DATA SHEET

NEC

COMPOUND TRANSISTOR

μPA101

HIGH FREQUENCY NPN TRANSISTOR ARRAY

FEATURES

- **BUILT-IN ULTRAHIGH FREQUENCY MULTIPLIER:** (Each Transistor has f_T 9 GHz)
- **OUTSTANDING h_{FE} LINEARITY**
- **TWO PACKAGE OPTIONS:**
  μPA101B: Superior thermal dissipation due to studded 14-pin ceramic package
  μPA101G: Reduced circuit size due to 8-pin plastic SOP package for surface mounting

DESCRIPTION AND APPLICATIONS

This Si bipolar transistor array contains six bipolar transistors which have f_T 9 GHz. Applications include a multiplier, double balanced mixer, phase detector, or AGC circuit. The two package options offer a choice of excellent heat dissipation or 35 % size reduction.

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA101B-E1	14-pin ceramic package
μPA101G-E1	8-pin plastic SOP (225 mil)

ABSOLUTE MAXIMUM RATINGS (T_A = +25 °C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{CBO}*	Collector to Base Voltage	V	15
V_{CEO}*	Collector to Emitter Voltage	V	6
V_{EBO}*	Emitter to Base Voltage	V	2.5
I_C*	Collector Current	mA	40
P_T	Power Dissipation		
	μPA101B	mW	650
	μPA101G	mW	250
T_J	Junction Temperature		
	μPA101B	°C	200
	μPA101G	°C	125
T_{STG}	Storage Temperature		
	μPA101B	°C	–55 to +200
	μPA101G	°C	–55 to +125

* Absolute maximum ratings for each transistor.

Caution electro-static sensitive devices

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

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The mark ★ shows major revised points.

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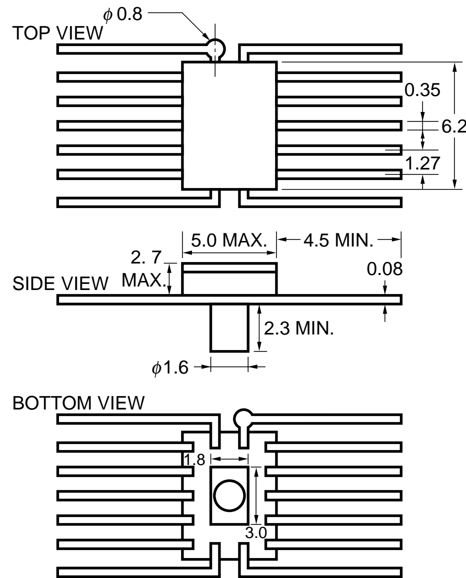
PACKAGE DIMENSIONS (UNIT: mm)

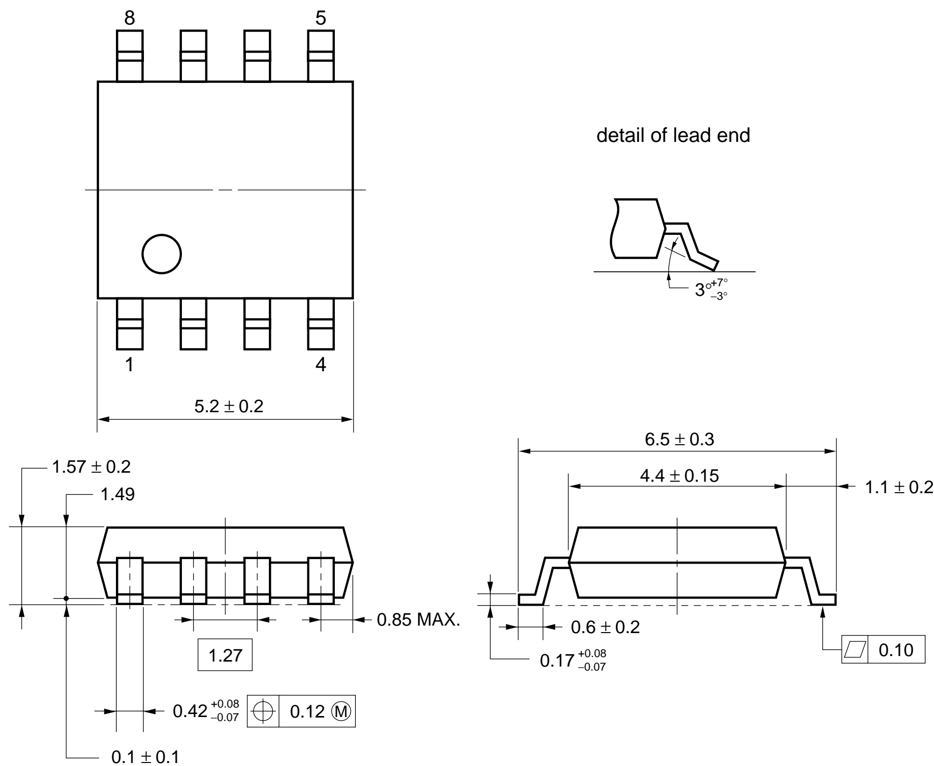
μPA101B

14 PIN CERAMIC PACKAGE



μPA101G

★ **8 PIN PLASTIC SOP (225 mil)**



NOTE Each lead centerline is located within 0.12 mm of its true position (T.P.) at maximum material condition.

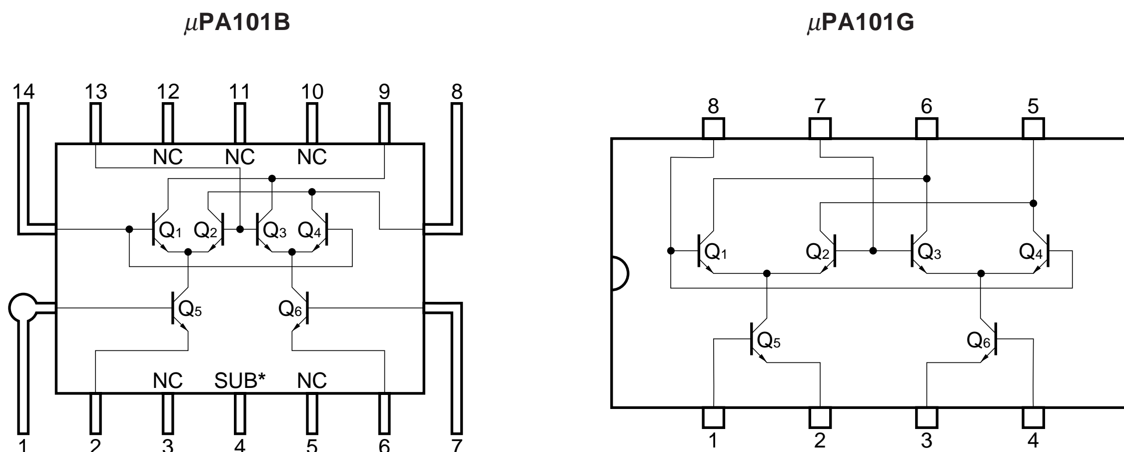
See connection diagram for description of leads.

ELECTRICAL CHARACTERISTICS (Unless otherwise specified T_A = +25 ˚C μPA101B, μPA101G common)

SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN.	TYP.	MAX.
I_{CBO}	Collector Cut-off Current at V_{CB} = 5 V, I_E = 0 (Q1 thru Q6)	μA			1.0
I_{EBO}	Emitter Cut-off Current at V_{EB} = 1 V, I_C = 0 (Q5 and Q6)	μA			1.0
h_{FE}	Direct Current Amplification, V_{CE} = 3 V, I_C = 1 mA (Q5 and Q6)		40	100	250
h_{FE1}/h_{FE2}	Direct Current Amplification Ratio, V_{CE} = 3 V, I_C = 1 mA, (Q5 and Q6)		0.9	1.0	1.1
C_{EB}	Emitter to Base Capacitance at V_{EB} = 0, f = 1 MHz	pF		1.4	2.8
f_T	Gain Bandwidth Product* at V_{CE} = 3 V, I_C = 10 mA	GHz		9	

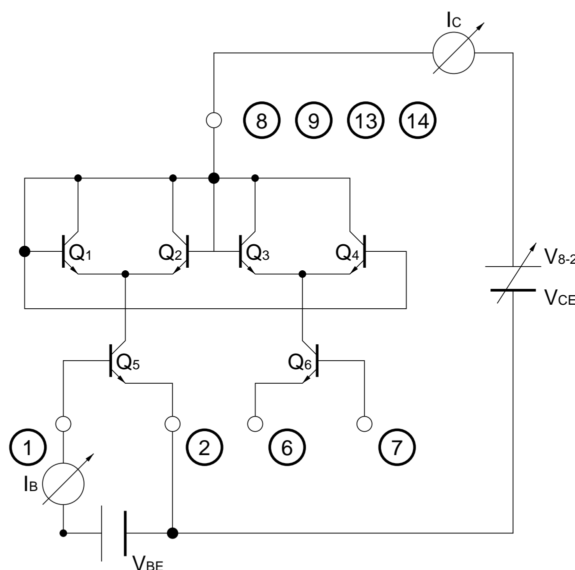
* Measured by installing a single transistor in a Micro-X package: the value shown is a reference value.

CONNECTION DIAGRAM (Top View)



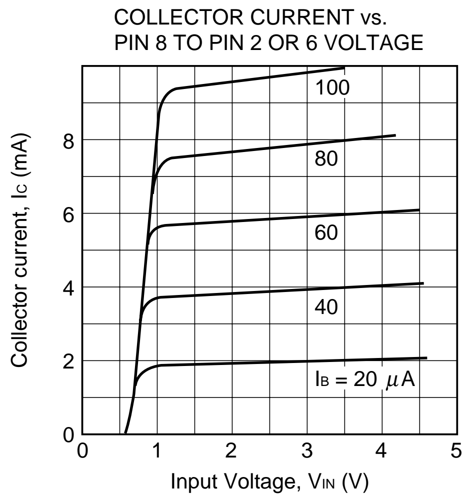
* Substrate should be connected to the lowest voltage point to prevent latch-up.

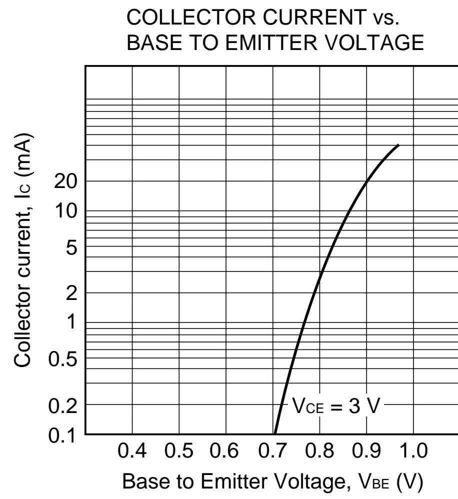
TEST CIRCUIT SCHEMATIC* (For Electrical Characteristics Measurements excluding f_T)

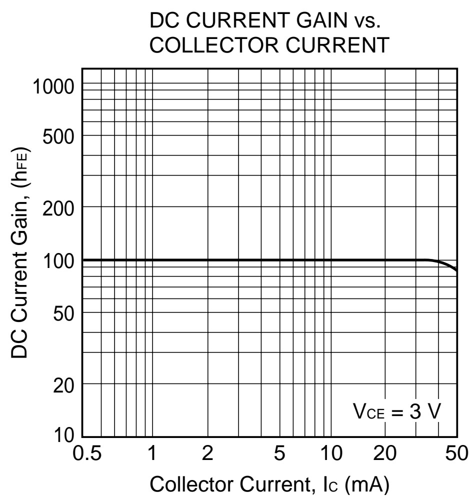


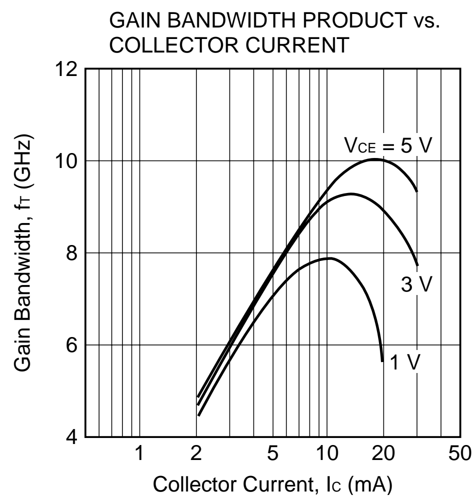
* See performance characteristics for voltage.

TYPICAL PERFORMANCE CHARACTERISTICS (T_A = +25 °C)









NOTES ON CORRECT USE

(1) Observe precautions for handling because of electro-static sensitive devices.
(2) Form a ground pattern as wide as possible to minimize ground impedance (to prevent undesired operation).
(3) Design circuits connected Subpin to the lowest voltage to prevent latch-up.
(4) Design circuits as each pin voltage difference within 15 V maximum.

RECOMMENDED SOLDERING CONDITIONS

This product should be soldered in the following recommended conditions. Other soldering methods and conditions than the recommended conditions are to be consulted with our sales representatives.

μPA101G

Soldering process	Soldering conditions	Recommended condition symbol
Infrared ray reflow	Package peak temperature: 235 °C, Hour: within 30 s. (more than 210 °C), Time: 2 times, Limited days: no.[Note]	IR35-00-2
VPS	Package peak temperature: 215 °C, Hour: within 40 s. (more than 200 °C), Time: 2 times, Limited days: no.[Note]	VP15-00-2
Wave soldering	Soldering tub temperature: less than 260 °C, Hour: within 10 s. Time: 1 time, Limited days: no.[Note]	WS60-00-1
Pin part heating	Pin area temperature: less than 300 °C, Hour: within 3 s./pin Limited days: no.[Note]	

μPA101B

Soldering process	Soldering conditions	Symbol
Infrared ray reflow	Peak package's surface temperature: 230 °C or below, Reflow time: 10 seconds or below (210 °C or higher), Number of reflow process: 1, Exposure limit*: None	
Partial heating method	Terminal temperature: 260 °C or below, Flow time: 10 seconds or below, Exposure limit*: None	

Note It is the storage days after opening a dry pack, the storage conditions are 25 °C, less than 65 % RH.

Caution The combined use of soldering method is to be avoided (However, except the pin area heating method).

For details of recommended soldering conditions for surface mounting, refer to information document SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL (C10535E).

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  - Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
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