



Spectrum Devices Corporation

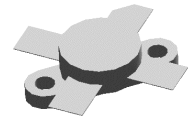
Semiconductor Engineering and Manufacturing

RF & MICROWAVE TRANSISTORS HF SSB APPLICATIONS

HF50-220

FEATURES:

- 30 MHz
- 50 Volts
- IMD -30 dB
- Common Emitter
- Gold Metallization
- $P_{out} = 220W$ PEP Min. with 13 dB Gain
- **Improved Collector-Base Breakdown Voltage: 175 Volts Min.**
- **Direct replacement for ST SD1731 (TH562)**



**0.500" DIAMETER
SOE PACKAGE**

DESCRIPTION:

The HF50-220 is a 50V epitaxial silicon NPN planar transistor designed primarily for SSB communications. This device utilizes emitter ballasting to achieve extreme ruggedness under severe operating conditions. The HF50-series products utilize the unique Spectrum Devices' Bipolar process which offers a 60% improvement in collector-base breakdown voltage, enhancing reliability while maintaining RF performance

ABSOLUTE MAXIMUM RATINGS: ($T_{CASE} = 25^{\circ}C$)

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	175	V
V_{CEO}	Collector-Emitter Voltage	55	V
V_{EBO}	Emitter-Base Voltage	4.0	V
I_C	Device Current	12	A
P_{DISS}	Total Dissipation	320	W
T_J	Junction Temperature	+200	$^{\circ}C$
T_{STG}	Storage Temperature	-65 to +150	$^{\circ}C$

THERMAL DATA:

$R_{TH(J-C)}$	Thermal Resistance Junction-case	0.7	$^{\circ}C/W$
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ELECTRICAL SPECIFICATIONS ($T_{CASE} = 25^{\circ}C$)

DC CHARACTERISTICS

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
BV_{CBO}	$I_C = 200\text{ mA}$ $I_E = 0\text{ mA}$	175	--	--	V
BV_{CES}	$I_C = 200\text{ mA}$ $V_{BE} = 0\text{ V}$	175	--	--	V
BV_{CEO}	$I_C = 200\text{ mA}$ $I_B = 0\text{ mA}$	55	--	--	V
BV_{EBO}	$I_E = 20\text{ mA}$ $I_C = 0\text{ mA}$	4.0	--	--	V
I_{CEO}	$V_{CE} = 30\text{ V}$ $I_E = 0\text{ mA}$	--	--	5	mA
I_{CES}	$V_{CE} = 55\text{ V}$ $I_E = 0\text{ mA}$	--	--	10	mA
h_{FE}	$V_{CE} = 6\text{ V}$ $I_C = 10\text{ A}$	15	--	80	--

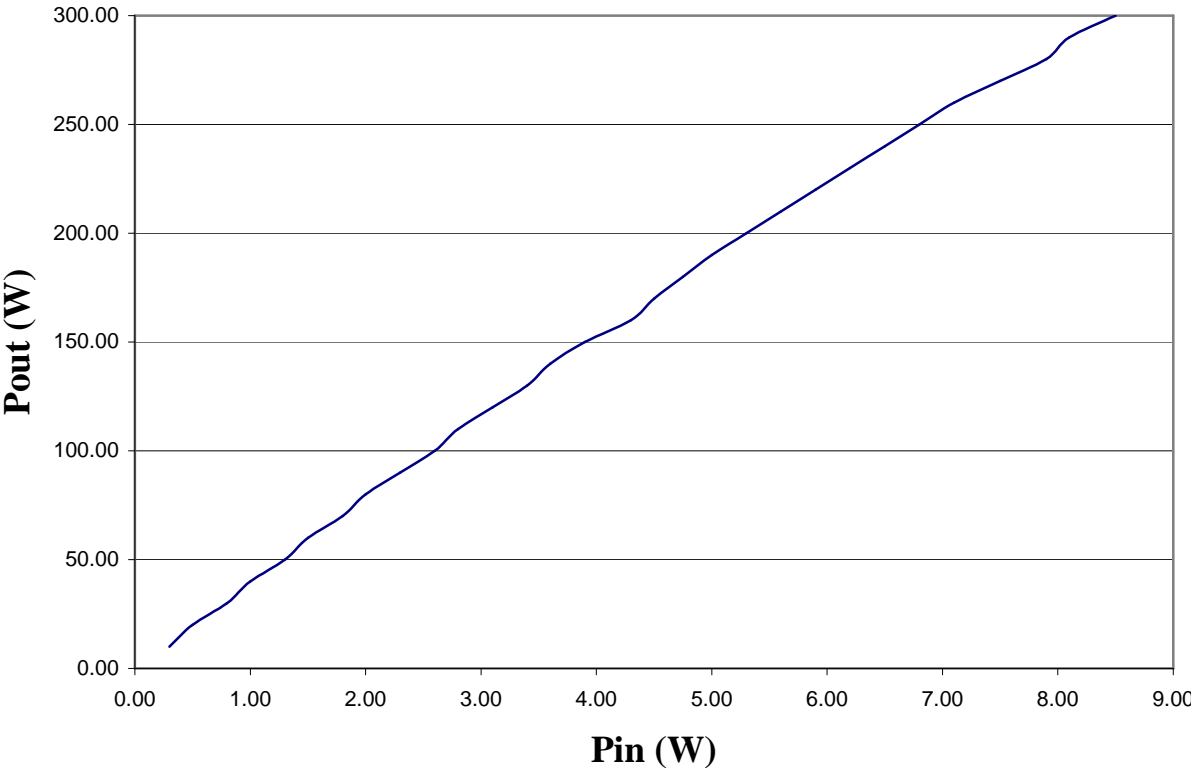
RF CHARACTERISTICS

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
P_{OUT}	$f = 30\text{ MHz}$ $V_{CC} = 50\text{ V}$ $I_{CQ} = 150\text{ mA}$	220	250	--	W PEP
G_P	$P_{out} = 220\text{ W PEP}$ $V_{CC} = 50\text{ V}$ $I_{CQ} = 150\text{ mA}$	13	--	--	dB
IMD*	$P_{out} = 220\text{ W PEP}$ $V_{CC} = 50\text{ V}$ $I_{CQ} = 150\text{ mA}$	--	--	-30	dBc
η_C	$P_{out} = 220\text{ W PEP}$ $V_{CC} = 50\text{ V}$ $I_{CQ} = 150\text{ mA}$	40	--	--	%
C_{OB}	$f = 1\text{ MHz}$ $V_{CB} = 50\text{ V}$	--	330	--	pF

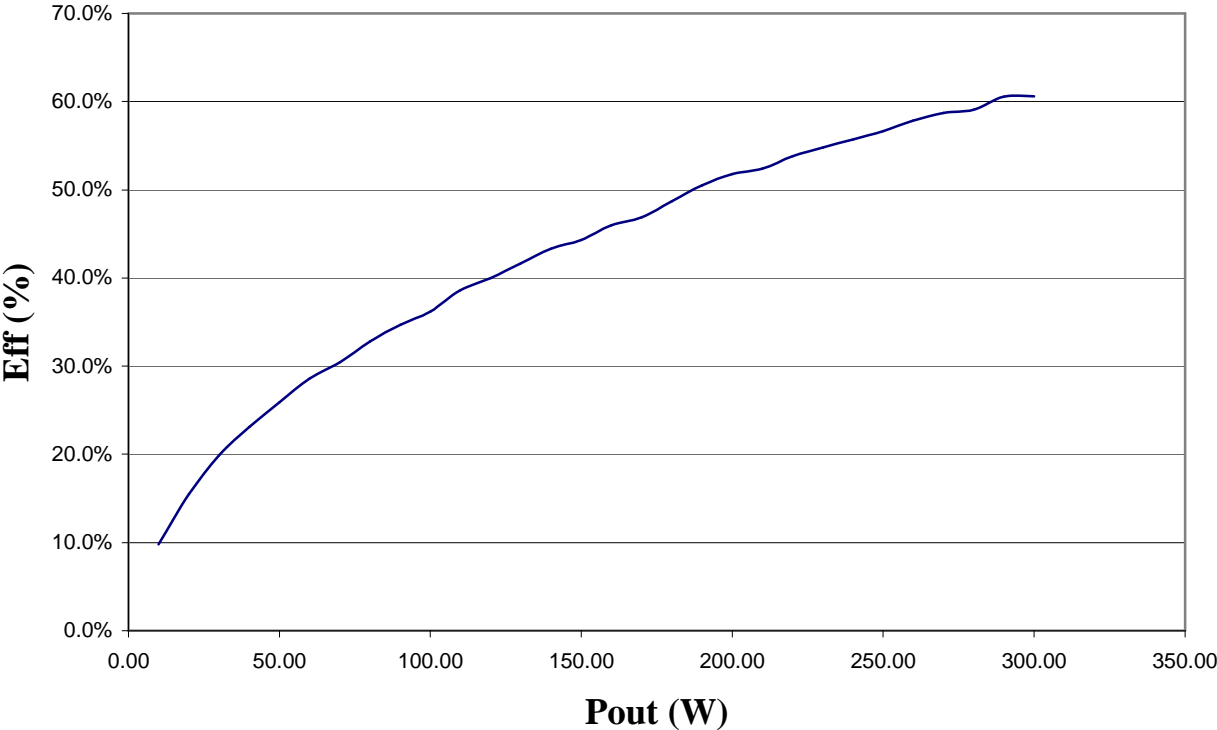
*Conditions $f_1 = 30.00\text{MHz}$ $f_2 = 30.001\text{MHz}$

TYPICAL PERFORMANCE

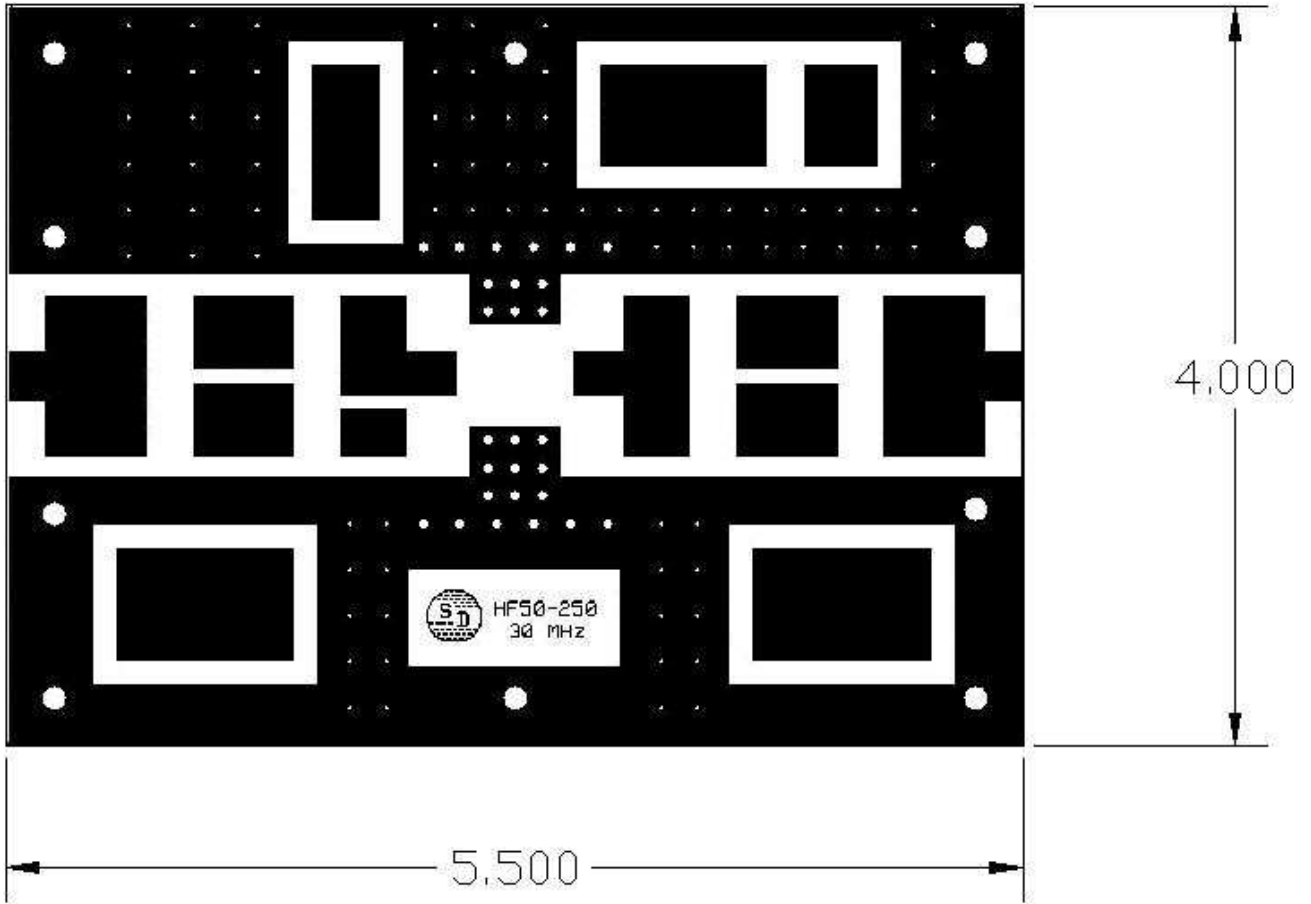
Power Output vs Power Input



Collector Efficiency vs Power Out

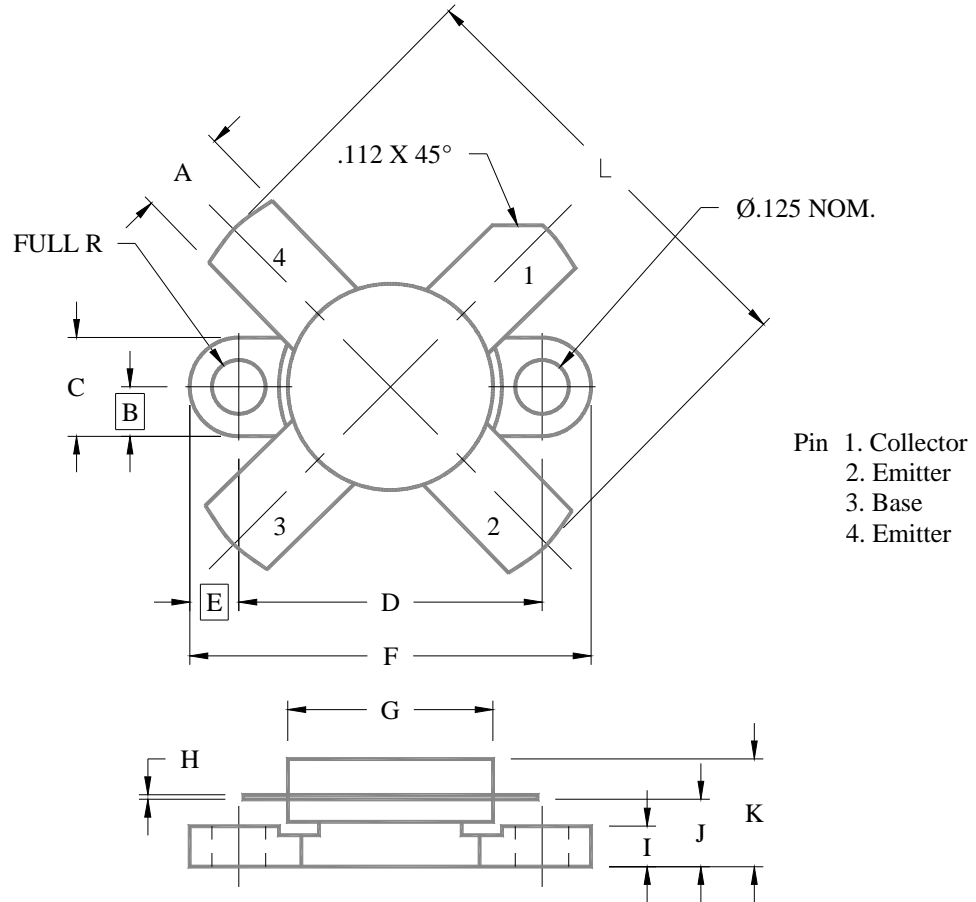


PCB BOARD LAYOUT



PACKAGE MECHANICAL DATA

SOE - 500



	Minimum Inches/MM	Maximum Inches/MM		Minimum Inches/MM	Maximum Inches/MM
A	.220/5.59	.230/5.84	G	.495/12.57	.505/12.83
B	.125/3.18		H	.003/0.08	.007/0.18
C	.245/6.22	.255/6.48	I	.090/2.29	.110/2.79
D	.720/18.28	.730/18.54	J	.160/4.06	.175/4.45
E	.125/3.18		K		.280/7.11
F	.970/24.64	.980/24.89	L		1.050/26.67

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