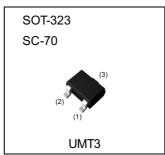


High-Frequency Amplifier Transistor (11V, 50mA, 3.2GHz)

Parameter	Value
V <sub>CEO</sub>	11V
I <sub>C</sub>	50mA

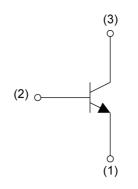
## Outline



## Features

- 1)High transition frequency.(Typ.f<sub>T</sub>=3.2GHz)
- 2)Small rbb' Cc and high gain.(Typ.4ps)
- 3)Small NF

# ●Inner circuit



- (1) Emitter
- (2) Base
- (3) Collector

# Application

UHF/VHF FREQUENCY CONVERTER, LOCAL OSCILLATOR

# Packaging specifications

Part No.	Package	Package size	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit.(pcs)	Marking
2SC4083	SOT-323 (UMT3)	2021	T106	180	8	3000	1D

# Notice

This product might cause chip aging and breakdown under the large electrified environment. Please consider to design ESD protection circuit.

# ● Absolute maximum ratings (T<sub>a</sub> = 25°C)

Parameter	Symbol	Values	Unit
Collector-base voltage	V <sub>CBO</sub>	20	V
Collector-emitter voltage	V <sub>CEO</sub>	11	V
Emitter-base voltage	V <sub>EBO</sub>	3	V
Collector current	I <sub>C</sub>	50	mA
Power dissipation	P <sub>D</sub> *1	200	mW
Junction temperature	T <sub>j</sub>	150	°C
Range of storage temperature	T <sub>stg</sub>	-55 to +150	°C

# • Electrical characteristics $(T_a = 25^{\circ}C)$

Parameter	Symbol	Symbol Conditions		Values			
raiametei	Symbol		Min.	Тур.	Max.	Unit	
Collector-base breakdown voltage	BV <sub>CBO</sub>	I <sub>C</sub> = 10μA	20	1	1	V	
Collector-emitter breakdown voltage	BV <sub>CEO</sub>	I <sub>C</sub> = 1mA	11	1	1	V	
Emitter-base breakdown voltage	$BV_{EBO}$	I <sub>E</sub> = 10μA	3	1	ı	V	
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> = 10V	1	1	500	nA	
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = 2V	-	-	500	nA	
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 10mA, I <sub>B</sub> = 5mA	-	-	500	mV	
DC current gain	OC current gain $h_{FE}$ $V_{CE} = 10V$ , $I_C = 5m$		56	1	270	-	
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> = 10V, I <sub>E</sub> = -10mA, f = 500MHz	1.4	3.2	1	GHz	
Output capacitance	$C_{ob}$	$V_{CB} = 10V, I_{E} = 0A,$ f = 1MHz	1	0.8	1.5	pF	
Noise figure	N <sub>F</sub>	$V_{CB} = 6V$ , $I_C = 2mA$ f = 500MHz, $R_g = 50\Omega$	-	3.5	-	dB	

# hFE values are calssified as follows:

rank	N	Р	Q	-	-
h <sub>FE</sub>	56-120	82-180	120-270	-	-

<sup>\*1</sup> Each terminal mounted on a reference land.

# ● Electrical characteristic curves(T<sub>a</sub> = 25°C)

Fig.1 Ground Emitter Propagation Characteristics

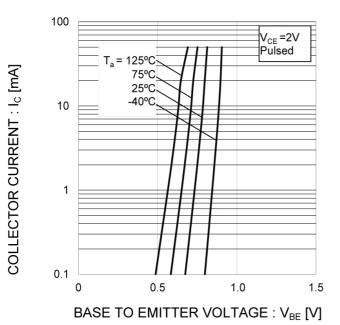
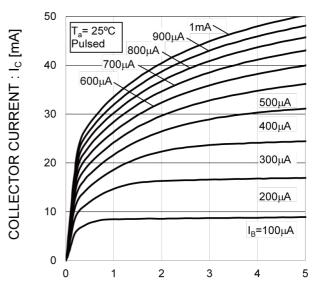


Fig.2 Typical Output Characteristics



COLLECTOR TO EMITTER VOLTAGE: V<sub>CE</sub> [V]

Fig.3 DC Current Gain vs. Collector Current (I)

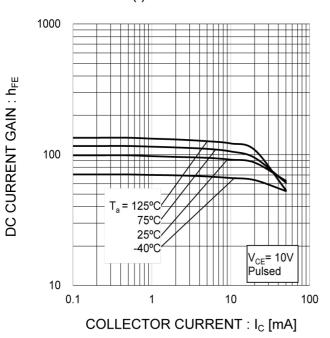
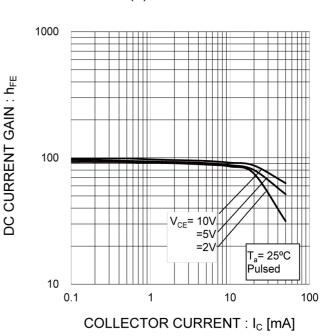


Fig.4 DC Current Gain vs. Collector Current (II)



# ● Electrical characteristic curves(T<sub>a</sub> = 25°C)

Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current (I)

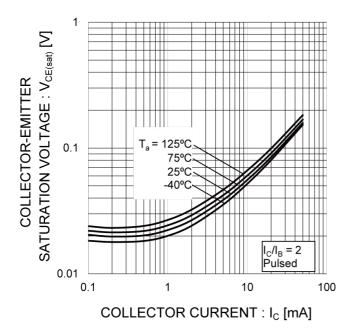


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current (II)

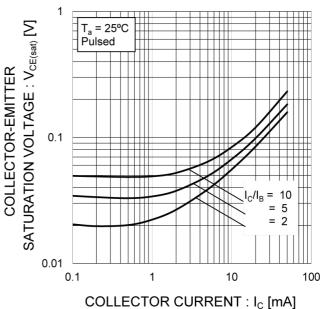


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

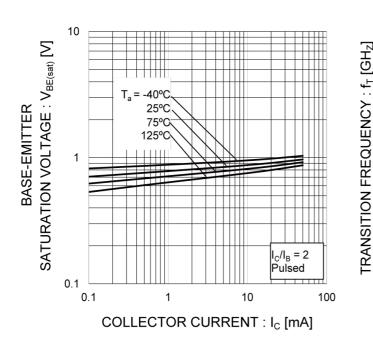
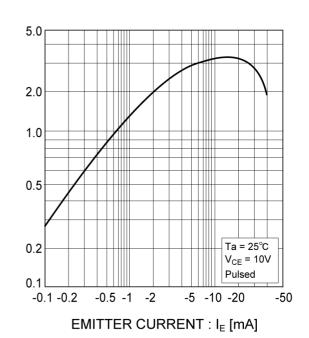


Fig.8 Gain Bandwidth Product vs. Emitter Current



# ● Electrical characteristic curves(T<sub>a</sub> = 25°C)

Fig.9 Capacitance vs. Reverse Bias Voltage

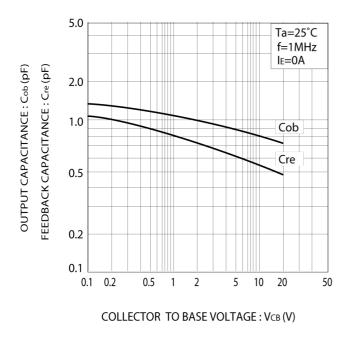


Fig.10 Collector to base time constance vs. collector current

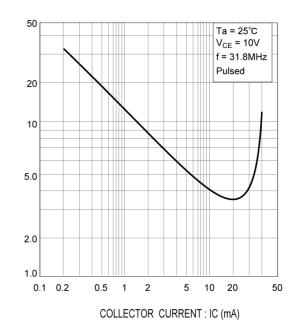
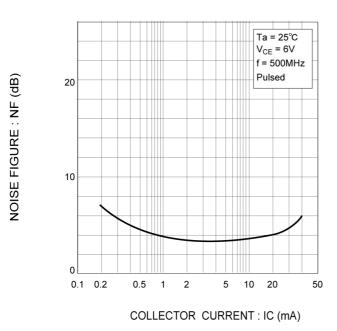
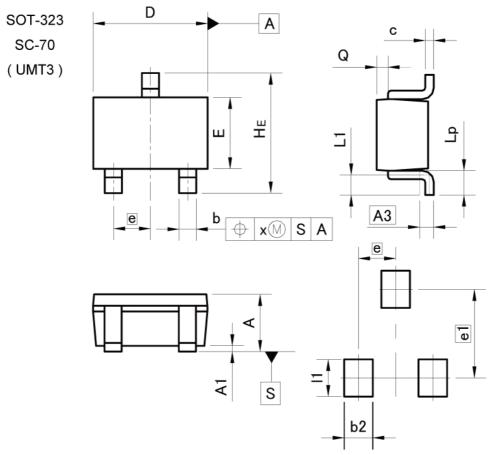


Fig.11 Noise factor vs.collector current characteristics



COLLECTOR TO BASE TIME CONSTANT : Cc rbb' (ps)

# Dimensions



Pattern of terminal position areas [Not a pattern of soldering pads]

DIM	MILIMETERS		INCHES		
DIM	MIN	MAX	MIN	MAX	
Α	0.80	1.00	0.031	0.039	
A1	0.00	0.10	0	0.004	
A3	0.2	25	0.0	01	
b	0.25	0.40	0.01	0.016	
С	0.10	0.20	0.004	0.008	
D	1.90	2.10	0.075	0.083	
E	1.15	1.35	0.045	0.053	
е	0.0	0.65		03	
HE	2.00	2.20	0.079	0.087	
L1	0.20	0.50	0.008	0.02	
Lp	0.25	0.55	0.01	0.022	
Q	0.10	0.30	0.004	0.012	
х	_	0.10	_	0.004	

DIM	MILIMETERS		INCHES		
DIM	MIN MAX		MIN	MAX	
e1	1.55		0.06		
b2	- 0.50		I	0.02	
11	_	0.65	-	0.026	

Dimension in mm/inches



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(Note1) Medical Equipment Classification of the Specific Applications

JAPAN	USA	EU	CHINA
CLASSⅢ	CLASSⅢ	CLASS II b	CL ACCIII
CLASSIV	CLASSIII	CLASSⅢ	CLASSIII

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  - [b] Installation of redundant circuits to reduce the impact of single or multiple circuit failure
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  - [a] Use of our Products in any types of liquid, including water, oils, chemicals, and organic solvents
  - [b] Use of our Products outdoors or in places where the Products are exposed to direct sunlight or dust
  - [c] Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, and NO<sub>2</sub>
  - [d] Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
  - [e] Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
  - [f] Sealing or coating our Products with resin or other coating materials
  - [g] Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
  - [h] Use of the Products in places subject to dew condensation
- 4. The Products are not subject to radiation-proof design.
- 5. Please verify and confirm characteristics of the final or mounted products in using the Products.
- 6. In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
- 7. De-rate Power Dissipation (Pd) depending on Ambient temperature (Ta). When used in sealed area, confirm the actual ambient temperature.
- 8. Confirm that operation temperature is within the specified range described in the product specification.
- 9. ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

### Precaution for Mounting / Circuit board design

- 1. When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.
- 2. In principle, the reflow soldering method must be used on a surface-mount products, the flow soldering method must be used on a through hole mount products. If the flow soldering method is preferred on a surface-mount products, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

### **Precautions Regarding Application Examples and External Circuits**

- 1. If change is made to the constant of an external circuit, please allow a sufficient margin considering variations of the characteristics of the Products and external components, including transient characteristics, as well as static characteristics.
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#### **Precaution for Electrostatic**

This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of lonizer, friction prevention and temperature / humidity control).

## **Precaution for Storage / Transportation**

- 1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
  - [a] the Products are exposed to sea winds or corrosive gases, including Cl2, H2S, NH3, SO2, and NO2
  - [b] the temperature or humidity exceeds those recommended by ROHM
  - [c] the Products are exposed to direct sunshine or condensation
  - [d] the Products are exposed to high Electrostatic
- Even under ROHM recommended storage condition, solderability of products out of recommended storage time period
  may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is
  exceeding the recommended storage time period.
- 3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.
- 4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

## **Precaution for Product Label**

QR code printed on ROHM Products label is for ROHM's internal use only.

#### **Precaution for Disposition**

When disposing Products please dispose them properly using an authorized industry waste company.

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