

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

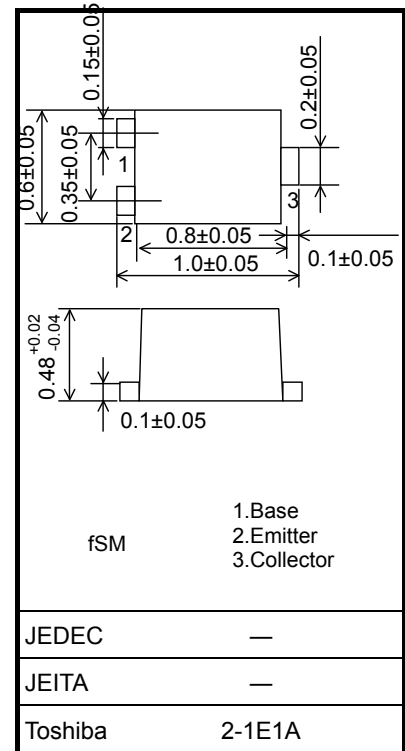
MT3S03AFS

VHF~UHF Band Low-Noise Amplifier Applications

VHF~UHF Band Oscillator/Buffer Applications

- Superior performance in oscillator and Buffer applications
- Superior noise characteristics
: $NF = 1.7 \text{ dB}$, $|S_{21e}|^2 = 5.5 \text{ dB}$ ($f = 2 \text{ GHz}$)

Unit: mm



Weight: 0.0006 g (typ.)

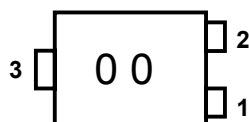
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristic	Symbol	Rating	Unit
Collector- base voltage	V_{CBO}	10	V
Collector- emitter voltage	V_{CEO}	5	V
Emitter- base voltage	V_{EBO}	2	V
Collector current	I_C	40	mA
Base current	I_B	10	mW
Collector power dissipation	P_C (Note 1)	85	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).

Note 1: $10 \text{ mm}^2 \times 1.0 \text{ mm}$ (t), mounted on a glass-epoxy printed circuit board.

Marking



Microwave Characteristics (Ta = 25°C)

Characteristic	Symbol	Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	$V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$	7	10	—	GHz
Insertion gain	$ S_{21e} ^2 (1)$	$V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$, $f = 2\text{ GHz}$	—	5.5	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE} = 3\text{ V}$, $I_C = 20\text{ mA}$, $f = 2\text{ GHz}$	6	8.5	—	
Noise figure	NF (1)	$V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$, $f = 2\text{ GHz}$	—	1.7	3	dB

Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Condition	Min	Typ.	Max	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = 5\text{ V}$, $I_E = 0$	—	—	0.1	μA
Emitter cutoff current	I_{EBO}	$V_{EB} = 3.5\text{ V}$, $I_C = 0$	—	—	10	μA
DC current gain	h_{FE}	$V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$	80	—	160	
Reverse transfer capacitance	C_{re}	$V_{CB} = 1\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$ (Note)	—	0.75	1	pF

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

Caution

This device is sensitive to electrostatic discharge. Ensure that tools and equipment are sufficiently grounded before handling. When handling individual devices (which are not yet mounted on a circuit board), ensure that the environment is protected against electrostatic discharge. Operators should wear antistatic clothing, and containers and other objects that come into direct contact with devices should be made of antistatic materials.

RESTRICTIONS ON PRODUCT USE

20070701-EN GENERAL

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- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
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