

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

# MT6L72FS

## VHF~UHF Band Low-Noise Amplifier Applications

Two devices are incorporated in a fine-pitch, small-mold package (6 pins): fS6.

- Superior noise characteristics
- Superior performance in buffer and oscillator applications
- Lead (Pb)-free.

## Mounted Devices

	Q1	Q2
Corresponding three-pin products:	MT3S36FS	MT3S11AFS
fSM mold products		

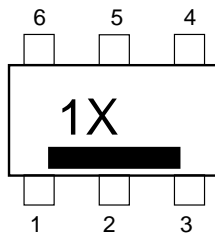
## Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating		Unit
		Q1	Q2	
Collector-base voltage	V <sub>CBO</sub>	8	13	V
Collector-emitter voltage	V <sub>CEO</sub>	4.5	6	V
Emitter-base voltage	V <sub>EBO</sub>	1.5	1	V
Collector current	I <sub>C</sub>	36	40	mA
Base current	I <sub>B</sub>	18	10	mA
Collector power dissipation	P <sub>C</sub> (Note 1)	100	90	mW
		105 (Note 2)		
Junction temperature	T <sub>j</sub>	125		°C
Storage temperature range	T <sub>stg</sub>	−55~125		°C

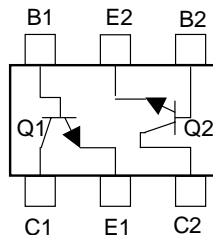
Note 1:  $10\text{ mm}^2 \times 1.0\text{ mm (t)}$ , mounted on a glass-epoxy printed circuit board.

Note 2: During two-element operation.

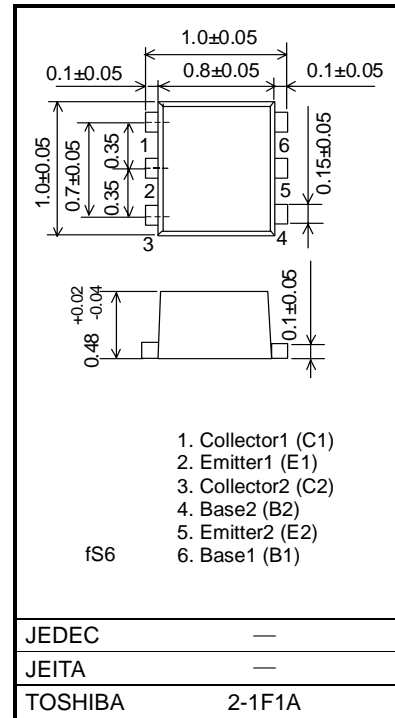
## Marking (top view)



## Pin Assignment (top view)



Unit: mm



Weight: 0.001g (typ.)

## Electrical Characteristics Q1 (Ta = 25°C)

Characteristic	Symbol	Condition	Min	Typ.	Max	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = 8\text{ V}, I_E = 0$	—	—	1	$\mu\text{A}$
Emitter cutoff current	$I_{EBO}$	$V_{EB} = 1\text{ V}, I_C = 0$	—	—	1	$\mu\text{A}$
DC current gain	$h_{FE}$	$V_{CE} = 3\text{ V}, I_C = 10\text{ mA}$	70	—	140	—
Reverse transfer capacitance	$C_{re}(\text{Note})$	$V_{CB} = 1\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	0.21	0.4	pF
Transition frequency	$f_T$	$V_{CE} = 3\text{ V}, I_C = 15\text{ mA}$	16	20	—	GHz
Insertion gain	$ S_{21e} ^2 (1)$	$V_{CE} = 3\text{ V}, I_C = 15\text{ mA}, f = 1\text{ GHz}$	16.5	18.5	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE} = 3\text{ V}, I_C = 15\text{ mA}, f = 2\text{ GHz}$	10.5	13	—	
Noise figure	NF	$V_{CE} = 3\text{ V}, I_C = 3\text{ mA}, f = 2\text{ GHz}$	—	1.3	1.8	dB

www.DataSheet4U.com

## Electrical Characteristics Q2 (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	$\mu\text{A}$
Emitter cutoff current	$I_{EBO}$	$V_{EB} = 1\text{ V}, I_C = 0$	—	—	1	$\mu\text{A}$
DC current gain	$h_{FE}$	$V_{CE} = 1\text{ V}, I_C = 5\text{ mA}$	100	—	160	—
Reverse transfer capacitance	$C_{re}(\text{Note})$	$V_{CB} = 1\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	0.6	0.85	pF
Transition frequency	$f_T$	$V_{CE} = 1\text{ V}, I_C = 5\text{ mA}$	4	6	—	GHz
Insertion gain	$ S_{21e} ^2 (1)$	$V_{CE} = 1\text{ V}, I_C = 5\text{ mA}, f = 2\text{ GHz}$	—	3.5	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE} = 3\text{ V}, I_C = 20\text{ mA}, f = 2\text{ GHz}$	4	6.5	—	
Noise figure	NF	$V_{CE} = 1\text{ V}, I_C = 5\text{ mA}, f = 2\text{ GHz}$	—	2.4	3.2	dB

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**

030619EAA

- The information contained herein is subject to change without notice.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
- 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.  
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations.