

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC5087R

VHF to UHF Band Low Noise Amplifier Applications

- Low noise figure, high gain.
- $NF = 1.1\text{dB}$, $|S_{21e}|^2 = 13.5\text{dB}$ ($f = 1\text{ GHz}$)

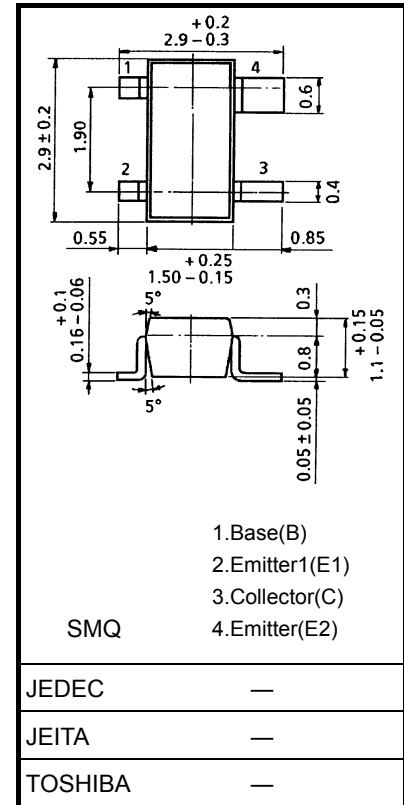
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	20	V
Collector-emitter voltage	V_{CEO}	12	V
Emitter-base voltage	V_{EBO}	3	V
Base current	I_B	40	mA
Collector current	I_C	80	mA
Collector power dissipation	P_C	150	mW
Junction temperature	T_j	125	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 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: 12 mg (typ.)

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

Characteristic	Symbol	Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	$V_{CE} = 10\text{ V}$, $I_C = 30\text{ mA}$	6	8	—	GHz
Insertion gain	$ S_{21e} ^2 (1)$	$V_{CE} = 5\text{ V}$, $I_C = 20\text{ mA}$, $f = 1\text{ GHz}$	—	12.5	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE} = 10\text{ V}$, $I_C = 30\text{ mA}$, $f = 1\text{ GHz}$	11	13.5	—	
Noise figure	NF	$V_{CE} = 10\text{ V}$, $I_C = 7\text{ mA}$, $f = 1\text{ GHz}$	—	1.1	2	

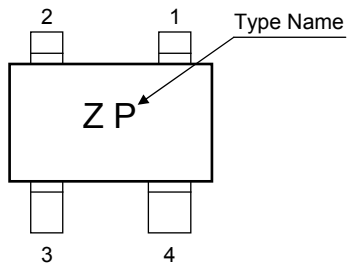
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristic	Symbol	Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = 10\text{ V}$, $I_E = 0$	—	—	1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 1\text{ V}$, $I_C = 0$	—	—	1	μA
DC current gain	h_{FE}	$V_{CE} = 10\text{ V}$, $I_C = 20\text{ mA}$	120	—	240	—
Output capacitance	C_{ob}	$V_{CB} = 10\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$ (Note 1)	—	1.1	1.6	pF
Reverse transfer capacitance	C_{re}		—	0.65	1	pF

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

Start of commercial production
2005-05

Marking



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