

BD809 (NPN), BD810 (PNP)

Plastic High Power Silicon Transistor

These devices are designed for use in high power audio amplifiers utilizing complementary or quasi complementary circuits.

Features

- DC Current Gain – $h_{FE} = 30$ (Min) @ $I_C = 2.0$ Adc
- Pb-Free Packages are Available*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	80	Vdc
Collector-Base Voltage	V_{CBO}	80	Vdc
Emitter-Base Voltage	V_{EBO}	5.0	Vdc
Collector Current	I_C	10	Adc
Base Current	I_B	6.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	90 720	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	θ_{JC}	1.39	$^\circ\text{C}/\text{W}$

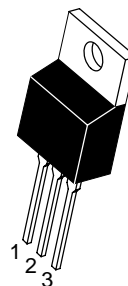
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.



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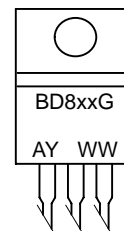
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**10 AMPERE
POWER TRANSISTORS
PNP SILICON
60 AND 80 VOLTS
90 WATTS**



TO-220AB
CASE 221A-09
STYLE 1

MARKING DIAGRAM



BD8xx = Device Code
 x = 09 or 10
A = Assembly Location
Y = Year
WW = Work Week
G = Pb-Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
Collector–Emitter Sustaining Voltage (Note 1) ($I_C = 0.1\text{ Adc}$, $I_B = 0$)	BV_{CEO}	80	–	Vdc
Collector Cutoff Current ($V_{CB} = 80\text{ Vdc}$, $I_E = 0$)	I_{CBO}	–	1.0	mAdc
Emitter Cutoff Current ($V_{BE} = 5.0\text{ Vdc}$, $I_C = 0$)	I_{EBO}	–	2.0	mAdc
DC Current Gain ($I_C = 2.0\text{ A}$, $V_{CE} = 2.0\text{ V}$) ($I_C = 4.0\text{ A}$, $V_{CE} = 2.0\text{ V}$)	h_{FE}	30 15	– –	
Collector–Emitter Saturation Voltage (Note 1) ($I_C = 3.0\text{ Adc}$, $I_B = 0.3\text{ Adc}$)	$V_{CE(sat)}$	–	1.1	Vdc
Base–Emitter On Voltage (Note 1) ($I_C = 4.0\text{ Adc}$, $V_{CE} = 2.0\text{ Vdc}$)	$V_{BE(on)}$	–	1.6	Vdc
Current–Gain Bandwidth Product ($I_C = 1.0\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ MHz}$)	f_T	1.5	–	MHz

1. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

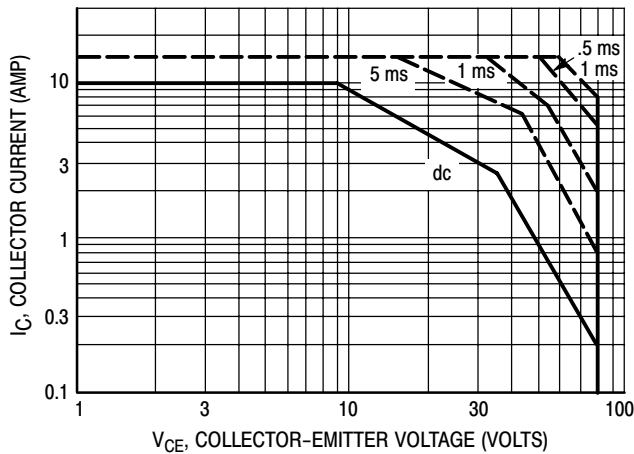


Figure 1. Active Region DC Safe Operating Area (see Note 1)

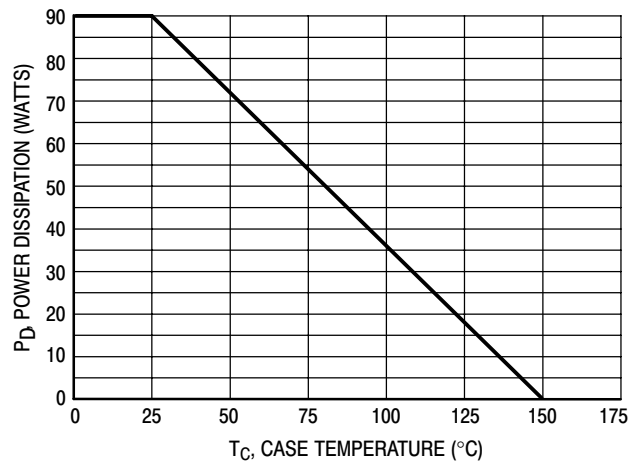


Figure 2. Power–Temperature Derating Curve

BD809 (NPN), BD810 (PNP)

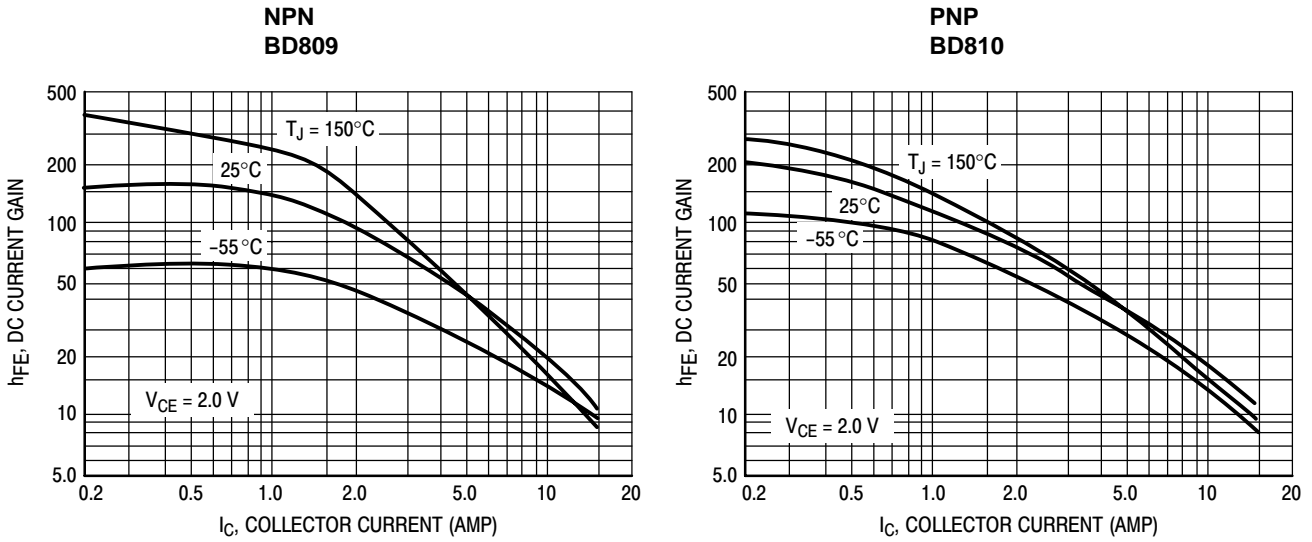


Figure 3. DC Current Gain

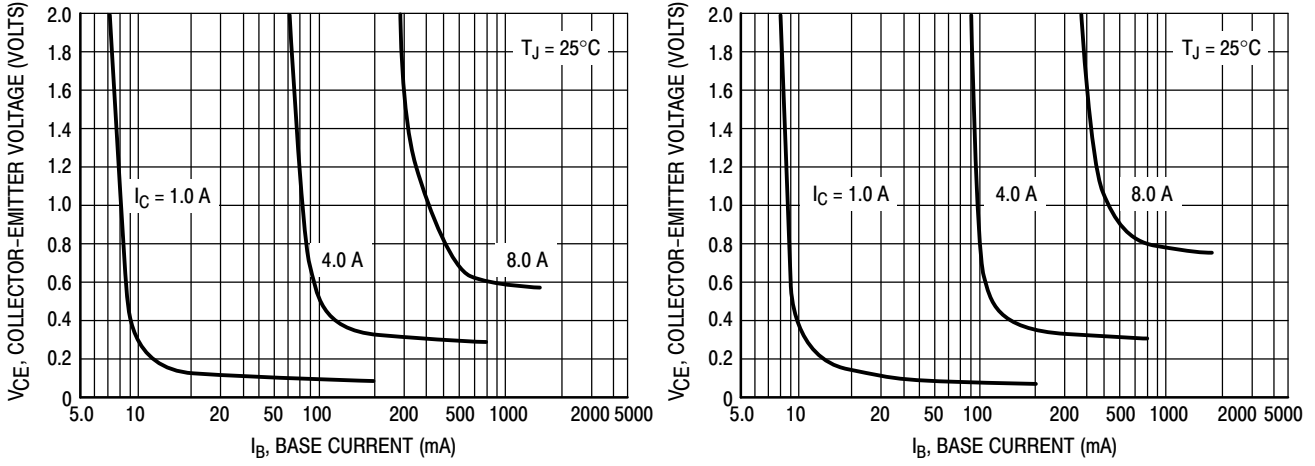


Figure 4. Collector Saturation Region

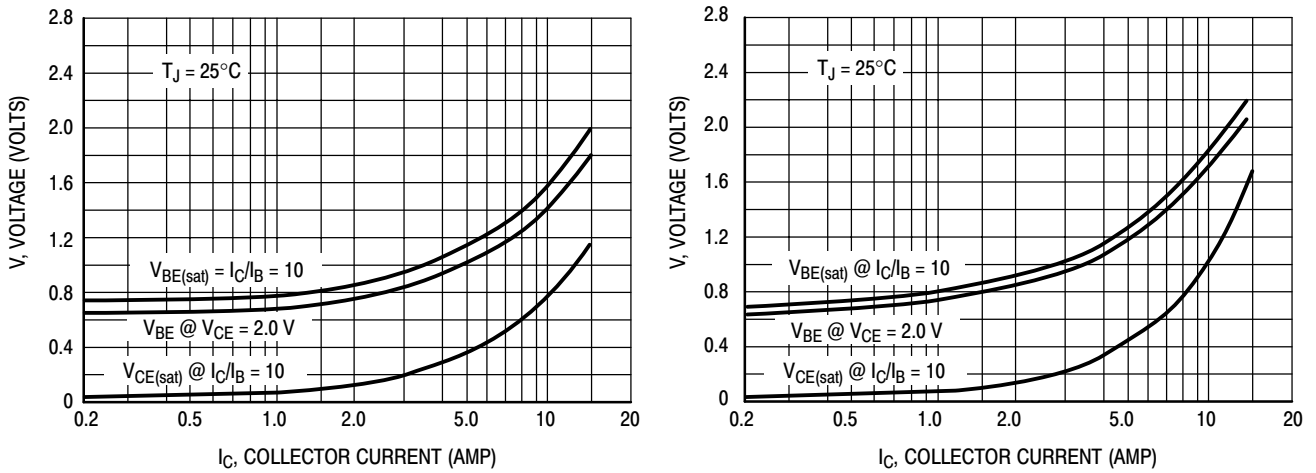


Figure 5. "On" Voltages

BD809 (NPN), BD810 (PNP)

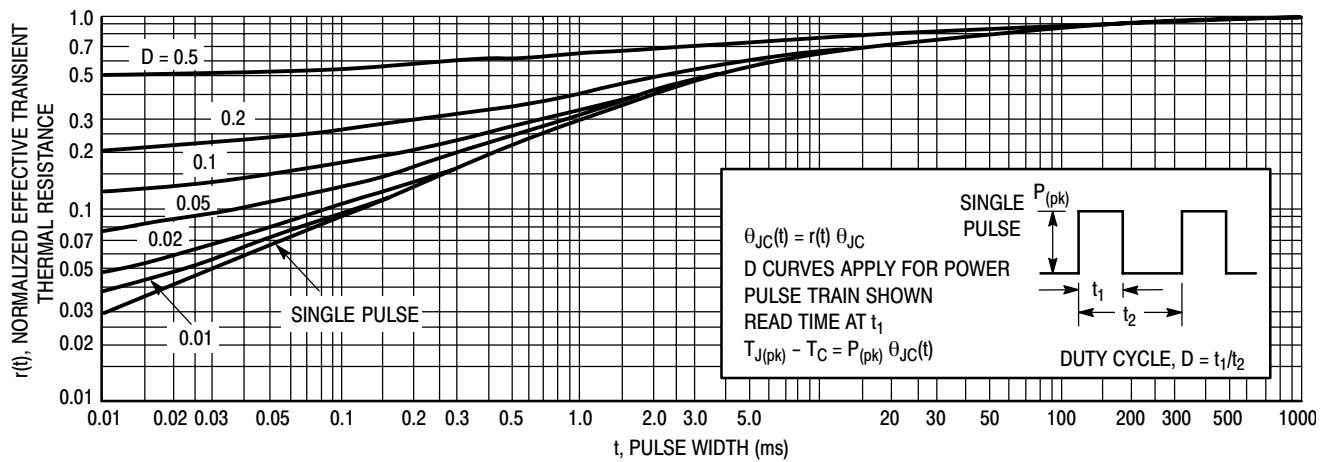


Figure 6. Thermal Response

Note 1:

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation, i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 1 is based on $T_{J(pk)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

ORDERING INFORMATION

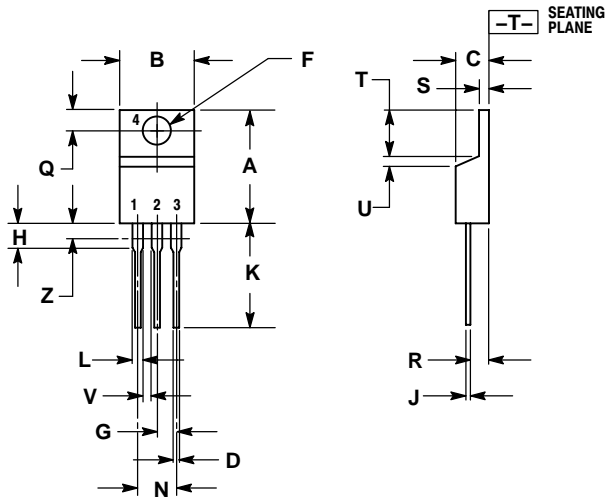
Device	Package	Shipping†
BD809	TO-220	50 Units / Rail
BD809G	TO-220 (Pb-Free)	
BD810	TO-220	50 Units / Rail
BD2810G	TO-220 (Pb-Free)	

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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PACKAGE DIMENSIONS

TO-220AB
CASE 221A-09
ISSUE AA



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

STYLE 1:

- PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

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