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## **BB503C**

# Built in Biasing Circuit MOS FET IC UHF RF Amplifier

REJ03G0834-0500 (Previous ADE-208-812C) Rev.5.00 Aug.10.2005

#### **Features**

- Built in Biasing Circuit; To reduce using parts cost & PC board space.
- Low noise; NF = 1.8 dB typ. at f = 900 MHz
- High gain; PG = 22 dB typ. at f = 900 MHz
- Withstanding to ESD; Built in ESD absorbing diode. Withstand up to 200V at C=200pF, Rs=0 conditions.
- Provide mini mold packages; CMPAK-4(SOT-343mod)

## **Outline**

RENESAS Package code: PTSP0004ZA-A

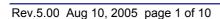
(Package name: CMPAK-4)



- 1. Source
- 2. Gate1
- 3. Gate2
- 4. Drain

Notes: 1. Marking is "CS-".

2. BB503C is individual type number of RENESAS BBFET.



## **Absolute Maximum Ratings**

 $(Ta = 25^{\circ}C)$ 

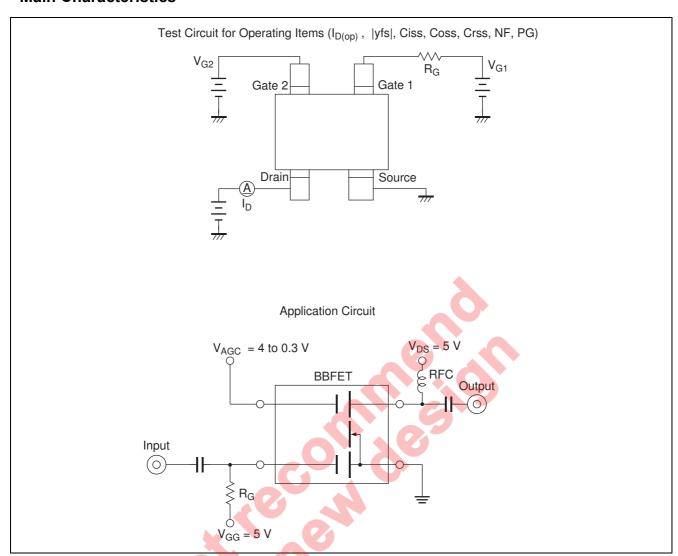
Item	Symbol	Ratings	Unit
Drain to source voltage	V <sub>DS</sub>	6	V
Gate1 to source voltage	V <sub>G1S</sub>	+6	V
		-0	
Gate2 to source voltage	V <sub>G2S</sub>	+6	V
		-0	
Drain current	I <sub>D</sub>	20	mA
Channel power dissipation	Pch	100	mW
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

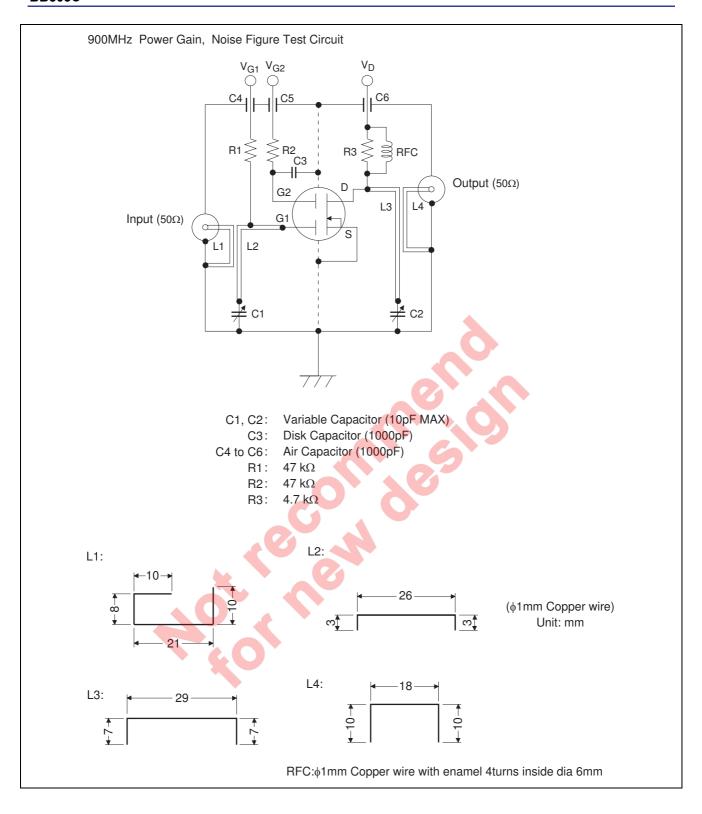
## **Electrical Characteristics**

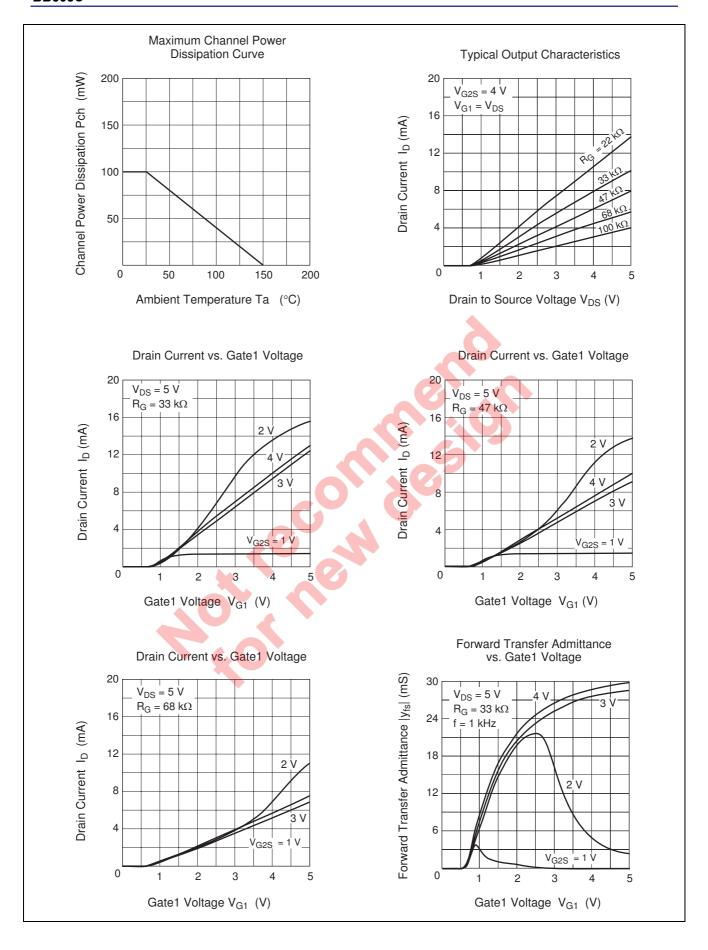
 $(Ta = 25^{\circ}C)$ 

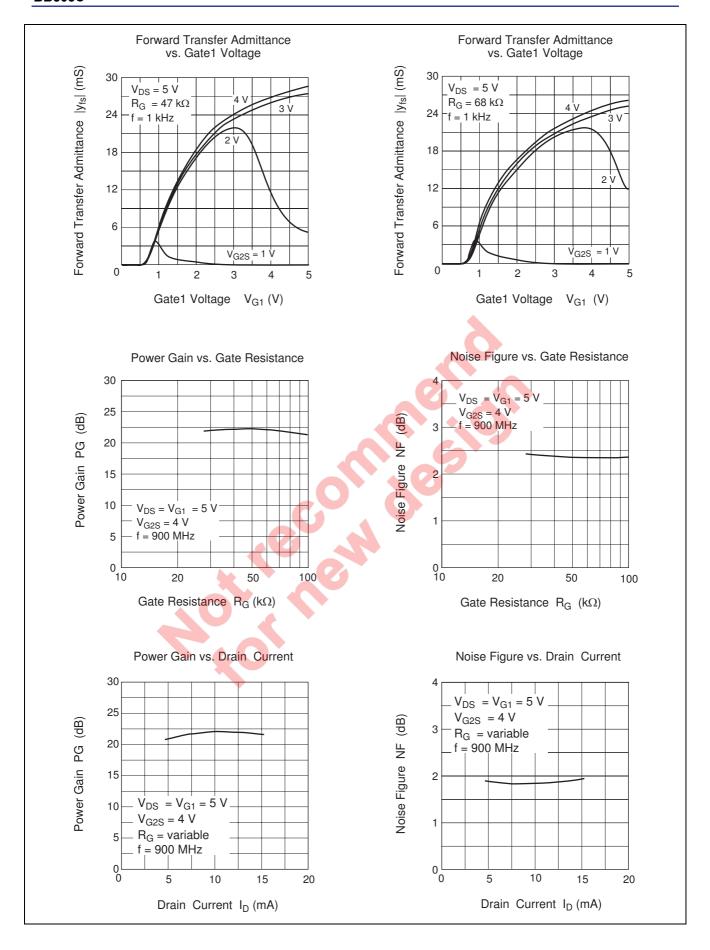
Item	Symbol	Min	Тур	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	6	_		٧	$I_D = 200 \mu A, V_{G1S} = V_{G2S} = 0$
Gate1 to source breakdown voltage	$V_{(BR)G1SS}$	+6	_		>	$I_{G1}$ = +10 $\mu$ A, $V_{G2S}$ = $V_{DS}$ = 0
Gate2 to source breakdown voltage	$V_{(BR)G2SS}$	+6	_		V	$I_{G2}$ = +10 $\mu$ A, $V_{G1S}$ = $V_{DS}$ = 0
Gate1 to source cutoff current	I <sub>G1SS</sub>	_	_	+100	nA	$V_{G1S} = +5 \text{ V}, V_{G2S} = V_{DS} = 0$
Gate2 to source cutoff current	I <sub>G2SS</sub>	_		+100	nA	$V_{G2S} = +5 \text{ V}, V_{G1S} = V_{DS} = 0$
Gate1 to source cutoff voltage	V <sub>G1S(off)</sub>	0.5	0.7	1.0	V	V <sub>DS</sub> = 5 V, V <sub>G2S</sub> = 4 V
						I <sub>D</sub> = 100 μA
Gate2 to source cutoff voltage	$V_{G2S(off)}$	0.5	0.7	1.0	<b>V</b>	$V_{DS} = 5 \text{ V}, V_{G1S} = 5 \text{ V}$
						$I_D = 100  \mu A$
Drain current	I <sub>D(op)</sub>	7	10	13	mA	$V_{DS} = 5 \text{ V}, V_{G1} = 5 \text{ V}$
						$V_{G2S}$ = 4 V, $R_G$ = 47 k $\Omega$
Forward transfer admittance	y <sub>fs</sub>	19	24	29	mS	$V_{DS}$ = 5 V, $V_{G1}$ = 5 V, $V_{G2S}$ =4 V
	10					$R_G = 47 \text{ k}\Omega, f = 1 \text{ kHz}$
Input capacitance	Ciss	1.4	1.7	2.0	pF	$V_{DS} = 5 V, V_{G1} = 5 V$
Output capacitance	Coss	0.7	1.1	1.5	pF	$V_{G2S}$ =4 $V$ , $R_G$ = 47 $k\Omega$
Reverse transfer capacitance	Crss	_	0.025	0.05	pF	f = 1 MHz
Power gain	PG	17	22	_	dB	V <sub>DS</sub> = 5 V, V <sub>G1</sub> = 5 V
Noise figure	NF	_	1.8	2.4	dB	$V_{G2S}$ =4 $V$ , $R_G$ = 47 $k\Omega$
						f = 900 MHz

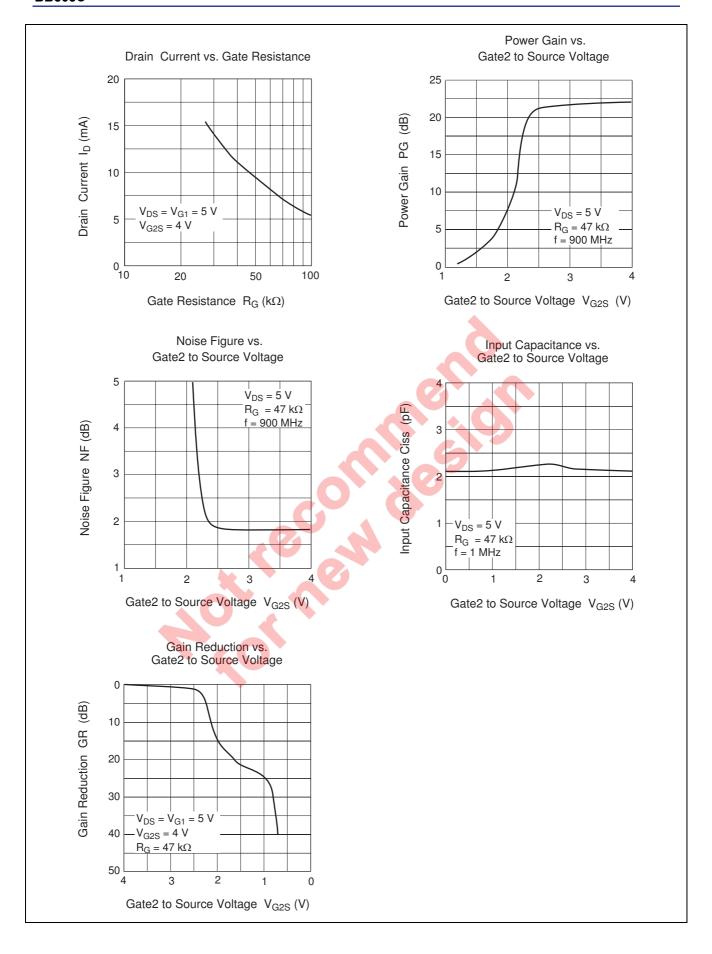
## **Main Characteristics**



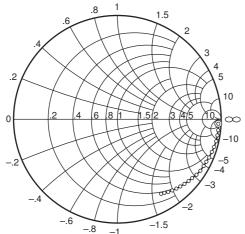








### S11 Parameter vs. Frequency

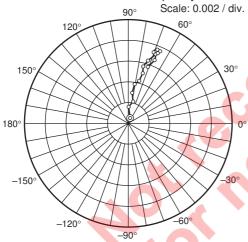


Test Condition:  $V_{DS}=5~V$  ,  $V_{G1}=5~V$   $V_{G2S}=4~V$  ,  $R_{G}=47~k\Omega$  ,  $Zo=50\Omega$ 

50 to 1000 MHz (50 MHz step)

⊚-----

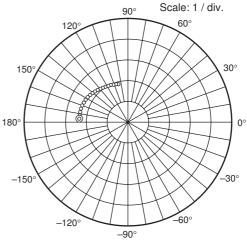
#### S12 Parameter vs. Frequency



Test Condition:  $V_{DS}=5~V$  ,  $V_{G1}=5~V$   $V_{G2S}=4~V$  ,  $R_{G}=47~k\Omega$  ,  $Z_{O}=50\Omega$ 

50 to 1000 MHz (50 MHz step)

#### S21 Parameter vs. Frequency

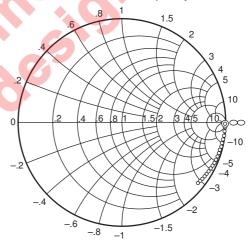


Test Condition: V  $_{DS}$  = 5 V , V  $_{G1}$  = 5 V  $V_{G2S}$  = 4 V , R  $_{G}$  = 47 k  $\!\Omega$  , Z  $\!o$  = 50  $\!\Omega$ 

50 to 1000 MHz (50 MHz step)

**O** 

### S22 Parameter vs. Frequency



Test Condition: V  $_{DS}$  = 5 V , V  $_{G1}$  = 5 V  $V_{G2S}$  = 4 V , R  $_{G}$  = 47 k  $\!\Omega$  , Zo = 50  $\!\Omega$ 

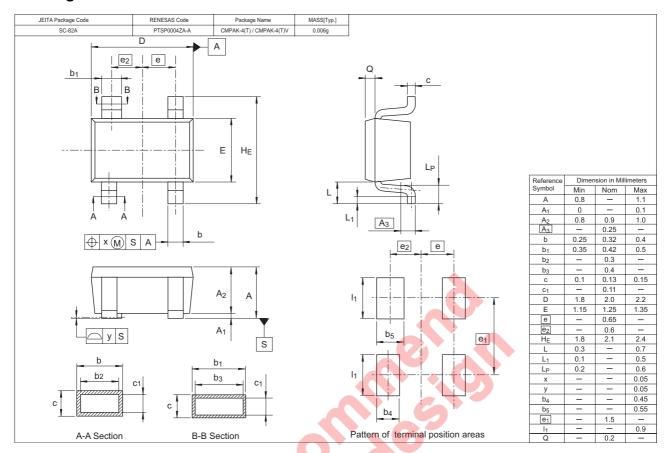
50 to 1000 MHz (50 MHz step)

⊚——∘

## **S** Parameter

1	$(V_{DS} = )$	$V_{\alpha i} =$	5W	Vara :	= 4W	$\mathbf{R}_{\alpha} =$	47kO	7 <sub>0</sub> =	50O)	١
(	$v_{DS}$ –	$v_{G1}$ $-$	JV,	V G2S -	-4v,	$\kappa_G$ –	4/K52,	Z0 –	JUS2)	,

## **Package Dimensions**



## **Ordering Information**

Part Name	Quantity		Shipping Container
BB503CCS-TL-E	3000	φ 17	8 mm Reel, 8 mm Emboss Taping

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