

< Silicon RF Power MOS FET (Discrete) >

RD45HMF1

RoHS Compliance, Silicon MOSFET Power Transistor 900MHz,45W

DESCRIPTION

RD45HMF1 is a MOS FET type transistor specifically designed for 900MHz-band High power amplifiers applications.

FEATURES

High power and High Gain:

$P_{out} > 45W$, $G_p > 4.7dB$ @ $V_{dd} = 12.5V, f = 900MHz$

High Efficiency: 50%typ.

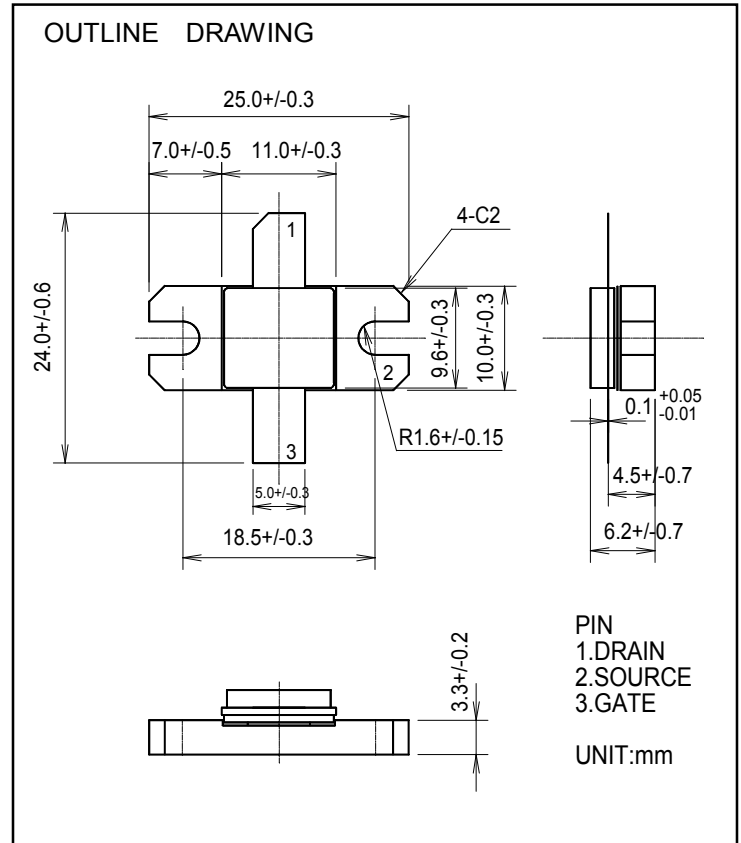
APPLICATION

For output stage of high power amplifiers in 800-900MHz Band mobile radio sets.

RoHS COMPLIANT

RD45HMF1-101 is a RoHS compliant products.

RoHS compliance is indicate by the letter "G" after the Lot Marking.



ABSOLUTE MAXIMUM RATINGS

($T_c = 25^\circ C$ UNLESS OTHERWISE NOTED)

SYMBOL	PARAMETER	CONDITIONS	RATINGS	UNIT
V_{DSS}	Drain to source voltage	$V_{gs} = 0V$	30	V
V_{GSS}	Gate to source voltage	$V_{ds} = 0V$	+/-20	V
P_{ch}	Channel dissipation	$T_c = 25^\circ C$	125	W
P_{in}	Input power	$Z_g = Z_l = 50\Omega$	25	W
I_D	Drain current	-	15	A
T_{ch}	Channel temperature	-	175	$^\circ C$
T_{stg}	Storage temperature	-	-40 to +175	$^\circ C$
$R_{th\ j-c}$	Thermal resistance	junction to case	1.2	$^\circ C/W$

Note 1: Above parameters are guaranteed independently.

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ELECTRICAL CHARACTERISTICS (T_c=25°C UNLESS OTHERWISE NOTED)

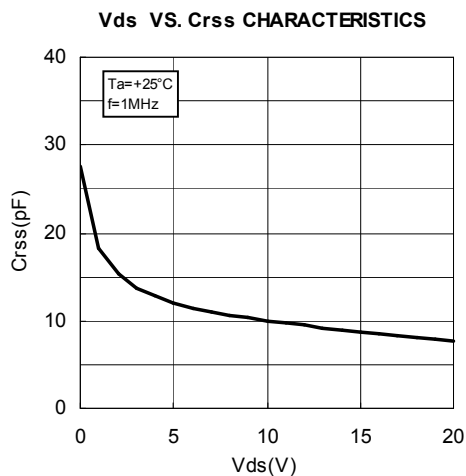
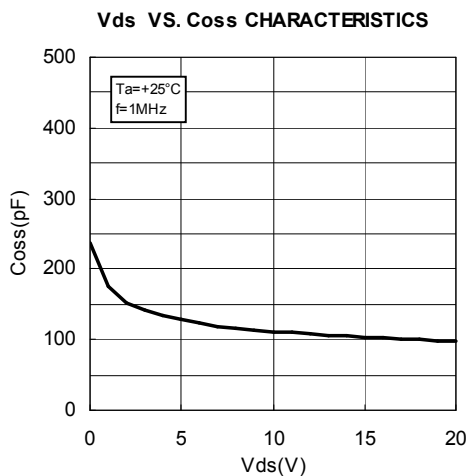
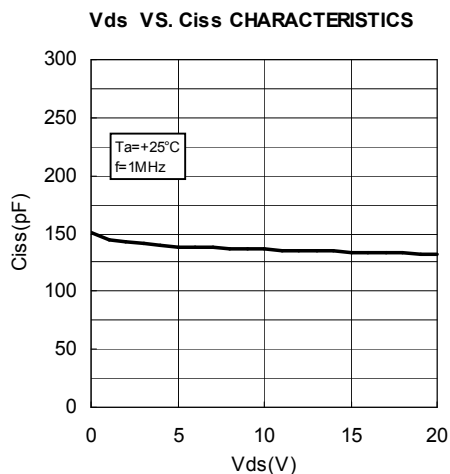
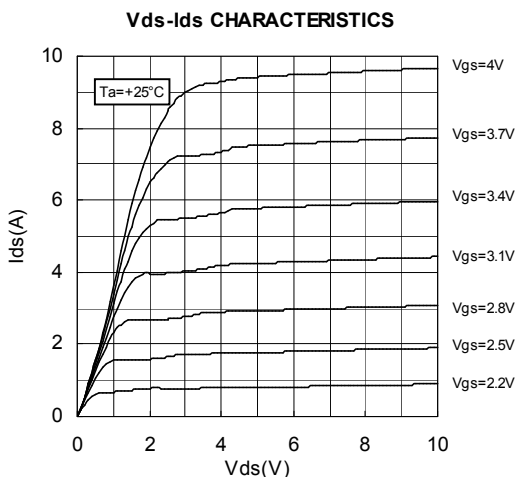
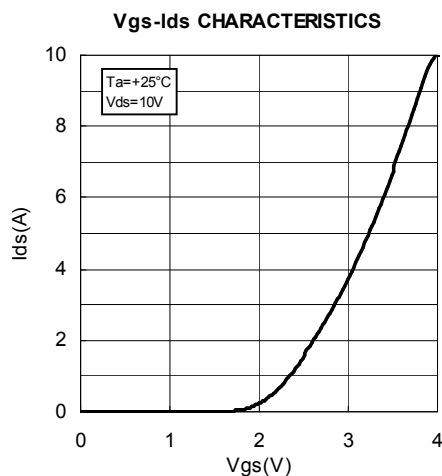
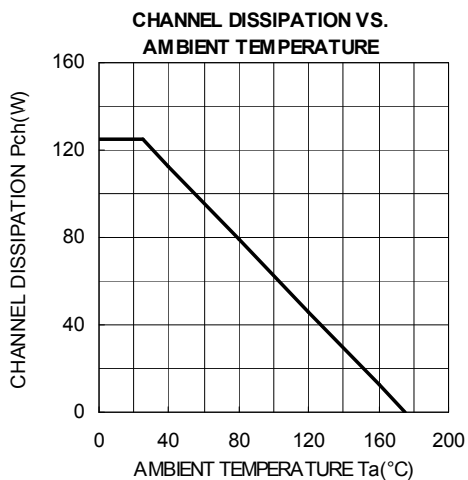
SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX.	
I _{DSS}	Zero gate voltage drain current	V _{DS} =17V, V _{GS} =0V	-	-	10	uA
I _{GSS}	Gate to source leak current	V _{GS} =10V, V _{DS} =0V	-	-	1	uA
V _{TH}	Gate threshold voltage	V _{DS} =12V, I _{DS} =1mA	1.0	-	3.0	V
P _{out}	Output power	f=900MHz, V _{DD} =12.5V	45	50	-	W
η _D	Drain efficiency	P _{in} =15W, I _{dq} =2.0A	45	50	-	%
	Load VSWR tolerance	V _{DD} =15.2V, P _o =45W(PinControl) I _{dq} =2.0A, Z _g =50Ω 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

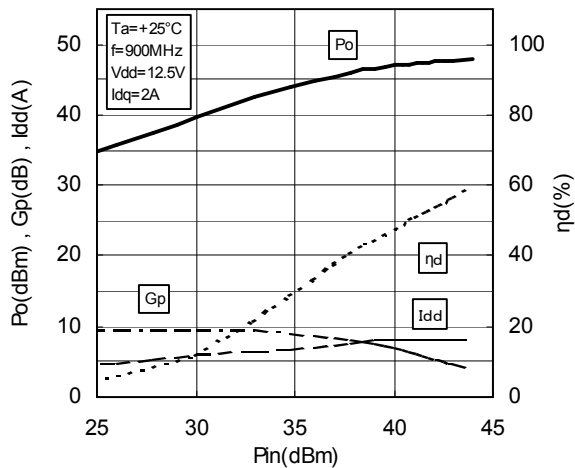


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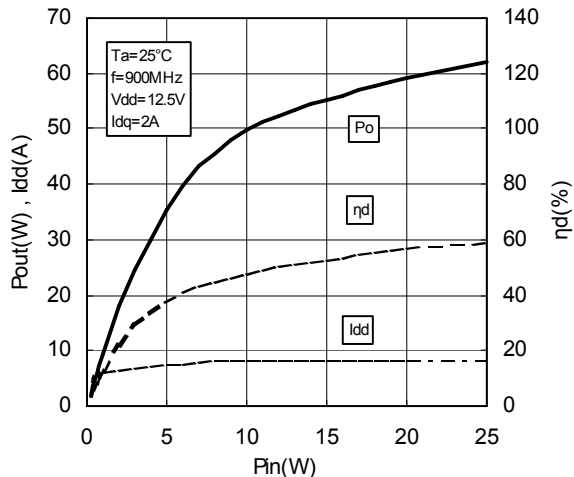
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TYPICAL CHARACTERISTICS

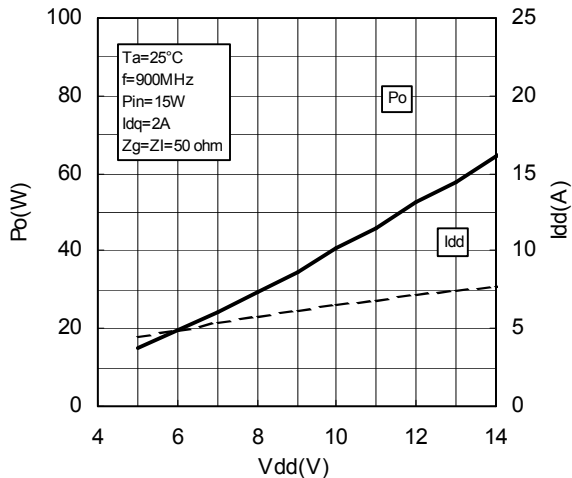
Pin-Po CHARACTERISTICS



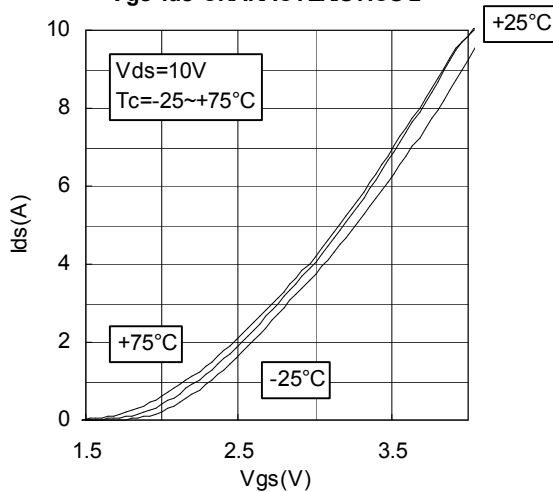
Pin-Po CHARACTERISTICS



Vdd-Po CHARACTERISTICS



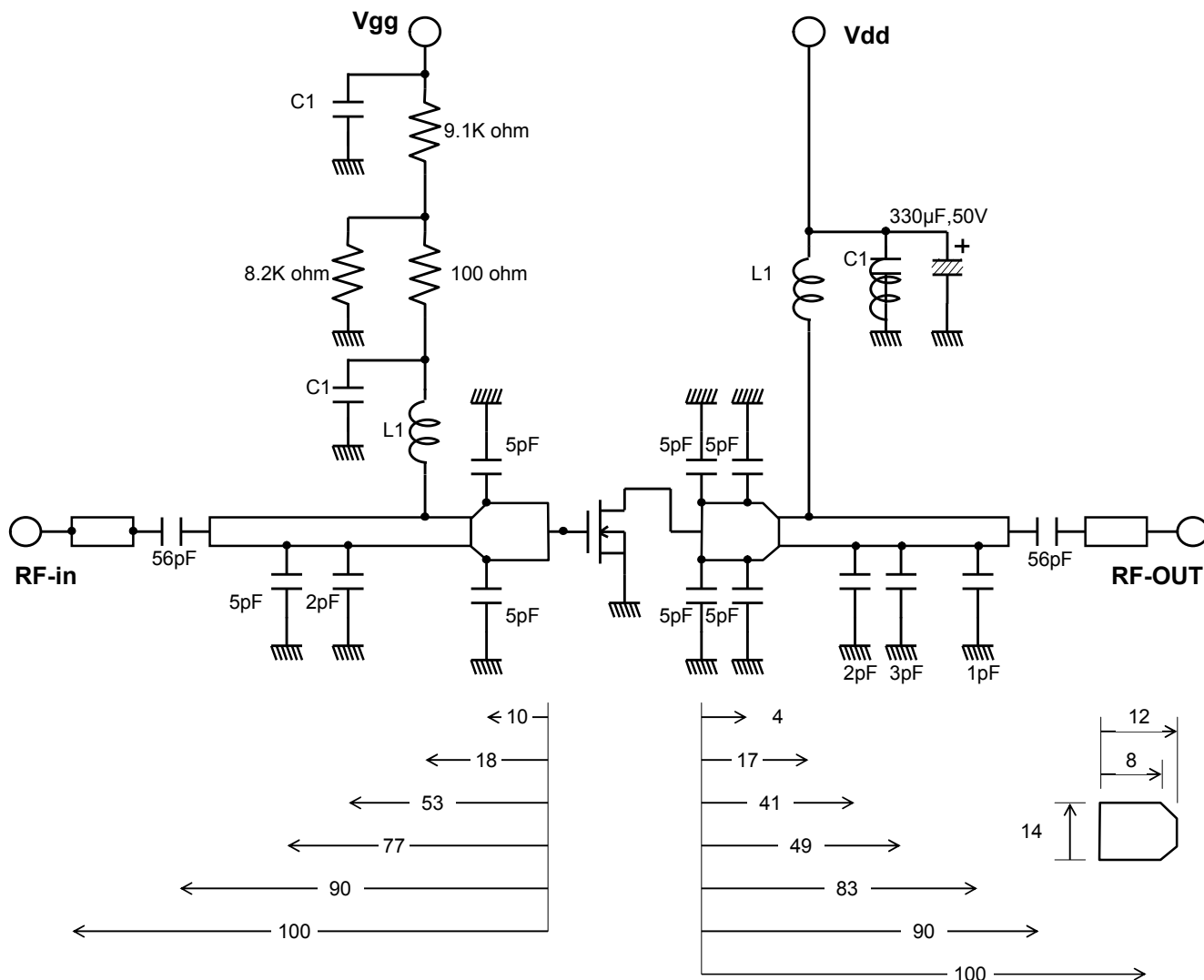
Vgs-Ids CHARACTERISTICS 2



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TEST CIRCUIT(f=900MHz)



C1: 2200pF*2 in parallel

L1: 1Turns, I.D3mm, D1.5mm silver plated copper wire

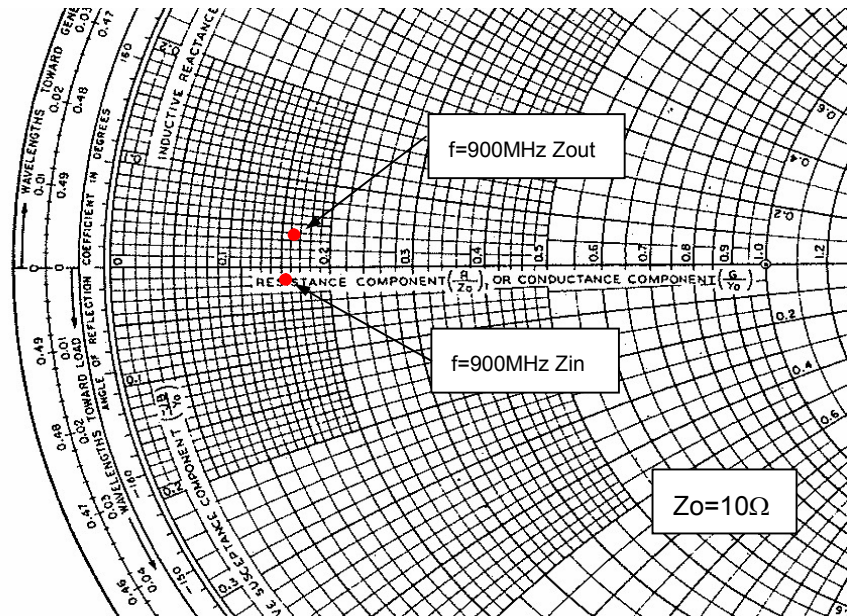
Note: Board material PTFE substrate

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

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INPUT/OUTPUT IMPEDANCE VS.FREQUENCY CHARACTERISTICS



Zin , Zout

f	Zin	Zout	Conditions
(MHz)	(ohm)	(ohm)	
900	1.53-j0.17	1.63+j0.34	Po=45W, Vdd=12.5V, Pin=15W

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RD45HMF1 S-PARAMETER DATA (@Vdd=12.5V, Id=800mA)

Freq. [MHz]	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
100	0.902	-177.8	4.481	77.4	0.008	0.7	0.864	-176.6
200	0.911	-179.0	2.125	63.5	0.011	-26.0	0.877	-177.8
300	0.917	-179.6	1.319	52.3	0.011	-1.0	0.895	-179.0
400	0.932	179.9	0.889	43.0	0.007	-25.4	0.924	179.7
500	0.941	178.7	0.642	35.6	0.005	24.9	0.936	178.8
600	0.945	177.7	0.497	30.2	0.004	14.3	0.937	177.6
700	0.950	176.6	0.384	23.3	0.005	60.8	0.948	176.2
800	0.955	175.5	0.318	18.7	0.006	66.9	0.954	174.6
900	0.959	174.4	0.265	15.6	0.008	66.0	0.951	173.7
1000	0.961	173.6	0.226	11.1	0.008	33.5	0.956	172.5
1100	0.964	171.6	0.178	9.0	0.012	74.4	0.962	170.8
1200	0.963	170.3	0.166	7.6	0.009	52.8	0.961	169.6
1300	0.966	168.5	0.147	2.2	0.013	71.1	0.966	168.1
1400	0.967	167.0	0.109	0.3	0.016	70.5	0.961	166.1
1500	0.965	165.3	0.106	8.8	0.014	57.8	0.958	164.6
1600	0.969	163.0	0.102	16.2	0.022	71.3	0.968	163.2
1700	0.969	161.1	0.106	10.0	0.021	78.6	0.956	161.1
1800	0.966	158.8	0.113	4.1	0.024	65.7	0.960	159.5
1900	0.967	156.3	0.122	-3.7	0.026	64.1	0.965	156.7
2000	0.963	153.9	0.106	1.7	0.028	59.4	0.955	154.6
2100	0.963	150.9	0.101	1.7	0.031	57.5	0.958	152.0
2200	0.961	148.3	0.093	-6.4	0.031	55.0	0.961	148.9
2300	0.956	145.2	0.094	-4.9	0.037	54.6	0.953	145.6
2400	0.955	142.3	0.096	-6.1	0.038	52.0	0.949	142.9
2500	0.954	139.3	0.091	-10.5	0.041	47.9	0.958	138.9
2600	0.949	136.1	0.093	-12.6	0.044	43.8	0.943	135.4
2700	0.949	133.0	0.081	-16.4	0.045	40.7	0.946	132.3
2800	0.948	129.6	0.083	-19.7	0.046	33.2	0.948	127.9
2900	0.943	126.3	0.086	-24.1	0.048	32.8	0.937	124.3
3000	0.939	123.0	0.087	-31.6	0.061	10.7	0.934	120.9

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ATTENTION:

- 1.High Temperature ; This product might have a heat generation while operation,Please take notice that have a possibility to receive a burn to touch the operating product directly or touch the product until cold after switch off. At the near the product,do not place the combustible material that have possibilities to arise the fire.
- 2.Generation of High Frequency Power ; This product generate a high frequency power. Please take notice that do not leakage the unnecessary electric wave and use this products without cause damage for human and property per normal operation.
- 3.Before use; Before use the product,Please design the equipment in consideration of the risk for human and electric wave obstacle for equipment.

PRECAUTIONS FOR THE USE OF MITSUBISHI SILICON RF POWER DEVICES:

1. The specifications of mention are not guarantee values in this data sheet. Please confirm additional details regarding operation of these products from the formal specification sheet. For copies of the formal specification sheets, please contact one of our sales offices.
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3. RD series products use MOSFET semiconductor technology. They are sensitive to ESD voltage therefore appropriate ESD precautions are required.
4. In the case of use in below than recommended frequency, there is possibility to occur that the device is deteriorated or destroyed due to the RF-swing exceed the breakdown voltage.
5. In order to maximize reliability of the equipment, it is better to keep the devices temperature low. It is recommended to utilize a sufficient sized heat-sink in conjunction with other cooling methods as needed (fan, etc.) to keep the channel temperature for RD series products lower than 120deg/C(in case of Tchmax=150deg/C) ,140deg/C(in case of Tchmax=175deg/C) under standard conditions.
6. 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.
7. For specific precautions regarding assembly of these products into the equipment, please refer to the supplementary items in the specification sheet.
8. Warranty for the product is void if the products protective cap (lid) is removed or if the product is modified in any way from it's original form.
9. For additional "Safety first" in your circuit design and notes regarding the materials, please refer the last page of this data sheet.
10. Please refer to the additional precautions in the formal specification sheet.

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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.

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