ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Silicon RF Power Semiconductors

RD01MUS1

RoHS Compliance, Silicon MOSFET Power Transistor 520MHz,1W

DESCRIPTION

RD01MUS1 is a MOS FET type transistor specifically designed for VHF/UHF RF amplifiers applications.

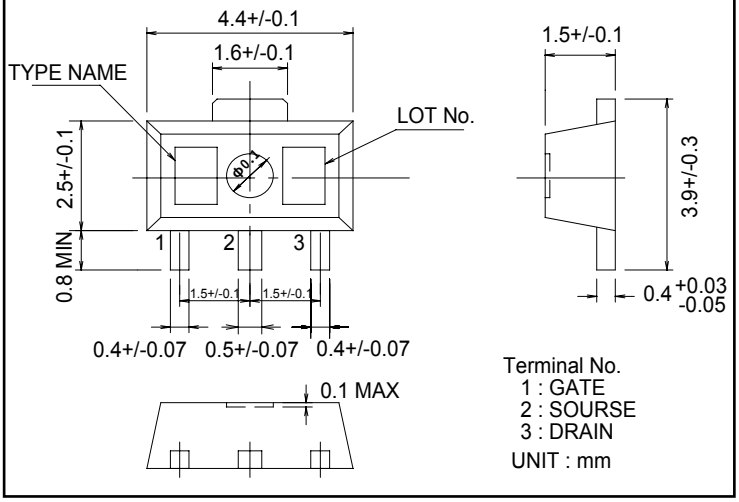
FEATURES

High power gain:
Pout>0.8W, Gp>14dB @Vdd=7.2V,f=520MHz
High Efficiency: 65%typ.

APPLICATION

For output stage of high power amplifiers in VHF/UHF Band mobile radio sets.

OUTLINE DRAWING



RoHS COMPLIANT

RD01MUS1-101,T113 is a RoHS compliant products.
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.)

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	+/-10	V
Pch	Channel dissipation	Tc=25°C	3.6	W
Pin	Input Power	Zg=Zl=50Ω	100	mW
ID	Drain Current	-	600	mA
Tch	Channel Temperature	-	150	°C
Tstg	Storage temperature	-	-40 to +125	°C
Rth j-c	Thermal resistance	Junction to case	34.5	°C/W

Note: Above parameters are guaranteed independently.

ELECTRICAL CHARACTERISTICS

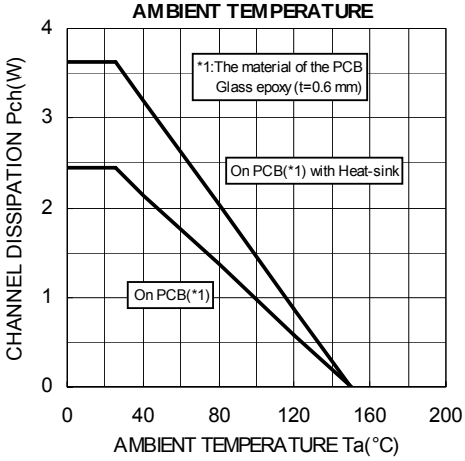
(Tc=25°C, UNLESS OTHERWISE NOTED)

SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
I_{DSS}	Zero gate voltage drain current	V_{DS}=17V, V_{GS}=0V	-	-	50	uA
I_{GSS}	Gate to source leak current	V_{GS}=10V, V_{DS}=0V	-	-	1	uA
Vth	Gate threshold Voltage	V_{DS}=12V, I_{DS}=1mA	1.3	1.8	2.3	V
Pout	Output power	V_{DD}=7.2V, Pin=30mW	0.8	1.4	-	W
ηD	Drain efficiency	f=520MHz,Idq=100mA	50	65	-	%

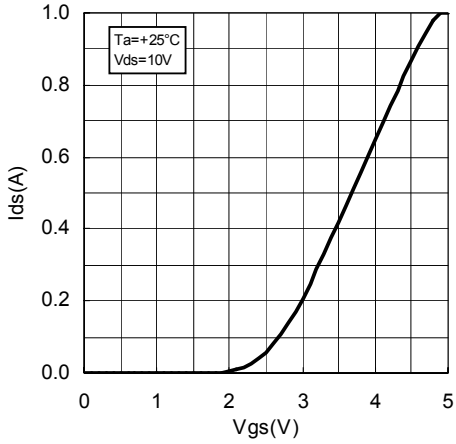
Note: Above parameters, ratings, limits and conditions are subject to change.

TYPICAL CHARACTERISTICS

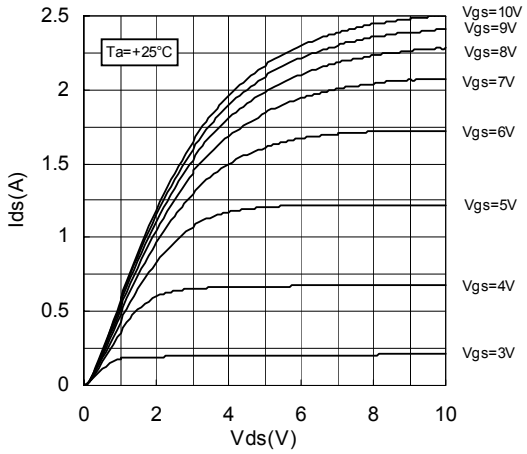
CHANNEL DISSIPATION VS. AMBIENT TEMPERATURE



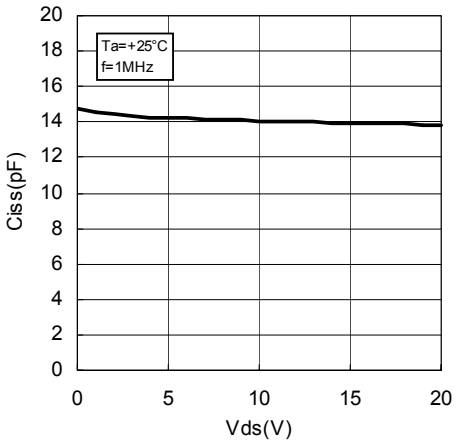
Vgs-Ids CHARACTERISTICS



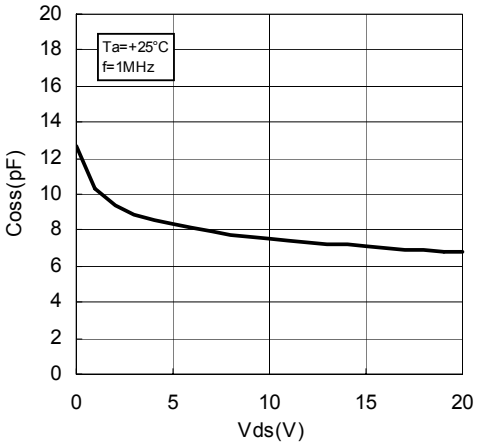
Vds-Ids CHARACTERISTICS



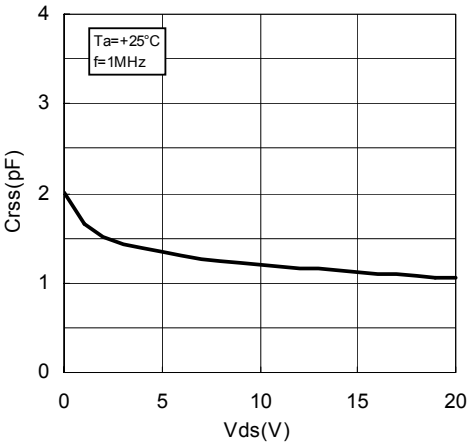
Vds VS. Ciss CHARACTERISTICS



Vds VS. Coss CHARACTERISTICS

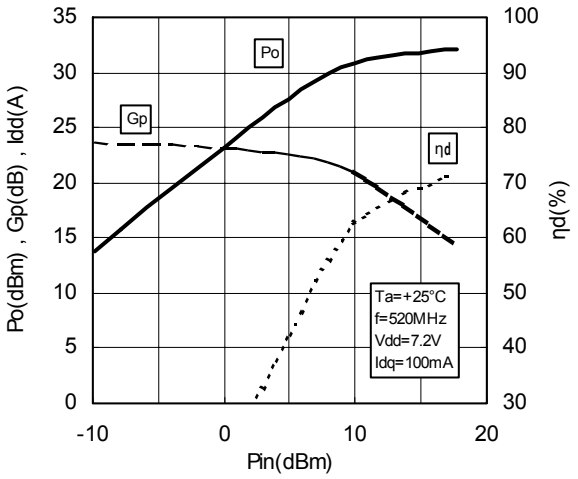


Vds VS. Crss CHARACTERISTICS

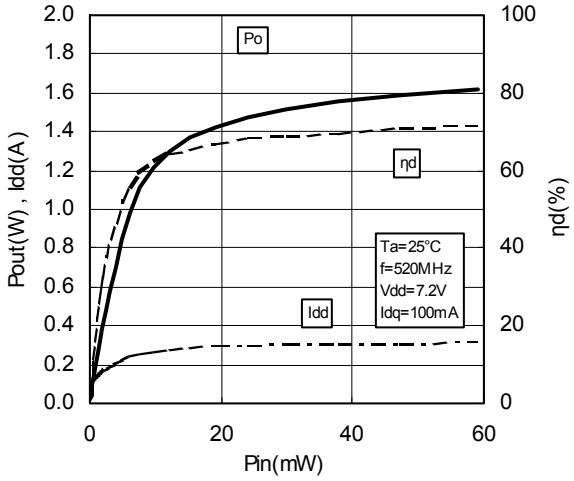


TYPICAL CHARACTERISTICS

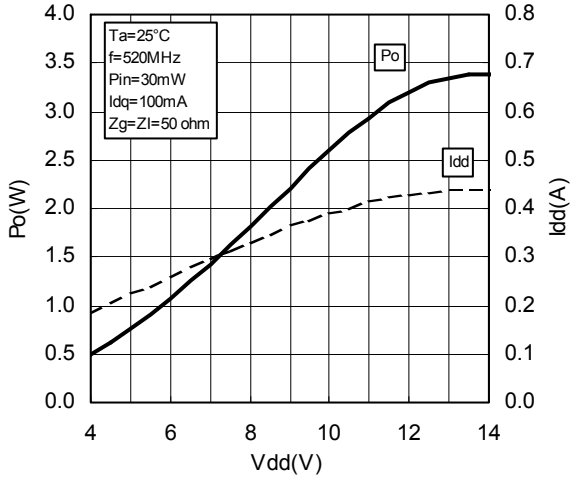
Pin-Po CHARACTERISTICS



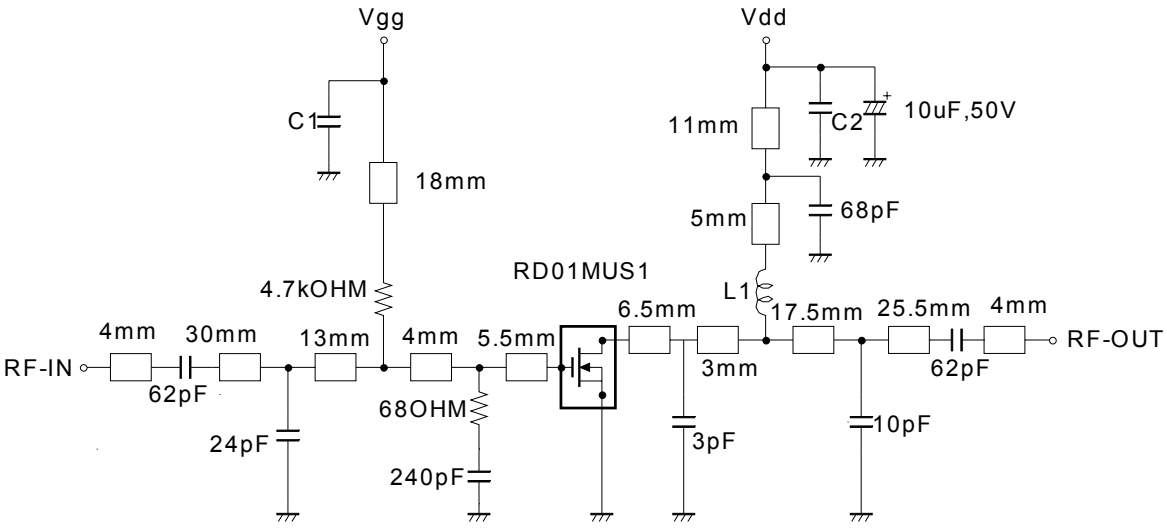
Pin-Po CHARACTERISTICS



Vdd-Po CHARACTERISTICS



TEST CIRCUIT(f=520MHz)

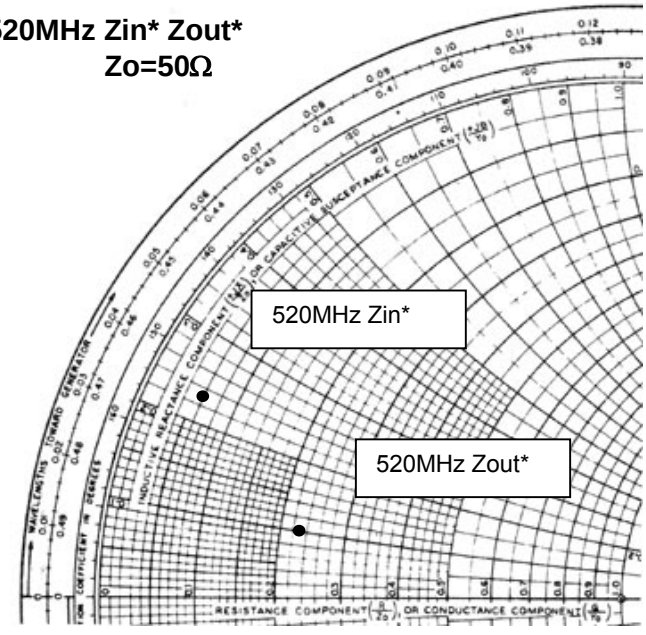


L1: Enameled wire 5Turns,D:0.43mm,2.46mmO.D
C1,C2: 1000pF,0.022uF in parallel

Note:Board material-glass epoxi substrate
Micro strip line width=1.0mm/50OHM,er:4.8,t=0.6mm

INPUT/OUTPUT IMPEDANCE VS. FREQUENCY CHARACTERISTICS

520MHz Zin* Zout*
Zo=50Ω



Vdd=7.2V, Idq=100mA(Vgg adj.),Pin=0.03W

Zin* =3.11+j11.56
Zout*=11.64+j4.74

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

RD01MSU1 S-PARAMETER DATA (@Vdd=7.2V, Id=100mA)

Freq.	S11		S21		S12		S22	
[MHz]	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
100	0.927	-77.0	19.536	132.3	0.043	41.3	0.772	-63.0
150	0.875	-101.2	15.657	116.5	0.050	26.5	0.687	-83.1
200	0.833	-117.9	12.662	105.0	0.053	16.1	0.630	-97.3
250	0.811	-129.5	10.427	96.2	0.054	8.4	0.600	-107.1
300	0.798	-138.0	8.814	89.3	0.053	2.6	0.588	-114.4
350	0.791	-144.5	7.548	83.3	0.052	-2.4	0.583	-120.1
400	0.790	-149.7	6.541	78.2	0.051	-6.6	0.590	-124.6
450	0.788	-154.1	5.789	73.5	0.049	-9.9	0.597	-128.4
500	0.794	-158.0	5.106	69.0	0.047	-13.3	0.608	-131.7
520	0.796	-159.2	4.876	67.5	0.046	-14.1	0.615	-133.1
550	0.798	-161.2	4.576	65.2	0.045	-15.8	0.622	-134.8
600	0.801	-164.2	4.120	61.3	0.043	-18.5	0.636	-137.3
650	0.807	-167.0	3.714	58.0	0.041	-21.0	0.650	-140.1
700	0.813	-169.3	3.389	54.7	0.039	-22.3	0.666	-142.4
750	0.817	-171.6	3.092	51.3	0.036	-24.9	0.680	-144.6
800	0.825	-174.0	2.820	48.6	0.033	-25.7	0.694	-146.8
850	0.831	-176.0	2.616	46.0	0.031	-26.8	0.711	-148.8
900	0.837	-178.0	2.401	42.8	0.028	-27.8	0.723	-150.9
950	0.845	-179.9	2.207	40.9	0.026	-27.3	0.734	-152.9
1000	0.851	178.2	2.076	38.4	0.023	-27.0	0.749	-154.5
1050	0.857	176.5	1.912	35.5	0.021	-26.3	0.760	-156.3
1100	0.862	174.7	1.773	34.0	0.018	-23.8	0.771	-158.2

RD01MSU1 S-PARAMETER DATA (@Vdd=12.5V, Id=100mA)

Freq.	S11		S21		S12		S22	
[MHz]	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
100	0.945	-72.3	19.517	135.2	0.039	44.5	0.742	-57.4
150	0.896	-96.7	15.937	119.5	0.046	29.2	0.665	-76.6
200	0.856	-113.9	13.050	107.7	0.049	18.5	0.612	-90.6
250	0.833	-126.2	10.830	98.6	0.050	11.2	0.581	-100.4
300	0.819	-135.1	9.194	91.6	0.050	5.0	0.568	-107.8
350	0.810	-141.9	7.890	85.3	0.049	-0.3	0.565	-113.8
400	0.806	-147.7	6.868	80.1	0.047	-4.2	0.571	-118.5
450	0.804	-152.2	6.084	75.3	0.046	-7.7	0.580	-122.3
500	0.808	-156.4	5.382	70.7	0.044	-11.0	0.591	-126.1
520	0.809	-157.8	5.139	69.1	0.044	-12.4	0.596	-127.5
550	0.812	-159.9	4.831	66.7	0.042	-13.7	0.605	-129.4
600	0.813	-163.0	4.356	62.7	0.040	-16.2	0.618	-132.2
650	0.819	-166.0	3.931	59.3	0.038	-18.7	0.633	-135.1
700	0.824	-168.6	3.597	56.0	0.036	-20.8	0.649	-137.6
750	0.827	-171.0	3.283	52.4	0.034	-22.3	0.664	-140.1
800	0.834	-173.3	2.991	49.8	0.031	-23.7	0.678	-142.5
850	0.841	-175.5	2.779	47.1	0.029	-24.6	0.695	-144.5
900	0.845	-177.4	2.554	43.8	0.026	-25.9	0.708	-146.7
950	0.852	-179.4	2.350	41.9	0.024	-25.4	0.720	-148.9
1000	0.857	178.6	2.209	39.4	0.022	-24.3	0.736	-150.7
1050	0.864	176.9	2.035	36.3	0.019	-23.5	0.747	-152.4
1100	0.868	175.0	1.889	34.8	0.017	-20.1	0.759	-154.6

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. 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. Examples of critical communications elements would include transmitters for base station applications and fixed station applications that operate with long term continuous transmission and a higher on-off frequency during transmitting, especially for systems that may have a high impact to society.

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.

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

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