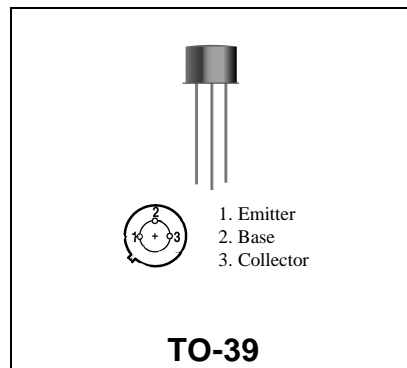


2N4427

**RF & MICROWAVE DISCRETE
 LOW POWER TRANSISTORS**

Features

- Silicon NPN, To-39 packaged VHF/UHF Transistor
- 1 Watt Minimum Power Output @ 175 MHz
- 500 MHz Current-Gain Bandwidth Product @ 50mA
- Power Gain, $G_{PE} = 10\text{dB (Min)}$ @ 175 MHz



DESCRIPTION:

Silicon NPN transistor, designed for VHF and UHF equipment. Applications include amplifier; pre-driver, driver, and output stages. Also suitable for oscillator and frequency-multiplier functions.

ABSOLUTE MAXIMUM RATINGS ($T_{case} = 25^{\circ}\text{C}$)

| Symbol | Parameter | Value | Unit |
|-----------|------------------------|-------|------|
| V_{CEO} | Collector-Emitter | 20 | Vdc |
| V_{CBO} | Collector-Base Voltage | 40 | Vdc |
| V_{EBO} | Emitter-Base Voltage | 2.0 | Vdc |
| I_C | Collector Current | 400 | mA |

Thermal Data

| | | | |
|-------|--|-------------|---------------------------------|
| P_D | Total Device Dissipation @ $T_A = 25^{\circ}\text{C}$ Derate above 25°C | 1.0 5.71 | Watts mW/ $^{\circ}\text{C}$ |
|-------|--|-------------|---------------------------------|

ELECTRICAL SPECIFICATIONS (Tcase = 25°C)

STATIC
 (off)

| Symbol | Test Conditions | Value | | | Unit |
|--------|--|-------|------|------|-----------------|
| | | Min. | Typ. | Max. | |
| BVCER | Collector-Emitter Sustaining Voltage (IC = 5.0 mA _{dc} , RBE = 10 ohms) | 40 | - | - | V _{dc} |
| BVCEO | Collector-Emitter Sustaining Voltage (IC=5.0 mA _{dc} , IB=0) | 20 | - | - | V _{dc} |
| ICEO | Collector Cutoff Current (VCE = 12 V _{dc} , IB = 0) | - | - | 20 | μA |
| ICEX | Collector Cutoff Current (VCE = 40 V _{dc} , VBE = -1.5 V _{dc}) | - | - | 100 | μA |
| IEBO | Emitter Cutoff Current (VEB = 2.0 V _{dc} , IC = 0) | - | - | 100 | μA |

(on)

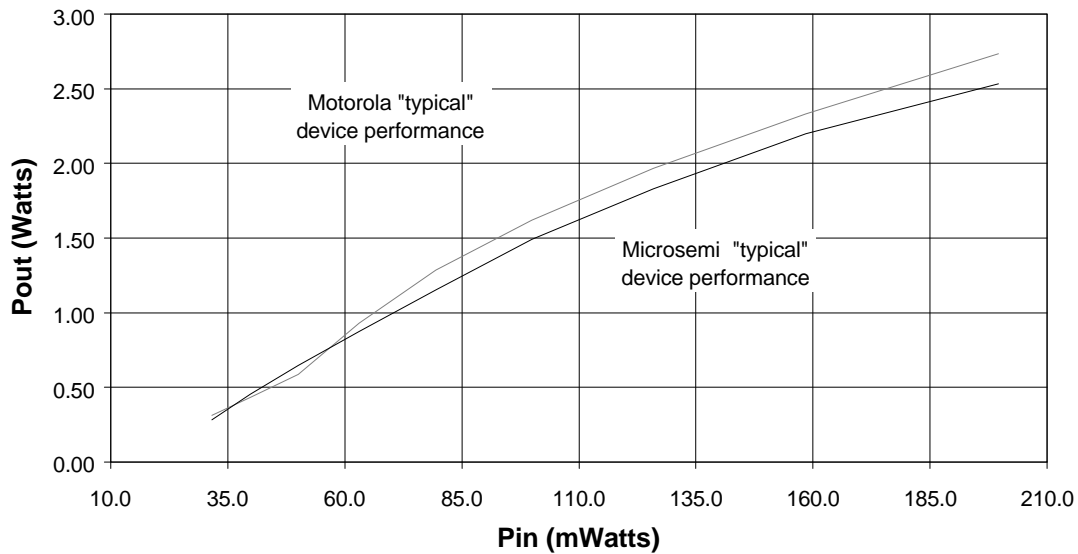
| | | | | | |
|----------|---|----|---|-----|-----------------|
| HFE | DC Current Gain (IC = 100 mA _{dc} , VCE = 5.0 V _{dc}) (IC = 360 mA _{dc} , VCE = 5.0 V _{dc}) | 10 | - | 200 | - |
| | | 5 | - | - | - |
| VCE(sat) | Collector-Emitter Saturation Voltage (IC = 100 mA _{dc} , IB = 20 mA _{dc}) | - | - | 0.5 | V _{dc} |

DYNAMIC

| Symbol | Test Conditions | Value | | | Unit |
|----------------|---|-------|------|------|------|
| | | Min. | Typ. | Max. | |
| f _T | Current-Gain - Bandwidth Product (IC = 50 mA _{dc} , VCE = 15 V _{dc} , f = 200 MHz) | 500 | - | - | MHz |
| COB | Output Capacitance (VCB = 12 V _{dc} , IE = 0, f = 1.0 MHz) | - | 4.0 | - | pF |

FUNCTIONAL

| Symbol | Test Conditions | | Value | | | Unit |
|----------|----------------------|--|-------|------|------|-------|
| | | | Min. | Typ. | Max. | |
| G_{PE} | Power Gain | Test Circuit-Figure 1 Pin = 0.1 W, VCE = 12Vdc f = 175 MHz | 10 | - | - | dB |
| Pout | Output Power | Test Circuit-Figure 1 Pin = 0.1 W, VCE = 12Vdc f = 175 MHz | 1.0 | - | - | Watts |
| η_C | Collector Efficiency | Test Circuit-Figure 1 Pin = 0.1 W, VCE = 12Vdc f = 175 MHz | 45 | - | - | % |



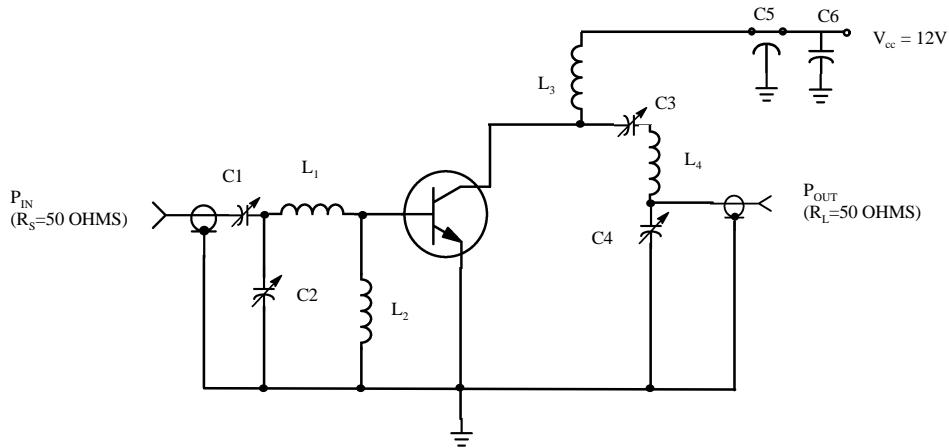


Figure 1 - 175 MHz RF AMPLIFIER CIRCUIT FOR G_{PE} , P_{OUT} , AND EFFICIENCY SPECIFICATIONS.

L₁: 2 TURNS No. 16 wire, 3/16" ID, 1/4" long

L₂: Ferrite choke, Z=450 ohms

L₃: 2 TURNS No. 16 wire, 1/4" ID, 1/4" long

L₄: 4 TURNS No. 16 wire, 3/8" ID, 3/8" long

Capacitor values in pF unless

Tuning capacitors are air variable otherwise indicated.

RF Low Power PA, LNA, and General Purpose Discrete Selector Guide

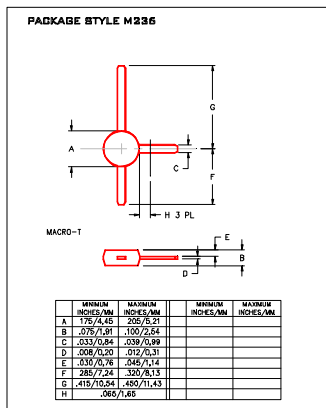
| Package | Device | Type | GPE Freq (MHz) | Pout (watts) | GPE (dB) | Efficiency (%) | GPE VCC | BVCEO | IC max (mA) |
|-------------|-----------------|------|----------------|--------------|----------|----------------|---------|-------|-------------|
| SO-8 | MRF4427, R2 | NPN | 175 | 0.15 | 18 | 60 | 12 | 20 | 400 |
| TO-39 | 2N4427 | NPN | 175 | 1 | 10 | 50 | 12 | 20 | 400 |
| POWER MACRO | MRF553 | NPN | 175 | 1.5 | 11.5 | 60 | 12.5 | 16 | 500 |
| POWER MACRO | MRF553T | NPN | 175 | 1.5 | 11.5 | 50 | 12.5 | 16 | 500 |
| TO-39 | MRF607 | NPN | 175 | 1.75 | 11.5 | 50 | 12.5 | 16 | 330 |
| TO-39 | 2N6255 | NPN | 175 | 3 | 7.8 | 50 | 12.5 | 18 | 1000 |
| TO-72 | 2N5179 | NPN | 200 | | 20 | | 6 | 12 | 50 |
| MACRO X | MRF559 | NPN | 512 | 0.5 | 10 | 65 | 7.5 | 16 | 150 |
| MACRO X | MRF559 | NPN | 512 | 0.5 | 13 | 60 | 12.5 | 16 | 150 |
| TO-39 | 2N3866A | NPN | 400 | 1 | 10 | 45 | 28 | 30 | 400 |
| SO-8 | MRF3866, R1, R2 | NPN | 400 | 1 | 10 | 45 | 28 | 30 | 400 |
| POWER MACRO | MRF555 | NPN | 470 | 1.5 | 11 | 50 | 12.5 | 16 | 400 |
| POWER MACRO | MRF555T | NPN | 470 | 1.5 | 11 | 50 | 12.5 | 16 | 400 |
| MACRO X | MRF559 | NPN | 870 | 0.5 | 6.5 | 70 | 7.5 | 16 | 150 |
| MACRO X | MRF559 | NPN | 870 | 0.5 | 9.5 | 65 | 12.5 | 16 | 150 |
| SO-8 | MRF8372, R1, R2 | NPN | 870 | 0.75 | 8 | 55 | 12.5 | 16 | 200 |
| POWER MACRO | MRF557 | NPN | 870 | 1.5 | 8 | 55 | 12.5 | 16 | 400 |
| POWER MACRO | MRF557T | NPN | 870 | 1.5 | 8 | 55 | 12.5 | 16 | 400 |

| Package | Device | Type | Freq (MHz) | NF | NF VCE | GN (dB) | Gu Max (dB) | Ftau (MHz) | Ccb(pF) | BVCEO | IC max (mA) | |
|---------|-----------------|------|------------|-----|--------|---------|-------------|------------|---------|-------|-------------|-----|
| TO-39 | 2N5109 | NPN | 200 | 3 | 10 | 15 | | | | | | |
| TO-39 | MRF5943C | NPN | 200 | 3.4 | 30 | 15 | 11.4 | 1000 | | 30 | 400 | |
| SO-8 | MRF5943, R1, R2 | NPN | 200 | 3.4 | 30 | 15 | 15 | 1300 | | 30 | 400 | |
| TO-72 | 2N5179 | NPN | 200 | 4.5 | 1.5 | 6 | | 900 | 1 | 12 | 50 | |
| TO-72 | 2N2857 | NPN | 300 | 5.5 | 50 | 6 | | 13 | 1600 | 1 | 15 | 40 |
| TO-39 | MRF517 | NPN | 300 | 7.5 | 50 | 15 | | 5.5 | 4600 | 3 | 25 | 150 |
| TO-72 | MRF904 | NPN | 450 | 1.5 | 5 | 6 | | 11 | 4000 | 1 | 15 | 30 |
| TO-72 | 2N6304 | NPN | 450 | 5 | 2 | 5 | | 14 | 1400 | 1 | 15 | 50 |
| MACRO T | BFR91 | NPN | 500 | 1.9 | 2 | 5 | 11 | 16.5 | 5000 | 1 | 12 | 35 |
| MACRO T | BFR96 | NPN | 500 | 2 | 10 | 10 | | 14.5 | 500 | 2.6 | 15 | 100 |
| SO-8 | MRF5812, R1, R2 | NPN | 500 | 2 | 50 | 10 | 15.5 | 17.8 | 5000 | | 15 | 200 |
| MACRO X | MRF581A | NPN | 500 | 2 | 50 | 10 | 14 | 15 | 5000 | | 15 | 200 |
| Macro | BFR90 | NPN | 500 | 2.4 | 2 | 10 | 15 | 18 | 5000 | 1 | 15 | 30 |
| TO-72 | BFY90 | NPN | 500 | 2.5 | 2 | 5 | | 20 | 1300 | | 15 | 50 |
| TO-72 | MRF914 | NPN | 500 | 2.5 | 5 | 10 | | 15 | 4500 | | 12 | 40 |
| MACRO X | MRF581 | NPN | 500 | 2.5 | 50 | 10 | 15 | 17.8 | 5000 | | 18 | 200 |
| TO-39 | MRF586 | NPN | 500 | 3 | 90 | 15 | 11 | 14.5 | 4500 | 2.2 | 17 | 200 |
| MACRO X | MRF951 | NPN | 1000 | 1.3 | 5 | 6 | 14 | 17 | 8000 | 0.45 | 10 | 100 |
| MACRO X | MRF571 | NPN | 1000 | 1.5 | 10 | 6 | 10 | | 8000 | 1 | 10 | 70 |
| MACRO T | BFR91 | NPN | 1000 | 2.5 | 2 | 5 | 8 | 11 | 5000 | 1 | 12 | 35 |
| MACRO T | BFR90 | NPN | 1000 | 3 | 2 | 10 | 10 | 12.5 | 5000 | 1 | 15 | 30 |
| TO-39 | MRF545 | PNP | | | | | | 14 | 1400 | 2 | 70 | 400 |
| TO-39 | MRF544 | NPN | | | | | | 13.5 | 1500 | | 70 | 400 |

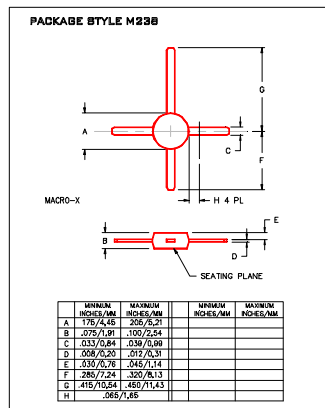
RF (Low Power PA / General Purpose) Selection Guide

RF (LNA / General Purpose) Selection Guide

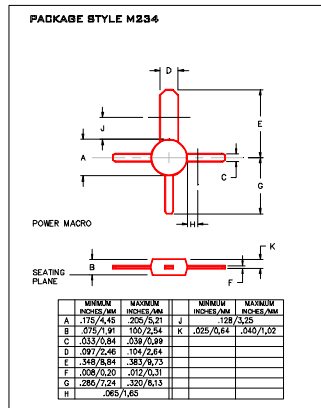
Low Cost RF Plastic Package Options



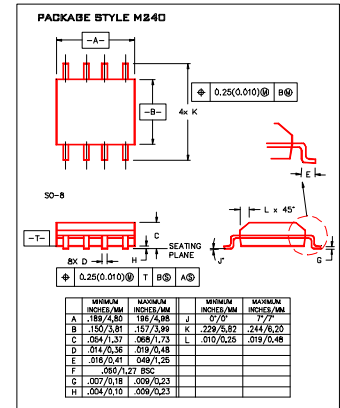
Macro T



Macro X

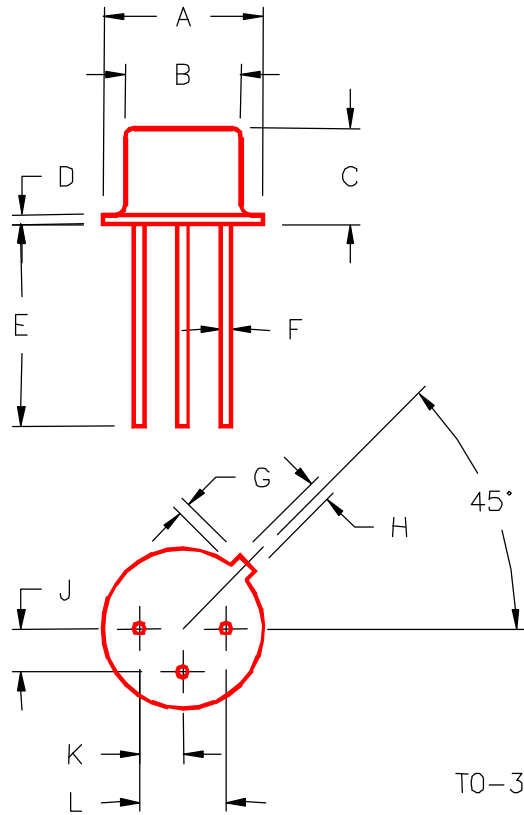


Power



SO-8

PACKAGE STYLE M246



| | MINIMUM INCHES/MM | MAXIMUM INCHES/MM | | MINIMUM INCHES/MM | MAXIMUM INCHES/MM |
|---|----------------------|----------------------|---|----------------------|----------------------|
| A | .350/8,89 | .370/9,40 | J | .095/2,41 | .105/2,67 |
| B | .315/8,00 | .335/8,51 | K | .095/2,41 | .105/2,67 |
| C | .240/6,10 | .260/6,60 | L | .190/4,83 | .210/5,33 |
| D | .015/0,38 | .045/1,14 | | | |
| E | .500/12,70 | | | | |
| F | .016/0,41 | .019/0,48 | | | |
| G | .029/0,74 | .040/1,02 | | | |
| H | .028/0,71 | .034/0,86 | | | |