



**ELECTROSTATIC SENSITIVE DEVICE**  
OBSERVE HANDLING PRECAUTIONS

**MITSUBISHI RF POWER MOS FET**

# RD06HHF1

**RoHS Compliance, Silicon MOSFET Power Transistor 30MHz,6W**

## DESCRIPTION

RD06HHF1 is a MOS FET type transistor specifically designed for HF RF power amplifiers applications.

## FEATURES

High power gain:  
Pout>6W, Gp>16dB @Vdd=12.5V,f=30MHz

## APPLICATION

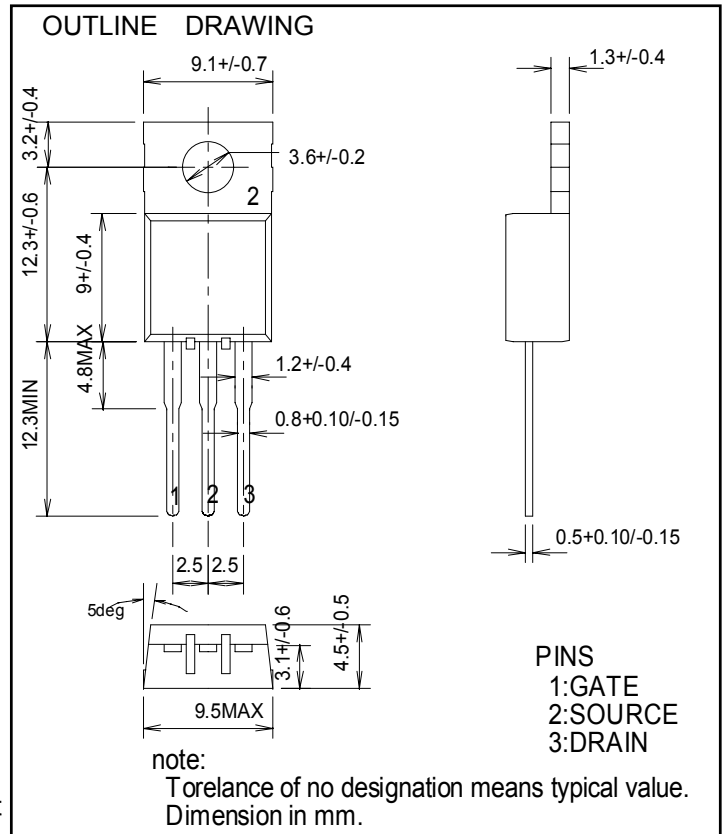
For output stage of high power amplifiers in HF band mobile radio sets.

## RoHS COMPLIANT

RD06HHF1-101 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.)





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## ABSOLUTE MAXIMUM RATINGS

(Tc=25°C UNLESS OTHERWISE NOTED)

| SYMBOL              | PARAMETER               | CONDITIONS                          | RATINGS     | UNIT |
|---------------------|-------------------------|-------------------------------------|-------------|------|
| V <sub>DSS</sub>    | Drain to source voltage | V <sub>GS</sub> =0V                 | 50          | V    |
| V <sub>GSS</sub>    | Gate to source voltage  | V <sub>DS</sub> =0V                 | +/- 20      | V    |
| P <sub>ch</sub>     | Channel dissipation     | T <sub>c</sub> =25°C                | 27.8        | W    |
| P <sub>in</sub>     | Input power             | Z <sub>g</sub> =Z <sub>l</sub> =50Ω | 0.3         | W    |
| I <sub>D</sub>      | Drain current           | -                                   | 3           | A    |
| T <sub>ch</sub>     | Channel temperature     | -                                   | 150         | °C   |
| T <sub>stg</sub>    | Storage temperature     | -                                   | -40 to +150 | °C   |
| R <sub>th j-c</sub> | 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. |      |
| I <sub>DSS</sub> | Drain cutoff current   | V <sub>DS</sub> =17V, V <sub>GS</sub> =0V   | -          | -   | 10   | μA   |
| I <sub>GSS</sub> | Gate cutoff current    | V <sub>GS</sub> =10V, V <sub>DS</sub> =0V   | -          | -   | 1    | μA   |
| V <sub>TH</sub>  | Gate threshold Voltage | V <sub>DS</sub> =12V, I <sub>DS</sub> =1mA  | 1.9        | -   | 4.9  | V    |
| P <sub>out</sub> | Output power           | V <sub>DD</sub> =12.5V, P <sub>in</sub> =0.15W,   | 6          | 10  | -    | W    |
| η <sub>D</sub>   | Drain efficiency       | f=30MHz, I <sub>dq</sub> =0.5A  | 55         | 65  | -    | %    |
|                  | Load VSWR tolerance    | V <sub>DD</sub> =15.2V, P <sub>o</sub> =6W(Pin Control)<br>f=30MHz, I <sub>dq</sub> =0.5A, Z <sub>g</sub> =50Ω<br>Load VSWR=20:1(All Phase) | No destroy |     |      | -    |

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



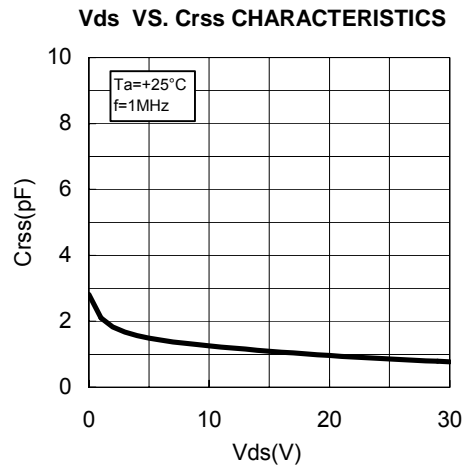
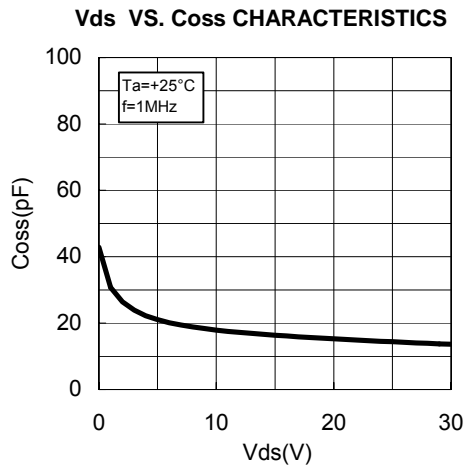
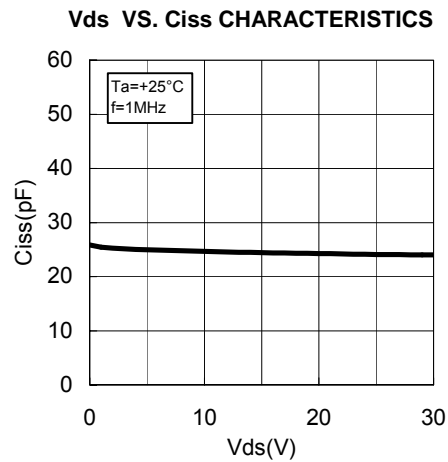
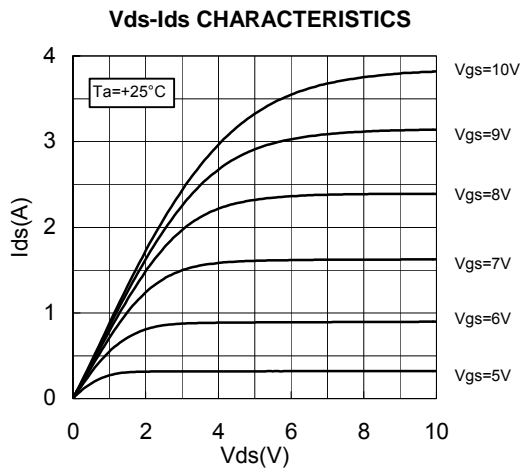
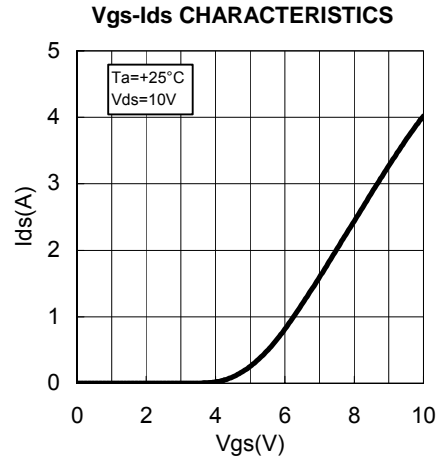
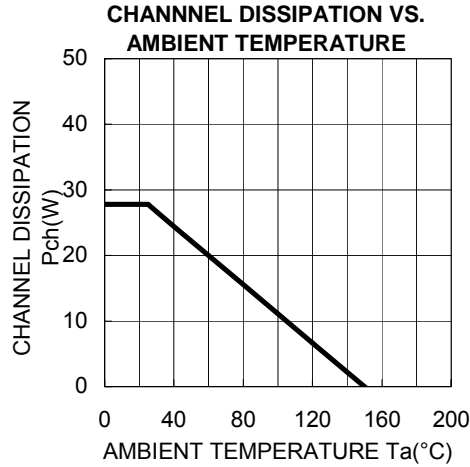
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## TYPICAL CHARACTERISTICS





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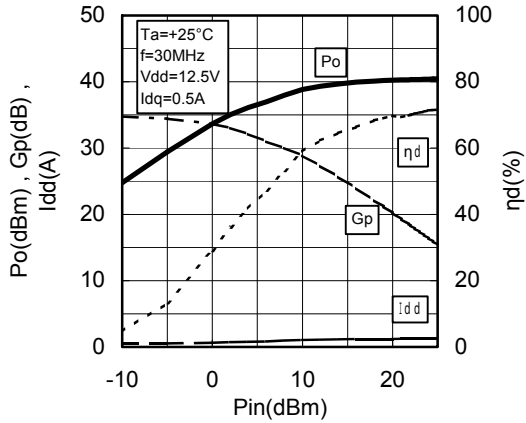
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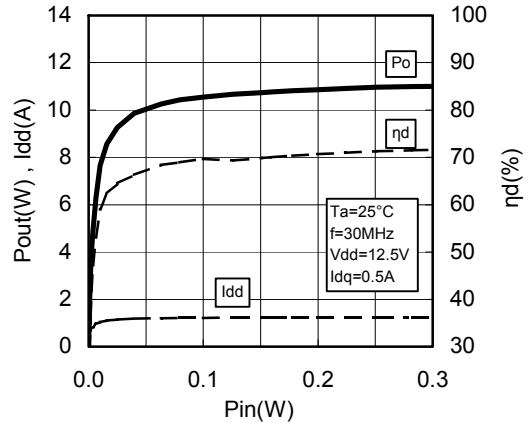
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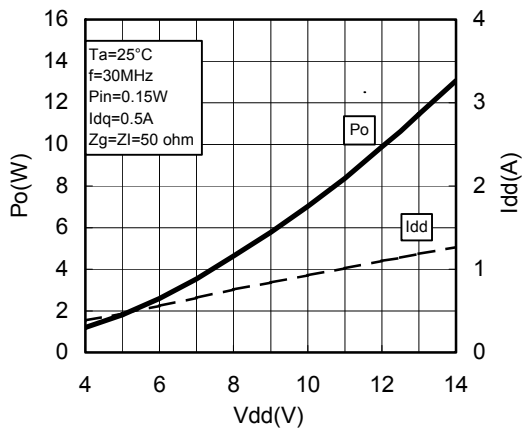
**Pin-Po CHARACTERISTICS**



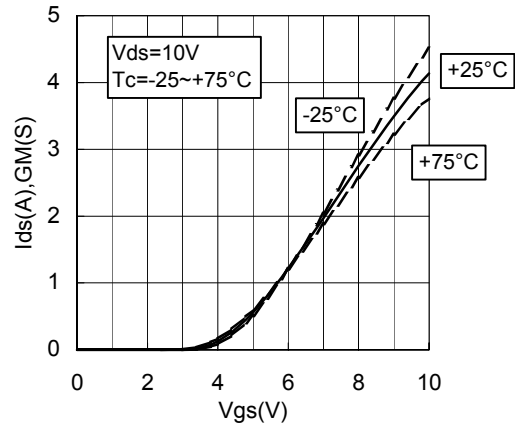
**Pin-Po CHARACTERISTICS**



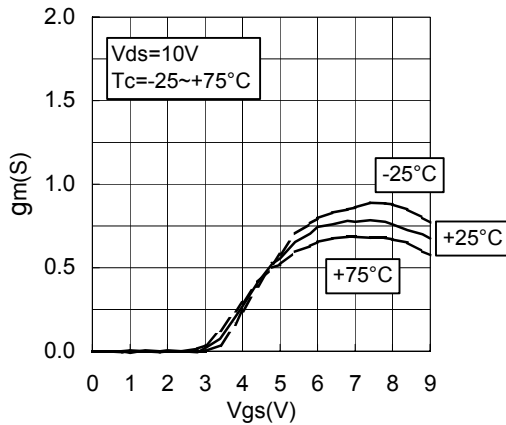
**Vdd-Po CHARACTERISTICS**



**Vgs-Ids CHARACTERISTICS 2**



**Vgs-gm CHARACTERISTICS**





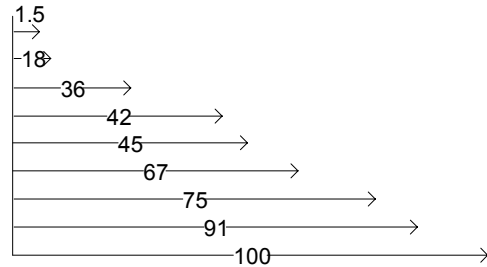
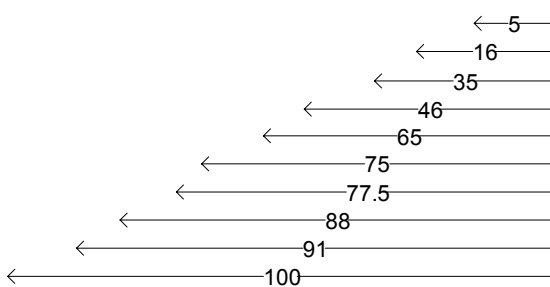
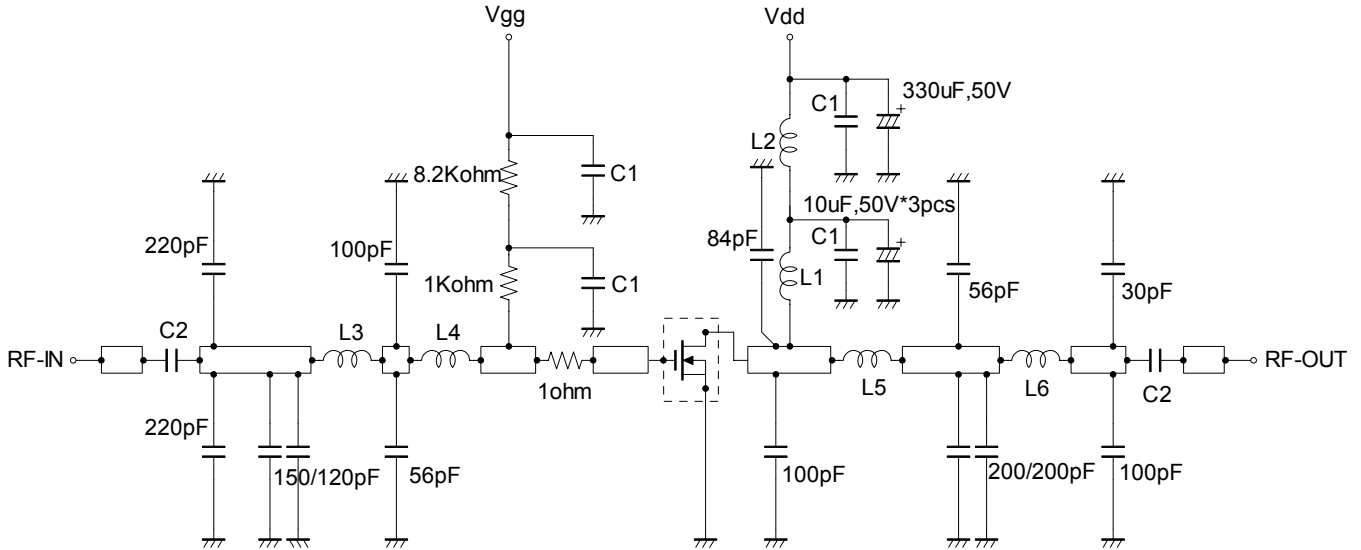
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**TEST CIRCUIT(f=30MHz)**



C1:100pF, 0.022uF, 0.1uF in parallel  
C2:470pF\*2 in parallel

Dimensions:mm

Note:Board material- teflon substrate

micro strip line width=4.2mm/50ohm,er:2.7,t=1.6mm

L1:10Turns,I,D8mm,D0.9mm copper wire  
L2:10Turns,I,D6mm,D1.6mm silver plated copper wire  
L3:5Turns,I,D5.6mm,D0.9mm copper wire  
L4:6Turns,I,D5.6mm,D0.9mm copper wire  
L5:4Turns,I,D5.6mm,D0.9mm copper wire P=0.5mm  
L6:7Turns,I,D5.6mm,D0.9mm copper wire



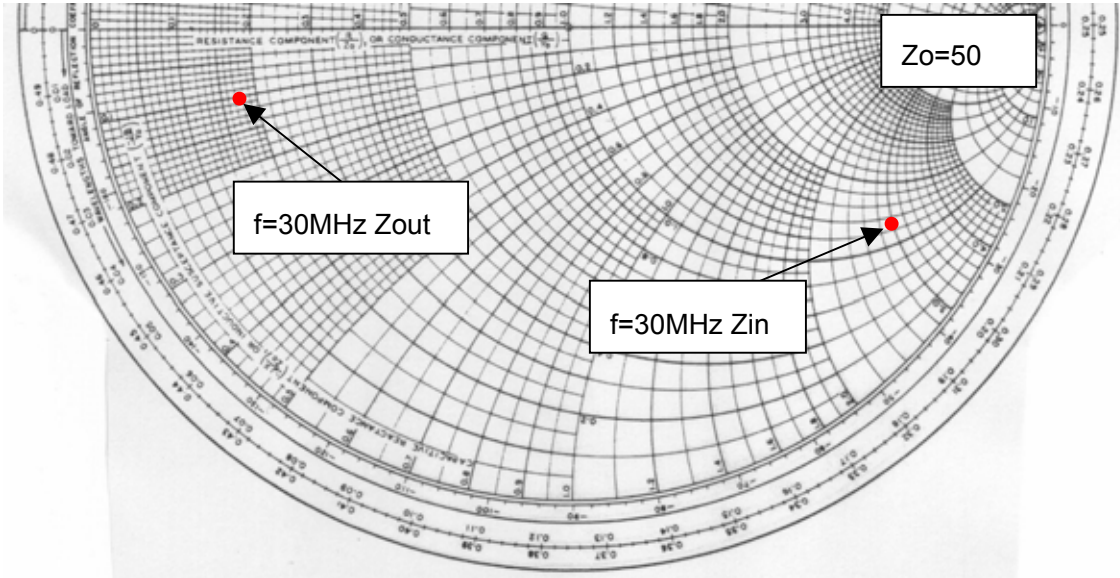
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INPUT/OUTPUT IMPEDANCE VS.FREQUENCY CHARACTERISTICS



Zin , Zout

| f     | Zin          | Zout       | Conditions                     |
|-------|--------------|------------|--------------------------------|
| (MHz) | (ohm)        | (ohm)      |                                |
| 30    | 65.06-j150.9 | 8.75-j4.92 | Po=10W,<br>Vdd=12.5V,Pin=0.15W |



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RD06HHF1 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.