

< Silicon RF Power MOS FET (Discrete) >

# RD01MUS3

RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

## Description

RD01MUS3 is a 2-stage MOSFET transistor for RF driver device. Designed for specifically VHF/UHF/940MHz-band RF power amplifiers applications.

## FEATURES

High power gain and High Efficiency.

Frequency (MHz)	Pout (W) typ.	$\eta_T$ (%) typ.	Gp (dB) typ.
175	1.0	60	30.0
530	1.5	53	32.0
940	1.1	52	30.5

@ $V_{DS1}=V_{DS2}=7.2V, I_{dq1}=20mA, I_{dq2}=60mA, P_{in1}=1mW$

Frequency (MHz)	Pout (W) typ.	$\eta_T$ (%) typ.	Gp (dB) typ.
175	0.60	58	27.5
530	0.57	54	27.5
940	0.55	47	27.0

@ $V_{DS1}=V_{DS2}=3.6V, I_{dq1}=20mA, I_{dq2}=60mA, P_{in1}=1mW$

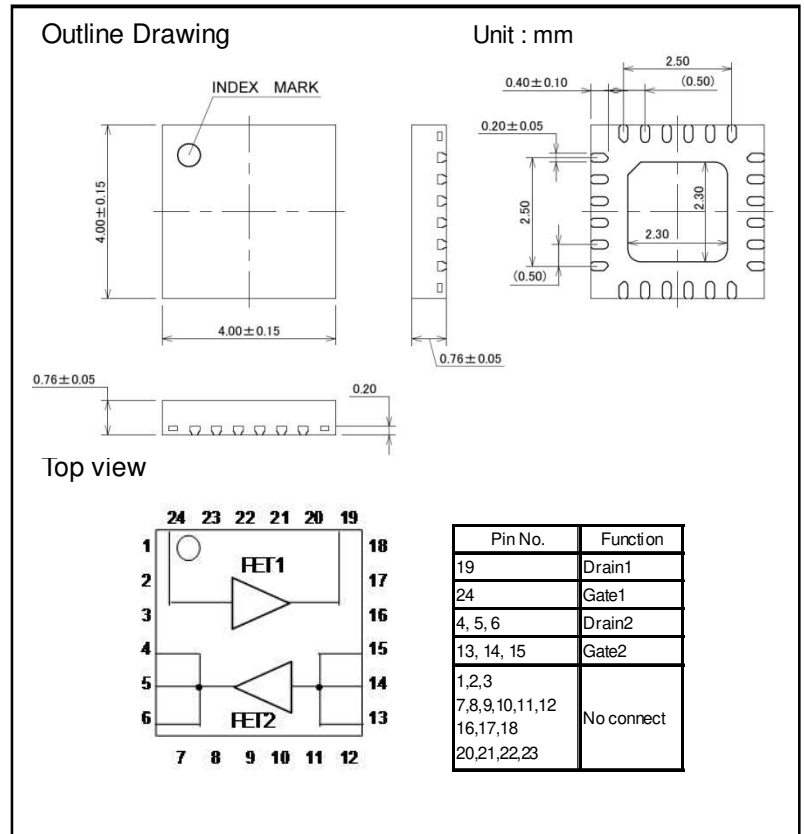
Integrated gate protection diode.

## APPLICATION

For driver stage of high power amplifiers in VHF/UHF/940MHz-band mobile radio sets.

## RoHS COMPLIANT

RD01MUS3 is EU RoHS compliant.



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**ABSOLUTE MAXIMUM RATINGS** (T<sub>c</sub>=25°C & Z<sub>g</sub>=Z<sub>l</sub>=50Ω UNLESS OTHERWISE NOTED)

SYMBOL	PARAMETER	CONDITIONS	RATINGS	UNIT
V <sub>DSS</sub>	Drain to source voltage	V <sub>GS</sub> =0V	25	V
V <sub>GSS</sub>	Gate to source voltage	V <sub>DS</sub> =0V	-5/+10	V
P <sub>ch1</sub> <sup>*7</sup>	Channel dissipation of FET1	-	5.4	W
P <sub>ch2</sub> <sup>*7</sup>	Channel dissipation of FET2	-	8.3	W
P <sub>in1</sub>	Input Power of FET1	-	2	mW
P <sub>in2</sub>	Input Power of FET2	-	0.2	W
I <sub>d1</sub>	Drain Current of FET1	-	0.3	A
I <sub>d2</sub>	Drain Current of FET2	-	0.9	A
T <sub>ch</sub>	Junction Temperature	-	150	°C
T <sub>stg</sub>	Storage temperature	-	-40 to +125	°C

Note: Above parameters are guaranteed independently.

\*7.Theoretical value in case of mounted on infinite heat sink.

**ELECTRICAL CHARACTERISTICS** (T<sub>c</sub>=25°C, UNLESS OTHERWISE NOTED)

SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX.	
I <sub>DSS1</sub>	Drain cutoff current of FET1	V <sub>DS1</sub> =17V, V <sub>GS1</sub> =0V	-	-	50	μA
I <sub>DSS2</sub>	Drain cutoff current of FET2	V <sub>DS2</sub> =17V, V <sub>GS2</sub> =0V	-	-	50	μA
I <sub>GSS1</sub>	Gate cutoff current of FET1	V <sub>GS1</sub> = 5V, V <sub>DS1</sub> =0V	-	-	1	μA
I <sub>GSS2</sub>	Gate cutoff current of FET2	V <sub>GS2</sub> = 5V, V <sub>DS2</sub> =0V	-	-	1	μA
V <sub>th1</sub>	Gate threshold Voltage of FET1	V <sub>DS1</sub> =7.2V, I <sub>DS1</sub> =0.6mA	0.5	1.0	1.5	V
V <sub>th2</sub>	Gate threshold Voltage of FET2	V <sub>DS2</sub> =7.2V, I <sub>DS2</sub> =1.8mA	0.5	1.0	1.5	V
P <sub>out1</sub> <sup>*8</sup>	Output power of FET1	f=520MHz, V <sub>DS1</sub> =7.2V	0.10	0.15	-	W
η <sub>D1</sub> <sup>*8</sup>	Drain efficiency of FET1	P <sub>in1</sub> = 1mW, I <sub>dq1</sub> =20mA	50	60	-	%
P <sub>out2</sub> <sup>*8</sup>	Output power of FET2	f=520MHz, V <sub>DS2</sub> =7.2V	1.0	1.8	-	W
η <sub>D2</sub> <sup>*8</sup>	Drain efficiency of FET2	P <sub>in2</sub> =0.1W, I <sub>dq2</sub> =60mA	50	70	-	%

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

\*8. Measured in 520MHz test circuit.

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX.	
R <sub>th(j-c)1</sub>	Thermal resistance of FET1	Junction to case	-	11.0	23.0	°C/W
R <sub>th(j-c)2</sub>	Thermal resistance of FET2	Junction to case	-	9.4	15.0	°C/W

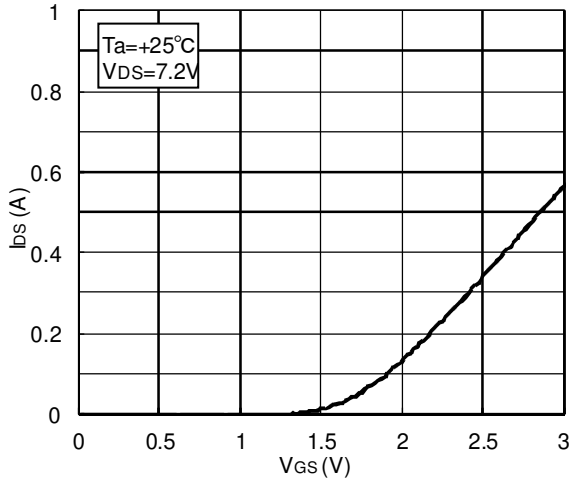
# RD01MUS3

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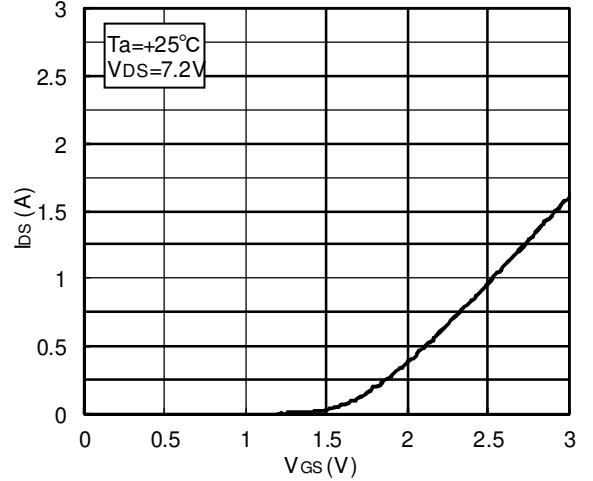
## TYPICAL CHARACTERISTICS

(These are only typical curves and devices are not necessarily guaranteed at these curves.)

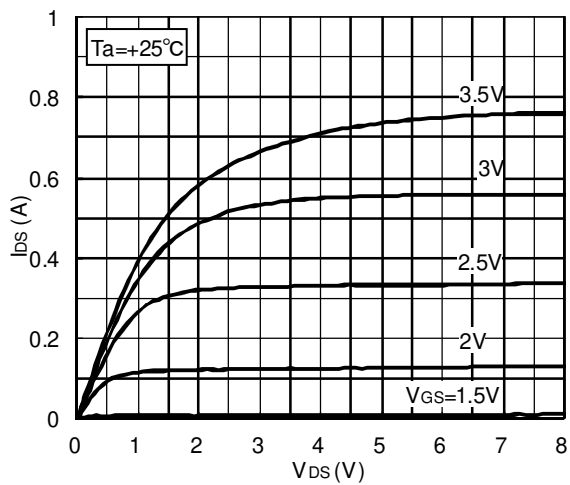
$V_{GS}$ - $I_{DS}$  CHARACTERISTICS of FET1



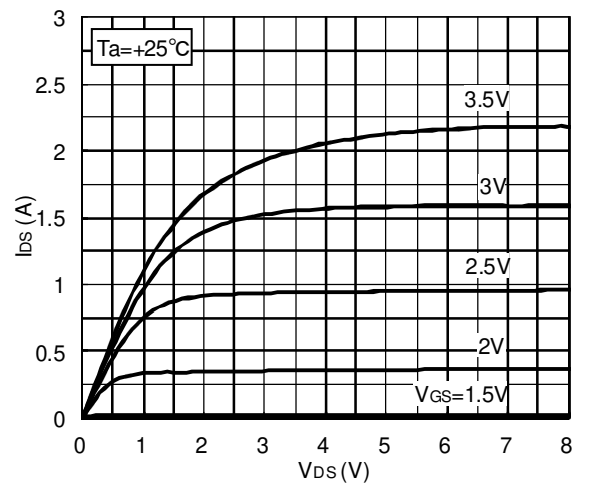
$V_{GS}$ - $I_{DS}$  CHARACTERISTICS of FET2



$V_{DS}$ - $I_{DS}$  CHARACTERISTICS of FET1



$V_{DS}$ - $I_{DS}$  CHARACTERISTICS of FET2

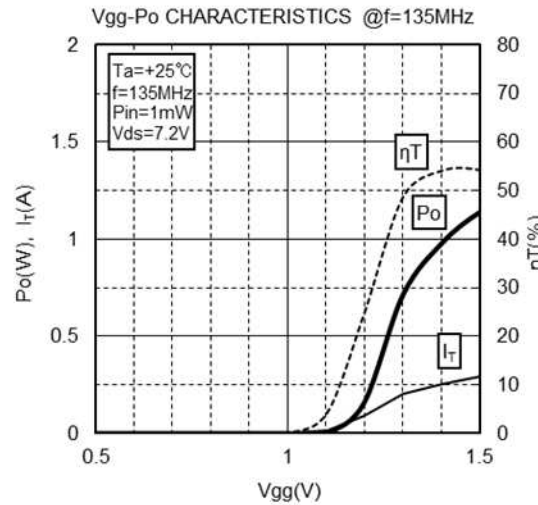
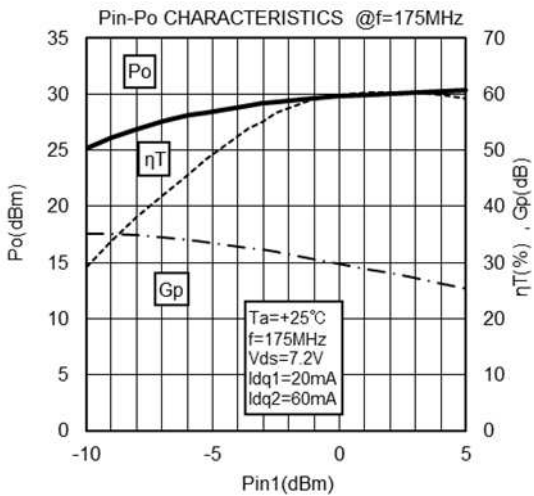
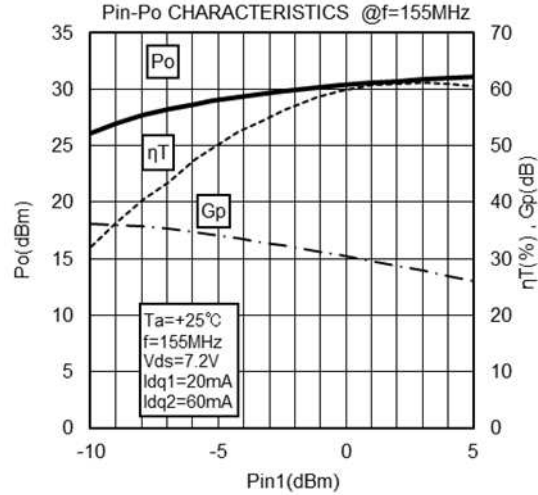
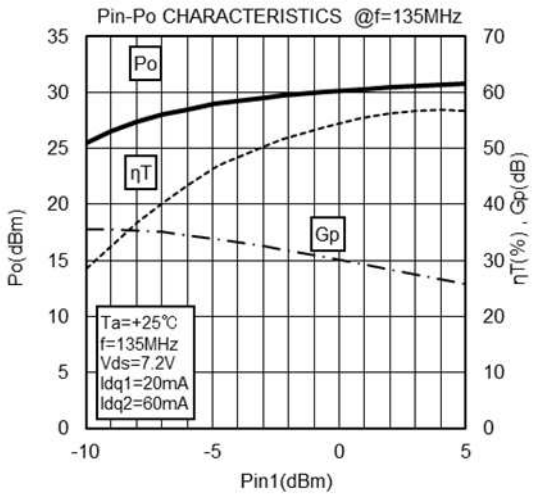
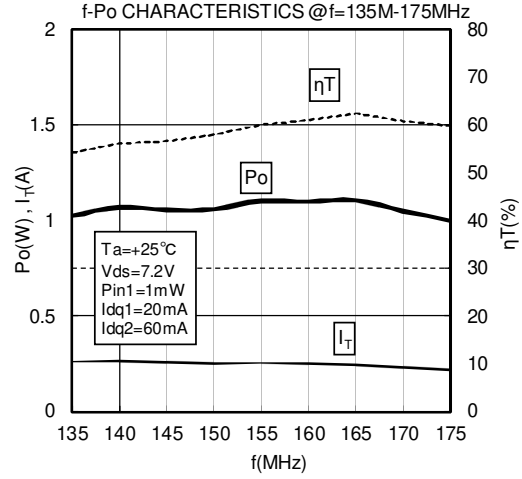
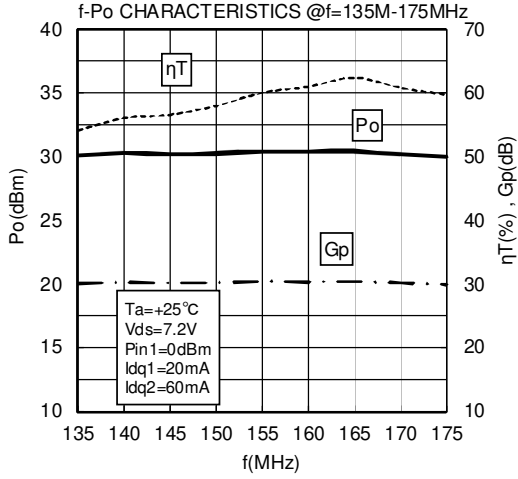


# RD01MUS3

RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

## TYPICAL CHARACTERISTICS for f=135-175MHz, Vds=7.2V

(These are only typical curves and devices are not necessarily guaranteed at these curves.)

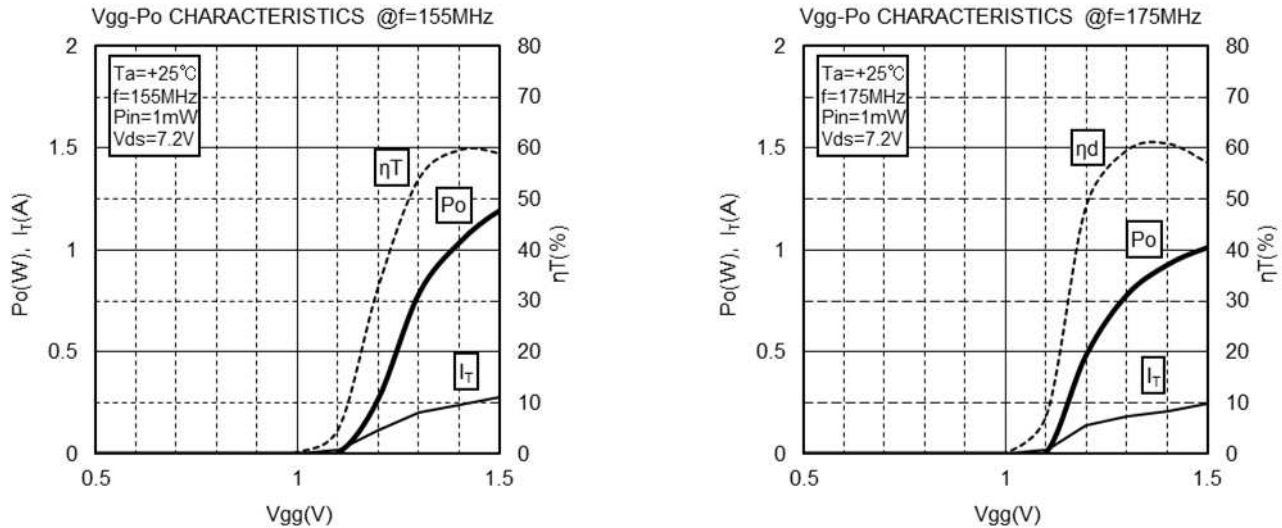


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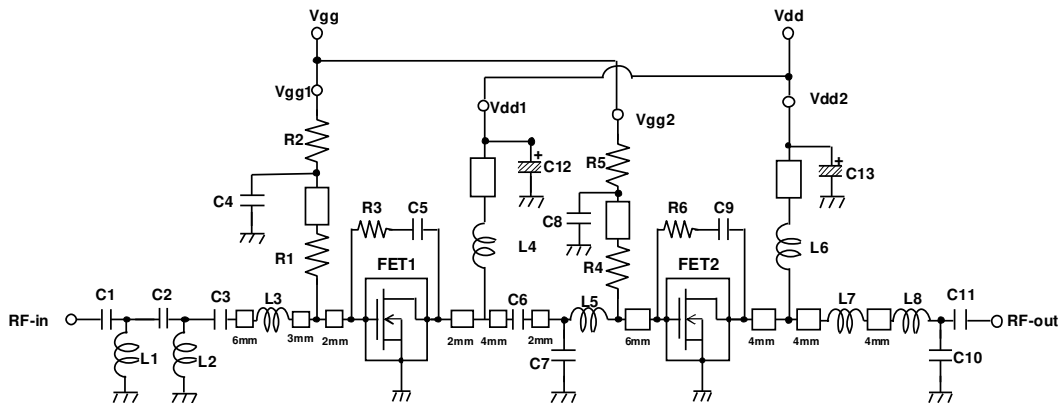
RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

## TYPICAL CHARACTERISTICS for f=135-175MHz, Vds=7.2V

(These are only typical curves and devices are not necessarily guaranteed at these curves.)



## EQUIVALENT CIRCUITRY for VHF-band Circuit for f=135-175MHz, Vds=7.2V



<Note>  
Board material - Glass-Epoxy Substrate(εr:4.8, t=0.8mm)  
Micro strip Line width = 1.3mm / 50 Ω

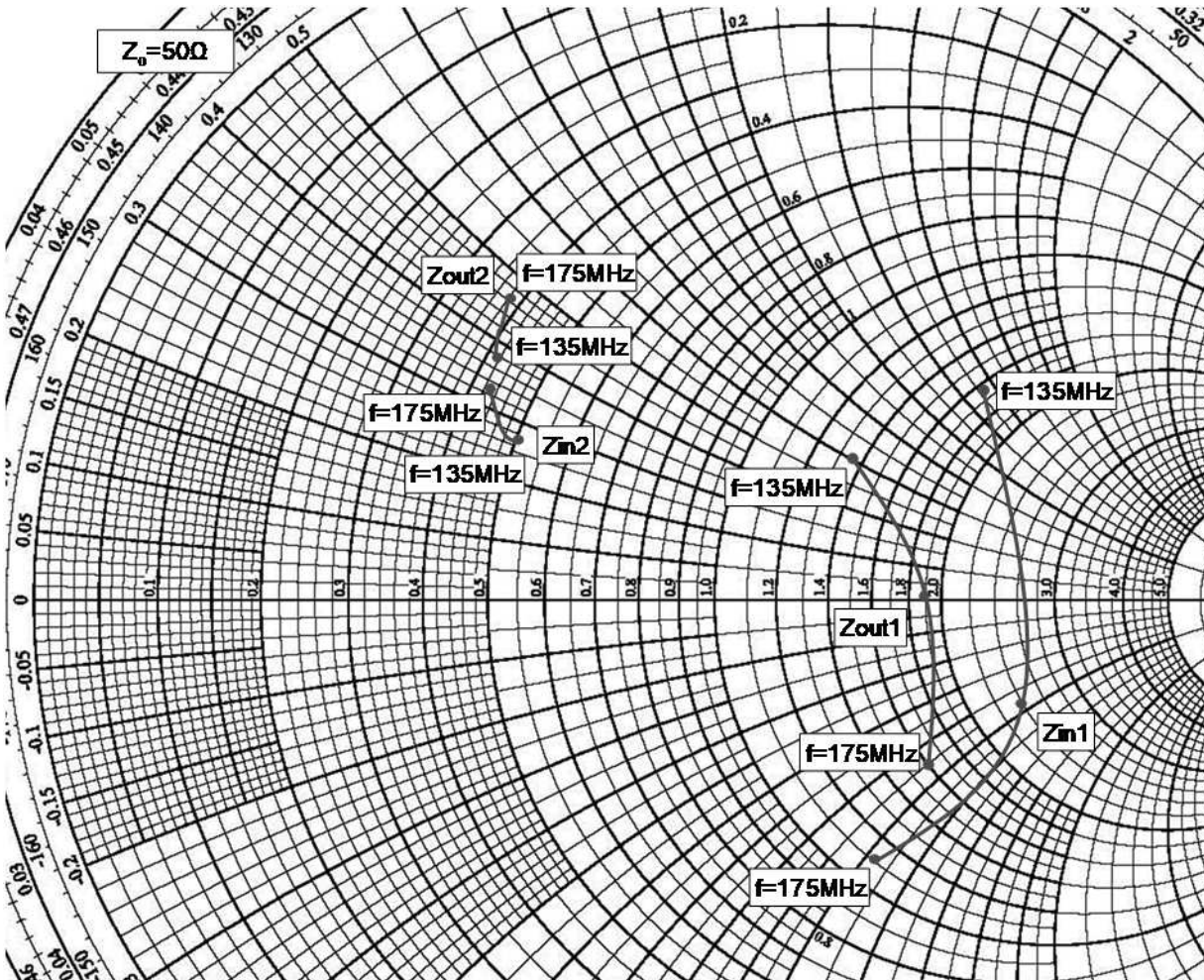
Part	Description	Part number	Manufacturer
C1, C3	51 pF	GRM1882C1H510JA01	MURATA MANUFACTURING CO.
C2	16 pF	GRM1882C1H160JA01	MURATA MANUFACTURING CO.
C4, C8	1000 pF	GRM1882C1H102JA01	MURATA MANUFACTURING CO.
C5, C9	47 pF	GRM1882C1H470JA01	MURATA MANUFACTURING CO.
C6, C11	100 pF	GRM1882C1H101JA01	MURATA MANUFACTURING CO.
C7	30 pF	GRM1882C1H300JA01	MURATA MANUFACTURING CO.
C10	11 pF	GRM1882C1H110JA01	MURATA MANUFACTURING CO.
C12, C13	22 μF	UVZ1H220MDD	NICHICON CORPORATION
L1, L2	51 nH	LQW18AN51NJ00	MURATA MANUFACTURING CO.
L3	36 nH	LQW18AN36NJ00	MURATA MANUFACTURING CO.
L4	68 nH	LQW18AN68NJ00	MURATA MANUFACTURING CO.
L5	39 nH	LQW18AN39NJ00	MURATA MANUFACTURING CO.
L6	56nH Enameled wire 12Turns, Diameter:0.23mm,φ1.62mm (the out side diameter)	2312A	Yoneda Processing Place Co.,Ltd.
L7, L8	16nH Enameled wire 4Turns, Diameter:0.4mm,φ2.46mm (the out side diameter)	4004C	Yoneda Processing Place Co.,Ltd.
R1, R4	100 Ω	RPC05 101-J	TAIYOSHA ELECTRIC CO.
R2, R5	4.7 kΩ	RPC05 472-J	TAIYOSHA ELECTRIC CO.
R3	270 Ω	RPC05 271-J	TAIYOSHA ELECTRIC CO.
R6	560 Ω	RPC05 561-J	TAIYOSHA ELECTRIC CO.

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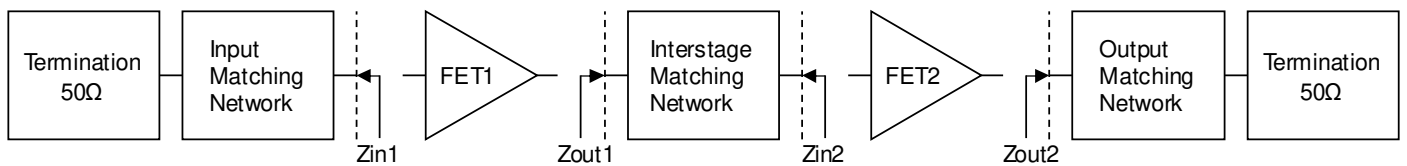
## Input / Interstage / Output Impedance VS. Frequency Characteristics

for  $f=135-175\text{MHz}$ ,  $V_{ds}=7.2\text{V}$



f (MHz)	Zin1 (Ω)	Zout1 (Ω)	Zin2 (Ω)	Zout2 (Ω)
135	82.75 + j 65.15	69.04 + j 30.32	25.61 + j 13.51	20.73 + j 19.06
155	120.26 - j 42.31	94.97 + j 0.03	23.62 + j 13.99	19.93 + j 21.07
175	55.09 - j 53.20	80.62 - j 47.07	21.43 + j 16.71	19.23 + j 23.48

### Method of Measurement



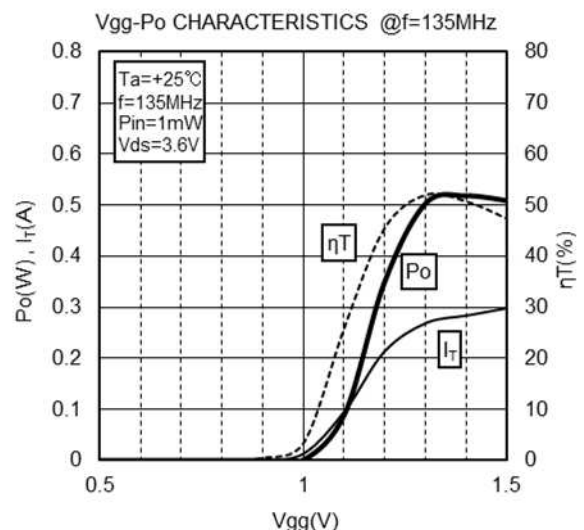
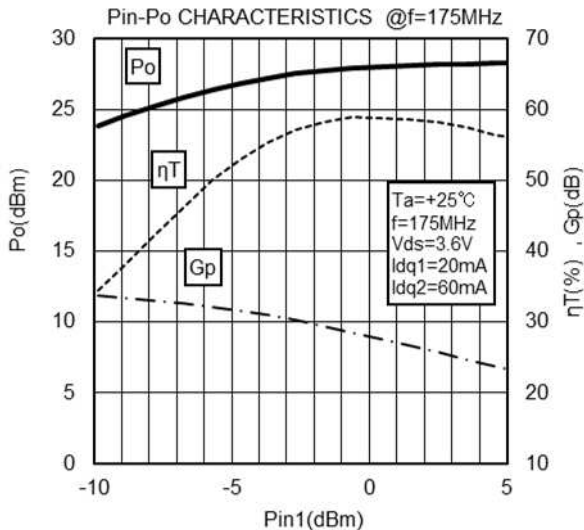
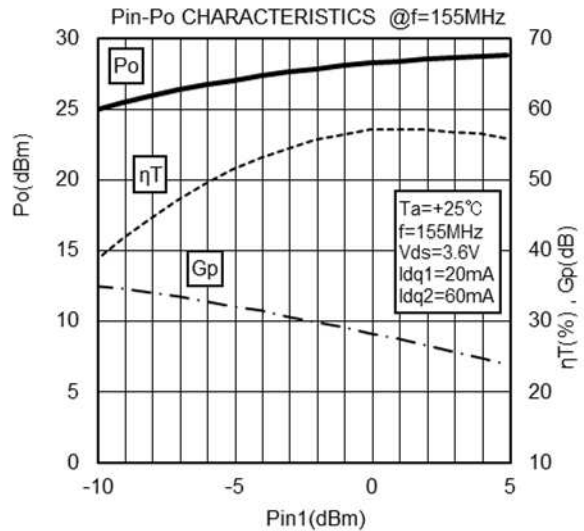
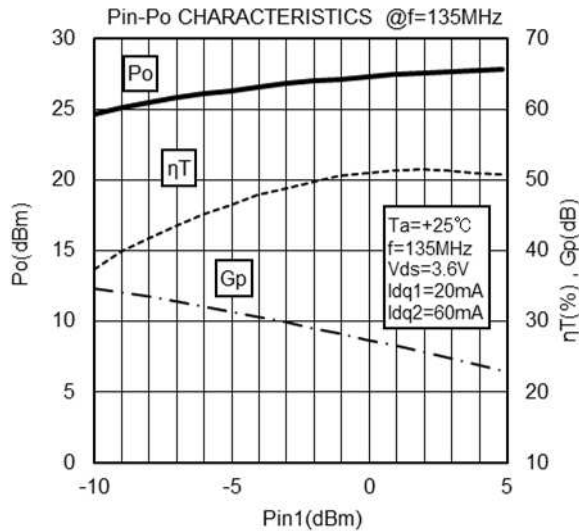
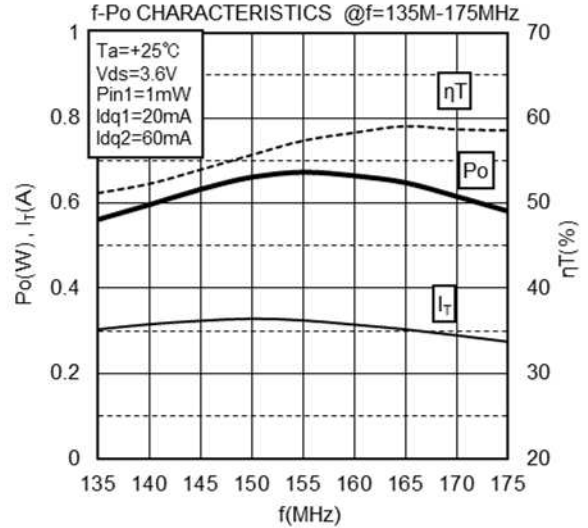
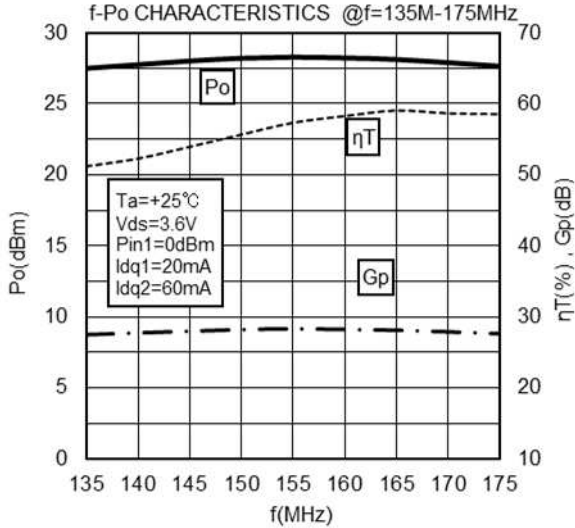
- $Z_{in1}$  : Input Matching Network impedance measured from FET1
- $Z_{out1}$  : Interstage Matching Network impedance measured from FET1
- $Z_{in2}$  : Interstage Matching Network impedance measured from FET2
- $Z_{out2}$  : Output Matching Network impedance measured from FET2
- $Z_0$  : Characteristic impedance

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RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

## TYPICAL CHARACTERISTICS for f=135-175MHz, Vds=3.6V

(These are only typical curves and devices are not necessarily guaranteed at these curves.)

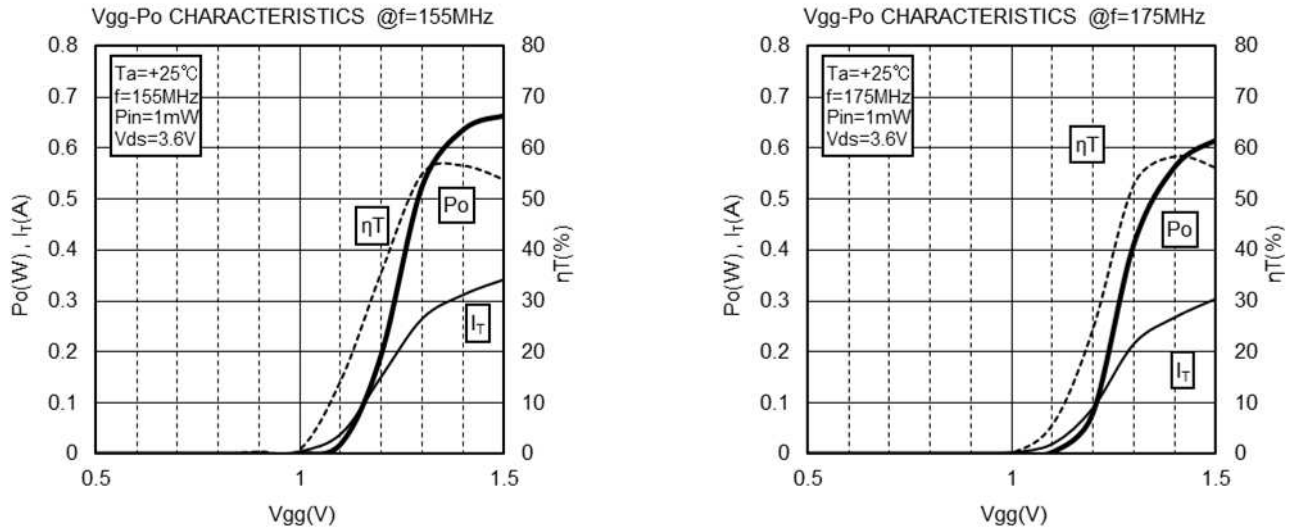


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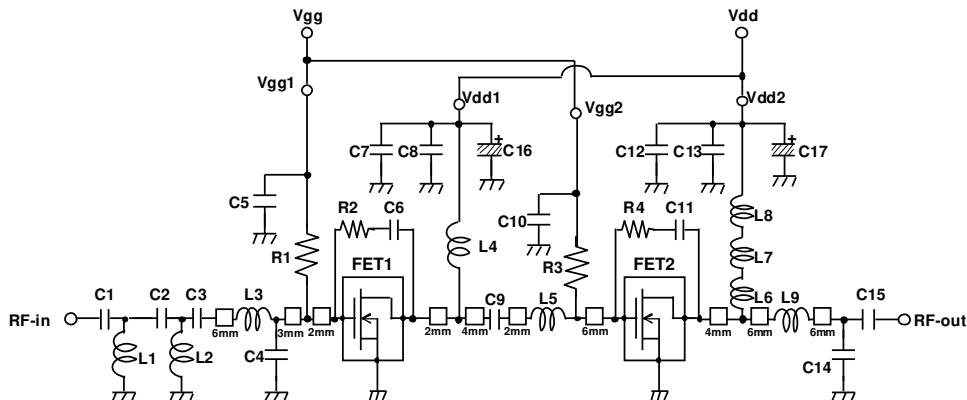
RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

## TYPICAL CHARACTERISTICS for f=135-175MHz, Vds=3.6V

(These are only typical curves and devices are not necessarily guaranteed at these curves.)



## EQUIVALENT CIRCUITRY for VHF-band Circuit for f=135-175MHz, Vds=3.6V



<Note>  
 Board material - Glass-Epoxy Substrate(εr:4.8, t=0.8mm)  
 Micro strip Line width = 1.3mm / 50 Ω

Part	Description	Part number	Manufacturer
C1, C3	51 pF	GRM1 882C 1H51 0JA01	MURATA MANUFACTURING CO.
C2	16 pF	GRM1 882C 1H160JA01	MURATA MANUFACTURING CO.
C4	20 pF	GRM1 882C 1H200JA01	MURATA MANUFACTURING CO.
C5, C10, C7, C12	1000 pF	GRM1 882C 1H102JA01	MURATA MANUFACTURING CO.
C6, C11	680 pF	GRM1 882C 1H681JA01	MURATA MANUFACTURING CO.
C8, C13	10 nF	GRM1 882C 1H103JA01	MURATA MANUFACTURING CO.
C9, C15	100 pF	GRM1 882C 1H101JA01	MURATA MANUFACTURING CO.
C14	33 pF	GRM1 882C 1H330JA01	MURATA MANUFACTURING CO.
C16, C17	22 μF	UVZ1 H220MDD	NICHICON CORPORATION
L1, L2	51 nH	LQW1 8AN51N.J00	MURATA MANUFACTURING CO.
L3	43 nH	LQW1 8AN43N.J00	MURATA MANUFACTURING CO.
L4	120 nH	LQW1 8ANR12G00	MURATA MANUFACTURING CO.
L5	30 nH	LQW1 8AN30N.J00	MURATA MANUFACTURING CO.
L6, L7	56nH Enam eled wire 12Turns, Diameter:0.23mm φ 1.62m m (the outside diam eter)	2312A	Yoneda Processing Place Co.,Ltd.
L8	38nH Enam eled wire 7Turns, Diameter:0.4m m, φ2.46m m (the outside diam eter)	4007C	Yoneda Processing Place Co.,Ltd.
L9	25nH Enam eled wire 5Turns, Diameter:0.4m m, φ2.46m m (the outside diam eter)	4005C	Yoneda Processing Place Co.,Ltd.
R1, R3	4.7 kΩ	RPC05 472-J	TAYOSHA ELECTRIC CO.
R2	270 Ω	RPC05 271-J	TAYOSHA ELECTRIC CO.
R4	560 Ω	RPC05 561-J	TAYOSHA ELECTRIC CO.

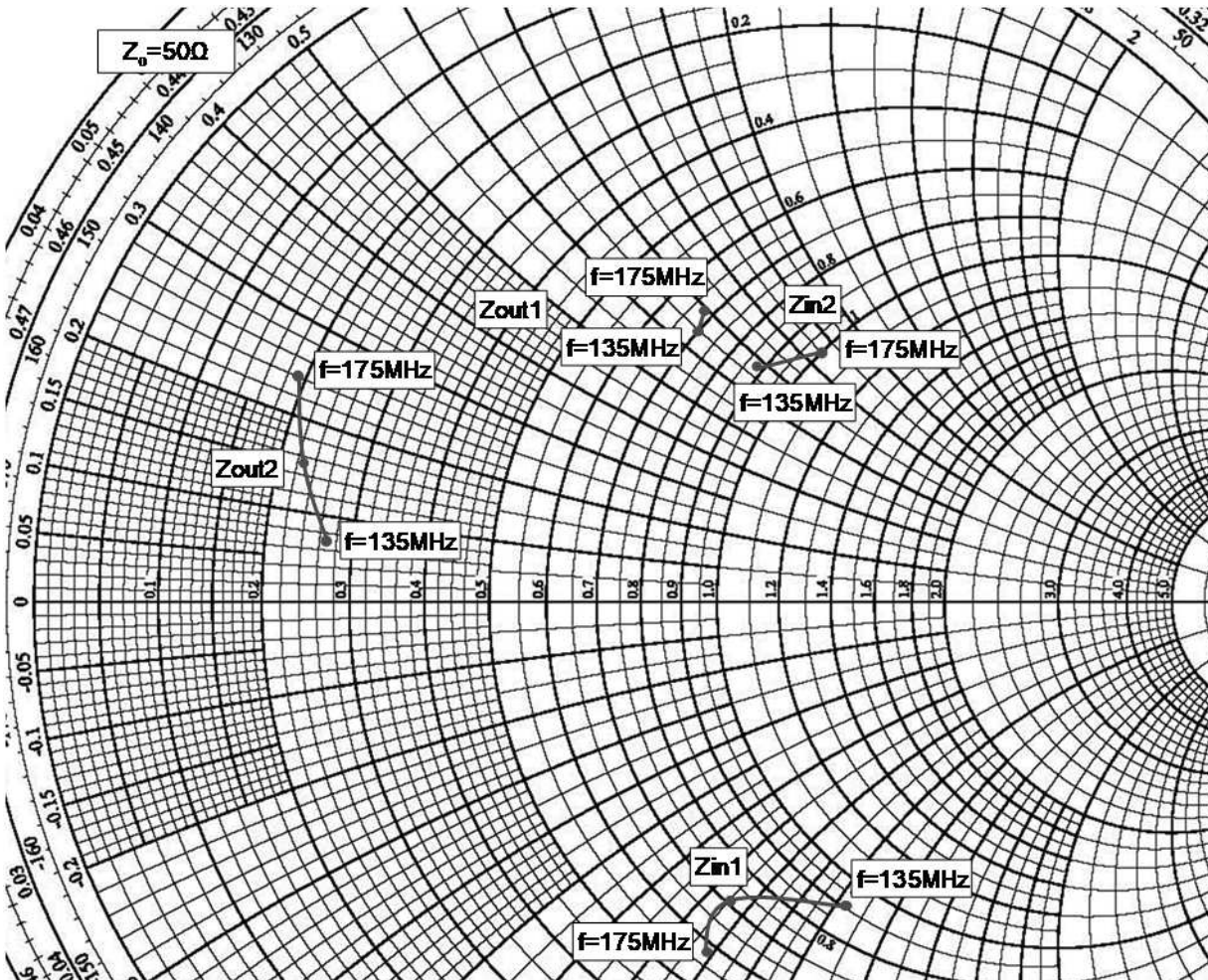


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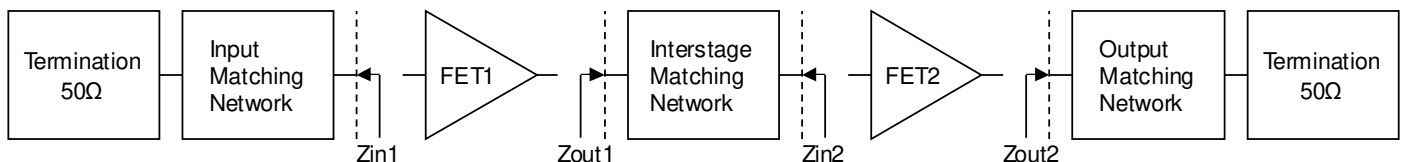
## Input / Interstage / Output Impedance VS. Frequency Characteristics

for  $f=135-175\text{MHz}$ ,  $V_{ds}=3.6\text{V}$



f (MHz)	Zin1 (Ω)	Zout1 (Ω)	Zin2 (Ω)	Zout2 (Ω)
135	45.88 - j 50.92	35.41 + j 27.81	44.52 + j 34.55	13.37 + j 3.68
155	35.07 - j 42.31	36.01 + j 30.39	47.74 + j 38.29	11.26 + j 7.79
175	29.46 - j 39.62	36.77 + j 33.49	50.47 + j 41.77	9.62 + j 11.98

### Method of Measurement



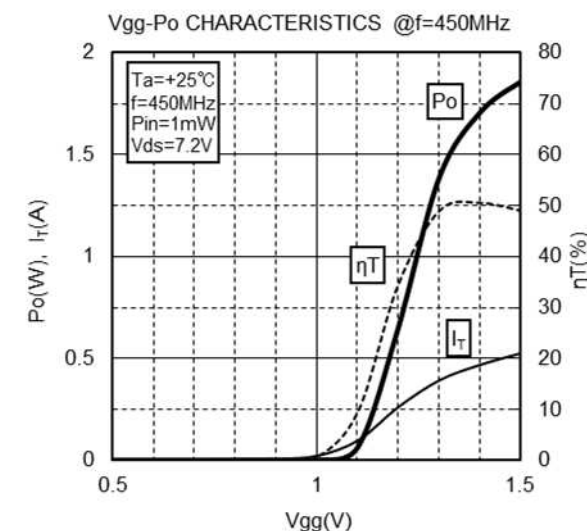
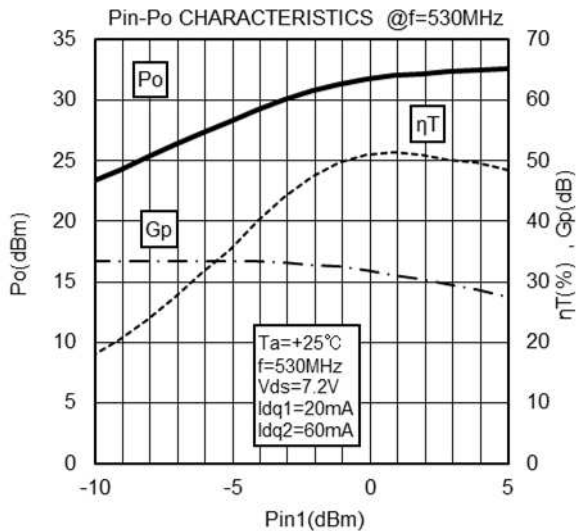
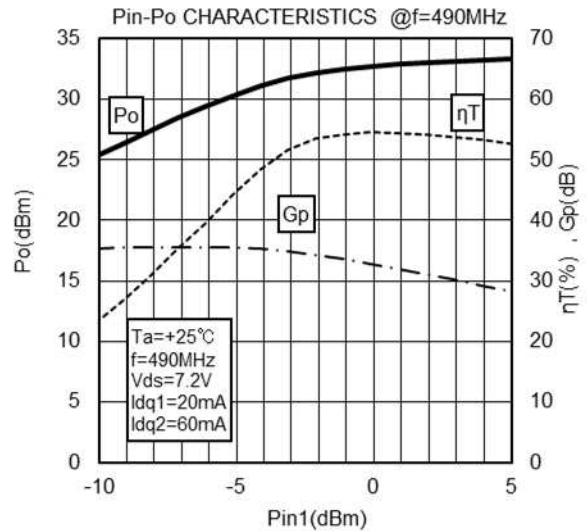
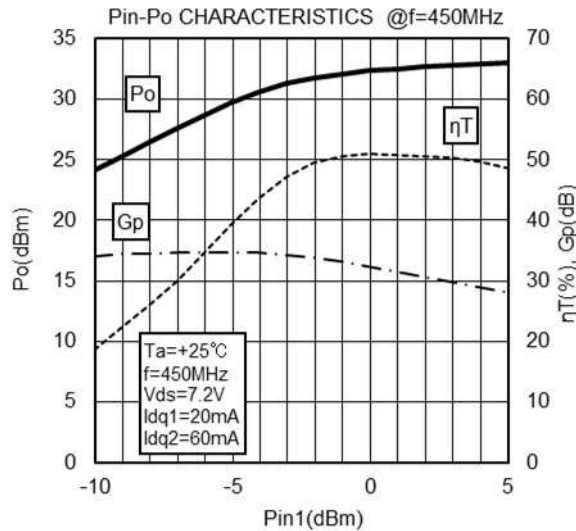
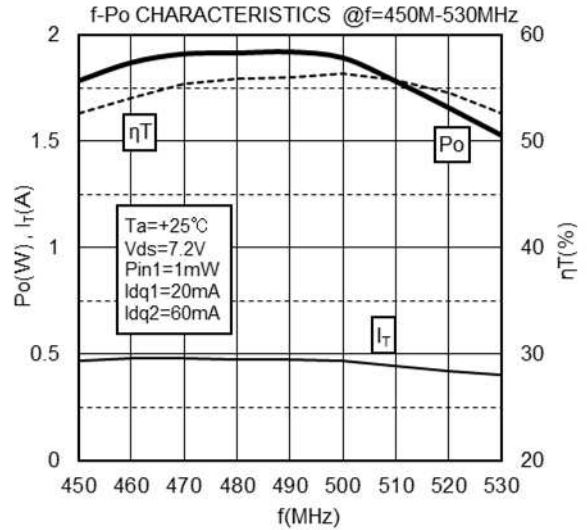
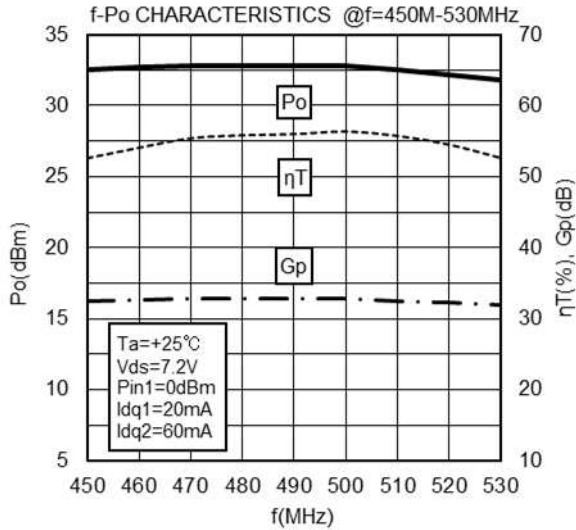
- Zin1 : Input Matching Network impedance measured from FET1
- Zout1 : Interstage Matching Network impedance measured from FET1
- Zin2 : Interstage Matching Network impedance measured from FET2
- Zout2 : Output Matching Network impedance measured from FET2
- Z<sub>0</sub> : Characteristic impedance

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## TYPICAL CHARACTERISTICS for f=450-530MHz, Vds=7.2V

(These are only typical curves and devices are not necessarily guaranteed at these curves.)

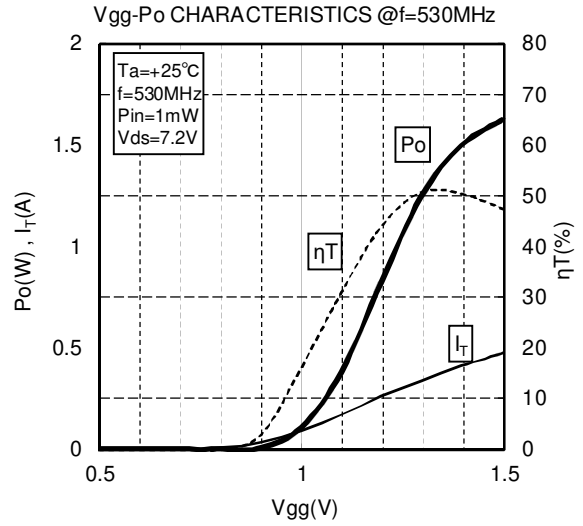
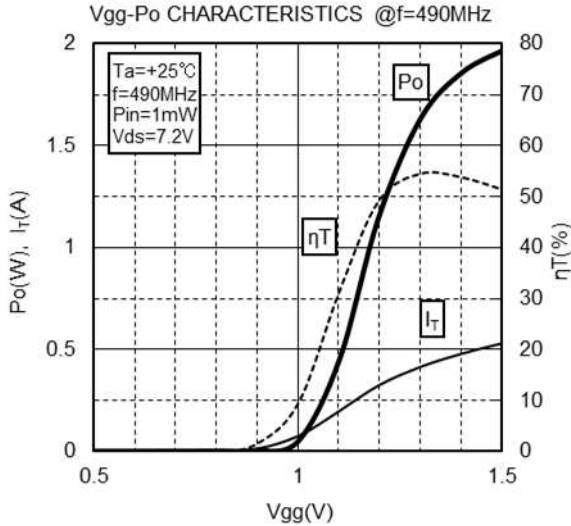


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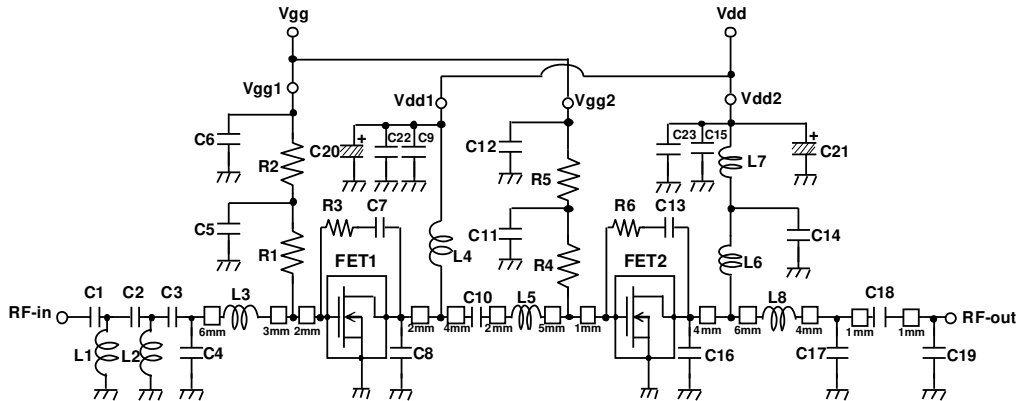
RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

## TYPICAL CHARACTERISTICS for f=450-530MHz, Vds=7.2V

(These are only typical curves and devices are not necessarily guaranteed at these curves.)



## EQUIVALENT CIRCUITRY for UHF-band Circuit for f=450-530MHz, Vds=7.2V



<Note>  
Board material - Glass-Epoxy Substrate(εr:4.8, t=0.8mm)  
Micro strip Line width = 1.3mm / 50 Ω

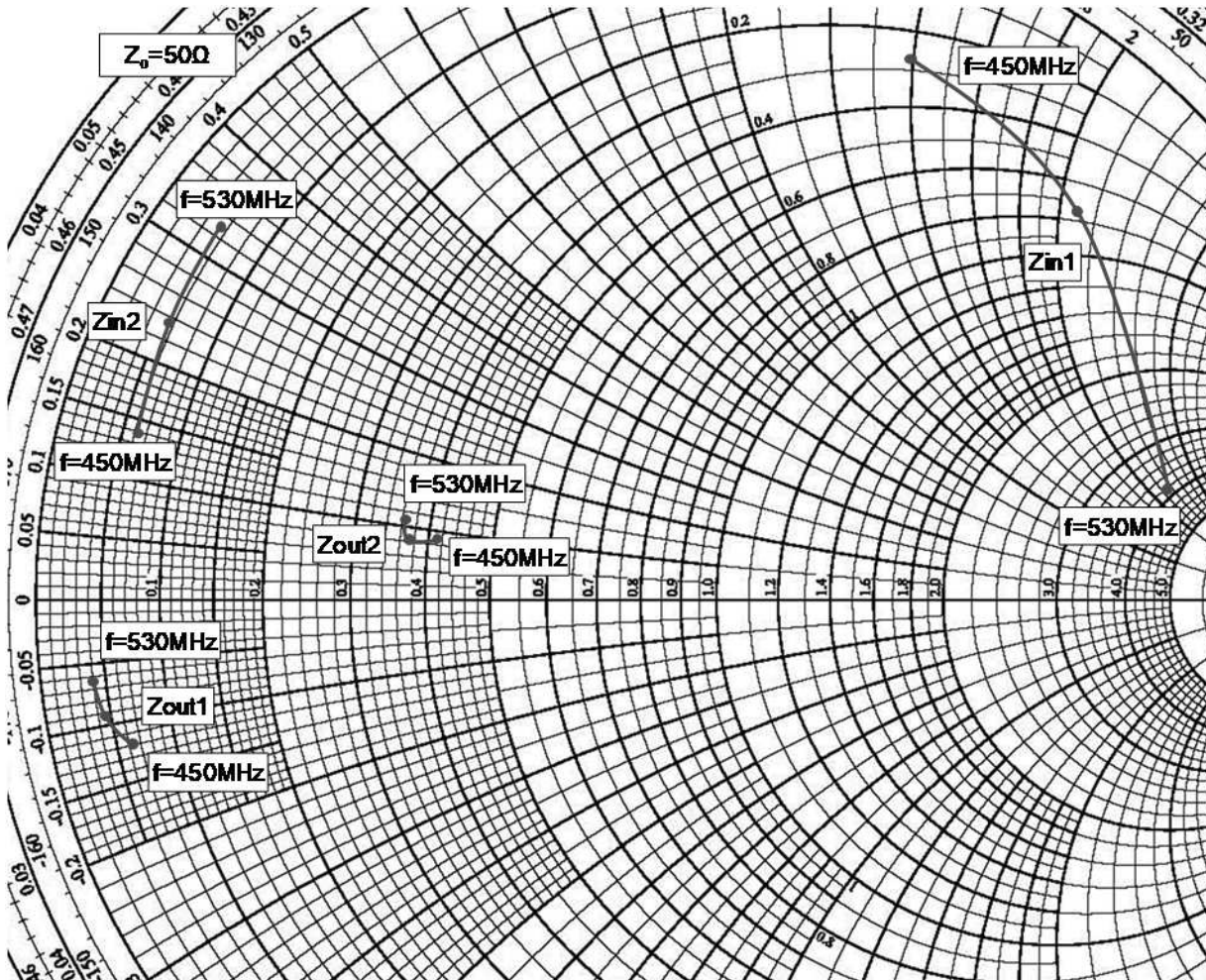
Part	Description	Part number	Manufacturer
C1,C3	12 pF	GRM1882C1H120CA01	MURATA MANUFACTURING CO.
C2	5 pF	GRM1882C1H5R0CA01	MURATA MANUFACTURING CO.
C4	8 pF	GRM2162C1H8R0CA01	MURATA MANUFACTURING CO.
C5, C6,C7,C11, C12,C13	1000 pF	GRM1882C1H102JA01	MURATA MANUFACTURING CO.
C9,C15	1000 pF	GRM1882C1H102JA01	MURATA MANUFACTURING CO.
C8,C10	27 pF	GRM1882C1H270JA01	MURATA MANUFACTURING CO.
C14	150 pF	GRM2162C1H151A01	MURATA MANUFACTURING CO.
C16	13 pF	GRM2162C1H130CA01	MURATA MANUFACTURING CO.
C17	6 pF	GRM1882C1H6R0CA01	MURATA MANUFACTURING CO.
C18	51 pF	GRM2162C1H510CA01	MURATA MANUFACTURING CO.
C19	2 pF	GRM1882C1H2R0CA01	MURATA MANUFACTURING CO.
C20,C21	22 μF	UVZ1H220MDD	NICHICON CORPORATION
C22,C23	22000 pF	GRM21B2C1H223JA01	MURATA MANUFACTURING CO.
L1,L2,L3	12 nH	LQW18AN12NJO0	MURATA MANUFACTURING CO.
L4	29nH Enameled wire 13Turns, Diameter:0.23mm,φ1.62mm (the out side diameter)	2313C	Yoneda Processing Place Co.,Ltd.
L5	5.6 nH	LQW18AN5N6C00	MURATA MANUFACTURING CO.
L6,L8	8nH Enameled wire 2Turns, Diameter:0.23mm,φ1.62mm (the out side diameter)	2302S	Yoneda Processing Place Co.,Ltd.
L7	29nH Enameled wire 6Turns, Diameter:0.4mm,φ2.46mm (the out side diameter)	4006C	Yoneda Processing Place Co.,Ltd.
R1, R4	470 Ω	RPC05 471-J	TAIYOSHA ELECTRIC CO.
R2, R5	4.7 kΩ	RPC05 472-J	TAIYOSHA ELECTRIC CO.
R3, R6	390 Ω	RPC05 391-J	TAIYOSHA ELECTRIC CO.

# RD01MUS3

RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

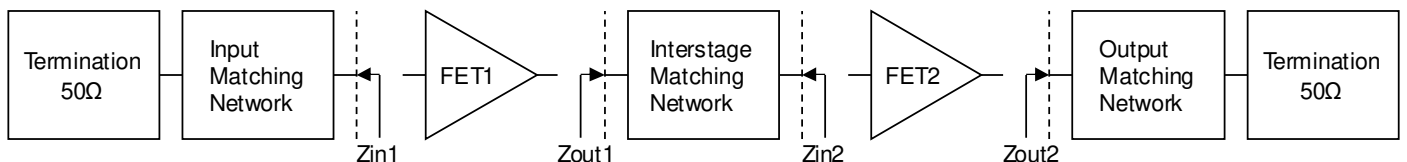
## Input / Interstage / Output Impedance VS. Frequency Characteristics

for  $f=450-530\text{MHz}$ ,  $V_{ds}=7.2\text{V}$



f (MHz)	Z <sub>in1</sub> (Ω)	Z <sub>out1</sub> (Ω)	Z <sub>in2</sub> (Ω)	Z <sub>out2</sub> (Ω)
450	14.03 + j 69.99	2.80 - j 6.30	3.05 + j 6.91	20.82 + j 4.53
490	37.49 + j 104.60	2.27 - j 4.70	2.77 + j 11.75	18.74 + j 4.01
530	189.93 + j 113.59	1.94 - j 3.29	2.72 + j 16.44	18.24 + j 5.28

### Method of Measurement



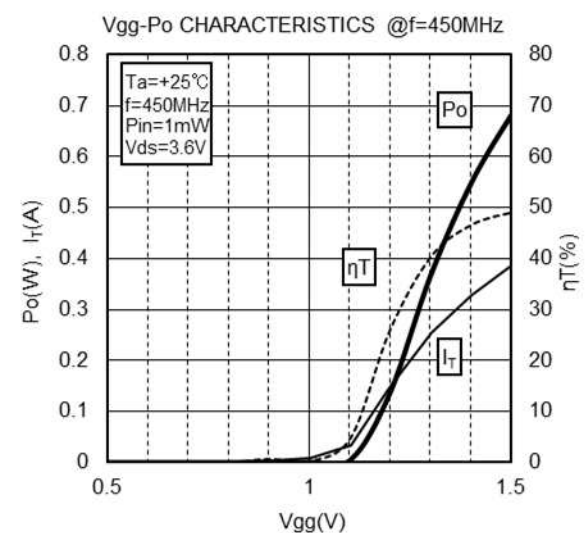
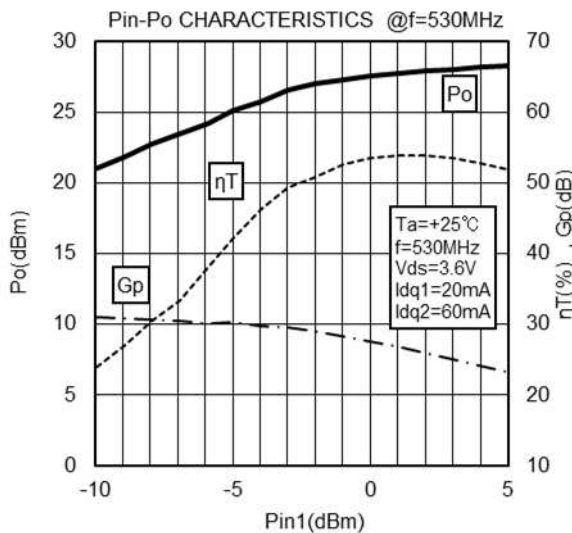
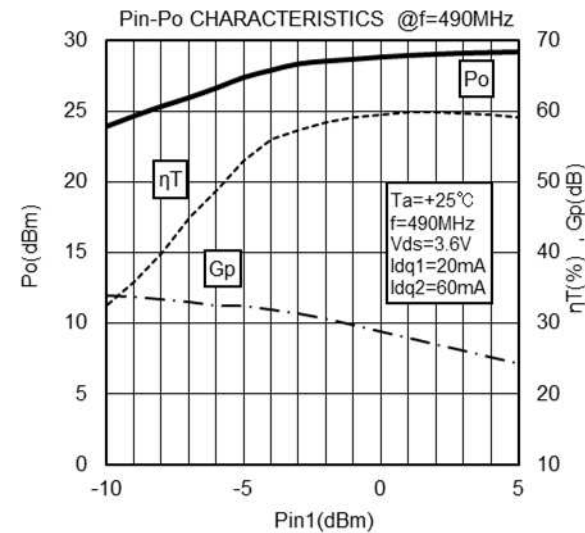
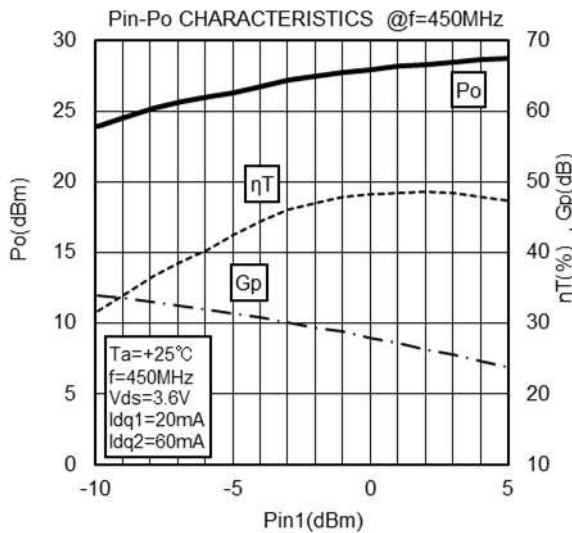
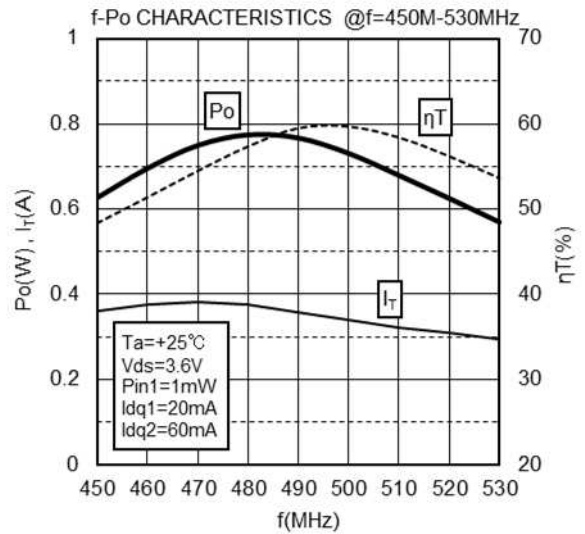
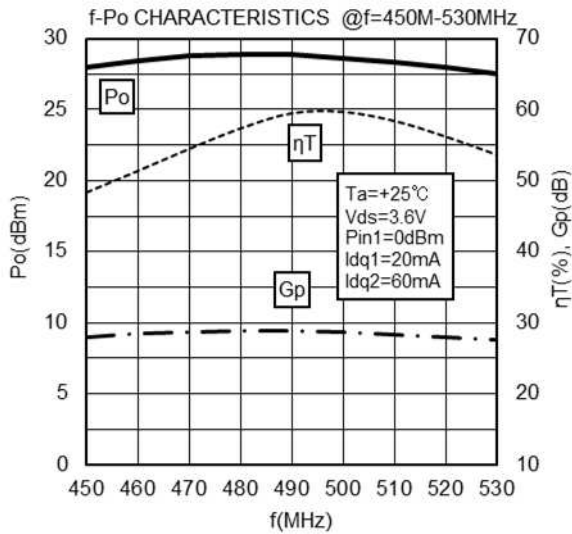
- Z<sub>in1</sub> : Input Matching Network impedance measured from FET1
- Z<sub>out1</sub> : Interstage Matching Network impedance measured from FET1
- Z<sub>in2</sub> : Interstage Matching Network impedance measured from FET2
- Z<sub>out2</sub> : Output Matching Network impedance measured from FET2
- Z<sub>0</sub> : Characteristic impedance

# RD01MUS3

RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

## TYPICAL CHARACTERISTICS for f=450-530MHz, Vds=3.6V

(These are only typical curves and devices are not necessarily guaranteed at these curves.)

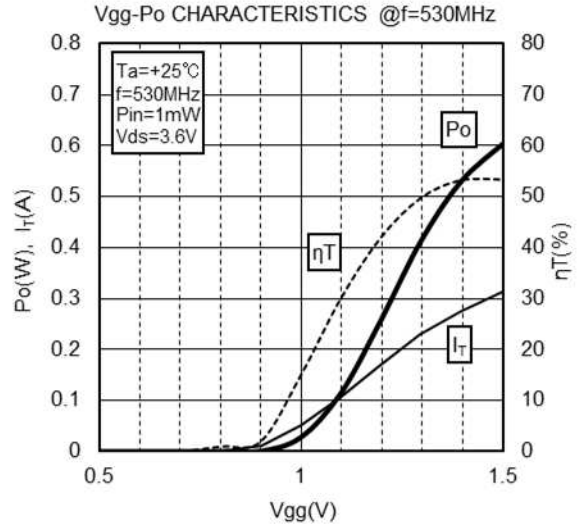
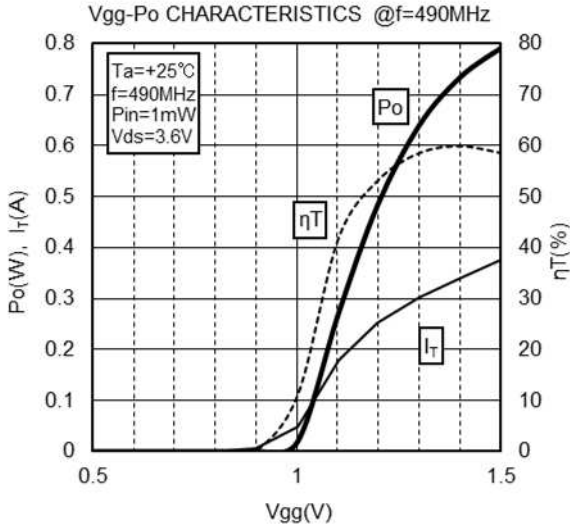


# RD01MUS3

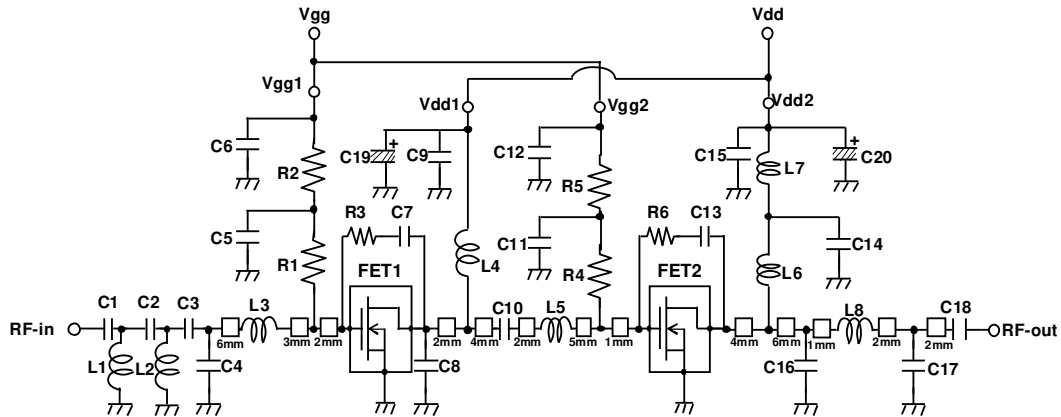
RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

## TYPICAL CHARACTERISTICS for f=450-530MHz, Vds=3.6V

(These are only typical curves and devices are not necessarily guaranteed at these curves.)



## EQUIVALENT CIRCUITRY for UHF-band Circuit for f=450-530MHz, Vds=3.6V



<Note>  
Board material - Glass-Epoxy Substrate(εr:4.8, t=0.8mm)  
Micro strip Line width = 1.3mm / 50 Ω

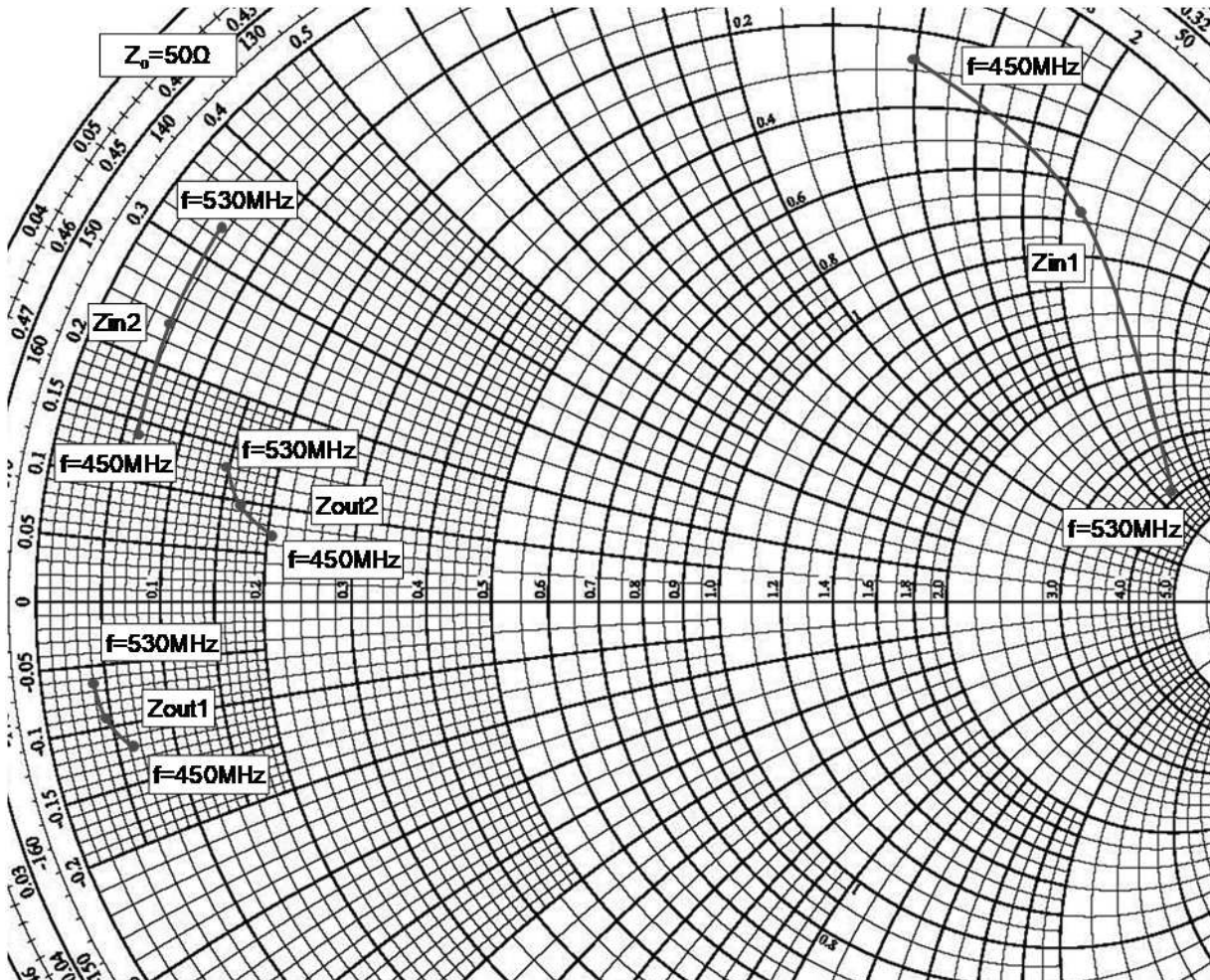
Part	Description	Part number	Manufacturer
C1,C3	12 pF	GRM1882C1H120CA01	MURATA MANUFACTURING CO.
C2	5 pF	GRM1882C1H5R0CA01	MURATA MANUFACTURING CO.
C4,C17	8 pF	GRM2162C1H8R0CA01	MURATA MANUFACTURING CO.
C5, C6,C7,C9,C11,	1000 pF	GRM1882C1H102JA01	MURATA MANUFACTURING CO.
C8,C10	27 pF	GRM1882C1H270JA01	MURATA MANUFACTURING CO.
C14	150 pF	GRM2162C1H151A01	MURATA MANUFACTURING CO.
C16	16 pF	GRM2162C1H160CA01	MURATA MANUFACTURING CO.
C18	51 pF	GRM2162C1H510CA01	MURATA MANUFACTURING CO.
C19,C20	22 μF	UVZ1H220MDD	NICHICON CORPORATION
L1, L2,L3	12 nH	LQW18AN12NJ00	MURATA MANUFACTURING CO.
L4	29nH Enameled wire 13Turns, Diameter:0.23mm,φ1.62mm (the out side diameter)	2313C	Yoneda Processing Place Co.,Ltd.
L5	5.6 nH	LQW18AN5N6C00	MURATA MANUFACTURING CO.
L6,L8	8nH Enameled wire 2Turns, Diameter:0.23mm,φ1.62mm (the out side diameter)	2302S	Yoneda Processing Place Co.,Ltd.
L7	29nH Enameled wire 6Turns, Diameter:0.4mm,φ2.46mm (the out side diameter)	4006C	Yoneda Processing Place Co.,Ltd.
R1, R4	470 Ω	RPC05 471 -J	TAIYOSHA ELECTRIC CO.
R2, R5	4.7 kΩ	RPC05 472 -J	TAIYOSHA ELECTRIC CO.
R3, R6	390 Ω	RPC05 391 -J	TAIYOSHA ELECTRIC CO.

# RD01MUS3

RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

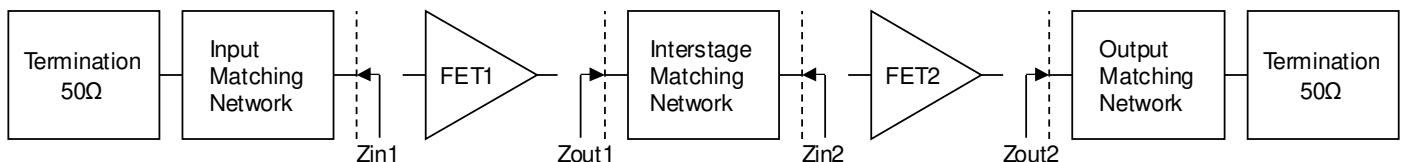
## Input / Interstage / Output Impedance VS. Frequency Characteristics

for  $f=450\text{-}530\text{MHz}$ ,  $V_{ds}=3.6\text{V}$



f (MHz)	Z <sub>in1</sub> (Ω)	Z <sub>out1</sub> (Ω)	Z <sub>in2</sub> (Ω)	Z <sub>out2</sub> (Ω)
450	14.03 + j 69.99	2.80 - j 6.30	3.05 + j 6.91	10.10 + j 3.38
490	37.49 + j 104.60	2.27 - j 4.70	2.77 + j 11.75	8.36 + j 4.80
530	189.93 + j 113.59	1.94 - j 3.29	2.72 + j 16.44	7.48 + j 6.45

### Method of Measurement



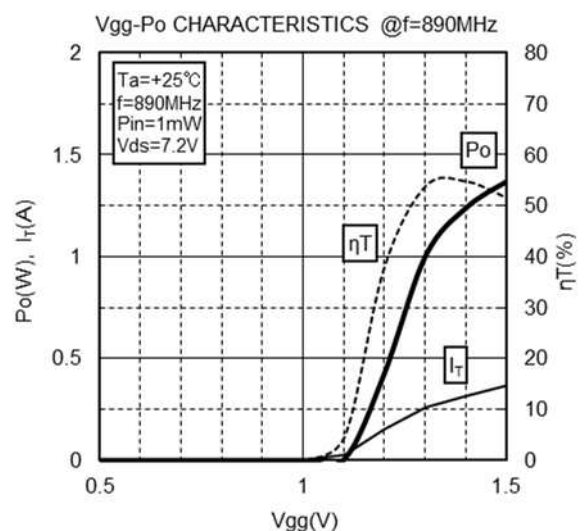
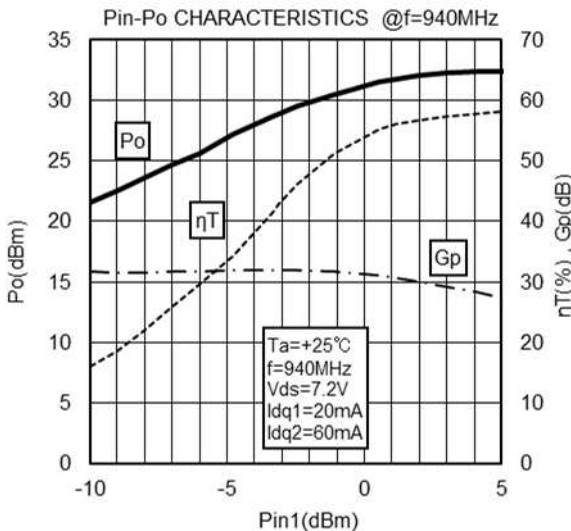
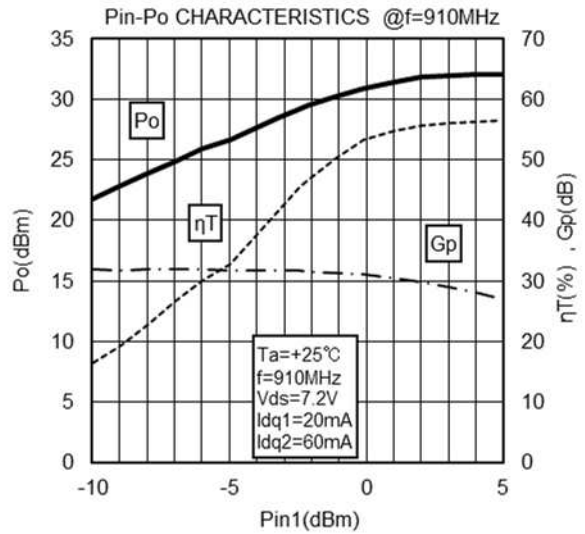
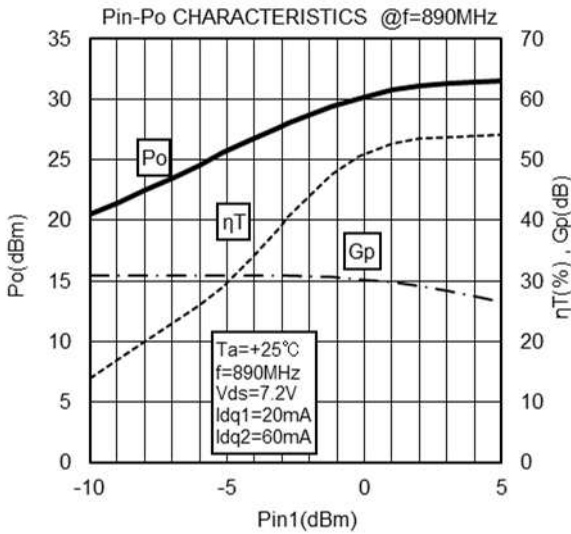
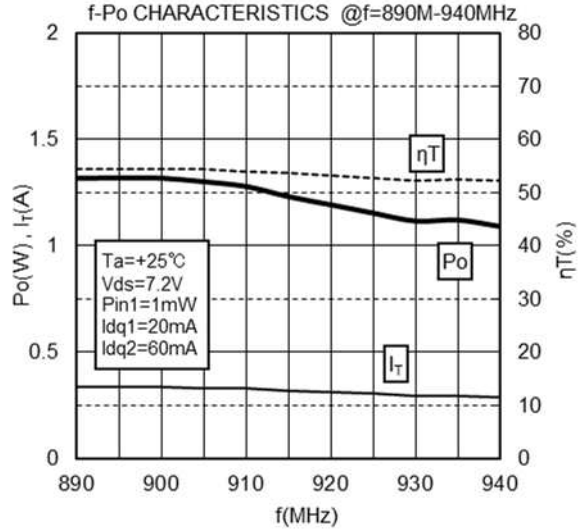
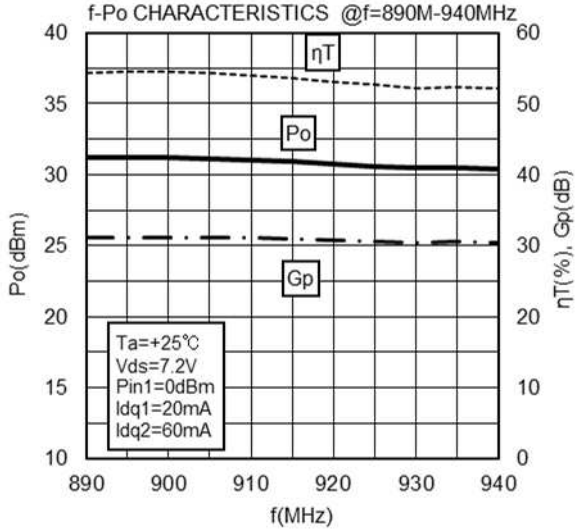
- Z<sub>in1</sub> : Input Matching Network impedance measured from FET1
- Z<sub>out1</sub> : Interstage Matching Network impedance measured from FET1
- Z<sub>in2</sub> : Interstage Matching Network impedance measured from FET2
- Z<sub>out2</sub> : Output Matching Network impedance measured from FET2
- Z<sub>0</sub> : Characteristic impedance

# RD01MUS3

RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

## TYPICAL CHARACTERISTICS for f=890-940MHz, Vds=7.2V

(These are only typical curves and devices are not necessarily guaranteed at these curves.)



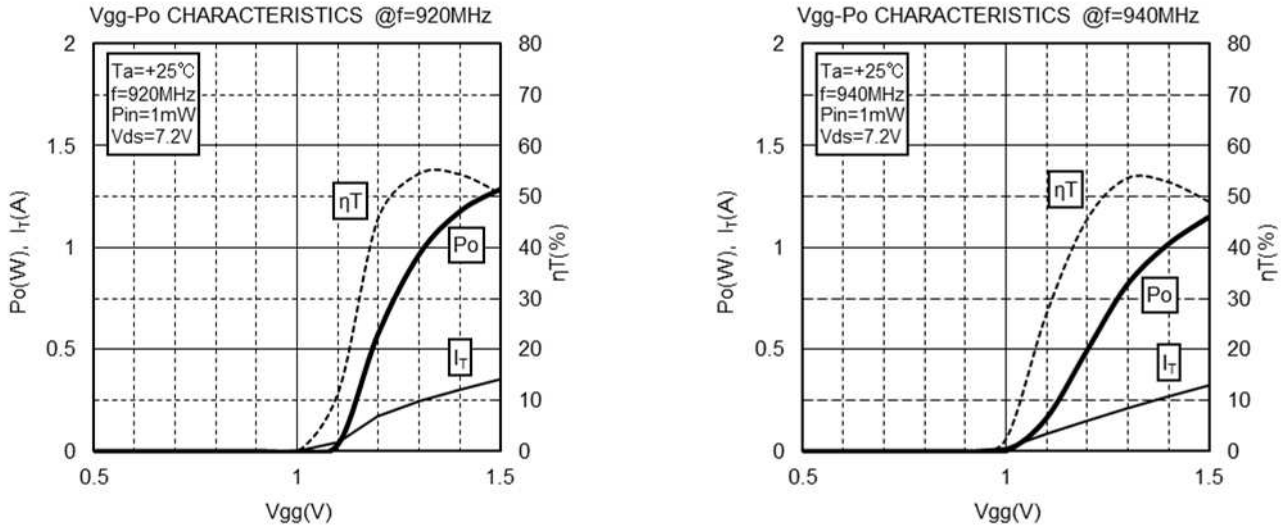


# RD01MUS3

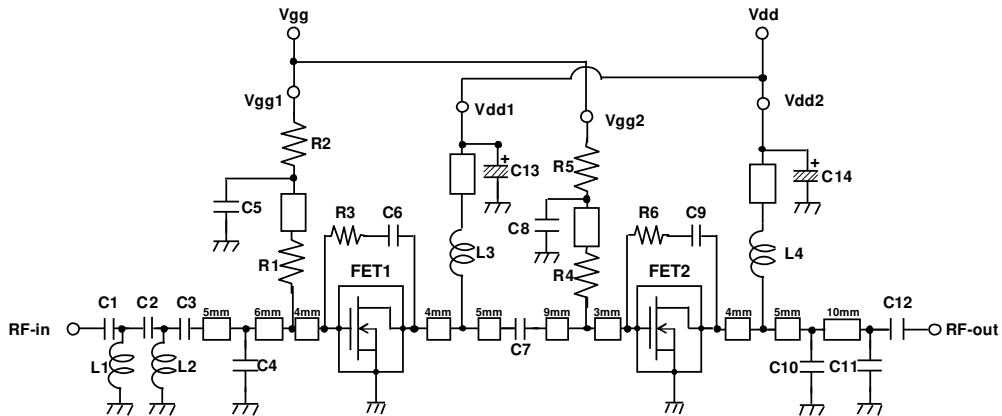
RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

## TYPICAL CHARACTERISTICS for f=890-940MHz, Vds=7.2V

(These are only typical curves and devices are not necessarily guaranteed at these curves.)



## EQUIVALENT CIRCUITRY for 940MHz-banb Circuit for f=890-940MHz, Vds=7.2V



<Note>  
 Board material - Glass-Epoxy Substrate(εr:4.8, t=0.8mm)  
 Micro strip Line width = 1.3mm / 50 Ω

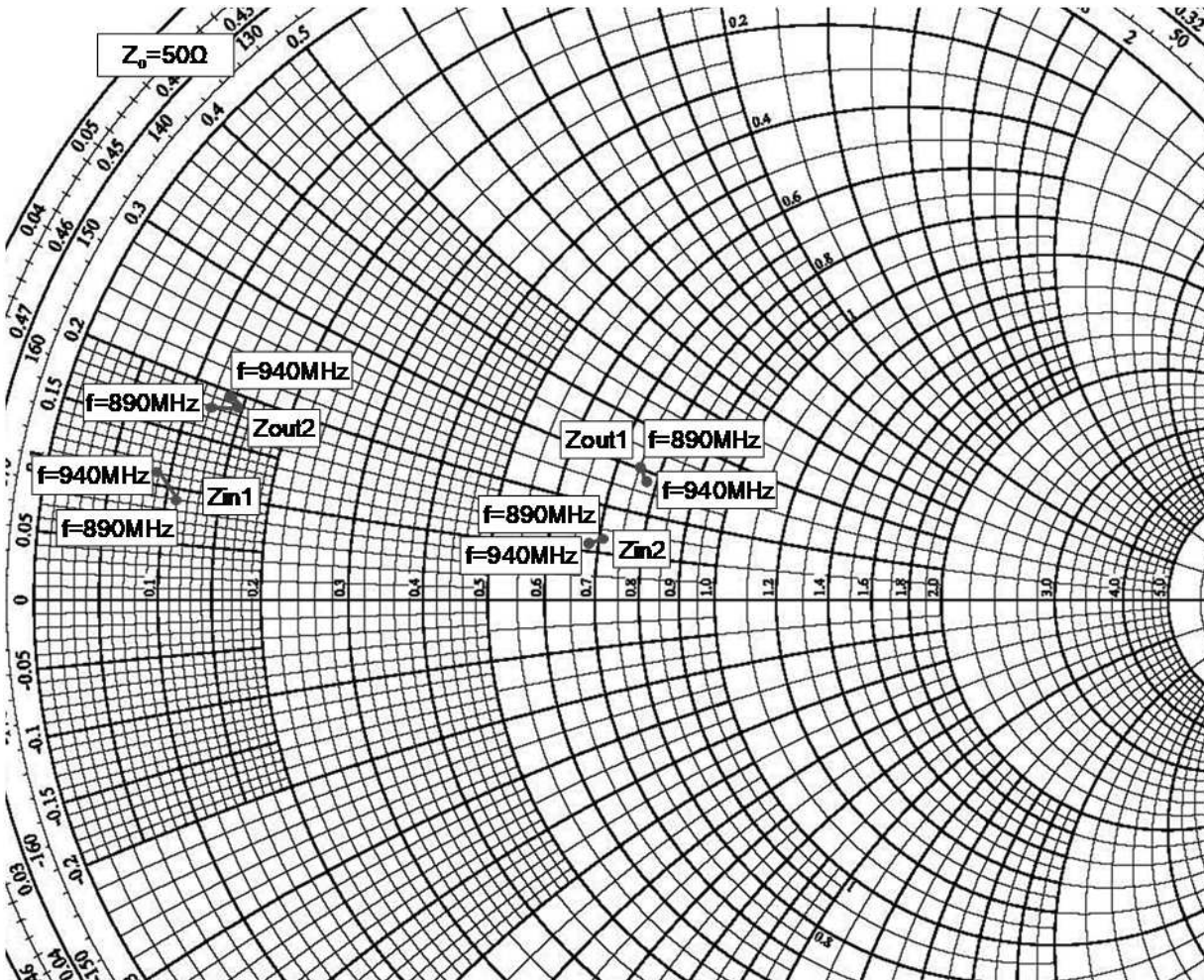
Part	Description	Part number	Manufacturer
C1	4 pF	GRM1882C2A4R0CA01	MURATA MANUFACTURING CO.
C2, C11	2 pF	GRM1884C1H2R0CA01	MURATA MANUFACTURING CO.
C3	3 pF	GRM1882C1H3R0CA01	MURATA MANUFACTURING CO.
C4	8 pF	GRM1882C1H8R0CA01	MURATA MANUFACTURING CO.
C5, C8	1000 pF	GRM1882C1H102JA01	MURATA MANUFACTURING CO.
C6, C9	47 pF	GRM1882C1H470JA01	MURATA MANUFACTURING CO.
C7, C12	91 pF	GRM1882C2A910JA01	MURATA MANUFACTURING CO.
C10	8 pF	GRM1882C1H8R0CA01	MURATA MANUFACTURING CO.
C13, C14	22 μF	UVZ1 H220MDD	NICHICON CORPORATION
L1, L2	6.2 nH	LQW18AN6N2C00	MURATA MANUFACTURING CO.
L3	22 nH	LQW18AN22NJ00	MURATA MANUFACTURING CO.
L4	29nH Enameled wire 6T turns, Diameter:0.4mm,φ2.46mm (the out side diameter)	4006C	Yoneda Processing Place Co.,Ltd.
R1, R4	100 Ω	RPC05 101-J	TAMOSHA ELECTRIC CO.
R2, R5	4.7 kΩ	RPC05 472-J	TAMOSHA ELECTRIC CO.
R3, R6	390 Ω	RPC05 391-J	TAMOSHA ELECTRIC CO.

# RD01MUS3

RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

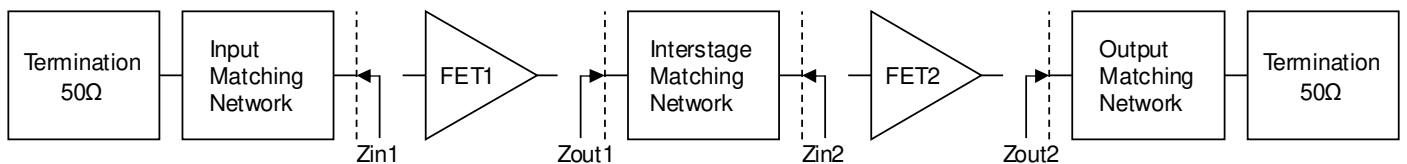
## Input / Interstage / Output Impedance VS. Frequency Characteristics

for  $f=890-940\text{MHz}$ ,  $V_{ds}=7.2\text{V}$



f (MHz)	$Z_{in1}$ ( $\Omega$ )	$Z_{out1}$ ( $\Omega$ )	$Z_{in2}$ ( $\Omega$ )	$Z_{out2}$ ( $\Omega$ )
890	$5.38 + j 3.94$	$37.83 + j 15.17$	$35.85 + j 6.44$	$6.23 + j 8.97$
910	$4.99 + j 4.59$	$38.17 + j 14.75$	$35.54 + j 6.17$	$7.28 + j 9.21$
940	$4.56 + j 5.59$	$38.51 + j 13.84$	$34.70 + j 5.76$	$6.79 + j 9.66$

### Method of Measurement



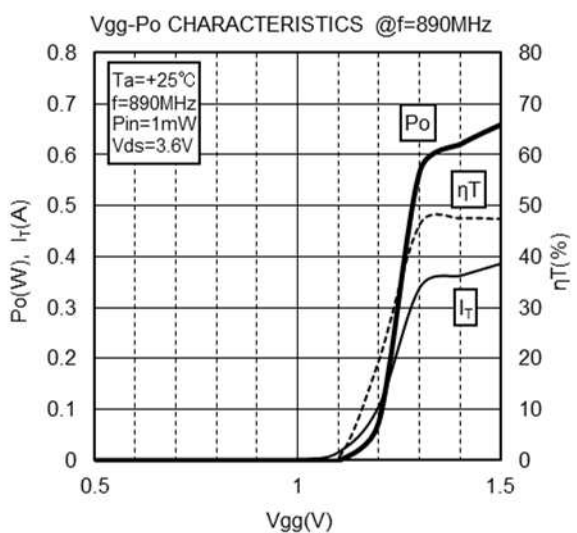
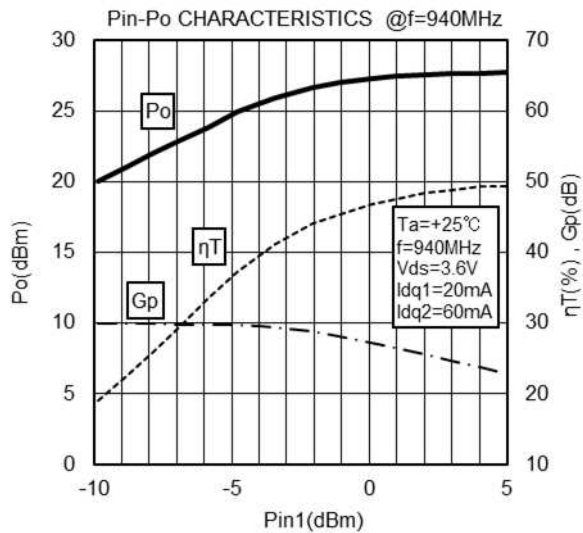
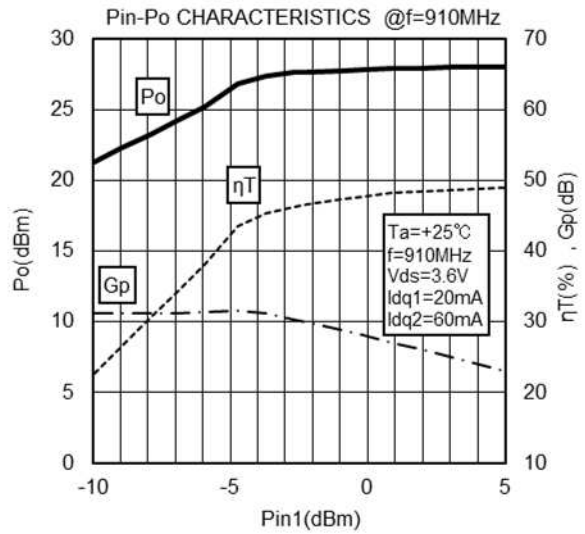
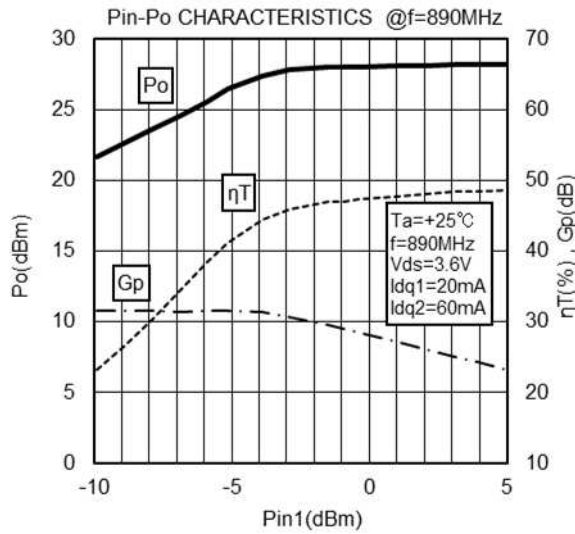
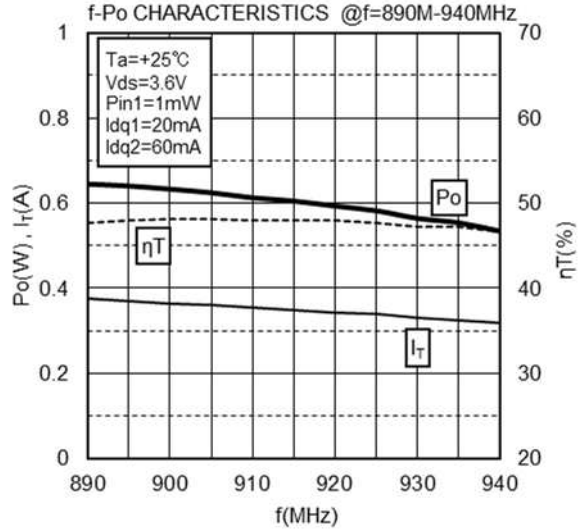
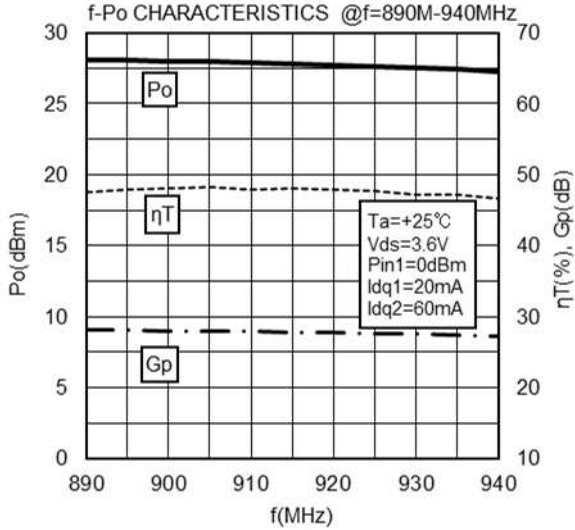
- $Z_{in1}$  : Input Matching Network impedance measured from FET1
- $Z_{out1}$  : Interstage Matching Network impedance measured from FET1
- $Z_{in2}$  : Interstage Matching Network impedance measured from FET2
- $Z_{out2}$  : Output Matching Network impedance measured from FET2
- $Z_0$  : Characteristic impedance

# RD01MUS3

RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

## TYPICAL CHARACTERISTICS for f=890-940MHz, Vds=3.6V

(These are only typical curves and devices are not necessarily guaranteed at these curves.)

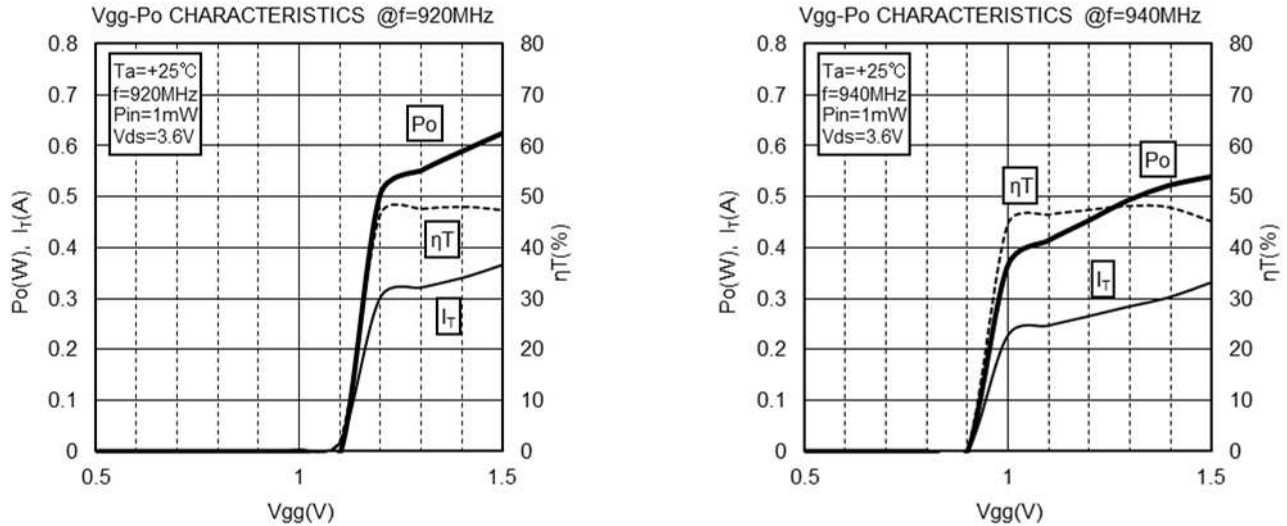


# RD01MUS3

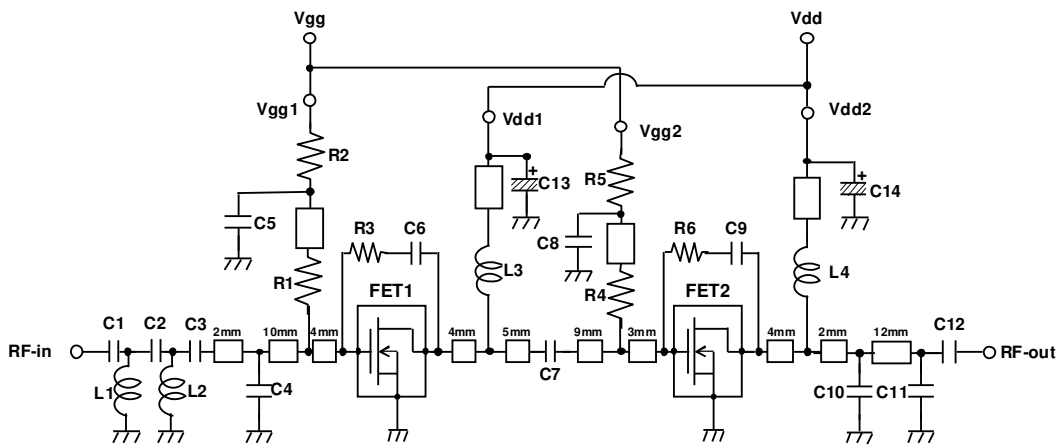
RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

## TYPICAL CHARACTERISTICS for f=890-940MHz, Vds=3.6V

(These are only typical curves and devices are not necessarily guaranteed at these curves.)



## EQUIVALENT CIRCUITRY for 940MHz-banb Circuit for f=890-940MHz, Vds=3.6V



<Note>  
Board material - Glass-Epoxy Substrate( $\epsilon_r=4.8$ ,  $t=0.8\text{mm}$ )  
Micro strip Line width = 1.3mm / 50  $\Omega$

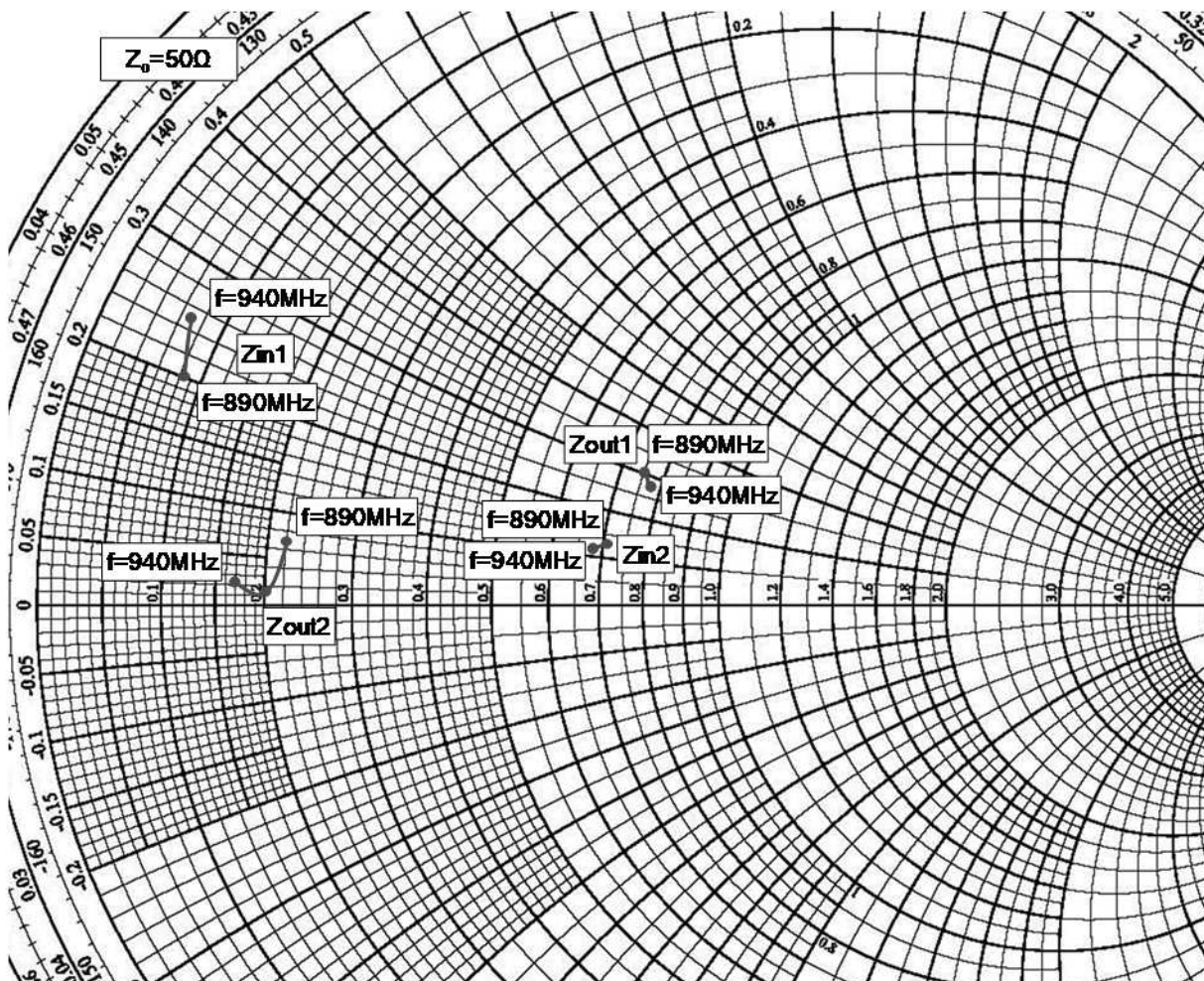
Part	Description	Part number	Manufacturer
C1	4 pF	GRM1882C2A4R0CA01	MURATA MANUFACTURING CO.
C2, C11	2 pF	GRM1884C1H2R0CA01	MURATA MANUFACTURING CO.
C3	3 pF	GRM1882C1H3R0CA01	MURATA MANUFACTURING CO.
C4	8 pF	GRM1882C1H8R0CA01	MURATA MANUFACTURING CO.
C5, C8	1000 pF	GRM1882C1H102JA01	MURATA MANUFACTURING CO.
C6, C9	47 pF	GRM1882C1H470JA01	MURATA MANUFACTURING CO.
C7, C12	91 pF	GRM1882C2A910JA01	MURATA MANUFACTURING CO.
C10	8 pF	GRM1882C1H8R0CA01	MURATA MANUFACTURING CO.
C13, C14	22 $\mu$ F	UVZ1H220MDD	NICHICON CORPORATION
L1, L2	6.2 nH	LQW18AN6N2C00	MURATA MANUFACTURING CO.
L3	22 nH	LQW18AN22NJ00	MURATA MANUFACTURING CO.
L4	29nH Enameled wire 6Turns, Diameter:0.4mm, $\phi$ 2.46mm (the out side diameter)	4006C	Yoneda Processing Place Co.,Ltd.
R1, R4	100 $\Omega$	RPC05 101-J	TAYOSHA ELECTRIC CO.
R2, R5	4.7 k $\Omega$	RPC05 472-J	TAYOSHA ELECTRIC CO.
R3, R6	390 $\Omega$	RPC05 391-J	TAYOSHA ELECTRIC CO.

# RD01MUS3

RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

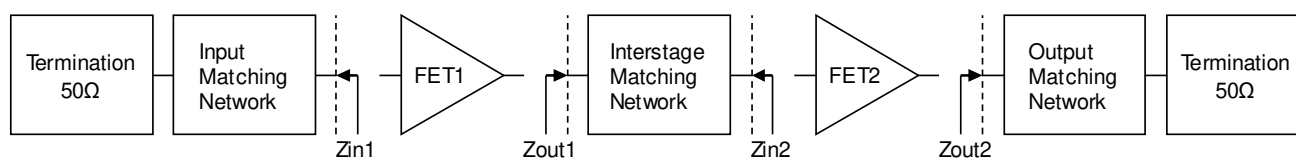
## Input / Interstage / Output Impedance VS. Frequency Characteristics

for  $f=890-940\text{MHz}$ ,  $V_{ds}=3.6\text{V}$



f (MHz)	Zin1 (Ω)	Zout1 (Ω)	Zin2 (Ω)	Zout2 (Ω)
890	4.11 + j 10.44	37.83 + j 15.14	35.85 + j 6.44	11.13 + j 3.40
910	3.91 + j 11.30	38.17 + j 14.75	35.54 + j 6.17	10.22 + j 0.74
940	3.76 + j 12.61	38.51 + j 13.84	34.70 + j 5.76	8.47 + j 1.12

### Method of Measurement



- Zin1 : Input Matching Network impedance measured from FET1
- Zout1 : Interstage Matching Network impedance measured from FET1
- Zin2 : Interstage Matching Network impedance measured from FET2
- Zout2 : Output Matching Network impedance measured from FET2
- Z<sub>0</sub> : Characteristic impedance



# RD01MUS3

RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

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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.

# RD01MUS3

RoHS Compliant, 2-stage Silicon MOSFET Power Transistor VHF/UHF/940MHz, 1W, 7.2V

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**

- These materials are intended as a reference to assist our customers in the selection of the Mitsubishi semiconductor product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Mitsubishi Electric Corporation or a third party.
- Mitsubishi Electric Corporation assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
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