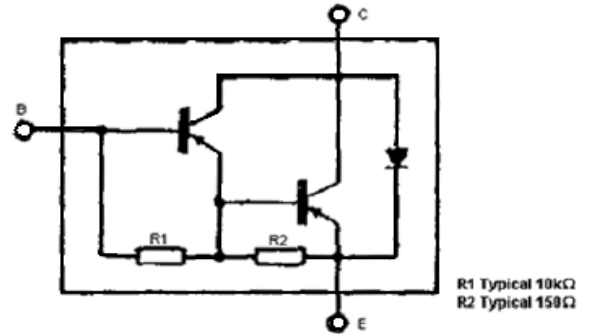
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BDW93 Series NPN

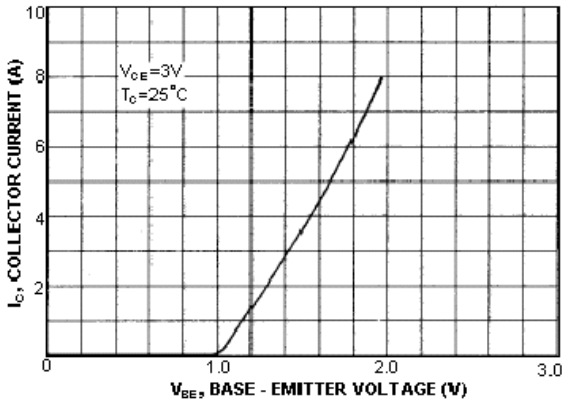


BDW94 Series PNP



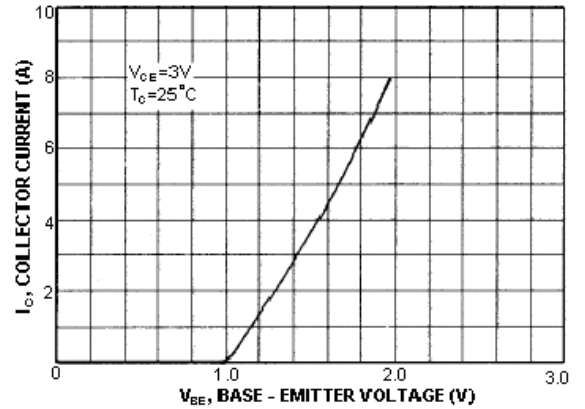
NPN BDW93B and C

$I_C - V_{be}$

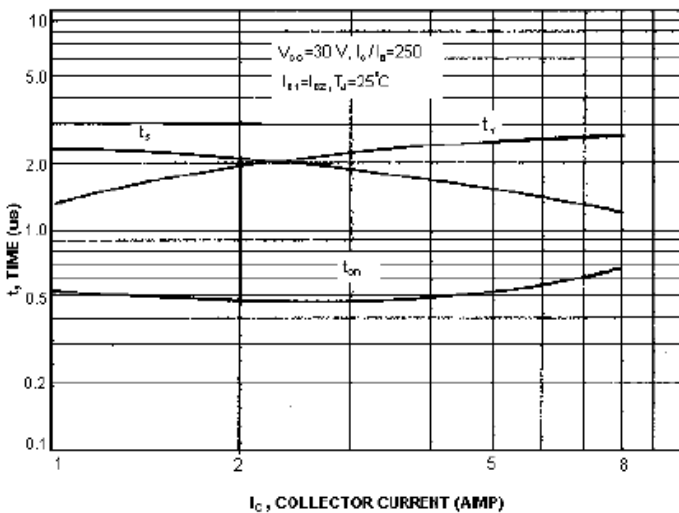


PNP BDW94B and C

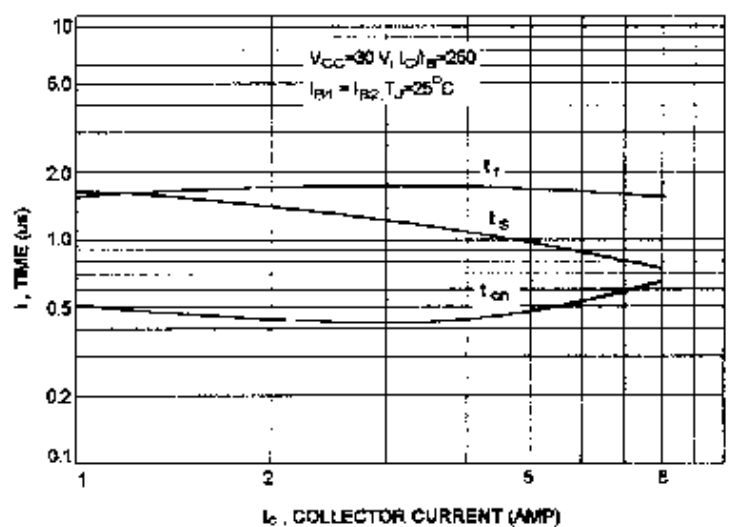
$I_C - V_{be}$



Switching Time



Switching Time

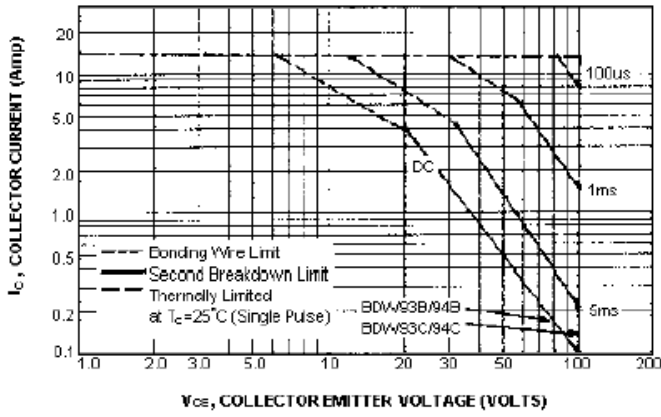


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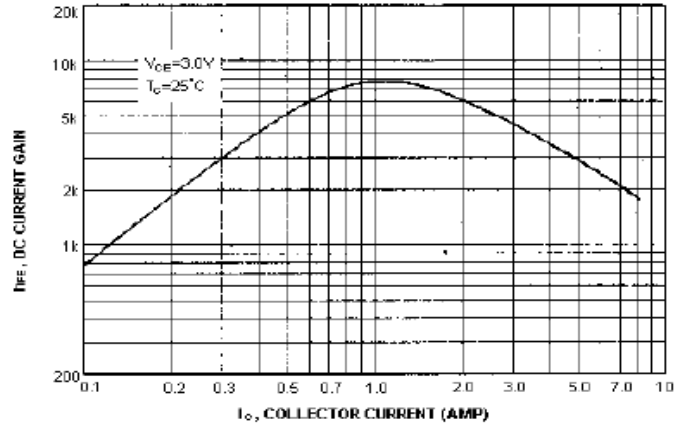
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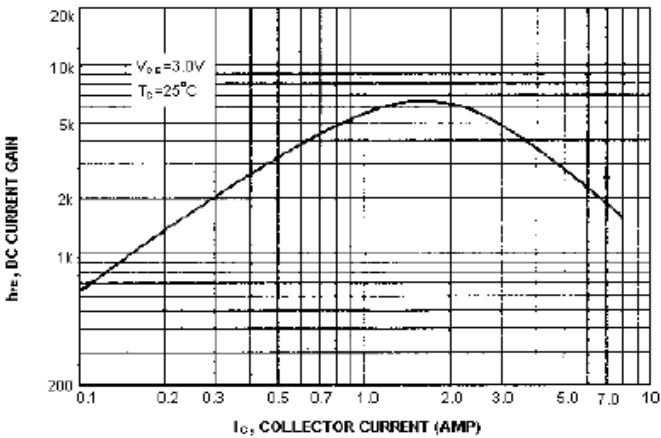
NPN BDW93B and C/PNP BDW94B and C  
Active-Region Safe Operating Area (SOA)



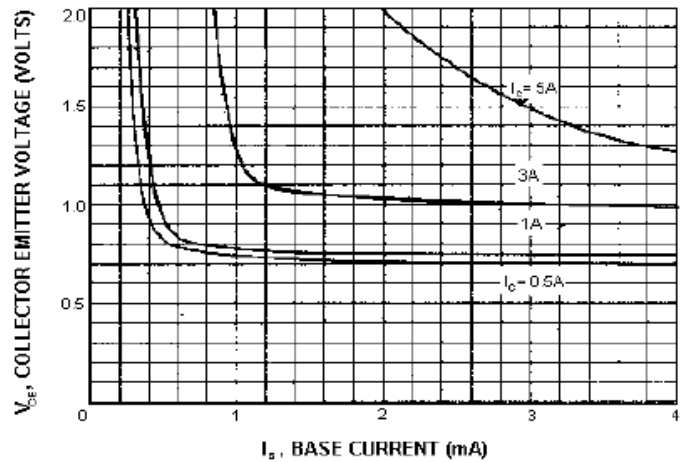
NPN BDW93B and C  
DC Current Gain



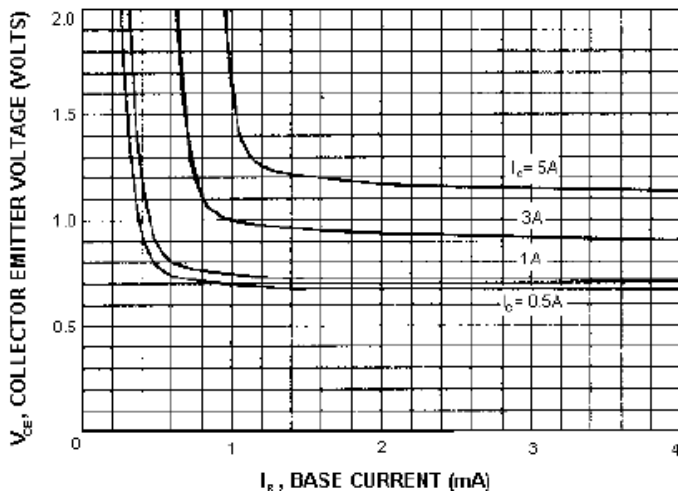
PNP BDW94B and C  
DC Current Gain



NPN BDW93B and C  
Collector Saturation Region



PNP BDW94B and C  
Collector Saturation Region



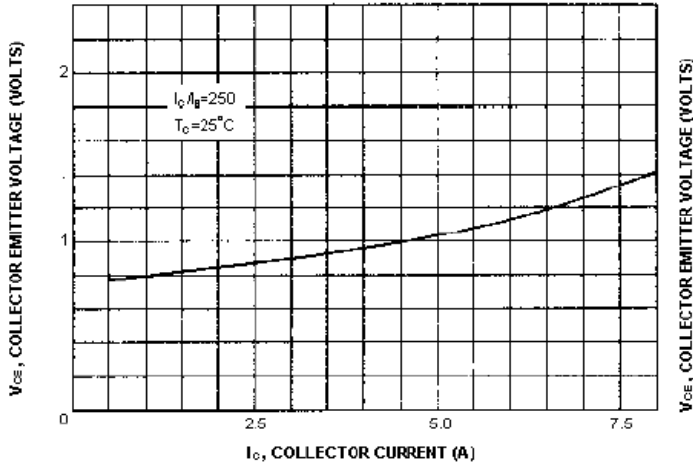
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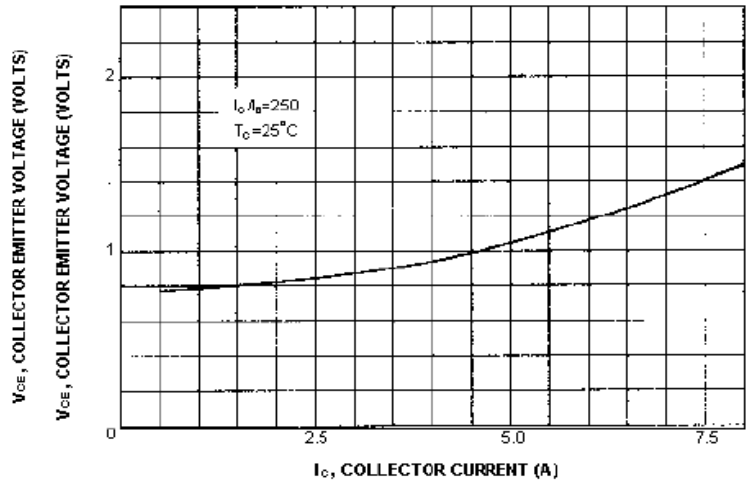
NPN BDW93B and C

$V_{CE}(\text{Sat}) - I_C$



PNP BDW94B and C

$V_{CE}(\text{Sat}) - I_C$



### Specifications

$I_C$ (av) maximum (A)	$V_{CE0}$ maximum V	$h_{FE}$ minimum at $I_C = 5A$	$P_{tot}$ at 25°C (W)	Package	Type	Part Number
12	80	750	80	TO-220	NPN	BDW94B
						BDW93B
	100				PNP	BDW93C
						BDW94C



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## Darlington Transistors



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