EPITAXIAL-BASE NPN/PNP

BD705 BD706
BD707 BD708
BD709 BD710
BD711 BD712

POWER LINEAR AND SWITCHING APPLICATIONS

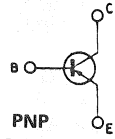
The BD705, BD707, BD709 and BD711 are silicon epitaxial-base NPN power transistors in Jedec TO-220 plastic package intended for use in power linear and switching applications. The complementary PNP types are the BD706, BD708, BD710 and BD712 respectively.

ABSOLUTE MAXIMUM RATINGS

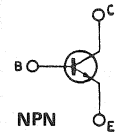
		NPN / PNP*	BD705 / BD706	BD707 / BD708	BD709 / BD710	BD711 / BD712
V_{CBO}	Collector-base voltage ($I_E = 0$)		45V	60V	80V	100V
V_{CES}	Collector-emitter voltage ($V_{BE} = 0$)		45V	60V	80V	100V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)		45V	60V	80V	100V
V_{EBO}	Emitter-base voltage ($I_C = 0$)		5V			
I_C	Collector current		12A			
I_B	Base current		5A			
P_{tot}	Total power dissipation at $T_{case} \leq 25°C$		75W			
T_{stg}	Storage temperature		-65 to 150°C			
T_j	Junction temperature		150°C			

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

INTERNAL SCHEMATIC DIAGRAMS



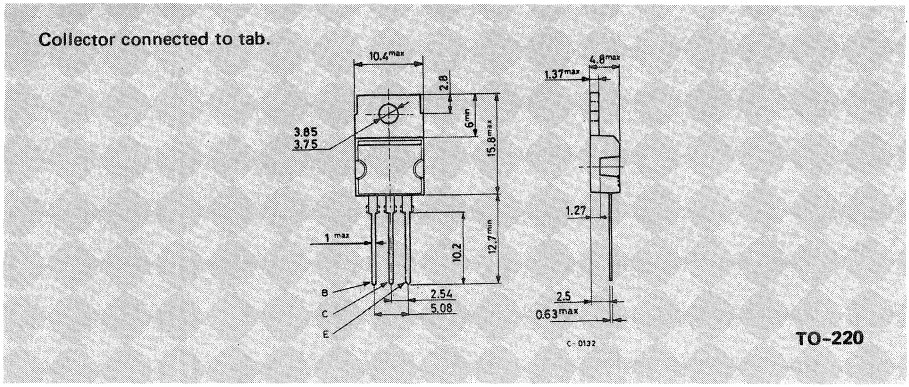
PNP



NPN

MECHANICAL DATA

Dimensions in mm



THERMAL DATA

$R_{th\ j\text{-}case}$	Thermal resistance junction-case	max	1.67	°C/W
$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	70	°C/W

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

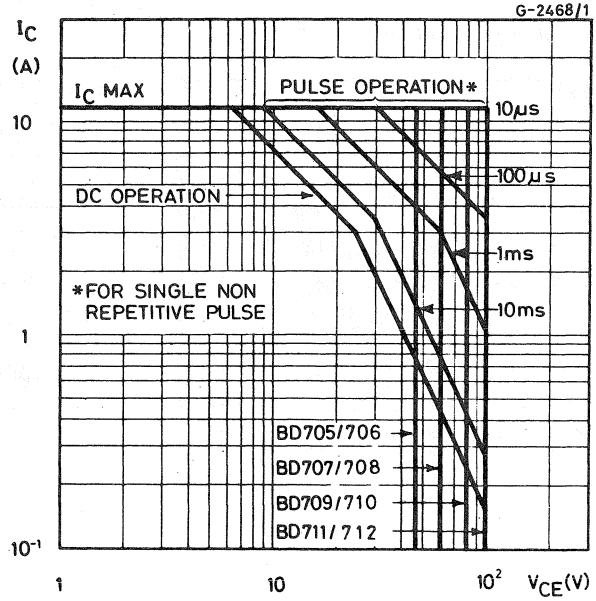
	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cutoff current (I_E = 0)	for **BD705/706** V_{CB} = 45 V			100	μA
		for **BD707/708** V_{CB} = 60 V			100	μA
		for **BD709/710** V_{CB} = 80 V			100	μA
		for **BD711/712** V_{CB} = 100 V			100	μA
		T_{case} = 150°C				
		for **BD705/706** V_{CB} = 45 V			1	mA
		for **BD707/708** V_{CB} = 60 V			1	mA
		for **BD709/710** V_{CB} = 80 V			1	mA
		for **BD711/712** V_{CB} = 100 V			1	mA
I_{CEO}	Collector cutoff current (I_B = 0)	for **BD705/706** V_{CE} = 22 V			1	mA
		for **BD707/708** V_{CE} = 30 V			1	mA
		for **BD709/710** V_{CE} = 40 V			1	mA
		for **BD711/712** 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 **BD705/706**	45			V
		for **BD707/708**	60			V
		for **BD709/710**	80			V
		for **BD711/712**	100			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 = 3A I_B = **		0.4		V
V_{BE}*	Base-emitter voltage	I_C = 4A V_{CE} = 4V			1.5	V

ELECTRICAL CHARACTERISTICS (continued)

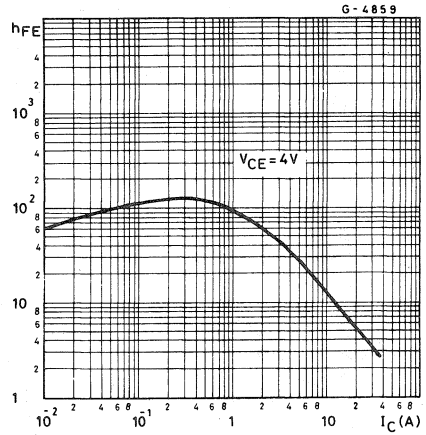
Parameter		Test conditions	Min.	Typ.	Max.	Unit
h_{FE}*	DC current gain	I_C = 0.5A V_{CE} = 2V	40	120	400	—
		I_C = 2A V_{CE} = 2V				
		for **BD705/706**	30			—
		for **BD707/708**	30			—
		for **BD709/710**	30			—
		I_C = 4A V_{CE} = 4V				
		for **BD705/706**	20	30	150	—
		for **BD707/708**	15		150	—
		for **BD709/710**	15		150	—
		for **BD711/712**	15		150	—
		I_C = 10A V_{CE} = 4V				
		for **BD705/706**	5	10		—
		for **BD707/708**	5	10		—
		for **BD709/710**		8		—
		for **BD711/712**		8		—
f_T	Transition frequency	I_C = 300mA V_{CE} = 3V	3			MHz

* Pulsed: pulse duration = 300 μs, duty cycle = 1.5%
** Value for which I_C = 3.3 A at V_{CE} = 2 V
For PNP types voltage and current values are negative

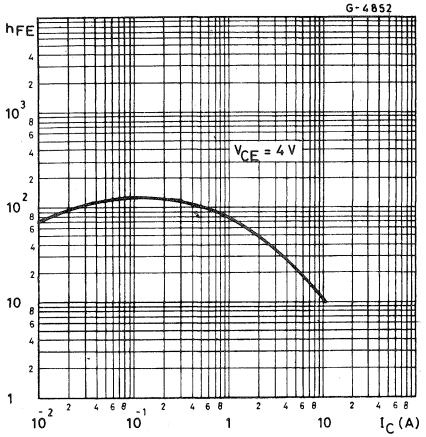
Safe operating areas



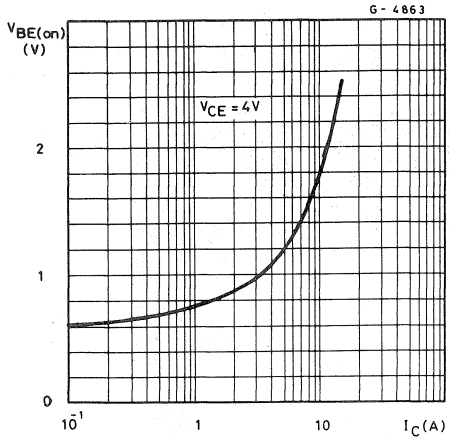
DC current gain (NPN types)



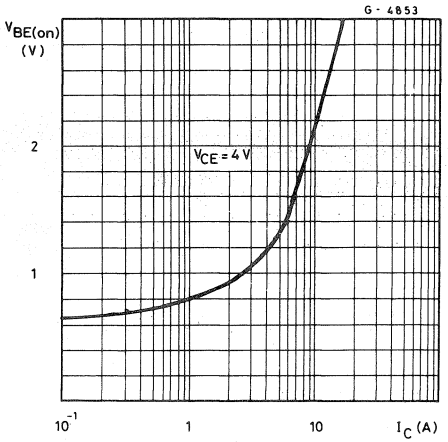
DC current gain (PNP types)



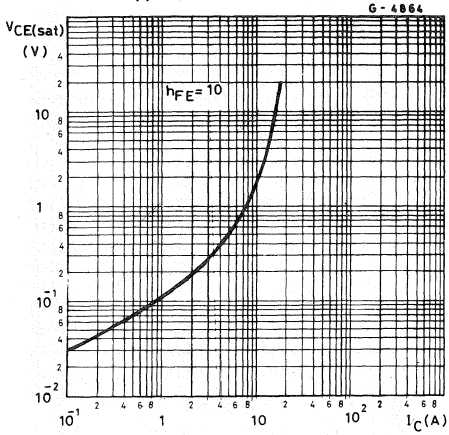
DC transconductance (NPN types)



DC transconductance (PNP types)



Collector-emitter saturation voltage (NPN types)



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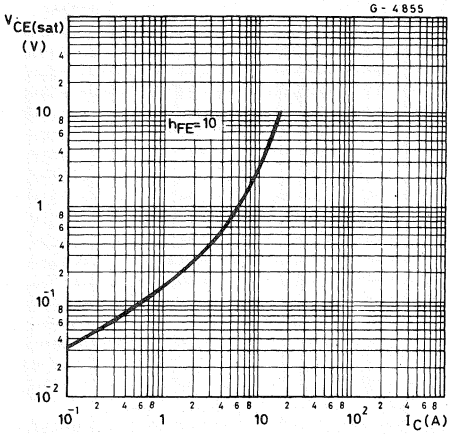
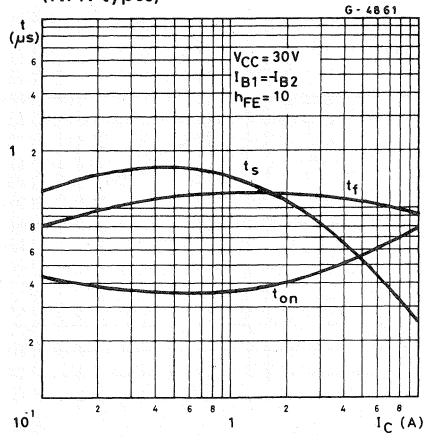
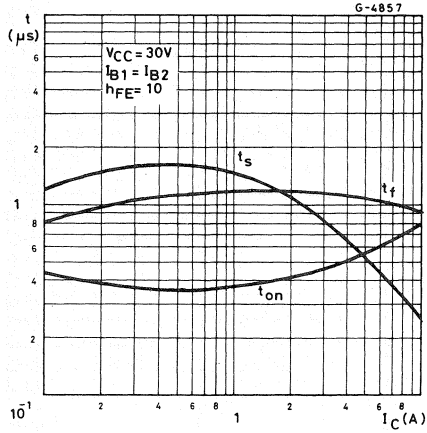


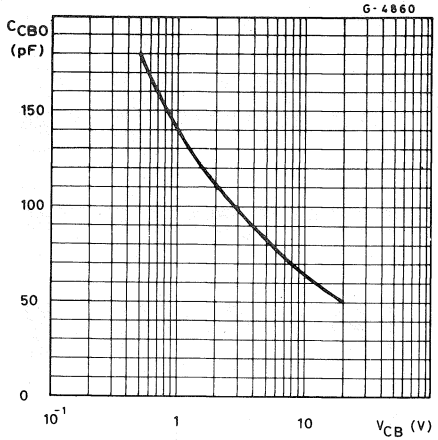
Saturated switching characteristics (NPN types)



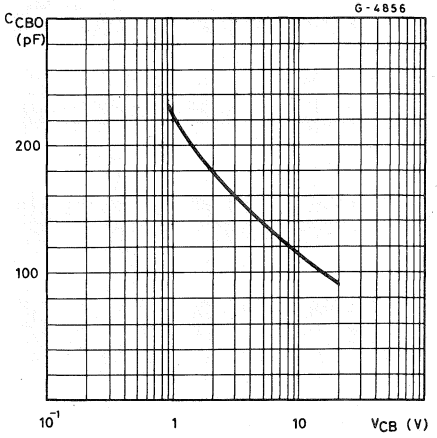
Saturated switching characteristics (PNP types)



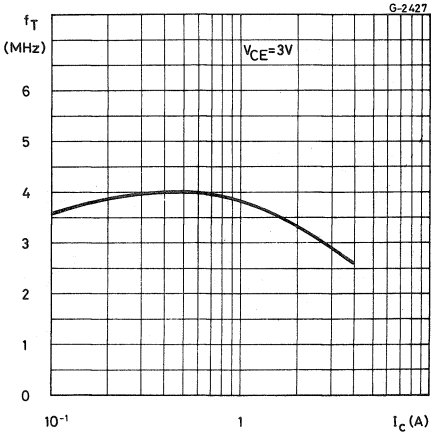
Collector-base capacitance (NPN types)



Collector-base capacitance (PNP types)



Transition frequency (NPN types)



Transition frequency (PNP types)