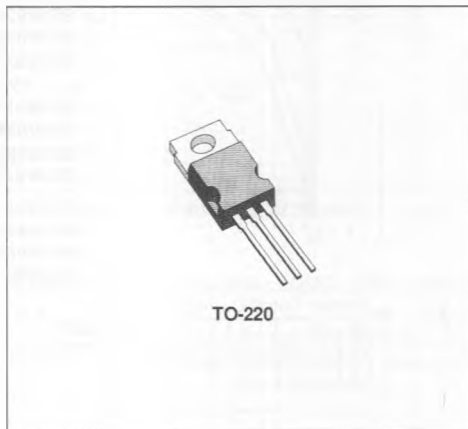


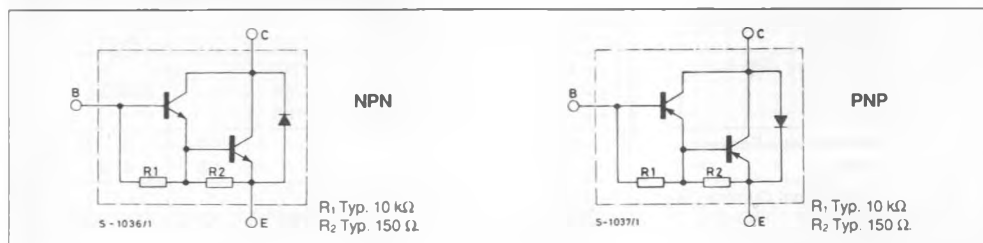
NPN/PNP POWER DARLINGTONS

DESCRIPTION

The BDW93, BDW93A, BDW93B and BDW93C are silicon epitaxial-base NPN transistors in monolithic Darlington configuration and are mounted in Jedec TO-220 plastic package. They are intended for use in power linear and switching applications. The complementary PNP types are the BDW94, BDW94A, BDW94B and BDW94C respectively.



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	NPN PNP*	Value				Unit
			BDW93 BDW94	BDW93A BDW94A	BDW93B BDW94B	BDW93C BDW94C	
V_{CBO}	Collector-base Voltage ($I_E = 0$)		45	60	80	100	V
V_{CEO}	Collector-emitter Voltage ($I_B = 0$)		45	60	80	100	V
I_C	Collector Current		12				A
I_{CM}	Collector Peak Current		15				A
I_B	Base Current		0.2				A
P_{tot}	Total Power Dissipation at $T_{case} \leq 25^\circ\text{C}$		80				W
T_{stg}	Storage Temperature		- 65 to 150				$^\circ\text{C}$
T_j	Junction Temperature		150				$^\circ\text{C}$

* For PNP types voltage and current values are negative.

THERMAL DATA

$R_{th(j-case)}$	Thermal Resistance Junction-case	Max	1.56	°C/W
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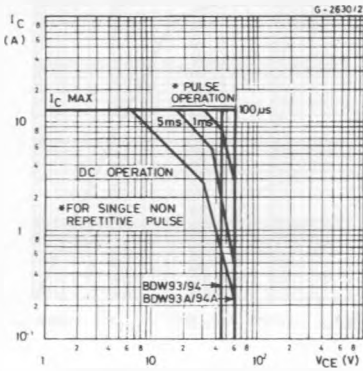
ELECTRICAL CHARACTERISTICS ($T_{case} = 25\text{ °C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current ($I_E = 0$)	for BDW93/94 $V_{CB} = 45\text{ V}$ for BDW93A/94A $V_{CB} = 60\text{ V}$ for BDW93B/94B $V_{CB} = 80\text{ V}$ for BDW93C/94C $V_{CB} = 100\text{ V}$ $T_{case} = 150\text{ °C}$ for BDW93/94 $V_{CB} = 45\text{ V}$ for BDW93A/94A $V_{CB} = 60\text{ V}$ for BDW93B/94B $V_{CB} = 80\text{ V}$ for BDW93C/94C $V_{CB} = 100\text{ V}$			100 100 100 100 5 5 5 5	μA μA μA μA mA mA mA mA
I_{CEO}	Collector Cutoff Current ($I_B = 0$)	for BDW93/94 $V_{CE} = 40\text{ V}$ for BDW93A/94A $V_{CE} = 60\text{ V}$ for BDW93B/94B $V_{CE} = 80\text{ V}$ for BDW93C/94C $V_{CE} = 80\text{ V}$			1 1 1 1	mA mA mA mA
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = 5\text{ V}$			2	mA
$V_{CE(sus)}^*$	Collector-emitter Sustaining Voltage ($I_B = 0$)	$I_C = 100\text{ mA}$ for BDW93/94 for BDW93A/94A for BDW93B/94B for BDW93C/94C	45 60 80 100			V V V V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 5\text{ A}$ $I_C = 10\text{ A}$	$I_B = 20\text{ mA}$ $I_B = 100\text{ mA}$		2 3	V V
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 5\text{ A}$ $I_C = 10\text{ A}$	$I_B = 20\text{ mA}$ $I_B = 100\text{ mA}$		2.5 4	V V
h_{FE}^*	DC Current Gain	$I_C = 3\text{ A}$ $I_C = 5\text{ A}$ $I_C = 10\text{ A}$	$V_{CE} = 3\text{ V}$ $V_{CE} = 3\text{ V}$ $V_{CE} = 3\text{ V}$	1000 750 100		20000
V_F^*	Parallel-diode Forward Voltage	$I_F = 5\text{ A}$ $I_F = 10\text{ A}$			1.3 1.8	2 4 V V
h_{ie}	Small Signal Current Gain	$I_C = 1\text{ A}$ $f = 1\text{ MHz}$	$V_{CE} = 10\text{ V}$	20		

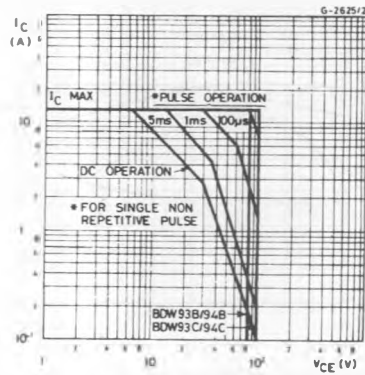
* Pulsed pulse duration = 300 μs , duty cycle = 1.5 %.

For PNP types voltage and current values are negative.

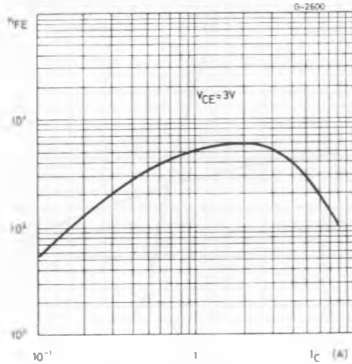
Safe Operating Areas (for BDW93, BDW93A, BDW94, BDW94A).



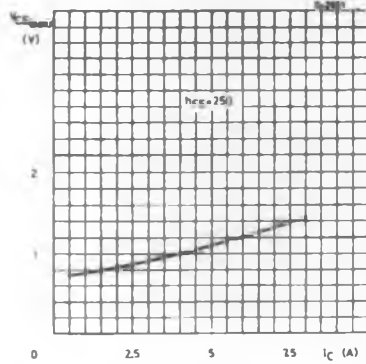
Safe Operating Areas (for BDW93B, BDW93C, BDW94B, BDW94C).



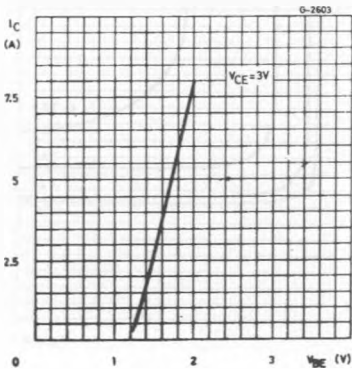
DC Current Gain (NPN types).



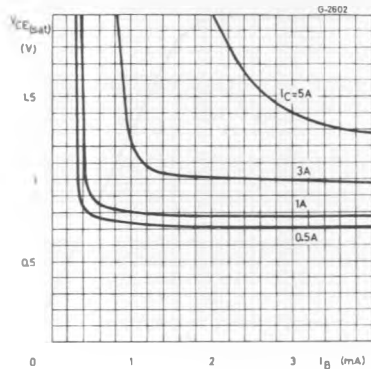
Collector-emitter Saturation Voltage (NPN types).



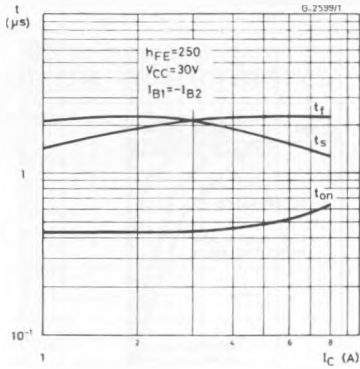
DC Transconductance (NPN types).



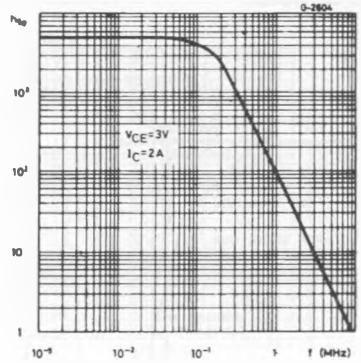
Collector-emitter Saturation Voltage (NPN types).



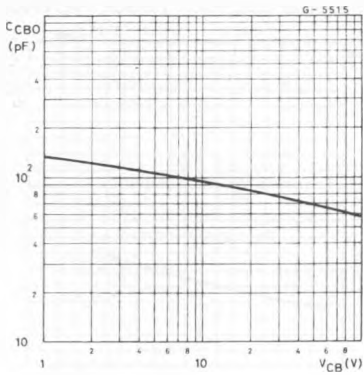
Saturated Switching Characteristics (NPN types).



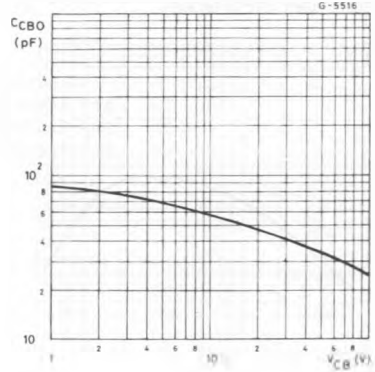
Small Signal Current Gain (NPN types).



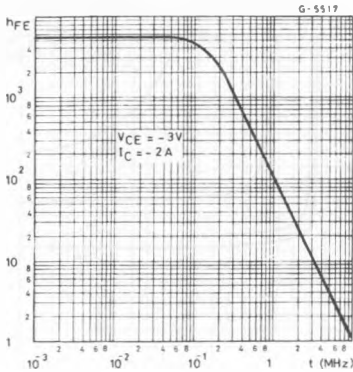
Collector-base Capacitance (PNP types).



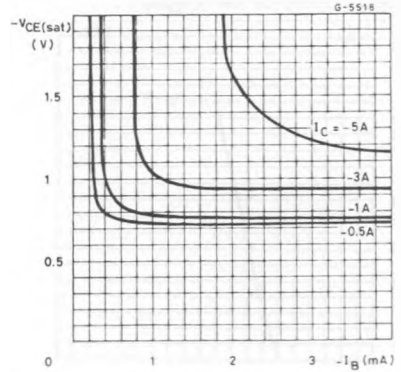
Collector-base Capacitance (NPN types).



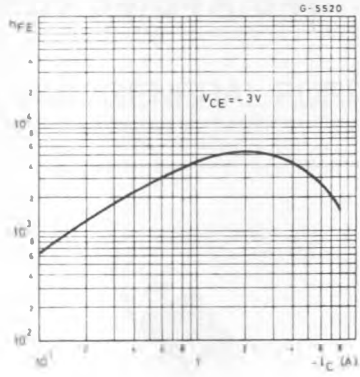
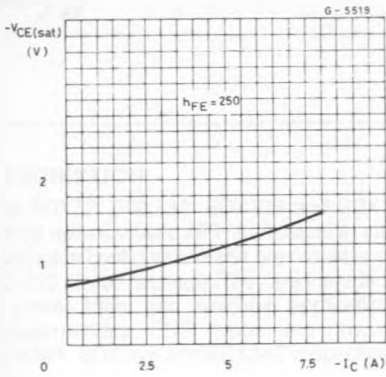
Small Signal Current Gain (PNP types).



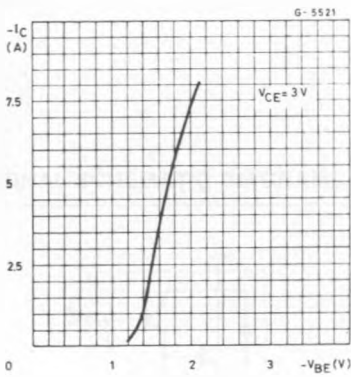
Collector-emitter Saturation Voltage (PNP types).



Collector-emitter Saturation Voltage (PNP types).



DC Transconductance (PNP types).



Saturated Switching Characteristics (PNP types).

