



SGS-THOMSON
MICROELECTRONICS

BD705/706/707/708
BD709/710/711/712

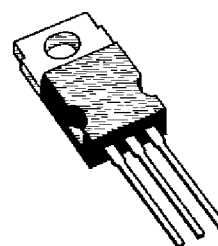
SGS-THOMSON

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POWER LINEAR AND SWITCHING APPLICATIONS

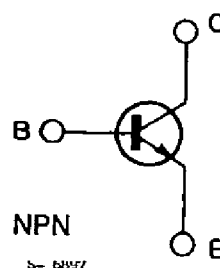
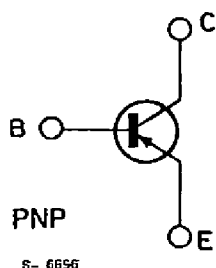
DESCRIPTION

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.



TO-220

INTERNAL SCHEMATIC DIAGRAMS



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	NPN PNP*	Value				Unit
			BD705 BD706	BD707 BD708	BD709 BD710	BD711 BD712	
V_{CE0}	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_{EB0}	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

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$R_{th\ j-case}$	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

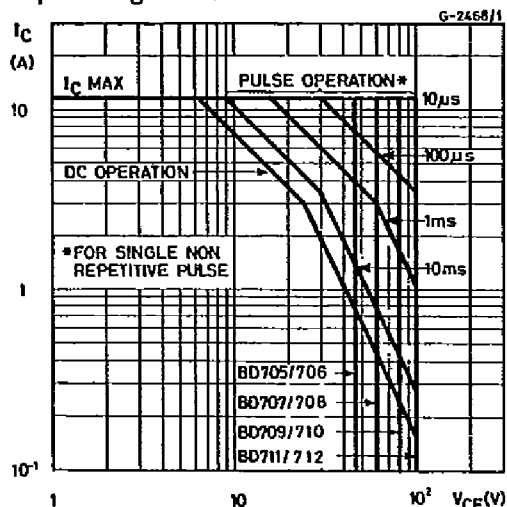
ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current ($I_E = 0$)	for 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
		$T_{case} = 150^{\circ}C$				
		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	$I_C = 3\ A$ $I_B = **$			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	
		$I_C = 2\ A$ $V_{CE} = 2\ V$				
		for BD705/706	30			
		for BD707/708	30			
		for BD709/710	30			
		$I_C = 4\ A$ $V_{CE} = 4\ V$				
		for BD705/706	20	30	150	
		for BD707/708	15		150	
		for BD709/710	15		150	
		for BD711/712	15		150	
		$I_C = 10\ A$ $V_{CE} = 4\ V$				
		for BD705/706	5	10		
		for BD707/708	5	10		
		for BD709/710		8		
		for BD711/712		8		
f_T	Transition Frequency	$I_C = 300\ mA$ $V_{CE} = 3\ V$	3			MHz

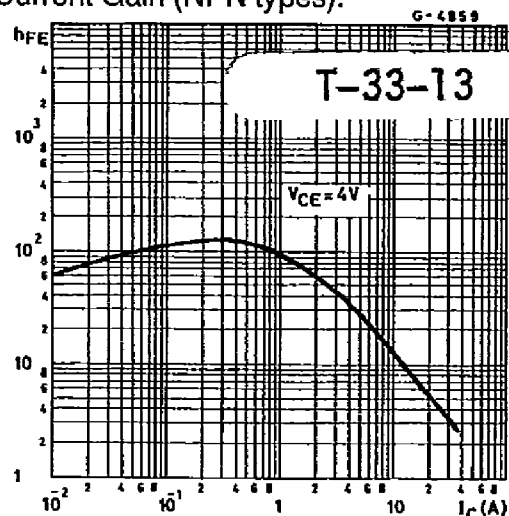
* Pulsed : pulse duration = 300 μs , duty cycle = 1.5 %.** Value for which $I_C = 3.3\ A$ at $V_{CE} = 2\ V$.

For PNP types voltage and current values are negative.

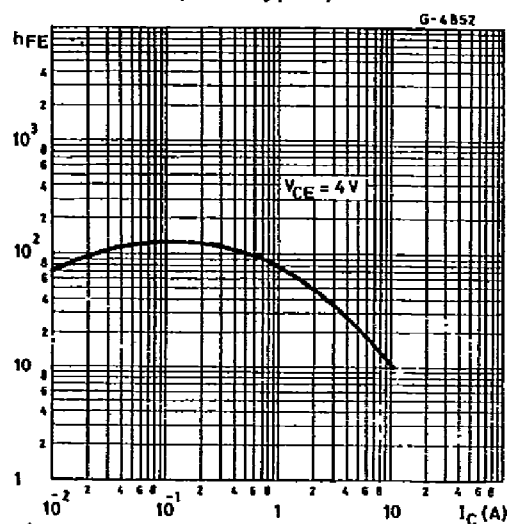
Safe Operating Areas.



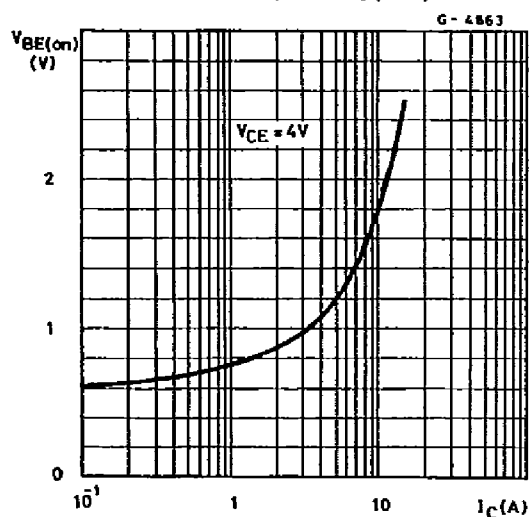
DC Current Gain (NPN types).



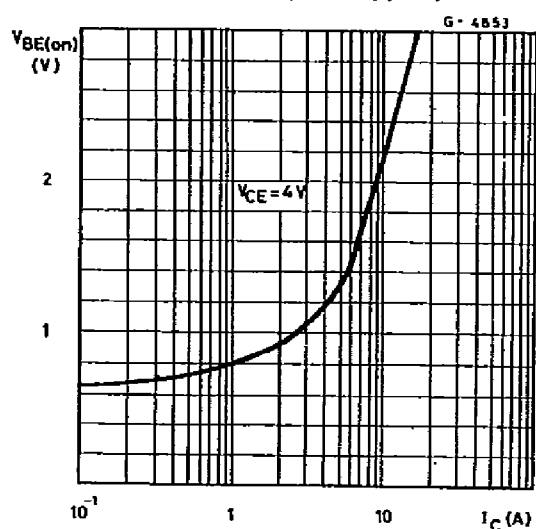
DC Current Gain (PNP types).



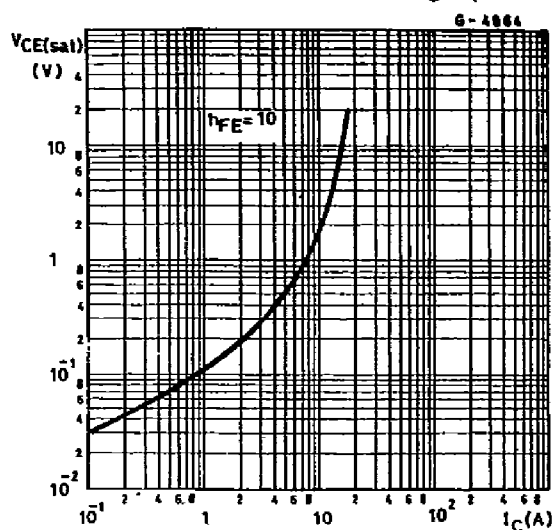
DC Transconductance (NPN types).



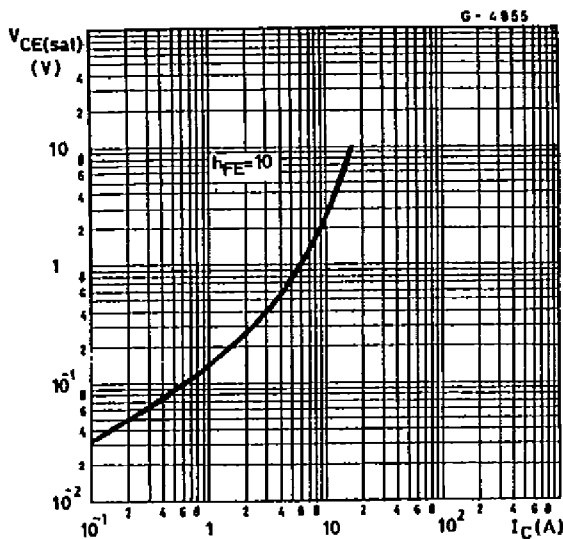
DC Transconductance (PNP types).



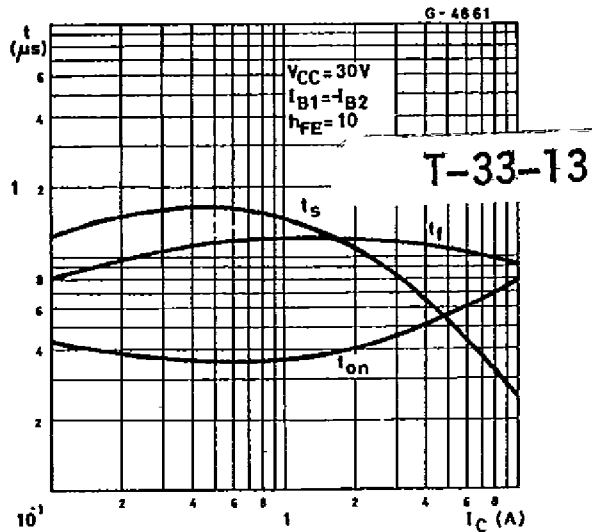
Collector-emitter Saturation Voltage (NPN types).



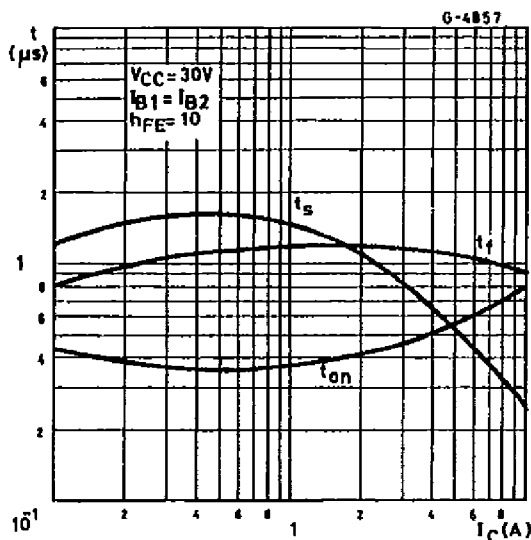
Collector-emitter Saturation Voltage (PNP types).



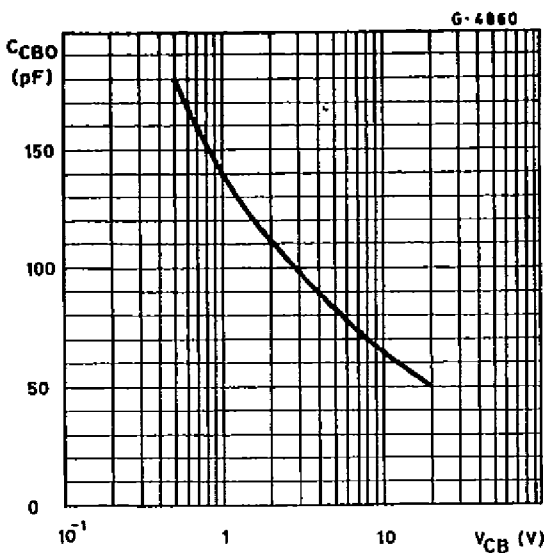
Saturated Switching Characteristics (NPN types)



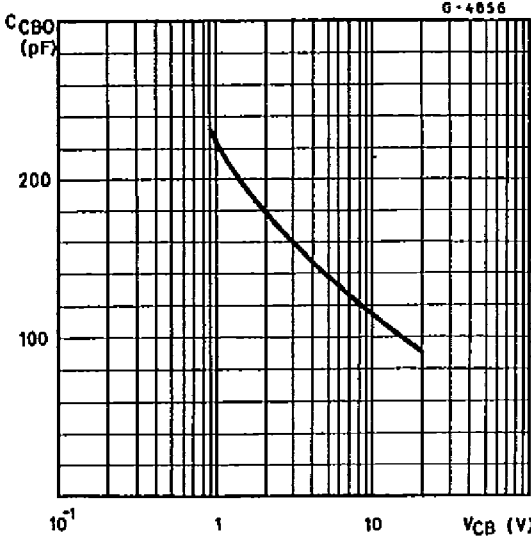
Saturated Switching Characteristics (PNP types).



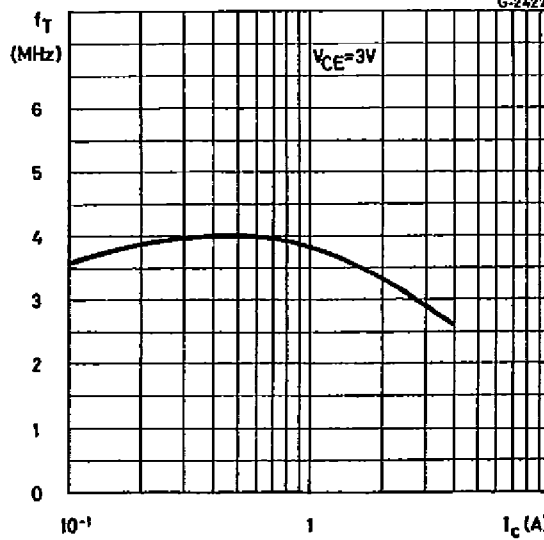
Collector-base Capacitance (NPN types).



Collector-base Capacitance (PNP types).



Transition Frequency (NPN types).



Transition Frequency (PNP types). Σ G Σ

