

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

MT3S07S

VHF~UHF Band Low Noise Amplifier Applications

- Low noise figure: $NF = 1.5\text{dB}$ ($V_{CE} = 3\text{ V}$, $I_C = 5\text{ mA}$, $f = 2\text{ GHz}$)
- High gain: $|S_{21e}|^2 = 9.5\text{dB}$ ($V_{CE} = 3\text{ V}$, $I_C = 15\text{ mA}$, $f = 2\text{ GHz}$)

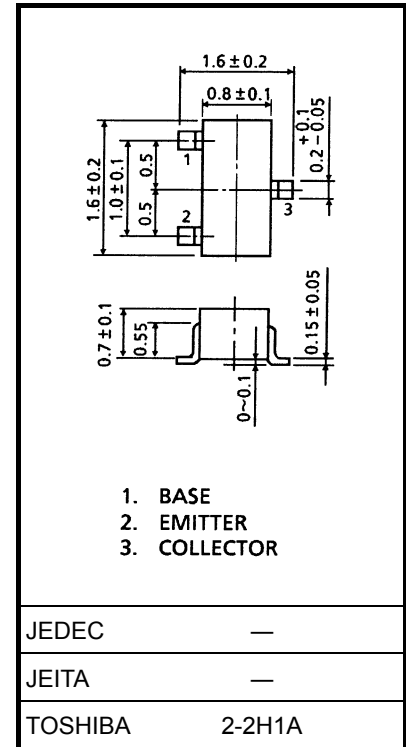
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	10	V
Collector-emitter voltage	V_{CEO}	5	V
Emitter-base voltage	V_{EBO}	1.5	V
Collector current	I_C	25	mA
Base current	I_B	10	mA
Collector power dissipation	P_C	100	mW
Junction temperature	T_j	125	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55~125	$^\circ\text{C}$

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.

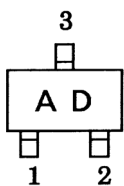
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Unit: mm



Weight: 0.0024 g (typ.)

Marking



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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	$V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$	10	12	—	GHz
Insertion gain	$ S_{21e} ^2$ (1)	$V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$, $f = 2\text{ GHz}$	—	7.5	—	dB
	$ S_{21e} ^2$ (2)	$V_{CE} = 3\text{ V}$, $I_C = 15\text{ mA}$, $f = 2\text{ GHz}$	6.5	9.5	—	
Noise figure	NF (1)	$V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$, $f = 2\text{ GHz}$	—	1.6	3	dB
	NF (2)	$V_{CE} = 3\text{ V}$, $I_C = 5\text{ mA}$, $f = 2\text{ GHz}$	—	1.5	3	

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = 5\text{ V}, I_E = 0$	—	—	0.1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 1\text{ V}, I_C = 0$	—	—	1	μA
DC current gain	h_{FE}	$V_{CE} = 1\text{ V}, I_C = 5\text{ mA}$	70	—	140	
Reverse transfer capacitance	C_{re}	$V_{CB} = 1\text{ V}, I_E = 0, f = 1\text{ MHz}$ (Note)	—	0.4	0.85	pF

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

Caution

This device is sensitive to electrostatic discharge. Please handle with caution.

RESTRICTIONS ON PRODUCT USE

20070701-EN GENERAL

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