

TOSHIBA Transistor Silicon-Germanium NPN Epitaxial Planer Type

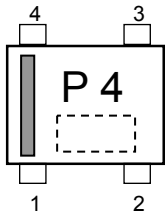
MT4S301T

UHF-SHF Low Noise Amplifier Application

FEATURES

- Low Noise Figure :NF=0.57dB(Typ.) (@f=2GHz)
- High Gain :|S21e|^2=19.5dB(Typ.) (@f=2GHz)
- 2 kV ESD robustness (HBM) due to integrated protection circuits

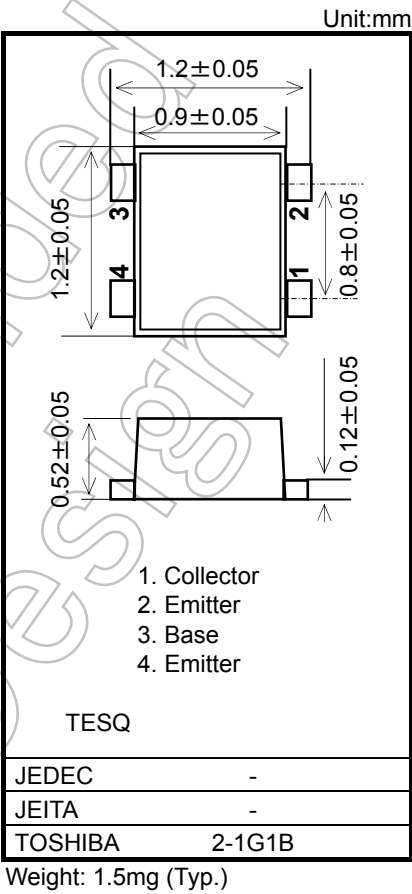
Marking



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	35	mA
Base-Current	I _B	10	mA
Collector Power dissipation	P _C	100	mW
Junction temperature	T _j	150	°C
Storage temperature Range	T _{stg}	-55~150	°C

Note: 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	$V_{CE}=3V, I_C=15mA$	23	27.5	—	GHz
Insertion Gain	$ S_{21e} ^2(1)$	$V_{CE}=3V, I_C=15mA, f=2GHz$	17	19.5	—	dB
	$ S_{21e} ^2(2)$	$V_{CE}=3V, I_C=15mA, f=5.8GHz$	9.5	11.5	—	
Noise Figure	NF(1)	$V_{CE}=3V, I_C=7mA, f=2GHz$	—	0.57	0.7	dB
	NF(2)	$V_{CE}=3V, I_C=7mA, f=5.8GHz$	—	1.45	—	

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	h_{FE}	$V_{CE}=3V, I_C=5mA$	200	—	400	-
Reverse Transfer Capacitance	C_{re}	$V_{CB}=1V, I_E=0, f=1MHz$ (Note 1)	—	0.09	0.17	pF

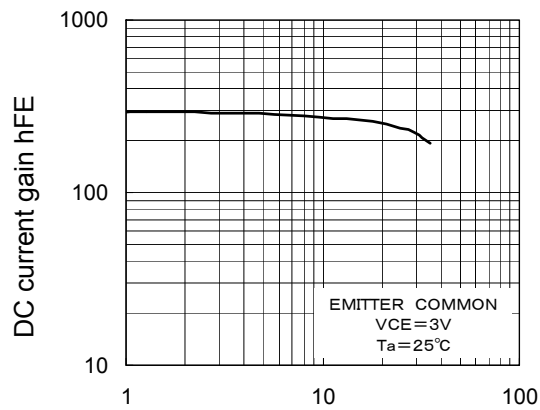
Note 1: C_{re} is measured by 3 terminal method with capacitance bridge.

Caution:

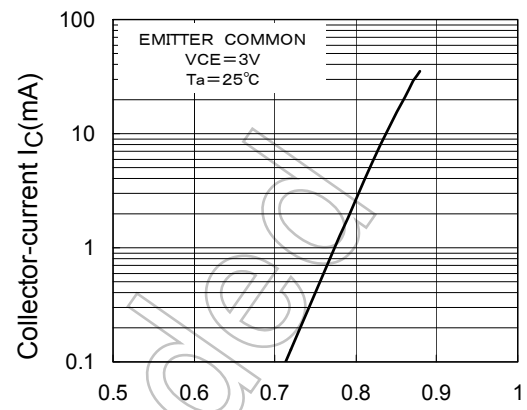
This device is due to applied the high frequency transistor process of $f_T=100GHz$ class is used for this product.

Please make enough tool and equipment earthed when you handle.

$h_{FE}-I_C$



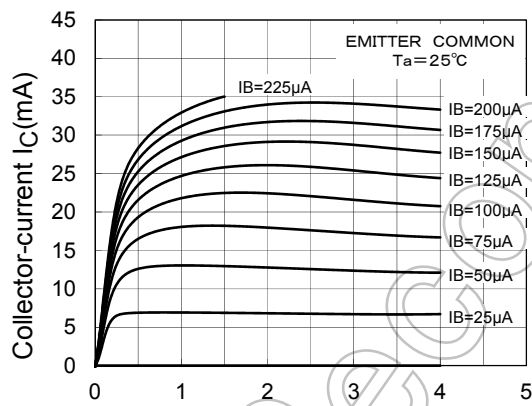
I_C-V_{BE}



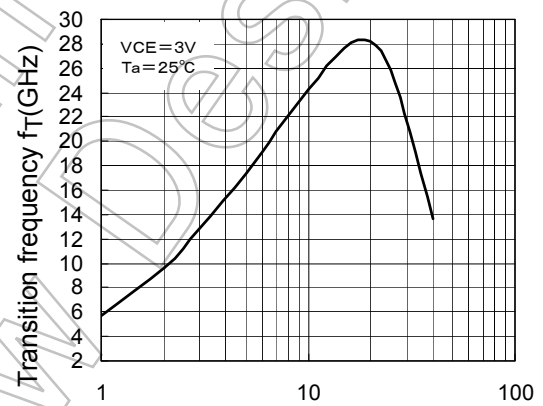
Collector-current I_C (mA)

Base-emitter voltage V_{BE} (V)

I_C-V_{CE}



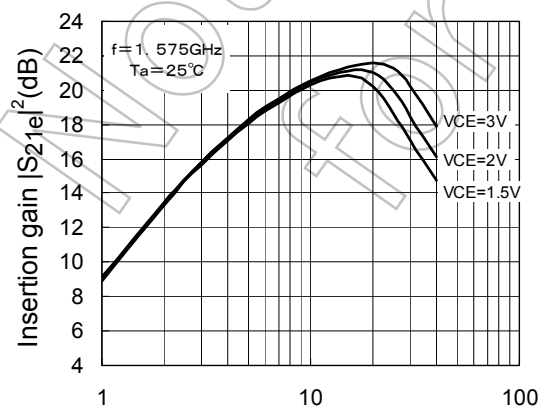
f_T-I_C



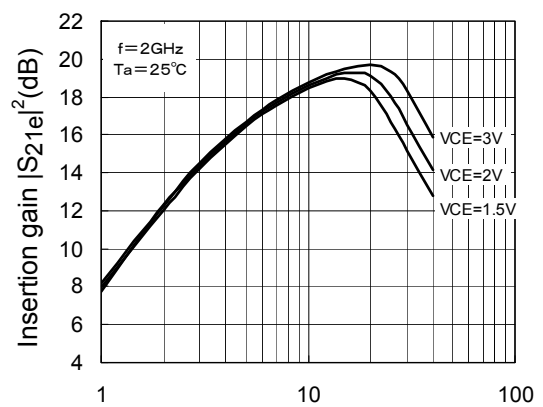
Collector-emitter voltage V_{CE} (V)

Collector-current I_C (mA)

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

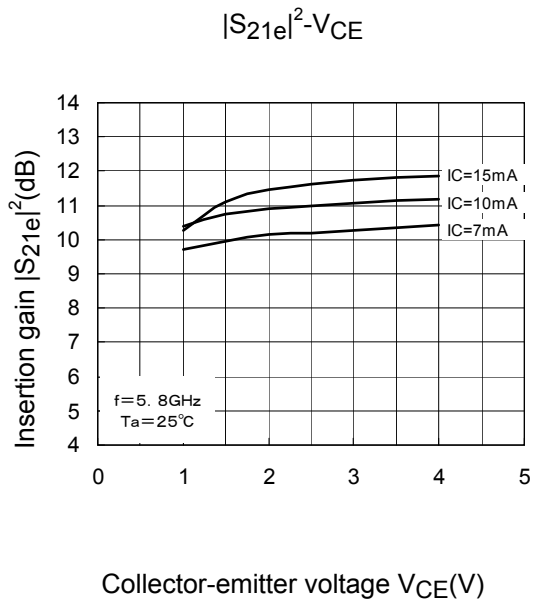
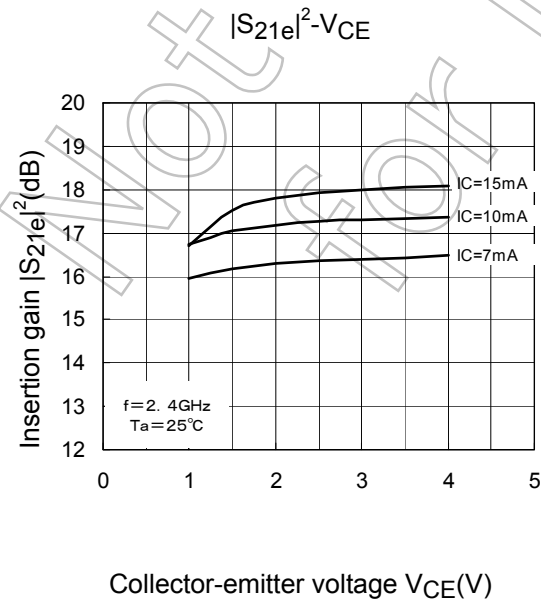
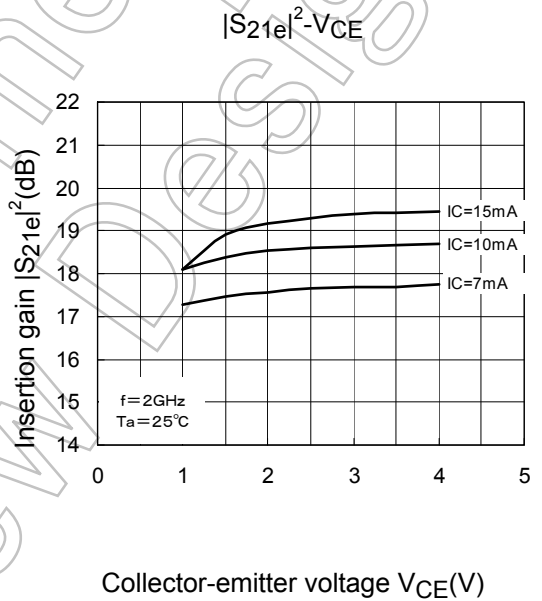
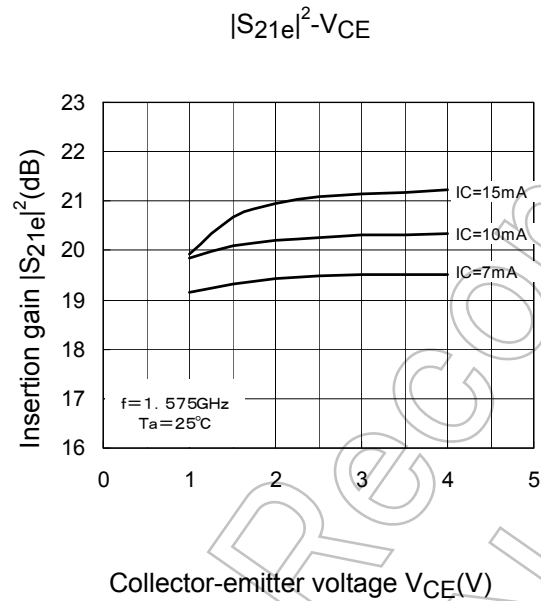
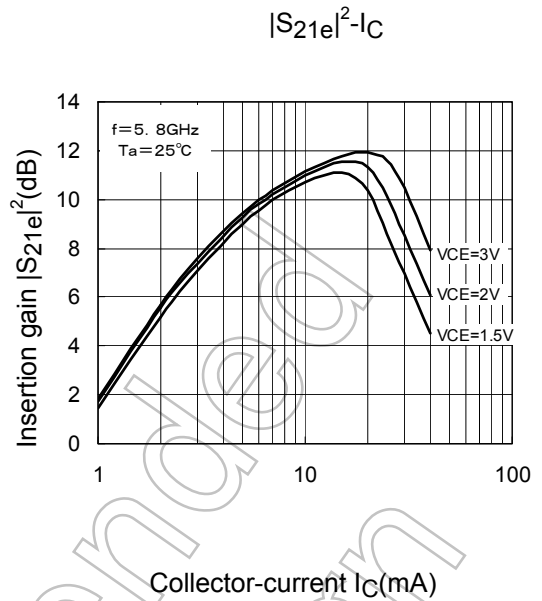
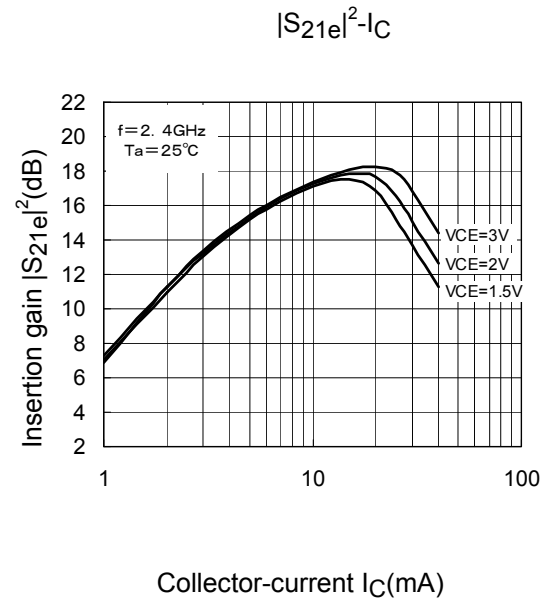


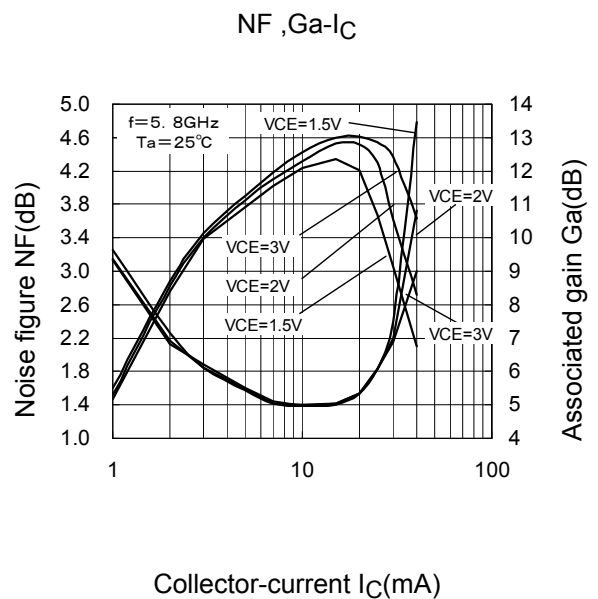
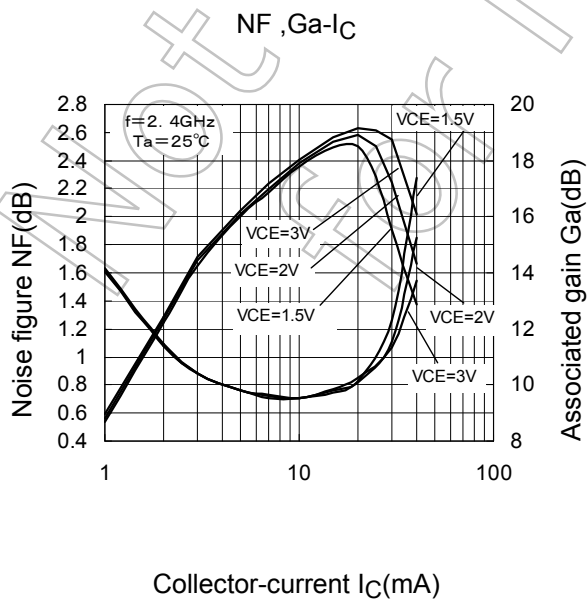
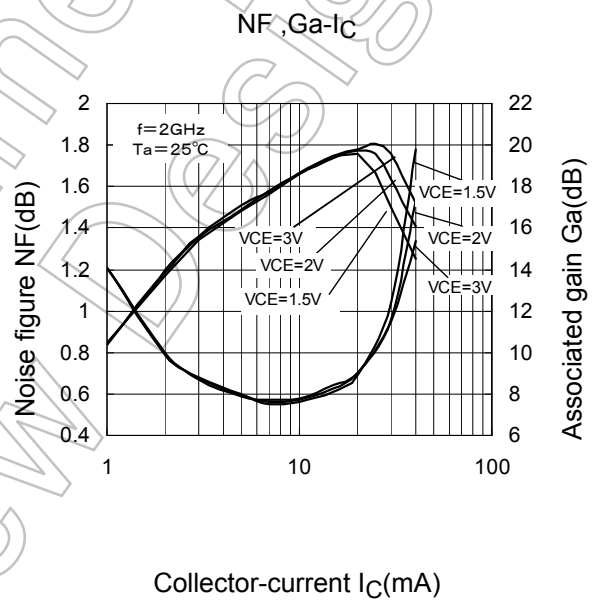
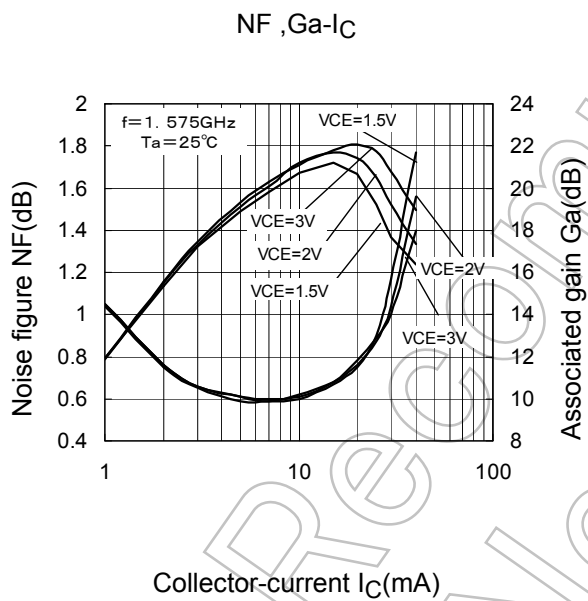
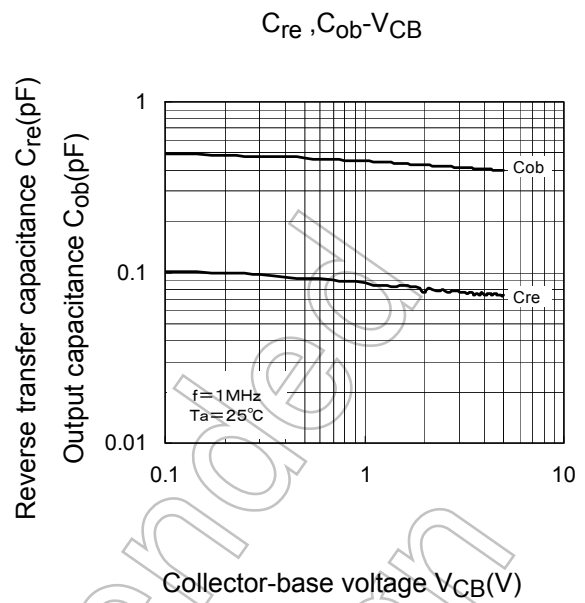
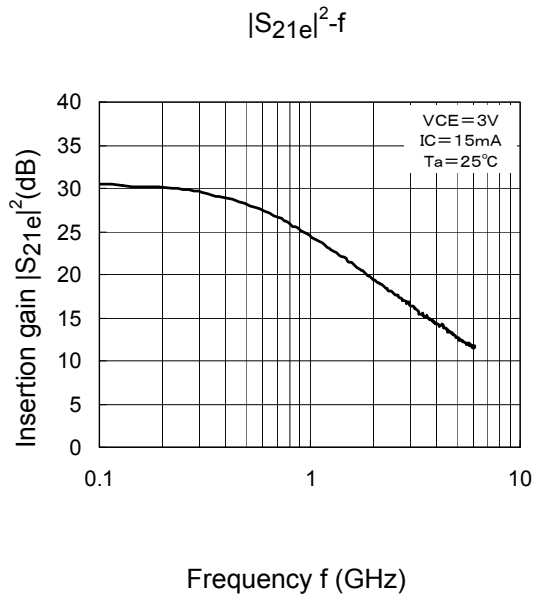
$|S_{21e}|^2-I_C$

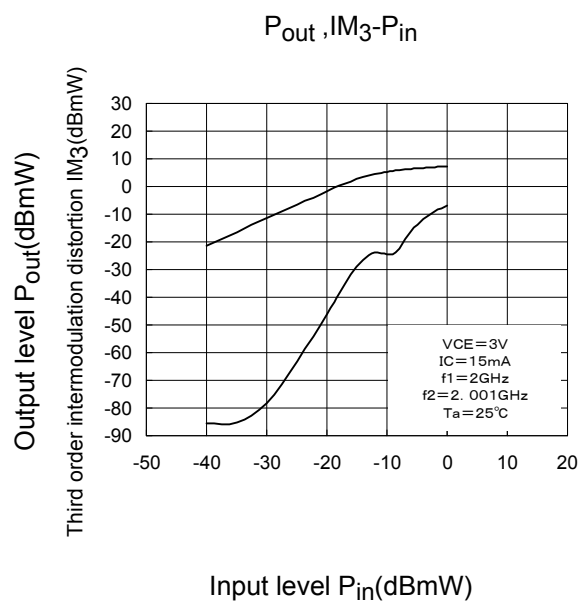
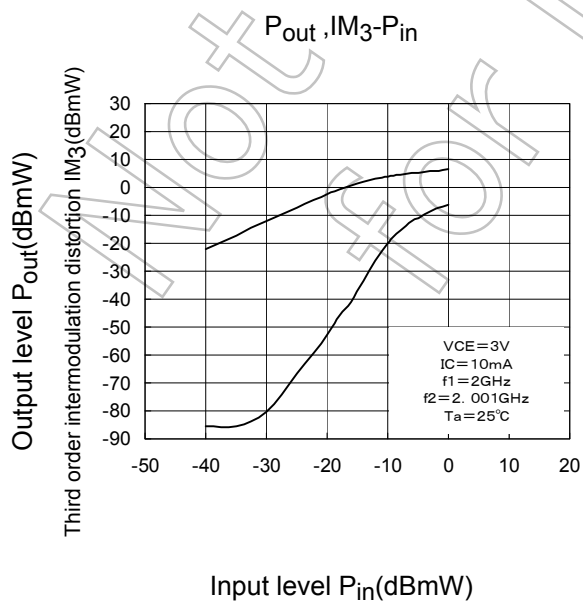
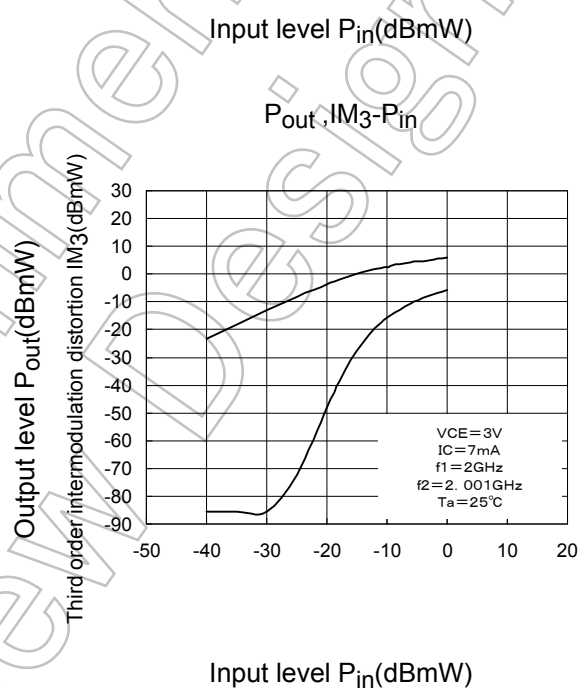
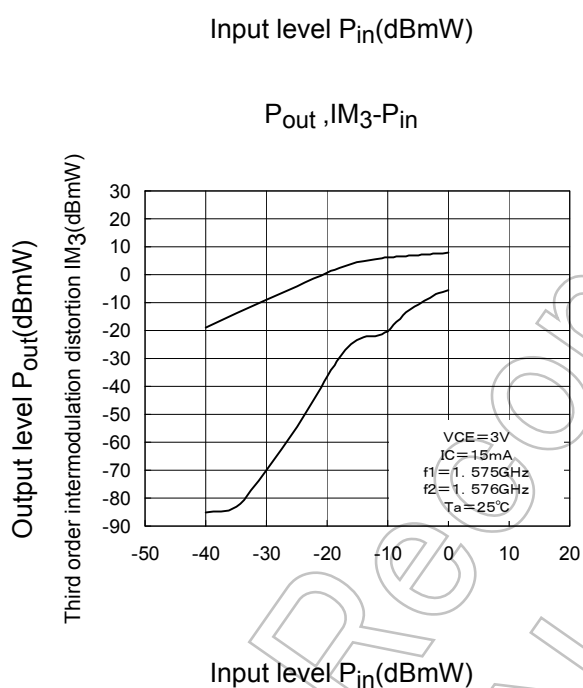
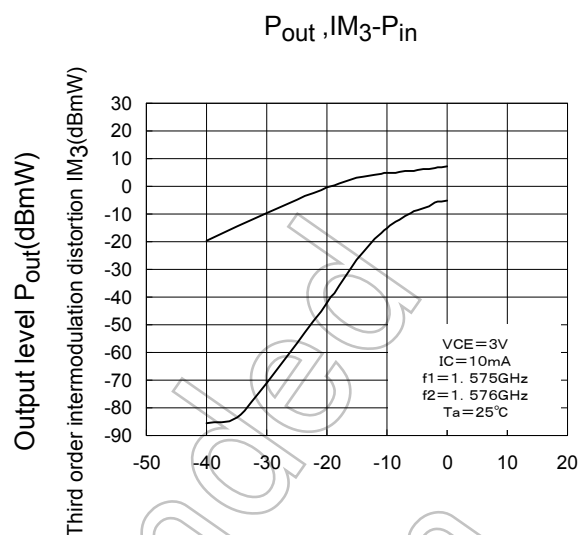
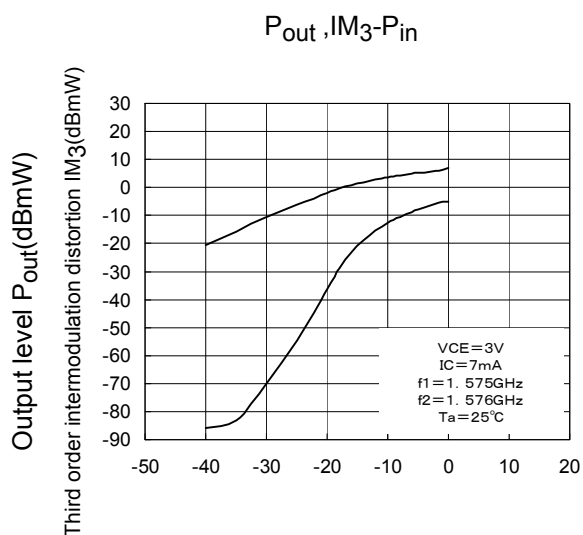


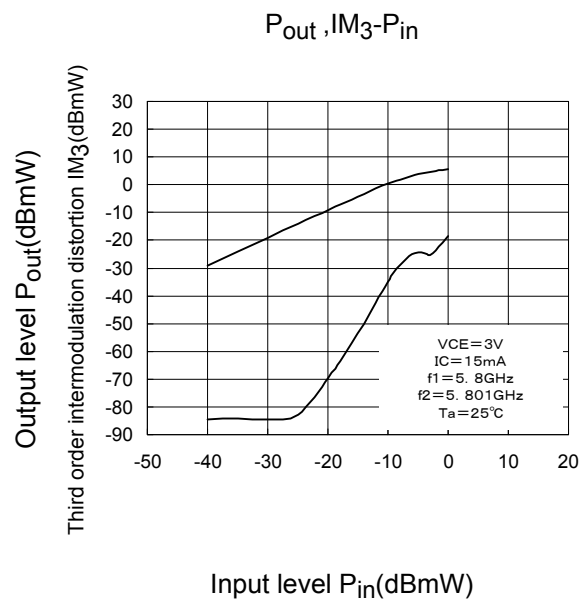
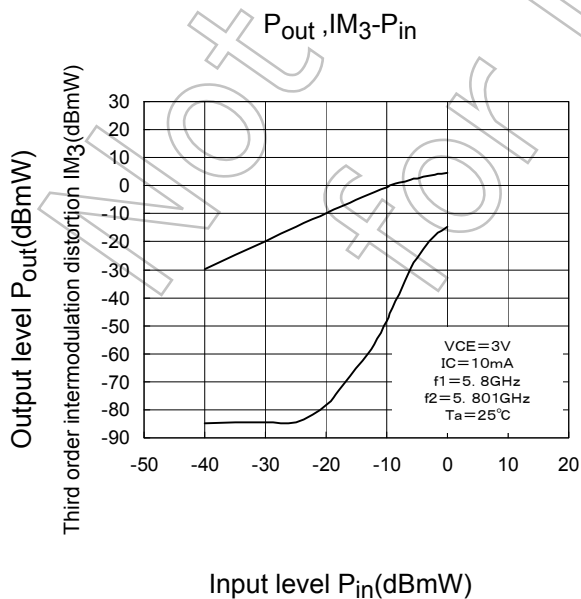
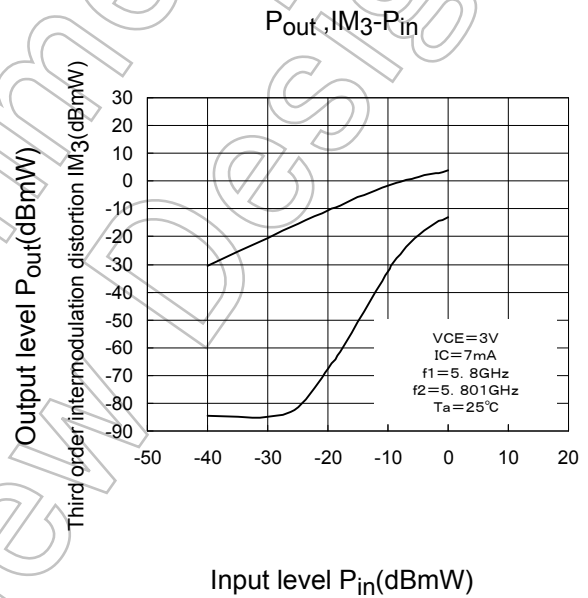
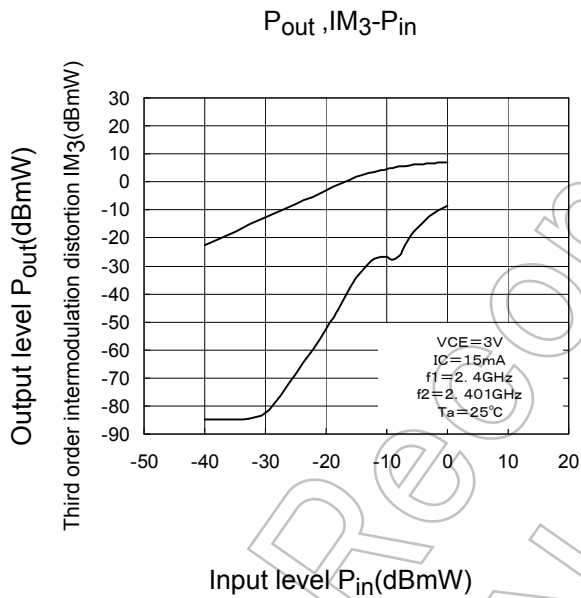
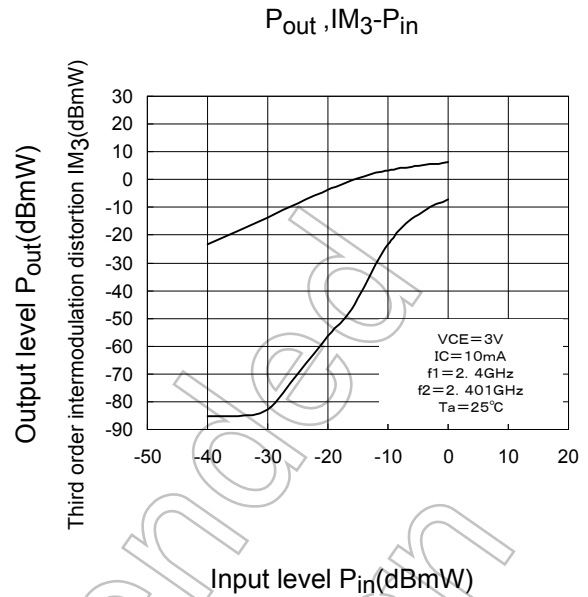
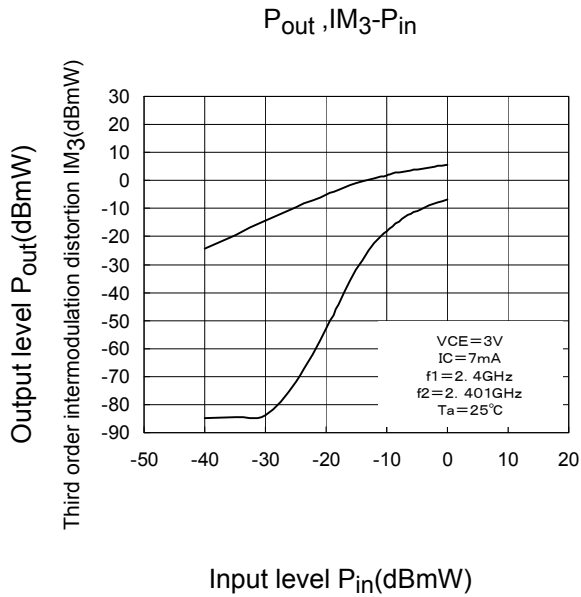
Collector-current I_C (mA)

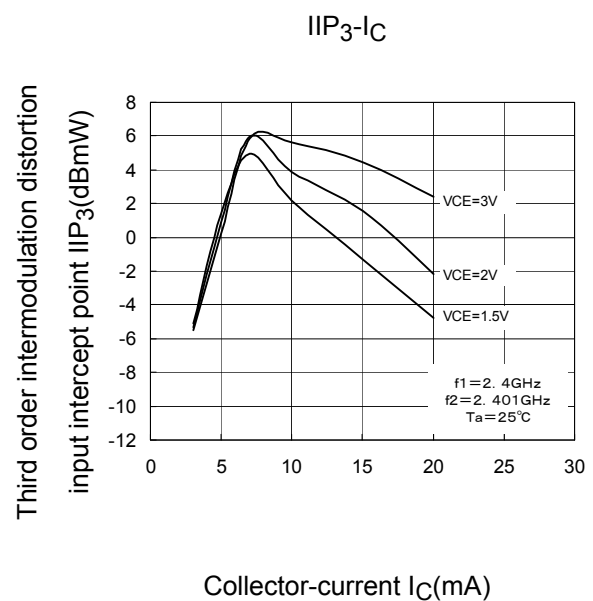
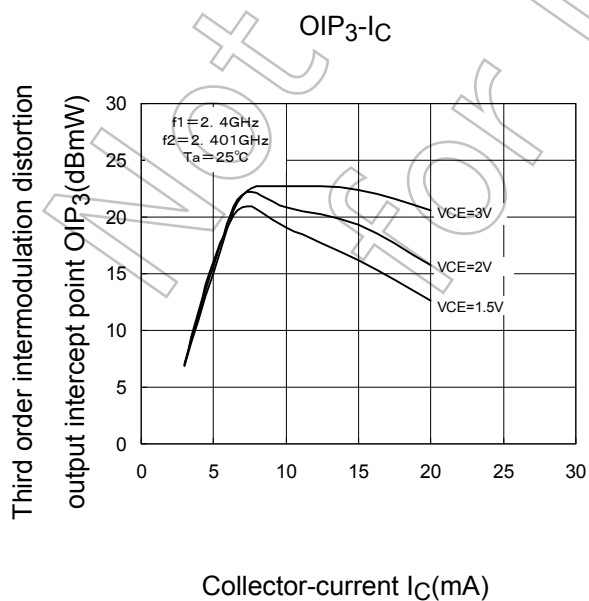
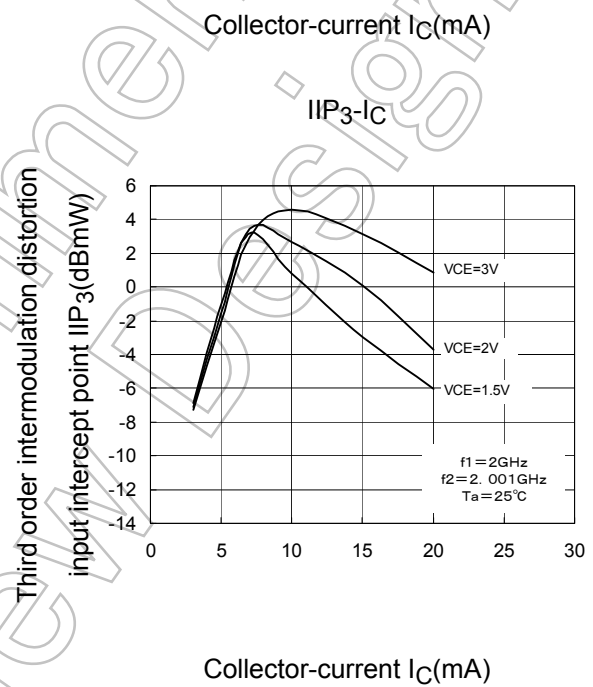
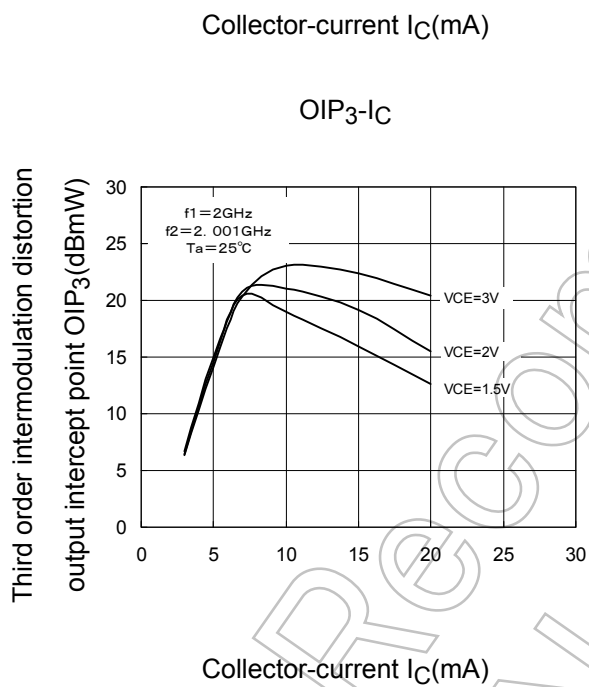
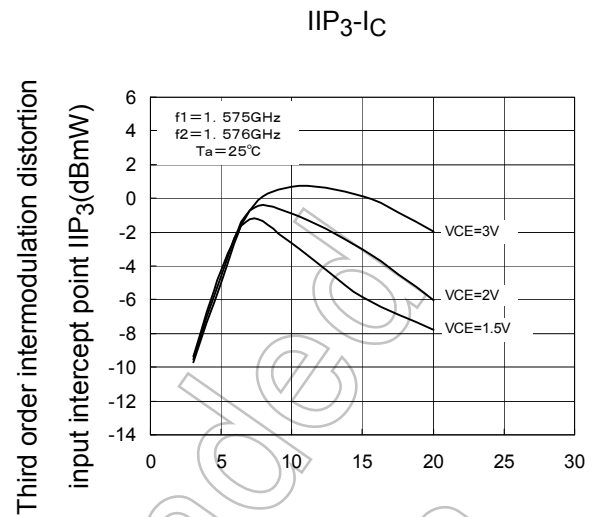
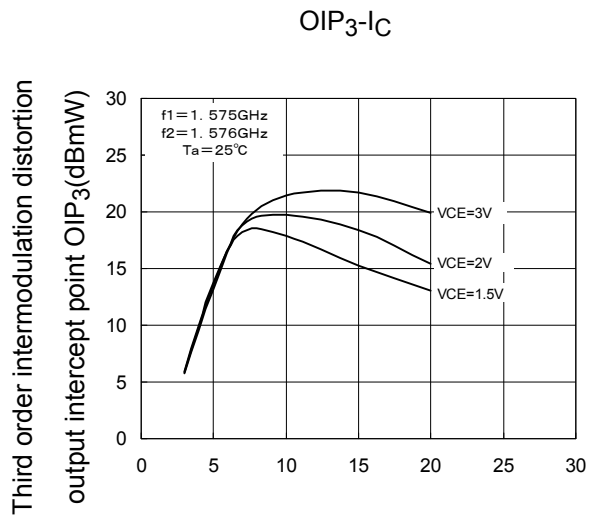
Collector-current I_C (mA)

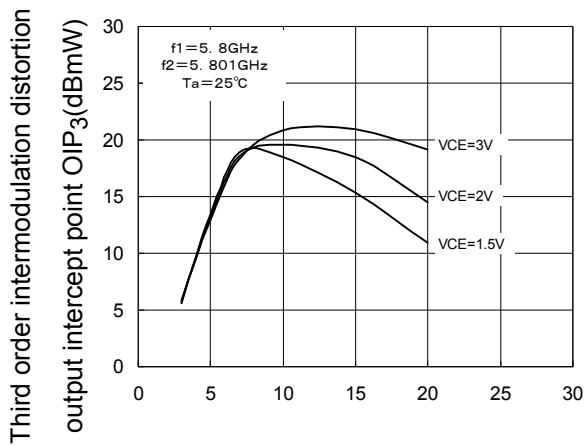
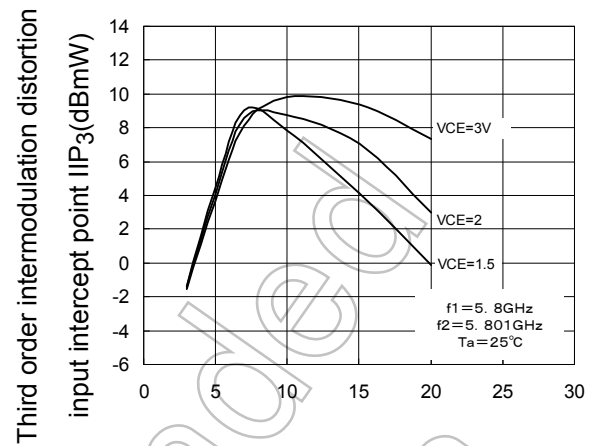
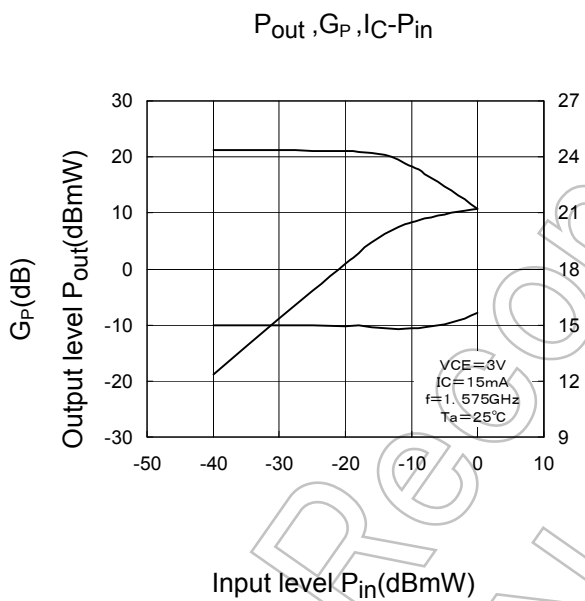
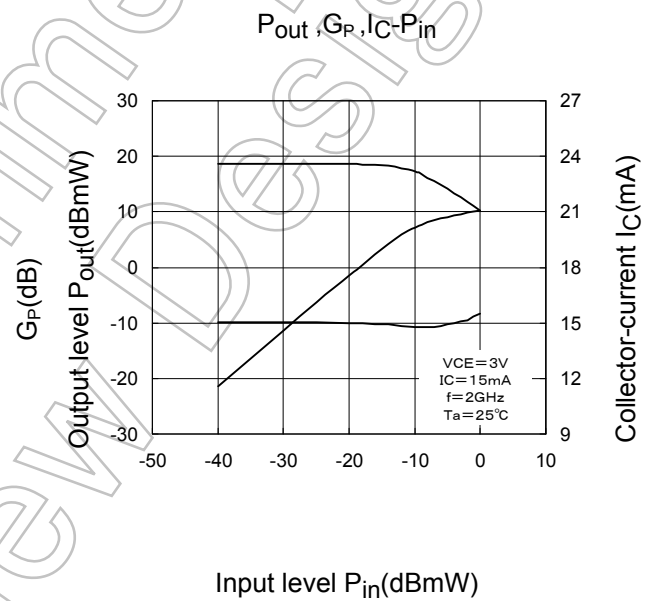
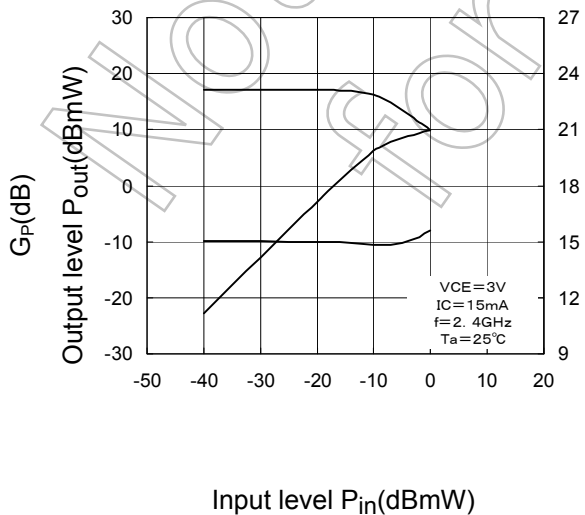
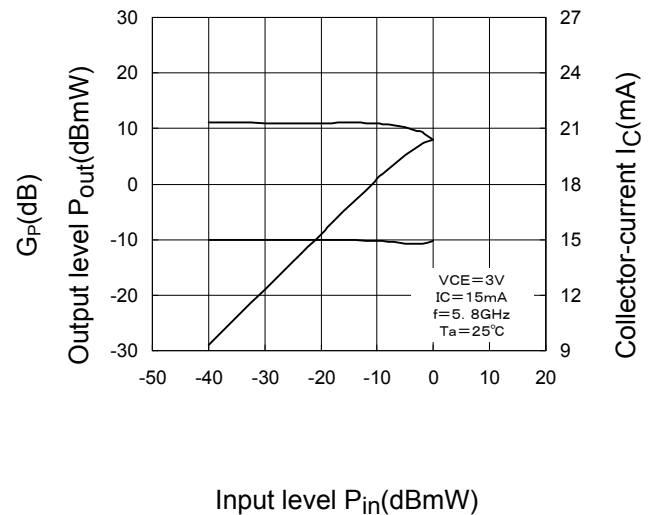


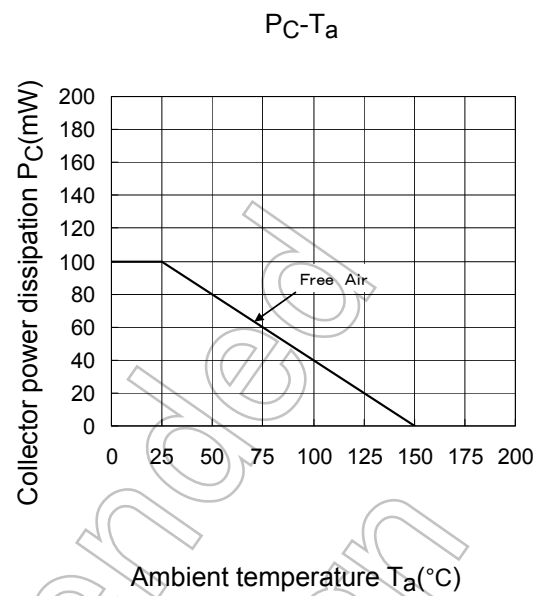
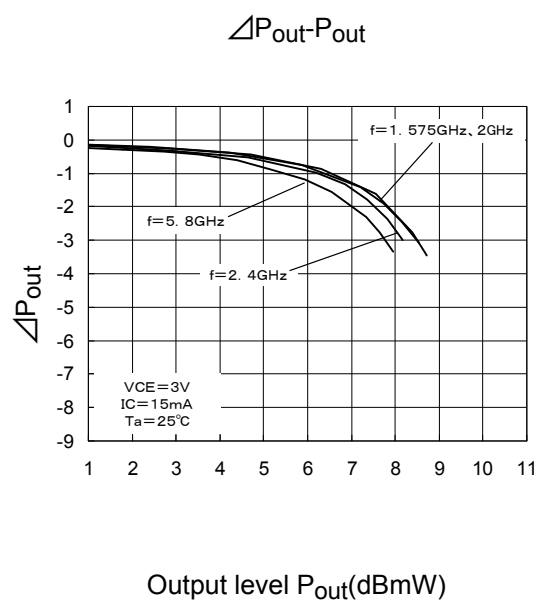








OIP₃-I_CIIP₃-I_CP_{out}, G_P, I_C-P_{in}P_{out}, G_P, I_C-P_{in}P_{out}, G_P, I_C-P_{in}P_{out}, G_P, I_C-P_{in}



Note2: The graphs indicate nominal characteristics.

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