

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

MITSUBISHI RF POWER MOS FET

RD07MVS1

RoHS Compliance, Silicon MOSFET Power Transistor, 175MHz, 520MHz, 7W

DESCRIPTION

RD07MVS1 is a MOS FET type transistor specifically designed for VHF/UHF RF power amplifiers applications.

FEATURES

High power gain:

$P_{out} > 7W$, $G_p > 10dB @ V_{dd} = 7.2V, f = 520MHz$

High Efficiency: 60% typ. (175MHz)

High Efficiency: 55% typ. (520MHz)

APPLICATION

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

RoHS COMPLIANT

RD07MVS1-101, T112 is a RoHS compliant products.

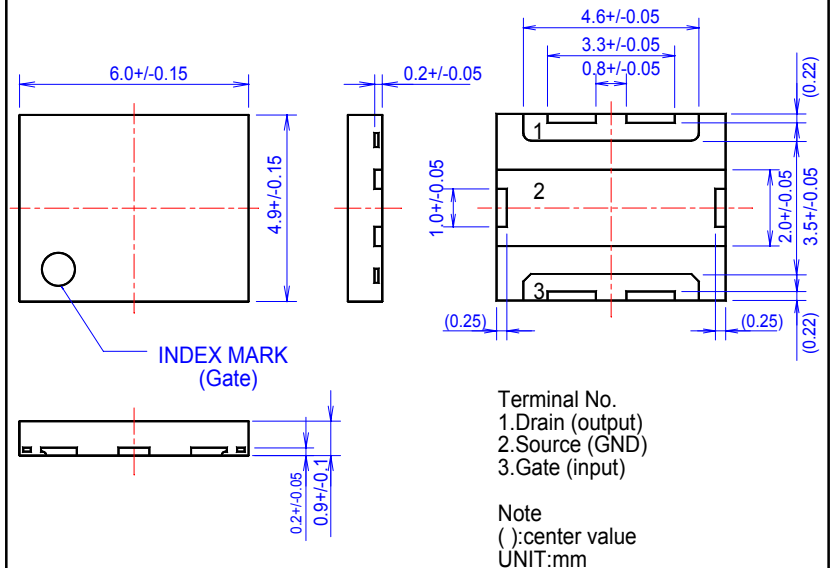
RoHS compliance is indicated by the letter "G" after the Lot Marking.

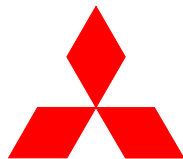
This product includes the lead in high melting temperature type solders.

However, it is applicable to the following exceptions of RoHS Directives.

1. Lead in high melting temperature type solders (i.e. tin-lead solder alloys containing more than 85% lead.)

OUTLINE DRAWING





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ABSOLUTE MAXIMUM RATINGS

(T_c=25°C UNLESS OTHERWISE NOTED)

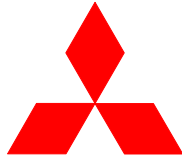
SYMBOL	PARAMETER	CONDITIONS	RATINGS	UNIT
VDSS	Drain to source voltage	V _{gs} =0V	30	V
VGSS	Gate to source voltage	V _{ds} =0V	+/- 20	V
P _{ch}	Channel dissipation	T _c =25°C	50	W
P _{in}	Input Power	Z _g =Z _l =50Ω	1.5	W
I _D	Drain Current	-	3	A
T _{ch}	Junction Temperature	-	150	°C
T _{stg}	Storage temperature	-	-40 to +125	°C
R _{th j-c}	Thermal resistance	Junction to case	2.5	°C/W

Note 1: Above parameters are guaranteed independently.

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	-	-	200	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	1.4	1.7	2.4	V
P _{out1}	Output power	f=175MHz, V _{DD} =7.2V	7	8	-	W
η _{D1}	Drain efficiency	P _{in} =0.3W, I _{dq} =700mA	55	60	-	%
P _{out2}	Output power	f=520MHz, V _{DD} =7.2V	7	8	-	W
η _{D2}	Drain efficiency	P _{in} =0.7W, I _{dq} =750mA	50	55	-	%
	Load VSWR tolerance	V _{DD} =9.2V, P _o =7W(Pin Control) f=175MHz, I _{dq} =700mA, Z _g =50Ω Load VSWR=20:1(All Phase)	No destroy			-
	Load VSWR tolerance	V _{DD} =9.2V, P _o =7W(Pin Control) f=520MHz, I _{dq} =750mA, Z _g =50Ω Load VSWR=20:1(All Phase)	No destroy			-

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



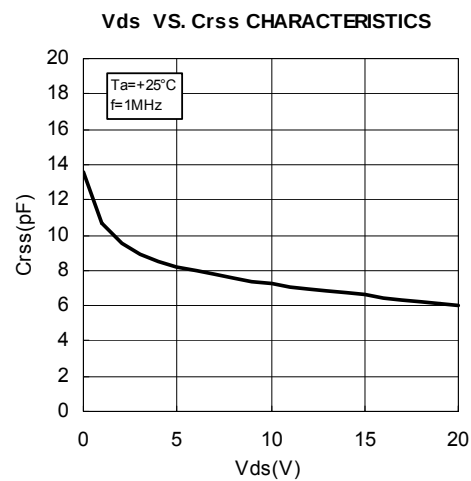
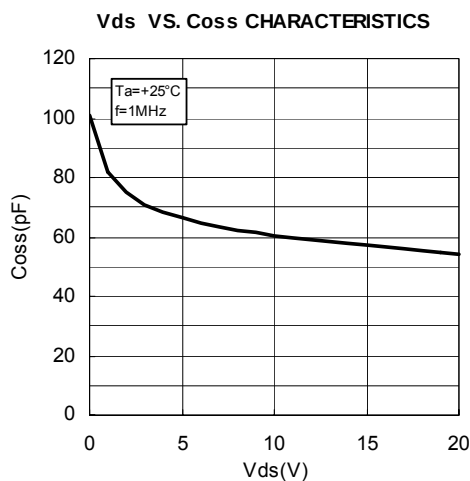
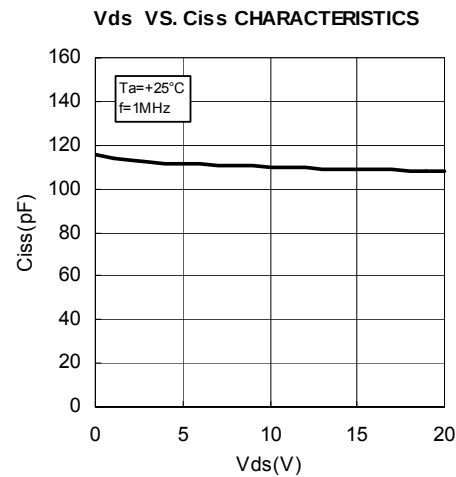
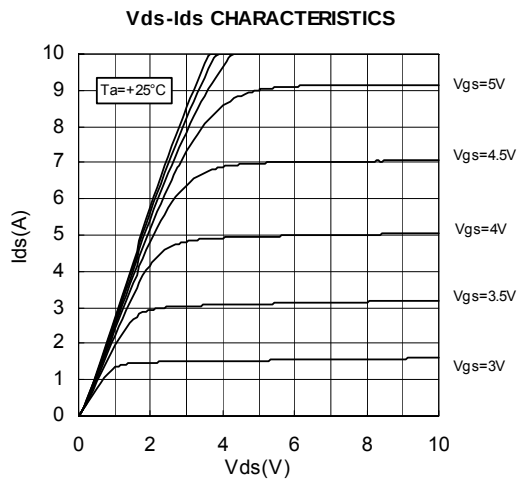
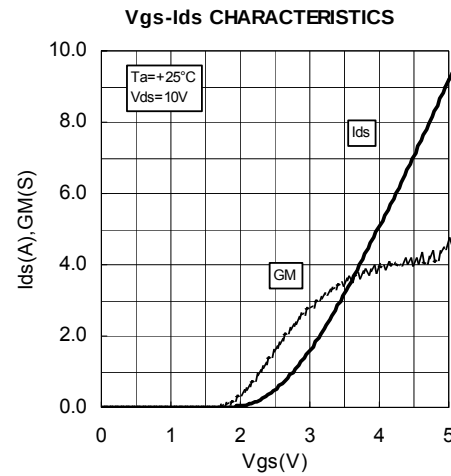
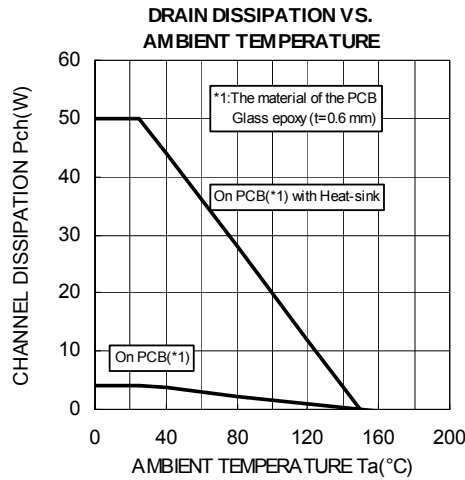
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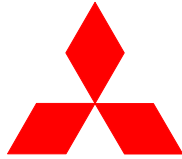
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TYPICAL CHARACTERISTICS





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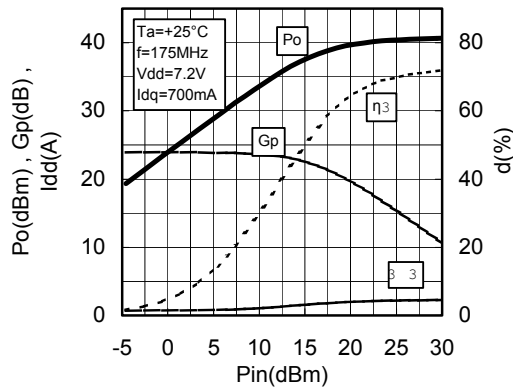
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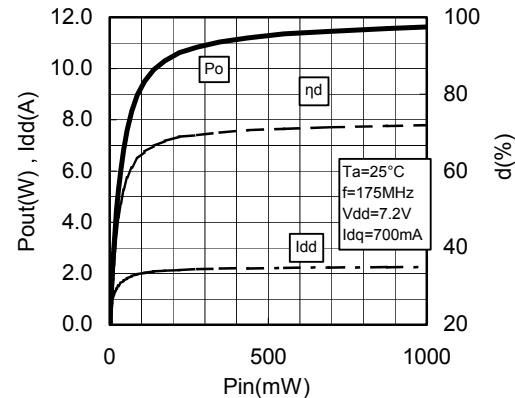
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TYPICAL CHARACTERISTICS

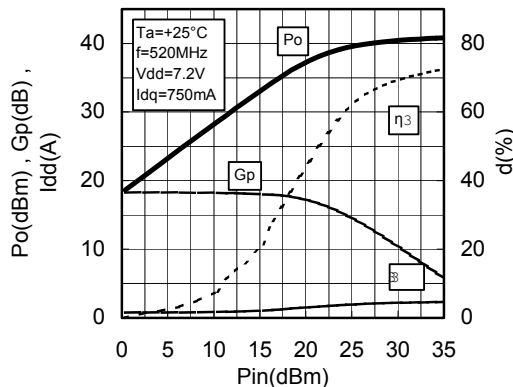
Pin-Po CHARACTERISTICS
@f=175MHz



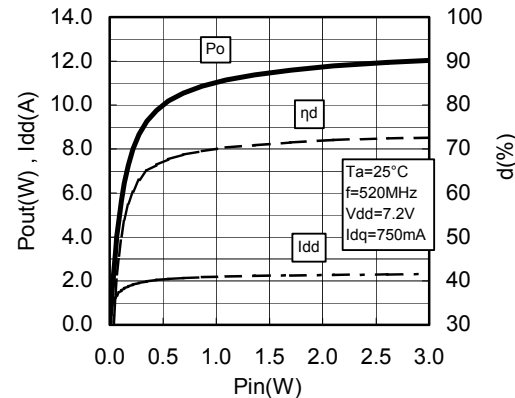
Pin-Po CHARACTERISTICS
@f=175MHz



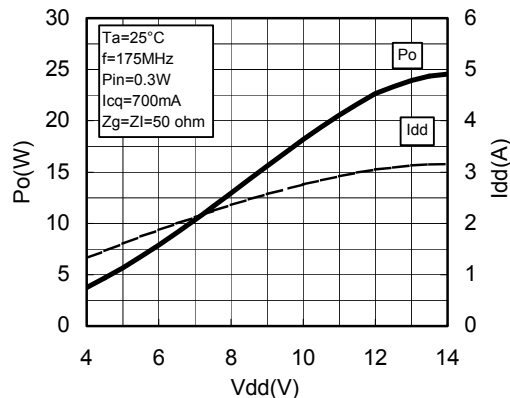
Pin-Po CHARACTERISTICS
@f=520MHz



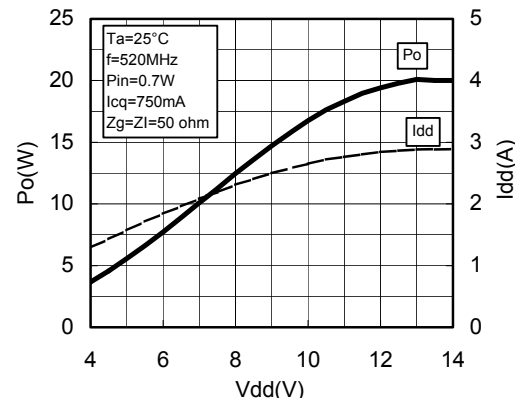
Pin-Po CHARACTERISTICS
@f=520MHz

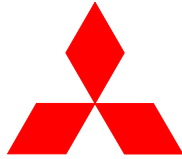


Vdd-Po CHARACTERISTICS
@f=175MHz



Vdd-Po CHARACTERISTICS
@f=520MHz





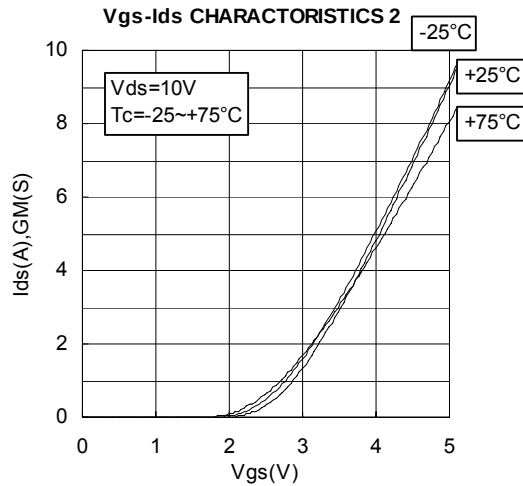
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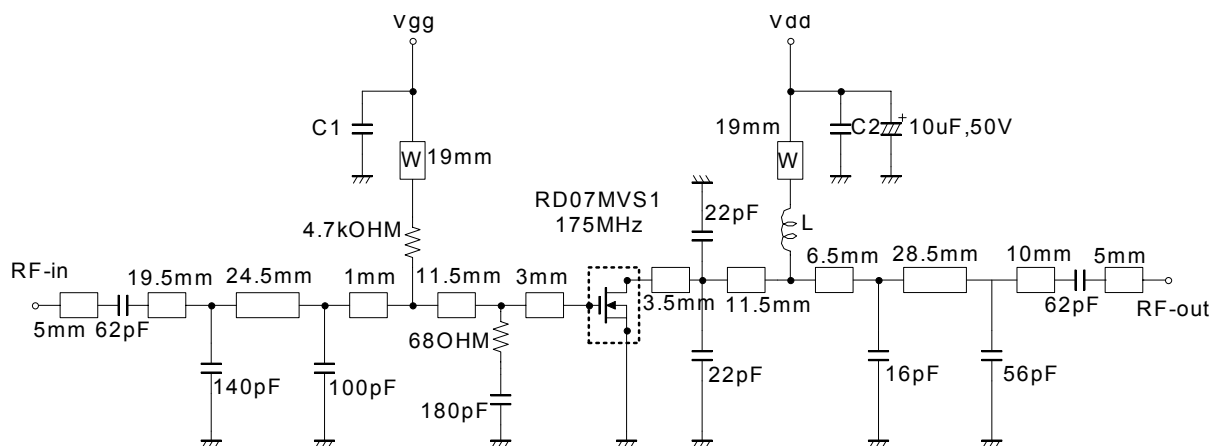
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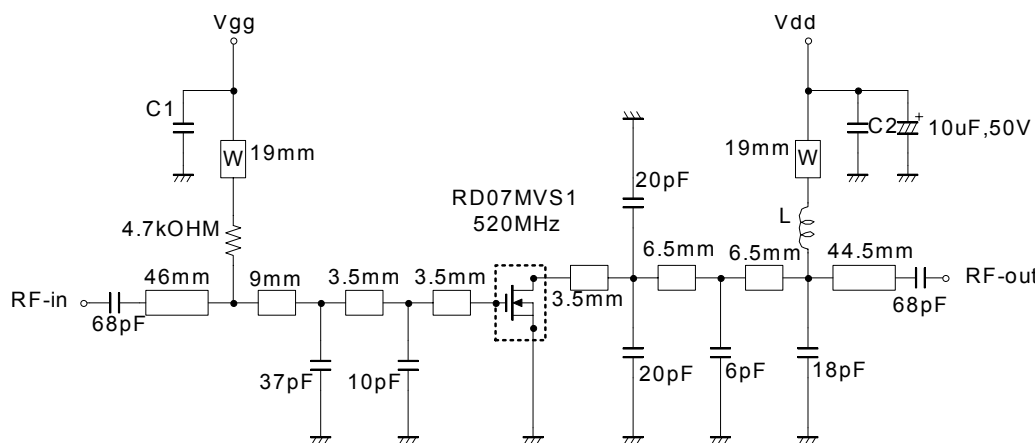
TEST CIRCUIT(f=175MHz)



L: Enameled wire 7Turns, D:0.43mm, 2.46mm O.D
C1, C2: 1000pF, 0.022uF in parallel

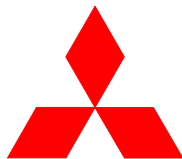
Note: Board material- Teflon substrate
Micro strip line width=2.2mm/50OHM, er:2.7, t=0.8mm
W: line width=1.0mm

TEST CIRCUIT(f=520MHz)



L: Enameled wire 5Turns, D:0.43mm, 2.46mm O.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
W: line width=1.0mm



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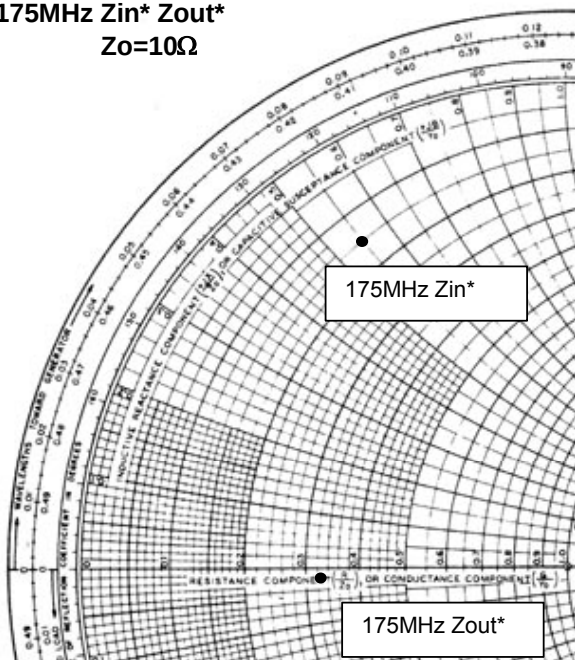
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INPUT/OUTPUT IMPEDANCE VS. FREQUENCY CHARACTERISTICS

175MHz Z_{in}^* Z_{out}^*
 $Z_o=10\Omega$

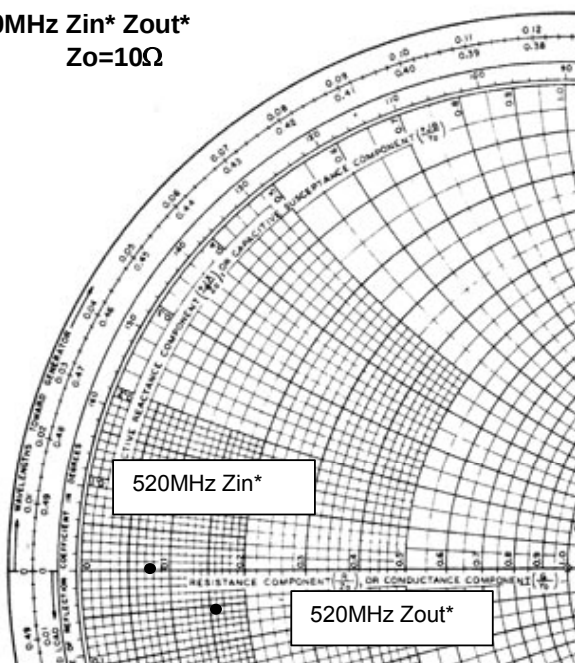


$V_{dd}=7.2V$, $I_{dq}=700mA$ (V_{gg} adj.), $P_{in}=0.28W$

$Z_{in}^*=1.55+j5.53$
 $Z_{out}^*=3.24-j0.26$

Z_{in}^* : Complex conjugate of input impedance
 Z_{out}^* : Complex conjugate of input impedance

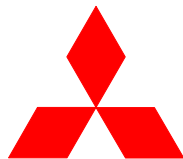
520MHz Z_{in}^* Z_{out}^*
 $Z_o=10\Omega$



$V_{dd}=7.2V$, $I_{dq}=750mA$ (V_{gg} adj.), $P_{in}=0.7W$

$Z_{in}^*=0.76+j0.06$
 $Z_{out}^*=1.61-j0.52$

Z_{in}^* : Complex conjugate of input impedance
 Z_{out}^* : Complex conjugate of input impedance



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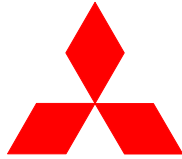
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RD07MVS1 S-PARAMETER DATA (@Vdd=7.2V, Id=750mA)

Freq. [MHz]	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
100	0.890	-174.1	5.508	82.1	0.016	-3.6	0.790	-172.8
150	0.897	-175.6	3.613	75.0	0.015	-8.5	0.801	-174.0
175	0.899	-176.0	3.028	72.4	0.015	-9.6	0.802	-174.1
200	0.901	-176.3	2.604	70.1	0.014	-10.9	0.815	-174.0
250	0.907	-176.7	2.019	65.6	0.014	-12.7	0.844	-174.1
300	0.913	-177.0	1.614	60.7	0.012	-15.3	0.843	-174.1
350	0.918	-177.3	1.308	57.1	0.011	-15.8	0.860	-174.4
400	0.924	-177.8	1.102	54.1	0.010	-14.2	0.879	-175.0
450	0.928	-178.0	0.929	50.1	0.009	-14.8	0.882	-175.1
500	0.933	-178.3	0.790	48.6	0.008	-9.6	0.895	-175.5
520	0.935	-178.5	0.753	47.6	0.007	-7.7	0.901	-175.8
550	0.937	-178.8	0.692	45.3	0.007	-5.6	0.906	-176.2
600	0.940	-179.2	0.595	43.6	0.006	0.4	0.907	-176.6
650	0.942	-179.4	0.529	42.4	0.006	17.1	0.916	-177.2
700	0.944	-179.8	0.467	40.2	0.005	21.8	0.923	-177.6
750	0.947	-179.8	0.416	39.4	0.005	40.9	0.921	-178.0
800	0.948	-179.4	0.374	38.6	0.004	52.0	0.930	-178.8
850	0.949	-179.0	0.343	37.6	0.005	67.1	0.933	-178.9
900	0.951	-178.6	0.304	36.5	0.005	72.6	0.932	-179.3
950	0.951	-178.2	0.284	37.6	0.006	85.8	0.937	-179.8
1000	0.952	-177.9	0.262	35.1	0.007	85.1	0.938	-179.7
1050	0.950	-177.4	0.234	36.0	0.008	89.8	0.938	-179.3
1100	0.952	-176.9	0.226	35.8	0.009	93.4	0.940	-178.2

RD07MVS1 S-PARAMETER DATA (@Vdd=12.5V, Id=750mA)

Freq. [MHz]	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
100	0.883	-172.1	6.013	81.0	0.017	-5.3	0.748	-170.4
150	0.891	-174.1	3.914	72.8	0.016	-10.7	0.765	-171.4
175	0.894	-174.6	3.269	69.8	0.016	-13.1	0.769	-171.4
200	0.897	-175.0	2.798	67.2	0.015	-14.9	0.786	-171.3
250	0.906	-175.6	2.144	62.1	0.014	-18.3	0.822	-171.4
300	0.914	-176.0	1.697	56.9	0.012	-20.4	0.828	-171.6
350	0.920	-176.4	1.361	53.0	0.011	-21.6	0.848	-172.0
400	0.927	-177.0	1.134	49.9	0.010	-21.2	0.871	-172.9
450	0.932	-177.4	0.949	45.8	0.009	-21.8	0.876	-173.2
500	0.937	-177.8	0.800	44.2	0.007	-16.9	0.892	-173.7
520	0.938	-178.0	0.761	43.2	0.007	-16.0	0.898	-174.1
550	0.940	-178.3	0.697	41.1	0.006	-13.3	0.904	-174.6
600	0.944	-178.8	0.594	39.3	0.005	-7.2	0.906	-175.1
650	0.946	-179.1	0.527	38.2	0.004	4.5	0.917	-175.9
700	0.948	-179.5	0.464	36.1	0.004	17.4	0.924	-176.3
750	0.950	-179.9	0.412	35.5	0.004	28.0	0.922	-176.9
800	0.951	-179.6	0.368	34.5	0.004	56.9	0.931	-177.8
850	0.953	-179.2	0.336	33.6	0.004	66.4	0.934	-178.0
900	0.954	-178.8	0.297	32.3	0.005	78.3	0.933	-178.3
950	0.954	-178.4	0.276	33.8	0.006	87.4	0.939	-179.4
1000	0.954	-178.0	0.254	31.1	0.006	90.9	0.941	-179.5
1050	0.952	-177.5	0.226	32.2	0.007	94.7	0.940	-179.9
1100	0.954	-177.0	0.219	32.0	0.008	98.0	0.943	-178.9



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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.