TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

# MT6L54E

VHF-UHF Band Low Noise Amplifier Application VHF-UHF Band Oscillator Application

 Tow devices are built in to the super-thin and ultra super mini (6 pin) package: ES6

	Q1: SSM (TESM)	Q2: TESM
Three pin (SSM/TESM) type part No.	MT3S06S (MT3S06T)	MT3S08T

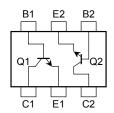
#### **Maximum Ratings (Ta = 25°C)**

Characteristics	Symbol	Q1	Q2	Unit
Collector-base voltage	V <sub>CBO</sub>	10	20	V
Collector-emitter voltage	V <sub>CEO</sub>	5	8	V
Emitter-base voltage	V <sub>EBO</sub>	1.5	1.5	٧
Collector current	IC	15	40	mA
Base current	Ι <sub>Β</sub>	7	10	mA
Collector power dissipation	P <sub>C</sub> (Note 1)	100		mW
Junction temperature	Tj	125		°C
Storage temperature range	T <sub>stg</sub>	-55 to 125		°C

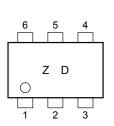
Note 1: Total power dissipation of Q1 and Q2

# ;

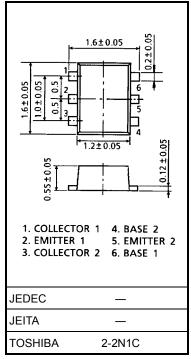
Marking



**Pin Assignment** 



Unit: mm



Weight: 0.003 g (typ.)

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

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	$V_{CB} = 5 \text{ V}, I_{E} = 0$	_	_	0.1	μА
Emitter cut-off current	I <sub>EBO</sub>	$V_{EB} = 1 \text{ V, } I_{C} = 0$	_	_	1	μА
DC current gain	h <sub>FE</sub>	$V_{CE} = 1 \text{ V}, I_{C} = 5 \text{ mA}$	70	_	140	_
Transition frequency	f <sub>T</sub>	$V_{CE} = 3 \text{ V}, I_{C} = 5 \text{ mA}$	7	10	_	GHz
Insertion gain ——	S <sub>21e</sub>   <sup>2</sup> (1)	$V_{CE} = 1 \text{ V}, I_{C} = 5 \text{ mA}, f = 2 \text{ GHz}$	_	7.5	_	dB
	S <sub>21e</sub>   <sup>2</sup> (2)	$V_{CE} = 3 \text{ V}, I_{C} = 7 \text{ mA}, f = 2 \text{ GHz}$	4.5	8	_	
Noise figure	NF (1)	$V_{CE} = 1 \text{ V}, I_{C} = 3 \text{ mA}, f = 2 \text{ GHz}$	_	1.7	3	- dB
	NF (2)	$V_{CE} = 3 \text{ V}, I_{C} = 3 \text{ mA}, f = 2 \text{ GHz}$	_	1.6	3	
Reverse transfer capacitance	C <sub>re</sub>	$V_{CB} = 1 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	_	0.35	0.75	pF

## **Electrical Characteristics Q2-Side (Ta = 25°C)**

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	$V_{CB} = 10 \text{ V}, I_{E} = 0$	_	_	0.1	μΑ
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0	_	_	1	μΑ
DC current gain	h <sub>FE</sub>	$V_{CE} = 1 \text{ V, } I_{C} = 5 \text{ mA}$	80	_	140	_
Transition frequency	f <sub>T</sub>	$V_{CE} = 1 \text{ V}, I_{C} = 5 \text{ mA}$	2	4.5	_	GHz
Insertion gain	S <sub>21e</sub>   <sup>2</sup> (1)	$V_{CE} = 1 \text{ V}, I_{C} = 5 \text{ mA}, f = 1 \text{ GHz}$	_	9.5	_	dB
	S <sub>21e</sub>   <sup>2</sup> (2)	$V_{CE} = 3 \text{ V}, I_{C} = 20 \text{ mA}, f = 1 \text{ GHz}$	9.5	12.5	_	ub
Noise figure	NF	$V_{CE} = 1 \text{ V}, I_{C} = 5 \text{ mA}, f = 1 \text{ GHz}$	_	1.4	2.5	dB
Reverse transfer capacitance	C <sub>re</sub>	$V_{CB} = 1 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	_	0.55	0.95	pF

### Caution

This device electrostatic sensitivity. Please handle with caution.

#### **RESTRICTIONS ON PRODUCT USE**

Handbook" etc..

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
- 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.