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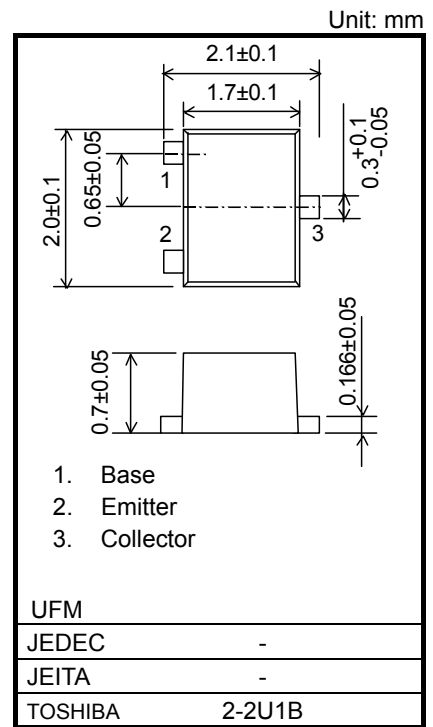
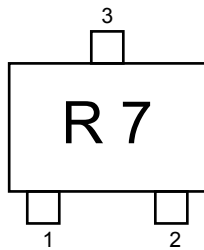
MT3S113TU

VHF-UHF Band Low-Noise, Low-Distortion Amplifier Applications

FEATURES

- Low Noise Figure: $NF = 1.15\text{dB}$ (typ.) (@ $f=1\text{GHz}$)
- High Gain: $|S_{21e}|^2 = 12.5\text{dB}$ (typ.) (@ $f=1\text{GHz}$)

Marking



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

Characteristics	Symbol	Rating	Unit
Collector-emitter voltage	V_{CES}	13	V
Collector-emitter voltage	V_{CEO}	5.3	V
Emitter-base voltage	V_{EBO}	0.6	V
Collector-current	I_C	100	mA
Base-current	I_B	10	mA
Collector power dissipation	$P_C(\text{Note1})$	900	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 150	$^\circ\text{C}$

Note1: The device is mounted on a ceramic board (25.4 mm x 25.4 mm x 0.8 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).

Start of commercial production
2008-10

Microwave Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	$V_{CE} = 5V, I_C = 50mA$	9	11.2	—	GHz
Insertion gain	$ S_{21e} ^2(1)$	$V_{CE} = 5V, I_C = 50mA, f = 500MHz$	—	18	—	dB
	$ S_{21e} ^2(2)$	$V_{CE} = 5V, I_C = 50mA, f = 1GHz$	10.5	12.5	—	dB
Noise figure	NF(1)	$V_{CE} = 5V, I_C = 50mA, f = 500MHz$	—	0.88	—	dB
	NF(2)	$V_{CE} = 5V, I_C = 50mA, f = 1GHz$	—	1.15	1.45	dB
3 rd order intermodulation distortion output intercept point	OIP3	$V_{CE} = 5V, I_C = 50mA, f = 500MHz, \Delta f = 1MHz$	30.5	34.8	—	dBmW

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}	$V_{CE} = 5V, I_C = 30mA$	200	—	400	—
Output capacitance	C_{ob}	$V_{CB} = 5V, I_E = 0, f = 1MHz$	—	1.49	—	pF
Reverse transfer capacitance	C_{re}	$V_{CB} = 5V, I_E = 0, f = 1MHz$ (Note3)	—	0.94	1.25	pF

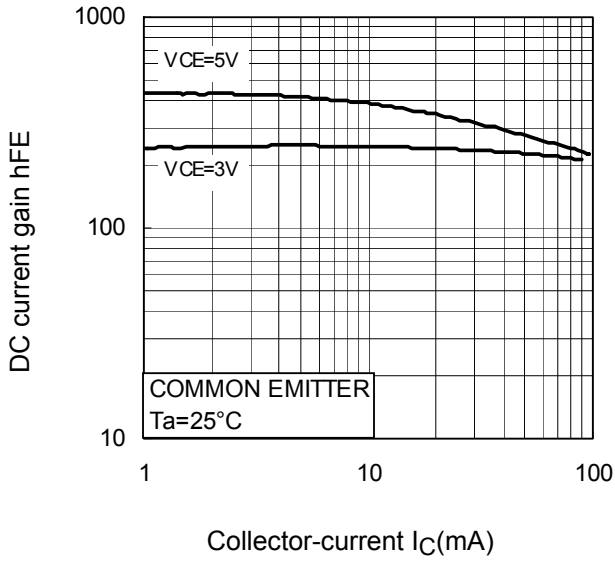
Note 3: C_{re} is measured using a 3-terminal method with capacitance bridge

Caution:

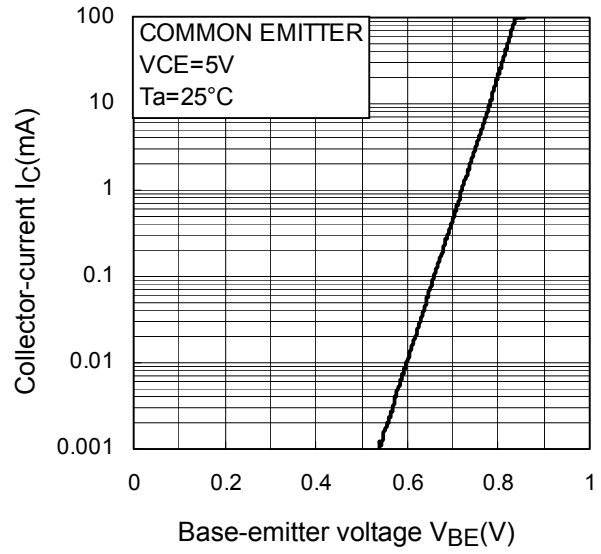
This device is sensitive to electrostatic discharge due to the high frequency transistor process of $f_T=60GHz$ class is used for this product.

Please make enough tool and equipment earthed when you handle.

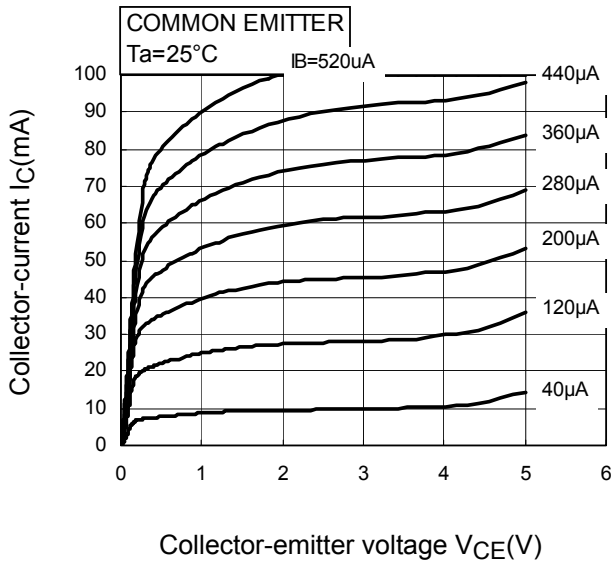
$h_{FE}-I_C$



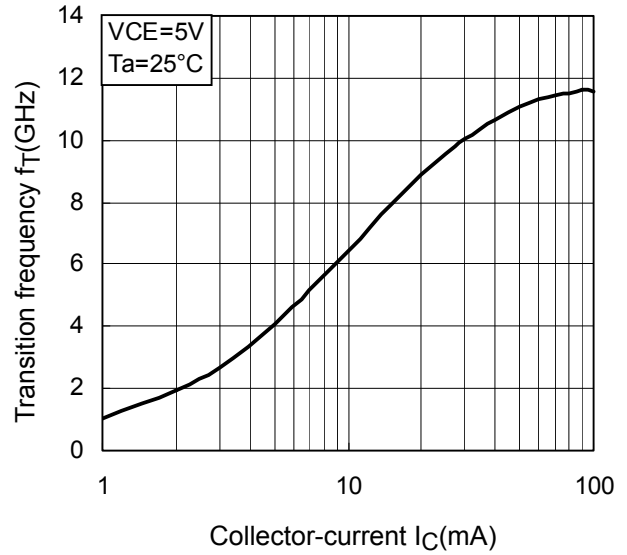
I_C-V_{BE}



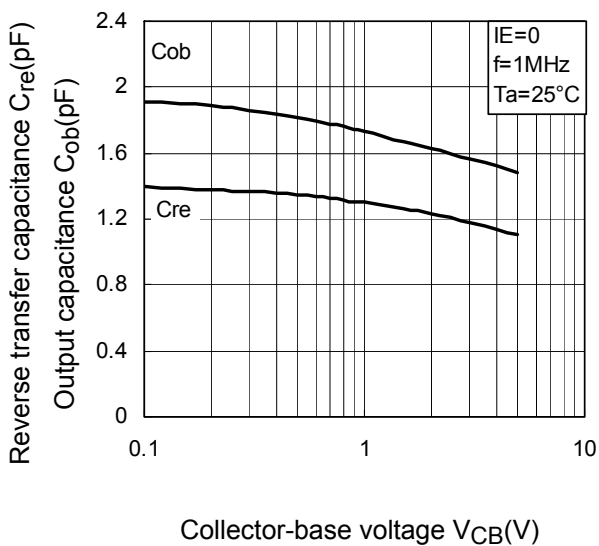
I_C-V_{CE}



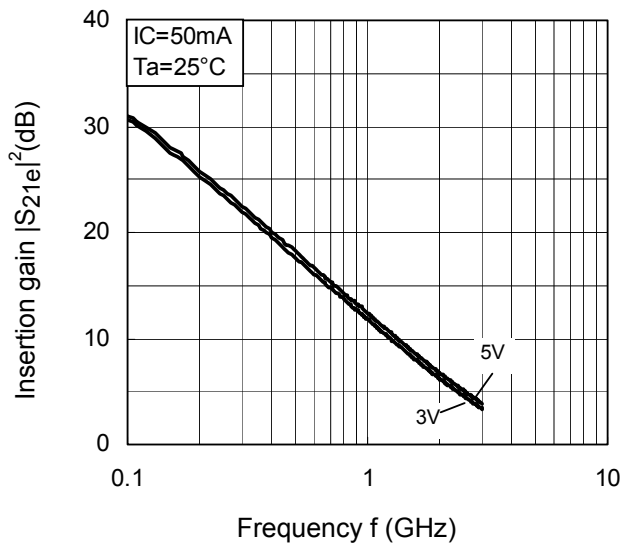
f_T-I_C

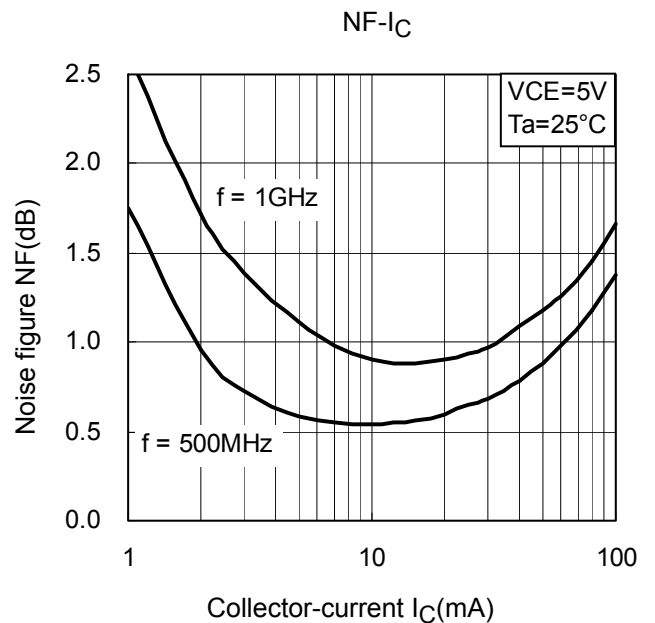
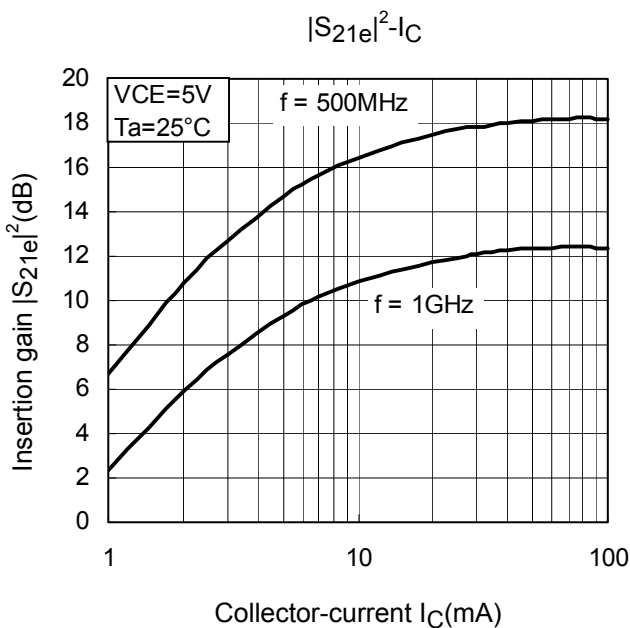
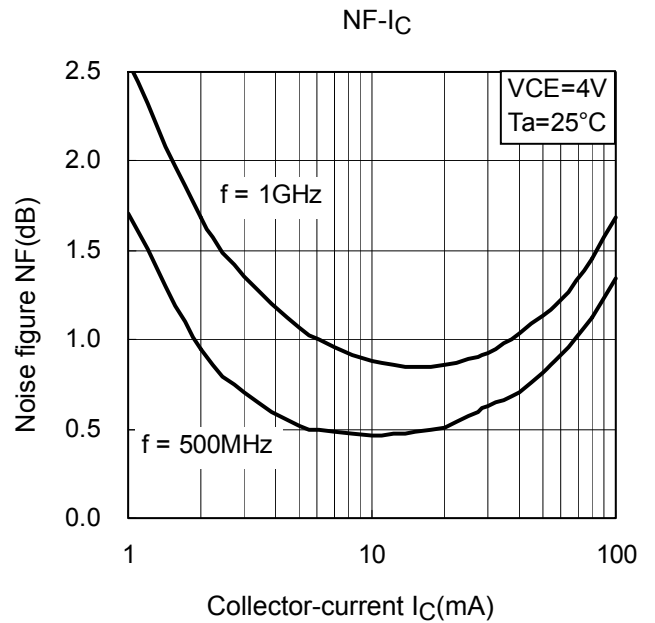
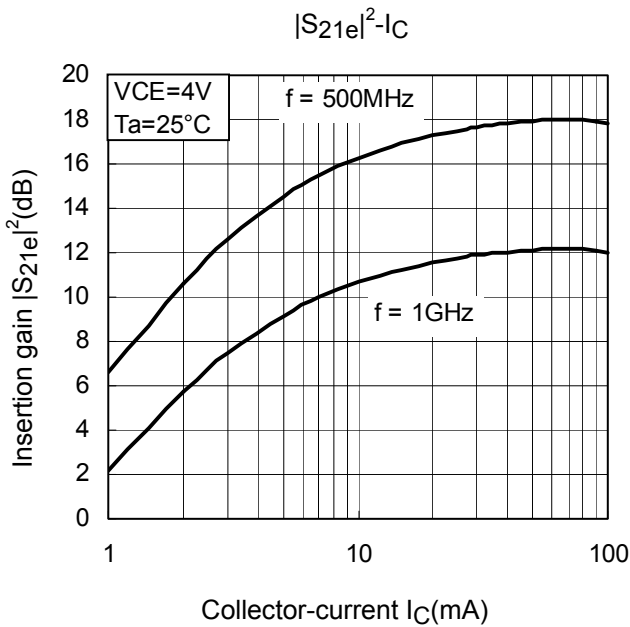
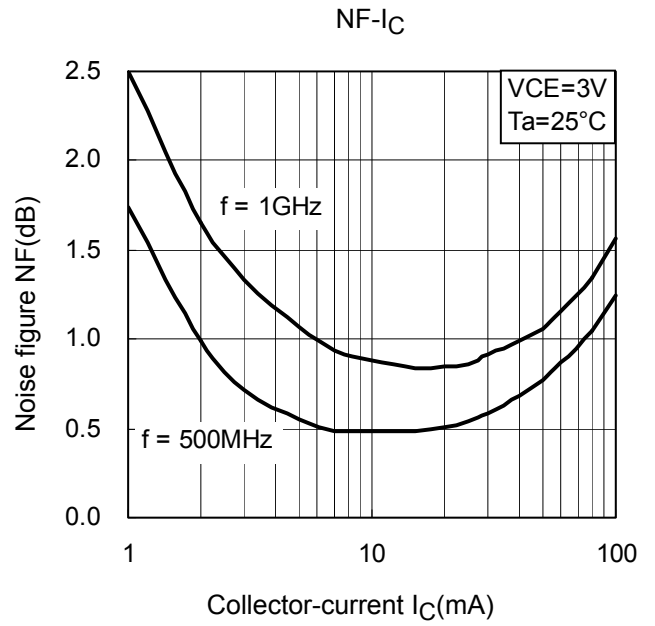
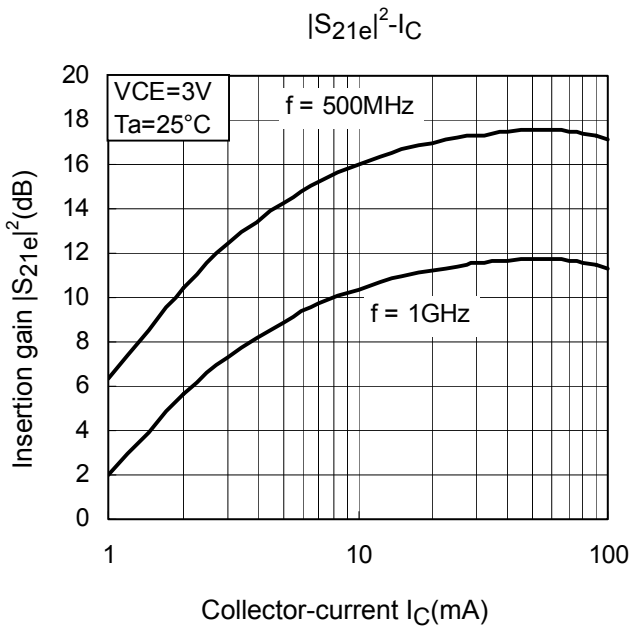


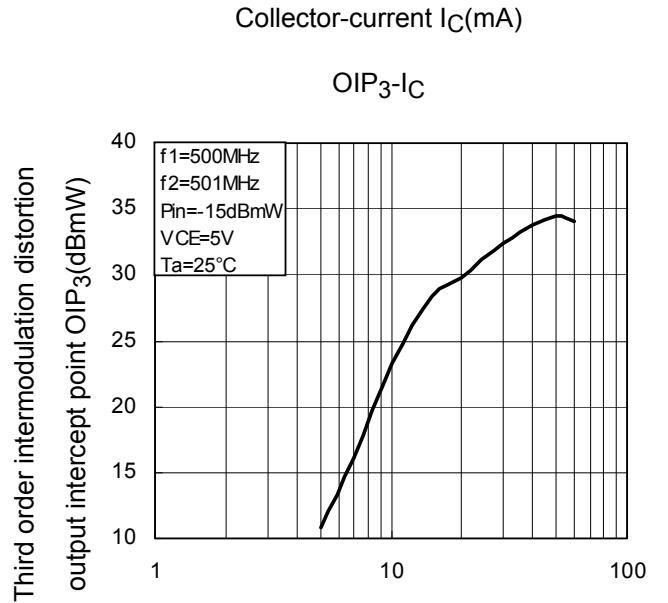
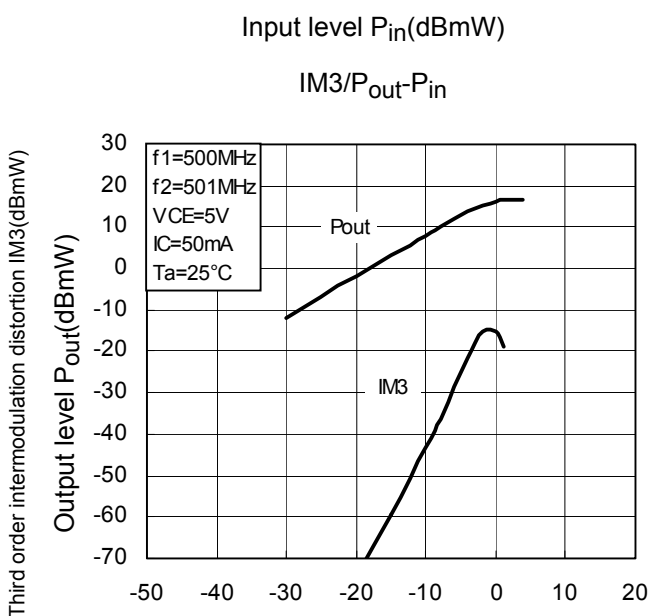
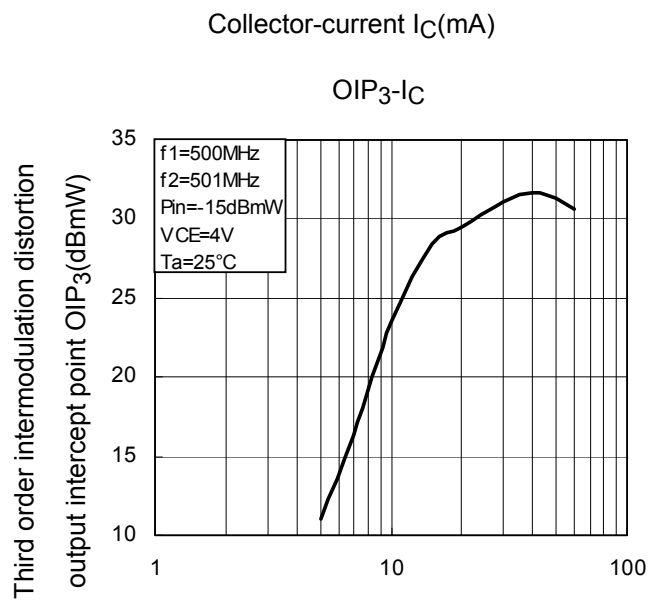
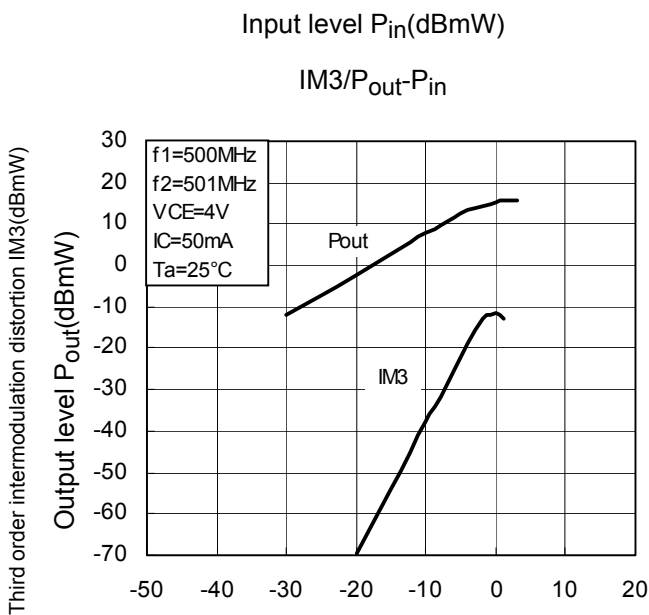
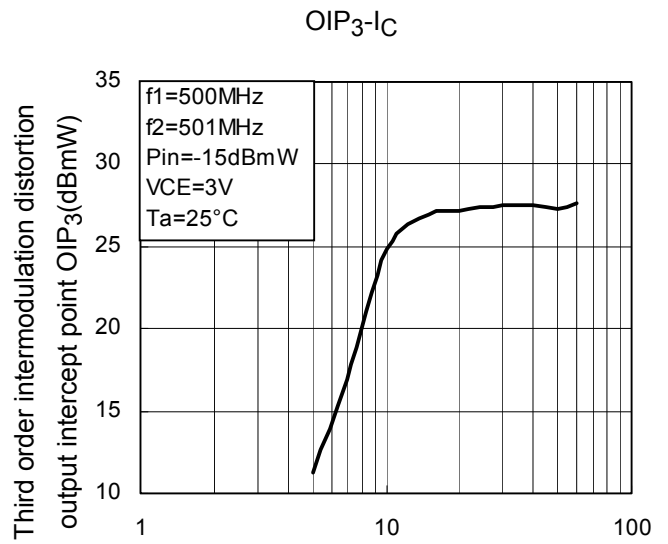
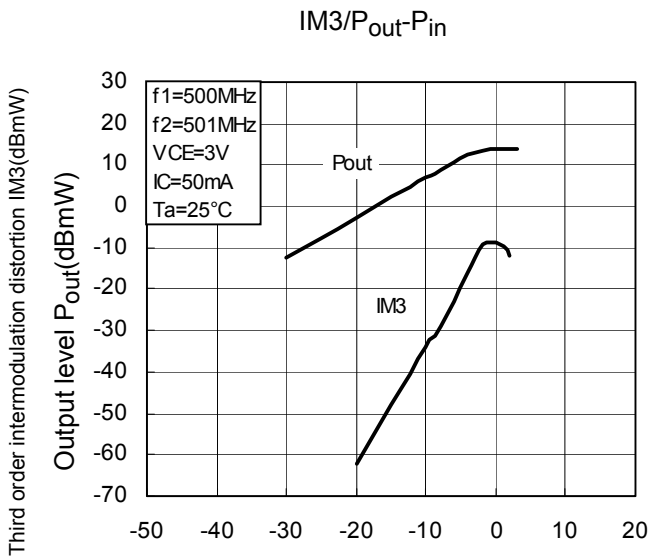
$C_{re}, C_{ob}-V_{CB}$



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

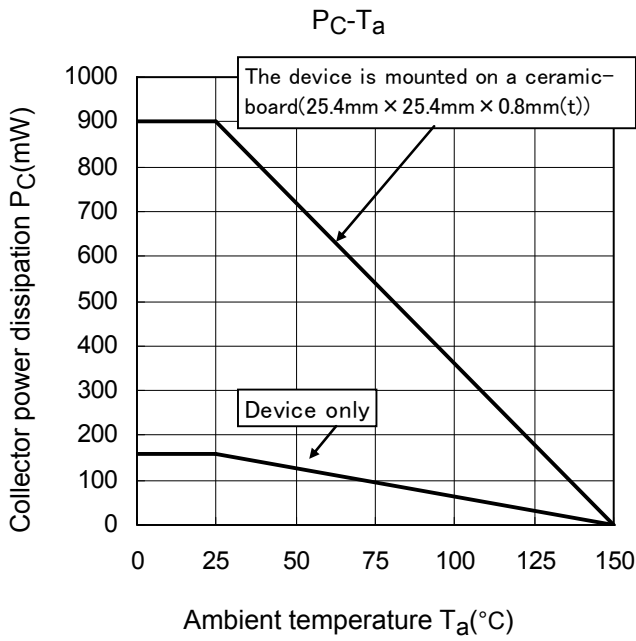
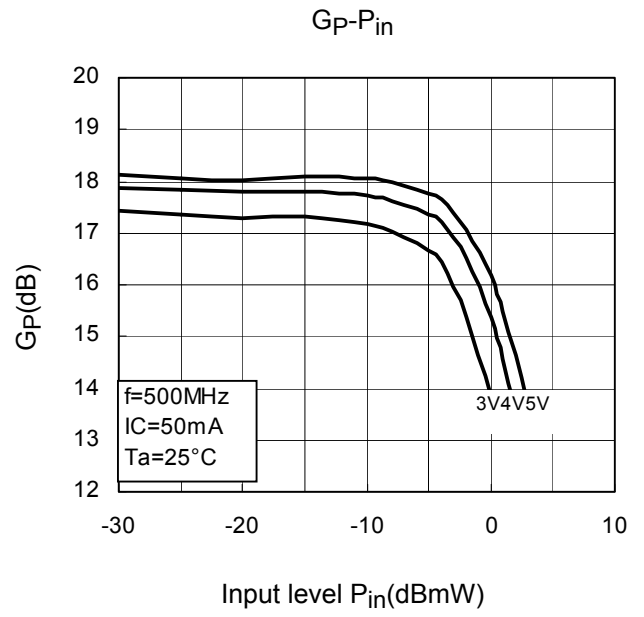
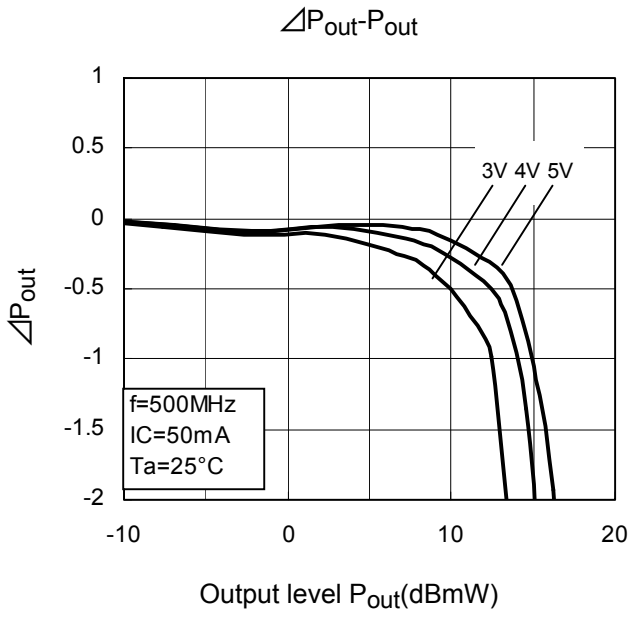






Input level P_{in}(dBmW)

Collector-current I_C(mA)



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