

DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS

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

FEATURES:

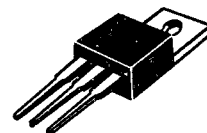
- * Collector-Emitter Sustaining Voltage-
 $V_{CEO(SUS)} = 45 \text{ V (Min.) - BDW93, BDW94}$
 $= 60 \text{ V (Min.) - BDW93A, BDW94A}$
 $= 80 \text{ V (Min.) - BDW93B, BDW94B}$
 $= 100 \text{ V (Min.) - BDW93C, BDW94C}$
- * Collector-Emitter Saturation Voltage
 $V_{CE(sat)} = 2.0 \text{ V (Max.) @ } I_C = 5.0 \text{ A}$
- * Monolithic Construction with Built-in Base-Emitter Shunt Resistor

NPN	PNP
BDW93	BDW94
BDW93A	BDW94A
BDW93B	BDW94B
BDW93C	BDW94C

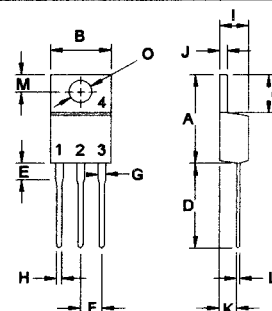
12 AMPERE
DARLINGTON
COMPLEMENTARY SILICON
POWER TRANSISTORS
45-100 VOLTS
80 WATTS

MAXIMUM RATINGS

Characteristic	Symbol	BDW93 BDW94	BDW93A BDW94A	BDW93B BDW94B	BDW93C BDW94C	Unit
Collector-Emitter Voltage	V_{CEO}	45	60	80	100	V
Collector-Base Voltage	V_{CBO}	45	60	80	100	V
Emitter-Base Voltage	V_{EBO}	5.0				V
Collector Current - Continuous	I_C	12				A
Peak	I_{CM}	15				A
Base Current	I_B	0.2				A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	80 0.64				W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150				$^\circ\text{C}$



TO-220

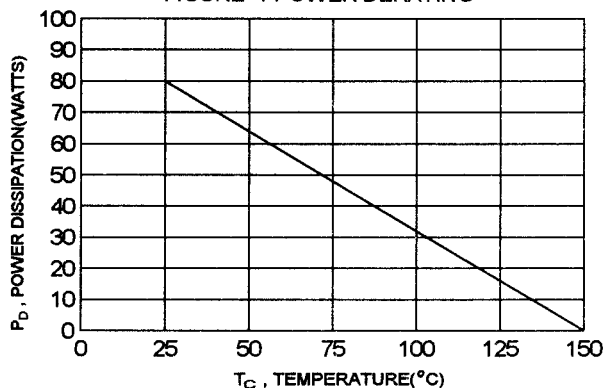


PIN 1.BASE
2.COLLECTOR
3.EMITTER
4.COLLECTOR(CASE)

THERMAL CHARACTERISTICS

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

FIGURE -1 POWER DERATING



DIM	MILLIMETERS	
	MIN	MAX
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

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

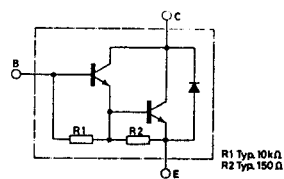
Collector-Emitter Sustaining Voltage(1) ($I_C = 100\text{ mA}$, $I_B = 0$)	BDW93, BDW94 BDW93A, BDW94A BDW93B, BDW94B BDW93C, BDW94C	$V_{CEO(sus)}$	45 60 80 100	V
Collector Cutoff Current ($V_{CE} = 40\text{ V}$, $I_B = 0$) ($V_{CE} = 60\text{ V}$, $I_B = 0$) ($V_{CE} = 80\text{ V}$, $I_B = 0$) ($V_{CE} = 80\text{ V}$, $I_B = 0$)	BDW93, BDW94 BDW93A, BDW94A BDW93B, BDW94B BDW93C, BDW94C	I_{CEO}	1.0 1.0 1.0 1.0	mA
Collector-Base Cutoff Current ($V_{CB} = \text{Rated } V_{CB}$, $I_E = 0$)		I_{CBO}	100	μA
Emitter-Base Cutoff Current ($V_{EB} = 5.0\text{ V}$, $I_C = 0$)		I_{EBO}	2.0	mA

ON CHARACTERISTICS (1)

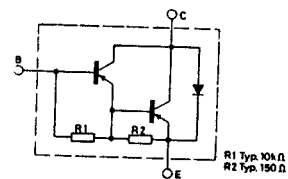
DC Current Gain ($I_C = 3.0\text{ A}$, $V_{CE} = 3.0\text{ V}$) ($I_C = 5.0\text{ A}$, $V_{CE} = 3.0\text{ V}$) ($I_C = 10\text{ A}$, $V_{CE} = 3.0\text{ V}$)	h_{FE}	1000 750 100	20000	
Collector-Emitter Saturation Voltage ($I_C = 5.0\text{ A}$, $I_B = 20\text{ mA}$) ($I_C = 10\text{ A}$, $I_B = 100\text{ mA}$)	$V_{CE(sat)}$		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 μs , Duty Cycle $\leq 2.0\%$

BDW93 Series NPN



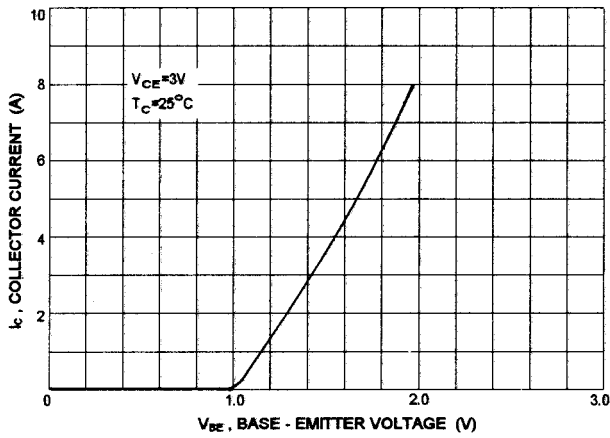
BDW94 Series PNP



BDW93,A,B,C NPN / BDW93,A,B,C PNP

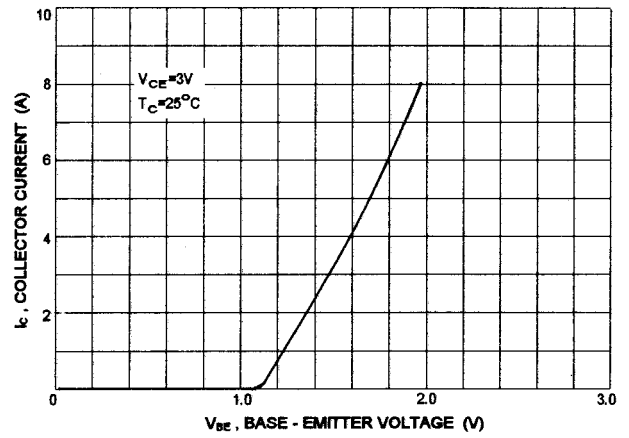
NPN BDW93,A,B,C

$I_c - V_{be}$

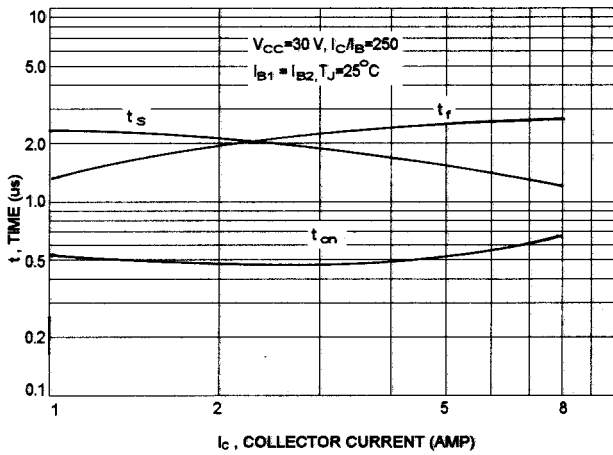


PNP BDW94,A,B,C

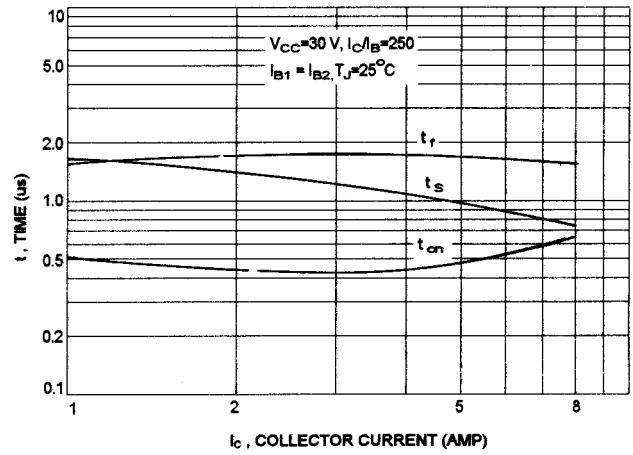
$I_c - V_{be}$



SWITCHING TIME

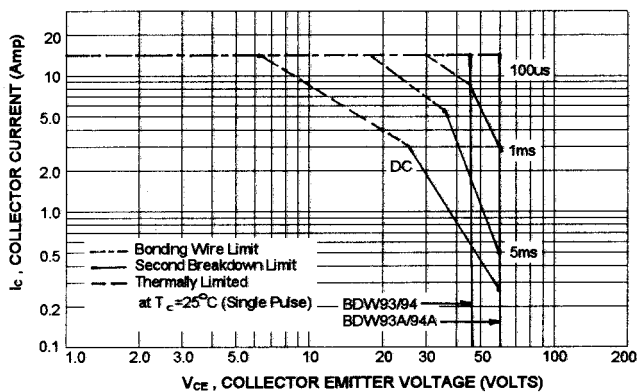


SWITCHING TIME



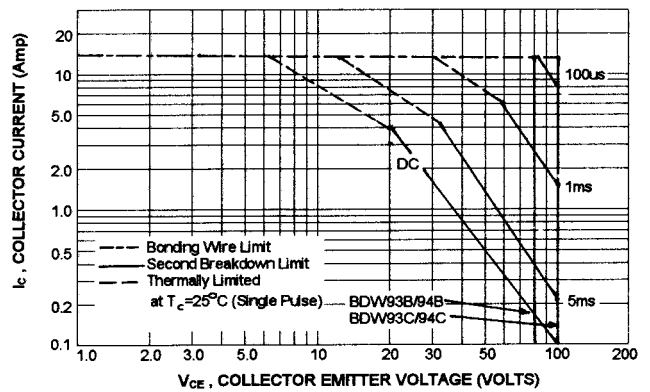
NPN BDW93,A / PNPBDW94,A

ACTIVE-REGION SAFE OPERATING AREA (SOA)

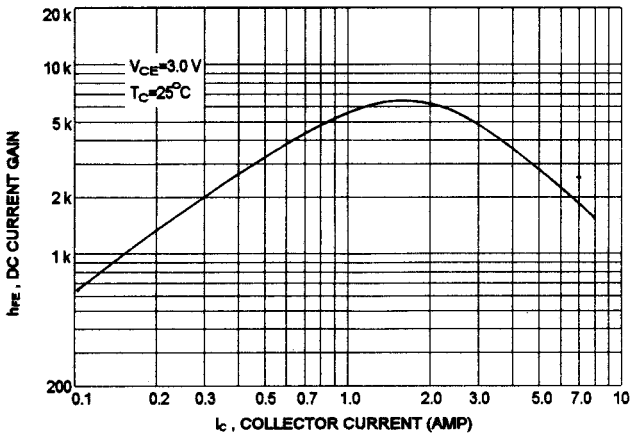


NPN BDW93B,C / PNP BDW94B,C

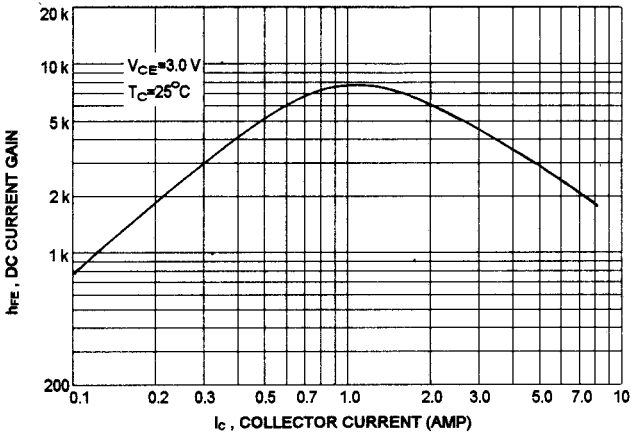
ACTIVE-REGION SAFE OPERATING AREA (SOA)



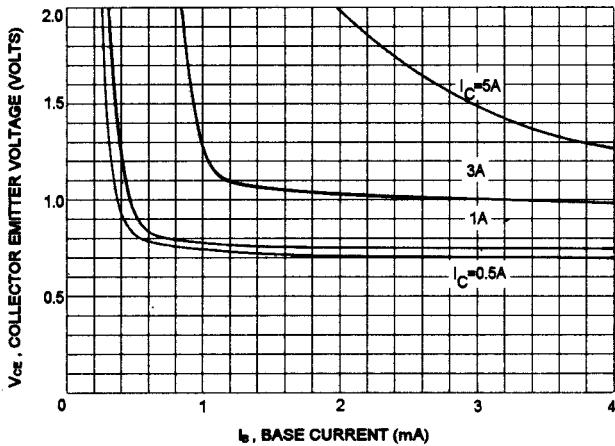
NPN BDW93,A,B,C
DC CURRENT GAIN



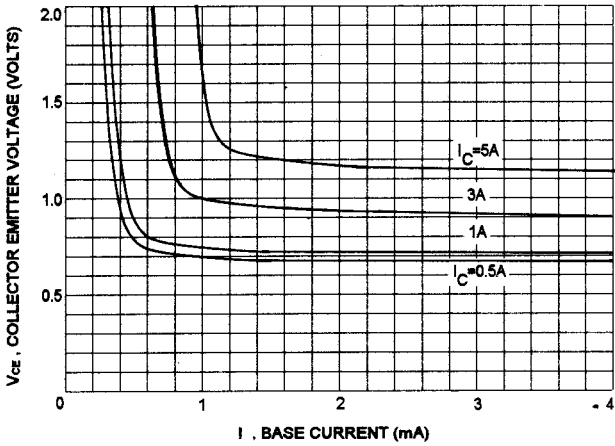
PNP BDW94,A,B,C
DC CURRENT GAIN



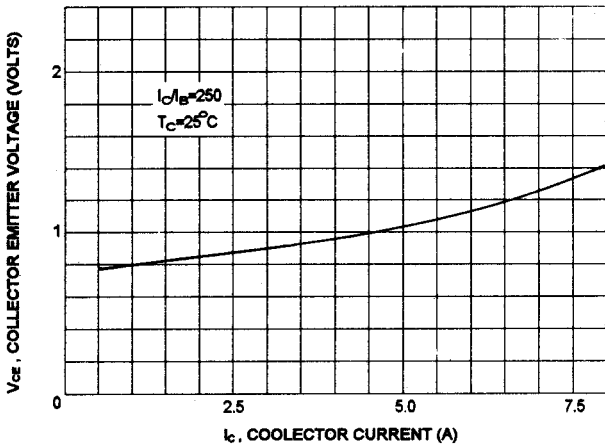
COLLECTOR SATURATION REGION



COLLECTOR SATURATION REGION



$V_{CE(sat)} - I_C$



$V_{CE(sat)} - I_C$

