

To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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

April 1st, 2010
Renesas Electronics Corporation

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

Send any inquiries to <http://www.renesas.com/inquiry>.

Notice

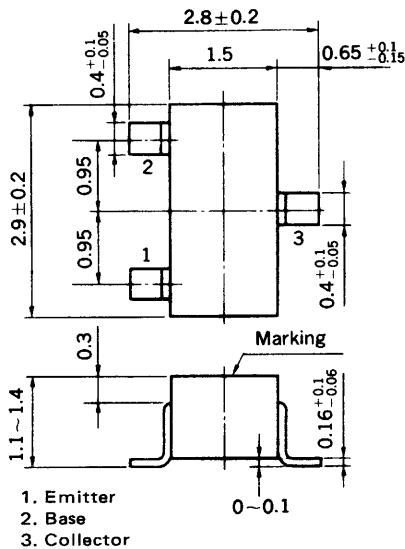
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(Note 2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

HIGH SPEED SWITCHING NPN SILICON EPITAXIAL TRANSISTOR MINI MOLD

PACKAGE DIMENSIONS in millimeters



FEATURE

- High Speed : $t_{stg} = 20 \text{ ns MAX.}$

ABSOLUTE MAXIMUM RATINGS

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

Collector to Base Voltage	V_{CBO}	40	V
Collector to Emitter Voltage	V_{CEO}	20	V
Emitter to Base Voltage	V_{EBO}	5	V
Collector Current (DC)	I_C	200	mA

Maximum Power Dissipation

Total Power Dissipation at 25°C Ambient Temperature	P_T	200	mW
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Maximum Temperatures

Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^\circ\text{C}$

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

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			100	nA	$V_{CB} = 30 \text{ V}, I_E = 0$
Emitter Cutoff Current	I_{EBO}			100	nA	$V_{EB} = 4.0 \text{ V}, I_C = 0$
DC Current Gain	h_{FE1}^*	40	80	180		$V_{CE} = 0.5 \text{ V}, I_C = 1.0 \text{ mA}$
Collector Saturation Voltage	$V_{CE(sat)}^*$		0.13	0.25	V	$I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$
Base Saturation Voltage	$V_{BE(sat)}^*$		0.74	0.85	V	$I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$
Gain Bandwidth Product	f_T	200	500		MHz	$V_{CE} = 10 \text{ V}, I_E = -10 \text{ mA}$
Output Capacitance	C_{ob}		3.0	6.0	pF	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1.0 \text{ MHz}$
Turn-on Time	t_{on}		12	20	ns	See Test Circuit
Storage Time	t_{stg}		7	20	ns	
Turn-off Time	t_{off}		18	40	ns	

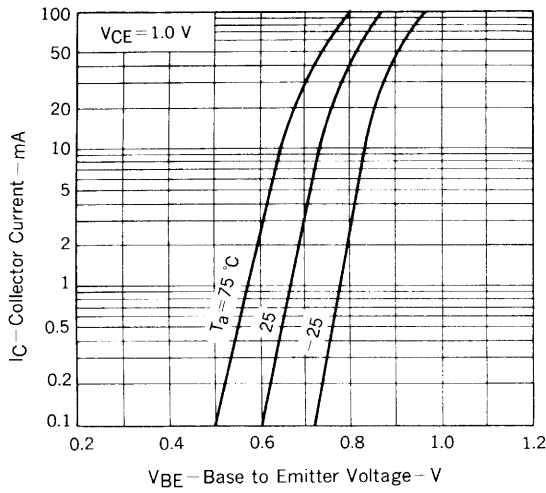
* Pulsed: $PW \leq 350 \mu\text{s}$, Duty Cycle $\leq 2\%$

h_{FE} Classification

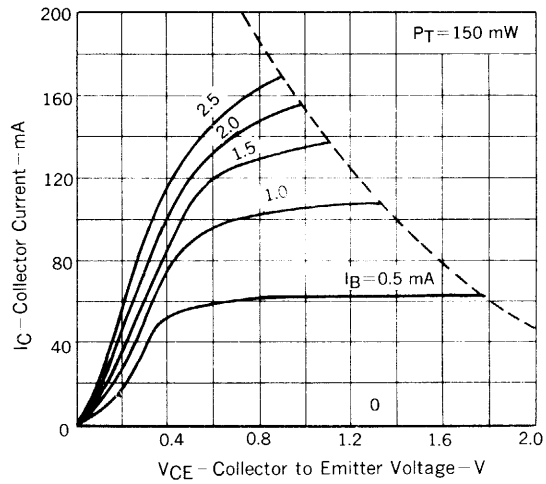
Marking	B2	B3	B4
h_{FE}	40 to 80	60 to 120	90 to 180

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

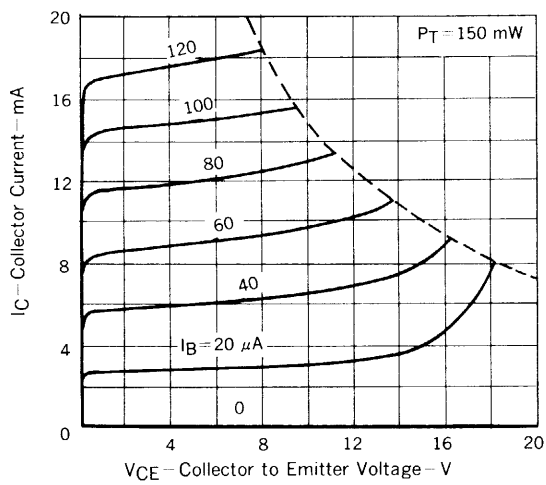
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



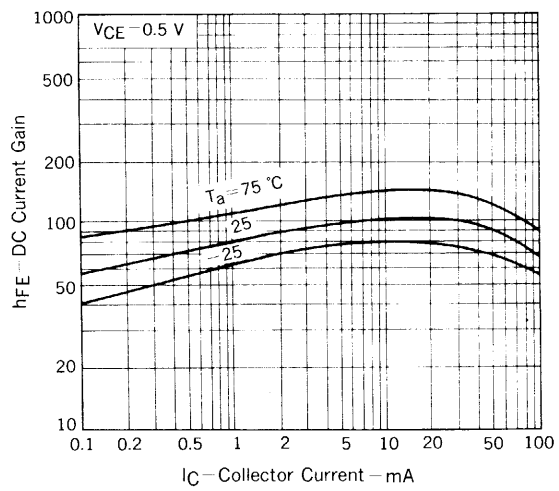
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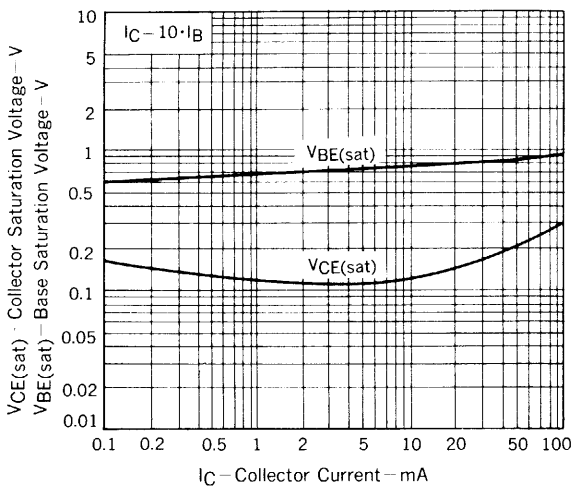
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



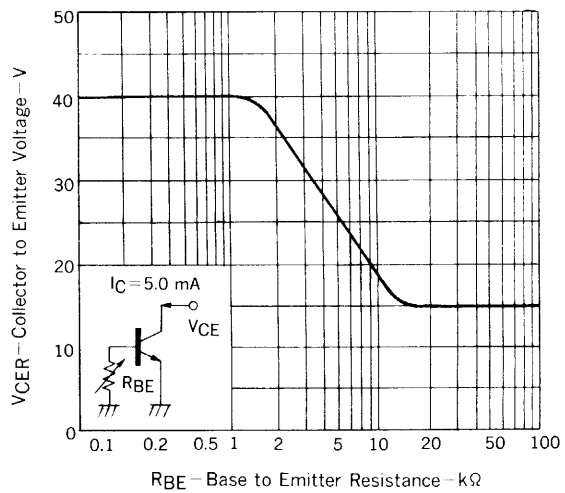
DC CURRENT GAIN vs. COLLECTOR CURRENT



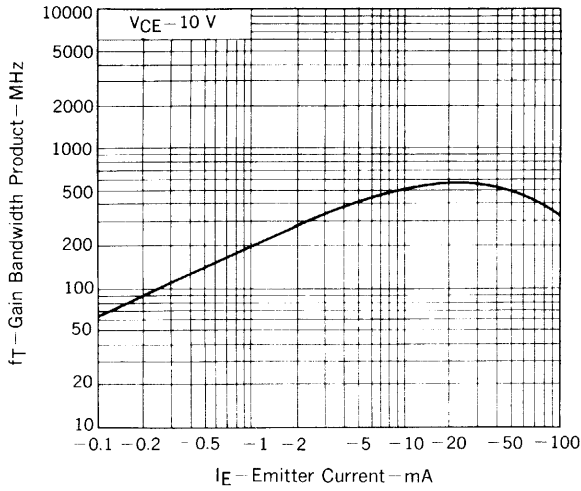
BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



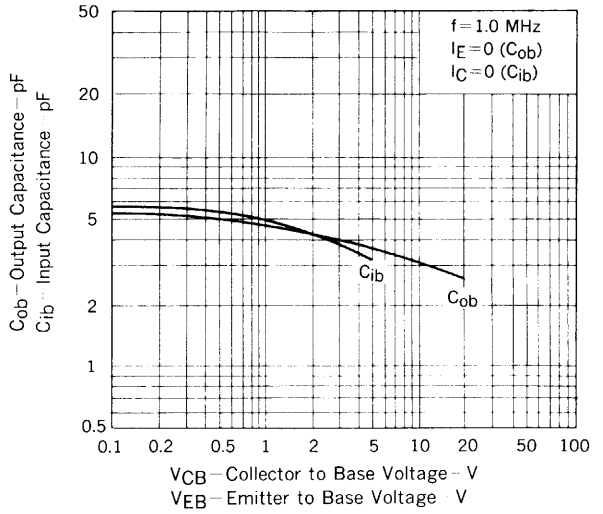
COLLECTOR TO EMITTER VOLTAGE vs. BASE EMITTER RESISTANCE



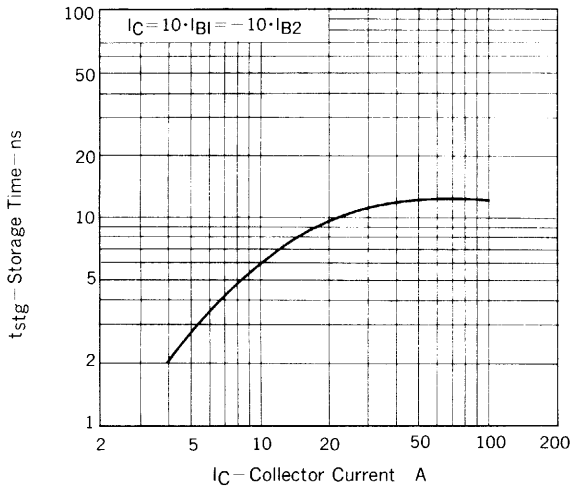
GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



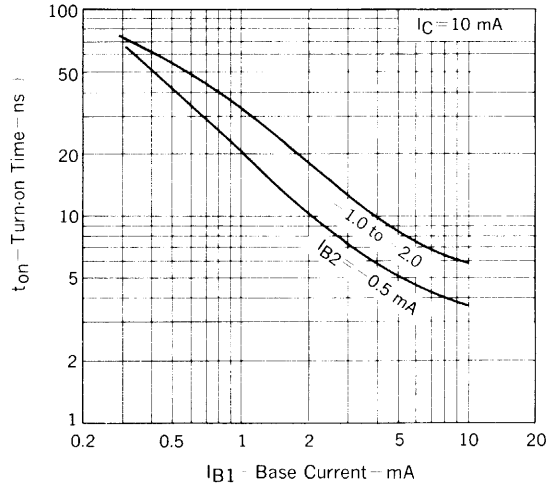
INPUT AND OUTPUT CAPACITANCE vs. REVERSE VOLTAGE



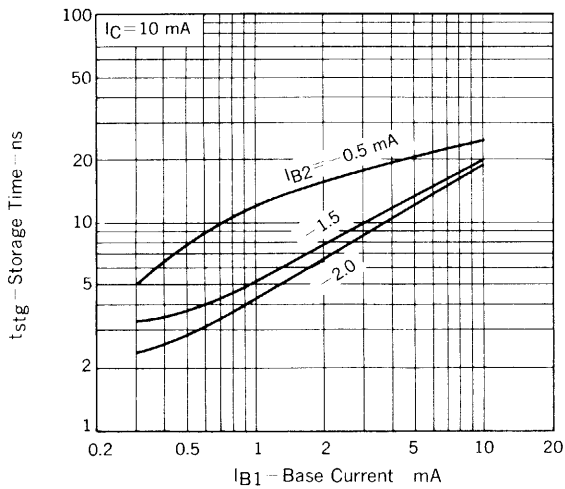
STORAGE TIME vs. COLLECTOR CURRENT



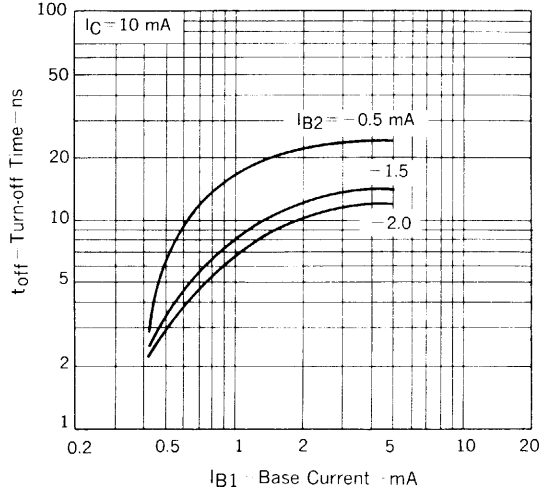
TURN ON TIME vs. BASE CURRENT



STORAGE TIME vs. BASE CURRENT

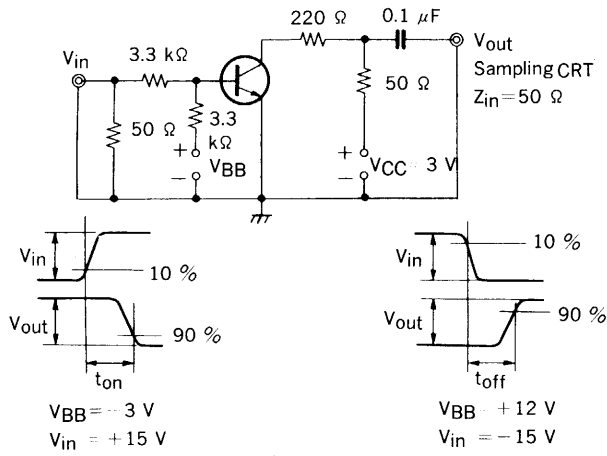


TURN OFF TIME vs. BASE CURRENT

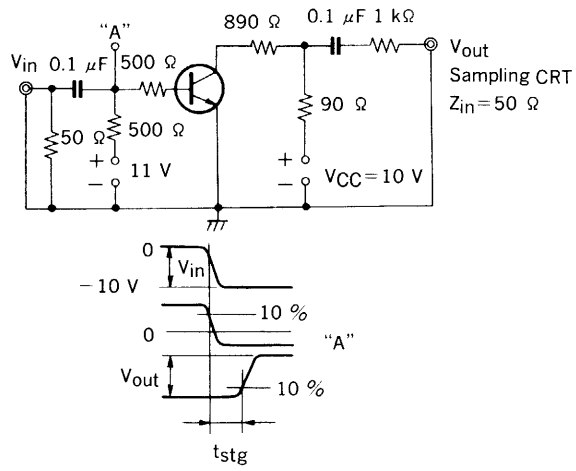


SWITCHING TIME TEST CIRCUIT

t_{on} , t_{off} TEST CIRCUIT



t_{stg} TEST CIRCUIT



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