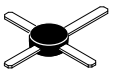
The RF Line
NPN Silicon RF Low Power Transistor

Designed primarily for wideband large signal predriver stages in 800 MHz and UHF frequency ranges.

- Specified @ 12.5 V, 870 MHz Characteristics
  - Output Power = 750 mW
  - Minimum Gain = 8.0 dB
  - Efficiency 60% (Typ)
- Low Cost Macro–X Plastic Package or SORF Plastic Surface Mounted Package
- State–of–the–Art Technology
  - Fine Line Geometry
  - Gold Top Metal and Wires
  - Silicon Nitride Passivated
  - Ion Implanted Arsenic Emitters
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.
- MRF8372 available in tape and reel packaging options by adding suffix:
  - R1 suffix = 500 units per reel
  - R2 suffix = 2,500 units per reel

MRF837
MRF8372, R1, R2

750 mW, 870 MHz
RF LOW POWER
TRANSISTOR
NPN SILICON



CASE 317–01, STYLE 2
MACRO–X
MRF837

CASE 751–05, STYLE 1
SORF (SO–8)
MRF8372

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}	4.0	Vdc
Collector Current — Continuous		I_C	200	mAdc
Total Device Dissipation @ T_C = 75°C (1) Derate above 75°C	MRF837	P_D	1.88 25	Watts mW/°C
Total Device Dissipation @ T_C = 75°C (1) Derate above 75°C	MRF8372	P_D	1.67 22.2	Watts mW/°C
Storage Temperature Range		T_J, T_{stg}	–55 to +150	°C
Maximum Junction Temperature		T_{Jmax}	150	°C

THERMAL CHARACTERISTICS

Characteristic		Symbol	Max	Unit
Thermal Resistance, Junction to Case	MRF837	$R_{\theta JC}$	40	°C/W
Thermal Resistance, Junction to Case	MRF8372	$R_{\theta JC}$	45	°C/W

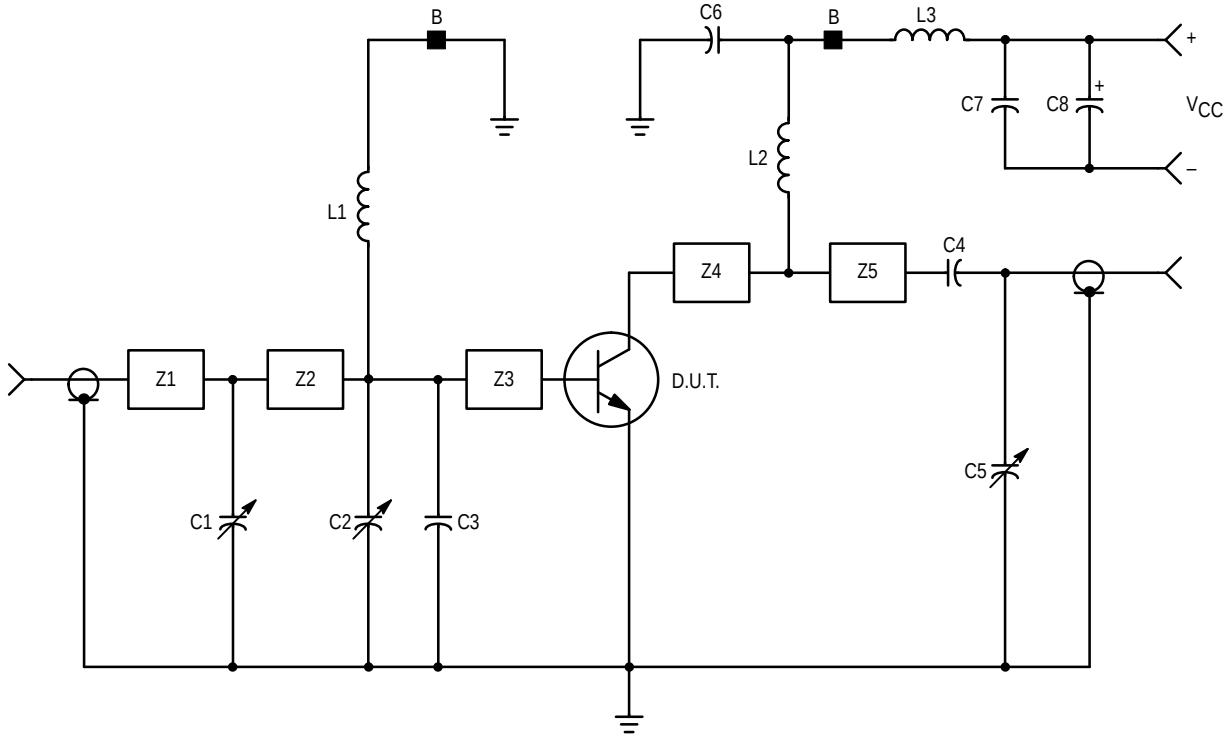
DEVICE MARKING

MRF8372 = 8372

NOTE:
1. Case temperature measured on collector lead immediately adjacent to body of package.

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

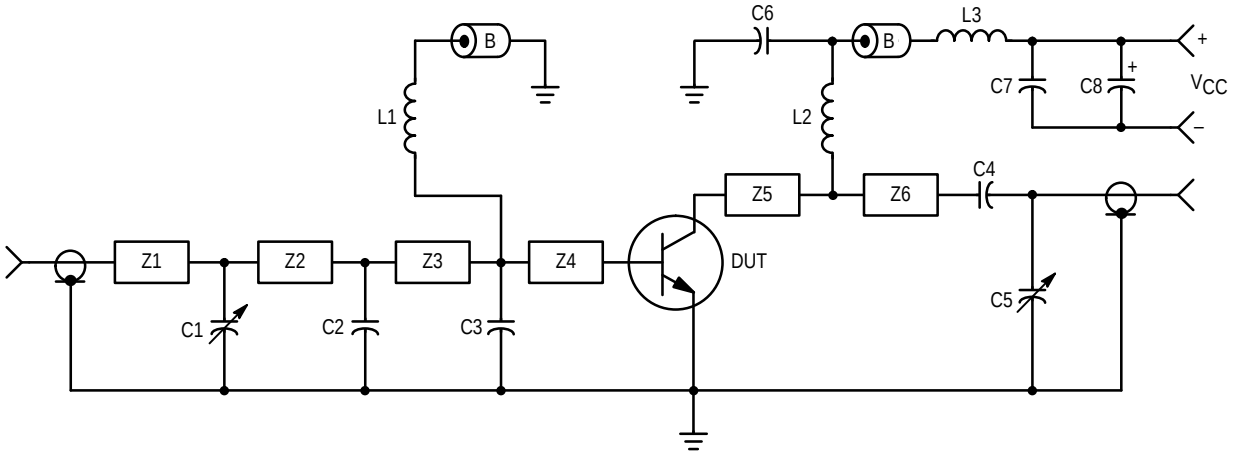
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 5.0 mAdc, I_B = 0)	$V_{(BR)CEO}$	16	—	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 5.0 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	36	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 0.1 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current (V_{CE} = 15 Vdc, V_{BE} = 0, T_C = 25°C)	I_{CES}	—	—	0.1	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 50 mAdc, V_{CE} = 10 Vdc)	h_{FE}	30	90	200	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 15 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	—	1.8	2.5	pF
FUNCTIONAL TESTS					
Common–Emitter Amplifier Power Gain (V_{CC} = 12.5 Vdc, P_{out} = 0.75 W, f = 870 MHz)	G_{pe}	8.0	10	—	dB
Collector Efficiency (V_{CC} = 12.5 Vdc, P_{out} = 0.75 W, f = 870 MHz)	η	55	60	—	%



C1, C2, C5 — 0.8–8.0 pF Johanson Gigatrim
C3 — 5.0 pF Clamped Mica, Mini–Underwood
C6 — 91 pF Clamped Mica, Mini–Underwood
C4 — 470 pF Ceramic Chip Capacitor
C7 — 68 pF Clamped Mica, Mini–Underwood
C8 — 1.0 μF 25 V Tantalum
B — Bead, Ferroxcube 56–590–65/3B

L1, L2 — 4 Turns, #21 AWG, 5/32″ ID
L3 — 7 Turns, #21 AWG, 5/32″ ID
Z1 — 0.80″ x 0.163″ Microstrip, Z_O = 50 Ω
Z2 — 1.375″ x 0.163″ Microstrip, Z_O = 50 Ω
Z3, Z4 — 0.375″ x 0.163″ Microstrip, Z_O = 50 Ω
Z5 — 1.35″ x 0.163″ Microstrip, Z_O = 50 Ω
PCB — 1/16″ Glass Teflon, ε_r = 2.56

Figure 1. MRF837 800–880 MHz Broadband Circuit



C1, C5 — 0.8–8.0 pF Johanson Gigatrim
C2, C3 — 10 pF Ceramic Chip Capacitor
C6 — 91 pF Clamped Mica, Mini–Underwood
C4 — 47 pF Ceramic Chip Capacitor
C7 — 91 pF Clamped Mica, Mini–Underwood
C8 — 1.0 μF 25 V Tantalum
B — Bead, Ferroxcube 56–590–65/3B

L1, L2 — 4 Turns, #21 AWG, 5/32″ ID
L3 — 7 Turns, #21 AWG, 5/32″ ID
Z1, Z2 — 1″ x 0.078″ Microstrip, Z_O = 50 Ohms
Z3 — 0.25″ x 0.078″ Microstrip, Z_O = 50 Ohms
Z4 — 0.15″ x 0.078″ Microstrip, Z_O = 50 Ohms
Z5 — 0.30″ x 0.078″ Microstrip, Z_O = 50 Ohms
Z6 — 1.63″ x 0.078″ Microstrip, Z_O = 50 Ohms
PCB — 1/32″ Glass Teflon, ε_r = 2.56

Figure 2. MRF8372 800–900 MHz Broadband Circuit

800/900 MHz BAND DATA

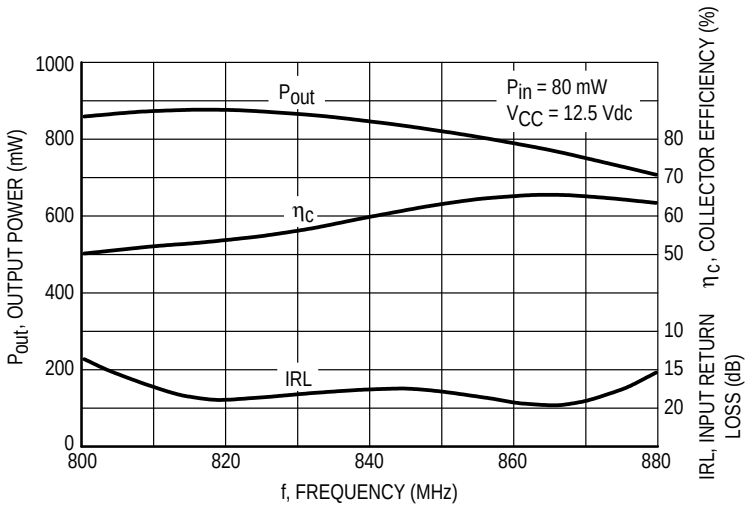


Figure 3. MRF837 Typical Broadband Performance

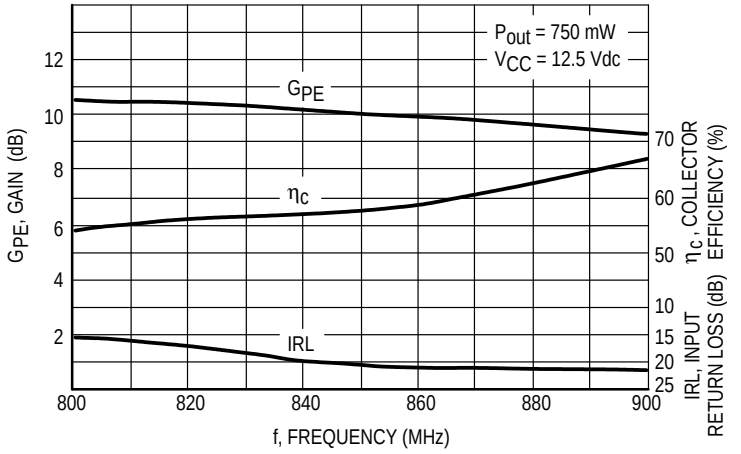


Figure 4. MRF8372 Typical Broadband Performance

f Frequency MHz	Z_{in} Ohms		Z_{OL}* Ohms	
	V_{CC} = 7.5 V	V_{CC} = 12.5 V	V_{CC} = 7.5 V	V_{CC} = 12.5 V
	P_{in} = 150 mW	P_{in} = 100 mW	P_{out} 806 MHz = 870 mW P_{out} 870 MHz = 820 mW P_{out} 960 MHz = 700 mW	P_{out} 806 MHz = 1.05 W P_{out} 870 MHz = 950 mW P_{out} 960 MHz = 725 mW
806	6.1 + j3.6	4.3 + j0.6	38.3 – j16.4	23.2 – j31.6
870	5.6 + j5.2	6.5 + j3.6	40.8 – j18.9	41.3 – j18.4
960	6.1 + j6.8	6.4 + j4.5	43.8 – j14.7	41.4 – j19.0

Z_{OL}* = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage, and frequency.

Table 1. MRF837 Z_{in} and Z_{OL} versus Collector Voltage, Input Power and Output Power

f Frequency MHz	Z_{in} Ohms		Z_{OL}* Ohms	
	V_{CC} = 7.5 V	V_{CC} = 12.5 V	V_{CC} = 7.5 V	V_{CC} = 12.5 V
	P_{in} = 150 mW	P_{in} = 100 mW	P_{out} = 806 MHz = 820 mW P_{out} = 870 MHz = 635 mW P_{out} = 960 MHz = 530 mW	P_{out} = 806 MHz = 1.05 mW P_{out} = 870 MHz = 855 mW P_{out} = 960 MHz = 580 mW
806	8.0 + j1.9	4.0 + j1.2	24.7 – j19.2	20.9 – j31.0
870	5.2 + j3.5	6.0 + j1.9	36.9 – j20.5	32.1 – j26.6
960	6.8 + j4.0	6.1 + j2.5	39.3 – j18.5	36.3 – j25.7

Z_{OL}* = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage, and frequency.

Table 2. MRF8372 Series Equivalent Input/Output Impedance

MRF837
800/900 MHz BAND DATA (continued)

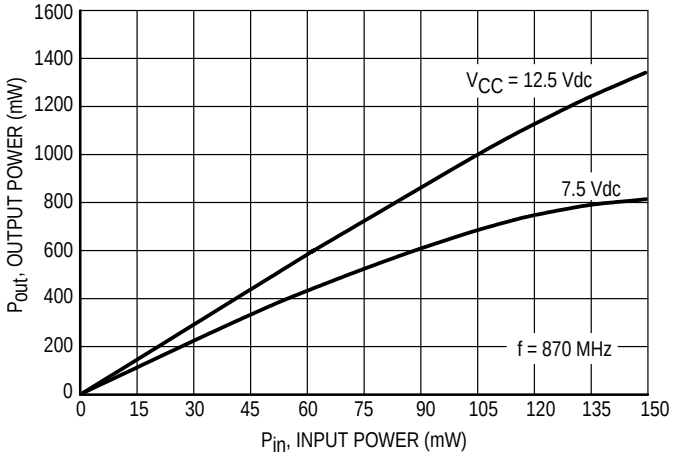


Figure 5. Output Power versus Input Power

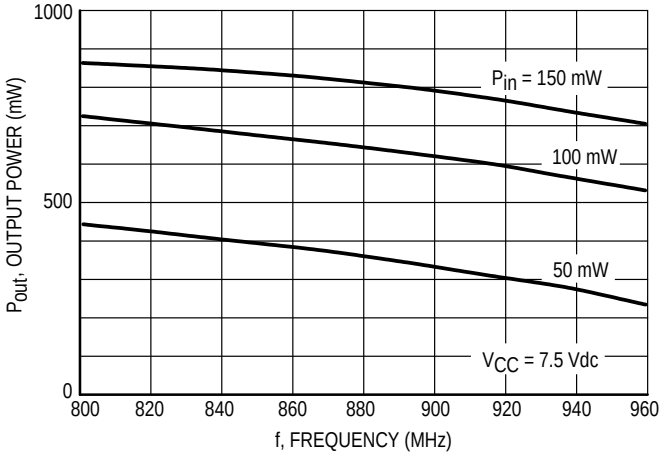


Figure 6. Output Power versus Frequency

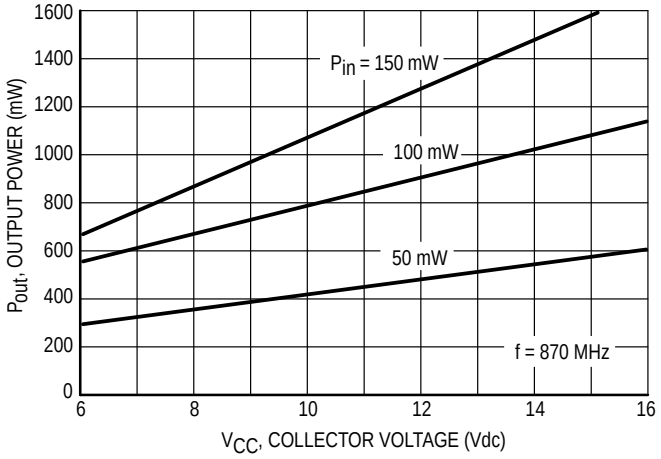


Figure 7. Output Power versus Collector Voltage

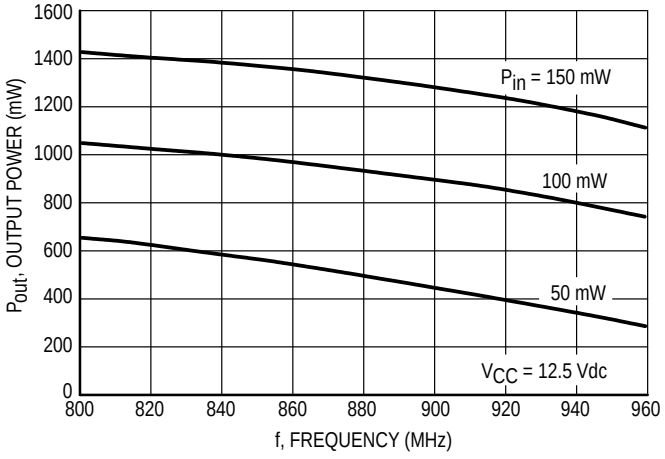


Figure 8. Output Power versus Frequency

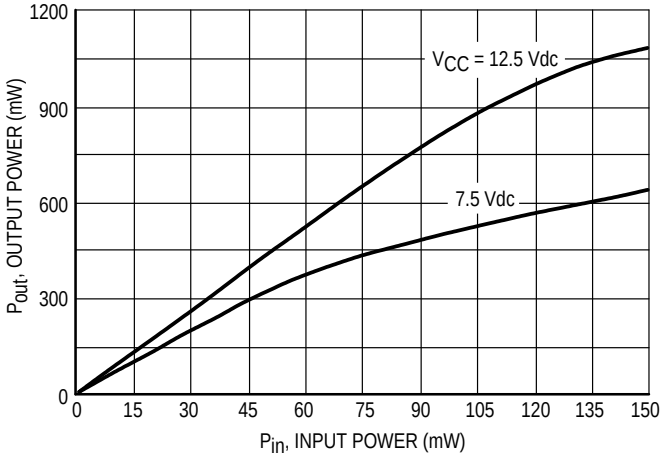


Figure 9. Output Power versus Input Power
f = 870 MHz

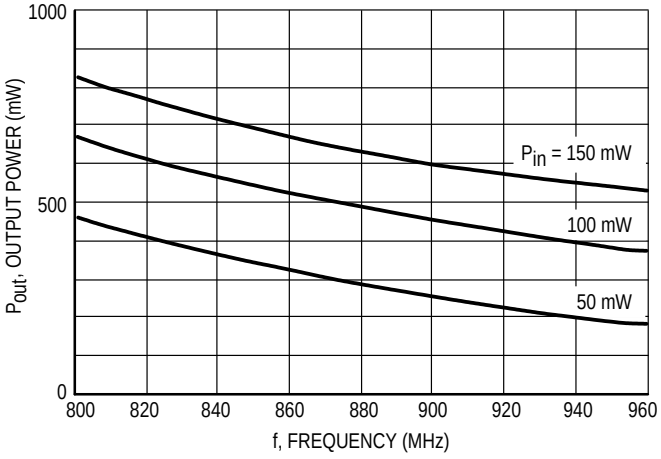


Figure 10. Output Power versus Frequency
V_{CC} = 7.5 Vdc

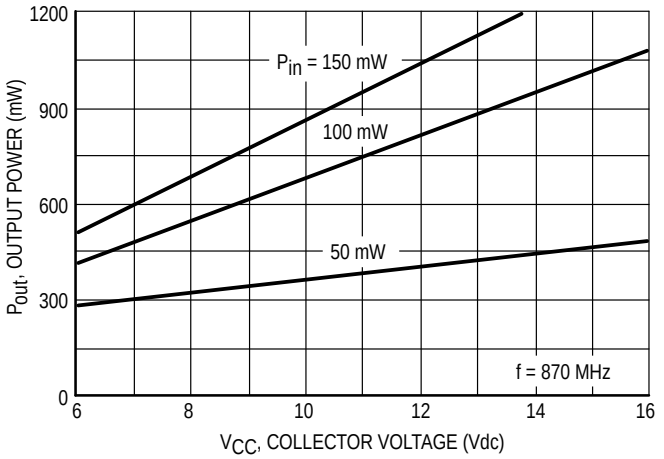


Figure 11. Output Power versus Collector Voltage

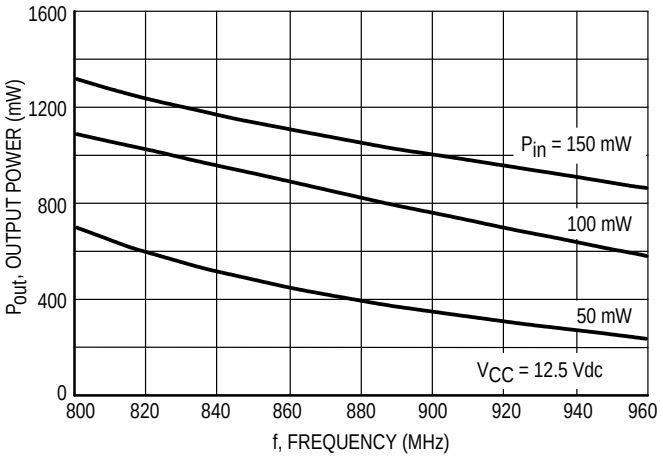


Figure 12. Output Power versus Frequency

MRF837 UHF BAND DATA

f Frequency MHz	Z_{in} Ohms		Z_{OL}* Ohms	
	V_{CC} = 7.5 V	V_{CC} = 12.5 V	V_{CC} = 7.5 V	V_{CC} = 12.5 V
	P_{in} = 75 mW	P_{in} = 50 mW	P_{out} 400 MHz = 875 mW P_{out} 450 MHz = 790 mW P_{out} 512 MHz = 675 mW	P_{out} 400 MHz = 1.25 W P_{out} 450 MHz = 1.1 W P_{out} 512 MHz = 775 mW
400	9.6 – j7.5	8.2 – j11.5	37.8 + j12.3	51.8 – j7.2
450	11.3 – j7.5	9.7 – j11	35.8 + j8.6	52.2 – j16.7
512	11.5 – j6.8	12 – j9.2	42.4 + j0.24	43.7 – j5.7

Z_{OL}* = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.

Table 2. MRF837 Z_{in} and Z_{OL} versus Collector Voltage, Input Power, and Output Power

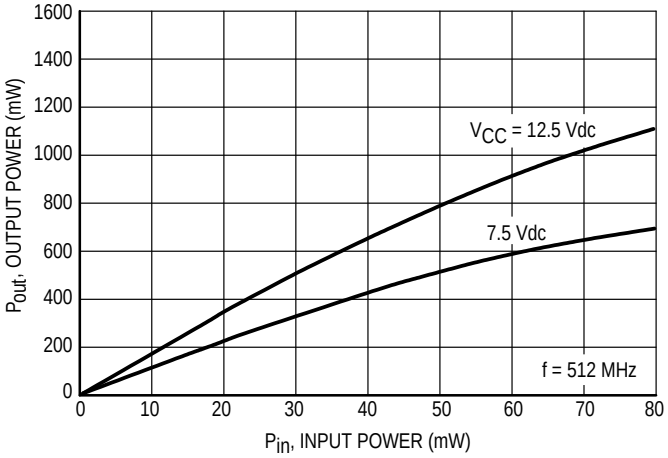


Figure 13. Output Power versus Input Power

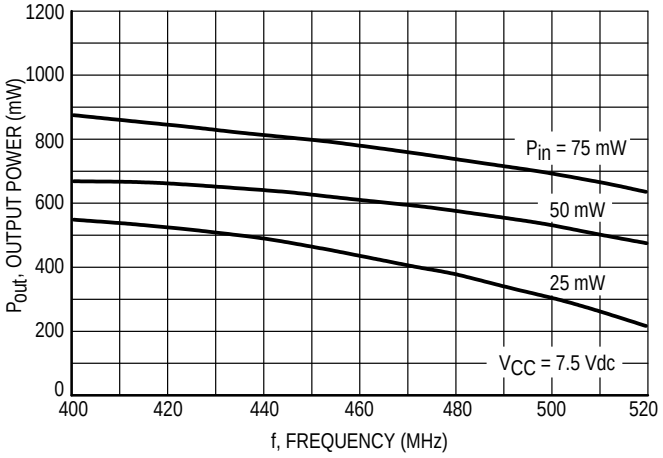


Figure 14. Output Power versus Frequency

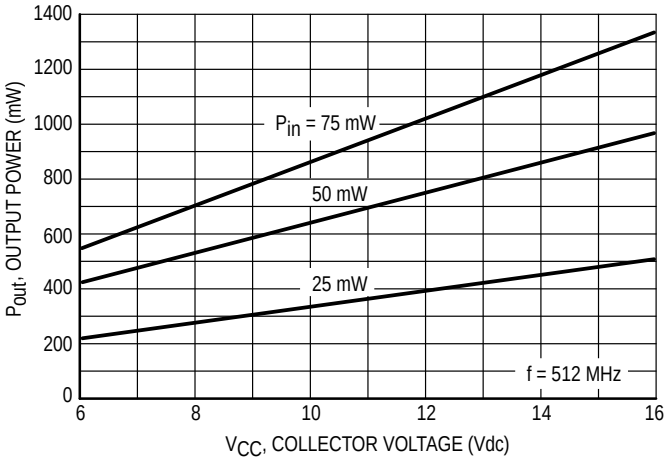


Figure 15. Output Power versus Collector Voltage

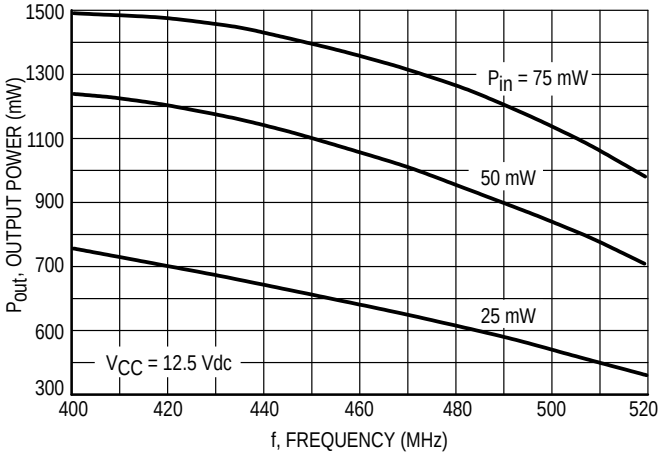
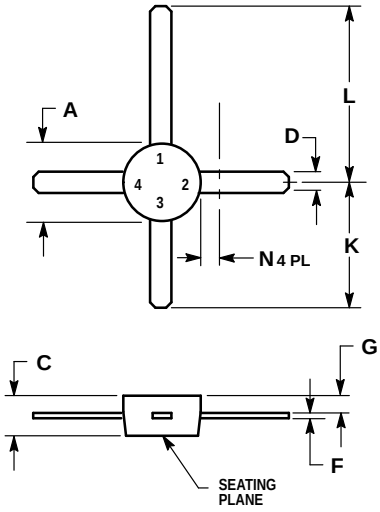


Figure 16. Output Power versus Frequency

PACKAGE DIMENSIONS

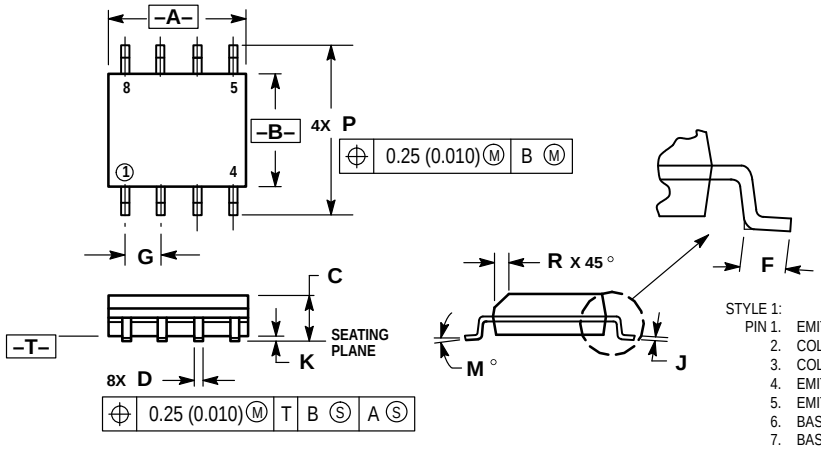


NOTES:
1. DIMENSION D NOT APPLICABLE IN ZONE N.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.44	5.21	0.175	0.205
C	1.90	2.54	0.075	0.100
D	0.84	0.99	0.033	0.039
F	0.20	0.30	0.080	0.012
G	0.76	1.14	0.030	0.045
K	7.24	8.13	0.285	0.320
L	10.54	11.43	0.415	0.450
N	—	1.65	—	0.065

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

CASE 317–01
ISSUE E
MRF837



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.18	0.25	0.007	0.009
K	0.10	0.25	0.004	0.009
M	0 °	7 °	0 °	7 °
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

STYLE 1:
PIN 1. EMITTER
2. COLLECTOR
3. COLLECTOR
4. EMITTER
5. EMITTER
6. BASE
7. BASE
8. EMITTER

CASE 751–05
ISSUE N
MRF8372

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