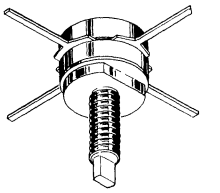
2N5635 (SILICON)
2N5636
2N5637

NPN SILICON RF POWER TRANSISTORS

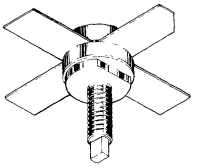
. . . designed for VHF/UHF amplifier applications. These devices are suitable for use in 28 volt systems to 470 MHz. These transistors are ideal for 225-400 MHz communications equipment.

- Balanced Emitter Construction to provide the designer with the device technology that assures ruggedness and resists transistor damage caused by load mismatch.
- Low inductance strip line packaging for easier and better broadband designs.
- Ceramic Package
- Choice of Power Levels at 400 MHz, 28 Vdc –
  2N5635 – 2.5 Watts – 6.2 dB (Min) Gain
  2N5636 – 7.5 Watts – 5.7 dB (Min) Gain
  2N5637 – 20 Watts – 4.6 dB (Min) Gain

NPN SILICON RF POWER TRANSISTORS



2N5635
2N5636

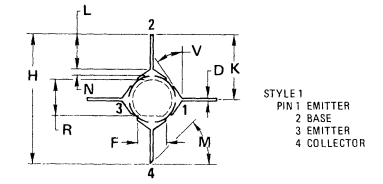


2N5637

*MAXIMUM RATINGS

Rating	Symbol	2N5635	2N5636	2N5637	Unit
Collector-Emitter Voltage	V_{CEO}	← 35 →			Vdc
Collector-Base Voltage	V_{CB}	← 60 →			Vdc
Emitter-Base Voltage	V_{EB}	← 4.0 →			Vdc
Collector Current	I_C	1.0	1.5	3.0	Adc
Total Device Dissipation @ $T_C = 25^oC$	P_D	7.5	15	30	Watts
Derate above 25^oC		43	86	171	mW/^oC
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200			^oC

*Indicates JEDEC Registered Data.

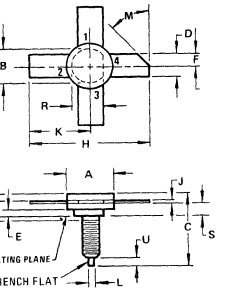


STYLE 1
PIN 1 EMITTER
2 BASE
3 EMITTER
4 COLLECTOR

DIM	MILLIMETERS MIN	MAX	INCHES MIN	MAX
A	9.40	9.78	0.370	0.385
B	8.13	8.38	0.320	0.330
C	17.63	19.46	0.694	0.766
D	0.64	0.89	0.025	0.035
E	1.78	2.03	0.070	0.080
F	5.59	5.84	0.220	0.230
H	26.16	27.69	1.030	1.090
J	0.10	0.15	0.004	0.006
K	13.08	13.84	0.515	0.545
L	7.11	7.37	0.280	0.290
M	40°	50°	40°	50°
N	1.27	1.52	0.050	0.060
P		1.27		0.050
R	7.59	7.80	0.299	0.307
S	4.01	4.52	0.158	0.178
T	2.16	2.41	0.085	0.095
U	2.54	3.30	0.100	0.130
V	10°	20°	10°	20°

2N5635, 2N5636

CASE 144B-03



STYLE 1
PIN 1 EMITTER
2 BASE
3 EMITTER
4 COLLECTOR

DIM	MILLIMETERS MIN	MAX	INCHES MIN	MAX
A	9.40	9.78	0.370	0.385
B	8.13	8.38	0.320	0.330
C	18.03	19.05	0.710	0.750
D	5.59	5.84	0.220	0.230
E	1.78	2.03	0.070	0.080
F	2.79	2.92	0.110	0.115
H	26.42	28.70	1.040	1.130
J	0.10	0.15	0.004	0.006
K	13.21	14.35	0.520	0.565
L	1.40	1.65	0.055	0.065
M	45° NOM		45° NOM	
P	–	1.27	–	0.050
R	7.59	7.80	0.299	0.307
S	4.01	4.52	0.158	0.178
T	2.16	2.41	0.085	0.095
U	2.54	3.30	0.100	0.130

NOTE
CASE 145A-01 USE 8-32NC2A STUD

2N5637

CASE 145A-01

*ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (Note 1)		BV_{CEO}				Vdc
(I_C = 100 mAdc, I_B = 0)	2N5635		35	–	–	
(I_C = 200 mAdc, I_B = 0)	2N5636,2N5637		35	–	–	
Collector-Emitter Breakdown Voltage (Note 1)		BV_{CES}				Vdc
(I_C = 100 mAdc, V_{BE} = 0)	2N5635		60	–	–	
(I_C = 200 mAdc, V_{BE} = 0)	2N5636,2N5637		60	–	–	
Emitter-Base Breakdown Voltage		BV_{EBO}				Vdc
(I_E = 1.0 mAdc, I_C = 0)	2N5635		4.0	–	–	
(I_E = 5.0 mAdc, I_C = 0)	2N5636		4.0	–	–	
(I_E = 10 mAdc, I_C = 0)	2N5637		4.0	–	–	
Collector Cutoff Current		I_{CBO}				mAdc
(V_{CB} = 30 Vdc, I_E = 0)	2N5635		–	–	0.1	
	2N5636		–	–	1.0	
	2N5637		–	–	1.0	
ON CHARACTERISTICS						
DC Current Gain		h_{FE}				–
(I_C = 100 mAdc, V_{CE} = 5.0 Vdc)	2N5635		5.0	–	–	
(I_C = 200 mAdc, V_{CE} = 5.0 Vdc)	2N5636		5.0	–	–	
(I_C = 500 mAdc, V_{CE} = 5.0 Vdc)	2N5637		5.0	–	–	
DYNAMIC CHARACTERISTICS						
Output Capacitance		C_{ob}				pF
(V_{CB} = 30 Vdc, I_E = 0, f = 0.1 to 1.0 MHz)	2N5635		–	5.0	10	
	2N5636		–	10	20	
	2N5637		–	20	30	
FUNCTIONAL TEST						
Common-Emitter Amplifier Power Gain		G_{PE}				dB
(P_{out} = 2.5 Watts, V_{CE} = 28 Vdc, f = 400 MHz)	2N5635		6.2	9.2	–	
(P_{out} = 7.5 Watts, V_{CE} = 28 Vdc, f = 400 MHz)	2N5636		5.7	7.0	–	
(P_{out} = 20 Watts, V_{CE} = 28 Vdc, f = 400 MHz)	2N5637		4.6	5.8	–	
Power Output		P_{out}				Watts
(P_{in} = 0.6 Watt, V_{CE} = 28 Vdc, f = 400 MHz)	2N5635		2.5	3.2	–	
(P_{in} = 2.0 Watts, V_{CE} = 28 Vdc, f = 400 MHz)	2N5636		7.5	8.4	–	
(P_{in} = 7.0 Watts, V_{CE} = 28 Vdc, f = 400 MHz)	2N5637		20	22	–	
Collector Efficiency		η				%
(P_{out} = 2.5 Watts, V_{CE} = 28 Vdc, f = 400 MHz)	2N5635		50	–	–	
(P_{out} = 7.5 Watts, V_{CE} = 28 Vdc, f = 400 MHz)	2N5636		50	–	–	
(P_{out} = 20 Watts, V_{CE} = 28 Vdc, f = 400 MHz)	2N5637		60	–	–	

*Indicates JEDEC Registered Data.
Note 1: Pulsed through 25 mH inductor.

FIGURE 1 – 400 MHz TEST CIRCUIT (2N5635,2N5636)

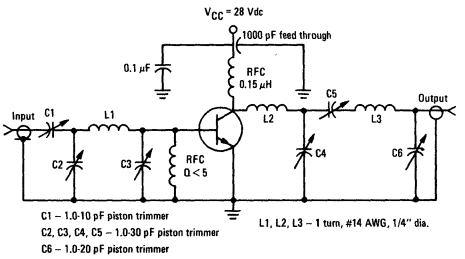
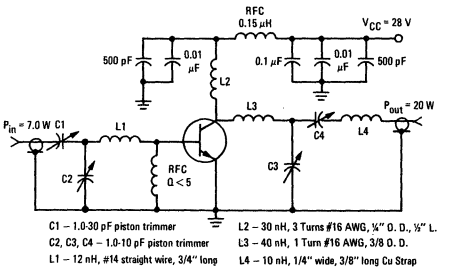


FIGURE 2 – 400 MHz TEST CIRCUIT (2N5637)



TYPICAL PERFORMANCE DATA

POWER OUTPUT versus FREQUENCY

FIGURE 3

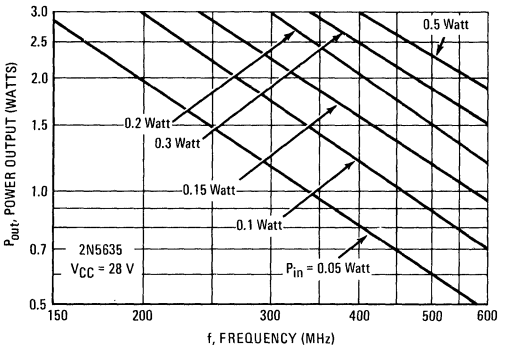


FIGURE 4

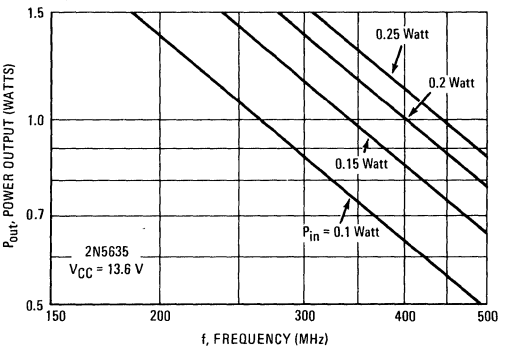


FIGURE 5

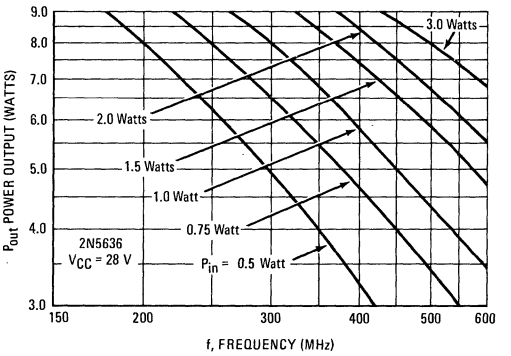


FIGURE 6

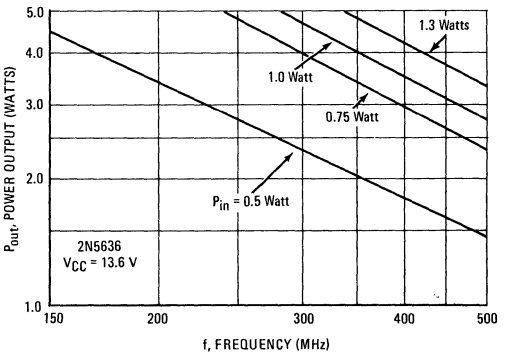


FIGURE 7

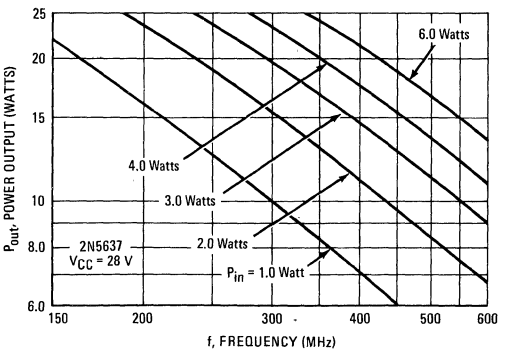
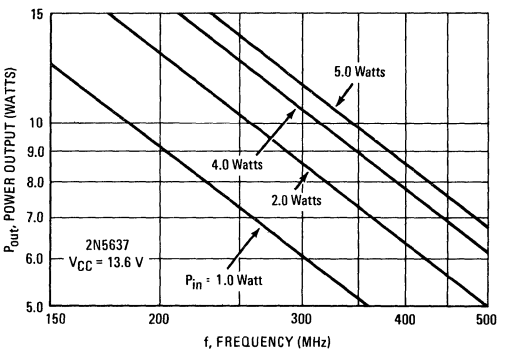


FIGURE 8



TYPICAL PERFORMANCE DATA

POWER OUTPUT versus POWER INPUT

FIGURE 9

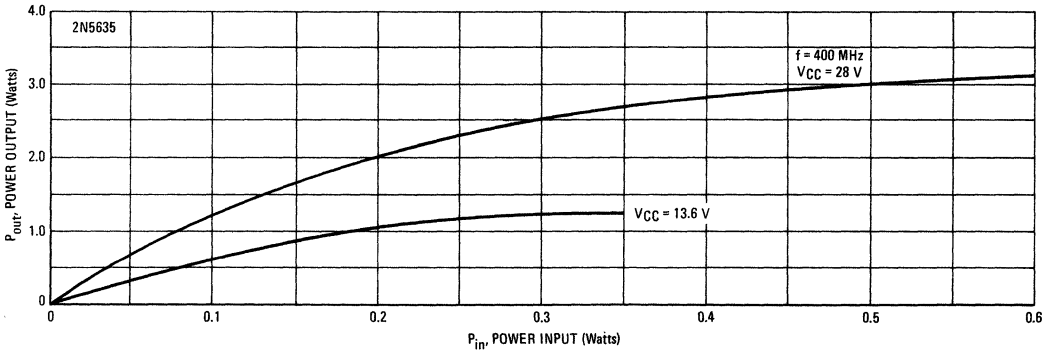


FIGURE 10

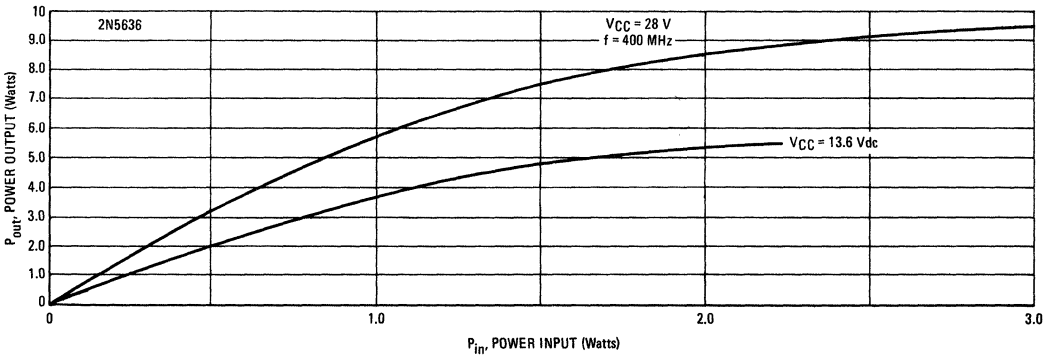
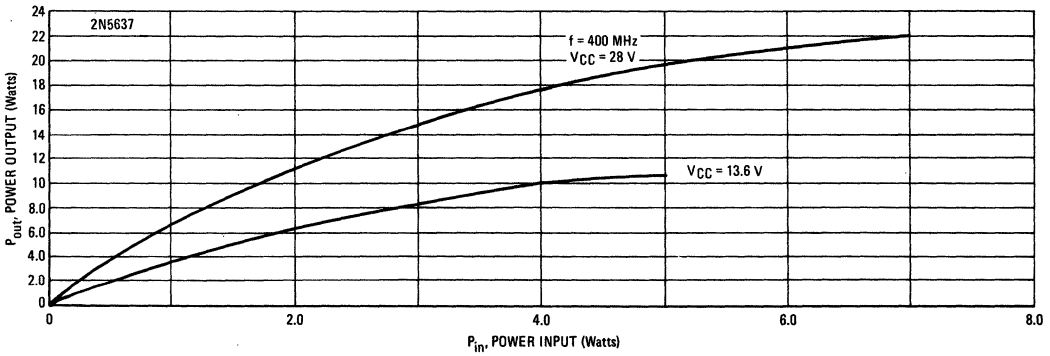


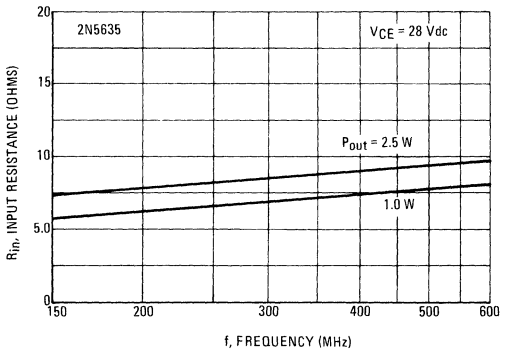
FIGURE 11



CIRCUIT DESIGN DATA

PARALLEL EQUIVALENT INPUT RESISTANCE versus FREQUENCY

FIGURE 12



PARALLEL EQUIVALENT INPUT CAPACITANCE versus FREQUENCY

FIGURE 13

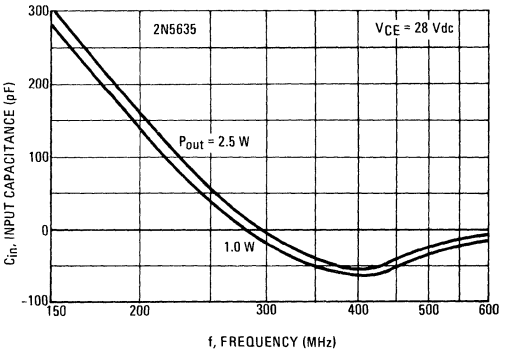


FIGURE 14

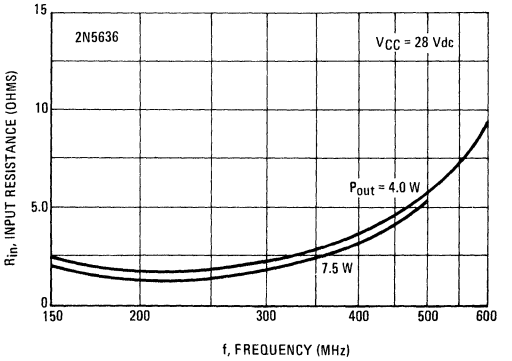


FIGURE 15

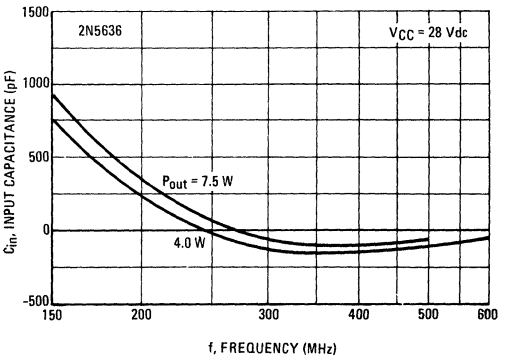


FIGURE 16

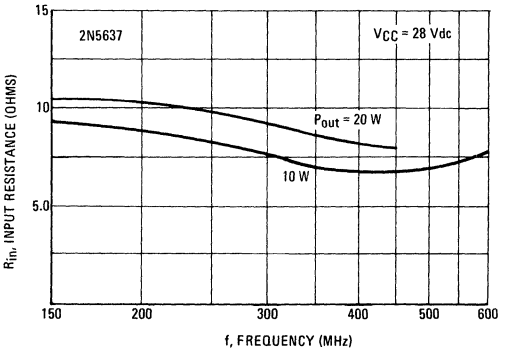
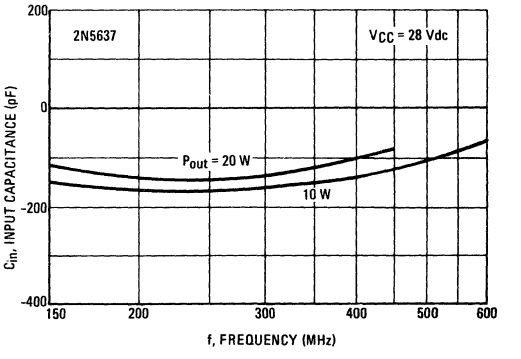


FIGURE 17



CIRCUIT DESIGN DATA

LARGE SIGNAL OUTPUT CAPACITANCE versus FREQUENCY

FIGURE 18

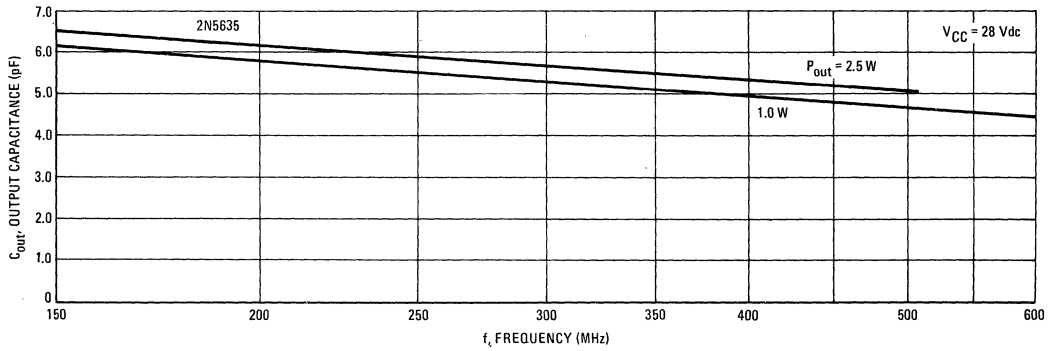


FIGURE 19

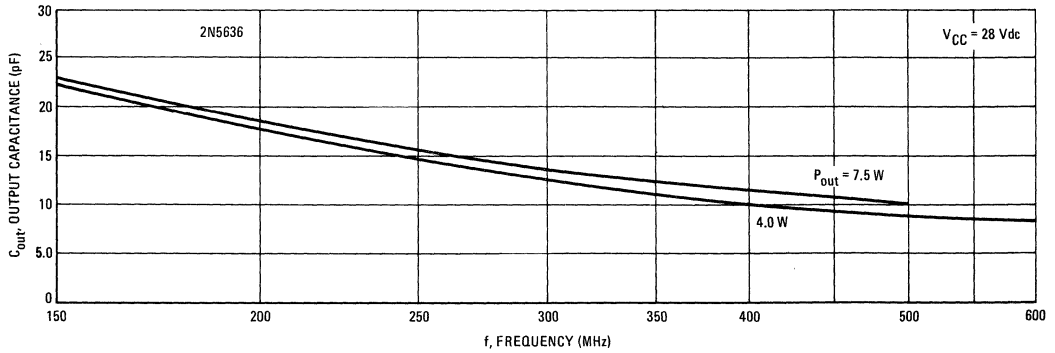
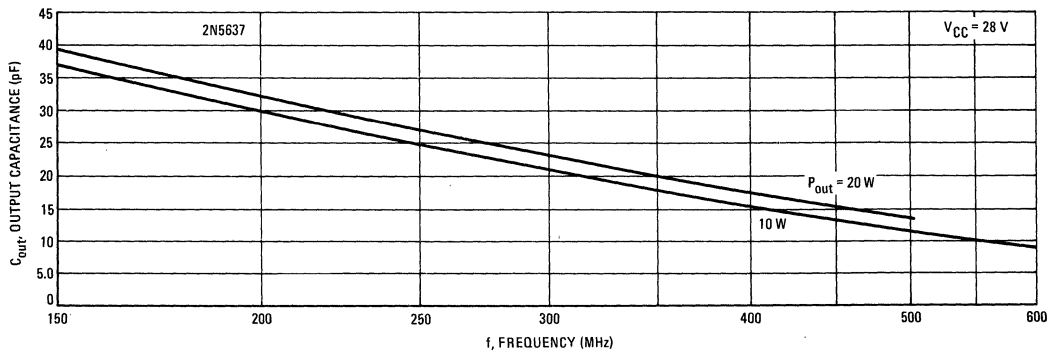


FIGURE 20



DC SAFE OPERATING AREA

FIGURE 21

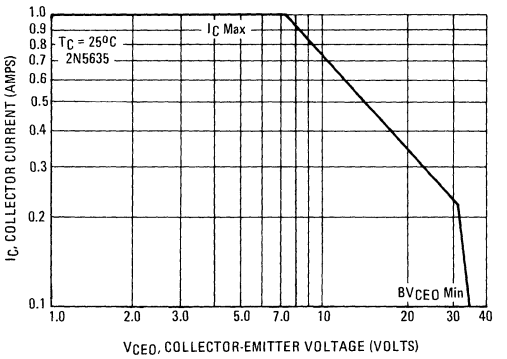


FIGURE 23

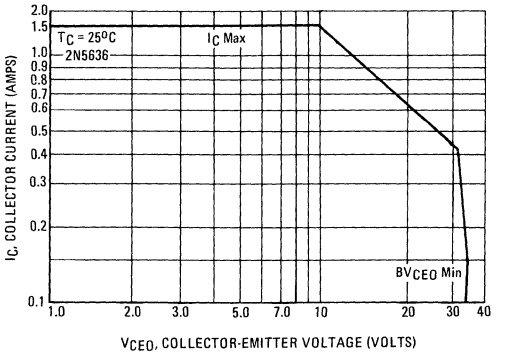
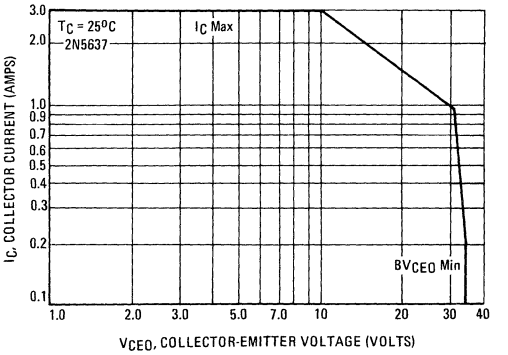


FIGURE 25



POWER DISSIPATION DERATING CURVE

FIGURE 22

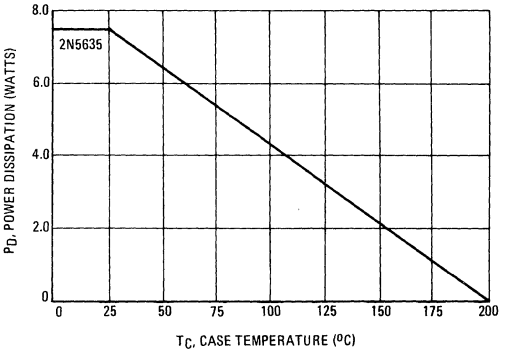


FIGURE 24

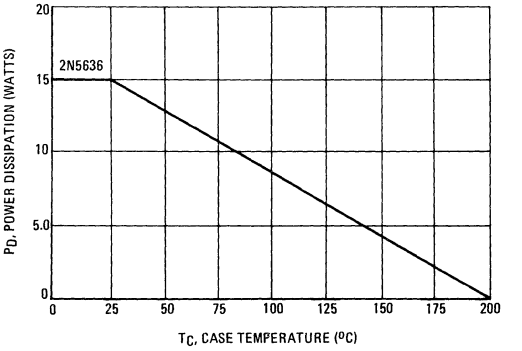
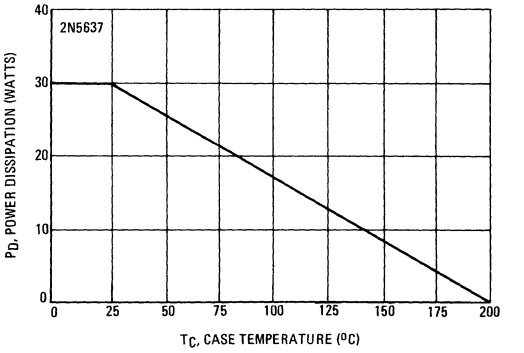


FIGURE 26



APPLICATION INFORMATION

In addition to a fine selection of quality RF Semiconductors, Motorola provides applications information in the form of Application Notes. Any of the notes listed on this page may be obtained by writing to the Technical Information Center, Motorola Semiconductor Products Inc., P. O. Box 20912, Phoenix, Arizona.

Small Signal RF Design

AN-139A- Understanding Transistor Response Parameters
AN-166 – Using Linvill Techniques for RF Amplifiers
AN-215A – RF Small Signal Design Using 2-Port Parameters
AN-238 – Transistor Mixer Design Using Admittance Parameters
AN-247A- An Integrated Circuit RF-IF Amplifier
AN-419 – UHF Amplifier Design Using Data Sheet Curves
AN-421 – Semiconductor Noise Figure Considerations
AN-423 – Field-Effect Transistor RF Amplifier Design Techniques

RF Power Transistor Circuit Design

AN-267 – Matching Network Designs with Computer Solutions
AN-282A – Systemizing RF Power Amplifier Design