MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

JO4036

36 W — 175 MHz
RF POWER
TRANSISTOR
NPN SILICON

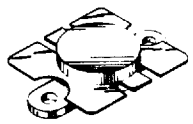
2

The RF Line

NPN Silicon VHF Power Transistor

. . . designed primarily for 12.5 Volt wideband, large-signal amplifier applications in industrial and commercial FM equipment operating to 175 MHz.

- Specified 12.5 Volt, 175 MHz Characteristics:
  Output Power — 36 Watts
  Gain — 7.8 dB, Min
- Internally Matched for Broadband Operation
- Tested for Load Mismatch Stress
- Gold Metallization for Improved Reliability
- Diffused Ballast Resistors



CASE 316A-01, STYLE 1
(.500 J ZERO)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	16	Vdc
Collector-Base Voltage	V_{CBO}	36	Vdc
Emitter-Base Voltage	V_{EBO}	4	Vdc
Collector Current — Continuous	I_C	6.5	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	100 0.57	Watts W/°C
Operating Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{stg}	−65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.75	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 50 mA, I_B = 0)	$V_{(BR)CEO}$	16	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 50 mA, I_E = 0)	$V_{(BR)CBO}$	36	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 5 mA, I_C = 0)	$V_{(BR)EBO}$	4	—	—	Vdc
Collector Cutoff Current (V_{CE} = 15 V, V_{BE} = 0)	I_{CES}	—	—	10	mAdc
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain (V_{CE} = 12.5 V, P_{in} = 6 W, f = 175 MHz)	G_{PE}	7.8	—	—	dB
Load Mismatch (V_{CE} = 15.5 V, P_{in} = 6 W, f = 175 MHz, Load VSWR = 20:1, All Phase Angles)	ψ	No Degradation in Output Power			
Input Return Loss (V_{CE} = 12.5 V, P_{in} = 6 W, f = 175 MHz, Circuit in Figure 7)	IRL	10	—	—	dB

TYPICAL CHARACTERISTICS

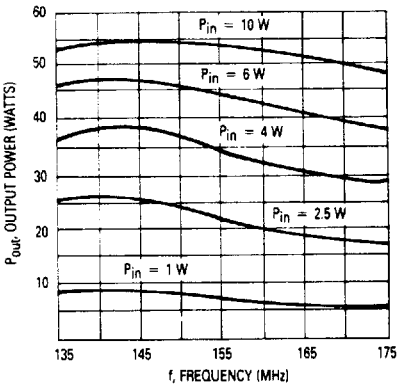


Figure 1. Output Power versus Frequency

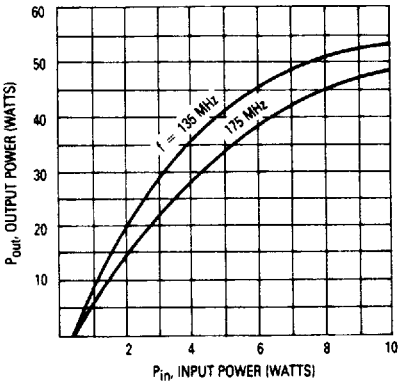


Figure 2. Output Power versus Input Power

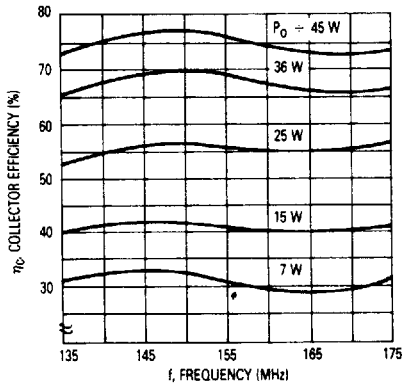


Figure 3. Collector Efficiency versus Frequency

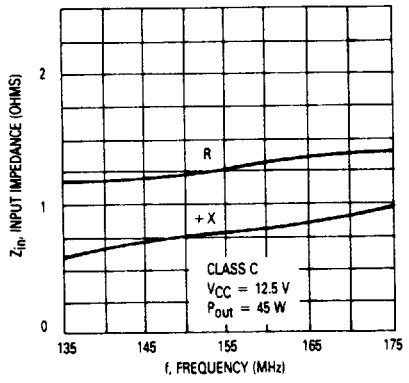


Figure 4. Series Input Impedance versus Frequency

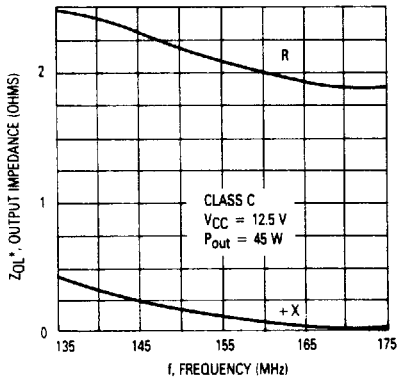


Figure 5. Series Output Impedance versus Frequency

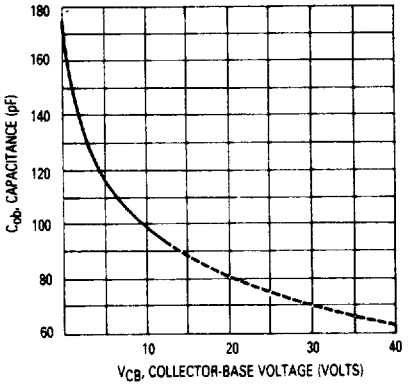
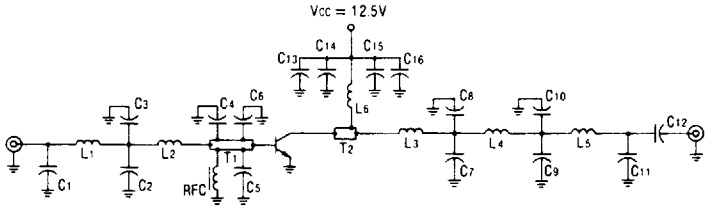


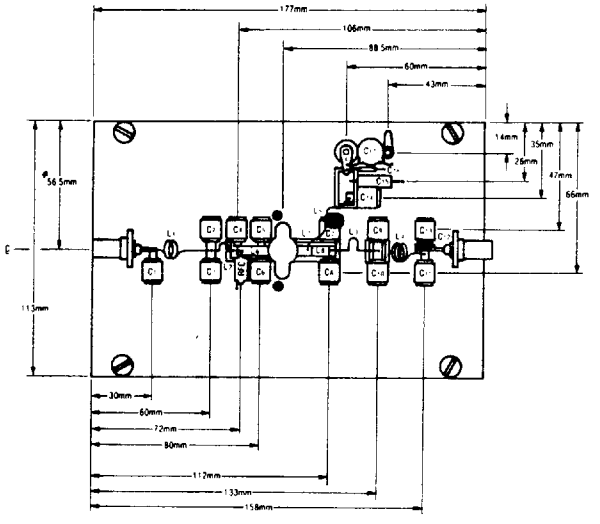
Figure 6. Output Capacitance versus Voltage



C1, C2 — 25 pF
C3, C4 — 80 pF
C5 — 250 pF
C6 — 200 pF
C7 — 150 pF
C8 — 100 pF
C9, C10 — 40 pF
C11 — 25 pF
C12, C13 — 1000 pF
C14 — 0.001 μF
C15 — 0.01 μF
C16 — 25 μF
L1 — 2T 18 AWG .2" dia.
L2 — .2" hairpin .125" wide x .025 thick copper strip
L3 — .1" x .2" wide x .005" thick copper loop
L4 — .3" hairpin 18 AWG
L5 — 3T 18 AWG, .2" dia.
L6 — 4T 18 AWG, .2" dia.
RFC — 2-1/2T on VK-211-07/3B ferroxcube
T1 — .2" width .5" length from package as ref.
T2 — .2" width .4" length from package as ref.

NOTES:
1. All capacitors in signal path are Underwood Electric Corp. Case Type J101.
2. Position C5 and C6 as close to pkg. as possible.

Figure 7. Broadband Test Fixture



C1 — 25 pF
C2, C4 — 80 pF
C3 — 30 pF
C5 — 250 pF
C6 — 200 pF
C7 — 150 pF
C8 — 100 pF
C9, C10 — 40 pF
C11 — 10 pF
C12, C14 — 1000 pF
C13 — 15 pF
C15 — 5 μF 25 V
C16 — 0.001K Disc
C17 — 0.01 μ 1KV Disc
L1 — 2T .2" dia. 18 AWG .250" long
L2 — .2" hairpin .125" wide x .025 thick
RFC1 — 2-1/2T on VK-211-07/3B ferroxcube
L3 — .3" hairpin #18 AWG
L4 — 3T .2" dia. #10 AWG .500" long
L5 — 4T .2" dia. #18 AWG .400" long
L6 — .5" x .2"
L7 — .4" x .2"
L8 — .1" x .2" wide x .005" thick
Material: .062" Epoxy Board, Copper Clad — 2 Sides

Figure 8. Test Fixture Component Layout