

COMPLEMENTARY SILICON POWER TRANSISTORS

■ COMPLEMENTARY PNP - NPN DEVICES

APPLICATION

APPLICATIONS

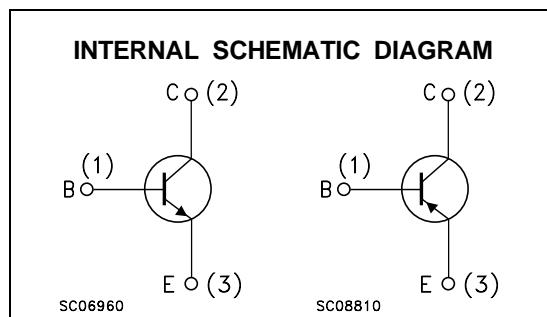
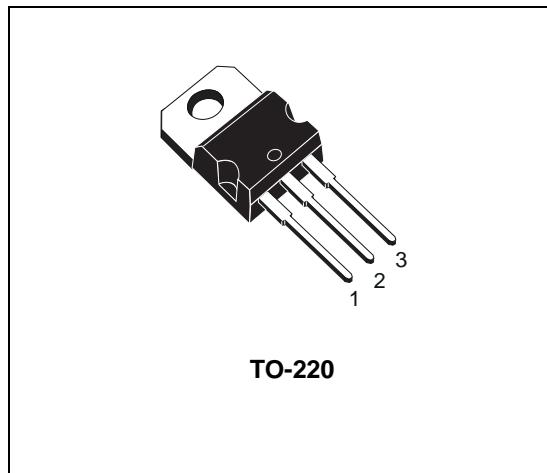
- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT

DESCRIPTION

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The BD707, BD709 and BD711 are silicon Epitaxial-Base NPN power transistors in Jedec TO-220 plastic package. They are intended for use in power linear and switching applications.

The BD707 and BD711 complementary PNP types are BD708 and BD712 respectively.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value			Unit	
		NPN	BD707	BD709		
		PNP	BD708			
V_{CBO}	Collector-Base Voltage ($I_E = 0$)		60	80	100	V
V_{CER}	Collector-Emitter Voltage ($V_{BE} = 0$)		60	80	100	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)		60	80	100	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)			5		V
I_C	Collector Current			12		A
I_{CM}	Collector Peak Current			18		A
I_B	Base Current			5		A
P_{tot}	Total Dissipation at $T_C \leq 25^\circ\text{C}$			75		W
T_{stg}	Storage Temperature			-65 to 150		$^\circ\text{C}$
T_j	Max. Operating Junction Temperature			150		$^\circ\text{C}$

For PNP types voltage and current values are negative

THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1.67	$^{\circ}\text{C}/\text{W}$
$R_{thj-case}$	Thermal Resistance Junction-ambient	Max	70	$^{\circ}\text{C}/\text{W}$

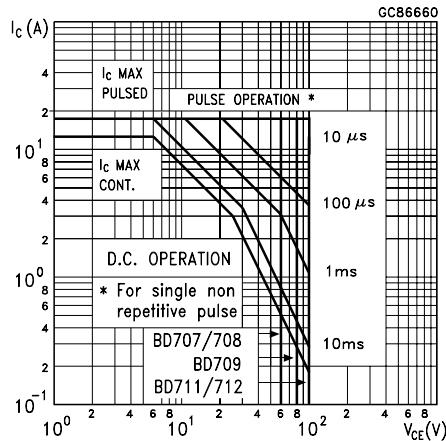
ELECTRICAL CHARACTERISTICS ($T_{\text{case}} = 25^{\circ}\text{C}$ unless otherwise specified)

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

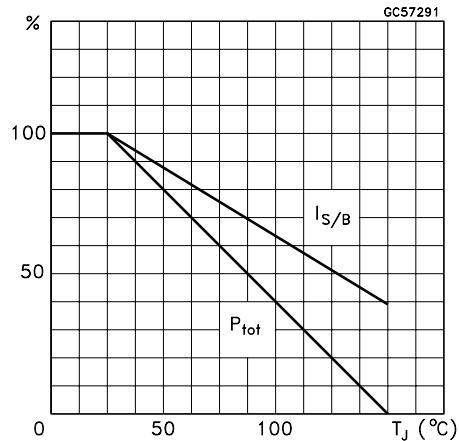
* Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %** Value for which $I_C = 3.3\text{ A}$ at $V_{CE} = 2\text{V}$.

For PNP types voltage and current values are negative.

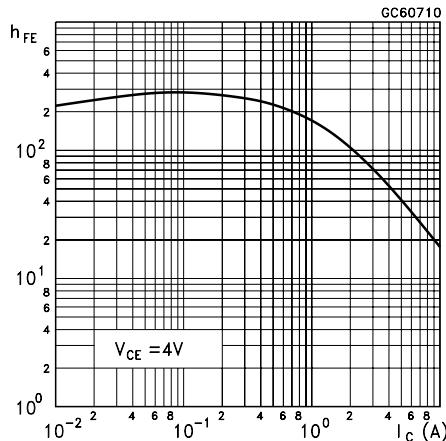
Safe Operating Areas



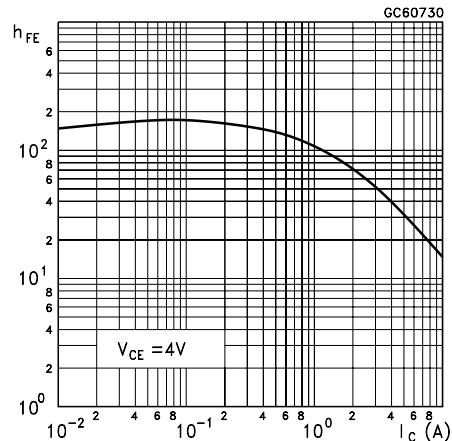
Derating Curve



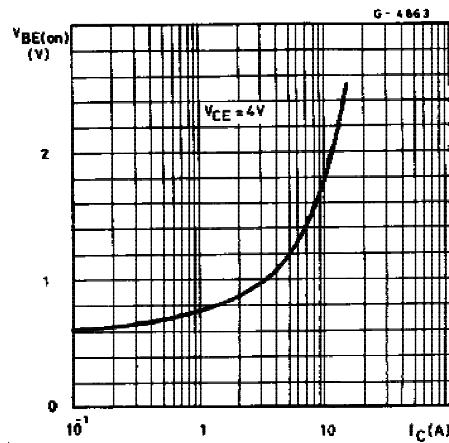
DC Current Gain(NPN type)



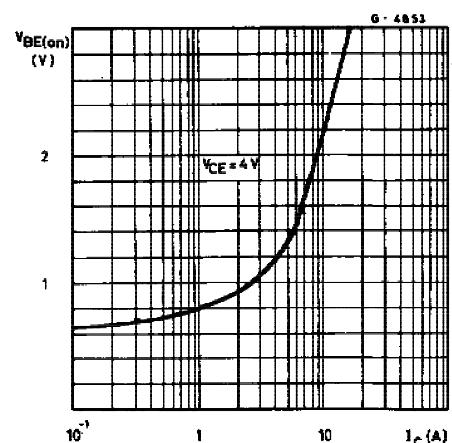
DC Current Gain(PNP type)



DC Transconductance(NPN type)

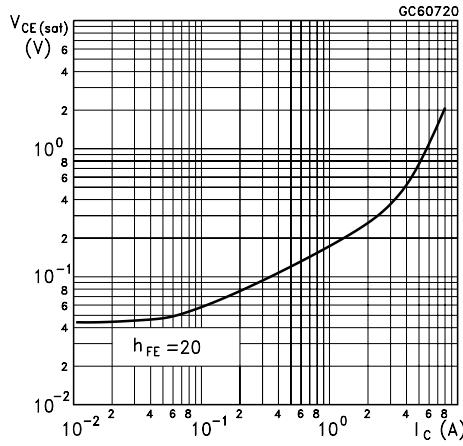


DC Transconductance(PNP type)

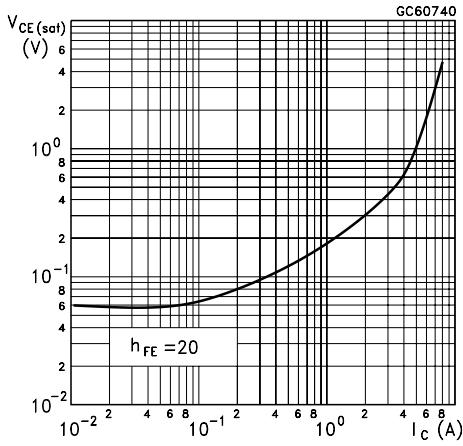


BD707/708/709/711/712

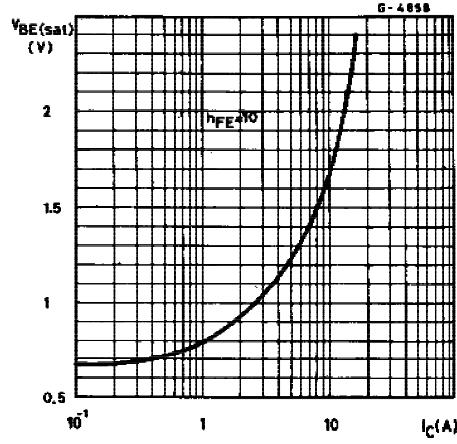
Collector-Emitter Saturation Voltage (NPN type)



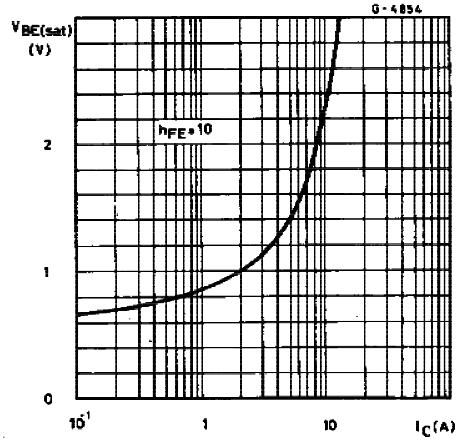
Collector-Emitter Saturation Voltage (PNP type)



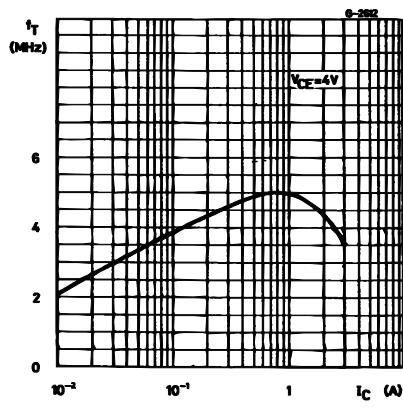
Base-Emitter Saturation Voltage (NPN type)



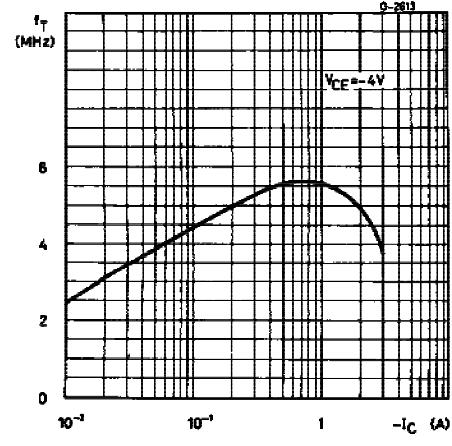
Base-Emitter Saturation Voltage (PNP type)



Transition Frequency (NPN type)

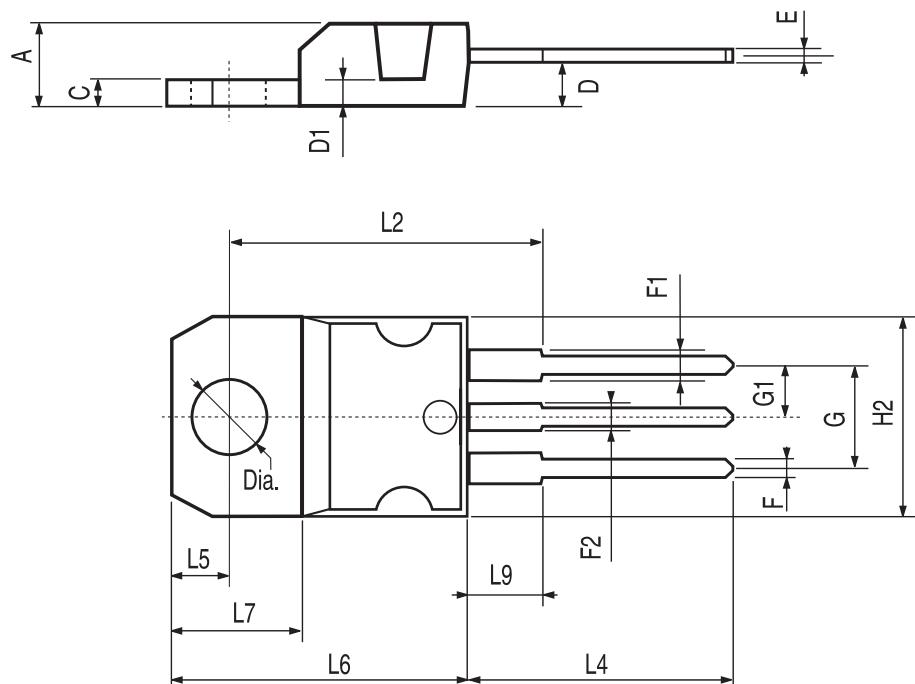


Transition Frequency (PNP type)



TO-220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



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