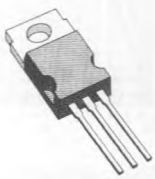
SGS-THOMSON MICROELECTRONICS

BDW93/A/B/C
BDW94/A/B/C

NPN/PNP POWER DARLINGTONS

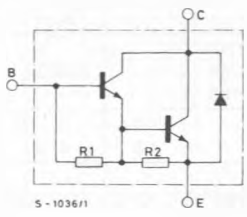
DESCRIPTION

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.



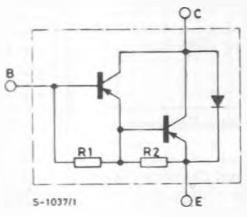
TO-220

INTERNAL SCHEMATIC DIAGRAM



NPN

R_1 Typ. 10 kΩ
R_2 Typ. 150 Ω.



PNP

R_1 Typ. 10 kΩ
R_2 Typ. 150 Ω.

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 $T_{case} \leq 25$ °C		80				W
T_{stg}	Storage Temperature		– 65 to 150				°C
T_j	Junction Temperature		150				°C

* For PNP types voltage and current values are negative.

THERMAL DATA

$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	1.56	°C/W

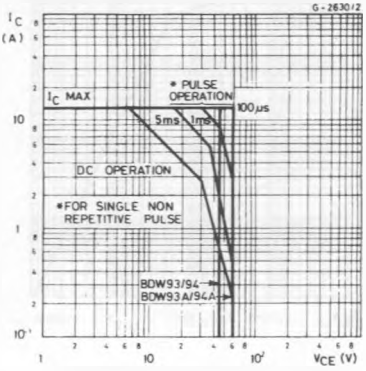
ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

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

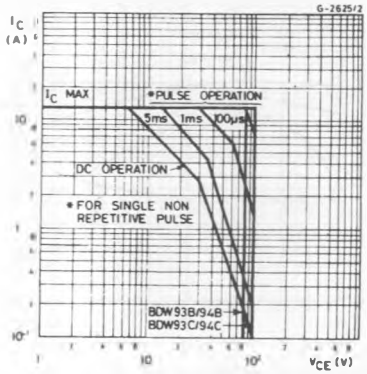
* Pulsed: pulse duration = 300 μs, duty cycle = 1.5 %.

For PNP types voltage and current values are negative.

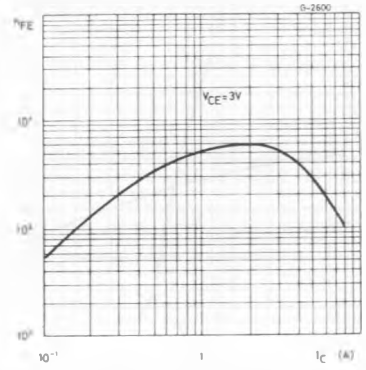
Safe Operating Areas (for **BDW93**. **BDW93A**. **BDW94**. **BDW94A**).



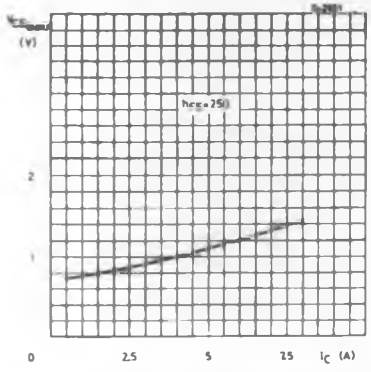
Safe Operating Areas (for **BDW93B**. **BDW93C**. **BDW94B**. **BDW94C**).



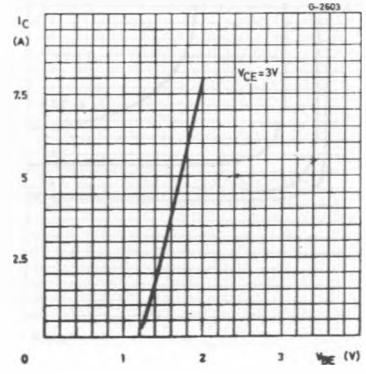
DC Current Gain (NPN types).



Collector-emitter Saturation Voltage (NPN types).



DC Transconductance (NPN types).



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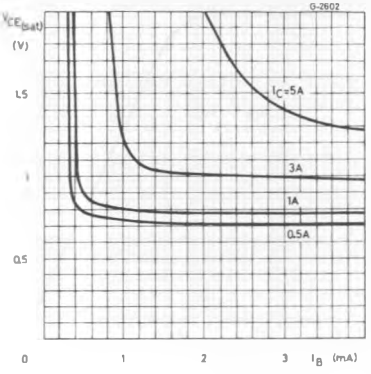
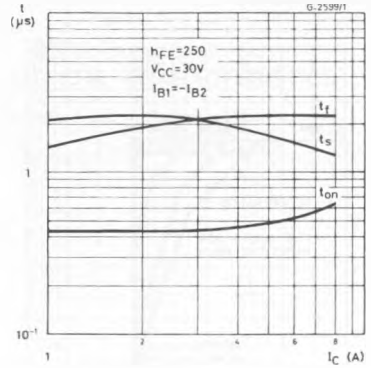
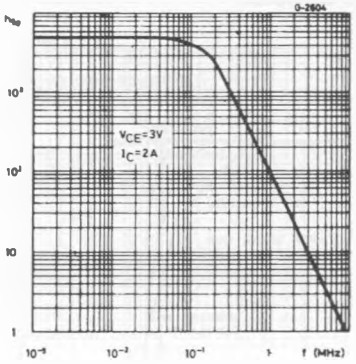


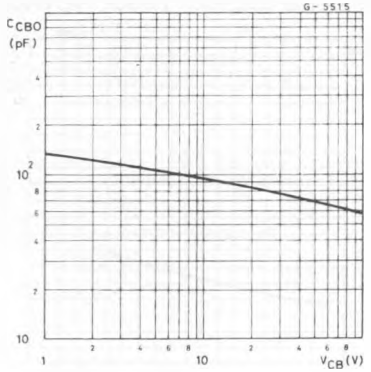
Saturated Switching Characteristics (NPN types).



Small Signal Current Gain (NPN types).



Collector-base Capacitance (PNP types).



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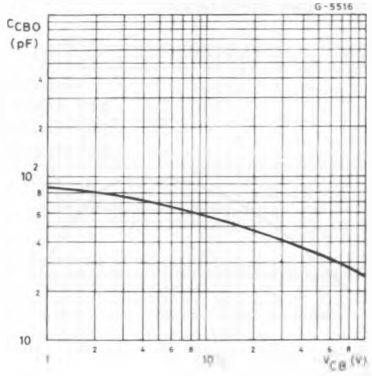

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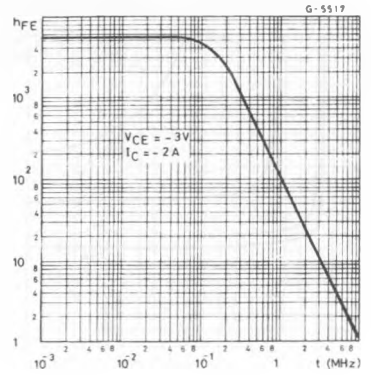
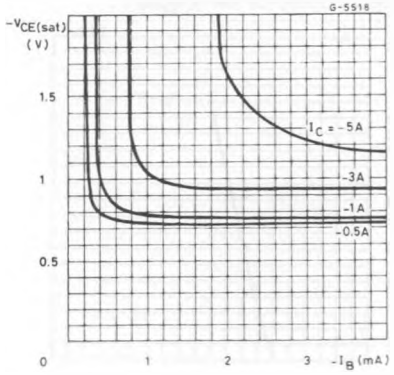
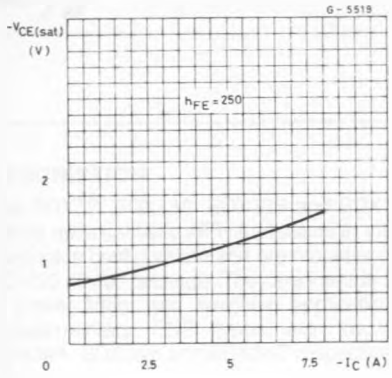
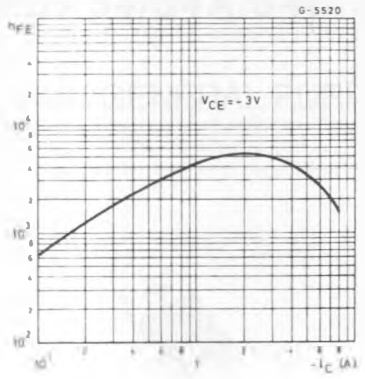


Collector-emitter Saturation Voltage (PNP types).

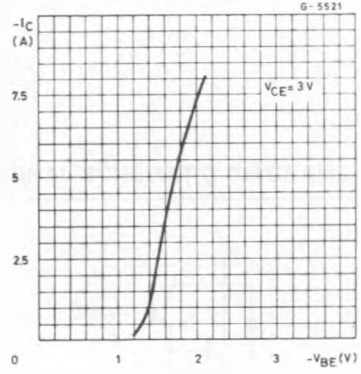


Collector-emitter Saturation Voltage (PNP types).





DC Transconductance (PNP types).



Saturated Switching Characteristics (PNP types).