

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

MT3S36FS

VCO Oscillator Stage

UHF Low-Noise Amplifier Application

FEATURES

- Low-Noise Figure: $NF = 1.3 \text{ dB}$ (@ $f = 2 \text{ GHz}$)
- High Gain: $|S_{21e}|^2 = 12.5 \text{ dB}$ (@ $f = 2 \text{ GHz}$)

Marking



Absolute Maximum Ratings (Ta = 25°C)

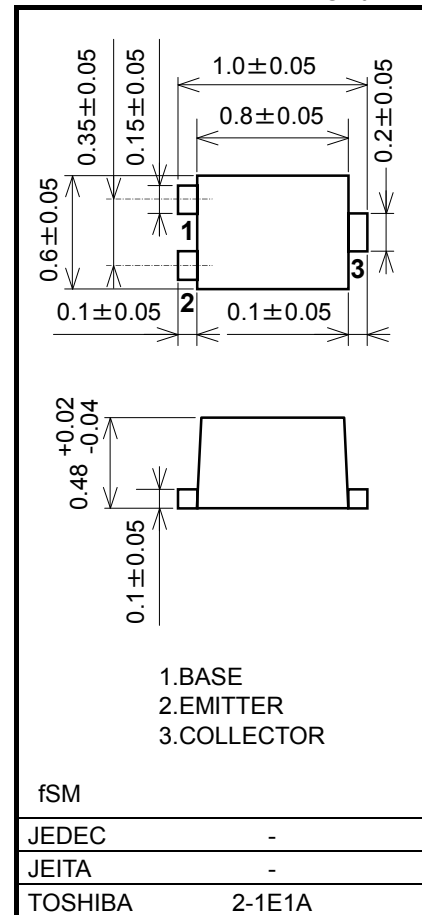
Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	8	V
Collector-emitter voltage	V_{CEO}	4.5	V
Emitter-base voltage	V_{EBO}	1.5	V
Collector-current	I_C	36	mA
Base-current	I_B	18	mA
Collector power dissipation	P_C (Note 1)	100	mW
Junction temperature	T_j	150	°C
Storage temperature range	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).

Note 1: Device mounted on a glass-epoxy PCB (1.0 cm² x 0.8 mm (t))

Unit: mm



Weight: 0.0006 g (typ.)

Microwave Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	$V_{CE} = 3\text{ V}, I_C = 15\text{ mA}, f = 2\text{ GHz}$	15	19	-	GHz
Insertion gain	$ S_{21e} ^2 (1)$	$V_{CE} = 3\text{ V}, I_C = 15\text{ mA}, f = 1\text{ GHz}$	15	17.5	-	dB
	$ S_{21e} ^2 (2)$	$V_{CE} = 3\text{ V}, I_C = 15\text{ mA}, f = 2\text{ GHz}$	10	12.5	-	dB
Noise figure	NF (1)	$V_{CE} = 3\text{ V}, I_C = 3\text{ mA}, f = 1\text{ GHz}$	-	1.1	-	dB
	NF (2)	$V_{CE} = 3\text{ V}, I_C = 3\text{ mA}, f = 2\text{ GHz}$	-	1.3	1.8	dB

Electrical Characteristics (Ta = 25°C)

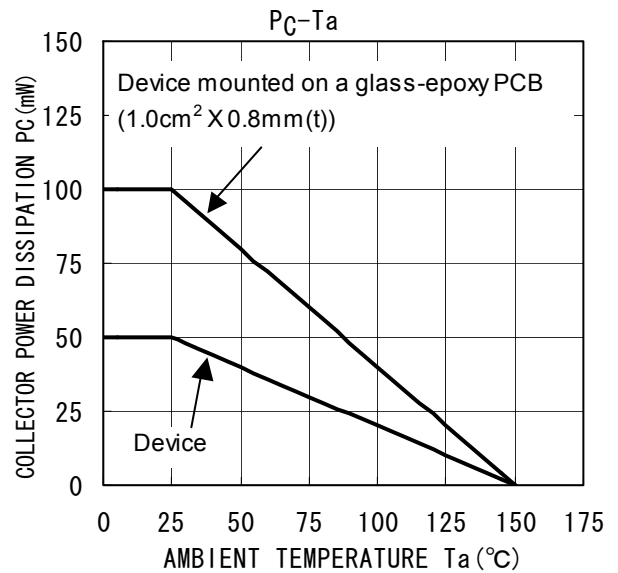
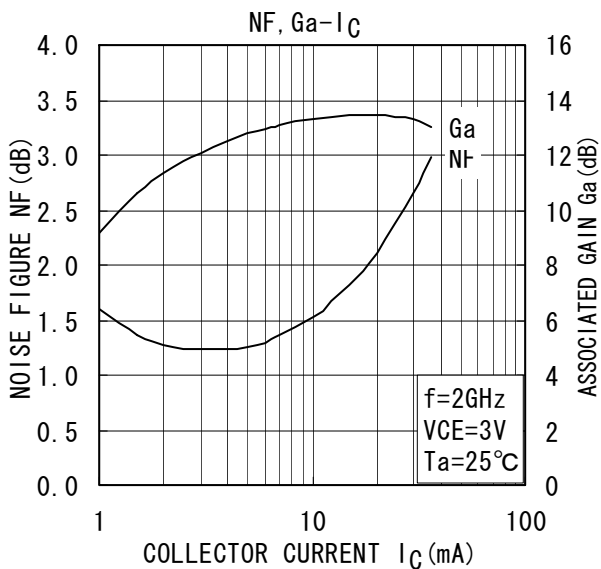
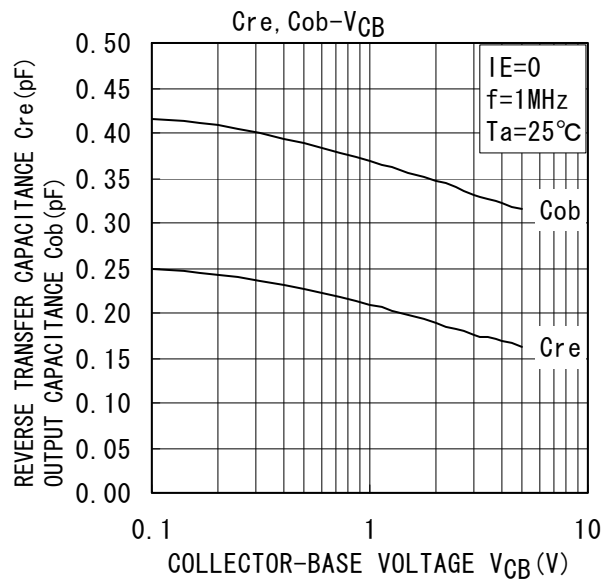
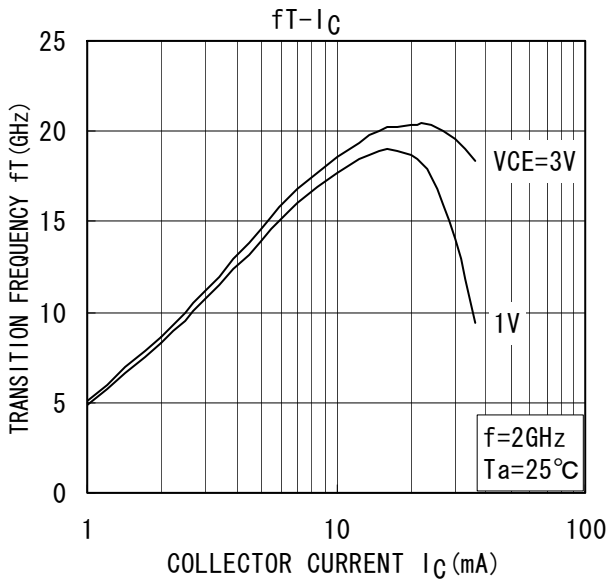
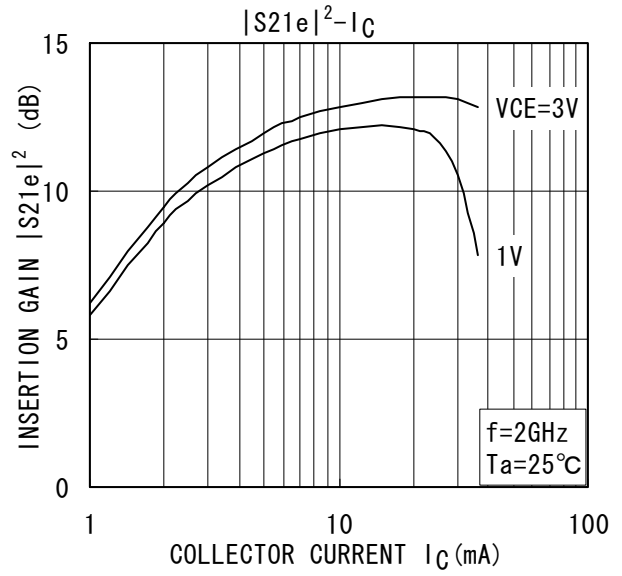
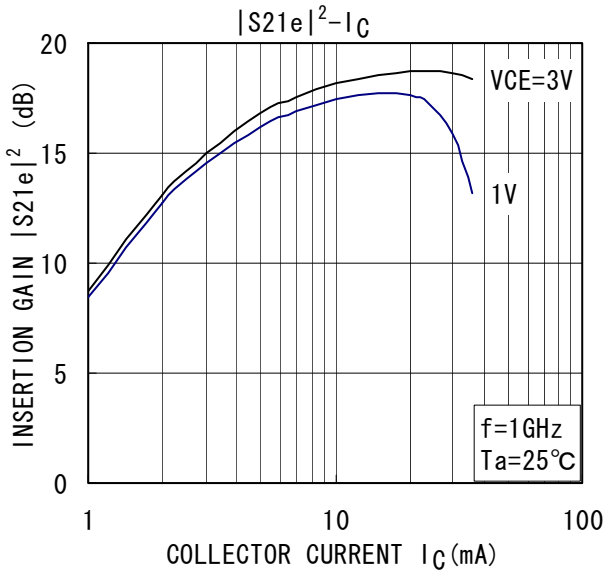
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = 8\text{ V}, I_E = 0$	-	-	1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 1\text{ V}, I_C = 0$	-	-	1	μA
DC current gain	h_{FE}	$V_{CE} = 3\text{ V}, I_C = 10\text{ mA}$	70	-	140	-
Output capacitance	C_{ob}	$V_{CB} = 1\text{ V}, I_E = 0, f = 1\text{ MHz}$	-	0.37	0.60	pF
Reverse transistor capacitance	C_{re}	$V_{CB} = 1\text{ V}, I_E = 0, f = 1\text{ MHz}$ (Note 1)	-	0.21	0.40	pF

Note 1: C_{re} is measured using a three-terminal method with a capacitance bridge.

Note 2: This product is a lead-free article.

Caution: This device is sensitive to electrostatic discharge.

Be sure to provide all tools and equipment with adequate grounding.



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20070701-EN GENERAL

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