

< Silicon RF Power MOS FET (Discrete) >

RD12MVP1

RoHS Compliance, Silicon MOSFET Power Transistor, 175MHz, 10W

DESCRIPTION

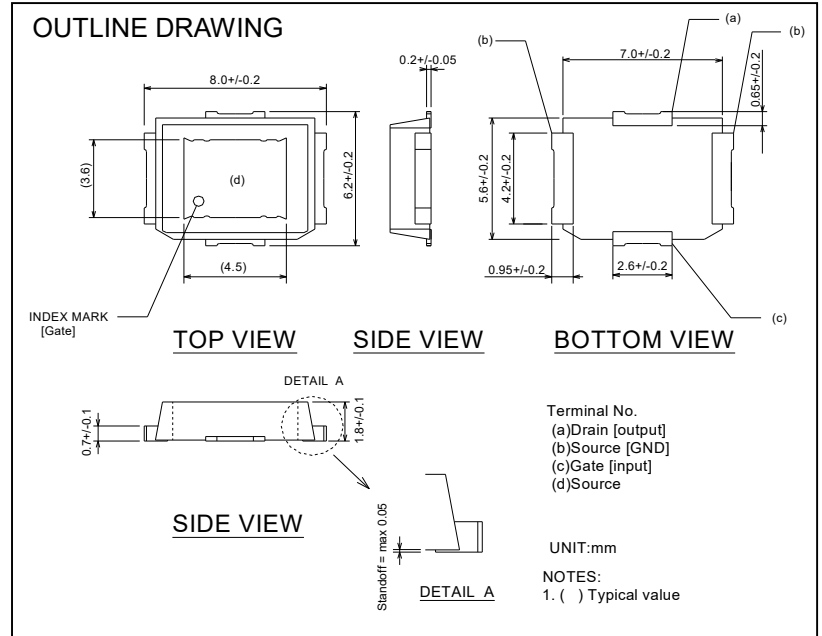
RD12MVP1 is a MOS FET type transistor specifically designed for VHF RF power amplifiers applications.

FEATURES

- High Power Gain
Pout>10W, Gp>13dB@ Vds =7.2V,f=175MHz
- High Efficiency: 55%min. (175MHz)
- Integrated gate protection diode.

APPLICATION

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



RoHS COMPLIANT

RD12MVP1 is a RoHS compliant product.

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 than 85% lead.)

ABSOLUTE MAXIMUM RATINGS (Tc=25°C, UNLESS OTHERWISE NOTED)

SYMBOL	PARAMETER	CONDITIONS	RATINGS	UNIT
V _{DSS}	Drain to Source Voltage	V _{gs} =0V	50	V
V _{GSS}	Gate to Source Voltage	V _{ds} =0V	-5 /+10	V
I _D	Drain Current	-	4.0	A
P _{in}	Input Power	Z _g =Z _l =50Ω	1.0	W
P _{ch}	Channel Dissipation	-	83	W
T _j	Junction Temperature	-	+150	°C
T _{stg}	Storage Temperature	-	-40 to +125	°C
R _{thj-c}	Thermal Resistance	Junction to Case	1.5	°C/W

Note: Above parameters are guaranteed independently.

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

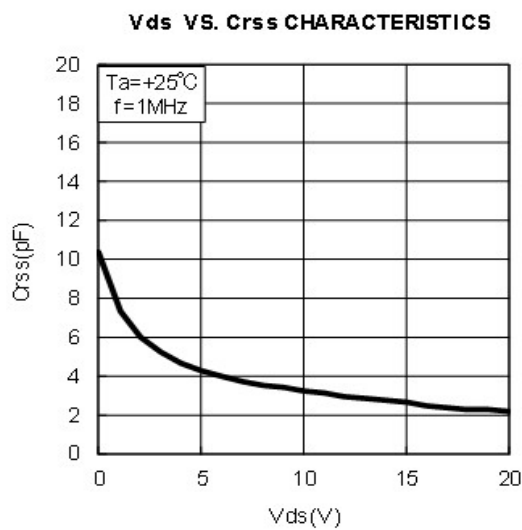
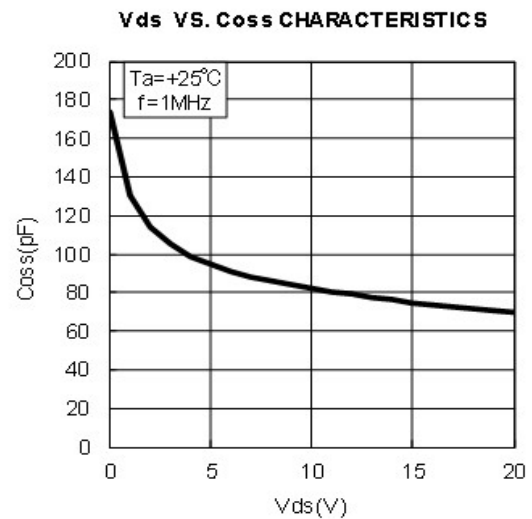
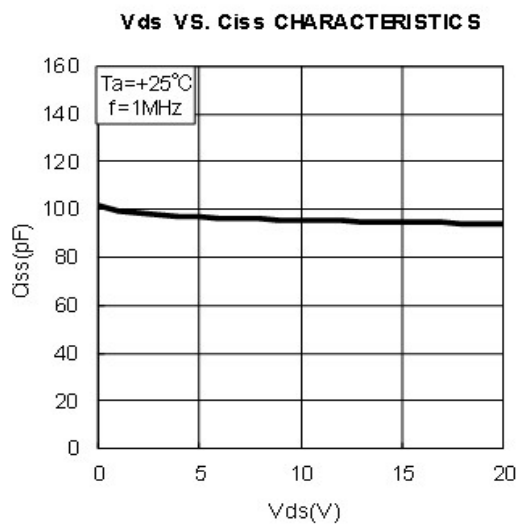
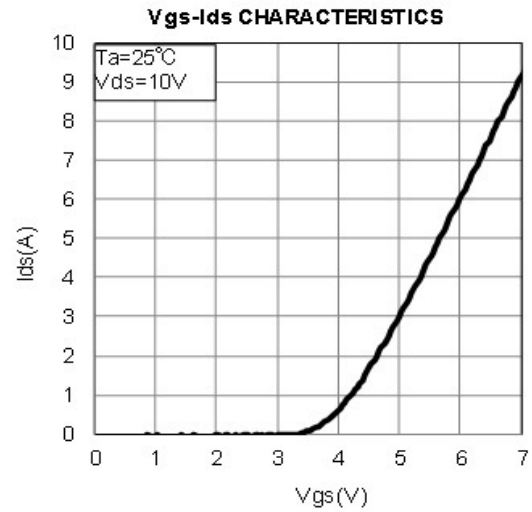
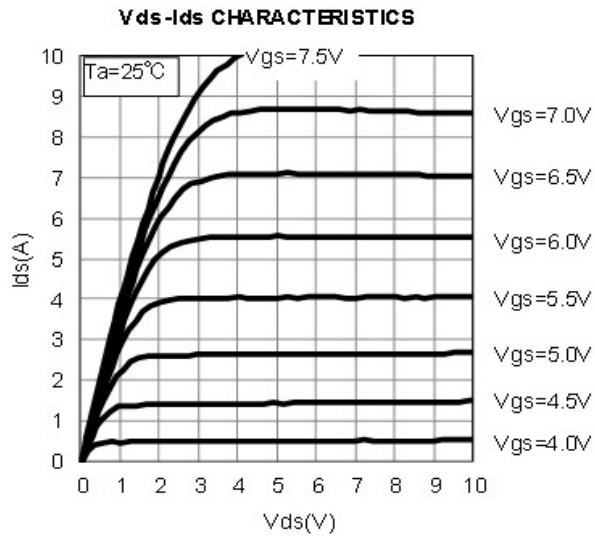
SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			MIN.	TYP.	MAX.	
I _{DSS}	Zero Gate Voltage Drain Current	V _{ds} =17V, V _{gs} =0V	-	-	10	uA
I _{GSS}	Gate to Source Leak Current	V _{gs} =10V, V _{ds} =0V	-	-	1.0	uA
V _{TH}	Gate Threshold Voltage	V _{ds} =12V, I _{ds} =1mA	1.8	-	4.4	V
P _{out}	Output Power	f=175MHz, V _{ds} =7.2V	10	12	-	W
η _D	Drain Efficiency	P _{in} =0.5W, I _{dq} =1.0A	55	57	-	%
VSWRT	Load VSWR tolerance	V _{ds} =9.5V, P _o =10W(Pin Control) f=175MHz, I _{dq} =1.0A, 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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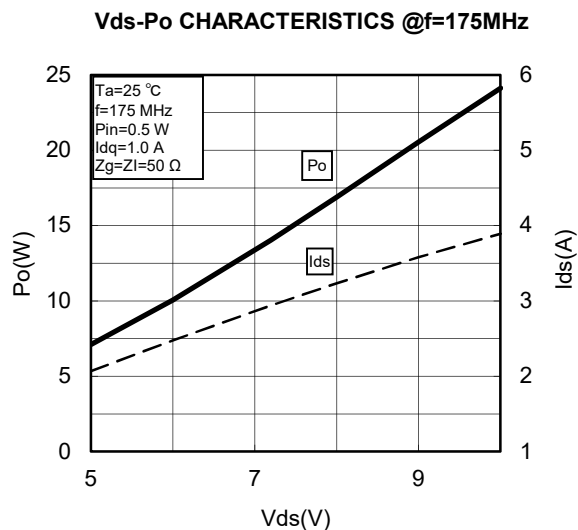
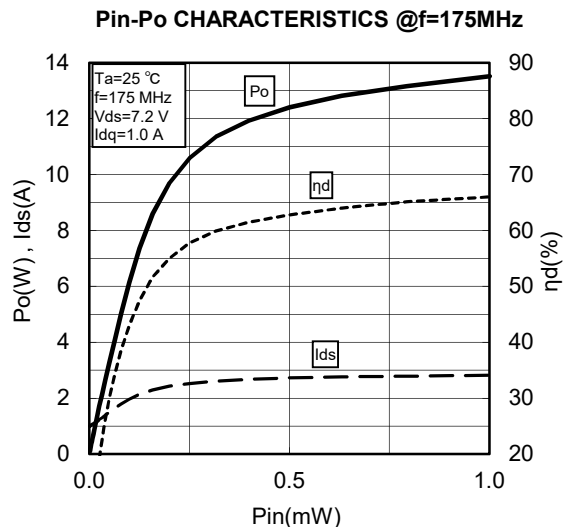
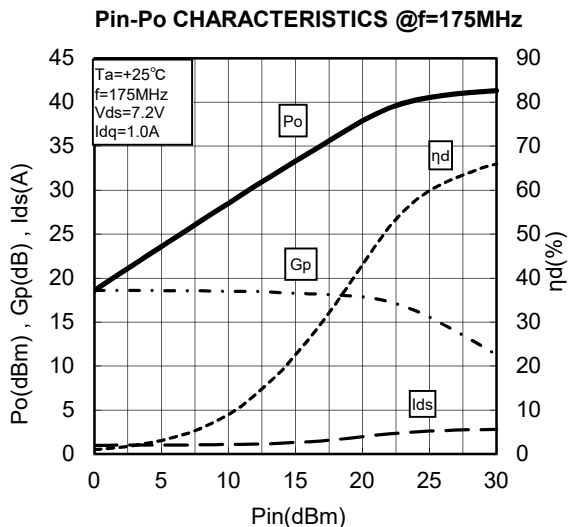
TYPICAL CHARACTERISTICS



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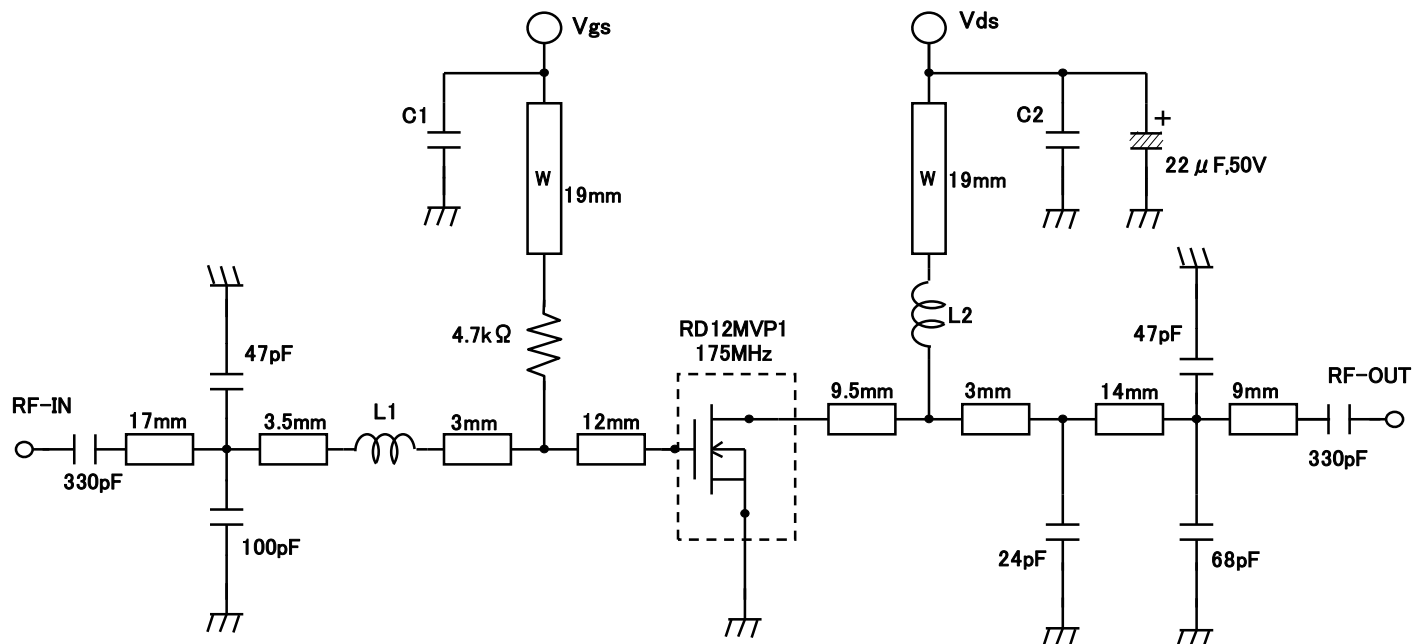
TYPICAL CHARACTERISTICS



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TEST CIRCUIT (f=175MHz)



Note: Board material Glass-Epoxy substrate
 Micro strip line width=1.3mm/50 Ω、er=4.8、t=0.8mm
 W: Line width=1.0mm

L: Enameled Wire
 L1: 4Turns, D: 0.43mm、φ 1.66mm(outside diameter)
 L2: 6Turns, D: 0.43mm、φ 2.46mm(outside diameter)
 C1, C2: 2200pF

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RD12MVP1 S-PARAMETER(V_{ds}=7.2V,I_{ds}=500mA)

Freq. [MHz]	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
50	0.734	-156.2	17.210	81.3	0.017	-5.3	0.703	-154.8
100	0.782	-162.8	7.872	63.1	0.015	-19.1	0.760	-160.9
150	0.831	-165.7	4.620	50.3	0.011	-26.3	0.819	-163.7
200	0.871	-168.1	3.017	40.6	0.008	-28.2	0.864	-166.2
250	0.897	-170.2	2.106	33.3	0.005	-19.8	0.896	-168.4
300	0.917	-172.1	1.545	27.6	0.004	4.5	0.918	-170.3
350	0.930	-173.7	1.180	23.2	0.004	42.4	0.934	-172.0
400	0.940	-175.1	0.929	19.4	0.005	67.8	0.945	-173.5
450	0.947	-176.4	0.747	16.3	0.007	76.6	0.953	-174.8
500	0.951	-177.6	0.614	13.8	0.009	81.7	0.959	-175.8
550	0.955	-178.6	0.513	11.8	0.011	84.1	0.963	-176.9
600	0.958	-179.5	0.436	10.2	0.013	84.9	0.966	-177.8
650	0.961	179.7	0.374	8.8	0.015	85.0	0.969	-178.6
700	0.962	178.8	0.326	7.4	0.017	85.0	0.971	-179.4
750	0.963	178.1	0.285	6.9	0.019	84.8	0.972	179.8
800	0.965	177.4	0.252	5.9	0.021	84.8	0.974	179.2
850	0.965	176.7	0.224	5.8	0.023	84.3	0.973	178.6
900	0.965	176.1	0.200	6.0	0.025	83.9	0.975	178.0
950	0.966	175.5	0.182	5.9	0.027	83.3	0.975	177.4
1000	0.966	174.9	0.166	6.2	0.030	82.7	0.974	176.9

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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.
- 2.RA series products (RF power amplifier modules) and RD series products (RF power transistors) are designed for consumer mobile communication terminals and were not specifically designed for use in other applications. In particular, while these products are highly reliable for their designed purpose, they are not manufactured under a quality assurance testing protocol that is sufficient to guarantee the level of reliability typically deemed necessary for critical communications elements and In the application, which is base station applications and fixed station applications that operate with long term continuous transmission and a higher on-off frequency during transmitting, please consider the derating, the redundancy system, appropriate setting of the maintain period and others as needed. For the reliability report which is described about predicted operating life time of Mitsubishi Silicon RF Products , please contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor.
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.

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10. Please avoid use in the place where water or organic solvents can adhere directly to the product and the environments with the possibility of caustic gas, dust, salinity, etc. Reliability could be markedly decreased and also there is a possibility failures could result causing a serious accident. Likewise, there is a possibility of causing a serious accident if used in an explosive gas environment. Please allow for adequate safety margin in your designs.

11. Please refer to the additional precautions in the formal specification sheet.

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.

Notes regarding these materials

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