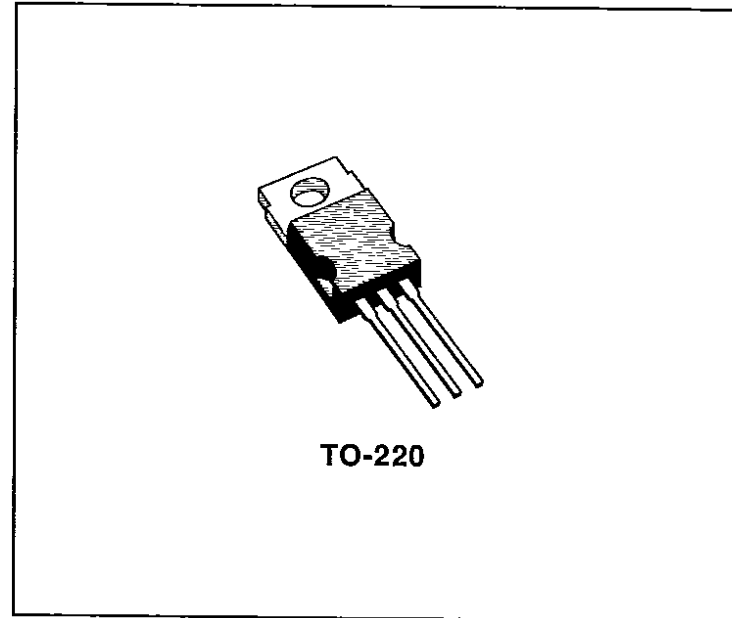


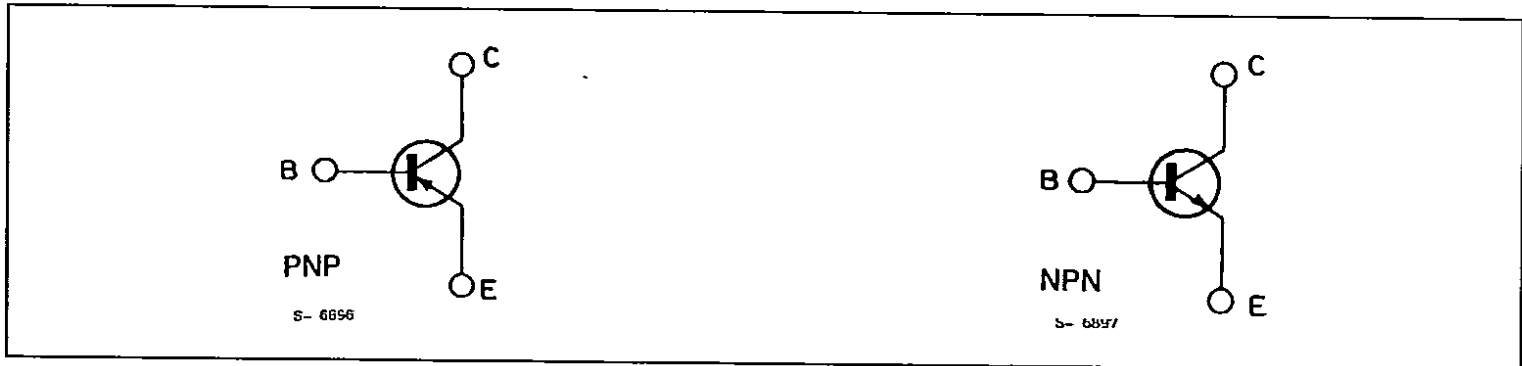


**DESCRIPTION**

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 $T_{case} \leq 25\text{ }^\circ\text{C}$		75				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.

$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	1.67	$^{\circ}C/W$
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	70	$^{\circ}C/W$

**T-33-13**

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

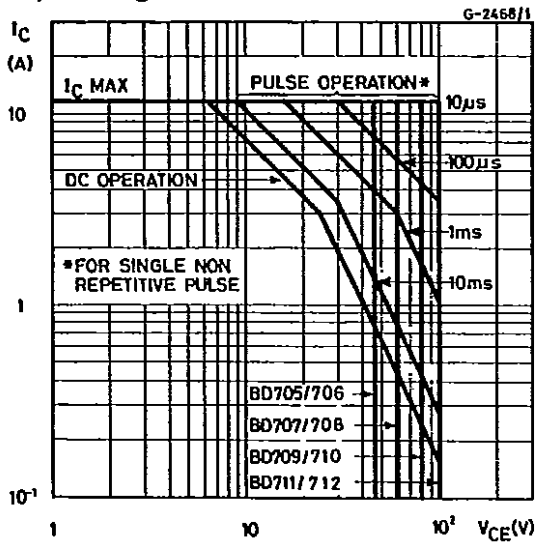
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	for <b>BD705/706</b> $V_{CB} = 45\ V$			100	$\mu A$	
		for <b>BD707/708</b> $V_{CB} = 60\ V$			100	$\mu A$	
		for <b>BD709/710</b> $V_{CB} = 80\ V$			100	$\mu A$	
		for <b>BD711/712</b> $V_{CB} = 100\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

\* Pulsed : pulse duration = 300  $\mu s$ , duty cycle = 1.5 %.

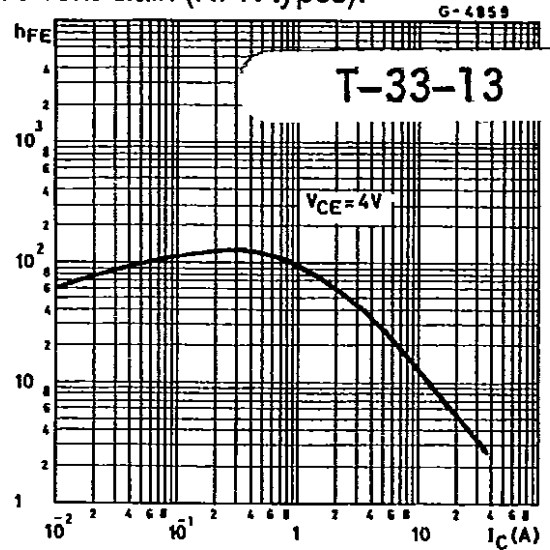
\*\* Value for which  $I_C = 3.3A$  at  $V_{CE} = 2V$ .

For PNP types voltage and current values are negative.

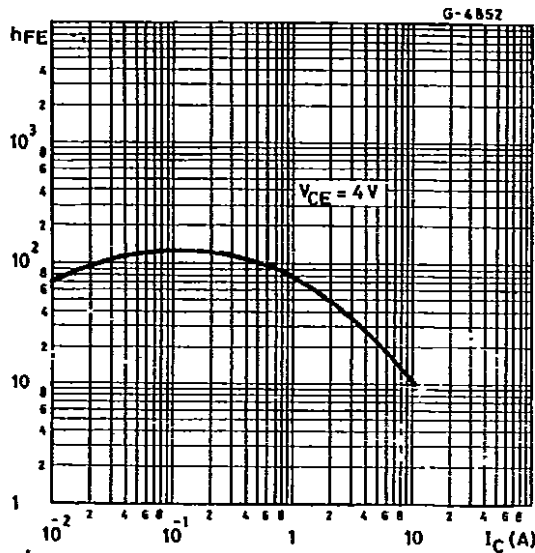
### Safe Operating Areas.



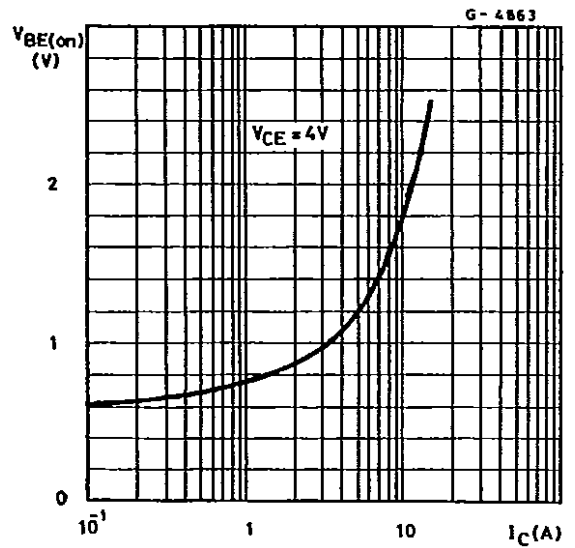
### DC Current Gain (NPN types).



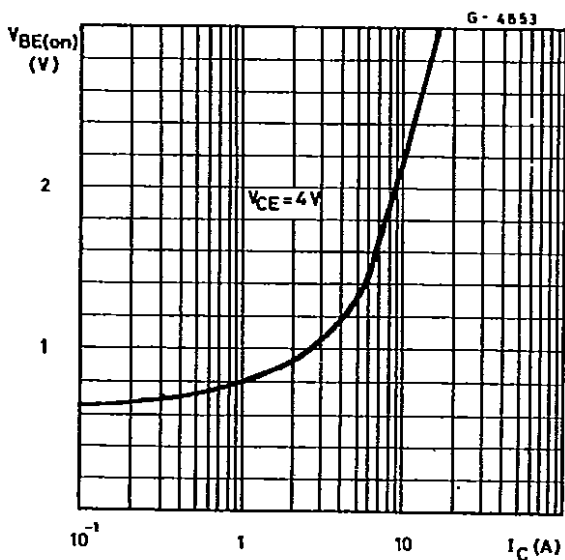
### DC Current Gain (PNP types).



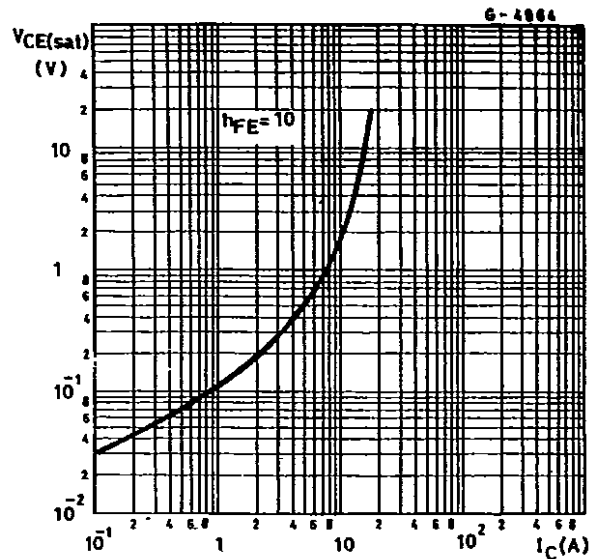
### DC Transconductance (NPN types).



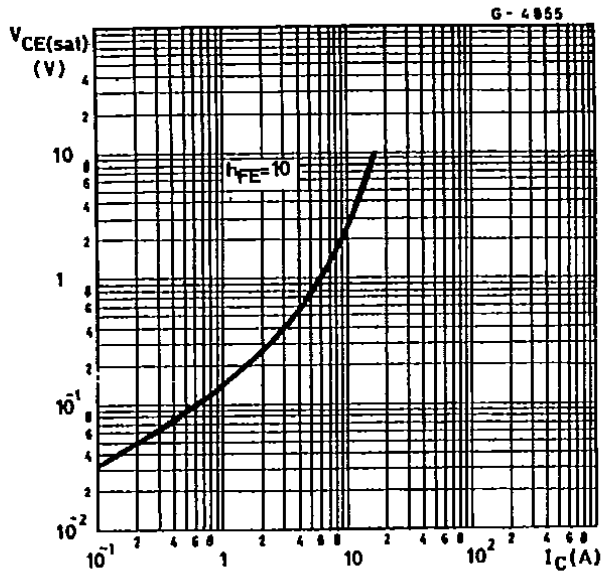
### DC Transconductance (PNP types).



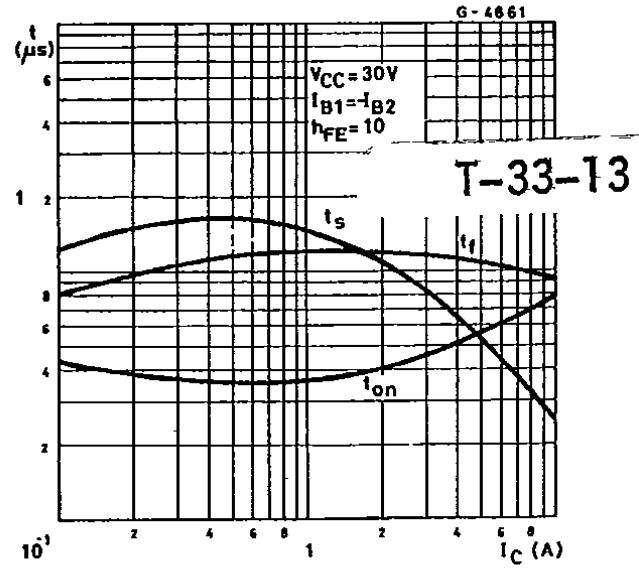
### Collector-emitter Saturation Voltage (NPN types).



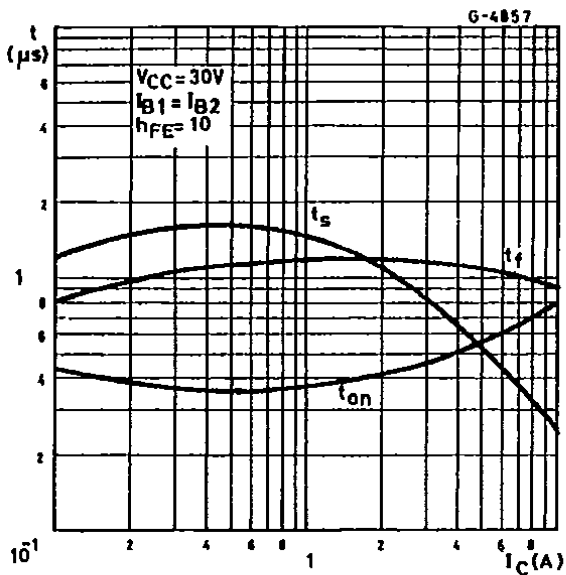
Collector-emitter Saturation Voltage (PNP types).



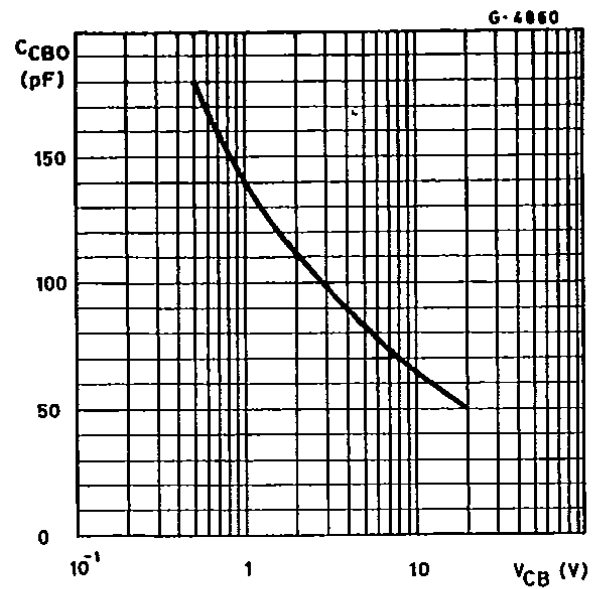
Saturated Switching Characteristics (NPN types)



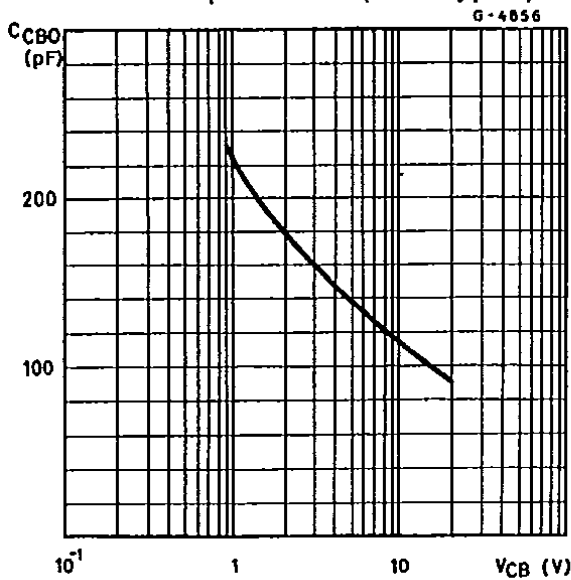
Saturated Switching Characteristics (PNP types).



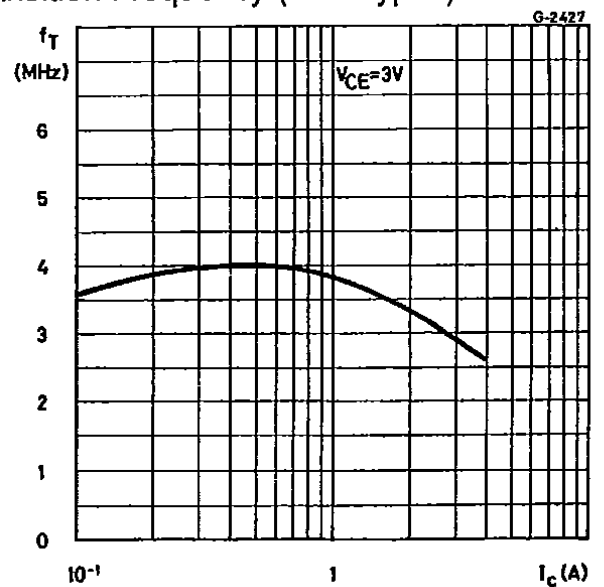
Collector-base Capacitance (NPN types).



Collector-base Capacitance (PNP types).



Transition Frequency (NPN types).



# Transition Frequency (PNP types). Σ 6 Σ

