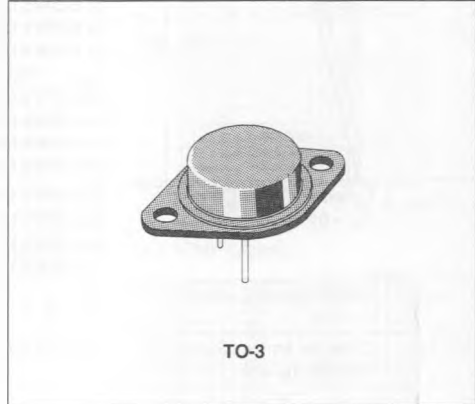


## POWER LINEAR AND SWITCHING APPLICATIONS

### DESCRIPTION

The BDW51, BDW51A, BDW51B and BDW51C are silicon epitaxial-base NPN power transistors in Jedec TO-3 metal case. They are intended for use in power linear and switching applications.

The complementary PNP types are the BDW52, BDW52A, BDW52B and BDW52C respectively.



### INTERNAL SCHEMATIC DIAGRAMS



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	NPN PNP*	Value				Unit
			BDW51 BDW52	BDW51A BDW52A	BDW51B BDW52B	BDW51C BDW52C	
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )		45	60	80	100	V
$V_{CES}$	Collector-emitter Voltage ( $V_{BE} = 0$ )		45	60	80	100	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )		45	60	80	100	V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )		5				V
$I_C$	Collector Current		15				A
$I_{CM}$	Collector Peak Current (repetitive)		20				A
$I_B$	Base Current		7				A
$P_{Tot}$	Total Power Dissipation at $T_{case} \leq 25^\circ\text{C}$		125				W
$T_{stg}$	Storage Temperature		- 65 to 200				$^\circ\text{C}$
$T_j$	Junction Temperature		200				$^\circ\text{C}$

For PNP types voltage and current values are negative

**THERMAL DATA**

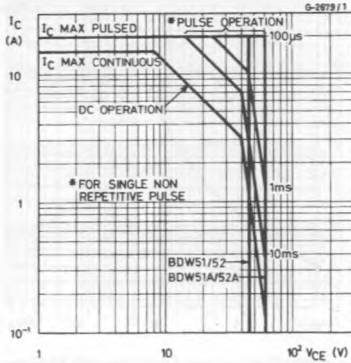
$R_{\text{Th(case)}}$	Thermal Resistance Junction-case	Max	1.4	°C/W
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**ELECTRICAL CHARACTERISTICS** ( $T_{\text{case}} = 25\text{ °C}$  unless otherwise specified)

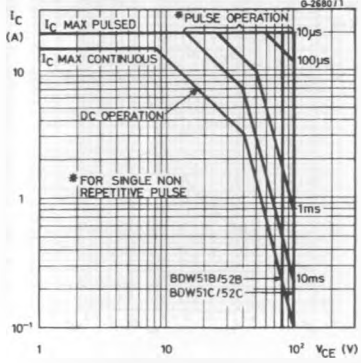
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{\text{CBO}}$	Collector Cutoff Current ( $I_{\text{E}} = 0$ )	for <b>BDW51/52</b> $V_{\text{CB}} = 45\text{ V}$			500	$\mu\text{A}$
		for <b>BDW51A/52A</b> $V_{\text{CB}} = 60\text{ V}$			500	$\mu\text{A}$
		for <b>BDW51B/52B</b> $V_{\text{CB}} = 80\text{ V}$			500	$\mu\text{A}$
		for <b>BDW51C/52C</b> $V_{\text{CB}} = 100\text{ V}$			500	$\mu\text{A}$
		$T_{\text{case}} = 150\text{ °C}$ for <b>BDW51/52</b> $V_{\text{CB}} = 45\text{ V}$			5	$\text{mA}$
		for <b>BDW51A/52A</b> $V_{\text{CB}} = 60\text{ V}$			5	$\text{mA}$
$I_{\text{CEO}}$	Collector Cutoff Current ( $I_{\text{B}} = 0$ )	for <b>BDW51/52</b> $V_{\text{CE}} = 22\text{ V}$			1	$\text{mA}$
		for <b>BDW51A/52A</b> $V_{\text{CE}} = 30\text{ V}$			1	$\text{mA}$
		for <b>BDW51B/52B</b> $V_{\text{CE}} = 40\text{ V}$			1	$\text{mA}$
		for <b>BDW51C/52C</b> $V_{\text{CE}} = 50\text{ V}$			1	$\text{mA}$
$I_{\text{EBO}}$	Emitter Cutoff Current ( $I_{\text{C}} = 0$ )	$V_{\text{EB}} = 5\text{ V}$			2	$\text{mA}$
$V_{\text{CE(ISO)}}$ *	Collector-emitter Sustaining Voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = 100\text{ mA}$ for <b>BDW51/52</b> for <b>BDW51A/52A</b> for <b>BDW51B/52B</b> for <b>BDW51C/52C</b>	45 60 80 100			V
$V_{\text{CE(sat)}}$ *	Collector-emitter Saturation Voltage	$I_{\text{C}} = 5\text{ A}$ $I_{\text{B}} = 0.5\text{ A}$			1	V
		$I_{\text{C}} = 10\text{ A}$ $I_{\text{B}} = 2.5\text{ A}$			3	V
$V_{\text{BE(sat)}}$ *	Base-emitter Saturation Voltage	$I_{\text{C}} = 10\text{ A}$ $I_{\text{B}} = 2.5\text{ A}$			2.5	V
$V_{\text{BE}}$ *	Base-emitter Voltage	$I_{\text{C}} = 5\text{ A}$ $V_{\text{CE}} = 4\text{ V}$			1.5	V
$h_{\text{FE}}$ *	DC Current Gain	$I_{\text{C}} = 5\text{ A}$ $V_{\text{CE}} = 4\text{ V}$	20		150	
		$I_{\text{C}} = 10\text{ A}$ $V_{\text{CE}} = 4\text{ V}$	5			
$f_{\text{T}}$	Transition Frequency	$I_{\text{C}} = 0.5\text{ A}$ $V_{\text{CE}} = 4\text{ V}$	3			MHz

\* Pulsed : pulse duration = 300  $\mu\text{s}$ , duty cycle = 1.5 %.  
For PNP types voltage and current values are negative.

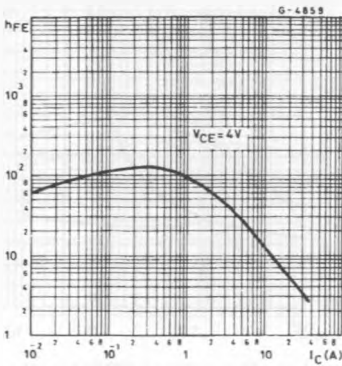
Safe Operating Areas (for BDW51, BDW51A, BDW52, BDW52A).



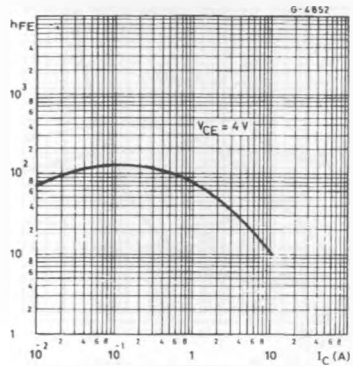
Safe Operating Areas (for BDW51B, BDW51C, BDW52B, BDW52C).



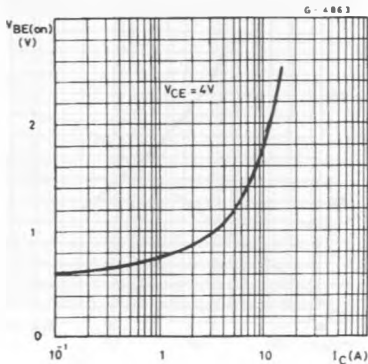
DC Current Gain (NPN types).



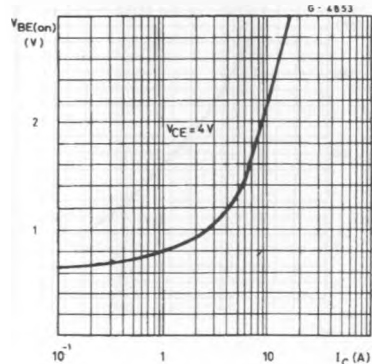
DC Current Gain (PNP types).



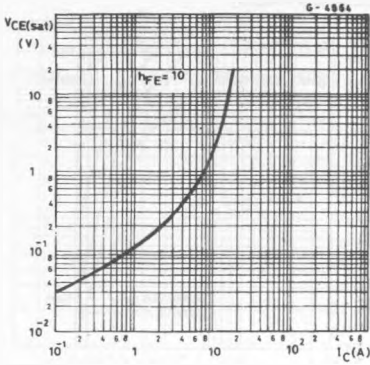
DC Transconductance (NPN types).



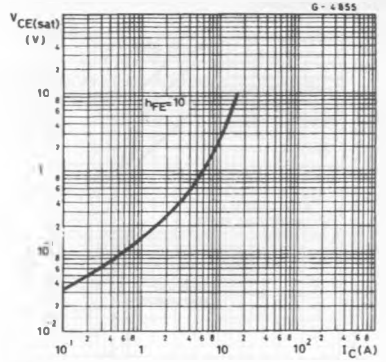
DC Transconductance (PNP types).



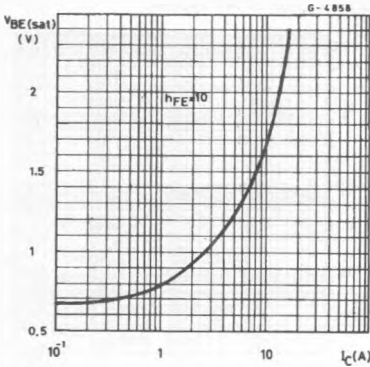
Collector-emitter Saturation Voltage (NPN types).



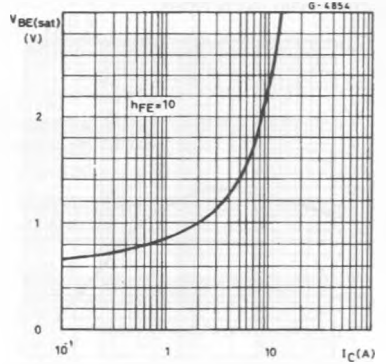
Collector-emitter Saturation Voltage (PNP types).



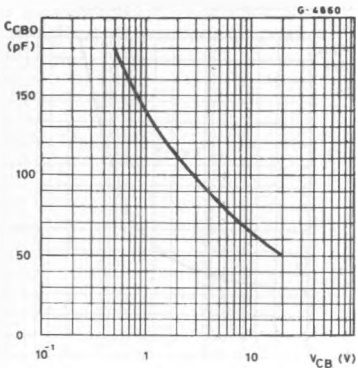
Base-emitter Saturation Voltage (NPN types).



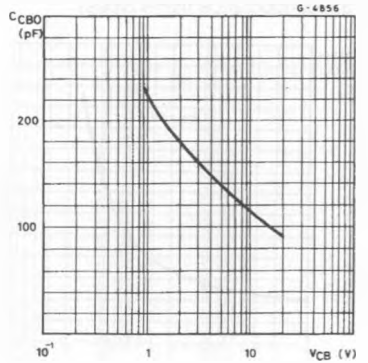
Base-emitter Saturation Voltage (PNP types).



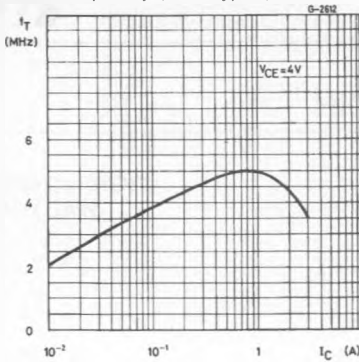
Collector-base Capacitance (NPN types).



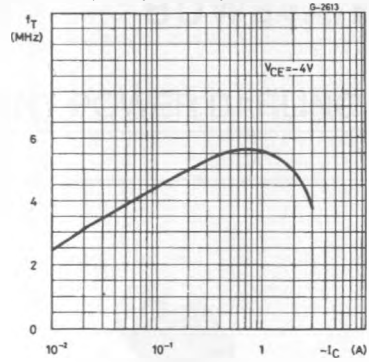
Collector-base Capacitance (PNP types).



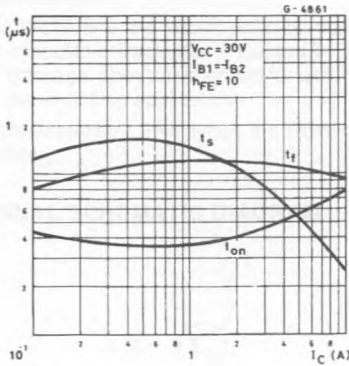
Transition Frequency (NPN types).



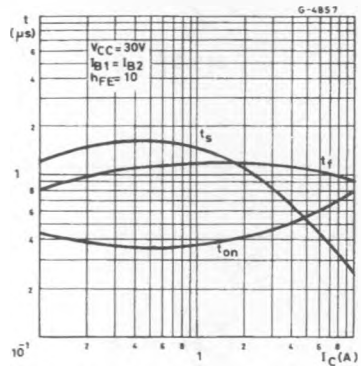
Transition Frequency (PNP types).



Saturated Switching Characteristics (NPN types).



Saturated Switching Characteristics (PNP types).



Power Rating Chart.

