

APPLICATION NOTE

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(Taking charge of Silicon RF by
MIYOSHI Electronics)

SUBJECT:

RD00HVS1 & RD02MUS1B 2-stage amplifier RF performance at $f=400\text{-}470\text{MHz}$, $V_{dd}=7.2\text{V}$
(improved stability versions)

SUMMARY:

- Sample history:

RD00HVS1: Lot number "551"

RD02MUS1B: Lot number "10ZAC-G"

- Evaluate conditions:

(1) Frequency characteristics

@ $f=400\text{MHz}$ to 470MHz , $P_{in}=5\text{mW}$, $V_{dd}=7.2\text{V}$, $I_{dq1}=50\text{mA}$ (V_{gg1} adj.),
 $I_{dq2}=200\text{mA}$ (V_{gg2} adj.)

(2) P_{out} vs. P_{in} characteristics

@ $f=400\text{MHz}$ to 470MHz , $V_{dd}=7.2\text{V}$, $I_{dq1}=50\text{mA}$ (V_{gg1} adj.), $I_{dq2}=200\text{mA}$ (V_{gg2} adj.)

(3) Small Signal S parameter (S_{11}, S_{22}, S_{21})

@ $f=50\text{MHz}$ to 1500MHz , $V_{dd}=7.2\text{V}$, $I_{dq1}=50\text{mA}$ (V_{gg1} adj.), $I_{dq2}=200\text{mA}$ (V_{gg2} adj.)

- Results:

Page 2 shows the typical frequency characteristics data @ $V_{dd}=7.2\text{V}$.

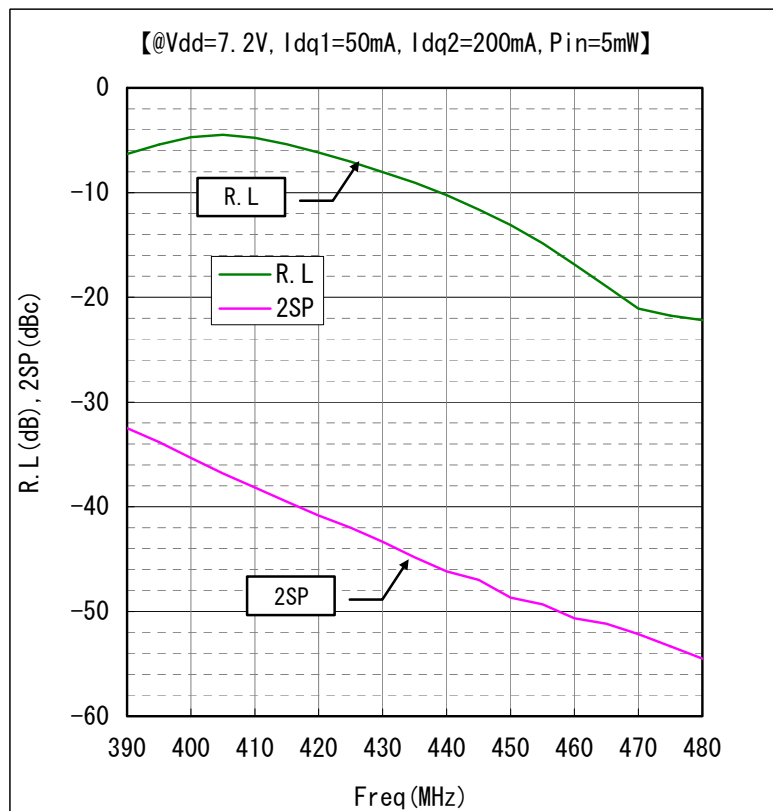
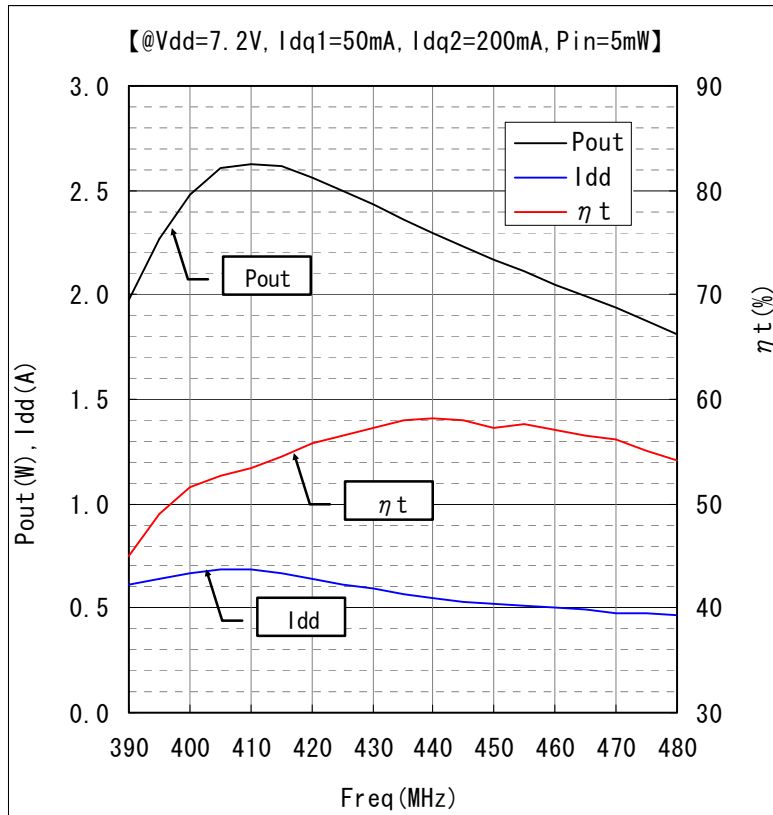
Page 3-5 shows the typical P_{out} vs. P_{in} characteristics data @ $V_{dd}=7.2\text{V}$.

Page 6 Small Signal S parameter. @ $V_{dd}=7.2\text{V}$.

Page 7 shows the equivalent circuit.

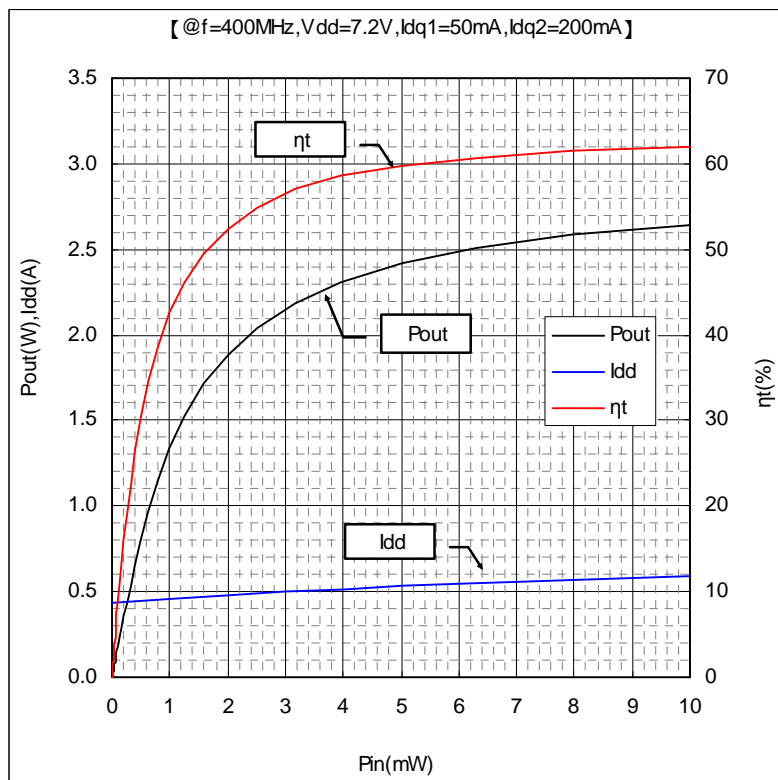
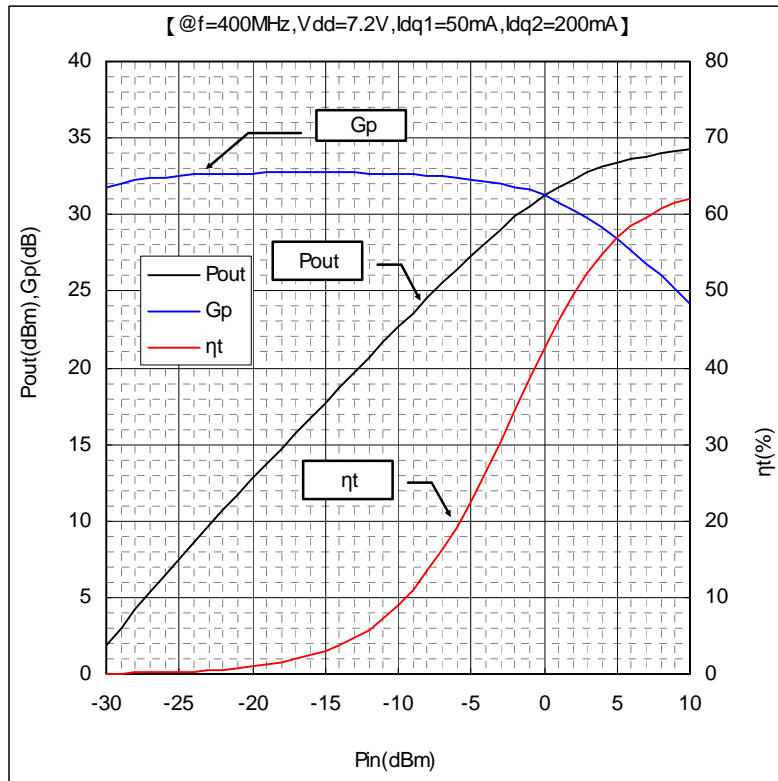
Frequency characteristics

@Vdd=7.2V, Pin=5mW, Idq1=50mA(Vgg1 adj.), Idq2=200mA(Vgg2 adj.)



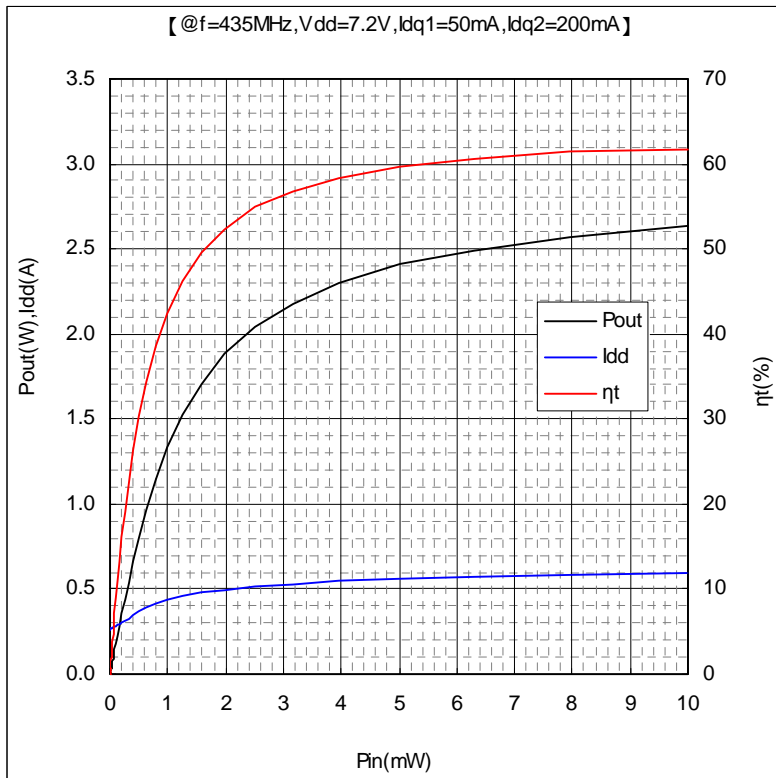
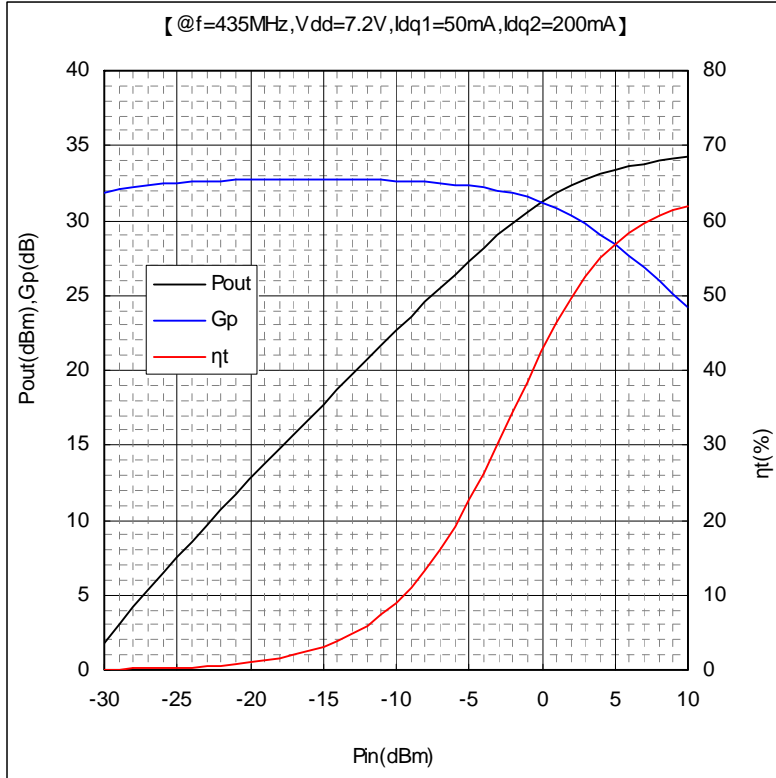
Pout vs. Pin characteristics

@ f=400MHz, Vdd=7.2V, Idq1=50mA(Vgg1 adj.), Idq2=200mA(Vgg2 adj.)



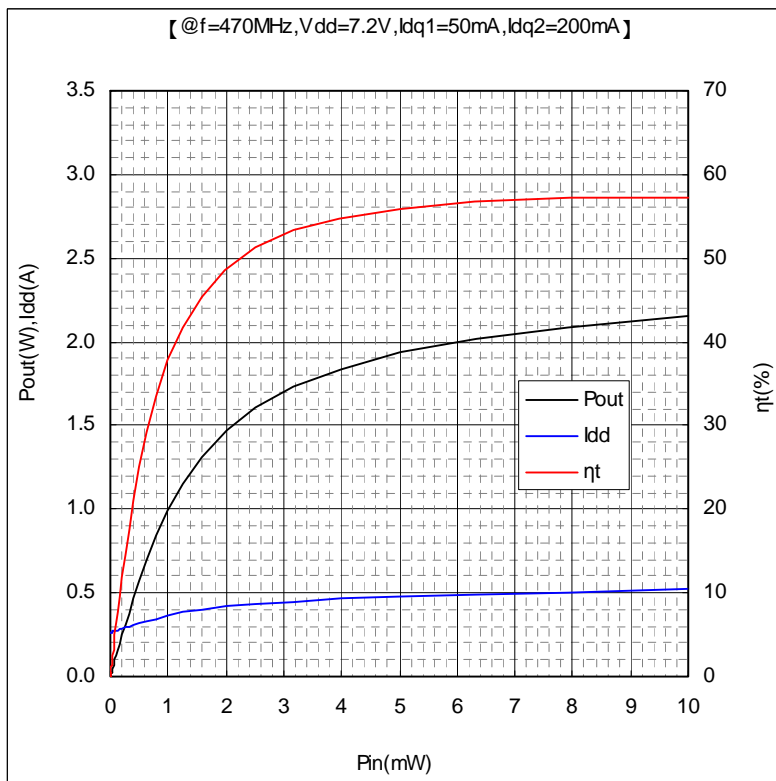
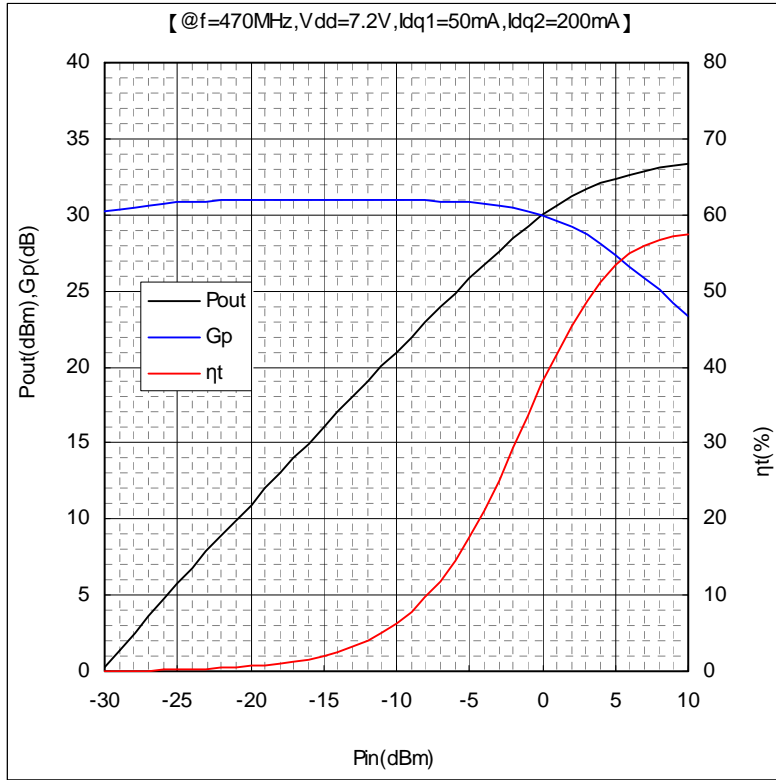
Pout vs. Pin characteristics

@ f=435MHz, Vdd=7.2V, Idq1=50mA(Vgg1 adj.), Idq2=200mA(Vgg2 adj.)



Pout vs. Pin characteristics

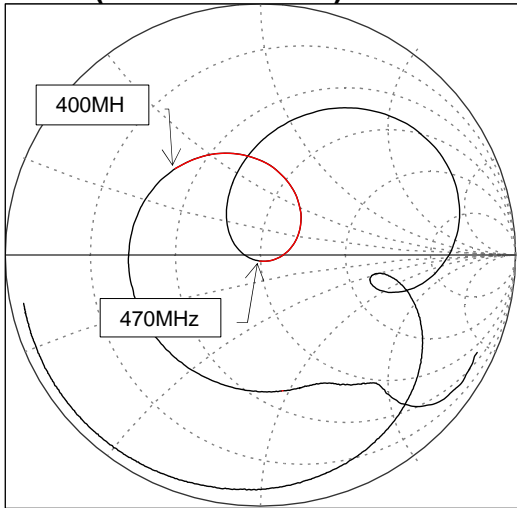
@ f=470MHz, Vdd=7.2V, Idq1=50mA(Vgg1 adj.), Idq2=200mA(Vgg2 adj.)



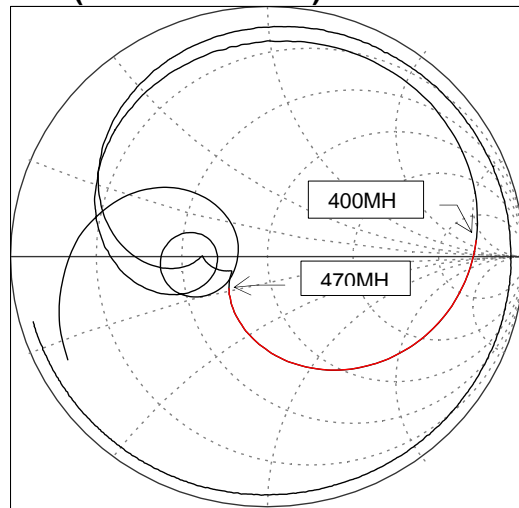
Small Signal S parameter

@ Vdd=7.2V, Idq1=50mA(Vgg1 adj.), Idq2=200mA(Vgg2 adj.)

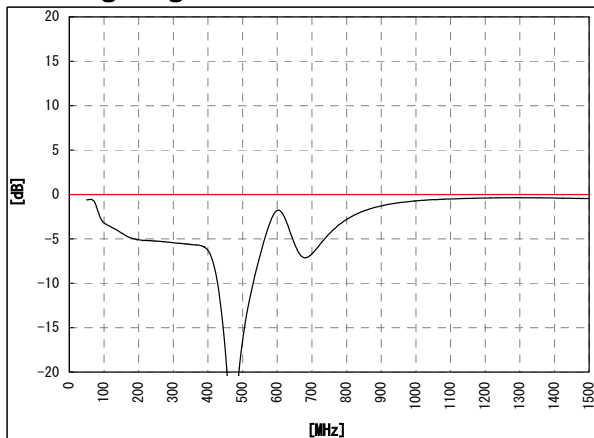
S11 (f=50MHz-1.5GHz)



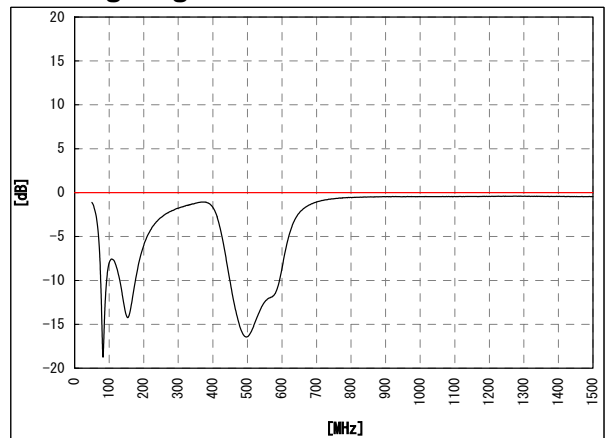
S22 (f=50MHz-1.5GHz)



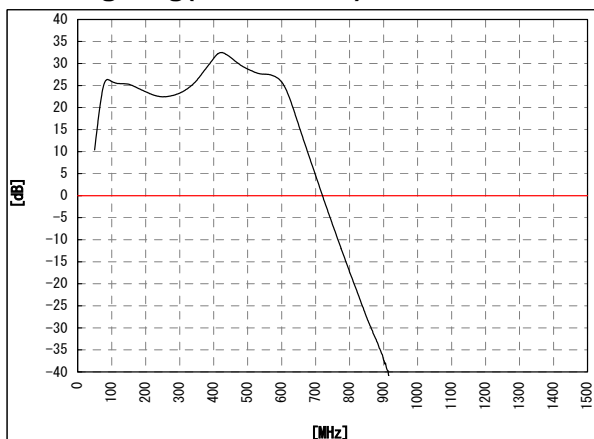
S11 Log Mag



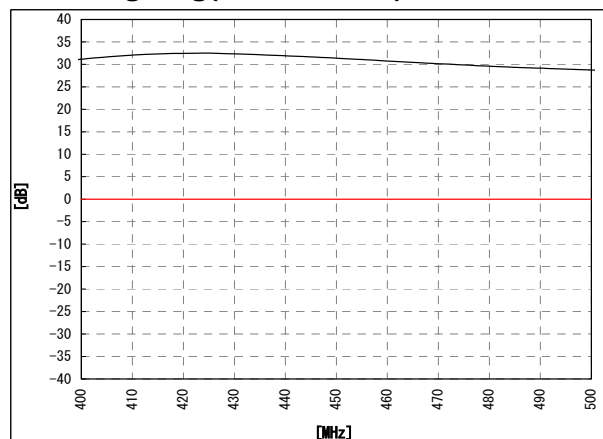
S22 Log Mag



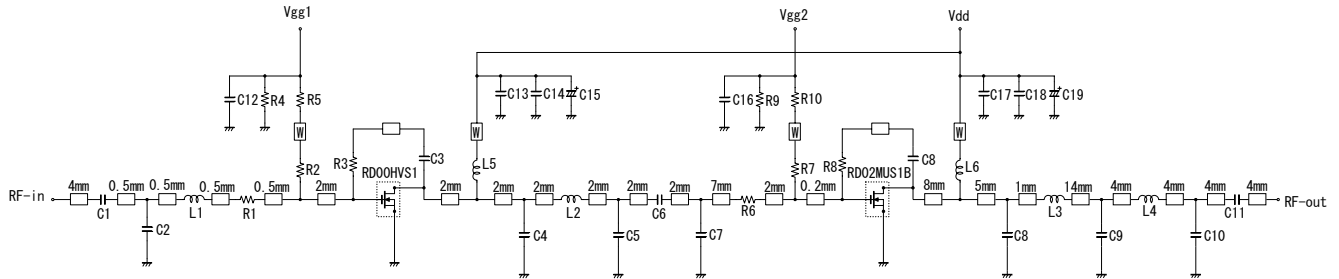
S21 Log Mag(broad band)



S21 Log Mag(narrow band)



Equivalent Circuit



Micro strip line width=1.3mm/50OHM, er:4.8, t=0.8mm
 W:Line width=1.0mm
 Note:Board material- Glass-Epoxy Substrate

Parts Type		Value	Type name	Vender
Capacitor	C1	15pF	GRM1882C1H150JA01D	Murata Manufacturing Co.,Ltd.
	C2,C4,C9	12pF	GRM1882C1H120JA01D	Murata Manufacturing Co.,Ltd.
	C3	47pF	GRM1882C1H470JA01D	Murata Manufacturing Co.,Ltd.
	C5	18pF	GRM1882C1H180JA01D	Murata Manufacturing Co.,Ltd.
	C6,C11,C13,C17	100pF	GRM1882C1H101JA01D	Murata Manufacturing Co.,Ltd.
	C7	13pF	GRM1882C1H130JA01D	Murata Manufacturing Co.,Ltd.
	C8	47pF	GRM2162C1H470JZ01D	Murata Manufacturing Co.,Ltd.
	C10	2pF	GRM1882C1H020JA01D	Murata Manufacturing Co.,Ltd.
	C12,C16	1000pF	GRM18R11H102KA01D	Murata Manufacturing Co.,Ltd.
	C17,C18	220000pF	GRM21BR71H224KA01L	Murata Manufacturing Co.,Ltd.
C15,C19	22μF	A0603	NICHICON CORPORATION	
Resistance	R1	6.8pF	RPC05-6R8	TAIYOSHA ELECTRIC Co.,Ltd.
	R2,R7	100pF	RPC05-101	TAIYOSHA ELECTRIC Co.,Ltd.
	R3	270pF	RPC05-271	TAIYOSHA ELECTRIC Co.,Ltd.
	R4,R5,R9,R10	10K ohm	RPC05-103	TAIYOSHA ELECTRIC Co.,Ltd.
	R6	0 ohm	RPC05-0	TAIYOSHA ELECTRIC Co.,Ltd.
	R8	270pF	RPC10-271	TAIYOSHA ELECTRIC Co.,Ltd.
Inductance	L1	12nH	LQW18AN12NJ10	Murata Manufacturing Co.,Ltd.
	L2,L3,L4	8nH Enameled wire 2Turns, Diameter:0.23mm,φ1.66mm(the out side diameter)	2302S	yc corporation Co.,Ltd.
	L5,L6	34nH Enameled wire 7Turns, Diameter:0.23mm,φ1.66mm(the out side diameter)	2307C	yc corporation Co.,Ltd.

