

BF959

VHF Transistor

NPN Silicon

Features

- Pb-Free Packages are Available*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector – Emitter Voltage	V_{CEO}	20	Vdc
Collector – Base Voltage	V_{CBO}	30	Vdc
Emitter – Base Voltage	V_{EBO}	3.0	Vdc
Collector Current – Continuous	I_C	100	mA dc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.5 12	W mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	200	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	$^\circ\text{C/W}$

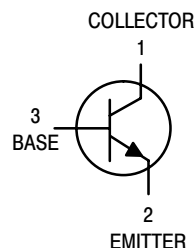
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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

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

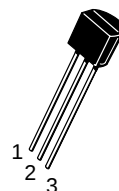


ON Semiconductor®

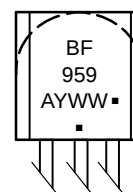
<http://onsemi.com>



MARKING DIAGRAM



TO-92
CASE 29
STYLE 21



BF959 = Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping [†]
BF959	TO-92	5000 Units/Box
BF959G	TO-92 (Pb-Free)	5000 Units/Box
BF959RL1	TO-92	2000/Tape & Reel
BF959RL1G	TO-92 (Pb-Free)	2000/Tape & Reel
BF959ZL1	TO-92	2000/Ammo Pack
BF959ZL1G	TO-92 (Pb-Free)	2000/Ammo Pack

[†]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.

BF959

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 1.0\text{ mA}$, $I_B = 0$)	$V_{(BR)CEO}$	20	–	–	Vdc
Collector–Base Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}$, $I_E = 0$)	$V_{(BR)CBO}$	30	–	–	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10\text{ }\mu\text{A}$, $I_C = 0$)	$V_{(BR)EBO}$	3.0	–	–	Vdc
Collector Cutoff Current ($V_{CB} = 20\text{ Vdc}$, $I_E = 0$)	I_{CBO}	–	–	100	nAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 5.0\text{ mA}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 20\text{ mA}$, $V_{CE} = 10\text{ Vdc}$)	h_{FE}	35 40	– –	– –	–
Collector–Emitter Saturation Voltage ($I_C = 30\text{ mA}$, $I_B = 2.0\text{ mA}$)	$V_{CE(sat)}$	–	–	1.0	Vdc
Base–Emitter Saturation Voltage ($I_C = 30\text{ mA}$, $I_B = 2.0\text{ mA}$)	$V_{BE(sat)}$	–	–	1.0	Vdc

SMALL–SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product ($I_C = 20\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 100\text{ MHz}$) ($I_C = 30\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	700 600	– –	– –	MHz
Common Emitter Feedback Capacitance ($V_{CB} = 10\text{ Vdc}$, $P_f = 0$, $f = 10\text{ MHz}$)	C_{re}	–	0.65	–	pF
Noise Figure ($I_C = 4.0\text{ mA}$, $V_{CE} = 10\text{ V}$, $R_S = 50\text{ }\Omega$, $f = 200\text{ MHz}$)	N_f	–	3.0	–	dB

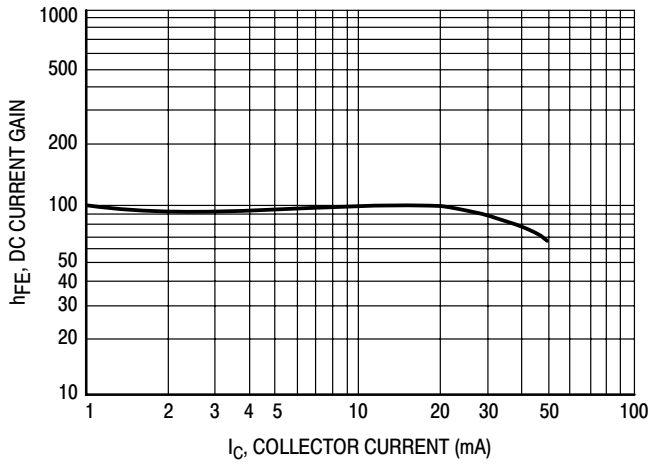


Figure 1. h_{FE} at 10 V

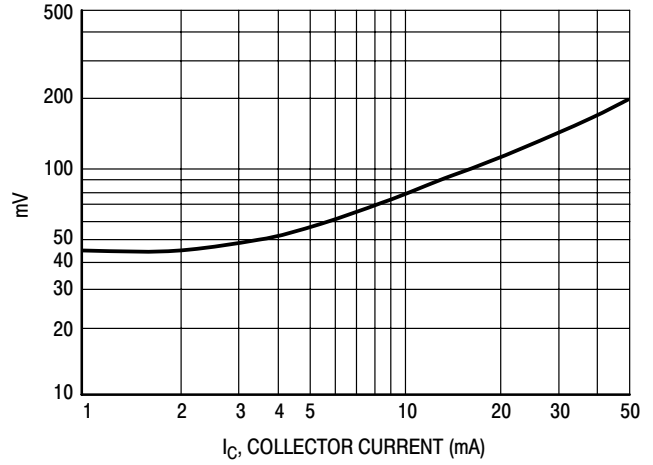


Figure 2. $V_{CE(sat)}$ at $I_C/I_B = 10$

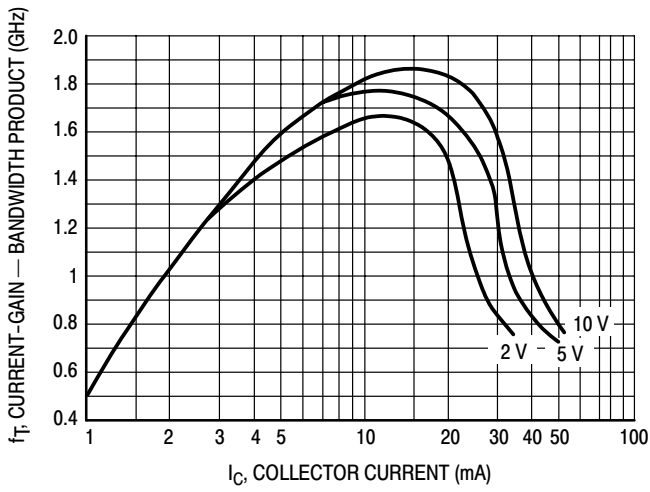


Figure 3. Current-Gain - Bandwidth Product

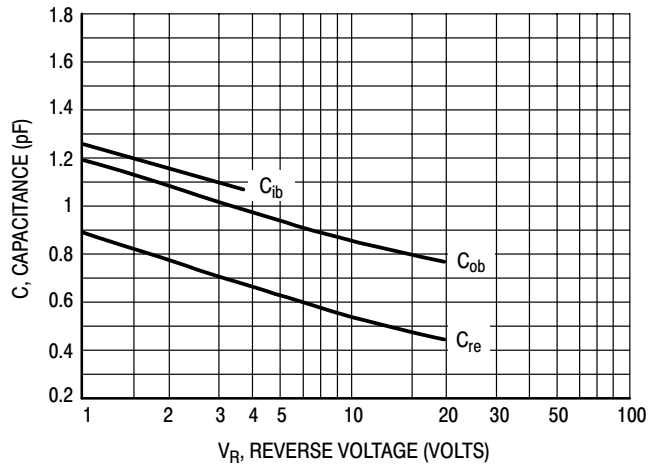


Figure 4. Capacitances

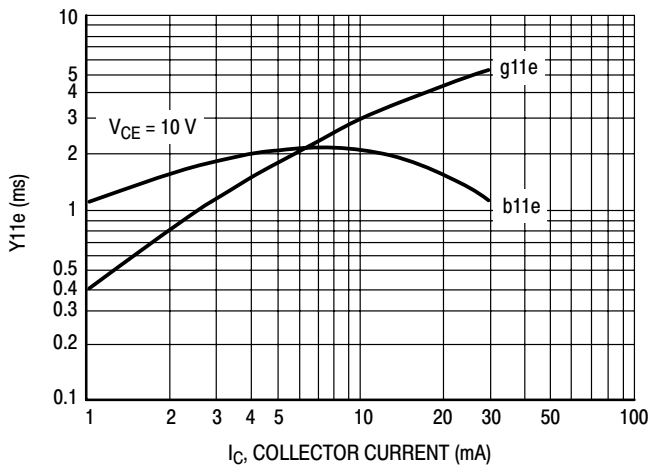


Figure 5. Input Impedance at 30 MHz

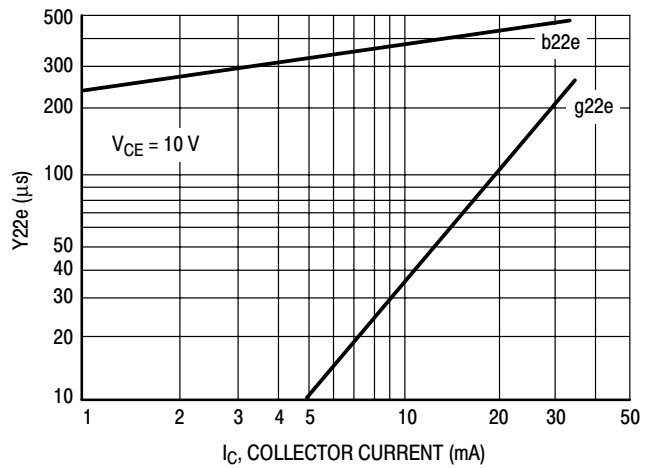
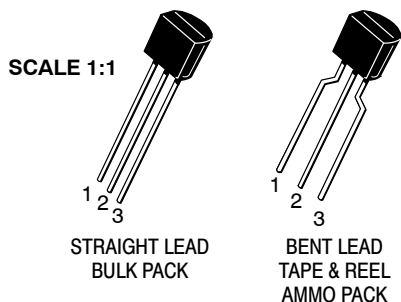
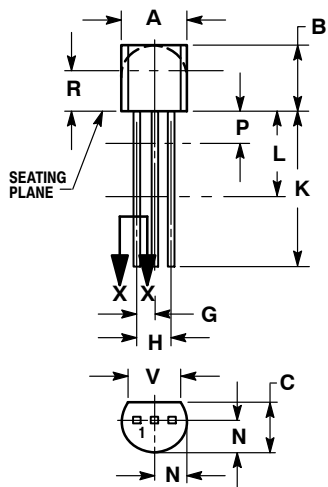


Figure 6. Output Impedance at 30 MHz

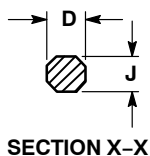


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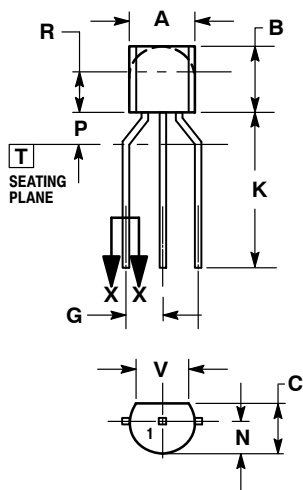
STRAIGHT LEAD
BULK PACK



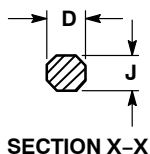
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---



BENT LEAD
TAPE & REEL
AMMO PACK



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	MILLIMETERS	
	MIN	MAX
A	4.45	5.20
B	4.32	5.33
C	3.18	4.19
D	0.40	0.54
G	2.40	2.80
J	0.39	0.50
K	12.70	---
N	2.04	2.66
P	1.50	4.00
R	2.93	---
V	3.43	---

STYLES ON PAGE 2

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STYLE 1: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 2: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 3: PIN 1. ANODE 2. ANODE 3. CATHODE	STYLE 4: PIN 1. CATHODE 2. CATHODE 3. ANODE	STYLE 5: PIN 1. DRAIN 2. SOURCE 3. GATE
STYLE 6: PIN 1. GATE 2. SOURCE & SUBSTRATE 3. DRAIN	STYLE 7: PIN 1. SOURCE 2. DRAIN 3. GATE	STYLE 8: PIN 1. DRAIN 2. GATE 3. SOURCE & SUBSTRATE	STYLE 9: PIN 1. BASE 1 2. EMITTER 3. BASE 2	STYLE 10: PIN 1. CATHODE 2. GATE 3. ANODE
STYLE 11: PIN 1. ANODE 2. CATHODE & ANODE 3. CATHODE	STYLE 12: PIN 1. MAIN TERMINAL 1 2. GATE 3. MAIN TERMINAL 2	STYLE 13: PIN 1. ANODE 1 2. GATE 3. CATHODE 2	STYLE 14: PIN 1. EMITTER 2. COLLECTOR 3. BASE	STYLE 15: PIN 1. ANODE 1 2. CATHODE 3. ANODE 2
STYLE 16: PIN 1. ANODE 2. GATE 3. CATHODE	STYLE 17: PIN 1. COLLECTOR 2. BASE 3. EMITTER	STYLE 18: PIN 1. ANODE 2. CATHODE 3. NOT CONNECTED	STYLE 19: PIN 1. GATE 2. ANODE 3. CATHODE	STYLE 20: PIN 1. NOT CONNECTED 2. CATHODE 3. ANODE
STYLE 21: PIN 1. COLLECTOR 2. EMITTER 3. BASE	STYLE 22: PIN 1. SOURCE 2. GATE 3. DRAIN	STYLE 23: PIN 1. GATE 2. SOURCE 3. DRAIN	STYLE 24: PIN 1. EMITTER 2. COLLECTOR/ANODE 3. CATHODE	STYLE 25: PIN 1. MT 1 2. GATE 3. MT 2
STYLE 26: PIN 1. V_{CC} 2. GROUND 2 3. OUTPUT	STYLE 27: PIN 1. MT 2. SUBSTRATE 3. MT	STYLE 28: PIN 1. CATHODE 2. ANODE 3. GATE	STYLE 29: PIN 1. NOT CONNECTED 2. ANODE 3. CATHODE	STYLE 30: PIN 1. DRAIN 2. GATE 3. SOURCE
STYLE 31: PIN 1. GATE 2. DRAIN 3. SOURCE	STYLE 32: PIN 1. BASE 2. COLLECTOR 3. EMITTER	STYLE 33: PIN 1. RETURN 2. INPUT 3. OUTPUT	STYLE 34: PIN 1. INPUT 2. GROUND 3. LOGIC	STYLE 35: PIN 1. GATE 2. COLLECTOR 3. EMITTER

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