

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>)

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Phase-out/Discontinued

HIGH SPEED SWITCHING
NPN SILICON EPITAXIAL TRANSISTOR

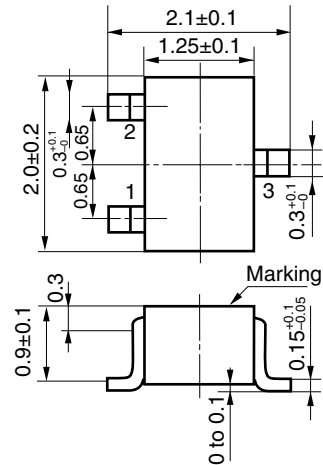
<R> FEATURES

- High-speed switching
- Low collector saturation voltage
- High gain bandwidth product
- Low collector capacitance
- Can be used complementary to the 2SA1610.
- Small Package: 3-pin Super Small Package (SC-70)

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Collector to Base Voltage	V _{CB0}	40	V
Collector to Emitter Voltage	V _{CES}	40	V
	V _{CEO}	15	V
Emitter to Base Voltage	V _{EBO}	5.0	V
Collector Current	I _c	200	mA
Total Power Dissipation	P _T	150	mW
Junction Temperature	T _j	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

PACKAGE DRAWING (Unit: mm)



1. Emitter
2. Base
3. Collector

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

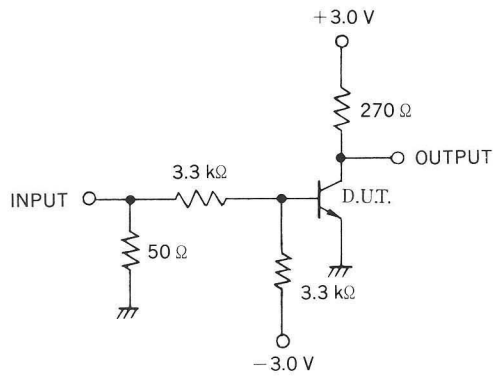
CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I _{cBO}	V _{CB} = 20 V, I _E = 0 A			0.1	μA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 3.0 V, I _C = 0 A			0.1	μA
DC Current Gain	h _{FE}	V _{CE} = 1.0 V, I _C = 10 mA	40	90	200	
Collector Saturation Voltage	V _{CE(sat)}	I _C = 10 mA, I _B = 1.0 mA		0.15	0.25	V
Base Saturation Voltage	V _{BE(sat)}	I _C = 10 mA, I _B = 1.0 mA		0.80	0.85	V
Gain Bandwidth Product	f _r	V _{CE} = 10 V, I _E = -10 mA	500	750		MHz
Collector Capacitance	C _{ob}	V _{CB} = 5.0 V, I _E = 0 A, f = 1.0 MHz		1.8	4.0	pF
Turn-on Time	t _{on}	(When t _{stg} , I _{B1} = -I _{B2} = 10 mA) See Test Circuits		8.0	12	ns
Storage Time	t _{stg}			6.0	13	ns
Turn-off Time	t _{off}			12	18	ns

h_{FE} Classification

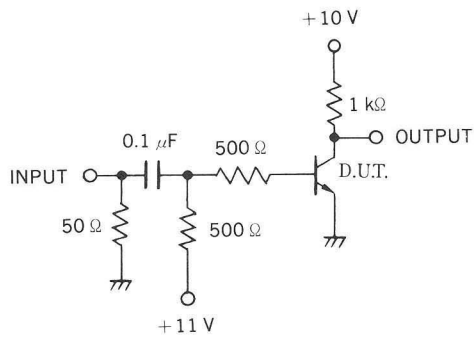
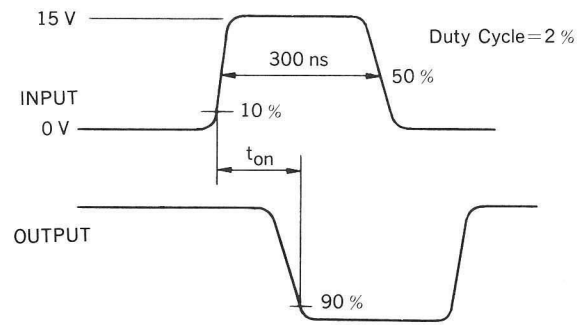
Marking	B33	B34	B35
h _{FE}	40 to 80	60 to 120	100 to 200

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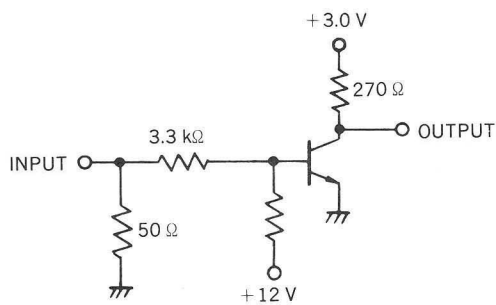
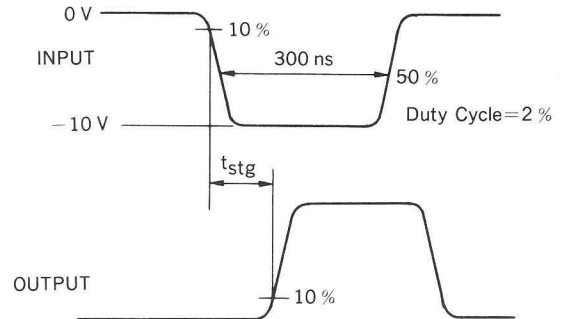
SWITCHING TIME TEST CIRCUITS



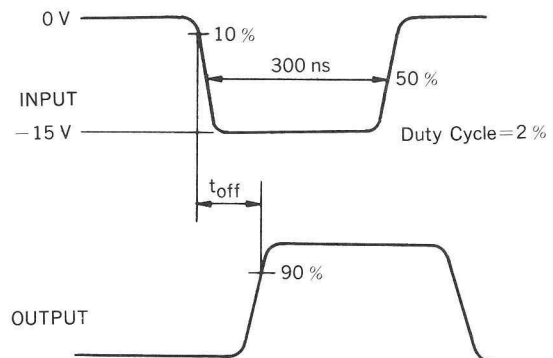
t_{on} SWITCHING



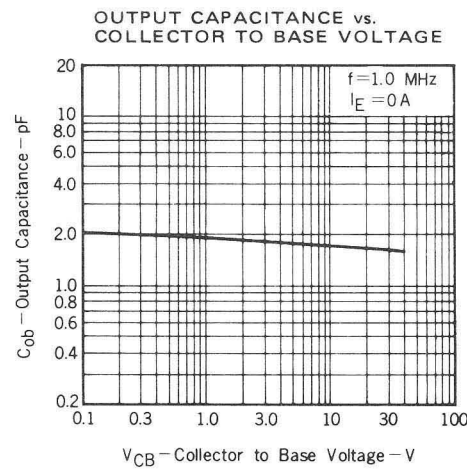
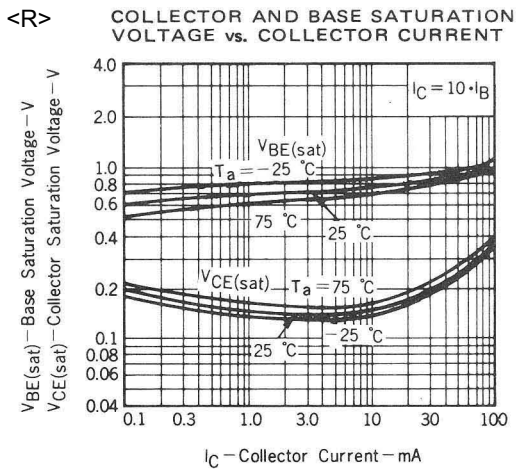
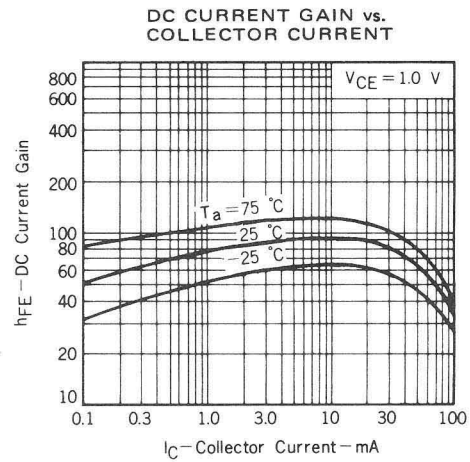
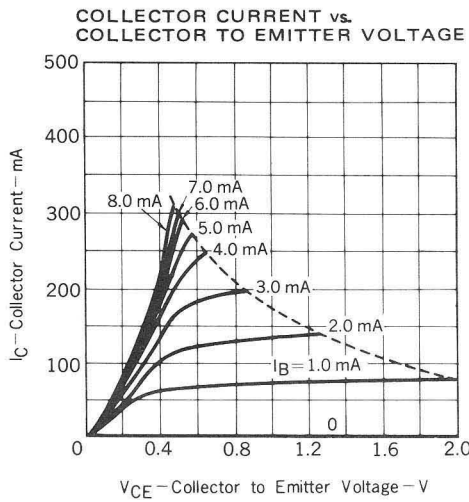
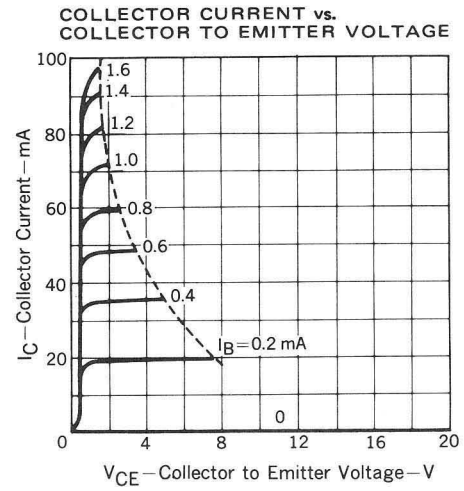
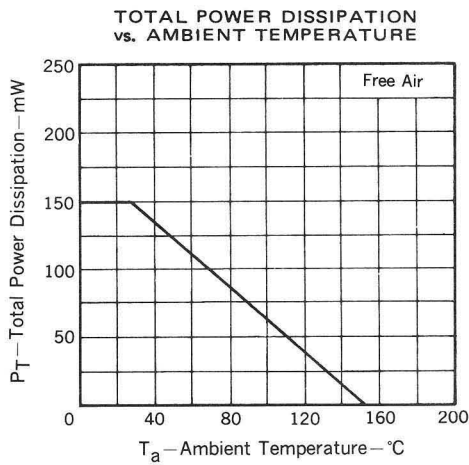
t_{stg} SWITCHING



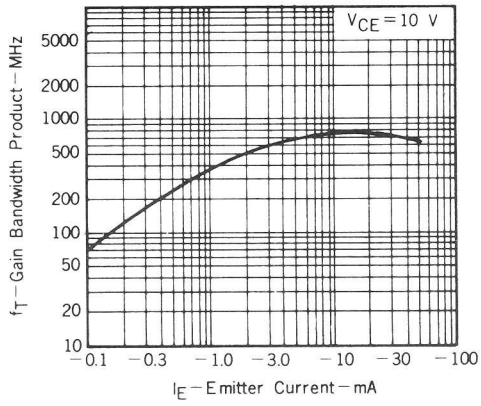
t_{off} SWITCHING



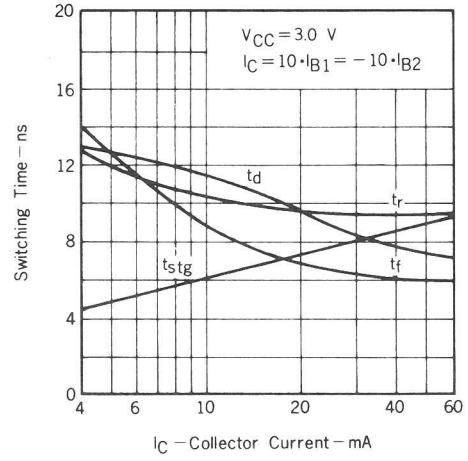
TYPICAL CHARACTERISTICS ($T_a = 25\text{ }^\circ\text{C}$)



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



SWITCHING TIME vs. COLLECTOR CURRENT



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