

RF discrete products

Toshiba Corporation Semiconductor Company
Discrete Semiconductor Div.
Small Signal Device Dept.



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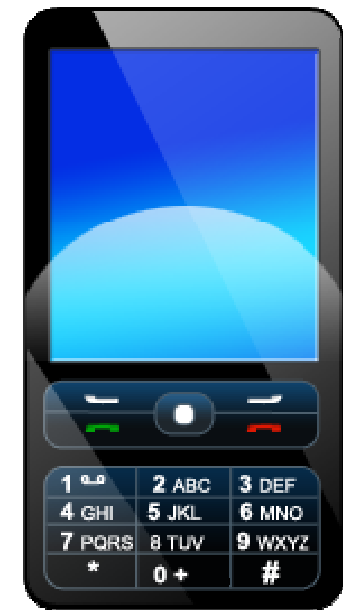


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1. Cellular phone, GPS

- RF power detector IC for LTE and HSPA
- RF transistor for GPS LNA
- LNA MMIC with pass through function for mobile TV

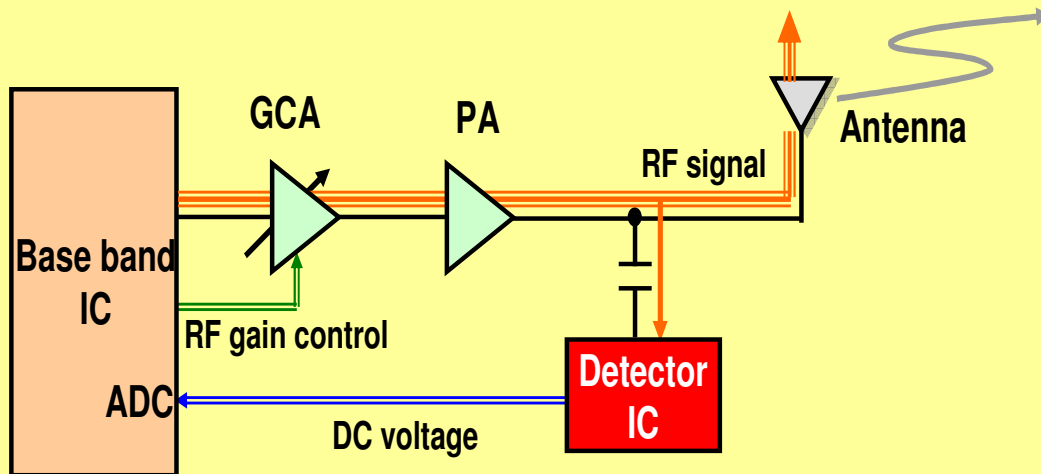


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1. Cellular phone, GPS

RF power detector IC TCX4A01WBG

for Cellular phone of W-CDMA(HSPA) and LTE



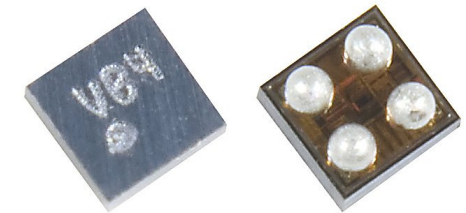
Feature of TCX4A01WBG

- Ultra small WCSP package
- Less external passive device
- RMS detective method
- Suitable for High Crest factor (Peak/Average)
- AC-DC convertor is unnecessary
- Linear output voltage to input RF power (log scale).

ES: Available
MP: Available

Test item	Unit	Test condition	Characteristics
Vcc	V		2.8
Error (Ta=25°C)	dB	Pin=-15~0dBm (CW), Ta=+25°C	$\leq \pm 0.1$
Error (Ta=-25~+85°C)	dB		$\leq \pm 0.4$
Temperature sensitivity	dB/°C	Pin=-5dBm (CW), Ta=-25~+85°C	-0.002
Operating current	mA	No RF signal	0.37

Package



WCSP4
0.79mm*0.79mm
*0.54mm

Schedule

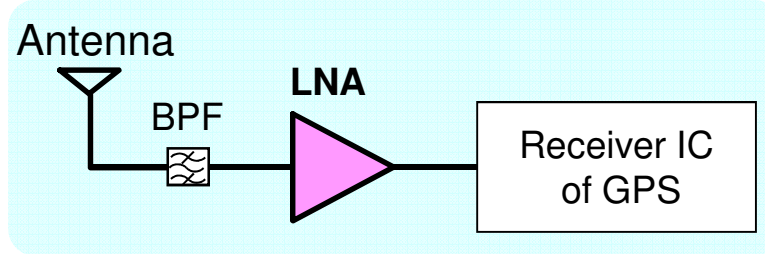
ES: OK
MP: OK

1. Cellular phone, GPS



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Selection guide of LNA for GPS



System	Feature	Recommendation products
GPS 1.575GHz	Low noise High ESD	MT4S300T/U: SiGe HBT $V_{cc}=1.8V, I_{cc}=6.2mA,$ $G_p=16.3dB, NF=0.75dB, OIP3=+8.7dBm$ Note) reference data MT4S301T/U: SiGe HBT $V_{cc}=1.8V, I_{cc}=5.2mA,$ $G_p=16.2dB, NF=0.76dB, OIP3=+7.8dBm$ Note) reference data
	Small package High ESD	TA4032FT/CTC: SiGe MMIC $V_c=3.0V, I_{cc}=5.0mA,$ $G_p=14.8dB, NF=1.0dB, IIP3=-8.2dBm$

Part number Package name	MT4S300T MT4S301T TESQ	MT4S300U MT4S301U USQ	TA4032FT TESQ	TA4032CTC CST6C
Package drawing				

RF transistor selection table

SPICE model of RF transistor

MMIC selection table

1. Cellular phone, GPS



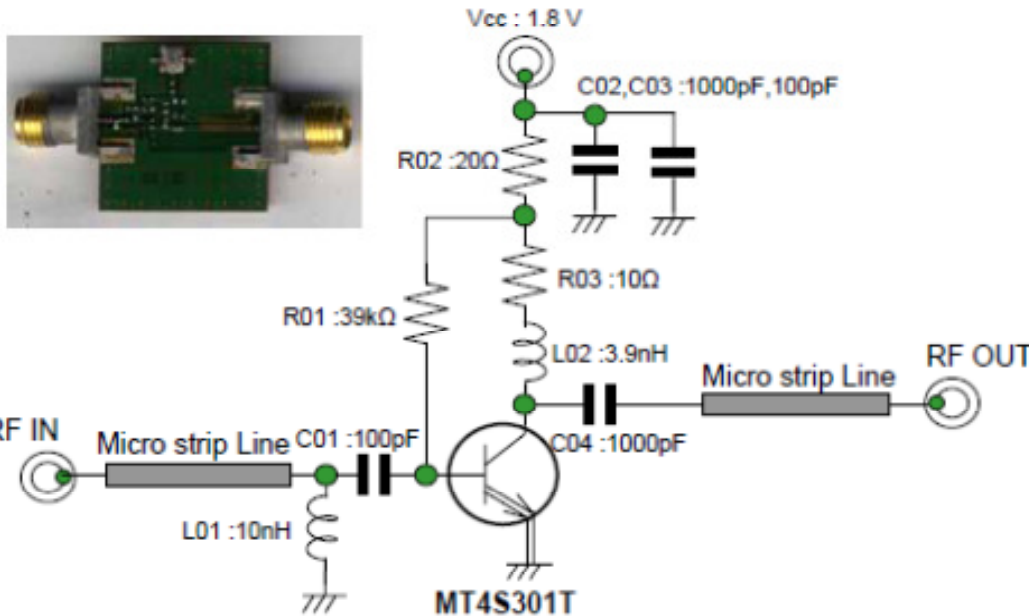
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Application note of LNA for GPS (MT4S301T)

1.Characteristics

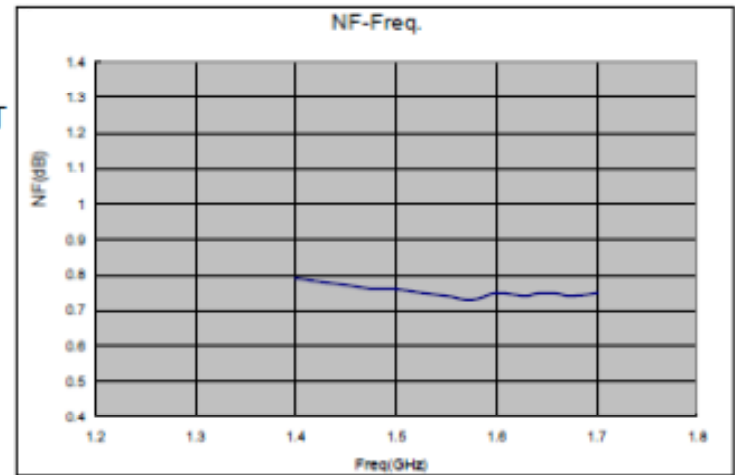
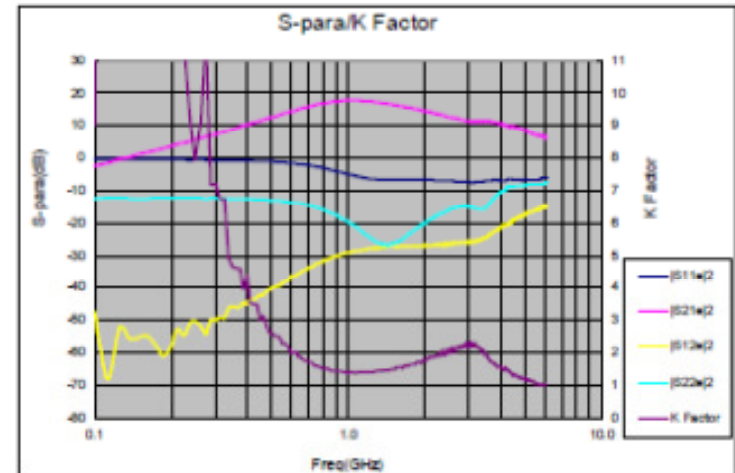
Vcc = 1.8V, Icc = 5.2mA
 Gain = 16.2dB, NF = 0.76dB,
 RLin = 6.7dB, RLout = 25.7dB, K Factor > 1 (100MHz to 6GHz)
 OP3= 7.77dBm, IP3= -7.77dBm

2.Evaluation circuit



The circuit and measured data contained herein are presented only as an example for the applications of this product, and do not specify or recommend any circuit and parameters. It is the responsibility of the customer to design external circuit for achieving the request from application

3.S-para/NF data

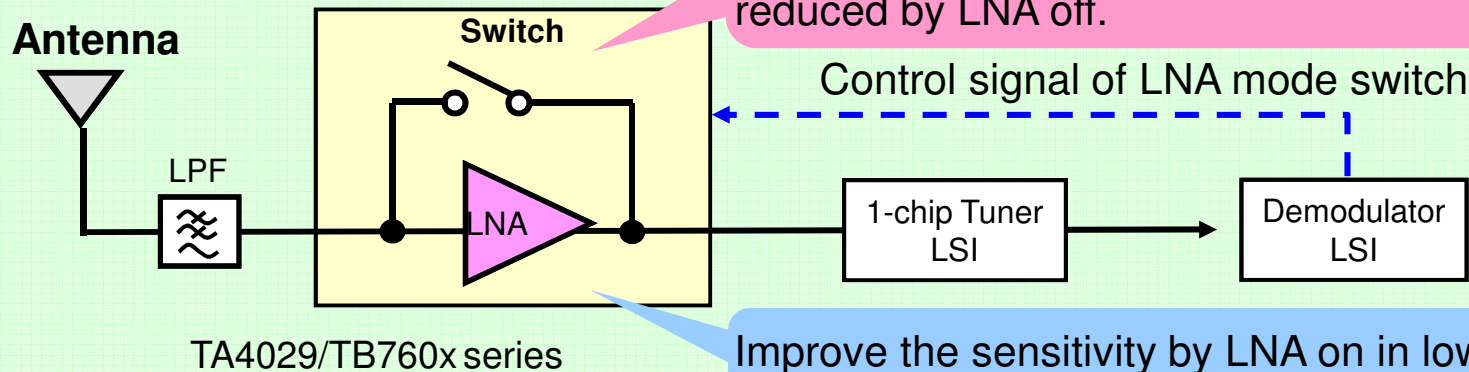


1. Cellular phone, GPS

TOSHIBA
eco style

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LNA MMIC for mobile TV TA4029/TB760x series

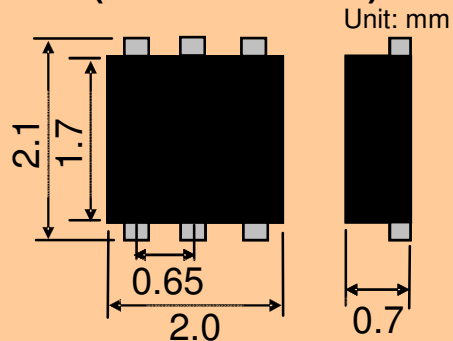


Pass through function operates for improvement of distortion in strong signal area. And current is reduced by LNA off.

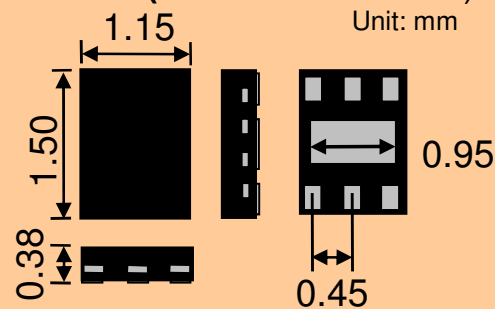
Improve the sensitivity by LNA on in low signal area.

Packages

UF6 (2.1x2.0x0.7mm)



CST6C (1.5x1.15x0.38mm)



Advantage of Toshiba products

TA4029 series and TB760x series which are built-in RF matching circuit are available. They provide design flexibility and short lead time of design. And UF6 package which is easy mount and CST6C package which is small lead less package are available in each series.

1. Cellular phone, GPS



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LNA MMIC for mobile TV TA4029/TB760x series

Electrical characteristics TA4029/TB760x series

V_{cc}=2.5V, freq.=1GHz, Ta=25deg.C (Typ.)

Characteristics		Unit	TA4029TU TA4029CTC	TB7601TU TB7601CTC	TB7602TU TB7602CTC	TB7604TU TB7604CTC	TB7605TU TB7605CTC
			-	Standard	Low distortion	Reverse logic of TB7601	Reverse logic of TB7602
LNA ON	LNA control voltage	V	0	0	0	2.5	2.5
	I _{cc} (1)	mA	4.0	4.0	6.0	4.0	6.0
	Gain(1)	dB	13	14	15	14	15
	NF	dB	1.2	1.4	1.3	1.4	1.3
	IIP3	dBm	-5.0	-5.0	-4.0	-5.0	-4.0
	S11/S22	dB	-5/-8	-8/-8	-10/-10	-8/-8	-10/-10
LNA OFF	LNA control voltage	V	2.5	2.5	2.5	0	0
	I _{cc} (2)	uA	3.0(Max)	3.0(Max)	3.0(Max)	3.0(Max)	3.0(Max)
	Gain(2)	dB	-2.0	-2.5	-2.5	-2.5	-2.5
	S11/S22	dB	-9/-8	-9/-8	-9/-8	-9/-8	-9/-8
Package			UF6/CTC6C	UF6/CTC6C	UF6/CTC6C	UF6/CTC6C	UF6/CTC6C

TA4029 series and TB760x series have low voltage operation and wide supply voltage (2.3~3.3V). They are very low current that is 3.0uA (Max) when LNA is OFF.

2. Digital TV / Satellite tuner

Digital Terrestrial/ CATV (Set Top Box) / Satellite

- MMIC and RF transistor for LNA
- Gain control amp. for IF block
- Varactor diode
- PIN diode



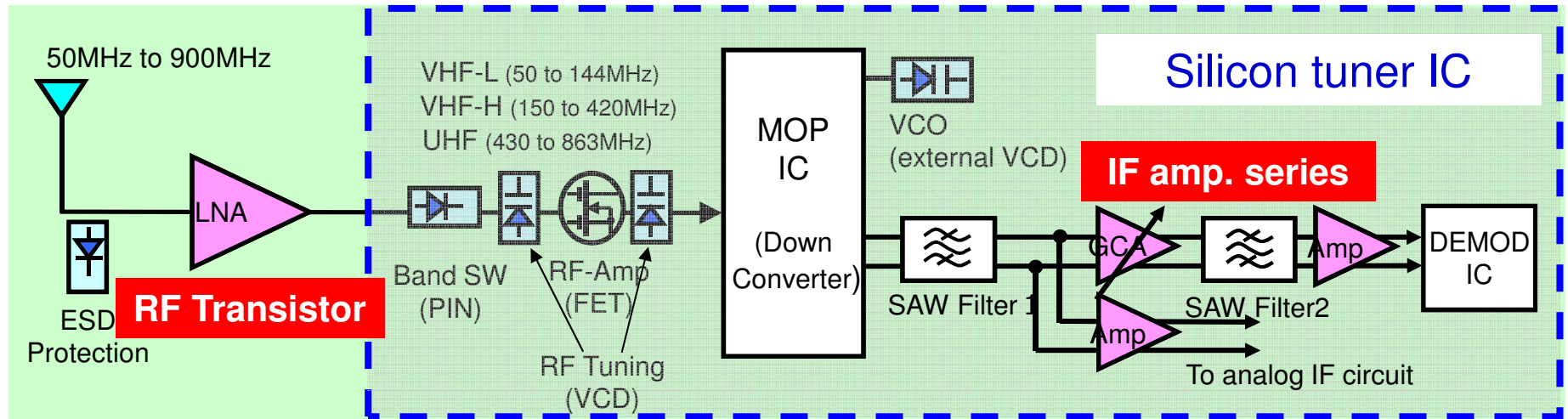
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2. Digital TV / Satellite tuner



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Block diagram of TV tuner



Advantage of Toshiba products: Toshiba offers total solution of TV tuner including RF transistor for LNA, MMIC for IF amp, PIN diode for band switch, varactor diode for tuning circuit. Especially, rich line-up of RF transistor for LNA.

PIN diode (for band switch)

Applica tion	Part Number	PKG	VR (V)	VF(max)		CT(typ)		rs Ω
				(V)	IF(mA)	(pF)	VR(V)	
VHS	1SS381	ESC	30	0.85	2	0.7	6	0.6
	1SS314	USC						0.5

Varactor diode (for tuning)

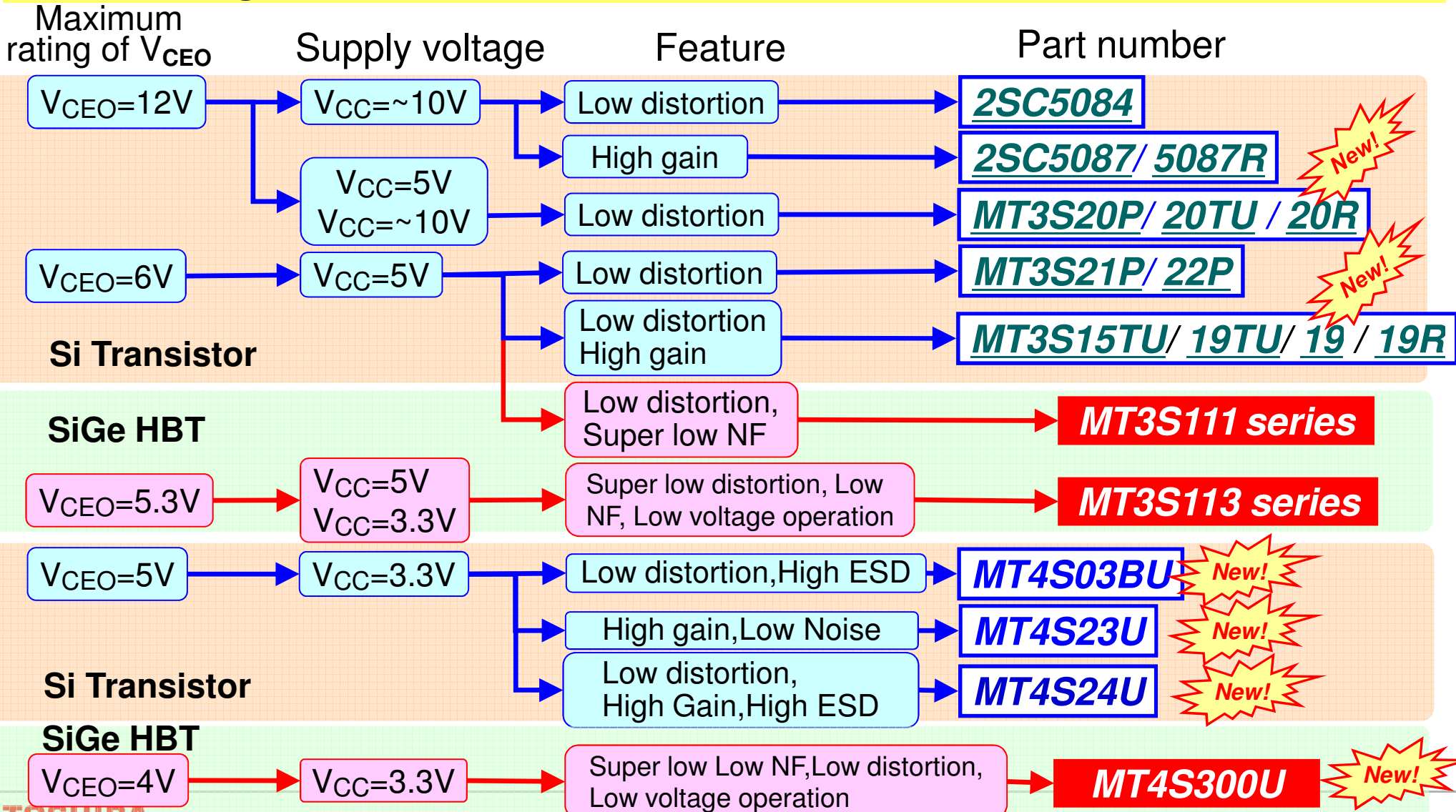
Part Number	PKG	VR (V)	CT(1)		CT(2)	
			(pF)	VR (V)	(pF)	VR (V)
1SV282	ESC	34	33.0- 38.0	2	2.6-3.0	25
1SV262	USC					

2. Digital TV / Satellite tuner



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Selection guide of RF transistor for LNA



2. Digital TV / Satellite tuner

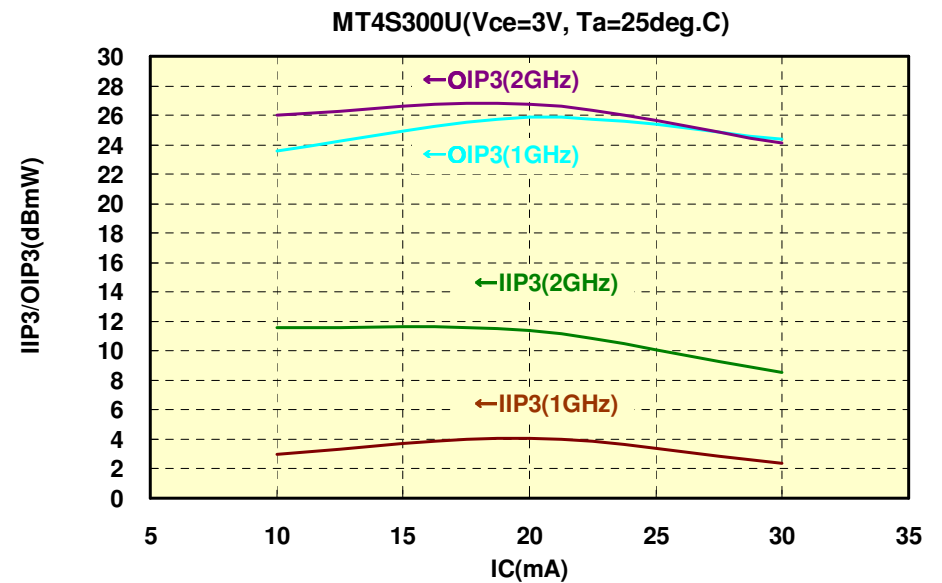
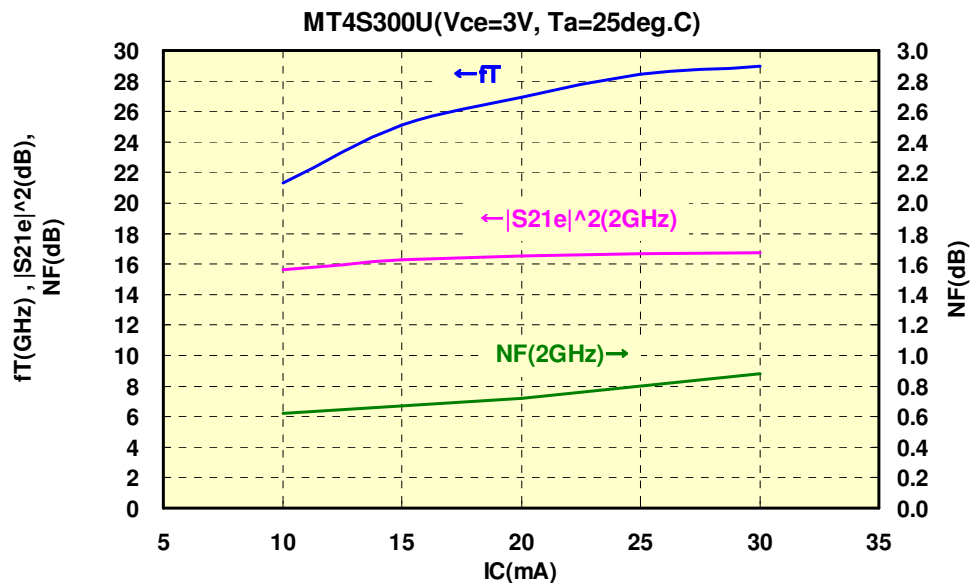


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MT4S300/301 Series summary New!

Part No.	PKG	Absolute Max Rating			Electrical Characteristics											Schedule
		V _{CEO}	I _C	P _C	f _T (GHz)			S ₂₁ ² (dB)			NF(dB)			MP		
		(V)	(mA)	(mW)	V _{CE} (V)	I _C (mA)	f(GHz)	V _{CE} (V)	I _C (mA)	f(GHz)	V _{CE} (V)	I _C (mA)	f(GHz)			
MT4S300U	USQ	4	50	100	26.5	3	20	16.9	3	20	2	0.55	3	10	2	OK
MT4S300T	TESQ							18.0								
MT4S301U	USQ	4	35	100	27.5	3	15	18.1	3	20	2	0.57	3	10	2	OK
MT4S301T	TESQ							19.5								

Curve data



2. Digital TV / Satellite tuner



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MT4S03BU, MT4S23U, MT4S24U summary

Feature



◇MT4S03BU

1. Low Distortion : OIP3=26.6dBmW(@2GHz)
2. Ultra small package : USQ(2.0*1.1mm)
3. High ESD level : HBM=2kV over



◇MT4S23U

1. High gain : $|S_{21e}|^2=12\text{dB}(@2\text{GHz})$
2. Low Noise : NF=1.4dB(@2GHz)
3. Ultra small package : USQ(2.0*1.1mm)



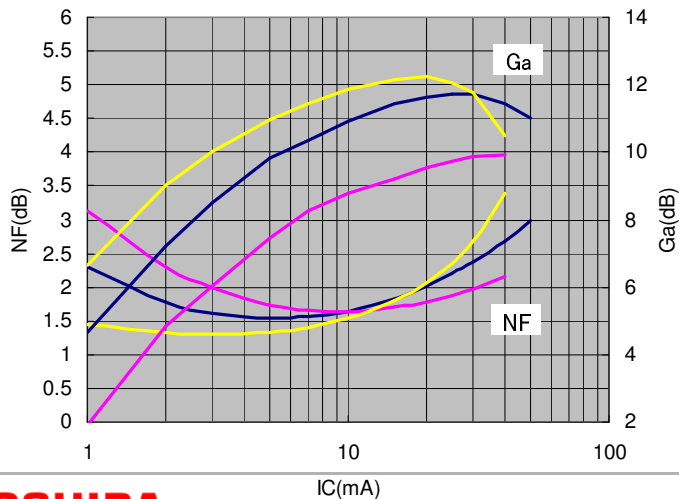
◇MT4S24U

1. High Gain : $|S_{21e}|^2=11.5\text{dB}(@2\text{GHz})$
2. Low Distortion : OIP3=25dBmW(@2GHz)
3. Ultra small package : USQ(2.0*1.1mm)

Part No.	PKG	Absolute Max Rating			Electrical Characteristics									Schedule		
		V _{CEO} (V)	I _C (mA)	P _C (mW)	f _T (GHz)		S ₂₁ ² (dB)			NF(dB)			MP			
					V _C (V)	I _C (mA)	V _{CE} (V)	I _C (mA)	f (GHz)	V _{CE} (V)	I _C (mA)	f (GHz)				
MT4S03BU	USQ	5	40	100	12	3	30	9	3	30	2	1.6	3	10	2	OK
MT4S24U	USQ	5	50	100	14.5	3	20	11.5	3	20	2	1.55	3	7	2	OK
MT4S23U	USQ	5	40	100	16	3	20	12	3	20	2	1.4	3	7	2	OK

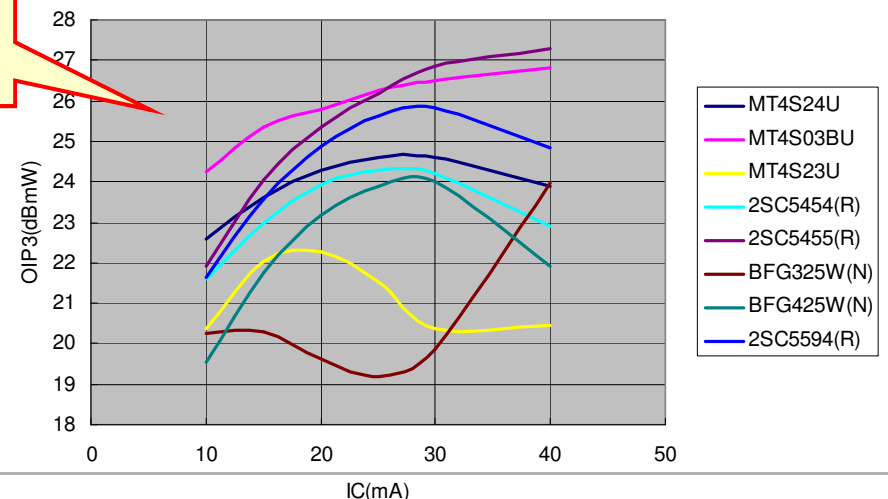
Curve data

NF/Ga-IC(@3V,2GHz)



Toshiba LNAs distortion is better than competitor

OIP3-IC(@3V,2GHz,Δ1MHz)



2. Digital TV / Satellite tuner



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MT3S19 series summary

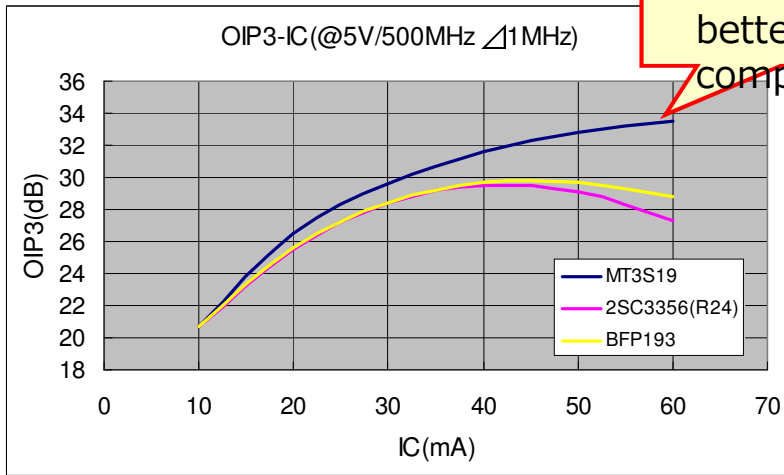
Feature

- 1. Low Distortion : OIP3=33.5dBmW(@500MHz)
- 2. Low Noise : NF=1.5dB(@1GHz)
- 3. High Power Dissipation : Pc=800mW(S-Mini) , 900mW(UFM) , 320mW(SOT-23F)

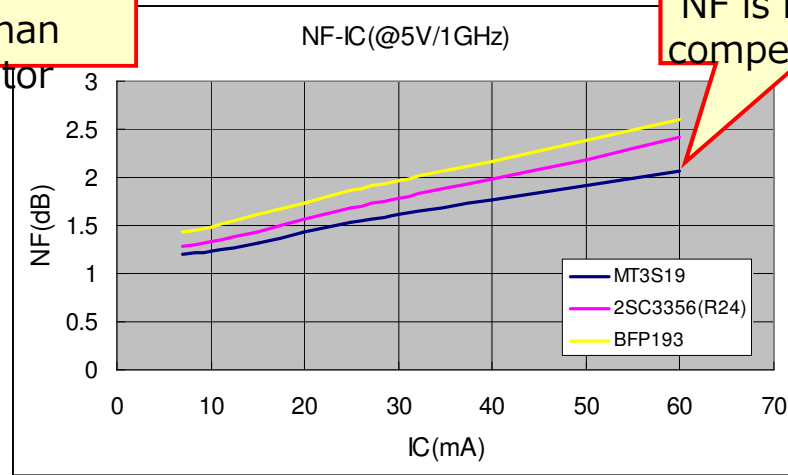
Series No.	Part No.	PKG	Absolute Max Rating			Electrical Characteristics										
			V _{CEO}	I _C	P _C	OIP3(dBmW) (f=500MHz, Δ1MHz)			S21 ^2(dB)			NF(dB)				
			(V)	(mA)	(mW)	V _C (V)	I _C (mA)	V _{CE} (V)	I _C (mA)	f (GHz)	V _{CE} (V)	I _C (mA)	f (GHz)			
MT3S19 Series	MT3S19	S-Mini	6	80	800*	33.5	5	50	12.5	5	50	1	1.5	5	20	1
	MT3S19R	SOT-23F	6	80	320**	33.5	5	50	13	5	50	1	1.5	5	20	1
	MT3S19TU	UFM	6	80	900*	33.5	5	50	13	5	50	1	1.5	5	20	1

*Mounted on ceramic board **Mounted on FR4 board

Curve data



Toshiba
MT3S19's distortion is better than competitor



Toshiba
MT3S19's NF is better than competitor

2. Digital TV / Satellite tuner



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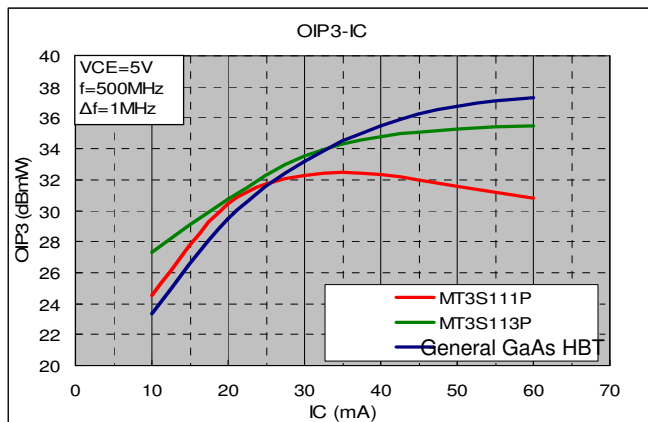
MT3S111 / MT3S113 series summary

Series No.	Part No.	PKG	Abusolute Max Rating			Electrical Characteristics										
			V_{CE0}	I_C	* P_C	OIP3(dBmW) (f=500MHz, Δf=1MHz)			S21 ^2(dB)			NF(dB)				
			(V)	(mA)	(mW)	V_C (V)	I_C (mA)		V_{CE} (V)	I_C (mA)	f (GHz)	V_{CE} (V)	I_C (mA)	f (GHz)		
MT3S111 Series	MT3S111	S-Mini	6	100	700	32	5	30	12	5	30	1	0.9	5	30	1
	MT3S111TU	UFM	6	100	800	32	5	30	12.5	5	30	1	0.85	5	30	1
	MT3S111P	Pw-Mini	6	100	1000	32.5	5	30	10.5	5	30	1	0.95	5	30	1
MT3S113 Series	MT3S113	S-Mini	5.3	100	700	35.9	5	50	11.8	5	50	1	1.15	5	50	1
	MT3S113TU	UFM	5.3	100	900	34.8	5	50	12.5	5	50	1	1.15	5	50	1
	MT3S113P	Pw-Mini	5.3	100	1600	36.7	5	50	10.5	5	50	1	1.15	5	50	1

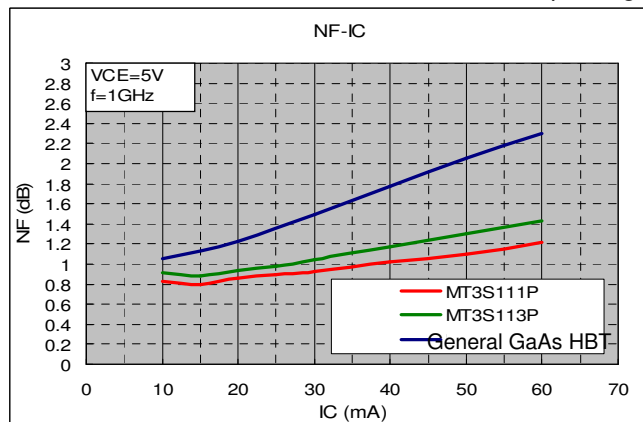
*Mounted on ceramic board

Curve data

Test result of Pw-Mini package



Test result of Pw-Mini package



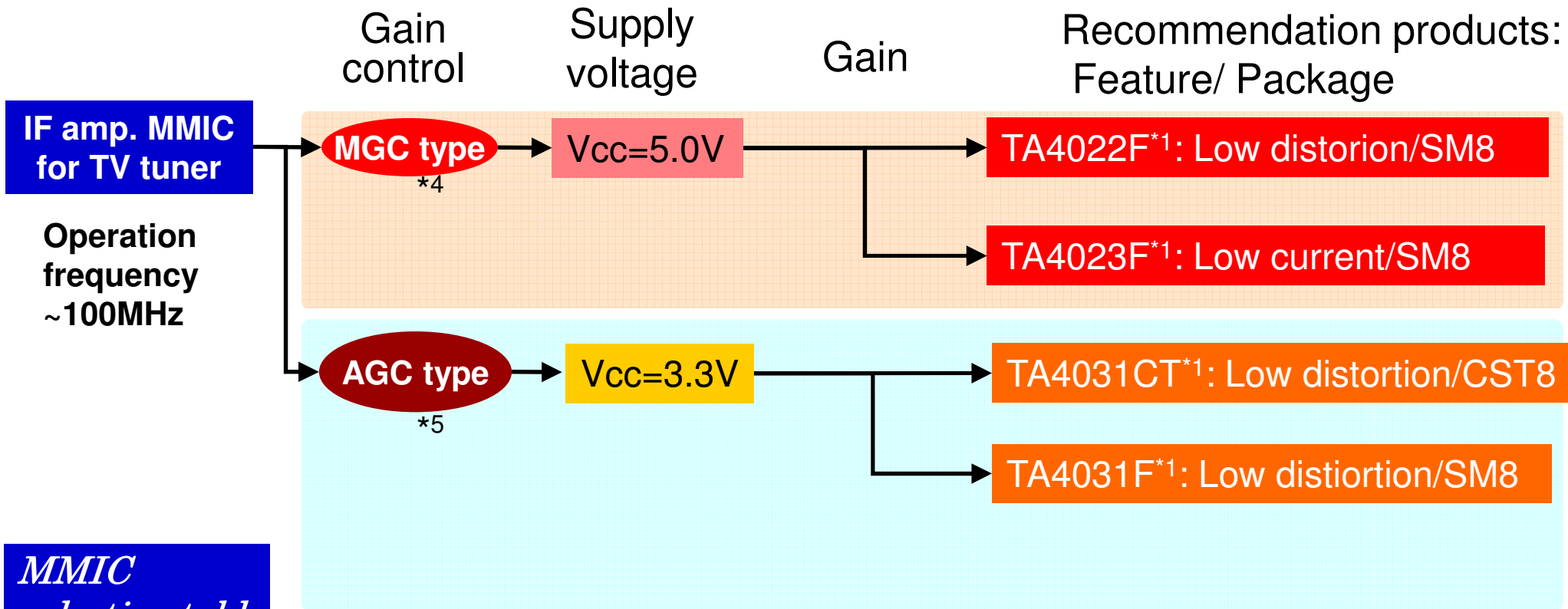
MT3S113's distortion is similar as GaAs HBT by improvement at high current area.

2. Digital TV / Satellite tuner



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Selection guide of IF amp MMIC



MMIC selection table

*4: Gain adjustment is possible by external resistance

*5: Gain control is possible by control voltage

3. Satellite digital radio / Digital Audio Broadcast(DAB)

- RF transistor for LNA

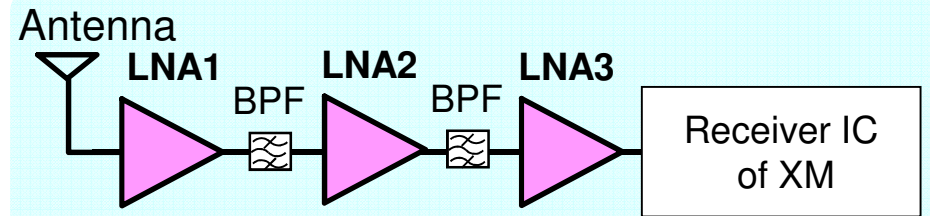
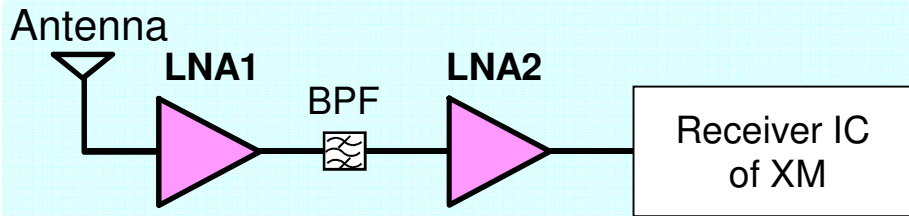


3. Satellite digital radio/DAB



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Selection guide of LNA for Satellite digital radio



System

Feature

Recommendation products

XM
XM : 2.4GHz

Low noise
High Gain
High ESD

Low noise

MT4S300T/U: SiGe HBT VCEO=4V, IC=50mA,
Gain=18dB(16.9dB), NF=0.55dB(@VCE=3V,f=2GHz),HBM=2kV over
MT4S301T/U: SiGe HBT VCEO=4V, IC=35mA,
Gain=19.5dB(18.1dB), NF=0.57dB(VCE=3V,f=2GHz),HBM=2kV over

MT4S102T: SiGe HBT VCEO=3V,IC=20mA,
Gain=16.7dB, NF=0.58dB(VCE=2V,f=2GHz)

Part number Package name	MT4S300T MT4S301T	MT4S300U MT4S301U	MT4S102T
Package drawing			

RF transistor selection table

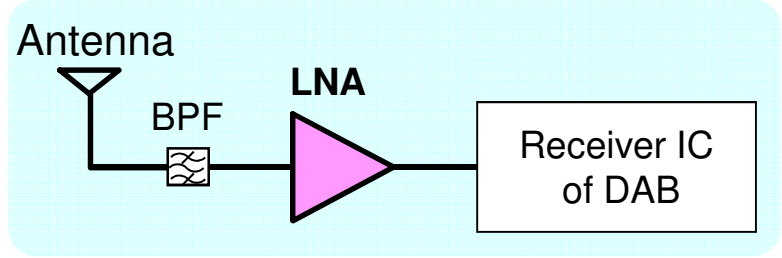
SPICE model of RF transistor

3. Satellite digital radio/DAB



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Selection guide of LNA for DAB



System
DAB
DAB : 1.472GHz
200MHz

Feature

- Low noise
High Gain
High ESD
- Low noise
Low distortion

Recommendation products

MT4S300T/U: SiGe HBT VCEO=4V, IC=50mA, Gain=18dB(16.9dB), NF=0.55dB(@VCE=3V,f=2GHz),HBM=2kV over
MT4S301T/U: SiGe HBT VCEO=4V, IC=35mA, Gain=19.5dB(18.1dB), NF=0.57dB(VCE=3V,f=2GHz),HBM=2kV over

MT3S111TU: SiGe HBT VCEO=6V,IC=100mA, Gain=12.5dB, NF=0.85dB, OIP3=32dBmW(VCE=5V,30mA)
MT3S113TU: SiGe HBT VCEO=5.3V,IC=100mA, Gain=12.5dB, NF=1.15dB, OIP3=34.8dBmW(VCE=5V,50mA)

Part number Package name	New! MT4S300T MT4S301T TESQ	New! MT4S300U MT4S301U USQ	MT3S111TU MT3S113TU UFM
Package drawing			

RF transistor selection table

SPICE model of RF transistor

4. ASM (Antenna Switch Module)

- PIN diode

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4. ASM



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PIN diode selection diode

Function	Part Number	Package	CT (pF)	CT	rs (ohm)	rs
				Condition		Condition
Single	JDP2S12CR	S-FLAT	1.0	VR=30V, f=1MHz	0.4	IF=10mA, f=100MHz
	1SV307	USC	0.25	VR=1V, f=1MHz	1.0	
	1SV308	ESC				
	JDP2S02AFS	fSC				
	JDP2S02ACT	CST2				
	JDP2S08SC	SC2	0.21	VR=1V, f=1MHz	1.0	IF=10mA, f=100MHz

Package name	SOD-323 <u>USC</u>	SOD-523 <u>ESC</u>	SOD-923 <u>fSC</u>	SOD-882 <u>CST2</u>	--- <u>SC2</u>
Package image					

Advantage of Toshiba products: The super small package of SC2 (0.62*0.32mm) and multiple diodes types are available. 2 in 1 and 4 in 1 package type is Available. Please ask these products to Toshiba sales team.

5. VCO (Voltage Controlled Oscillator)

- Varactor diode

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5. VCO



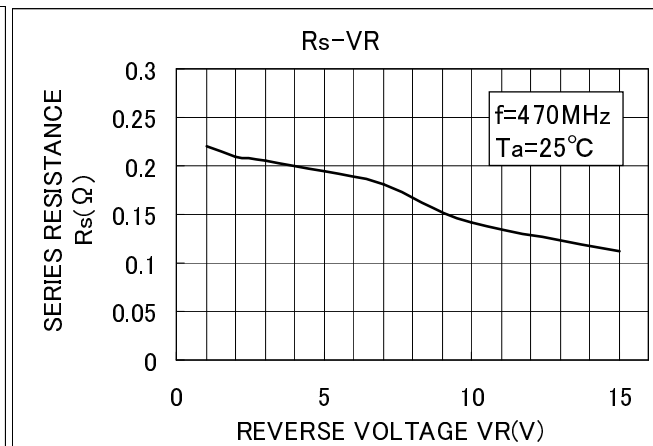
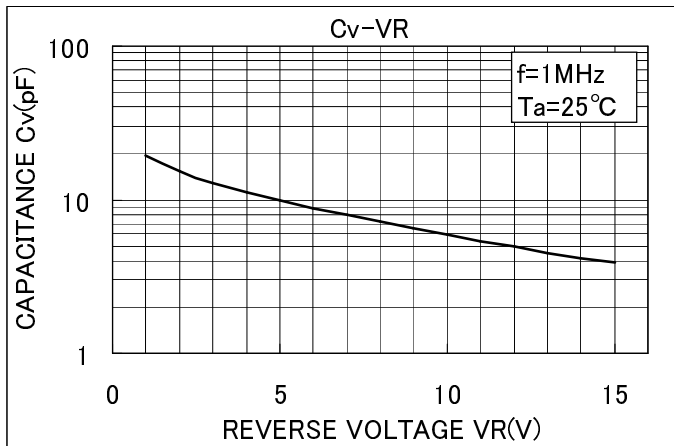
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for Low Resistance applications

New!!

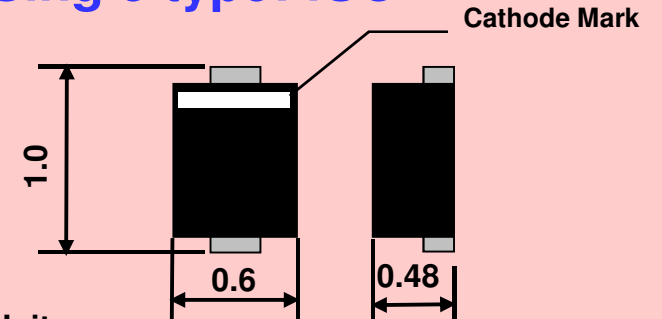
JDV2S41FS

Low-Resistance & Small Package fSC



Package Dimension

Single type: fSC

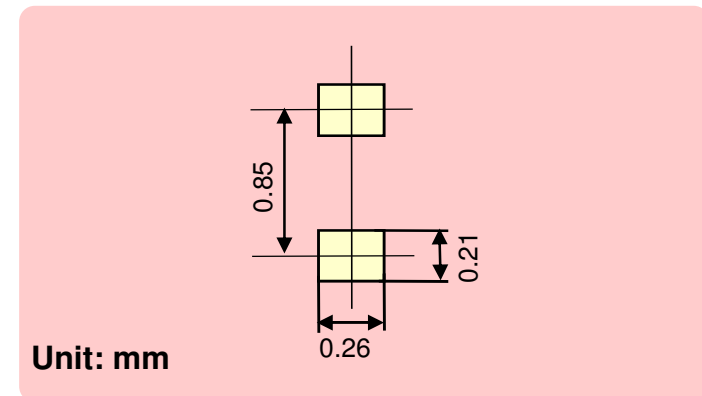


Unit: mm

Electrical characteristics

Characteristics (Symbol)	Specification @Test condition
Reverse voltage (VR)	15V(min.) @IR=1uA
Reverse current (IR)	3nA(max.) @VR=15V
Capacitance (C2V)	14pF(min.) @VR=2V, f=1MHz
Capacitance (C10V)	6.5pF(max.) @VR=10V, f=1MHz
Capacitance ratio (C2V/C10V)	2.5(typ.)
Series resistance (rs)	0.2Ω(typ.) @VR=5V, f=470MHz

Reference Pad Dimension



Unit: mm

5. VCO



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Selection guide of varactor diode for VCO

Part Number	VR (V)	CT(1)		CT(2)		CT(1)/CT(2)	rs(Typ.)			Package
		(pF)	VR (V)	(pF)	VR (V)		(Ω)	VR (V)	f (MHz)	
JDV2S36E	10	44.0 to 49.5	1	5.4 to 7.3	6	7.5 typ.	0.40	4	100	SOD-523
1SV325	10	44.0 to 49.5	1	9.2 to 12.0	4	4.3 typ.	0.40	4	100	SOD-523
1SV282	34	33.0 to 38.0	2	2.6 to 3.0	25	12.5 typ.	0.60	5	470	SOD-523
1SV323	10	26.5 to 29.5	1	6.0 to 7.1	4	4.3 typ.	0.40	4	100	SOD-523
1SV305	10	17.3 to 19.3	1	5.3 to 6.6	4	3.0 typ.	0.35	1	470	SOD-523
1SV281	10	15.0 to 17.0	1	7.3 to 8.7	4	2.0 typ.	0.28	1	470	SOD-523
JDV2S41FS	15	14.0 to 16.0	2	5.5 to 6.5	10	2.5 typ.	0.20	5	470	SOD-923
JDV2S09FS	10	9.7 to 11.1	1	4.45 to 5.45	4	2.1 typ.	0.33	1	470	SOD-923
JDV2S10FS	10	7.3 to 8.4	0.5	2.75 to 3.4	2.5	2.55 typ.	0.35	1	470	SOD-923
JDV2S07FS	10	4.0 to 4.9	1	1.85 to 2.35	4	2.3 typ.	0.42	1	470	SOD-923
1SV280	15	3.8 to 4.7	2	1.5 to 2.0	10	2.4 typ.	0.44	1	470	SOD-523

Package name	SOD-323 USC	SOD-523 ESC	SOD-923 fSC
Package image			

SPICE model of varactor Diode

Varactor diode selection table

6. Cordless phone

800MHz, 2.4GHz, 5.8GHz

- RF transistor
- Varactor diode
- PIN diode



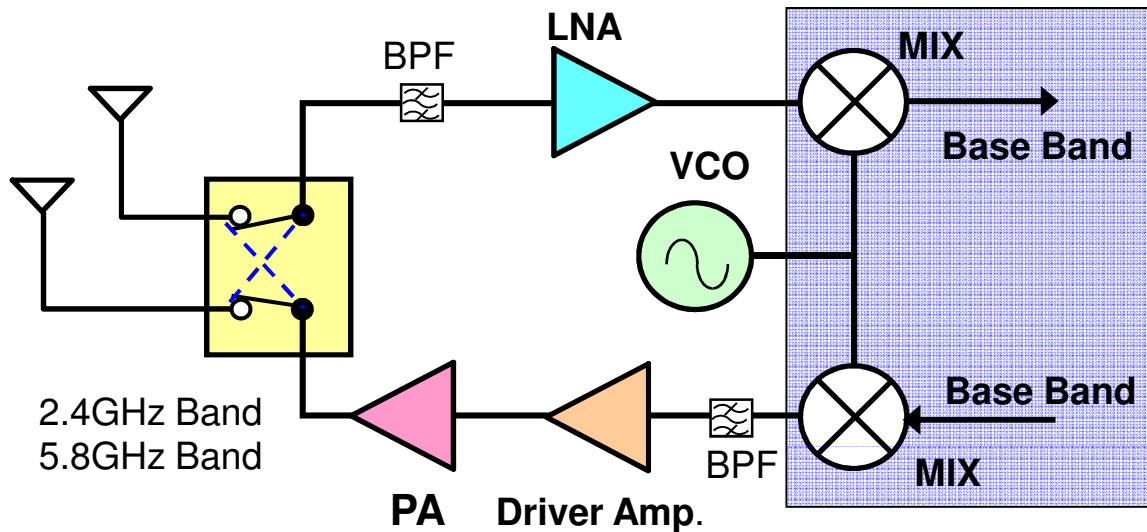
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6. Cordless phone



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Block diagram of cordless phone



RF switching diode selection table

RF transistor selection table

SPICE model of RF transistor

Varactor diode selection table

SPICE model of varactor Diode

Transistors for LNA, Mix, VCO and Driver Amp

Applications	Antenna switch	PA	Driver amp.	LNA	VCO
5.8GHz cordless phone	JDP3C02AU JDP3C13U	MT4S102U , MT4S300U ,MT4S301U			JDV2S07FS JDV2S10FS JDV2S41FS
2.4GHz cordless phone 1.8,1.9GHz DECT		---	---	MT4S300U MT4S301U TA4032FT	
800MHz cordless phone		---	2SC5066 2SC5086		

7. FRS/GMRS/2-way radio

- RF power MOSFET for PA
- RF transistor
- Varactor diode for VCO
- PIN diode for antenna switch



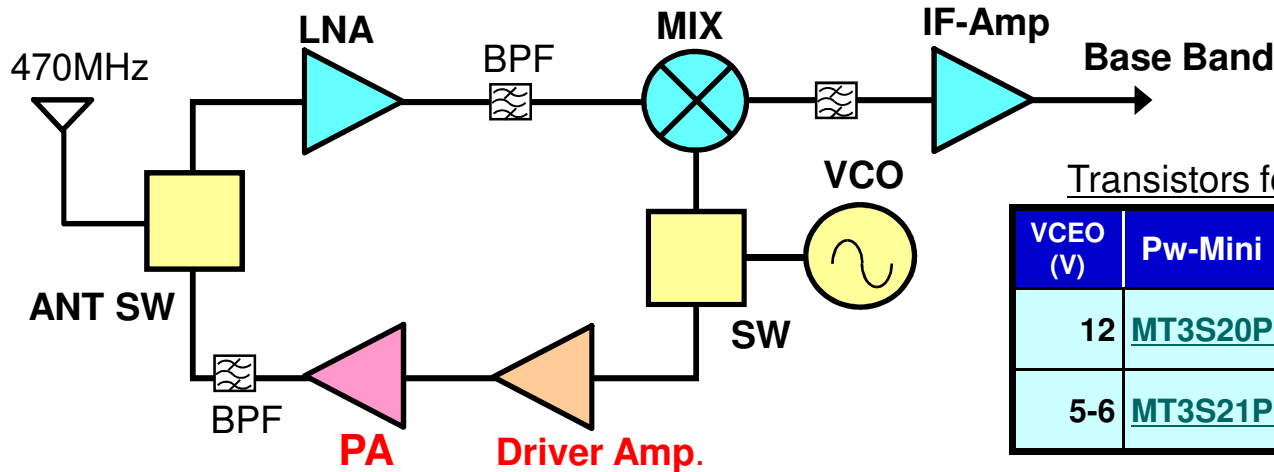
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7. FRS/GMRS/2-way radio



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Block diagram of FRS/GMRS



Transistors for LNA, Mix, VCO and Driver Amp

VCE0 (V)	Pw-Mini	SOT-23F	UFM	USQ
12	MT3S20P	MT3S20R	MT3S20TU	2SC5088
5-6	MT3S21P	MT3S19R	MT3S19TU	MT4S24BU

MOSFET, Transistors for PA and Driver Amp

PA	Driver Amp	Vds(V)	ANT_Po(W)	Application
RFM08U9X	2SK3074	9.6	5.0	Land mobile/HAM
RFM12U7X	RFM01U7P	7.2	5.0-10.0	Land mobile/HAM
RFM07U7X			5.0	
RFM04U6P	RFM00U7U	4.5	6.0	GMRS
2SK3756			1.5-2.0	GMRS/FRS/PMR
2SK3078A			1.0	
RFM03U3CT			0.5	
		3.6	0.5-2.0	GMRS/FRS/PMR

RF MOSFET selection table

S-parameter of RF MOSFET

RF transistor selection table

SPICE model of RF transistor

Diodes

	S-FLAT	USC	ESC	fSC
PIN	JDP2S12CR	1SV307	1SV308	JDP2S02AFS
Band SW	---	1SS314	1SS381	---
Varicap	---	1SV324	JDV2S36E	JDV2S41FS

Varactor diode selection table

SPICE model of varactor Diode

7. FRS/GMRS/2-way radio



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Selection guide of RF Power MOSFET

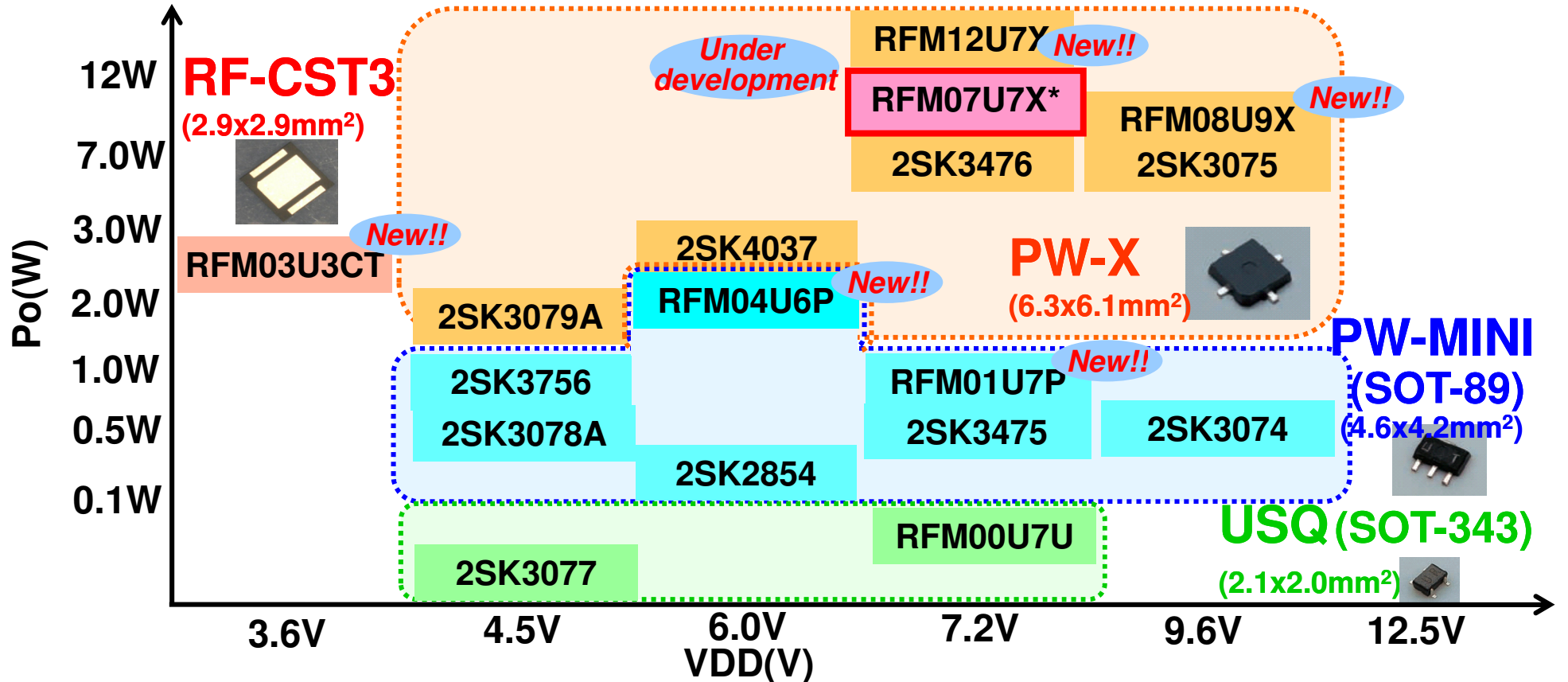
Output power at antenna	Supply voltage	Recommendation products
10-5W	7.2V	RFM12U7X+RFM01U7P+RFM00U7U
5W	9.6V	RFM08U9X+2SK3074
	7.2V	RFM07U7X+RFM01U7P
3W	6V	RFM04U6P+RFM00U7U
2W	4.5V	RFM04U6P+RFM00U7U
	3.6V	RFM03U3CT+RFM00U7U
1W	4.5V	2SK3756+RFM00U7U
	3.6V	RFM03U3CT+RFM00U7U
0.5W	4.5V	2SK3078A+RFM00U7U
	3.6V	RFM03U3CT+RFM00U7U

7. FRS/GMRS/2-way radio



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Line-up of RF Power MOSFET



Advantage of Toshiba products: Rich line-up with output powers, supply voltages and packages. S parameters are available for simulation on the [Toshiba web site](http://www.semicon.toshiba.co.jp). Please ask the SPICE models to Toshiba sales team.

7. FRS/GMRS/2-way radio



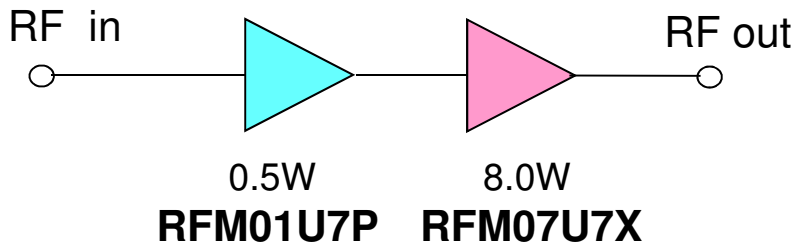
JH11-P165

RFM07U7X 7.2V / 8W , Wideband matching

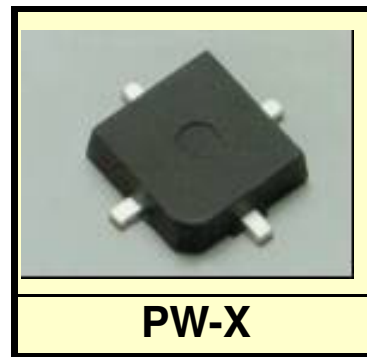
VHF/UHF 5 W application

Under development

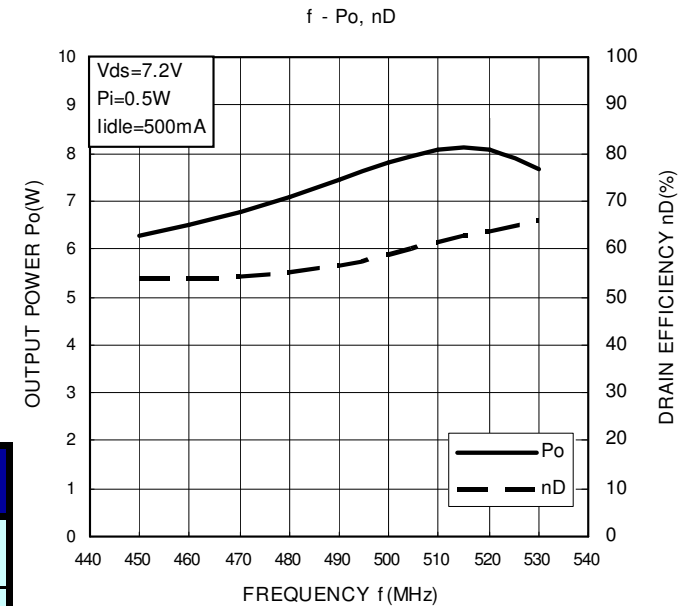
Block diagram example



Package



RFM07U7X freq-Po



Schedule

ES: Available
MP: 1Q/2012

Electrical characteristics

Characteristics	Spec. @ test condition
Output Power (P_O)	8W (typ.) @ $V_{DS}=7.2V$, $f=520MHz$
Drain Efficiency (η_D)	68% (typ.) @ $V_{DS}=7.2V$, $f=520MHz$
Power Gain (G_P)	12.5dB (typ.) @ $V_{DS}=7.2V$, $f=520MHz$

7. FRS/GMRS/2-way radio



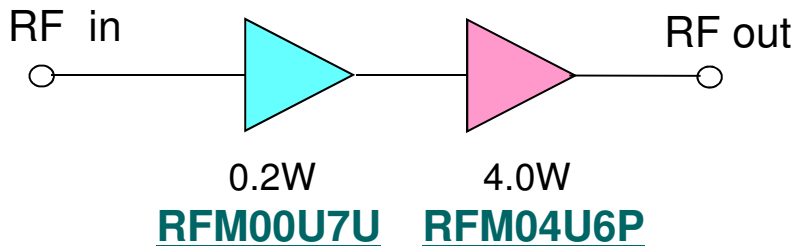
JH11-P165

RFM04U6P 4W/6V

NEW!

For VHF/UHF 2W~3W application

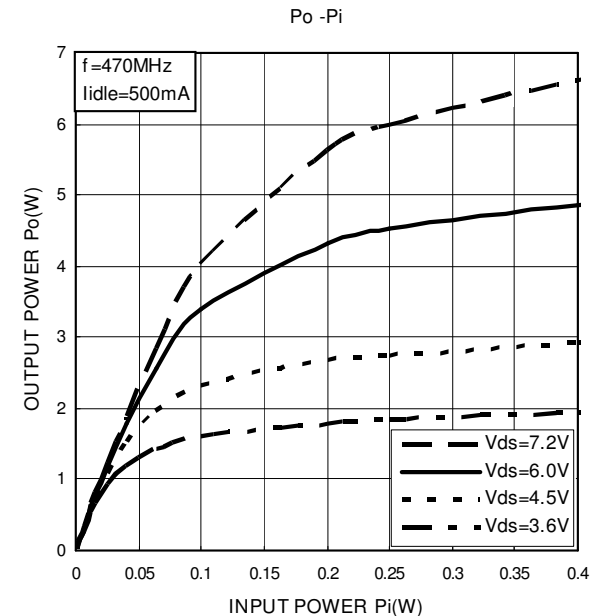
Block diagram example



Package



RFM04U6P Pi-Po



Schedule

MP: OK

Electrical characteristics

Characteristics	Spec. @ test condition
Output Power (P_o)	4W (typ.) @ $V_{DS}=6\text{V}$, $f=470\text{MHz}$
Drain Efficiency (η_D)	70% (typ.) @ $V_{DS}=6\text{V}$, $f=470\text{MHz}$
Power Gain (G_P)	13.3dB (typ.) @ $V_{DS}=6\text{V}$, $f=470\text{MHz}$

7. FRS/GMRS/2-way radio



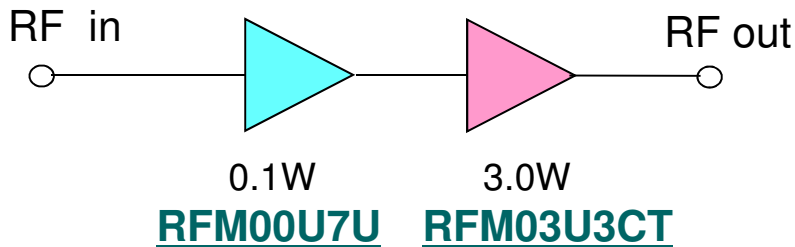
JH11-P165

RFM03U3CT 3W/3.6V

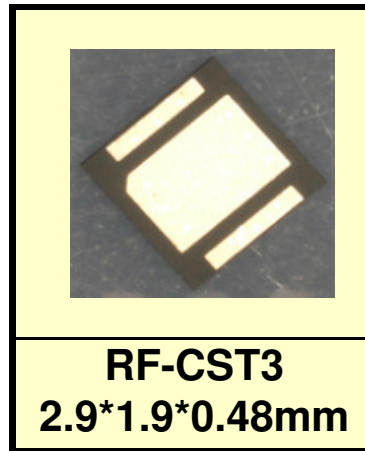
NEW!

For VHF/UHF 1W~2W application

Block diagram example



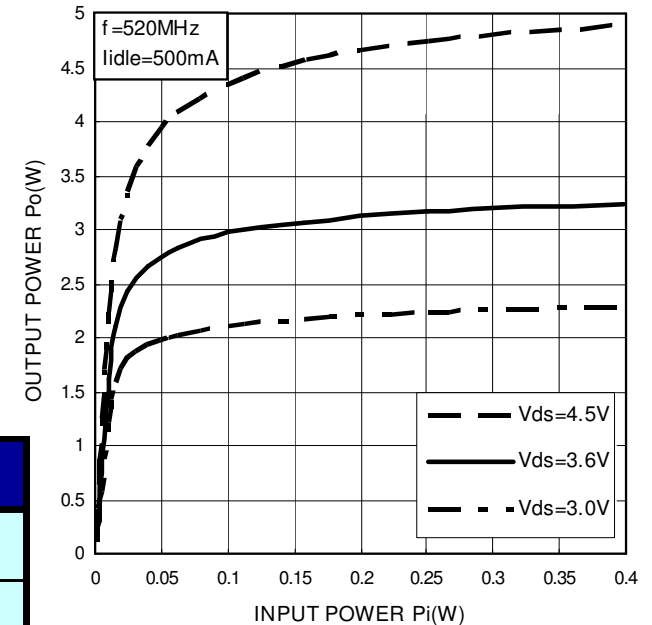
Package



Schedule

MP: OK

RFM03U3CT Pi-Po



Electrical characteristics

Characteristics	Spec. @ test condition
Output Power (P_o)	3.0W (typ.) @ $V_{DS}=3.6\text{V}$, $f=520\text{MHz}$
Drain Efficiency (η_D)	60% (typ.) @ $V_{DS}=3.6\text{V}$, $f=520\text{MHz}$
Power Gain (G_P)	15.0dB (typ.) @ $V_{DS}=3.6\text{V}$, $f=520\text{MHz}$

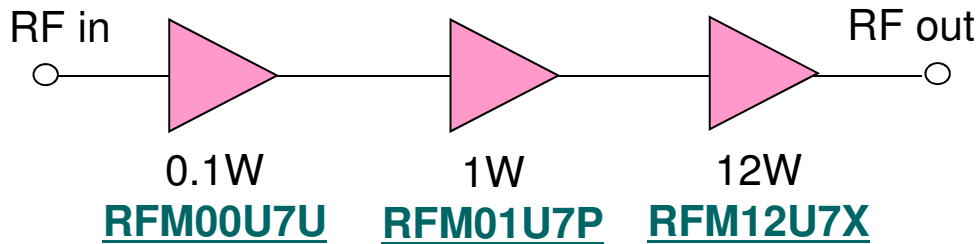
7. FRS/GMRS/2-way radio



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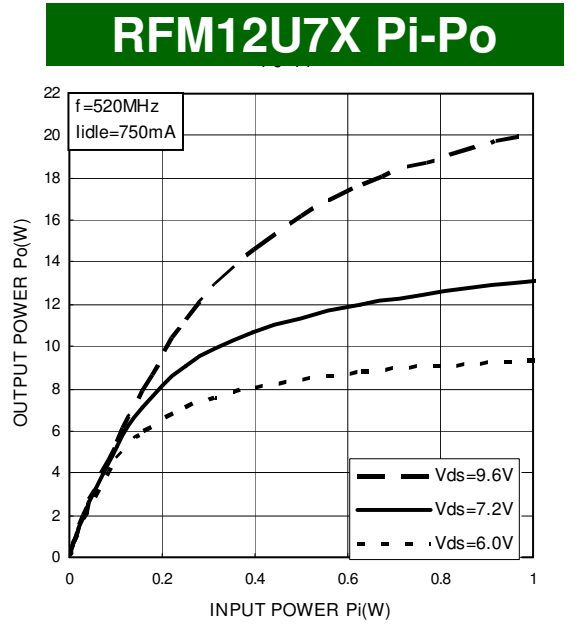
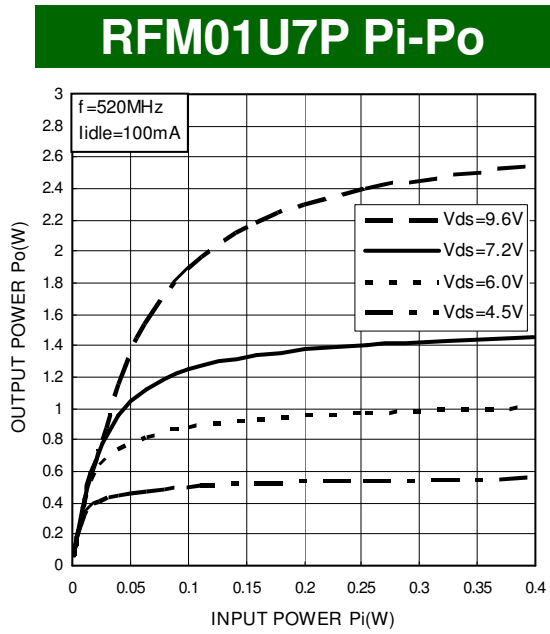
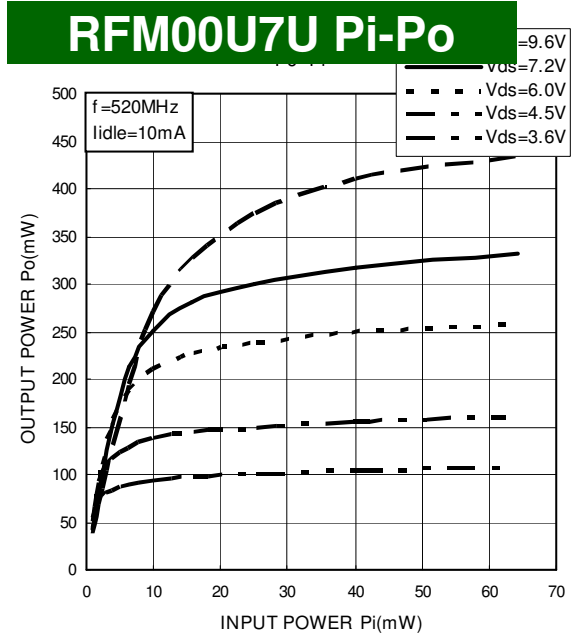
RFM12U7X/ RFM01U7P/ RFM00U7U 12W/7.2V

Block diagram example



Electrical characteristics

Part number	Po(Min.)	Pi	Gp(dB)	Package
RFM12U7X	11.5W	1W	10.6	PW-X
RFM01U7P	1.0W	0.1W	10.0	PW-MINI
RFM00U7U	0.1W	0.01W	10.0	USQ



7. FRS/GMRS/2-way radio



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JDP2S12CR PIN diode

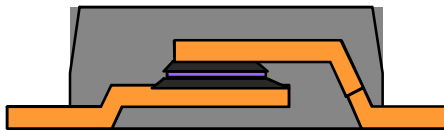
For antenna switch

NEW!

Feature

- Package: S-FLAT
- Capacitance: 1.0pF
- Series resistance: $r_s=0.4\text{ohm}$

Cu connector structure

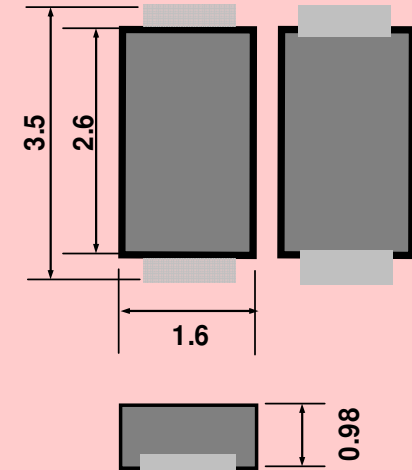


Electrical characteristics

Characteristics	Symbol	Test condition	Min.	Typ.	Max.	Unit.
Reverse current	I_R	$V_R=50\text{V}$	-	-	10	μA
Forward voltage	V_F	$I_F=50\text{mA}$	-	0.8	1.2	V
Capacitance	C_T	$V_R=40\text{V}, f=1\text{MHz}$	-	1.0	1.3	pF
Series resistance	r_s	$I_F=10\text{mA}, f=100\text{MHz}$	-	0.4	0.8	ohm

Package

S-FLAT™



Unit: mm

In MP

RF switching diode selection table

General information



TOSHIBA semiconductor web site

Datasheet, Simulation model, Spara, Spice data

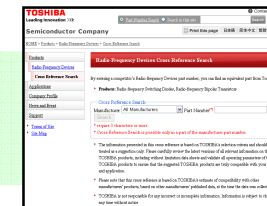
<http://www.semicon.toshiba.co.jp/eng/>



Cross reference search of RF products

PIN diode, Varactor diode, Microwave transistor

<http://www.semicon.toshiba.co.jp/eng/product/rf/xref/index.html>



Product Catalogs are available from TOSHIBA web

General- Purpose Small-Signal Surface-Mount Devices

Transistors, FET, Diodes, Multi-chip Discrete Device,
One Gate Logic, LDO, LED Driver, OP Amp and Comparator ICs

http://www.semicon.toshiba.co.jp/docs/catalog/en/BCE0030_catalog.pdf

General- Purpose Logic ICs

CMOS Logic IC, Bus Switches, Level shifter

http://www.semicon.toshiba.co.jp/docs/catalog/en/BCE0008_catalog.pdf

Radio-Frequency Semiconductors

Microwave Transistor, FETs, Variavre capacitance Diodes,
Shottky Diodes, PIN Diodes, RF MMIC, RF Power Device,

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