MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

2N6166

The RF Line

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NPN SILICON RF POWER TRANSISTOR

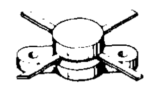
. . . designed for VHF power amplifier applications in military and industrial equipment. Particularly suited for use in Class AB, B, or C amplifier applications to 200 MHz

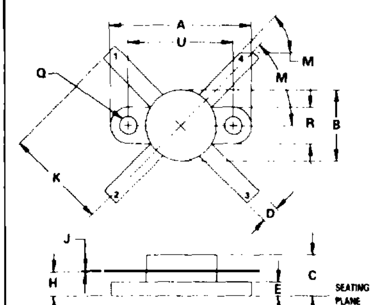
- Specified 28-Volt, 150-MHz Characteristics –
  Output Power = 100 Watts
  Minimum Gain = 6.0 dB
  Efficiency = 60%
- Specified 13.5-Volt, 150 MHz Characteristics –
  Output Power = 30 Watts
  Minimum Gain = 4.5 dB
- Parallel Impedance Characterization

100 WATTS – 150 MHz

RF POWER
TRANSISTOR

NPN SILICON





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

NOTES
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982
2. CONTROLLING DIMENSION: INCH

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	24.39	25.14	0.960	0.990
B	11.82	12.95	0.465	0.510
C	5.82	6.98	0.229	0.275
D	2.16	3.93	0.085	0.155
E	2.14	2.79	0.084	0.110
H	3.66	4.52	0.144	0.178
J	0.08	0.17	0.003	0.007
K	17.78	–	0.700	–
M	45 NOM		45 NOM	
Q	2.93	3.30	0.115	0.130
R	6.23	6.47	0.245	0.255
U	18.29	18.54	0.720	0.730

CASE 211-10

*MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	35	Vdc
Collector-Base Voltage	V_{CBO}	65	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	9.0	Adc
Total Device Dissipation @ $T_C = 25°C$ (1) Derate above 25°C	P_D	117 0.667	Watts W/°C
Storage Temperature Range	Tstg	–65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	1.5	°C/W

*Indicates JEDEC Registered Data.

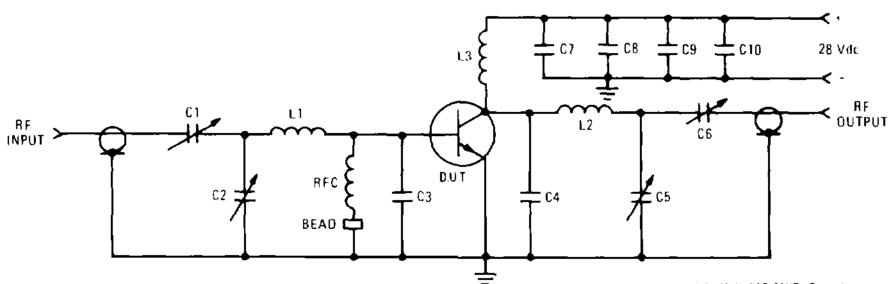
(1) This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (I_C = 200 mAdc, I_B = 0)	$V_{(BR)CEO}$	35	-	Vdc
Collector-Emitter Breakdown Voltage (I_C = 200 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	65	-	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	-	Vdc
Collector Cutoff Current (V_{CE} = 30 Vdc, V_{BE} = 0, T_C = 55°C)	I_{CES}	-	5.0	mAdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0)	I_{CBO}		3.0	mAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = 500 mAdc, V_{CE} = 5.0 Vdc)	h_{FE}	5.0	-	
DYNAMIC CHARACTERISTICS				
Output Capacitance (V_{CB} = 28 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}		130	pF
FUNCTIONAL TEST				
Common-Emitter Amplifier Power Gain (P_{out} = 100 W, V_{CC} = 28 Vdc, I_C (Max) = 5.95 Adc, f = 150 MHz)	G_{PE}	6.0	-	dB
Common-Emitter Amplifier Power Gain (P_{out} = 30 W, V_{CC} = 13.5 V, f = 150 MHz)	G_{PE}	4.5	--	dB
Collector Efficiency (P_{out} = 100 W, V_{CC} = 28 Vdc, I_C (Max) = 5.95 Adc, f = 150 MHz)	η	60	-	%

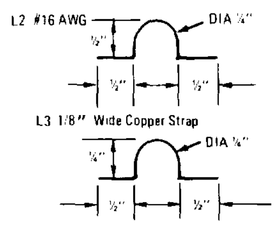
*Indicates JEDEC Registered Data.

FIGURE 1 – 150 MHz TEST CIRCUIT



C1, C6 2.7-30 pF, Arco 461 or Equivalent
C2, C5 9.0-180 pF, Arco 463 or Equivalent
C3 100 pF Underwood
C4 25 pF Underwood
C7 0.01 μF Ceramic Disc
C8 0.1 μF Ceramic Disc
C9 2400 pF Button
C10 5.0 μF/50 V
RFC 0.15 μH J. W. Miller
BEAD FERROXCUBE 56-590-65-3B

L1 1¼" #16 AWG, Straight



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OUTPUT POWER versus FREQUENCY

FIGURE 2 – V_{CC} = 28 Vdc

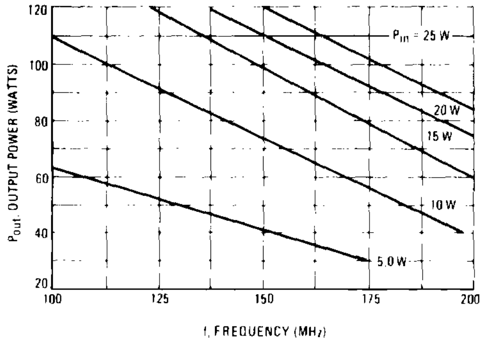

FIGURE 3 – V_{CC} = 13.5 Vdc

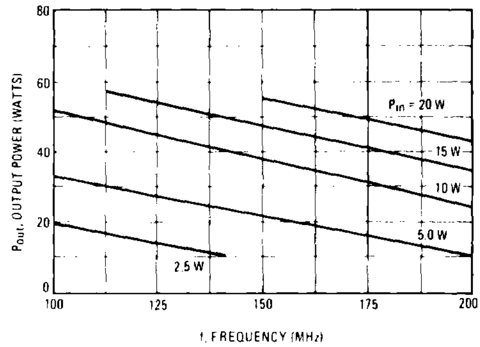

FIGURE 4 – OUTPUT POWER versus INPUT POWER

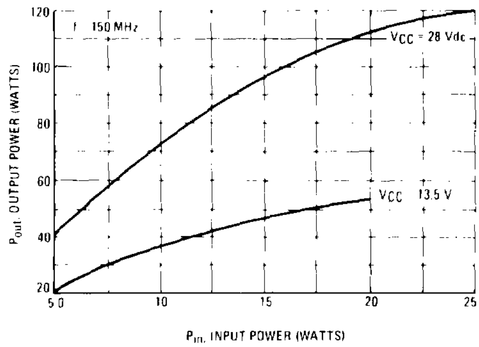

FIGURE 5 – OUTPUT POWER versus SUPPLY VOLTAGE

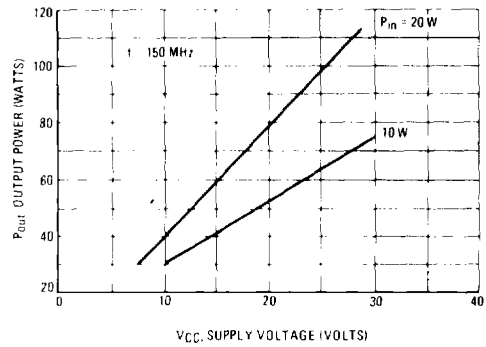

FIGURE 6 – PARALLEL EQUIVALENT INPUT RESISTANCE versus FREQUENCY

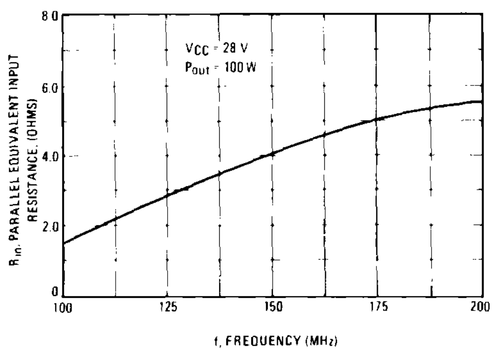

FIGURE 7 – PARALLEL EQUIVALENT INPUT CAPACITANCE versus FREQUENCY

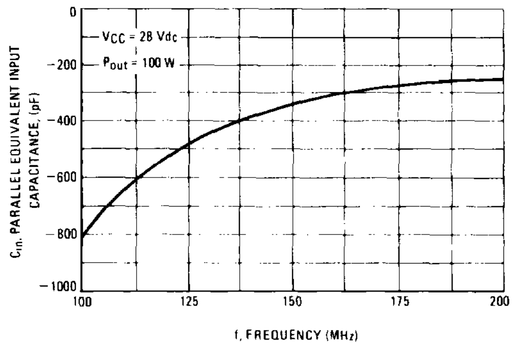

FIGURE 8 – PARALLEL EQUIVALENT OUTPUT CAPACITANCE versus FREQUENCY