TOSHIBA Transistor Silicon-Germanium NPN Epitaxial Planer Type

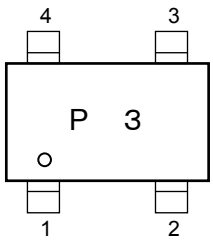
MT4S300U

○ UHF-SHF Low Noise Amplifier Application

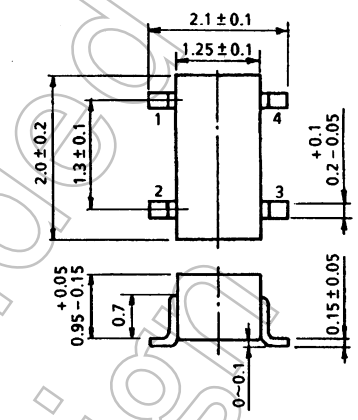
FEATURES

- Low Noise Figure :NF=0.55dB(Typ.) (@f=2GHz)
- High Gain :$|S21e|^2$=16.9dB(Typ.) (@f=2GHz)
- 2 kV ESD robustness (HBM) due to integrated protection circuits

Marking



Unit:mm



1. Collector
2. Emitter
3. Base
4. Emitter

USQ	
JEDEC	―
JEITA	―
TOSHIBA	2-2K1E

Weight: 6 mg (Typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-Base voltage	V_{CBO}	6	V
Collector-Emitter voltage	V_{CEO}	4	V
Collector-Current	I_C	50	mA
Base-Current	I_B	10	mA
Collector Power dissipation	P_C	100	mW
Collector Power dissipation	P_C(Note1)	250	mW
Junction temperature	T_j	150	°C
Storage temperature Range	T_{stg}	−55~150	°C

Note1 : The device is mounted on a FR4 board (20 mm x 25 mm x 1.55 mm (t))

Note2: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Microwave Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition Frequency	f_T	V_{CE}=3V, I_C=20mA	22.5	26.5	—	GHz
Insertion Gain	$\|S21e\|^2$	V_{CE}=3V, I_C=20mA,f=2GHz	14	16.9	—	dB
Noise Figure	NF	V_{CE}=3V, I_C=10mA, f=2GHz	—	0.55	0.7	dB

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector Cut-off Current	I_{CBO}	V_{CB}=5V, I_E=0	—	—	0.1	μA
DC Current Gain	hFE	V_{CE}=3V, I_C=10mA	200	—	400	-
Reverse Transfer Capacitance	C_{re}	V_{CB}=1V, I_E=0, f=1MHz (Note3)	—	0.16	0.27	pF

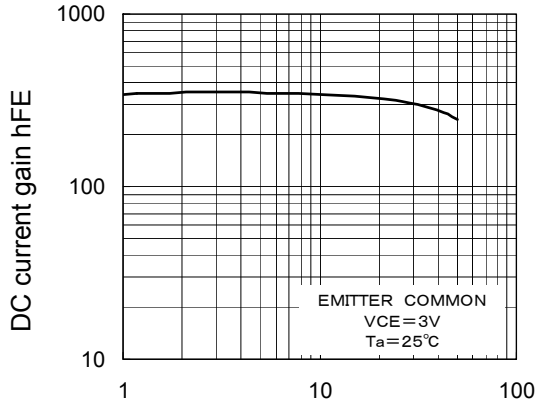
Note3: Cre is measured by 3 terminal method with capacitance bridge.

Caution:

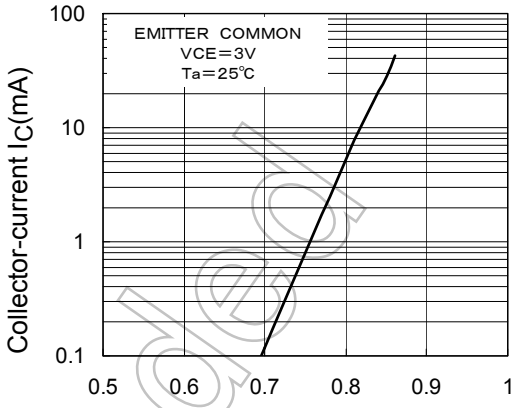
This device is due to applied the high frequency transistor process of fT=100GHz class is used for this product.

Please make enough tool and equipment earthed when you handle.

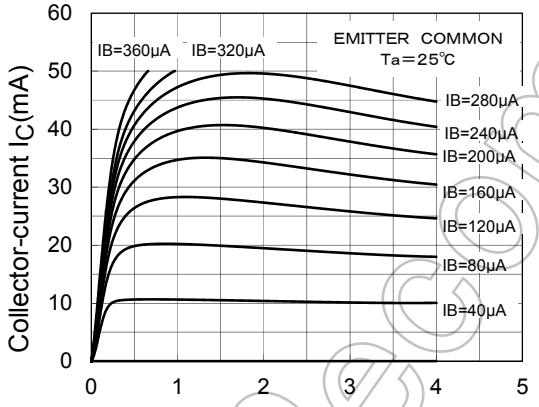
h_{FE}-I_C



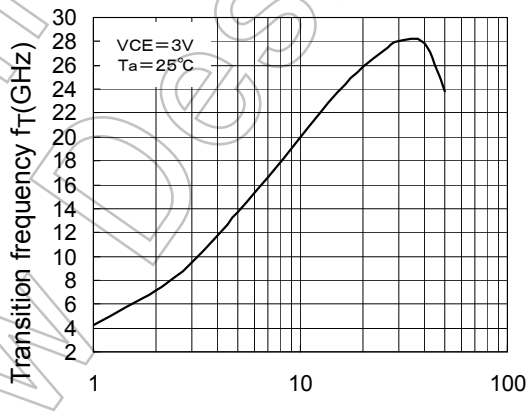
I_C-V_{BE}



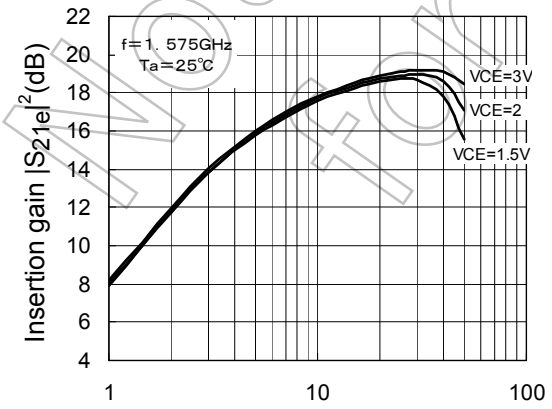
I_C-V_{CE}



f_T-I_C



$|S_{21e}|^2$-I_C



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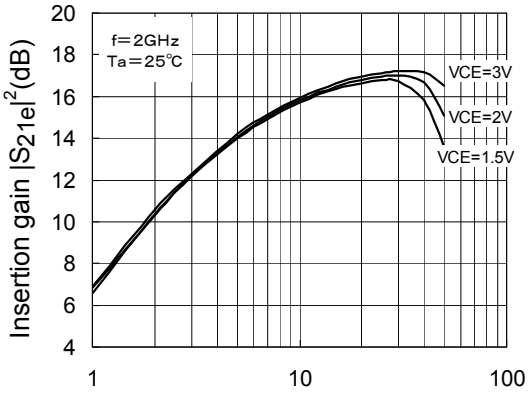

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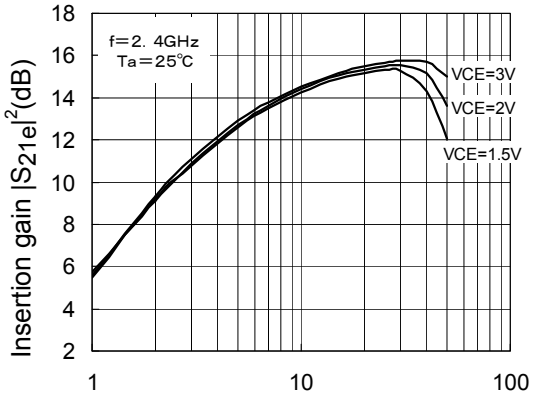
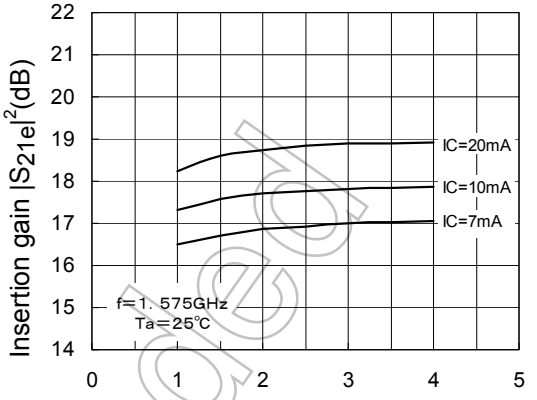


$|S_{21e}|^2$-V_{CE}



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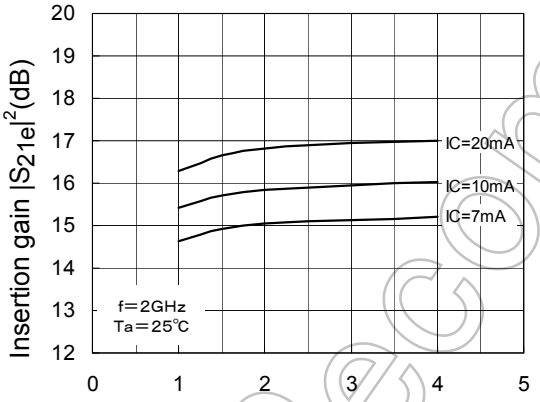

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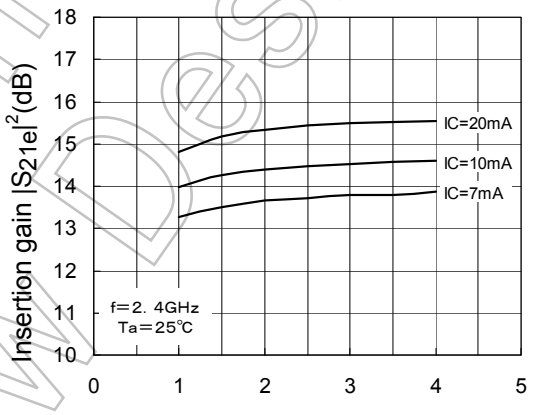
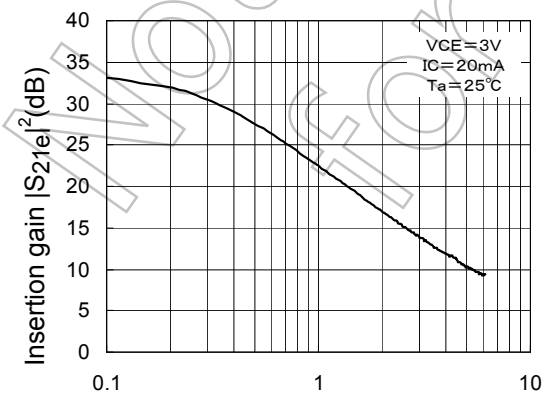
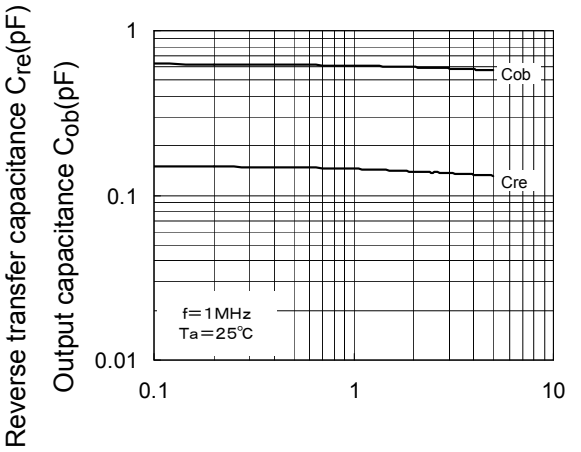


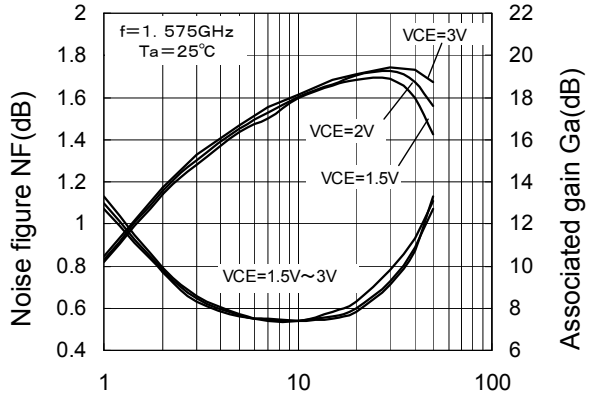
$|S_{21e}|^2$-Freq.



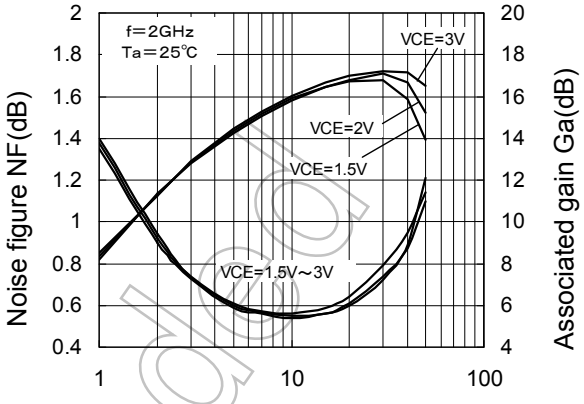
C_{re} ,C_{ob}-V_{CB}



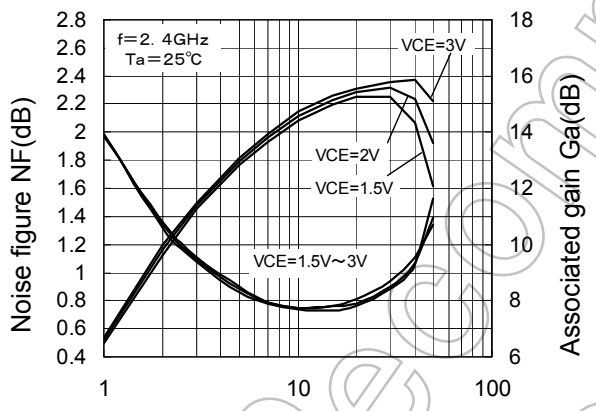
NF ,Ga-I_C



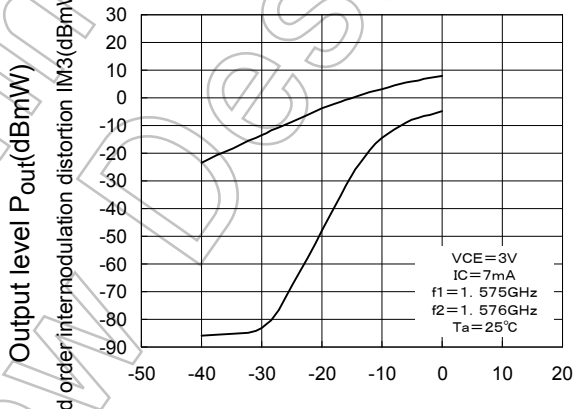
NF ,Ga-I_C



NF ,Ga-I_C



P_{out} ,IM_3-P_{in}



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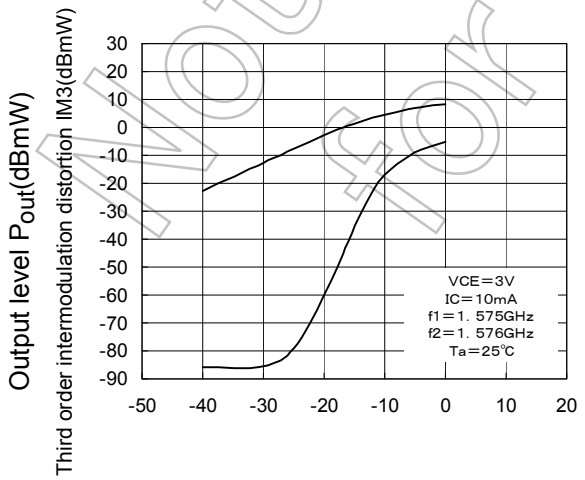
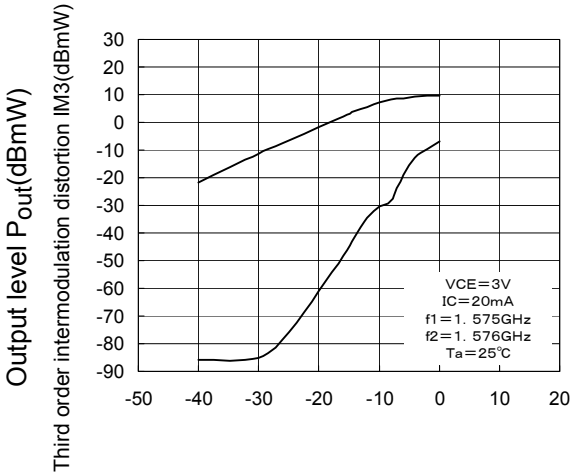


P_{out} ,IM_3-P_{in}



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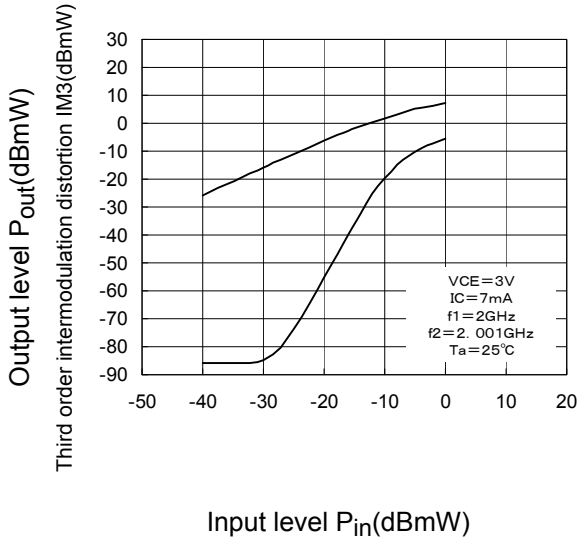

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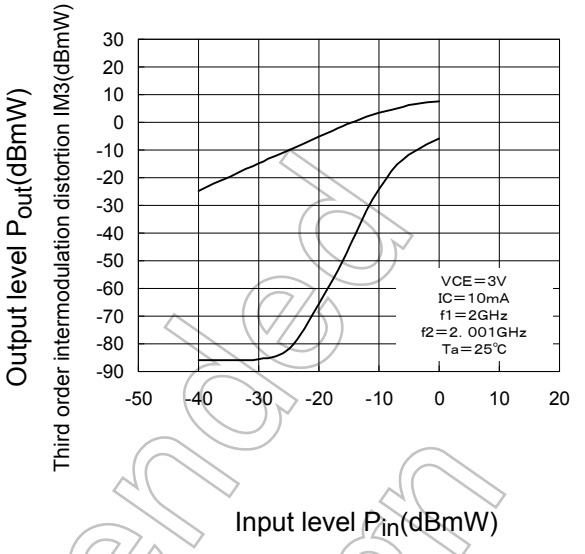

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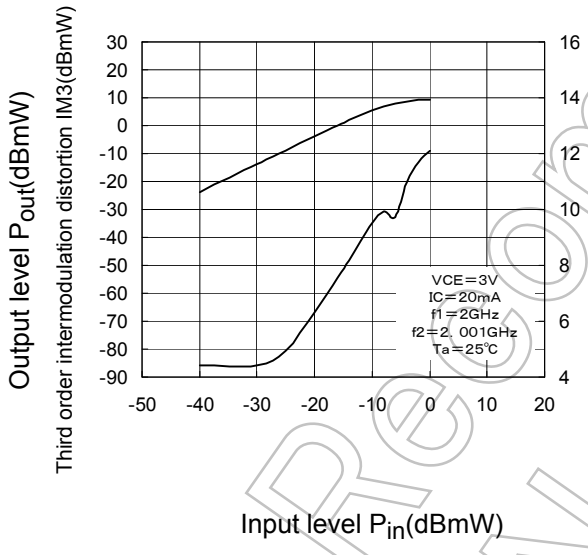
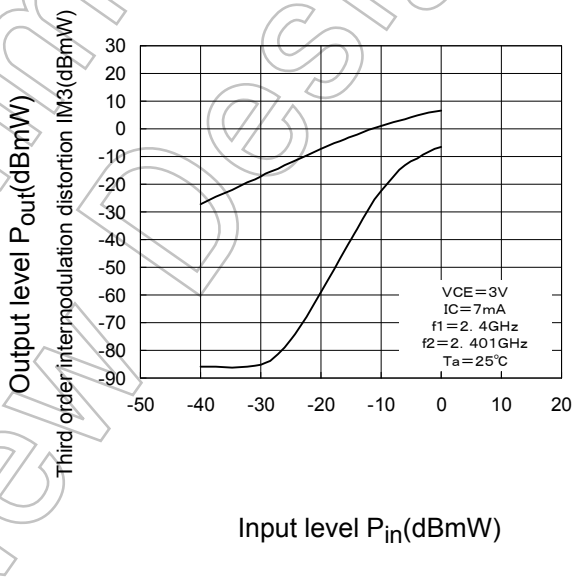
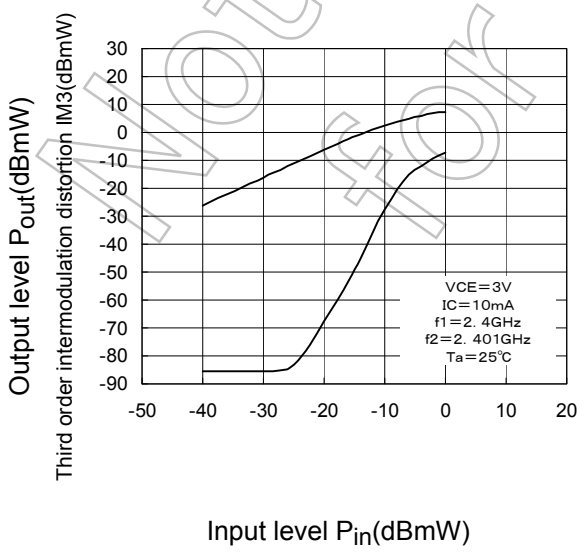


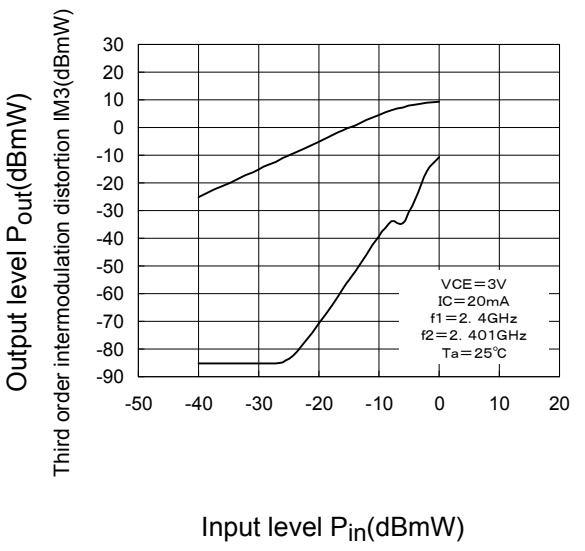
P_{out} ,IM_3-P_{in}



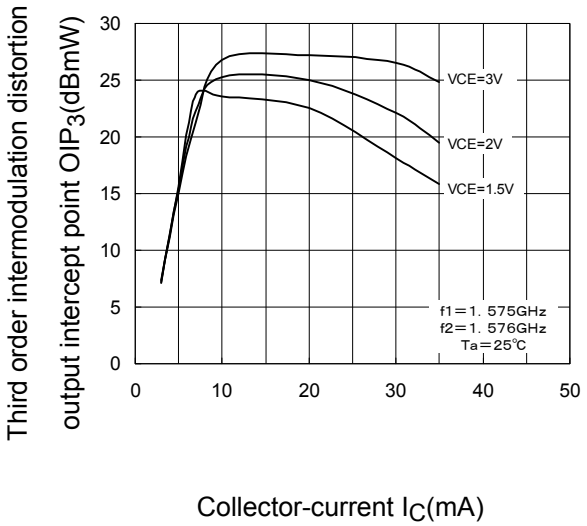
P_{out} ,IM_3-P_{in}



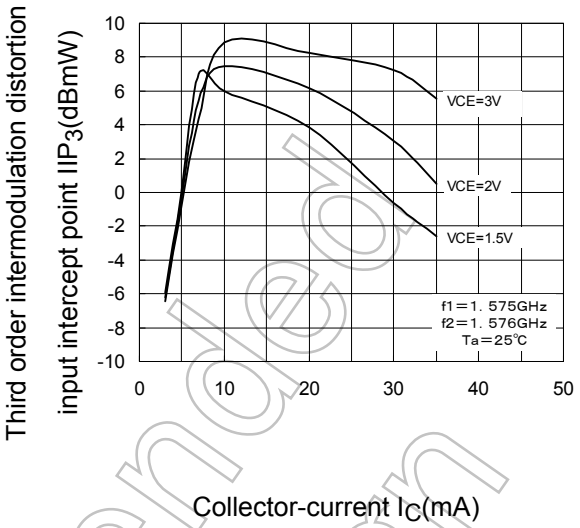
P_{out} ,IM_3-P_{in}



OIP_3-I_C



IIP_3-I_C



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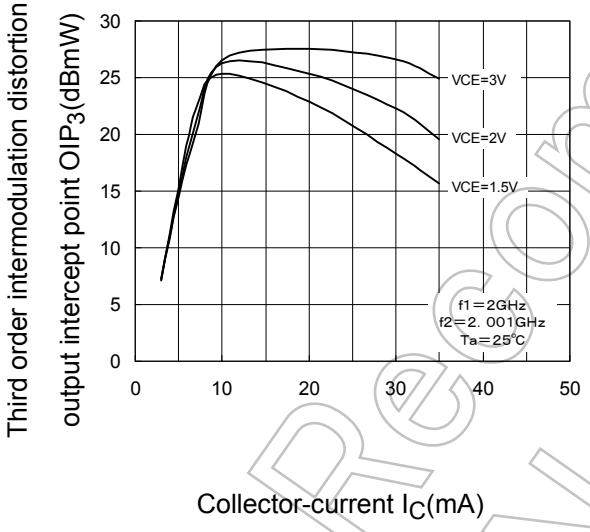

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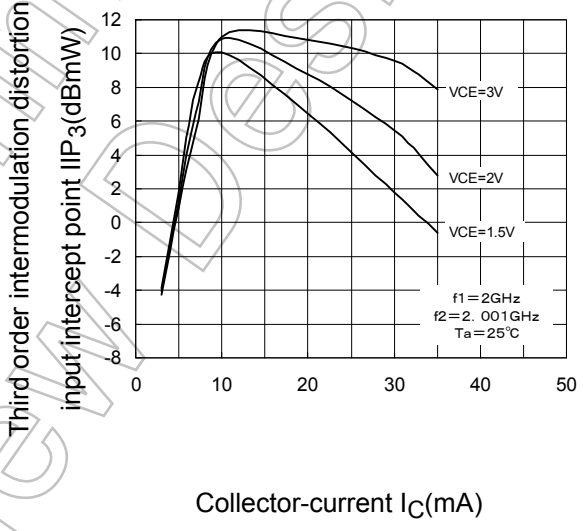

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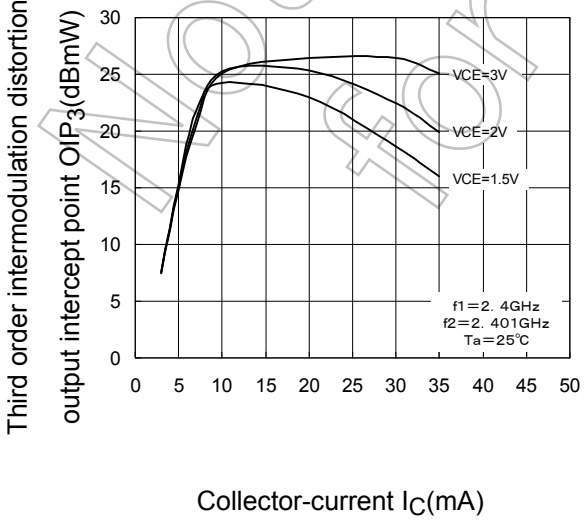

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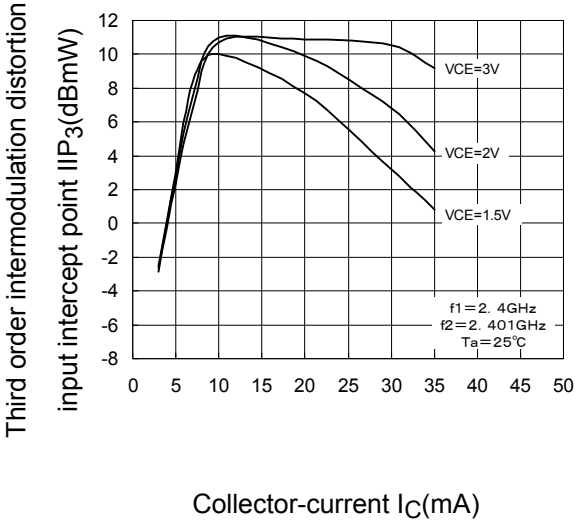
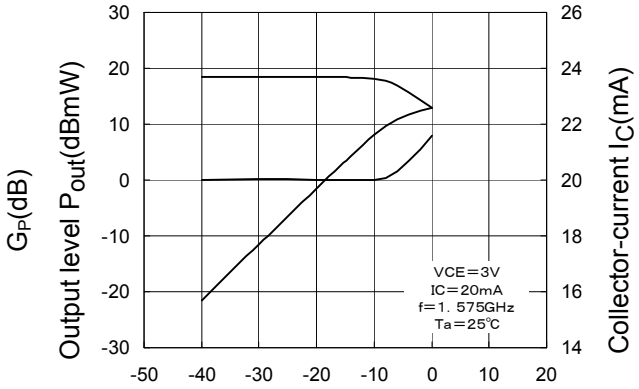
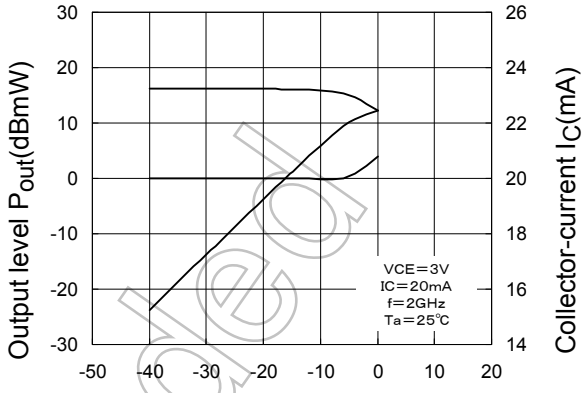


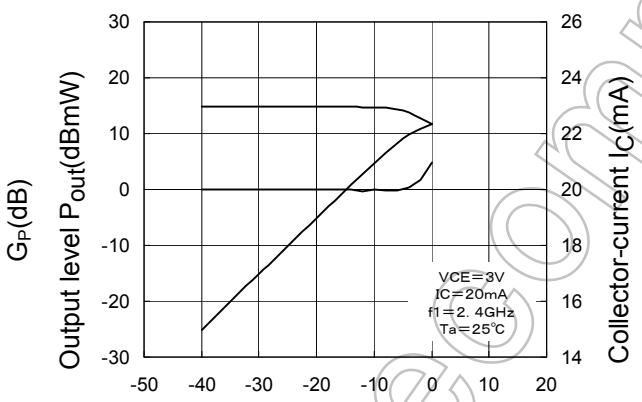
P_{out} ,Gp ,I_C-P_{in}



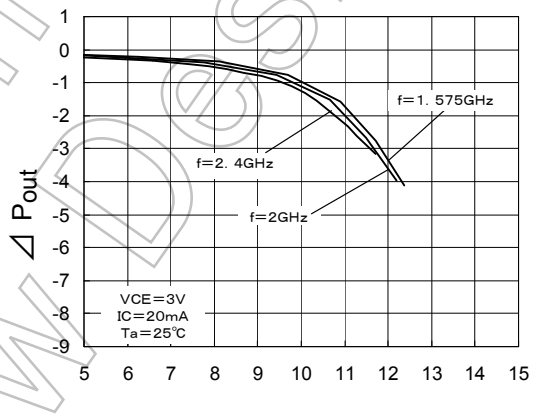
P_{out} ,Gp ,I_C-P_{in}



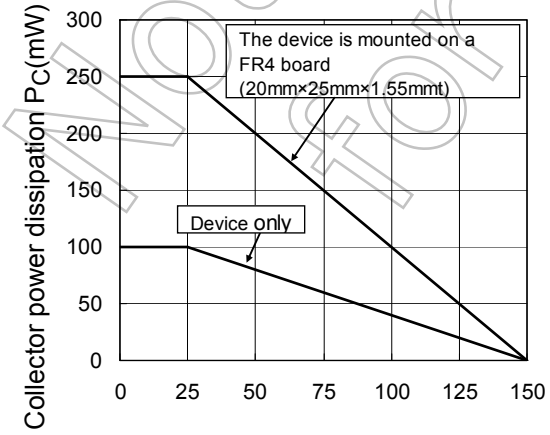
P_{out} ,Gp ,I_C-P_{in}



⊿ P_{out}-P_{out}



P_C-T_a



Note4: The graphs indicate nominal characteristics.

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