ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

MITSUBISHI RF POWER MOS FET

RD02MUS1B

RoHS Compliance,Silicon MOSFET Power Transistor 175MHz,520MHz,2W

DESCRIPTION

RD02MUS1B is a MOS FET type transistor specifically designed for VHF/UHF RF power amplifiers applications.
RD02MUS1B improved a drain surge than RD02MUS1 by optimizing MOSFET structure.

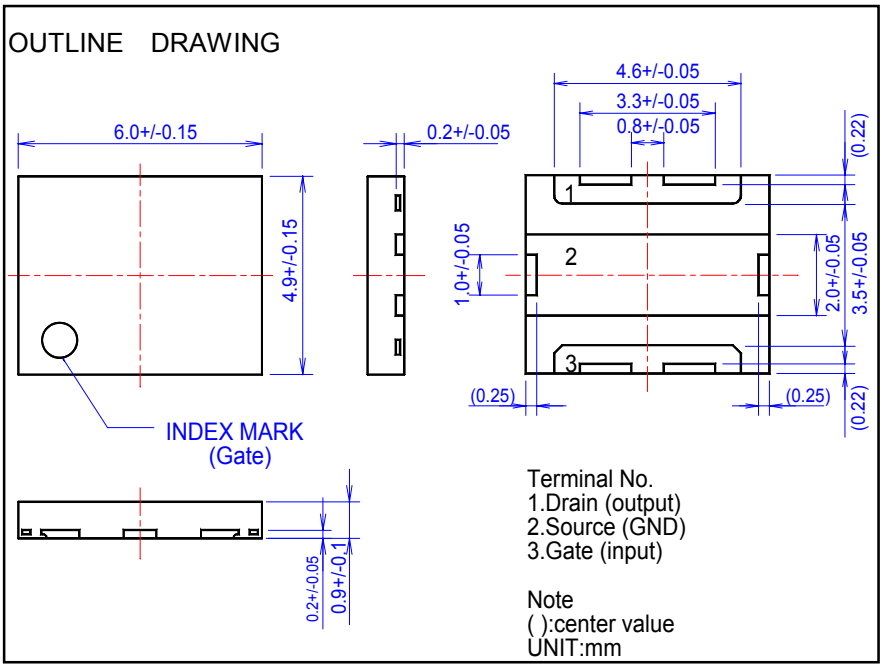
FEATURES

High power gain:
Pout>2W, Gp>16dB
@Vdd=7.2V,f=175MHz, 520MHz
High Efficiency: 65%typ. (175MHz)
High Efficiency: 65%typ. (520MHz)

APPLICATION

For output stage of high power amplifiers
In VHF/UHF band mobile radio sets.

OUTLINE DRAWING



RoHS COMPLIANT

RD02MUS1B-101,T112 is a RoHS compliant products.
RoHS compliance is indicating by the letter “G” after the Lot Marking.
This product includes the lead in high melting temperature type solders.
However, it is 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.)

ABSOLUTE MAXIMUM RATINGS

(Tc=25°C UNLESS OTHERWISE NOTED)

SYMBOL	PARAMETER	CONDITIONS	RATINGS	UNIT
VDSS	Drain to source voltage	Vgs=0V	30	V
VGSS	Gate to source voltage	Vds=0V	+/-20	V
Pch	Channel dissipation	Tc=25°C	21.9	W
Pin	Input Power	Zg=Zl=50Ω	0.1	W
ID	Drain Current	-	1.5	A
Tch	Junction temperature	-	150	°C
Tstg	Storage temperature	-	-40 to +125	°C
Rth j-c	Thermal resistance	Junction to case	5.7	°C/W

Note: Above parameters are guaranteed independently.

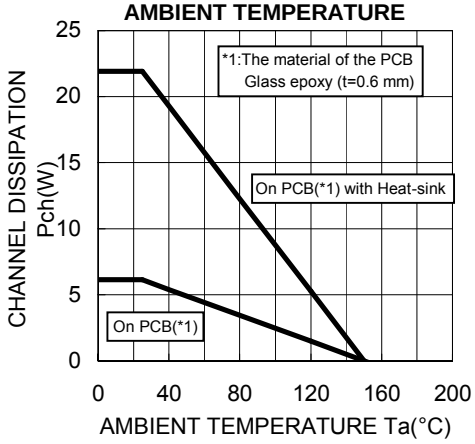
ELECTRICAL CHARACTERISTICS (Tc=25°C, UNLESS OTHERWISE NOTED)

SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX.	
I_{DSS}	Drain cutoff current	V_{DS}=17V, V_{GS}=0V	-	-	100	uA
I_{GSS}	Gate cutoff current	V_{GS}=10V, V_{DS}=0V	-	-	1	uA
V_{th}	Gate threshold Voltage	V_{DS}=12V, I_{DS}=1mA	1	1.8	3	V
Pout1	Output power	V_{DD}=7.2V, Pin=50mW, f=175MHz Idq=200mA	2	3	-	W
η_{D1}	Drain efficiency		55	65	-	%
Pout2	Output power	V_{DD}=7.2V, Pin=50mW, f=520MHz Idq=200mA	2	3	-	W
η_{D2}	Drain efficiency		50	65	-	%
	Load VSWR tolerance	V_{DD}=9.2V,Po=2W(Pin Control) f=175MHz,Idq=200mA,Zg=50Ω Load VSWR=20:1(All Phase)	No destroy			-
	Load VSWR tolerance	V_{DD}=9.2V,Po=2W(Pin Control) f=520MHz,Idq=200mA,Zg=50Ω Load VSWR=20:1(All Phase)	No destroy			-

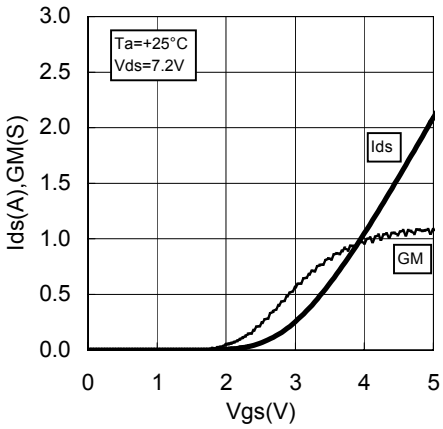
Note: Above parameters, ratings, limits and conditions are subject to change.

TYPICAL CHARACTERISTICS

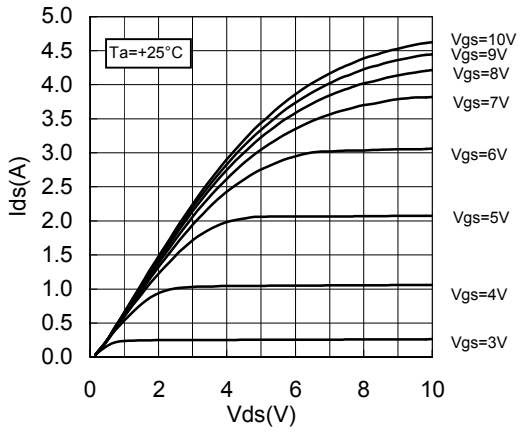
DRAIN DISSIPATION VS. AMBIENT TEMPERATURE



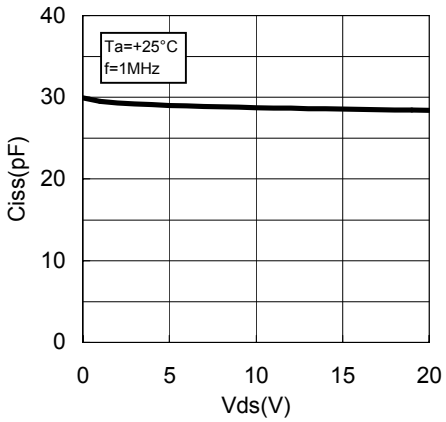
Vgs-Ids CHARACTERISTICS



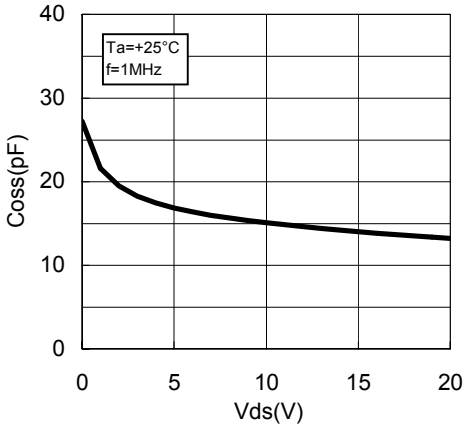
Vds-Ids CHARACTERISTICS



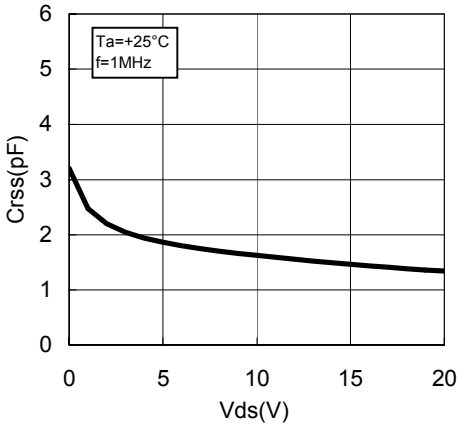
Vds VS. Ciss CHARACTERISTICS



Vds VS. Coss CHARACTERISTICS

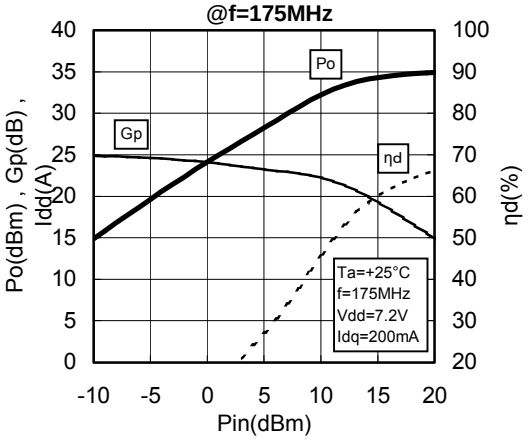


Vds VS. Crss CHARACTERISTICS

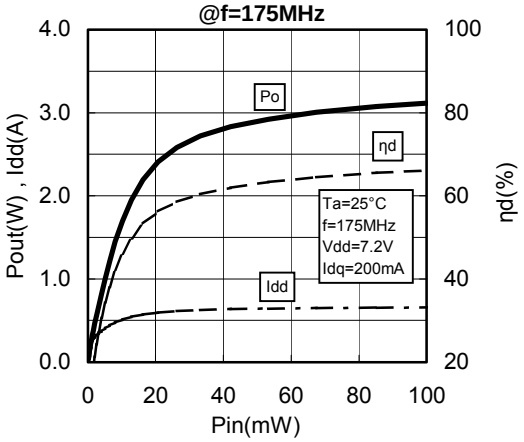


TYPICAL CHARACTERISTICS

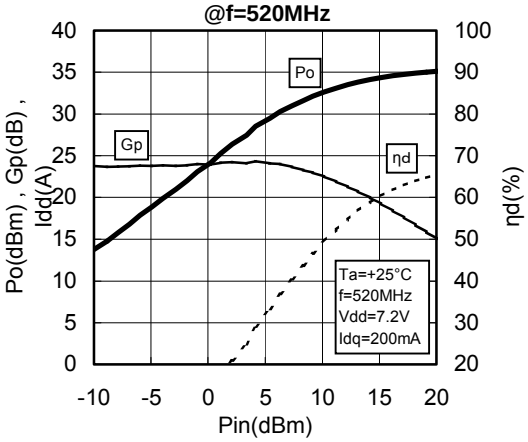
Pin-Po CHARACTERISTICS @f=175MHz



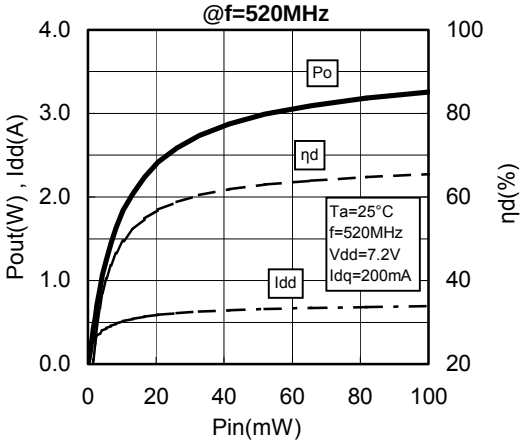
Pin-Po CHARACTERISTICS @f=175MHz



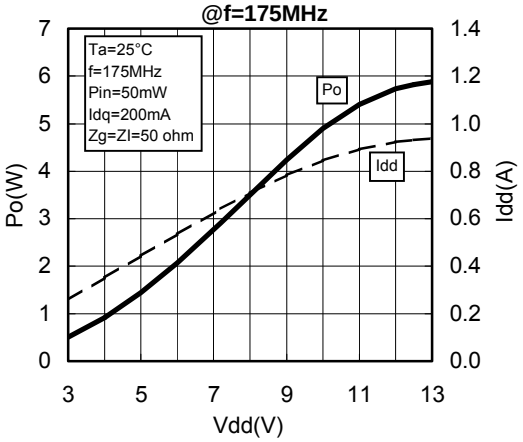
Pin-Po CHARACTERISTICS @f=520MHz



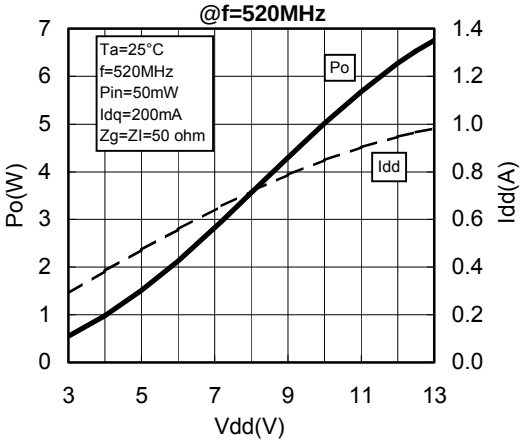
Pin-Po CHARACTERISTICS @f=520MHz



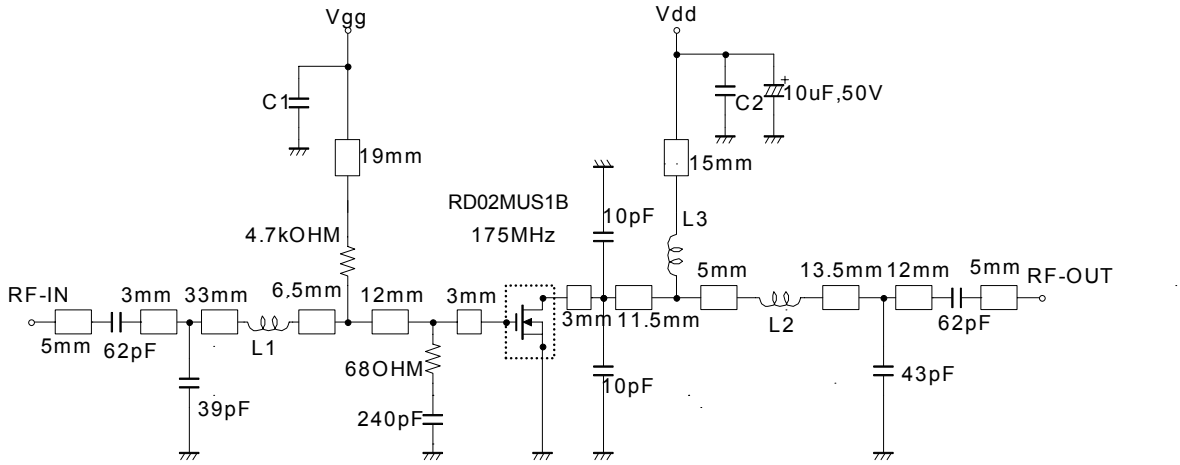
Vdd-Po CHARACTERISTICS @f=175MHz



Vdd-Po CHARACTERISTICS @f=520MHz



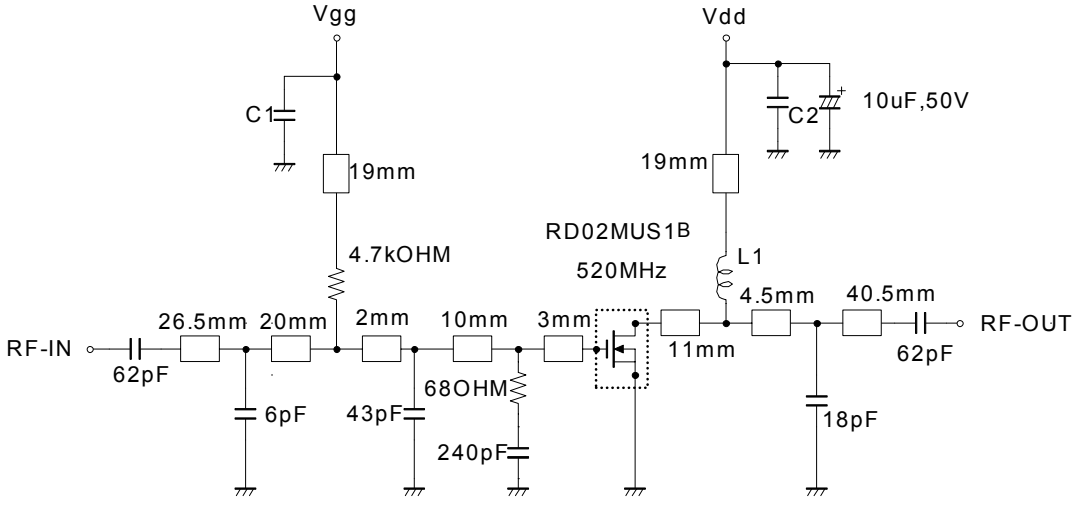
TEST CIRCUIT(f=175MHz)



L1: Enameled wire 5Turns,D:0.43mm,2.46mmO.D
L2: Enameled wire 3Turns,D:0.43mm,2.46mmO.D
L3: Enameled wire 9Turns,D:0.43mm,2.46mmO.D
C1,C2:1000pF,0.0022uF in parallel

Note:Board material-Teflon substrate
Micro strip line width=2.2mm/50OHM,er:2.7,t=0.8mm

TEST CIRCUIT(f=520MHz)

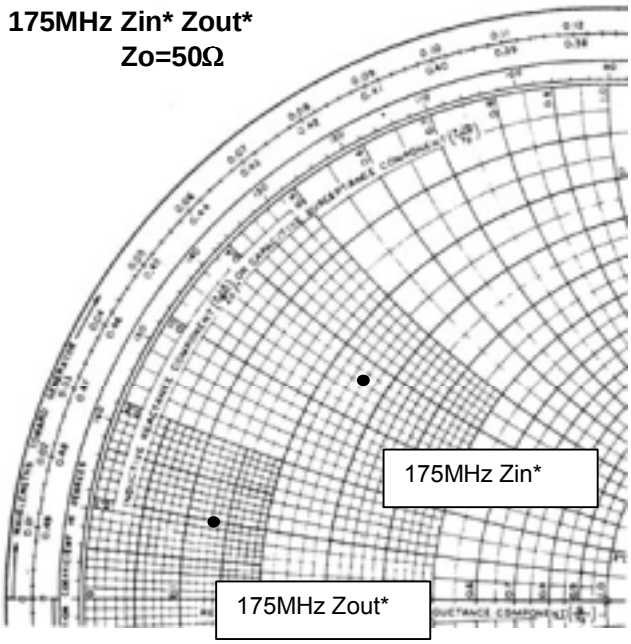


L1: Enameled wire 9Turns,D:0.43mm,2.46mmO.D
C1,C2:1000pF,0.022uF in parallel

Note:Board material-Teflon substrate
Micro strip line width=2.2mm/50OHM,er:2.7,t=0.8mm

INPUT/OUTPUT IMPEDANCE VS. FREQUENCY CHARACTERISTICS

175MHz Zin* Zout*
Zo=50Ω

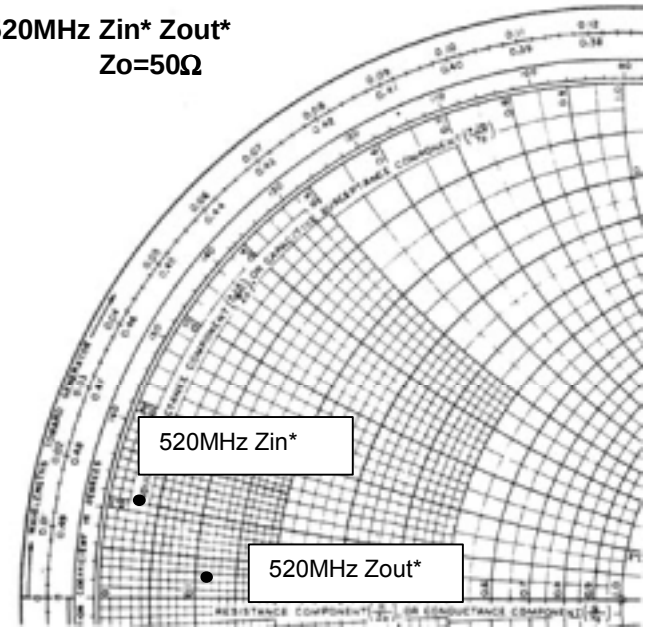


Vdd=7.2V, Idq=200mA(Vgg adj.),Pin=0.05W

Zin*=11.61+j17.88
Zout*=6.83+j5.21

Zin*: Complex conjugate of input impedance
Zout*: Complex conjugate of output impedance

520MHz Zin* Zout*
Zo=50Ω



Vdd=7.2V, Idq=200mA(Vgg adj.),Pin=0.05W

Zin*=1.20+j5.47
Zout*=5.56+j1.31

Zin*: Complex conjugate of input impedance
Zout*: Complex conjugate of output impedance

RD02MUS1B S-PARAMETER DATA (@Vdd=7.2V, Id=200mA)

Freq.	S11		S21		S12		S22	
[MHz]	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
100	0.847	-132.5	16.923	100.2	0.042	8.9	0.621	-118.8
135	0.828	-144.6	12.806	90.7	0.042	-0.1	0.598	-130.5
150	0.824	-148.1	11.555	87.5	0.042	-3.3	0.591	-133.7
175	0.817	-152.8	9.864	82.8	0.042	-7.6	0.590	-138.0
200	0.816	-156.2	8.579	78.6	0.041	-11.2	0.594	-141.2
250	0.816	-161.2	6.712	71.2	0.039	-17.6	0.609	-145.5
300	0.820	-164.9	5.436	64.9	0.038	-23.0	0.628	-148.8
350	0.827	-167.6	4.501	59.3	0.036	-28.2	0.653	-151.2
400	0.835	-169.9	3.813	54.0	0.034	-32.2	0.675	-153.5
450	0.844	-171.9	3.257	49.3	0.032	-36.5	0.699	-155.8
500	0.854	-173.6	2.823	44.9	0.031	-39.8	0.723	-157.7
520	0.858	-174.3	2.668	43.1	0.030	-41.1	0.732	-158.4
527	0.859	-174.7	2.613	42.6	0.030	-41.9	0.735	-158.6
550	0.862	-175.3	2.458	40.9	0.029	-43.2	0.743	-159.6
600	0.871	-176.7	2.161	37.1	0.027	-46.6	0.763	-161.5
650	0.878	-178.0	1.911	33.5	0.025	-49.5	0.781	-162.9
700	0.883	-179.4	1.701	30.4	0.024	-51.5	0.798	-164.6
750	0.890	179.4	1.522	27.3	0.022	-54.4	0.811	-166.1
800	0.897	178.3	1.368	24.4	0.021	-56.1	0.824	-167.7
850	0.899	177.0	1.238	21.7	0.019	-58.7	0.836	-169.0
900	0.905	176.0	1.123	19.3	0.018	-59.4	0.845	-170.3
950	0.907	175.1	1.025	17.1	0.016	-60.7	0.853	-171.4
1000	0.913	174.3	0.937	14.9	0.015	-62.1	0.861	-172.5
1050	0.915	173.2	0.859	12.9	0.013	-64.4	0.870	-173.5
1100	0.918	172.6	0.794	11.0	0.012	-64.9	0.874	-174.6

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.