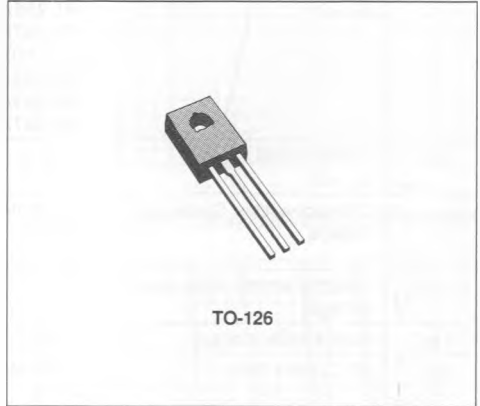


## MEDIUM POWER LINEAR AND SWITCHING APPLICATIONS

### DESCRIPTION

The BD233, BD235 and BD237 are silicon epitaxial-base NPN power transistors in Jedec TO-126 plastic package intended for use in medium power linear and switching applications.

The complementary PNP types are the BD234, BD236 and BD238 respectively.



### INTERNAL SCHEMATIC DIAGRAMS



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	NPN PNP*	Value			Unit
			BD233 BD234	BD235 BD236	BD237 BD238	
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )		45	60	100	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )		45	60	80	V
$V_{CER}$	Collector-emitter Voltage ( $R_{BE} = 1 \text{ K}\Omega$ )		45	60	100	V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )		5			V
$I_C$	Collector Current		2			A
$I_{CM}$	Collector Peak Current		6			A
$P_{Tot}$	Total Power Dissipation at $T_{case} \leq 25 \text{ }^\circ\text{C}$		25			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**

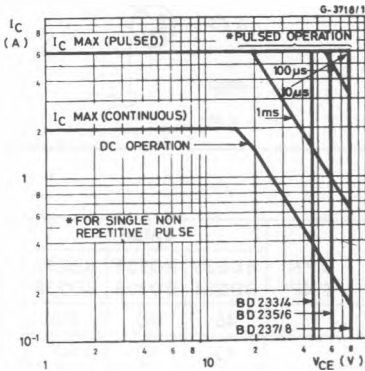
$R_{th(j-c)}$	Thermal Resistance Junction-case	Max	5	°C/W
---------------	----------------------------------	-----	---	------

**ELECTRICAL CHARACTERISTICS** ( $T_{case} = 25\text{ °C}$  unless otherwise specified)

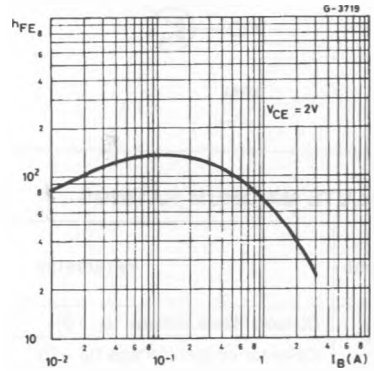
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	for <b>BD233/34</b> $V_{CB} = 45\text{ V}$ for <b>BD235/36</b> $V_{CB} = 60\text{ V}$ for <b>BD237/38</b> $V_{CB} = 100\text{ V}$ $T_{case} = 150\text{ °C}$ for <b>BD233/34</b> $V_{CB} = 45\text{ V}$ for <b>BD235/36</b> $V_{CB} = 60\text{ V}$ for <b>BD237/38</b> $V_{CB} = 100\text{ V}$			100 100 100	$\mu\text{A}$ $\mu\text{A}$ $\mu\text{A}$
$I_{EBO}$	Emitter Cutoff Current ( $I_C = 0$ )	$V_{EB} = 5\text{ V}$			1	$\text{mA}$
$V_{CE(sus)}^*$	Collector-emitter Sustaining Voltage	$I_C = 100\text{ mA}$ for <b>BD233/34</b> for <b>BD235/36</b> for <b>BD237/38</b>	45 60 80			$\text{V}$ $\text{V}$ $\text{V}$
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 1\text{ A}$ $I_B = 0.1\text{ A}$			0.6	$\text{V}$
$V_{BE}^*$	Base-emitter Voltage	$I_C = 1\text{ A}$ $V_{CE} = 2\text{ V}$			1.3	$\text{V}$
$h_{FE}^*$	DC Current Gain	$I_C = 150\text{ mA}$ $V_{CE} = 2\text{ V}$ $I_C = 1\text{ A}$ $V_{CE} = 2\text{ V}$	40 25			
$f_T$	Transition Frequency	$I_C = 250\text{ mA}$ $V_{CE} = 10\text{ V}$	3			$\text{MHz}$
$h_{FE1}/h_{FE2}^*$	Matched Pairs	$I_C = 150\text{ mA}$ $V_{CE} = 2\text{ V}$		1.6		

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

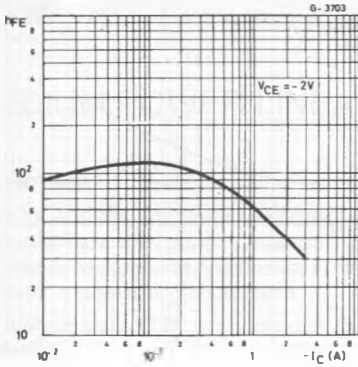
**Safe Operating Areas.**



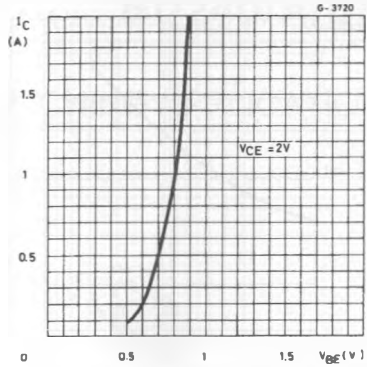
**DC Current Gain (NPN types).**



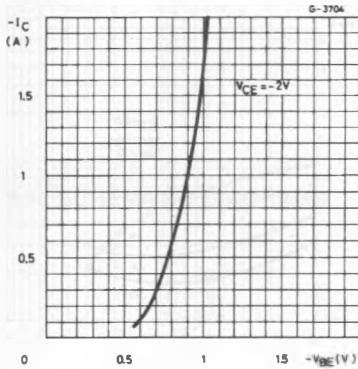
DC Current Gain (PNP types).



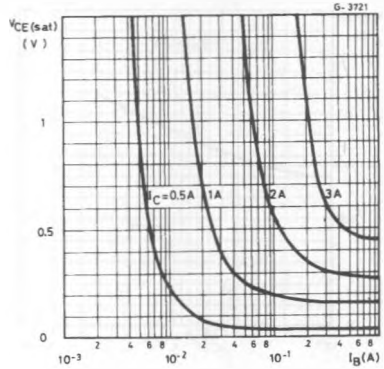
DC Transconductance (NPN types).



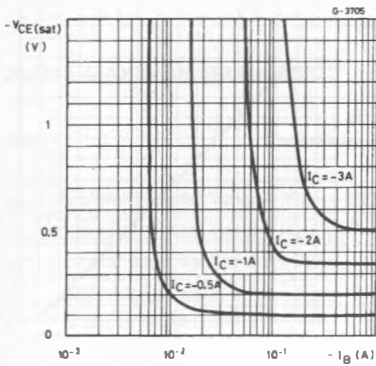
DC Transconductance (PNP types).



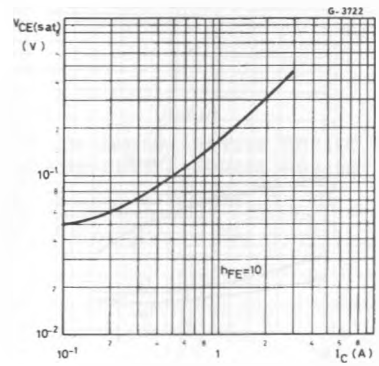
Collector-emitter Saturation Voltage (NPN types).



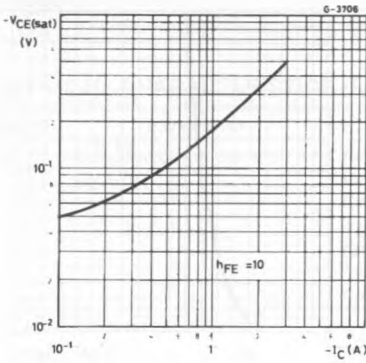
Collector-emitter Saturation Voltage (PNP types).



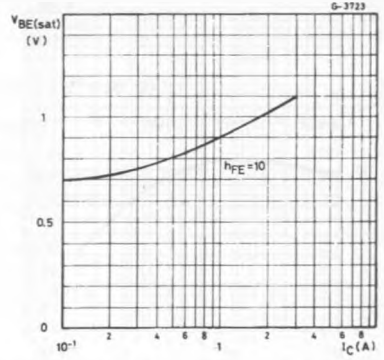
Collector-emitter Saturation Voltage (NPN types).



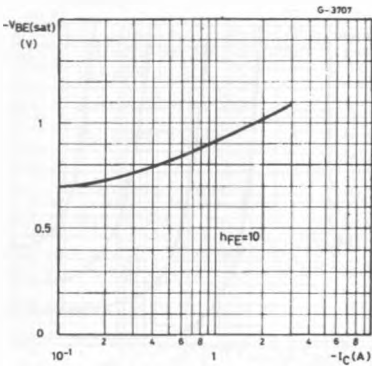
Collector-emitter Saturation Voltage (PNP types).



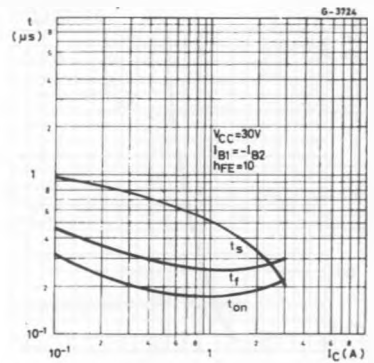
Base-emitter Saturation Voltage (NPN types).



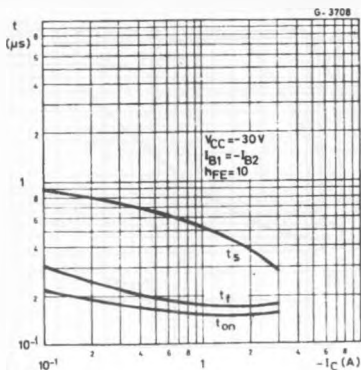
Base-emitter Saturation Voltage (NPN types).



Saturated Switching Characteristics (NPN types)



Saturated Switching Characteristics (PNP types).



Power Derating Chart.

