



# BD707/709/711 BD708/712

## COMPLEMENTARY SILICON POWER TRANSISTORS

### ■ COMPLEMENTARY PNP - NPN DEVICES

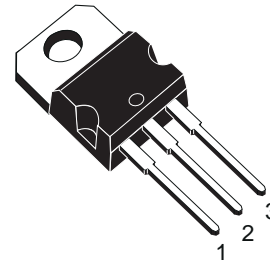
#### APPLICATION

- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT

#### DESCRIPTION

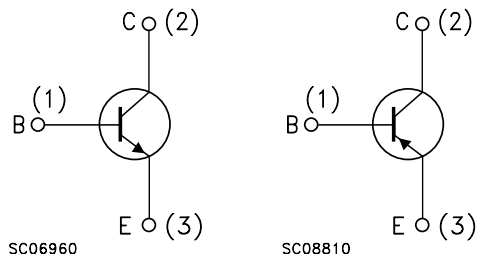
The BD707, BD709 and BD711 are silicon Epitaxial-Base NPN power transistors in Jedec TO-220 plastic package. They are intended for use in power linear and switching applications.

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



TO-220

#### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value			Unit
		NPN BD707 BD708	BD709	BD711 BD712	
$V_{CBO}$	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 $T_c \leq 25^\circ C$	75			W
$T_{stg}$	Storage Temperature	-65 to 150			$^\circ C$
$T_j$	Max. Operating Junction Temperature	150			$^\circ C$

For PNP types voltage and current values are negative

## BD707/708/709/711/712

### THERMAL DATA

R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	1.67	°C/W
R <sub>thj-case</sub>	Thermal Resistance Junction-ambient	Max	70	°C/W

### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

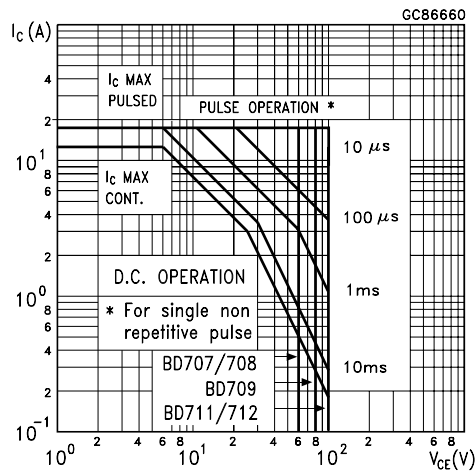
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CBO</sub>	Collector Cut-off Current (I <sub>E</sub> = 0)	for <b>BD707/708</b> V <sub>CB</sub> = 60 V for <b>BD709</b> V <sub>CB</sub> = 80 V for <b>BD711/712</b> V <sub>CB</sub> = 100 V T <sub>case</sub> = 150 °C for <b>BD707/708</b> V <sub>CB</sub> = 60 V for <b>BD709</b> V <sub>CB</sub> = 80 V for <b>BD711/712</b> V <sub>CB</sub> = 100 V			100 100 100 1 1 1	μA μA μA mA mA mA
I <sub>CEO</sub>	Collector Cut-off Current (I <sub>B</sub> = 0)	for <b>BD707/708</b> V <sub>CE</sub> = 30 V for <b>BD709</b> V <sub>CE</sub> = 40 V for <b>BD711/712</b> V <sub>CE</sub> = 50 V			100 100 100	mA mA mA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 5 V			1	mA
V <sub>CEO(sus)*</sub>	Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 100 mA for <b>BD707/708</b> for <b>BD709</b> for <b>BD711/712</b>	60 80 100			V V V
V <sub>CE(sat)*</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 4 A I <sub>B</sub> = 0.4 A			1	V
V <sub>CEK*</sub>	Knee Voltage	I <sub>C</sub> = 3 A I <sub>B</sub> = **			0.4	V
V <sub>BE*</sub>	Base-Emitter Voltage	I <sub>C</sub> = 4 A V <sub>CE</sub> = 4 V			1.5	V
h <sub>FE*</sub>	DC Current Gain	I <sub>C</sub> = 0.5 A V <sub>CE</sub> = 2 V I <sub>C</sub> = 2 A V <sub>CE</sub> = 2 V for <b>BD707/708</b> for <b>BD709</b> I <sub>C</sub> = 4 A V <sub>CE</sub> = 4 V I <sub>C</sub> = 10 A V <sub>CE</sub> = 4 V for <b>BD707/708</b> for <b>BD709</b> for <b>BD711/712</b>	40 30 30 15 5	120 10 8 8	400 150	
f <sub>T</sub>	Transition frequency	I <sub>C</sub> = 300 mA V <sub>CE</sub> = 3 V	3			MHz

\* Pulsed: Pulse duration = 300 μs, duty cycle 1.5 %

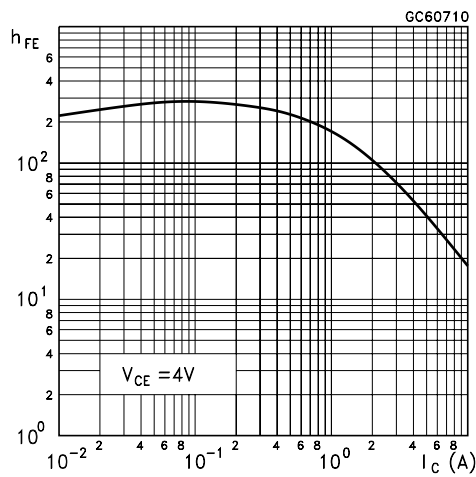
\*\* Value for which I<sub>C</sub> = 3.3 A at V<sub>CE</sub> = 2V.

For PNP types voltage and current values are negative.

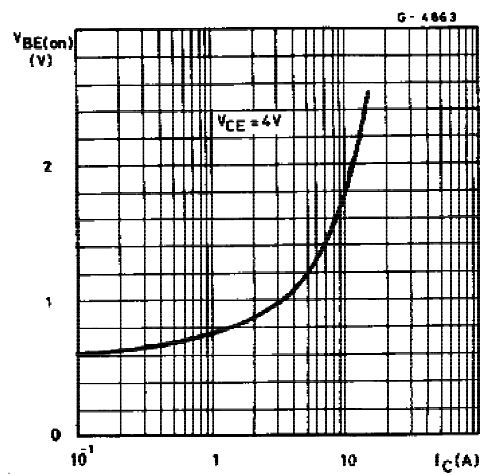
## Safe Operating Areas



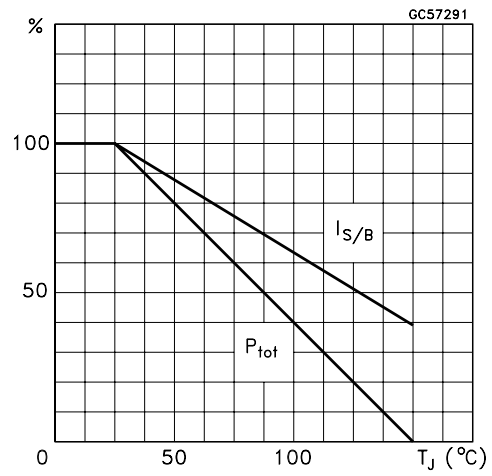
DC Current Gain(NPN type)



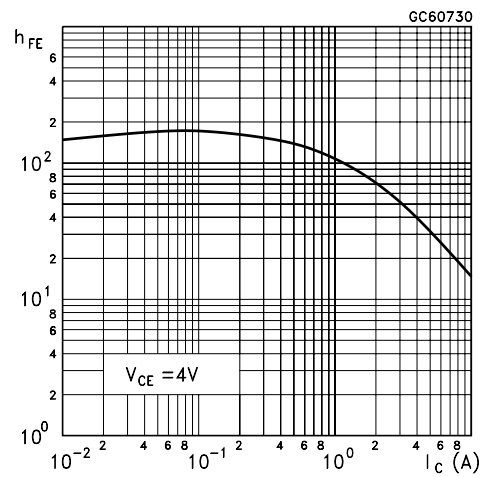
DC Transconductance(NPN type)



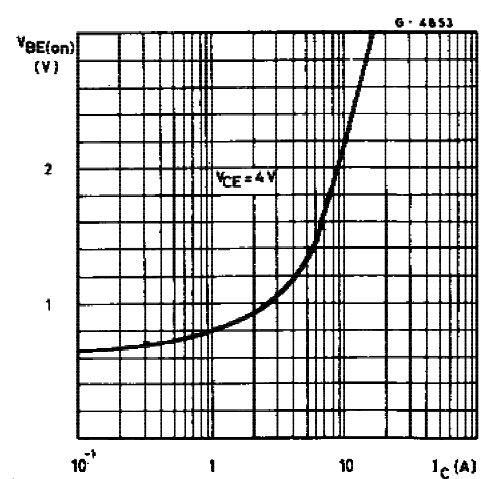
## Derating Curve



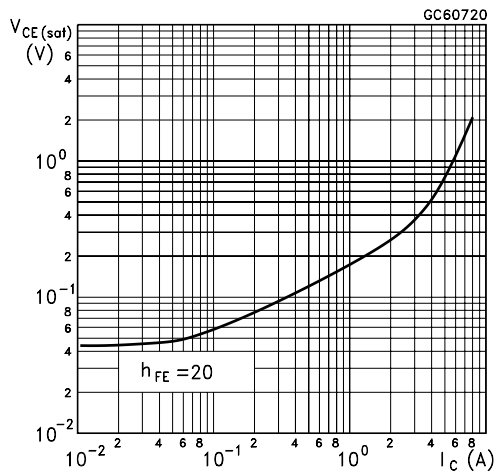
DC Current Gain(PNP type)



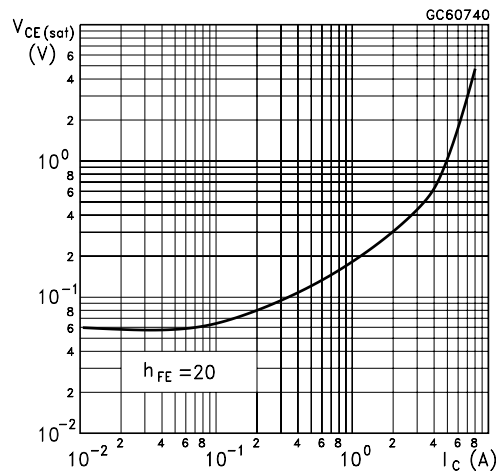
DC Transconductance(PNP type)



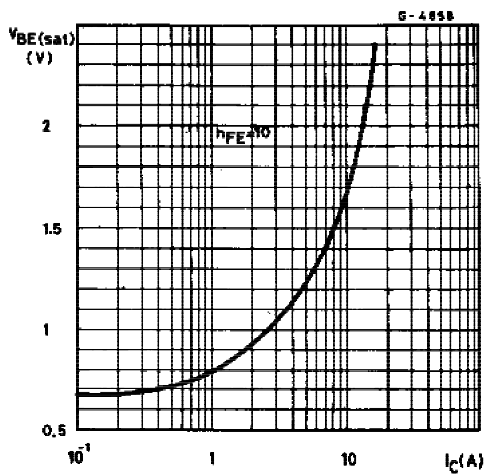
Collector-Emitter Saturation Voltage (NPN type)



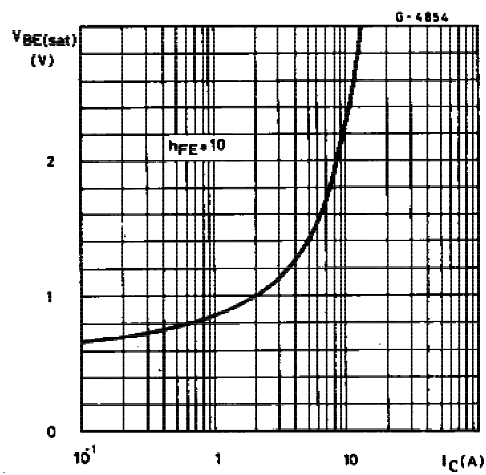
Collector-Emitter Saturation Voltage (PNP type)



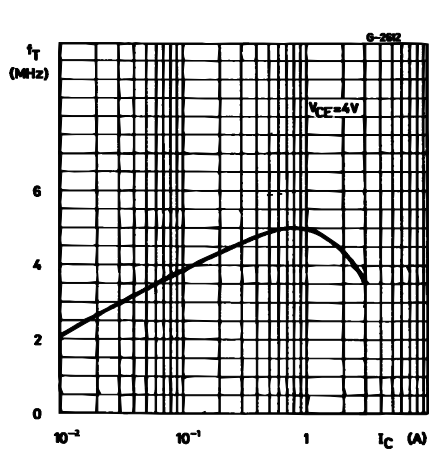
Base-Emitter Saturation Voltage (NPN type)



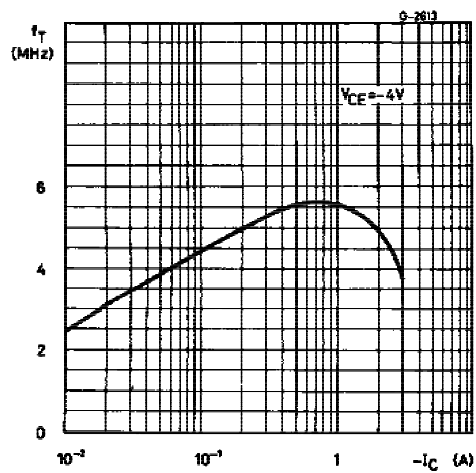
Base-Emitter Saturation Voltage (PNP type)



Transition Frequency (NPN type)

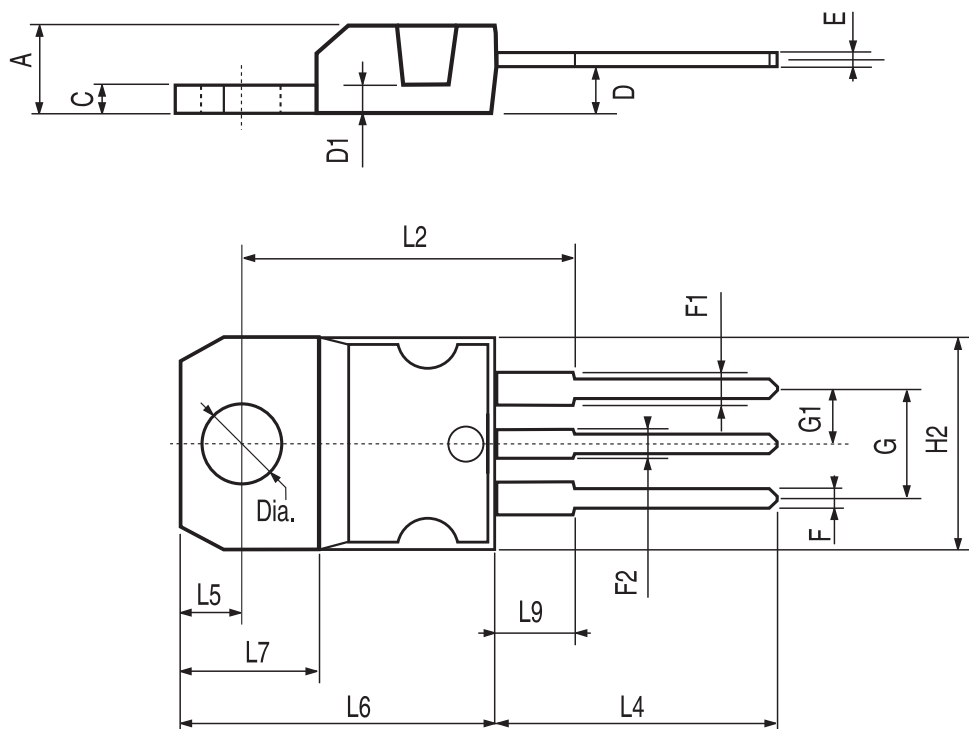


Transition Frequency (PNP type)



## 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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