



ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS

MITSUBISHI RF POWER MOS FET

# RD06HVF1

RoHS Compliance, Silicon MOSFET Power Transistor 175MHz,6W

## DESCRIPTION

RD06HVF1 is a MOS FET type transistor specifically designed for VHF RF power amplifiers applications.

## FEATURES

High power gain:

$P_{out} > 6W$ ,  $G_p > 13dB$  @  $V_{dd} = 12.5V$ ,  $f = 175MHz$

## APPLICATION

For output stage of high power amplifiers in VHF band mobile radio sets.

## RoHS COMPLIANT

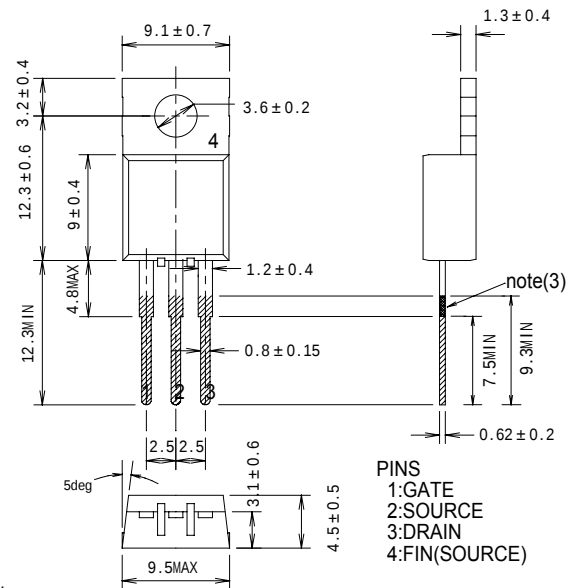
RD06HVF1-101 is a RoHS compliant products. RoHS compliance is indicate by the letter "G" after the lot marking.

This product include the lead in high melting temperature type solders.

How ever,it applicable to the following exceptions of RoHS Directions.

- 1.Lead in high melting temperature type solders(i.e.tin-lead solder alloys containing more than85% lead.)

## OUTLINE DRAWING



note:

(1)Tolerance of no designation means typical value.  
Dimension in mm.

(2) :Dipping area

(3) :Copper of the ground work is exposed in case of frame separation.



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## ABSOLUTE MAXIMUM RATINGS

(Tc=25°C UNLESS OTHERWISE NOTED)

| SYMBOL  | PARAMETER               | CONDITIONS       | RATINGS     | UNIT |
|---------|-------------------------|------------------|-------------|------|
| Vdss    | Drain to source voltage | Vgs=0V           | 50          | V    |
| Vgss    | Gate to source voltage  | Vds=0V           | +/- 20      | V    |
| Pch     | Channel dissipation     | Tc=25°C          | 27.8        | W    |
| Pin     | Input power             | Zg=Zl=50Ω        | 0.6         | W    |
| ID      | Drain current           | -                | 3           | A    |
| Tch     | Channel temperature     | -                | 150         | °C   |
| Tstg    | Storage temperature     | -                | -40 to +150 | °C   |
| Rth j-c | Thermal resistance      | junction to case | 4.5         | °C/W |

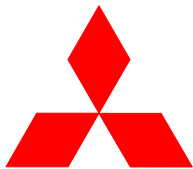
Note 1: Above parameters are guaranteed independently.

## ELECTRICAL CHARACTERISTICS

(Tc=25°C, UNLESS OTHERWISE NOTED)

| SYMBOL | PARAMETER                       | CONDITIONS                                                                               | LIMITS     |     |      | UNIT |
|--------|---------------------------------|------------------------------------------------------------------------------------------|------------|-----|------|------|
|        |                                 |                                                                                          | MIN        | TYP | MAX. |      |
| Idss   | Zero gate voltage drain current | VDS=17V, VGS=0V                                                                          | -          | -   | 10   | uA   |
| Igss   | Gate to source leak current     | VGS=10V, VDS=0V                                                                          | -          | -   | 1    | uA   |
| VTH    | Gate threshold Voltage          | VDS=12V, IDS=1mA                                                                         | 1.9        | -   | 4.9  | V    |
| Pout   | Output power                    | VDD=12.5V, Pin=0.3W,                                                                     | 6          | 10  | -    | W    |
| ηD     | Drain efficiency                | f=175MHz, Idq=0.3A                                                                       | 60         | 65  | -    | %    |
|        | Load VSWR tolerance             | VDD=15.2V, Po=6W(Pin Control)<br>f=175MHz, Idq=0.3A, Zg=50Ω<br>Load VSWR=20:1(All Phase) | No destroy |     |      | -    |

Note : Above parameters , ratings , limits and conditions are subject to change.



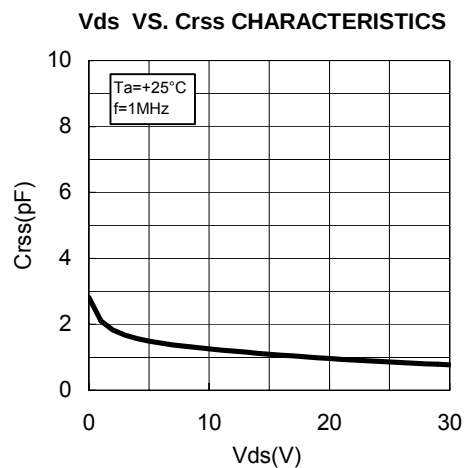
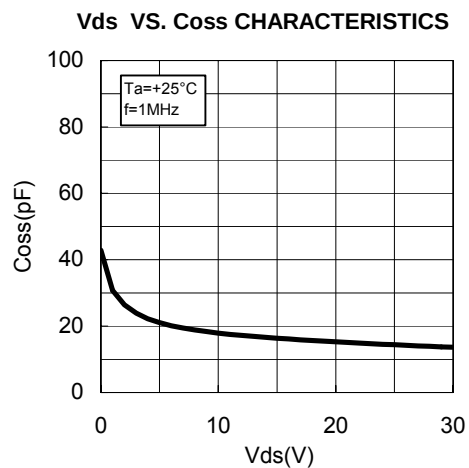
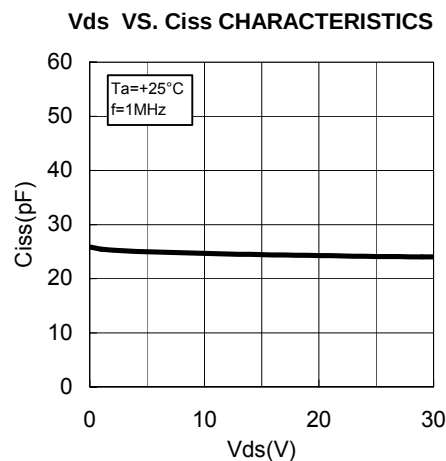
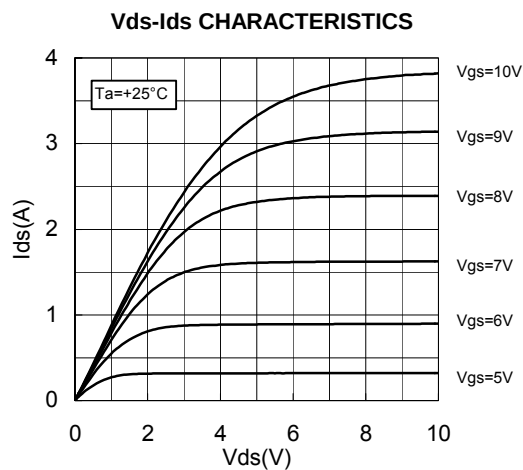
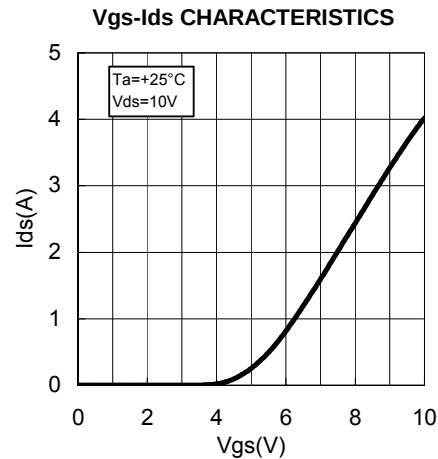
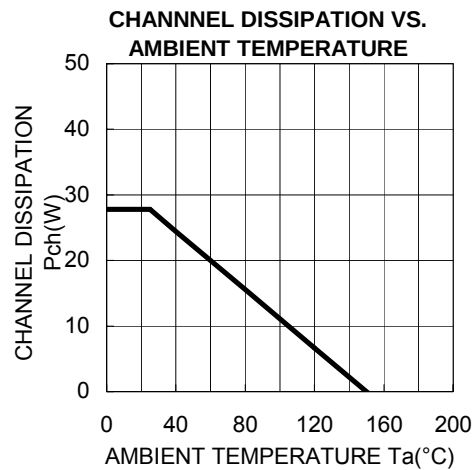
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## TYPICAL CHARACTERISTICS





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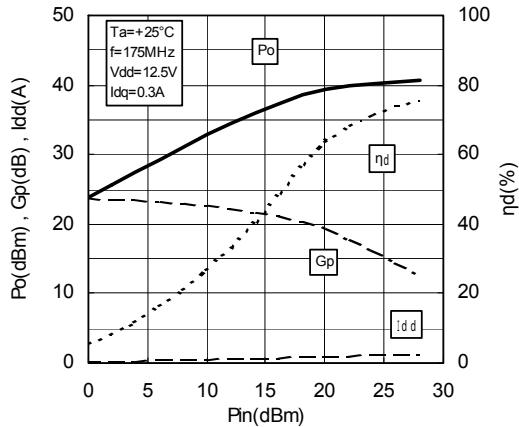
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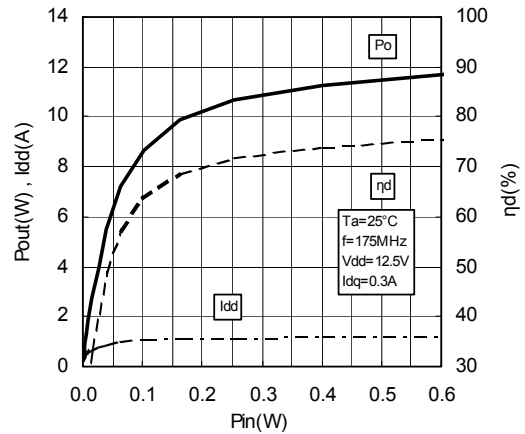
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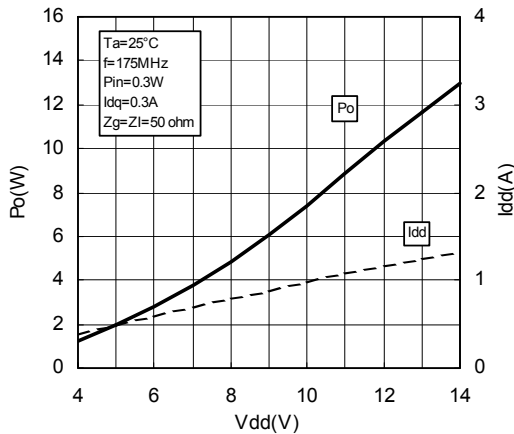
Pin-Po CHARACTERISTICS



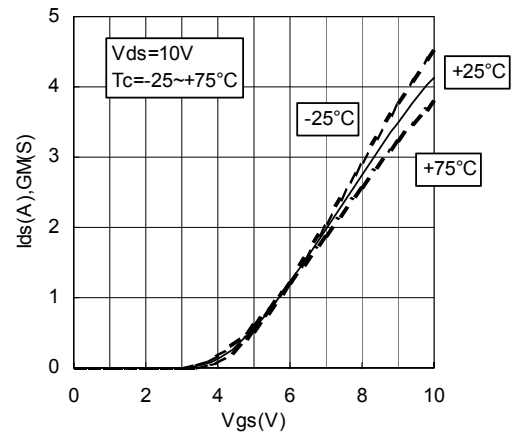
Pin-Po CHARACTERISTICS



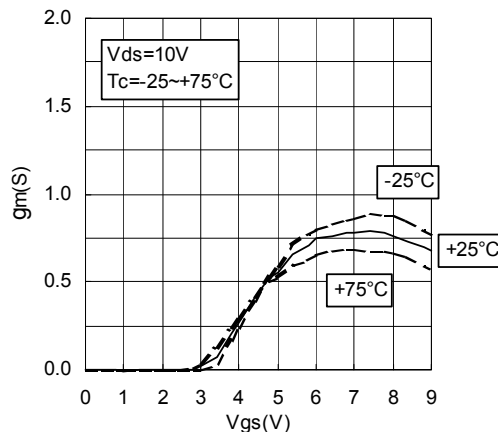
Vdd-Po CHARACTERISTICS



Vgs-Ids CHARACTERISTICS 2



Vgs-gm CHARACTERISTICS





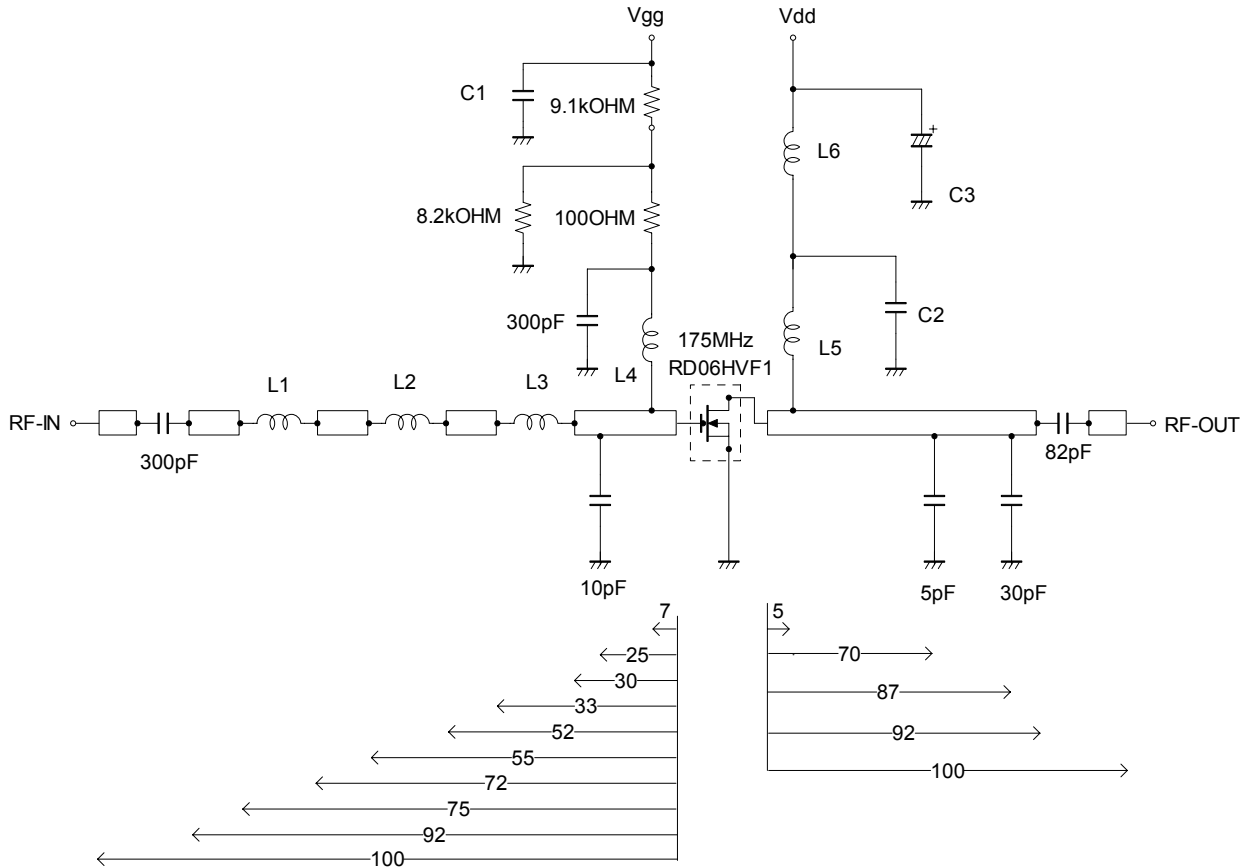
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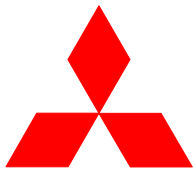
## TEST CIRCUIT(f=175MHz)



C1:2200pF 10uF in parallel  
C2:2200pF\*2 in parallel  
C3:2200pF,330uF in parallel

Note:Board material-Teflon substrate  
micro strip line width=4.2mm/50OHM,er:2.7,t=1.6mm  
Dimensions:mm

L1-L3:6Turns,I.D1.6mm,D0.4mm enameled copper wire  
L4:1Turns,I.D6mm,D1.6mm silver platetted copper wire  
L5:4Turns,I.D6mm,D1.6mm P=1 silver platetted copper wire  
L6:4Turns,I.D6mm,D1.6mm P=1 silver platetted copper wire



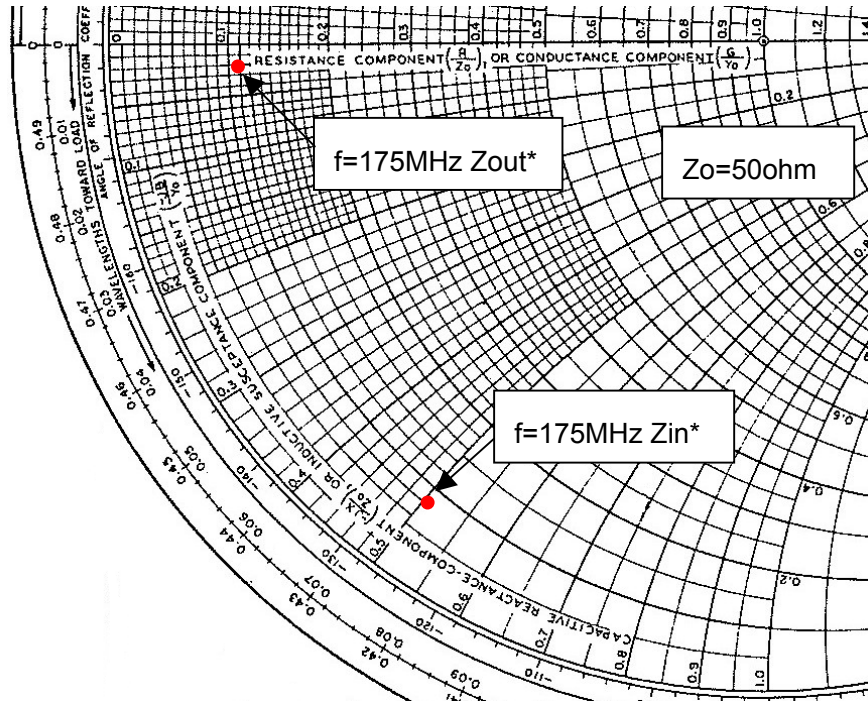
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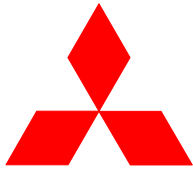
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## INPUT/OUTPUT IMPEDANCE VS.FREQUENCY CHARACTERISTICS



Zin , Zout

| f     | Zin        | Zout       | Conditions                  |
|-------|------------|------------|-----------------------------|
| (MHz) | (ohm)      | (ohm)      |                             |
| 175   | 4.25-j25.6 | 5.64-j1.05 | Po=10W, Vdd=12.5V, Pin=0.3W |



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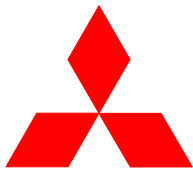
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## RD06HVF1 S-PARAMETER DATA (@Vdd=12.5V, Id=500mA)

| Freq.<br>[MHz] | S11   |        | S21    |       | S12   |       | S22   |        |
|----------------|-------|--------|--------|-------|-------|-------|-------|--------|
|                | (mag) | (ang)  | (mag)  | (ang) | (mag) | (ang) | (mag) | (ang)  |
| 10             | 0.985 | -18.8  | 34.407 | 165.9 | 0.008 | 76.2  | 0.826 | -17.3  |
| 30             | 0.900 | -50.4  | 30.427 | 143.3 | 0.021 | 59.4  | 0.767 | -43.6  |
| 50             | 0.799 | -74.4  | 24.979 | 126.1 | 0.029 | 43.2  | 0.677 | -65.0  |
| 100            | 0.667 | -109.6 | 15.565 | 100.7 | 0.032 | 27.3  | 0.547 | -96.8  |
| 150            | 0.636 | -129.0 | 10.953 | 85.1  | 0.032 | 23.1  | 0.523 | -113.4 |
| 200            | 0.630 | -140.1 | 8.194  | 73.7  | 0.029 | 25.3  | 0.528 | -124.7 |
| 250            | 0.645 | -148.2 | 6.528  | 63.9  | 0.027 | 34.5  | 0.561 | -132.7 |
| 300            | 0.663 | -155.0 | 5.315  | 55.2  | 0.027 | 49.1  | 0.588 | -139.6 |
| 350            | 0.685 | -160.7 | 4.437  | 47.4  | 0.031 | 61.8  | 0.622 | -145.9 |
| 400            | 0.708 | -165.9 | 3.771  | 39.9  | 0.039 | 71.0  | 0.657 | -151.7 |
| 450            | 0.729 | -170.8 | 3.233  | 33.2  | 0.048 | 75.8  | 0.686 | -157.0 |
| 500            | 0.752 | -175.4 | 2.826  | 26.8  | 0.059 | 77.9  | 0.715 | -162.3 |
| 550            | 0.771 | -179.9 | 2.475  | 20.7  | 0.070 | 76.9  | 0.743 | -167.6 |
| 600            | 0.789 | -175.4 | 2.186  | 15.2  | 0.083 | 76.1  | 0.763 | -172.3 |
| 650            | 0.804 | -171.2 | 1.943  | 9.7   | 0.095 | 73.7  | 0.789 | -177.3 |
| 700            | 0.819 | -166.9 | 1.738  | 4.6   | 0.108 | 71.0  | 0.804 | -178.1 |
| 750            | 0.834 | -162.6 | 1.560  | 0.0   | 0.120 | 68.1  | 0.820 | -173.5 |
| 800            | 0.842 | -158.5 | 1.410  | -4.5  | 0.133 | 65.0  | 0.837 | -169.0 |
| 850            | 0.851 | -154.3 | 1.275  | -8.7  | 0.145 | 61.6  | 0.847 | -164.8 |
| 900            | 0.859 | -150.3 | 1.160  | -12.6 | 0.157 | 58.2  | 0.858 | -160.2 |
| 950            | 0.866 | -146.2 | 1.058  | -16.9 | 0.167 | 54.5  | 0.869 | -155.7 |
| 1000           | 0.870 | -142.3 | 0.963  | -20.0 | 0.179 | 51.0  | 0.876 | -151.8 |



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—Keep safety first in your circuit designs! —

Mitsubishi Electric Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of non-flammable material or (iii) prevention against any malfunction or mishap.

— **warning !** —

Do not use the device at the exceeded the maximum rating condition. In case of plastic molded devices, the exceeded maximum rating condition may cause blowout, smoldering or catch fire of the molding resin due to extreme short current flow between the drain and the source of the device. These results causes in fire or injury.