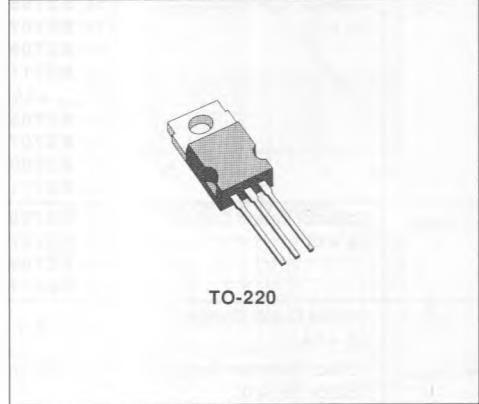


## POWER LINEAR AND SWITCHING APPLICATIONS

### DESCRIPTION

The BD705, BD707, BD709 and BD711 are silicon epitaxial-base NPN power transistors in Jedec TO-220 plastic package intended for use in power linear and switching applications. The complementary PNP types are the BD706, BD708, BD710 and BD712 respectively.



### INTERNAL SCHEMATIC DIAGRAMS



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	NPN PNP*	Value				Unit
			BD705 BD706	BD707 BD708	BD709 BD710	BD711 BD712	
$V_{CBO}$	Collector-emitter 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		12				A
$I_B$	Base Current		5				A
$P_{tot}$	Total Power Dissipation at $T_{case} \leq 25^\circ C$		75				W
$T_{stg}$	Storage Temperature		- 65 to 150				$^\circ C$
$T_j$	Junction Temperature		150				$^\circ C$

\* For PNP types voltage and current values are negative.

## THERMAL DATA

$R_{th(j-case)}$	Thermal Resistance Junction-case	Max	1.67	°C/W
$R_{th(j-amb)}$	Thermal Resistance Junction-ambient	Max	70	°C/W

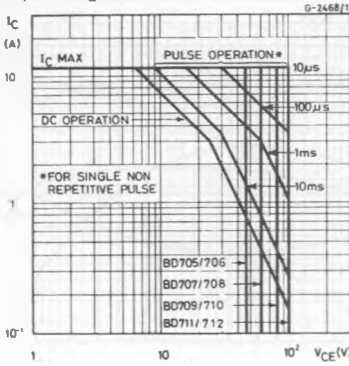
ELECTRICAL CHARACTERISTICS ( $T_{case} = 25\text{ °C}$  unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	for <b>BD705/706</b> for <b>BD707/708</b> for <b>BD709/710</b> for <b>BD711/712</b> $T_{case} = 150\text{ °C}$ for <b>BD705/706</b> for <b>BD707/708</b> for <b>BD709/710</b> for <b>BD711/712</b>	$V_{CB} = 45\text{ V}$ $V_{CB} = 60\text{ V}$ $V_{CB} = 80\text{ V}$ $V_{CB} = 100\text{ V}$ $V_{CB} = 45\text{ V}$ $V_{CB} = 60\text{ V}$ $V_{CB} = 80\text{ V}$ $V_{CB} = 100\text{ V}$			100 100 100 100 1 1 1 1	$\mu\text{A}$ $\mu\text{A}$ $\mu\text{A}$ $\mu\text{A}$ $\text{mA}$ $\text{mA}$ $\text{mA}$ $\text{mA}$
$I_{CEO}$	Collector Cutoff Current ( $I_B = 0$ )	for <b>BD705/706</b> for <b>BD707/708</b> for <b>BD709/710</b> for <b>BD711/712</b>	$V_{CE} = 22\text{ V}$ $V_{CE} = 30\text{ V}$ $V_{CE} = 40\text{ V}$ $V_{CE} = 50\text{ V}$			1 1 1 1	$\text{mA}$ $\text{mA}$ $\text{mA}$ $\text{mA}$
$I_{EBO}$	Emitter Cutoff Current ( $I_C = 0$ )	$V_{EB} = 5\text{ V}$				1	$\text{mA}$
$V_{CEO(sus)}^*$	Collector-emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 100\text{ mA}$	for <b>BD705/706</b> for <b>BD707/708</b> for <b>BD709/710</b> for <b>BD711/712</b>	45 60 80 100			$\text{V}$ $\text{V}$ $\text{V}$ $\text{V}$
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 4\text{ A}$	$I_B = 0.4\text{ A}$			1	$\text{V}$
$V_{CEK}^*$	Knee Voltage	$I_C = 3\text{ A}$	$I_B = **$			0.4	$\text{V}$
$V_{BE}^*$	Base-emitter Voltage	$I_C = 4\text{ A}$	$V_{GE} = 4\text{ V}$			1.5	$\text{V}$
$h_{FE}^*$	DC Current Gain	$I_C = 0.5\text{ A}$ $I_C = 2\text{ A}$  $I_C = 4\text{ A}$  $I_C = 10\text{ A}$	$V_{CE} = 2\text{ V}$ $V_{CE} = 2\text{ V}$ for <b>BD705/706</b> for <b>BD707/708</b> for <b>BD709/710</b> $V_{CE} = 4\text{ V}$ for <b>BD705/706</b> for <b>BD707/708</b> for <b>BD709/710</b> for <b>BD711/712</b> $V_{CE} = 4\text{ V}$ for <b>BD705/706</b> for <b>BD707/708</b> for <b>BD709/710</b> for <b>BD711/712</b>	40 30 30 30 20 15 15 15 5 5 8 8	120 30	400 150 150 150	
$f_T$	Transition Frequency	$I_C = 300\text{ mA}$	$V_{CE} = 3\text{ V}$	3			$\text{MHz}$

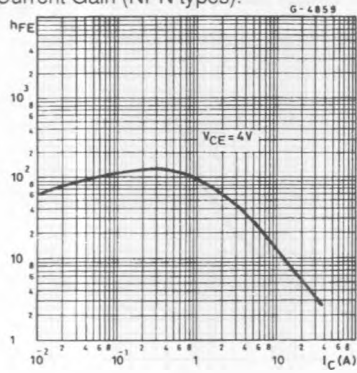
\* Pulsed : pulse duration = 300  $\mu\text{s}$ , duty cycle = 1.5 %.\*\* Value for which  $I_C = 3.3\text{ A}$  at  $V_{CE} = 2\text{ V}$ .

For PNP types voltage and current values are negative.

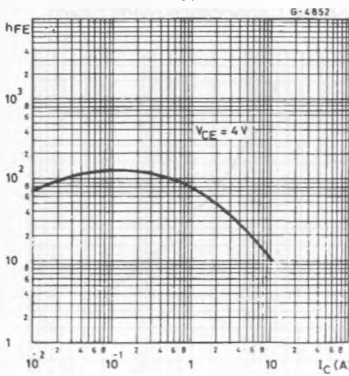
Safe Operating Areas.



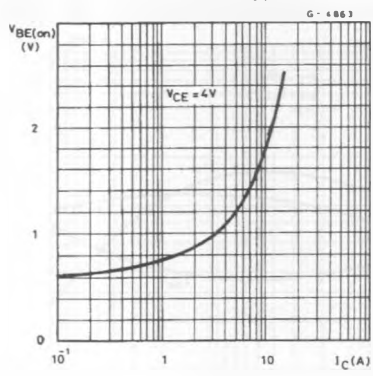
DC Current Gain (NPN types).



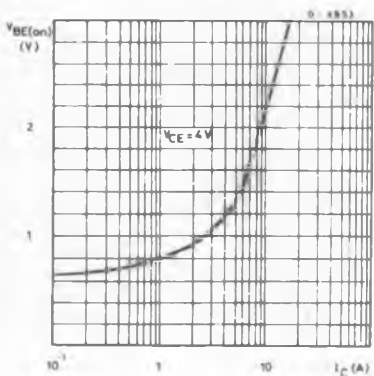
DC Current Gain (PNP types).



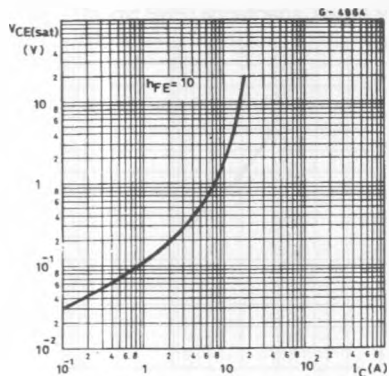
DC Transconductance (NPN types).



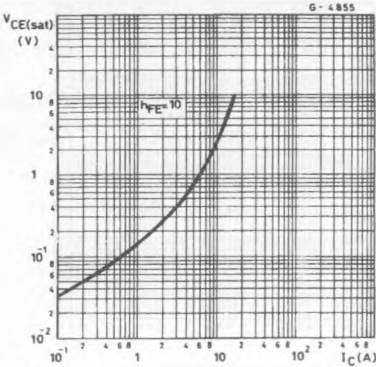
DC Transconductance (PNP types).



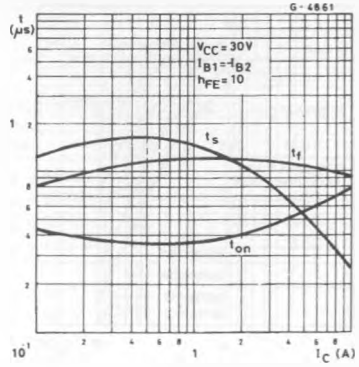
Collector-emitter Saturation Voltage (NPN types).



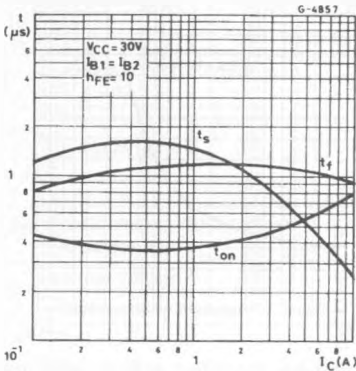
Collector-emitter Saturation Voltage (PNP types).



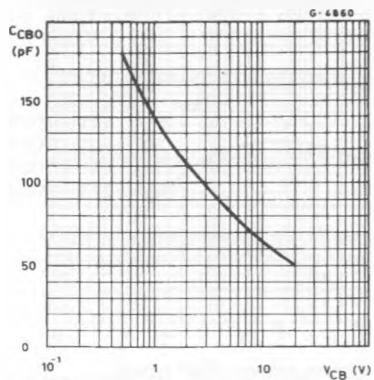
Saturated Switching Characteristics (NPN types).



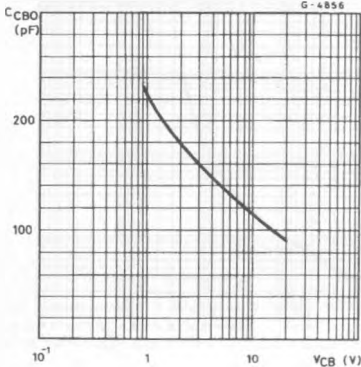
Saturated Switching Characteristics (PNP types).



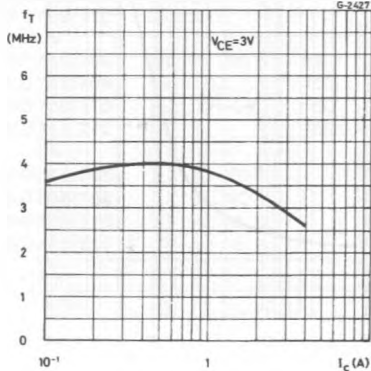
Collector-base Capacitance (NPN types).



Collector-base Capacitance (PNP types).



Transition Frequency (NPN types).



Transition Frequency (PNP types).

