

**MOTOROLA SEMICONDUCTOR TECHNICAL DATA**

T-33-07  
**MRF485**

**The RF Line**

**NPN SILICON RF POWER TRANSISTOR**

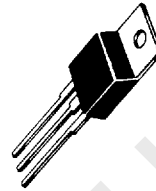
... designed primarily for use in single sideband linear amplifier output applications and other communications equipment operating to 30 MHz.

- Characterized for Single Sideband and Large-Signal Amplifier Applications Utilizing Low-Level Modulation
- Specified 28 V, 30 MHz Characteristics —  
Output Power = 15 W (PEP)  
Minimum Efficiency = 40% (SSB)  
Minimum Power Gain = 10 dB (PEP & CW)
- Common-Collector Configuration

15 W (PEP) – 15 W (CW) – 30 MHz

**RF POWER TRANSISTOR**

NPN SILICON



**MAXIMUM RATINGS**

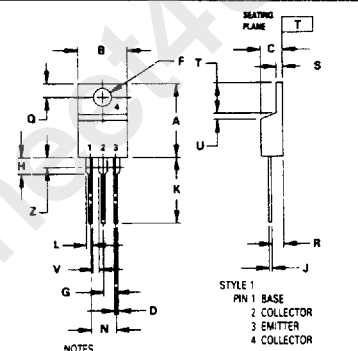
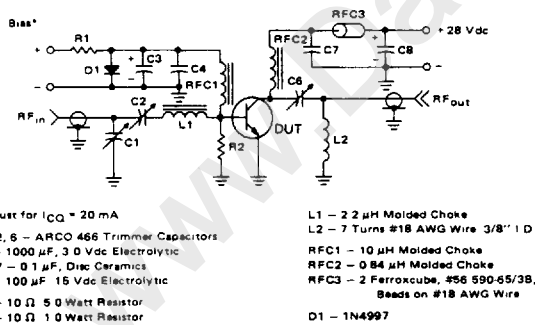
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	35	Vdc
Collector-Base Voltage	V <sub>CBO</sub>	65	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	4.0	Vdc
Collector Current – Continuous	I <sub>C</sub>	1.0	Adc
Total Device Dissipation @ T <sub>C</sub> = 50°C (1)	P <sub>D</sub>	30	Watts
Derate above 50°C		0.3	W/°C
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	3.33	°C/W

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

**FIGURE 1 – COMMON EMITTER TEST CIRCUIT**



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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.48	15.75	0.570	0.620
B	9.66	10.28	0.380	0.405
C	4.07	4.82	0.160	0.190
D	0.64	0.98	0.025	0.035
F	3.61	3.73	0.142	0.147
G	2.42	2.66	0.095	0.105
H	2.80	3.30	0.110	0.135
J	0.36	0.56	0.014	0.022
K	12.70	14.27	0.500	0.562
L	1.15	1.39	0.045	0.055
N	4.83	5.33	0.190	0.210
Q	2.54	3.04	0.100	0.120
R	2.04	2.75	0.080	0.110
S	1.15	1.39	0.045	0.055
T	5.97	6.47	0.235	0.255
U	0.00	1.27	0.000	0.050
V	1.15	—	0.045	—
Z	—	2.04	—	0.080

CASE 221A-04  
TO-220AB

MRF485

MOTOROLA SC (XSTRS/R F)

46E D 6367254 0094701 1 MOT6

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ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 20 mA, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	35	—	—	V <sub>dc</sub>
Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 50 mA, V <sub>BE</sub> = 0)	V <sub>(BR)CES</sub>	60	—	—	V <sub>dc</sub>
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 5.0 mA, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	40	—	—	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> = 25 V <sub>dc</sub> , I <sub>E</sub> = 0)	I <sub>CB0</sub>	—	—	1.0	mA <sub>dc</sub>
Collector Cutoff Current (V <sub>CE</sub> = 28 V <sub>dc</sub> , V <sub>BE</sub> = 0)	I <sub>CES</sub>	—	—	5.0	mA <sub>dc</sub>
<b>ON CHARACTERISTICS</b>					
DC Current Gain (I <sub>C</sub> = 500 mA, V <sub>CE</sub> = 5.0 V <sub>dc</sub> )	h <sub>FE</sub>	10	30	—	—
<b>DYNAMIC CHARACTERISTICS</b>					
Output Capacitance (V <sub>CB</sub> = 28 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>ob</sub>	—	85	100	pF
<b>FUNCTIONAL TESTS (SSB)</b>					
Common Emitter Amplifier Power Gain (V <sub>CC</sub> = 28 V <sub>dc</sub> , P <sub>out</sub> = 15 W (PEP), f <sub>1</sub> = 30 MHz, f <sub>2</sub> = 30.001 MHz, I <sub>CO</sub> = 20 mA)	G <sub>PE</sub>	10	13	—	dB
Collector Efficiency (V <sub>CC</sub> = 28 V <sub>dc</sub> , P <sub>out</sub> = 15 W (PEP), f <sub>1</sub> = 30 MHz, f <sub>2</sub> = 30.001 MHz, I <sub>CO</sub> = 20 mA)	η	40	—	—	%
Intermodulation Distortion (1) (V <sub>CC</sub> = 28 V <sub>dc</sub> , P <sub>out</sub> = 15 W (PEP), f <sub>1</sub> = 30 MHz, f <sub>2</sub> = 30.001 MHz, I <sub>CO</sub> = 20 mA)	IMD <sub>(d3)</sub>	—	-35	-30	dB
Load Mismatch (V <sub>CC</sub> = 28 V <sub>dc</sub> , P <sub>out</sub> = 15 W (PEP), f <sub>1</sub> = 30 MHz, f <sub>2</sub> = 30.001 MHz, VSWR = 30:1 All Angles)	ψ	No Degradation in Output Power			

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(1) To MIL-STD-1311 Version A, Test Method 2204B, Two Tone, Reference Each Tone

FIGURE 2 — OUTPUT POWER versus INPUT POWER

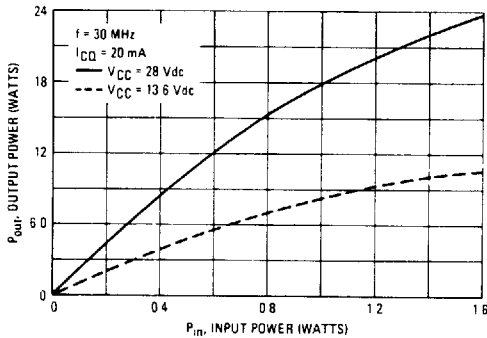
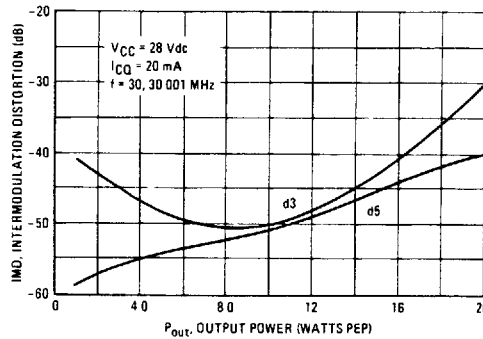


FIGURE 3 — INTERMODULATION DISTORTION versus OUTPUT POWER



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FIGURE 4 - OUTPUT POWER versus SUPPLY VOLTAGE

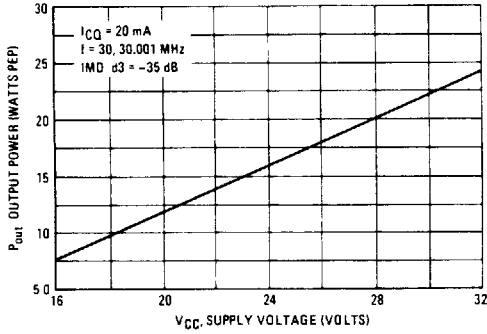
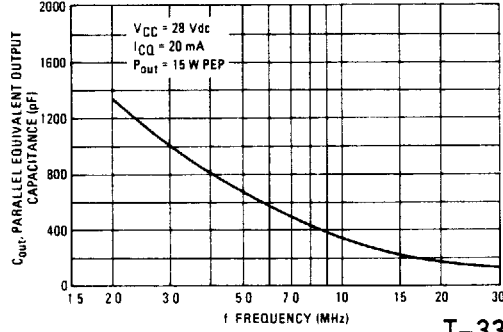


FIGURE 5 - OUTPUT CAPACITANCE versus FREQUENCY



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FIGURE 6 - OUTPUT RESISTANCE versus FREQUENCY

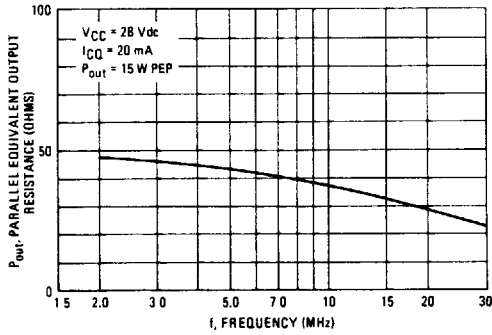


FIGURE 7 - POWER GAIN versus FREQUENCY

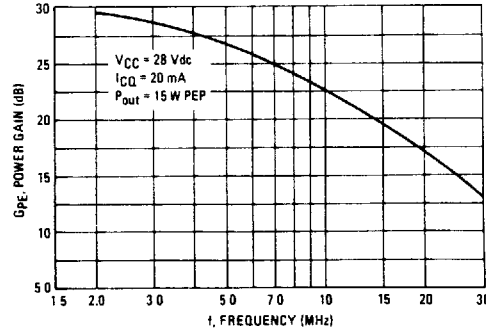
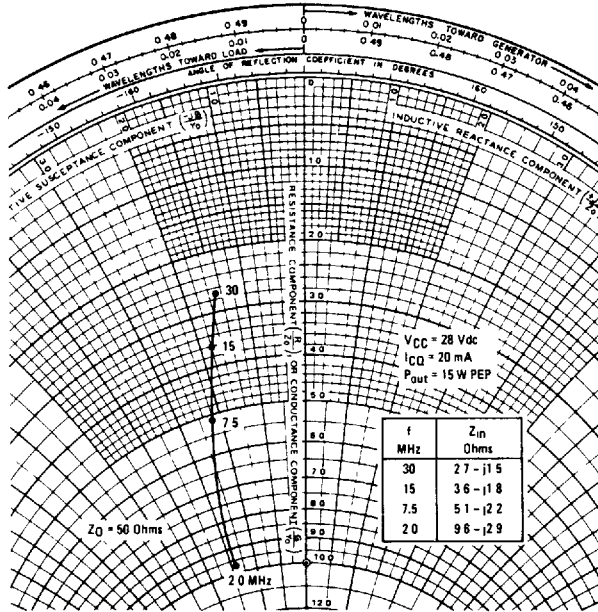


FIGURE 8 - SERIES EQUIVALENT INPUT IMPEDANCE



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