

# TBB1010

## Twin Built in Biasing Circuit MOS FET IC VHF/VHF RF Amplifier

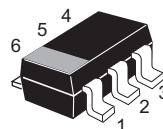
R07DS0316EJ0600  
(Previous: REJ03G0844-0500)  
Rev.6.00  
Mar 28, 2011

### Features

- Small SMD package CMPAK-6 built in twin BBFET; To reduce using parts cost & PC board space.
- High  $|y_{fs}|=29\text{mS} \times 2$
- Suitable for World Standard Tuner RF amplifier.
- Very useful for total tuner cost reduction.
- Withstanding to ESD; Built in ESD absorbing diode. Withstand up to 200 V at  $C = 200 \text{ pF}$ ,  $R_s = 0$  conditions.
- Provide mini mold packages; CMPAK-6

### Outline

RENESAS Package code: PTSP0006JA-A  
(Package name: CMPAK-6)



1. Drain(1)
2. Source
3. Drain(2)
4. Gate-1(2)
5. Gate-2
6. Gate-1(1)

- Notes:
1. Marking is "KM".
  2. TBB1010 is individual type number of RENESAS TWIN BBFET.

### Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DS}$	6	V
Gate1 to source voltage	$V_{G1S}$	+6 -0	V
Gate2 to source voltage	$V_{G2S}$	+6 -0	V
Drain current	$I_D$	30	mA
Channel power dissipation	$P_{ch}^{*3}$	250	mW
Channel temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

Notes: 3. Value on the glass epoxy board (50mm × 40mm × 1mm).

## Electrical Characteristics

(Ta = 25°C)

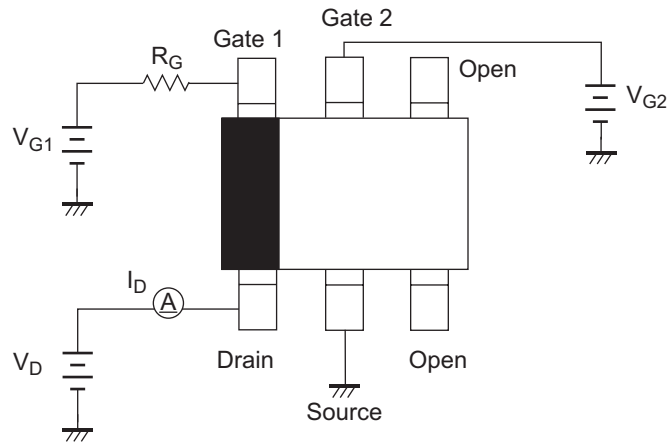
The below specification are applicable for FET1 and FET2 unit

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	6	—	—	V	$I_D = 200 \mu A, V_{G1S} = V_{G2S} = 0$
Gate1 to source breakdown voltage	$V_{(BR)G1SS}$	+6	—	—	V	$I_{G1} = +10 \mu A, V_{G2S} = V_{DS} = 0$
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	$I_{G1SS}$	—	—	+100	nA	$V_{G1S} = +5 V, V_{G2S} = V_{DS} = 0$
Gate2 to source cutoff current	$I_{G2SS}$	—	—	+100	nA	$V_{G2S} = +5 V, V_{G1S} = V_{DS} = 0$
Gate1 to source cutoff voltage	$V_{G1S(off)}$	0.6	—	1.1	V	$V_{DS} = 5 V, V_{G2S} = 4 V,$ $I_D = 100 \mu A$
Gate2 to source cutoff voltage	$V_{G2S(off)}$	0.6	—	1.1	V	$V_{DS} = 5 V, V_{G1S} = 5 V,$ $I_D = 100 \mu A$
Drain current	$I_{D(op)}$	12	16	20	mA	$V_{DS} = 5 V, V_{G1} = 5 V$ $V_{G2S} = 4 V, R_G = 120 k\Omega$
Forward transfer admittance	$ y_{fs} $	24	29	—	mS	$V_{DS} = 5 V, V_{G1} = 5 V, V_{G2S} = 4 V$ $R_G = 120 k\Omega, f = 1 kHz$
Input capacitance	$C_{iss}$	1.7	2.1	2.5	pF	$V_{DS} = 5 V, V_{G1} = 5 V$
Output capacitance	$C_{oss}$	1.0	1.4	1.8	pF	$V_{G2S} = 4 V, R_G = 120 k\Omega$
Reverse transfer capacitance	$C_{rss}$	—	0.03	0.05	pF	$f = 1 MHz$
Power gain	PG	25	30	—	dB	$V_{DS} = V_{G1} = 5 V, V_{G2S} = 4 V$
Noise figure	NF	—	1.1	1.8	dB	$R_G = 120 k\Omega, f = 200 MHz$

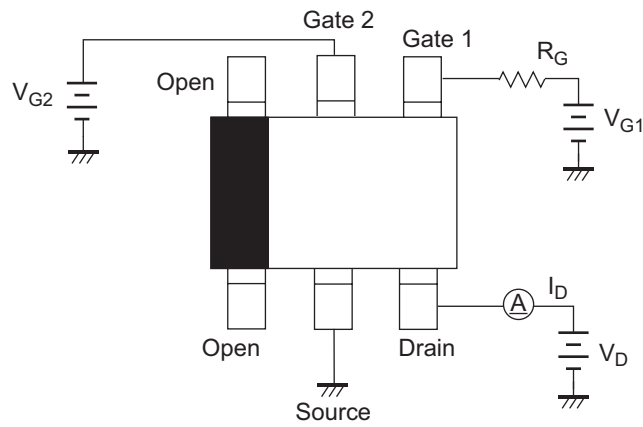
Test Circuits

- DC Biasing Circuit for Operating Characteristic Items ( $I_{D(op)}$ ,  $|y_{fs}|$ ,  $C_{iss}$ ,  $C_{oss}$ ,  $C_{rss}$ ,  $NF$ ,  $PG$ )

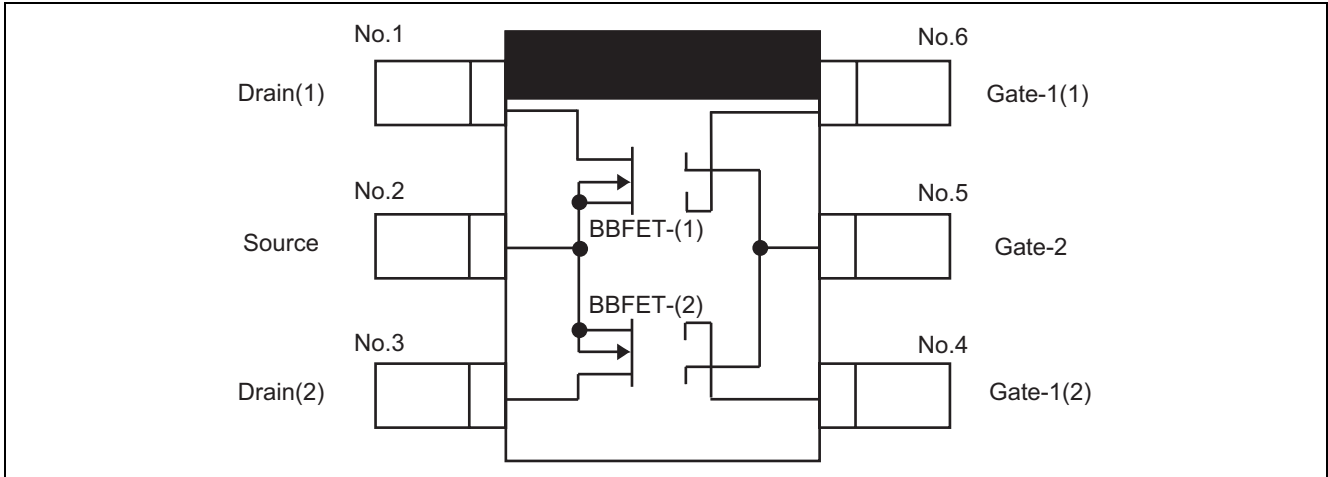
Measurement of FET1



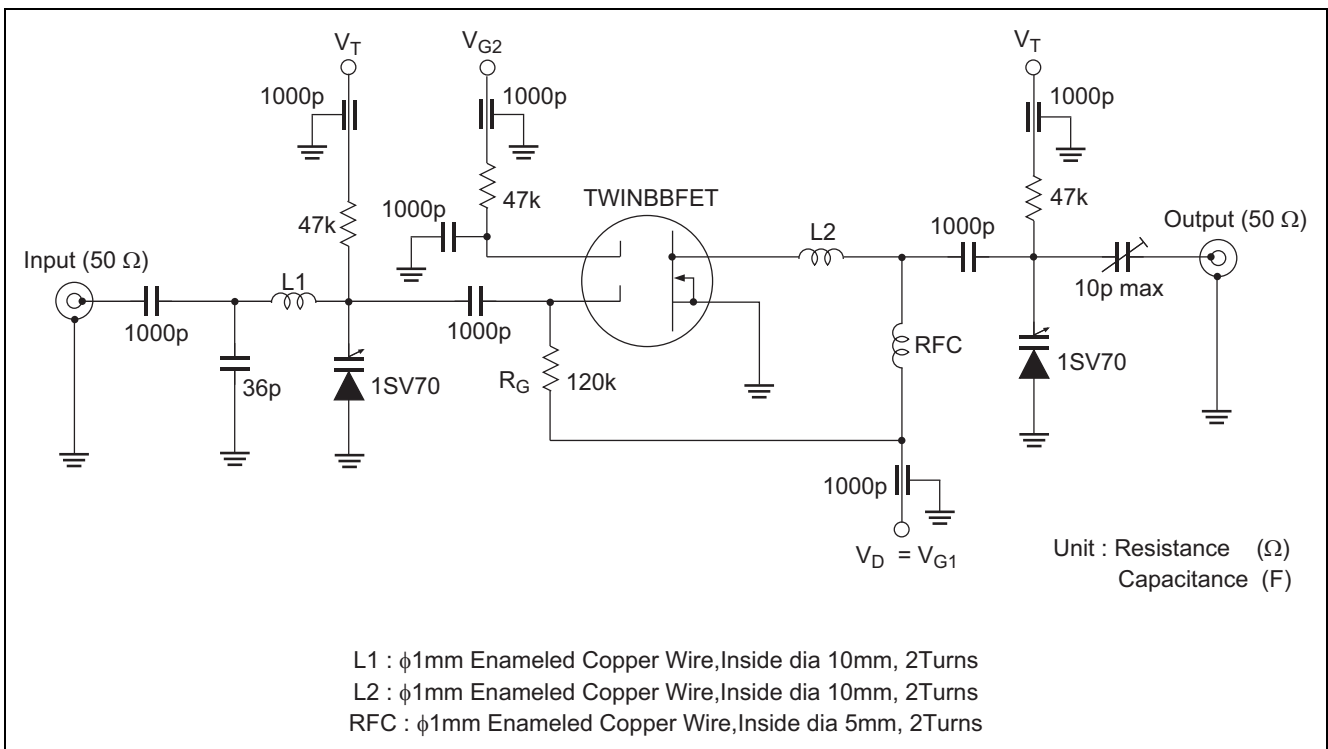
Measurement of FET2



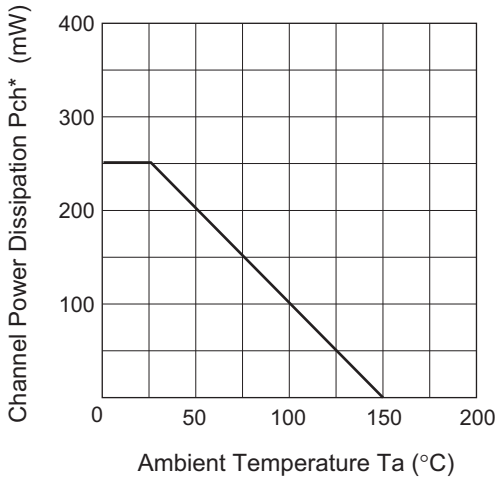
• Equivalent Circuit



• 200 MHz Power Gain, Noise Figure Test Circuit

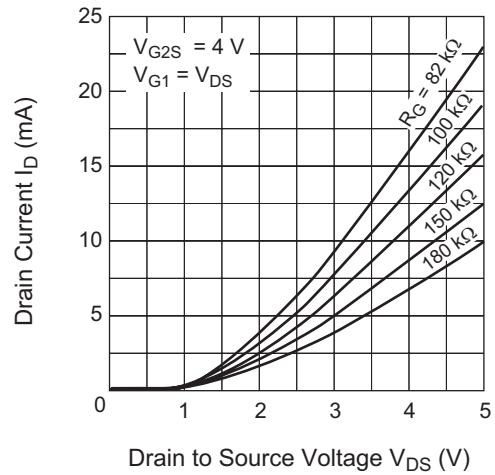


Maximum Channel Power Dissipation Curve

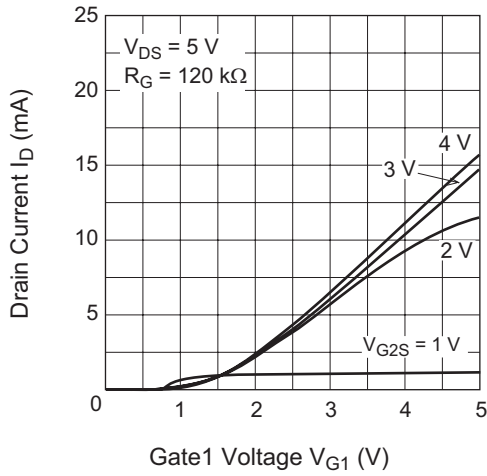


\* Value on the glass epoxy board (50mm × 40mm × 1mm)

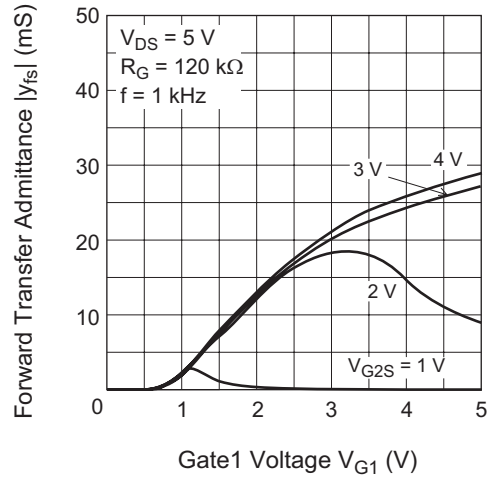
Typical Output Characteristics



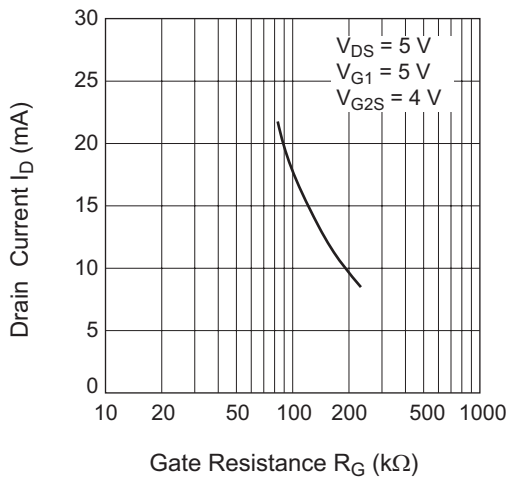
Drain Current vs. Gate1 Voltage



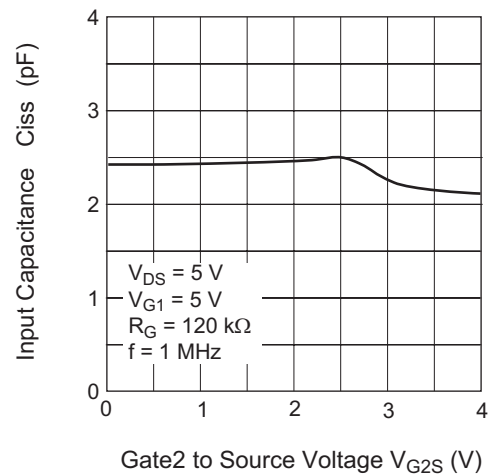
Forward Transfer Admittance vs. Gate1 Voltage



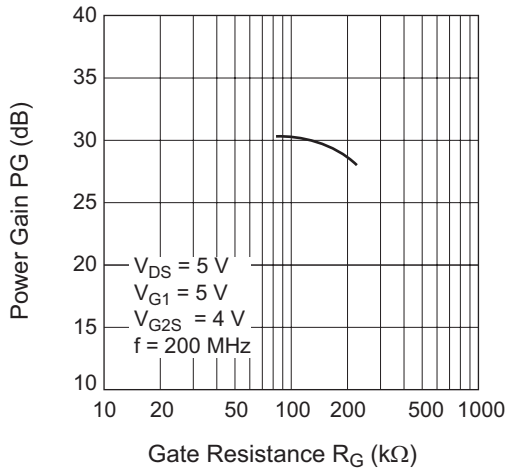
Drain Current vs. Gate Resistance



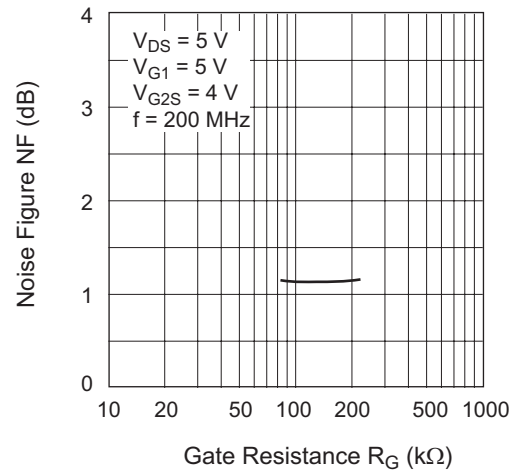
Input Capacitance vs. Gate2 to Source Voltage



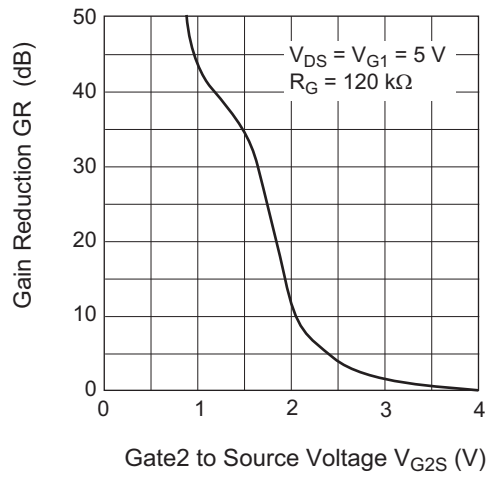
Power Gain vs. Gate Resistance



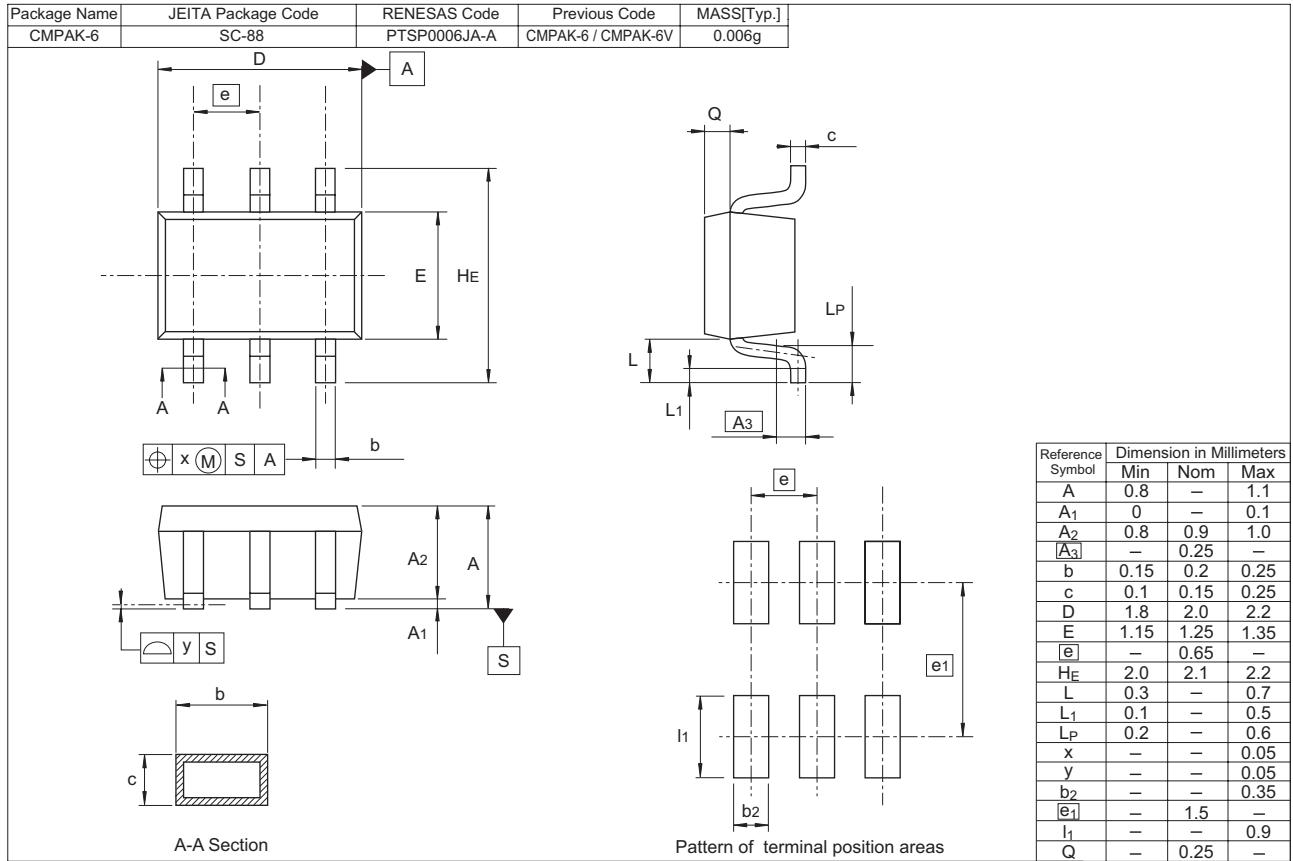
Noise Figure vs. Gate Resistance



Gain Reduction vs. Gate2 to Source Voltage



### Package Dimensions



### Ordering Information

Orderable Part Number	Quantity	Shipping Container
TBB1010KMTL-E	3000	φ 178 mm Reel, 8 mm Emboss Taping
TBB1010KMTL-H		

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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