

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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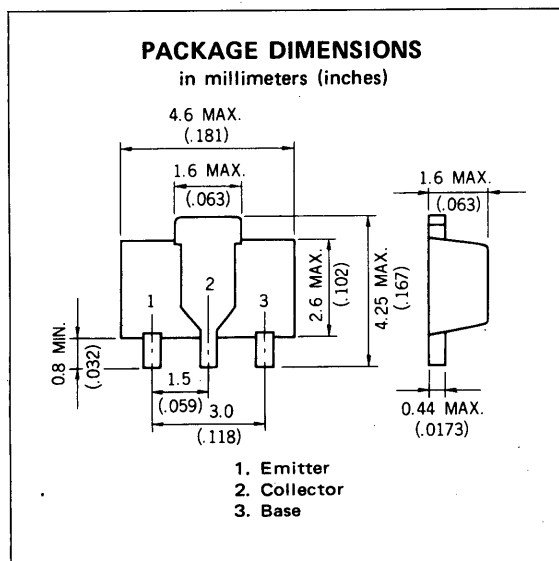
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NPN SILICON EPITAXIAL TRANSISTOR  
POWER MINI MOLD

DESCRIPTION

The 2SD1001 is designed for audio frequency power amplifier application, especially in Hybrid Integrated Circuits.



FEATURES

- World Standard Miniature Package : SOT-89
- High Collector to Emitter Voltage :  $V_{CEO} > 80$  V
- Complements to PNP type 2SB800

ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

Maximum Voltages and Currents

Collector to Base Voltage	$V_{CBO}$	80	V
Collector to Emitter Voltage	$V_{CEO}$	80	V
Emitter to Base Voltage	$V_{EBO}$	5.0	V
Collector Current (DC)	$I_C$	300	mA
Collector Current (Pulse)*	$I_C$	500	mA

Maximum Power Dissipation

Total Power Dissipation at $25^\circ\text{C}$ Ambient Temperature**	$P_T$	2.0	W
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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  $16\text{ cm}^2 \times 0.7\text{ mm}$

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

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	$I_{CBO}$			100	nA	$V_{CB} = 80\text{ V}, I_E = 0$
Emitter Cutoff Current	$I_{EBO}$			100	nA	$V_{EB} = 5.0\text{ V}, I_C = 0$
DC Current Gain	$h_{FE1}$	90	200	400		$V_{CE} = 1.0\text{ V}, I_C = 50\text{ mA}$ ***
DC Current Gain	$h_{FE2}$	30	80			$V_{CE} = 2.0\text{ V}, I_C = 300\text{ mA}$ ***
Collector Saturation Voltage	$V_{CE(sat)}$		0.15	0.60	V	$I_C = 300\text{ mA}, I_B = 30\text{ mA}$ ***
Base Saturation Voltage	$V_{BE(sat)}$		0.86	1.2	V	$I_C = 300\text{ mA}, I_B = 30\text{ mA}$ ***
Base to Emitter Voltage	$V_{BE}$	600	645	700	mV	$V_{CE} = 6.0\text{ V}, I_C = 10\text{ mA}$ ***
Gain Bandwidth Product	$f_T$		140		MHz	$V_{CE} = 6.0\text{ V}, I_E = -10\text{ mA}$
Output Capacitance	$C_{ob}$		7.0		pF	$V_{CB} = 6.0\text{ V}, I_E = 0, f = 1.0\text{ MHz}$

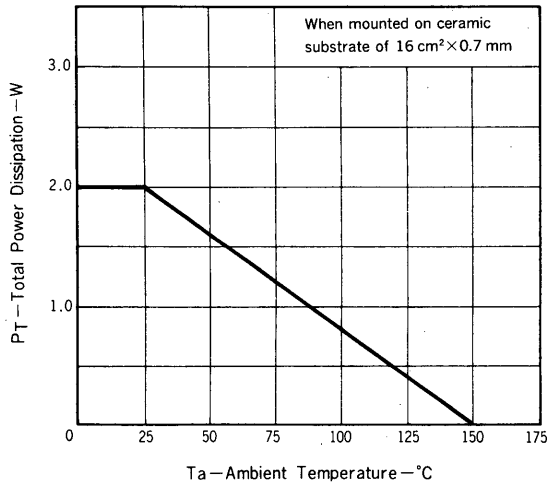
\*\*\*Pulsed:  $PW \leq 350\ \mu\text{s}$ , duty cycle  $\leq 2\%$

$h_{FE}$  Classification

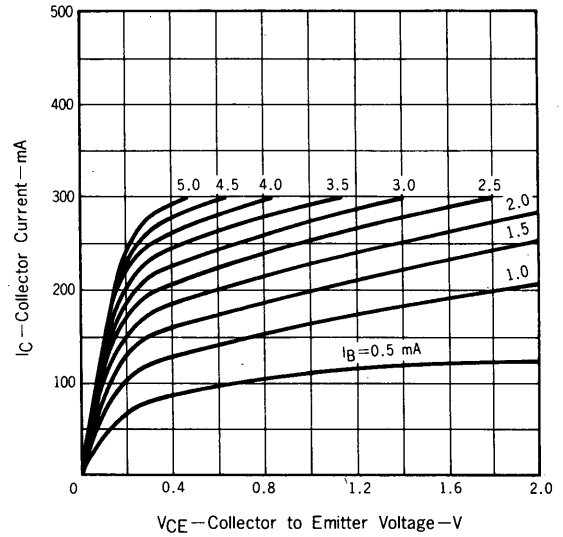
MARKING	EM	EL	EK
$h_{FE1}$	90 - 180	135 - 270	200 - 400

TYPICAL CHARACTERISTICS (Ta=25 °C)

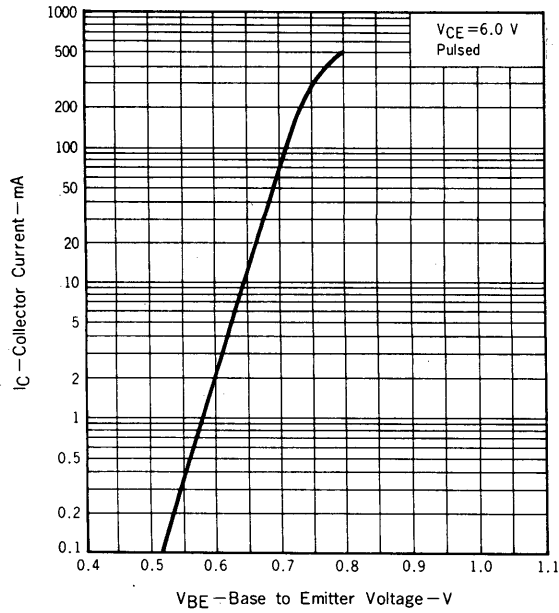
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



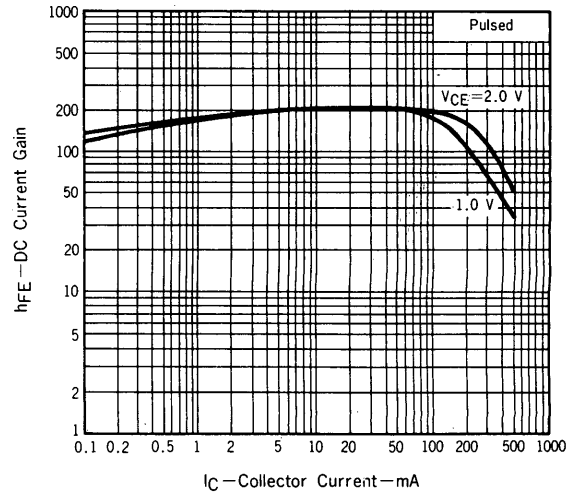
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



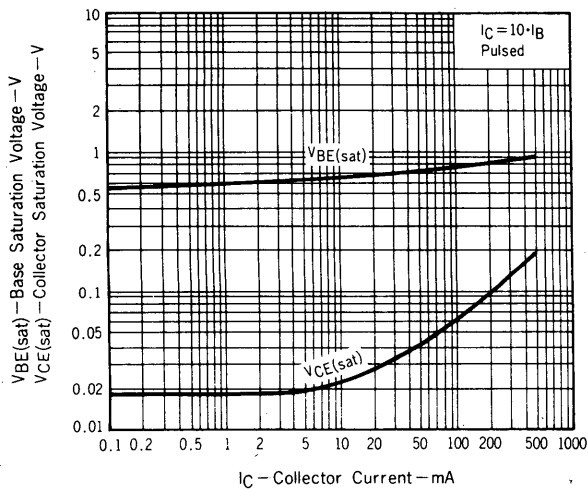
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



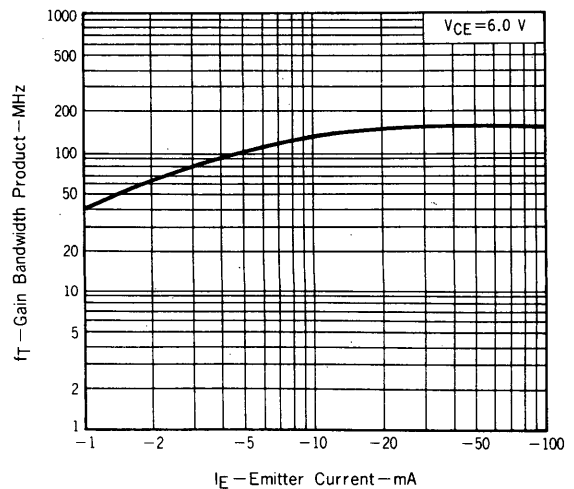
DC CURRENT GAIN vs. COLLECTOR CURRENT



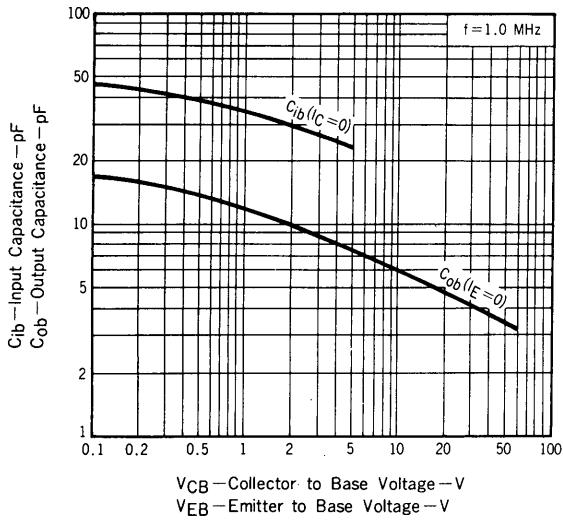
BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



INPUT AND OUTPUT CAPACITANCE  
vs. REVERSE VOLTAGE



REFERENCE

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

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