

To our customers,

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## Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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# SILICON TRANSISTOR

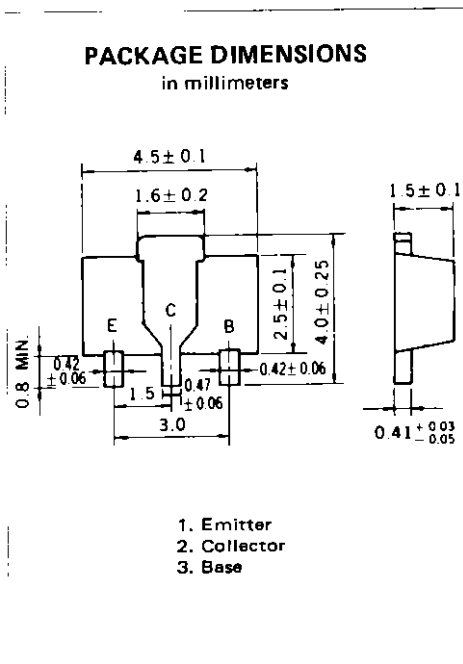
# 2SB1301

## PNP SILICON EPITAXIAL TRANSISTOR

### POWER MINI MOLD

#### DESCRIPTION

2SB1301 is designed for audio frequency power amplifier and switching application, especially in Hybrid Integrated Circuits.



#### FEATURES

- World Standard Miniature Package
- High DC Current Gain  $h_{FE} = 135$  to 600
- Low  $V_{CE(sat)} \cdot V_{CE(sat)} = -0.42$  V at 3.0 A
- Complement to 2SD1952

#### ABSOLUTE MAXIMUM RATINGS

Maximum Voltages and Currents ( $T_a = 25^\circ\text{C}$ )

Collector to Base Voltage	$V_{CBO}$	-20	V
Collector to Emitter Voltage	$V_{CEO}$	-16	V
Emitter to Base Voltage	$V_{EBO}$	-6	V
Collector Current (DC)	$I_C$	-3	A
Collector Current (Pulse)*	$I_C$	-5	A
Maximum Power Dissipation			
Total Power Dissipation			
at $25^\circ\text{C}$ Ambient Temperature**	$P_T$	2.0	W
Maximum Temperatures			
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55 to +150	$^\circ\text{C}$

\*  $PW \leq 10$  ms, Duty Cycle  $\leq 50$  %

\*\* When mounted on ceramic substrate of  $16\text{ cm}^2 \times 0.7$  mm

#### ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

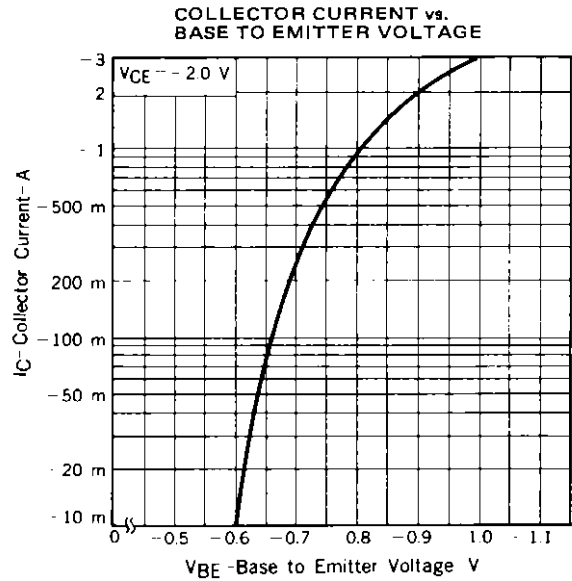
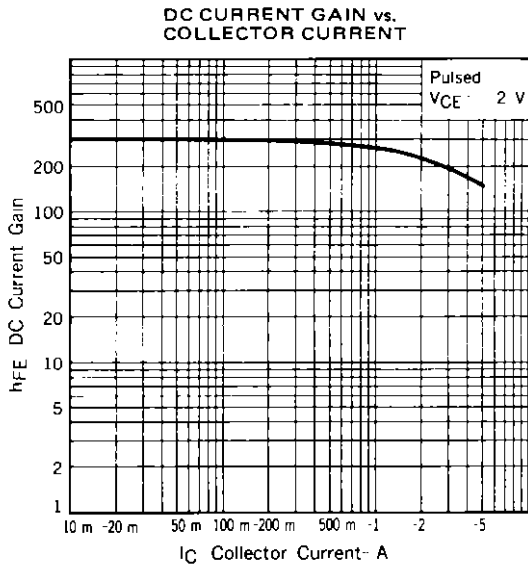
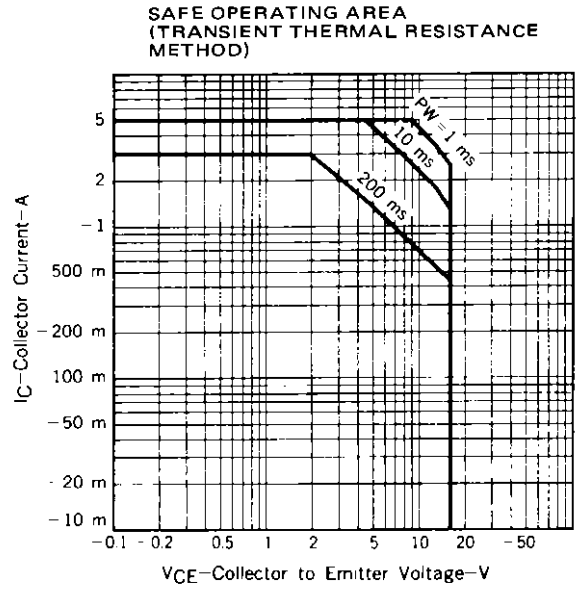
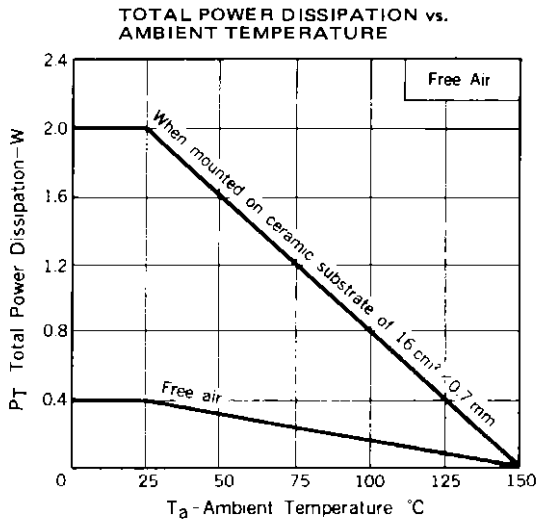
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	$I_{CBO}$			-100	nA	$V_{CB} = -20$ V, $I_E = 0$
Emitter Cutoff Current	$I_{EBO}$			-100	nA	$V_{EB} = -6.0$ V, $I_C = 0$
DC Current Gain	$h_{FE1}^{***}$	135	350	600		$V_{CE} = -2.0$ V, $I_C = -100$ mA
DC Current Gain	$h_{FE2}^{***}$	90				$V_{CE} = -2.0$ V, $I_C = -2.0$ A
Collector Saturation Voltage	$V_{CE(sat)}^{***}$		-0.28	-0.35	V	$I_C = -2.0$ A, $I_B = -0.1$ A
Base Saturation Voltage	$V_{BE(sat)}^{***}$		-0.95	-1.2	V	$I_C = -2.0$ A, $I_B = -0.1$ A
Base to Emitter Voltage	$V_{BE}^{***}$	-0.6	-0.66	-0.7	V	$V_{CE} = -2.0$ V, $I_C = -100$ mA
Gain Bandwidth Product	$f_T$	100	140		MHz	$V_{CE} = -10$ V, $I_E = 50$ mA
Output Capacitance	$C_{ob}$		60		pF	$V_{CB} = -10$ V, $I_E = 0$ , $f = 1.0$ MHz

\*\*\*Pulsed:  $PW \leq 350$   $\mu\text{s}$ , Duty Cycle  $\leq 2$  %

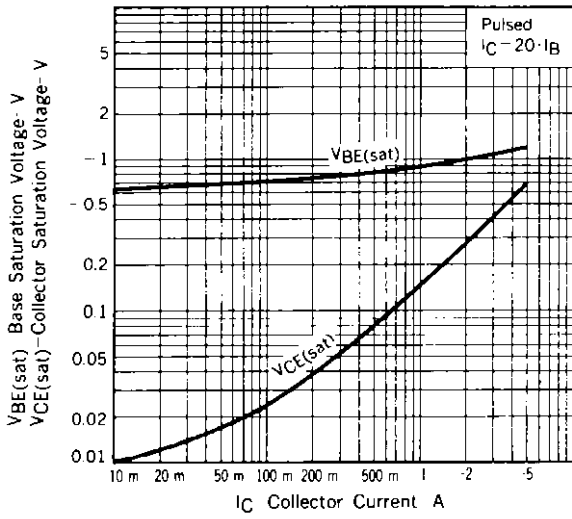
#### $h_{FE}$ Classification

MARKING	ZR	ZQ	ZP
$h_{FE}$	135 to 270	200 to 400	300 to 600

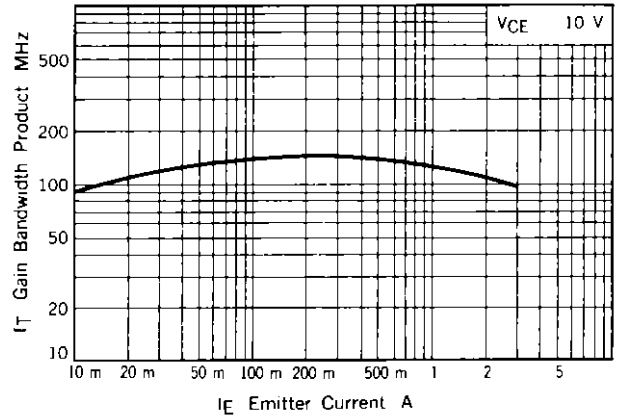
TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )



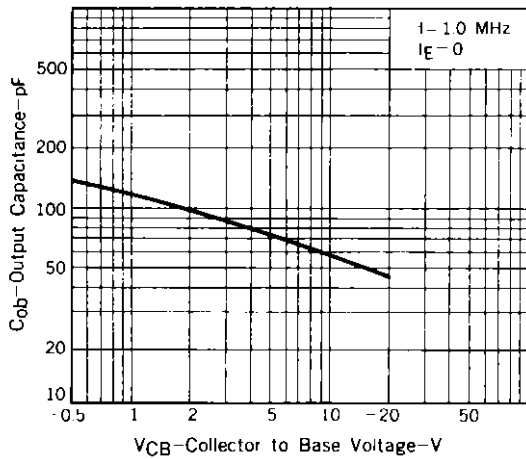
BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT GAIN



OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system.	TEI-1202
Quality grade on NEC semiconductor devices.	1EI-1209
Semiconductor device mounting technology manual.	1EI-1207
Semiconductor device package manual.	1EI-1213
Guide to quality assurance for semiconductor devices.	MEI-1202
Semiconductor selection guide.	MF-1134

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