

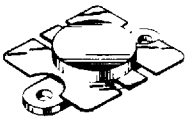
T-33-13

MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

JO4045

45 W — 175 MHz
RF POWER
TRANSISTOR
NPN SILICON

2



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

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 — 45 Watts
 - Gain — 6.5 dB, Min
- Internally Matched for Broadband Operation
- Tested for Load Mismatch Stress
- Gold Metallization for Improved Reliability
- Diffused Ballast Resistors

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	16	V _{dc}
Collector-Base Voltage	V _{CES}	36	V _{dc}
Collector Current — Continuous	I _C	6.5	A _{dc}
Total Device Dissipation (a. 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 _{θJC}	1.75	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage (I _C = 50 mA, I _B = 0)	V _{(BR)CEO}	16	—	—	V _{dc}
Collector-Emitter Breakdown Voltage (I _C = 50 mA, V _{BE} = 0)	V _{(BR)CES}	36	—	—	V _{dc}
Collector Cutoff Current (V _{CE} = 15 V, V _{BE} = 0)	I _{CES}	—	—	10	mA _{dc}

ON CHARACTERISTICS

DC Current Gain (I _C = 1 A, V _{CE} = 5 V)	h _{FE}	10	—	200	—
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FUNCTIONAL TESTS

Common-Emitter Amplifier Power Gain (V _{CE} = 12.5 V, P _{in} = 10 W, f = 175 MHz)	G _{PE}	6.5	—	—	dB
Load Mismatch (V _{CE} = 15.5 V, P _{in} = 10 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} = 10 W, f = 175 MHz, Circuit in Figure 7)	IRL	10	—	—	dB

TYPICAL CHARACTERISTICS

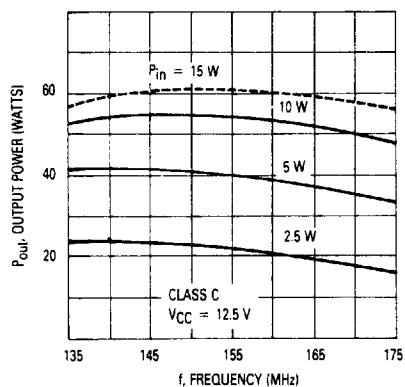


Figure 1. Output Power versus Frequency

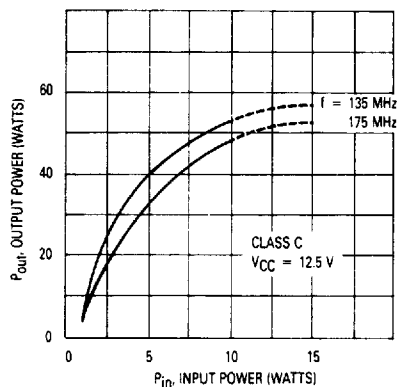


Figure 2. Output Power versus Input Power

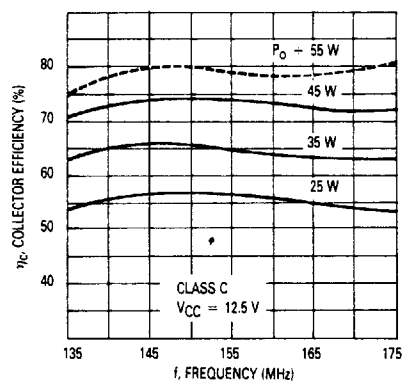


Figure 3. Broadband Collector Efficiency

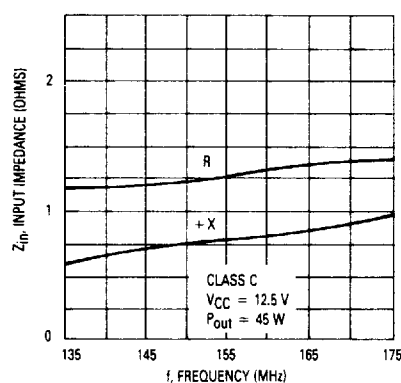


Figure 4. Series Input Impedance

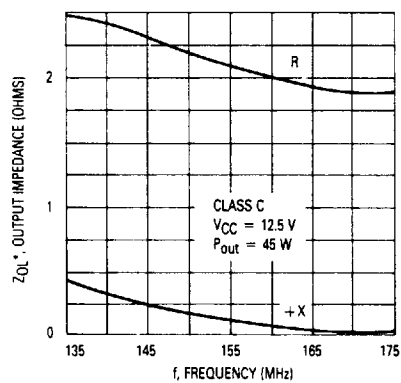


Figure 5. Series Output Impedance

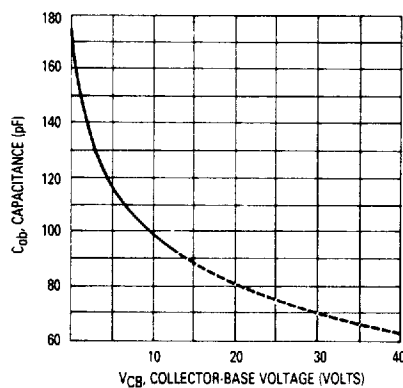
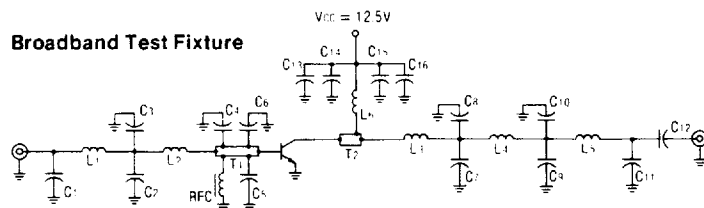


Figure 6. Output Capacitance

Broadband Test Fixture



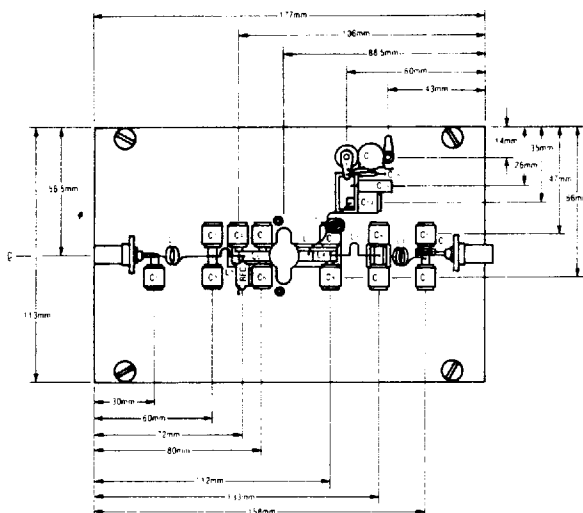
C1, C2 — 25 pF
 C3, C4 — 80 pF
 C5 — 250 pF
 C6 — 200 pF
 C7 — 150 pF
 C8 — 100 pF
 C9, C10 — 40 pF
 C11 — 25 pF
 C12, C13 — 1000 pF
 C14 — 0.001 μ F
 C15 — 0.01 μ F
 C16 — 25 μ F
 L1 — 2T 18 AWG .2" dia.

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-211-07/38 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 μ F 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-211-07/38 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