

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

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

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## Notice

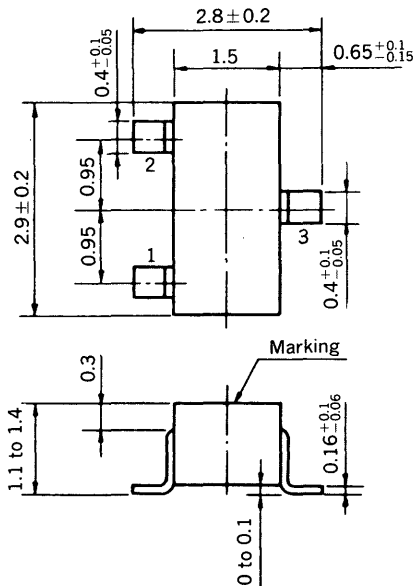
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MEDIUM SPEED SWITCHING  
RESISTOR BUILT-IN TYPE PNP TRANSISTOR  
MINI MOLD

PACKAGE DIMENSIONS  
in millimeters

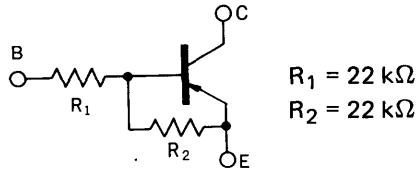


- 1. Emitter
- 2. Base
- 3. Collector

Marking: M32

FEATURES

- Resistors Built-in TYPE



- Complementary to FA1F4M

ABSOLUTE MAXIMUM RATINGS

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

Collector to Base Voltage	$V_{CB0}$	-60	V
Collector to Emitter Voltage	$V_{CEO}$	-50	V
Emitter to Base Voltage	$V_{EBO}$	-10	V
Collector Current (DC)	$I_{C(DC)}$	-100	mA
Collector Current (Pulse)	$I_{C(Pulse)}$	-200	mA

Maximum Power Dissipation

Total Power Dissipation at $25^\circ\text{C}$ 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	$^\circ\text{C}$

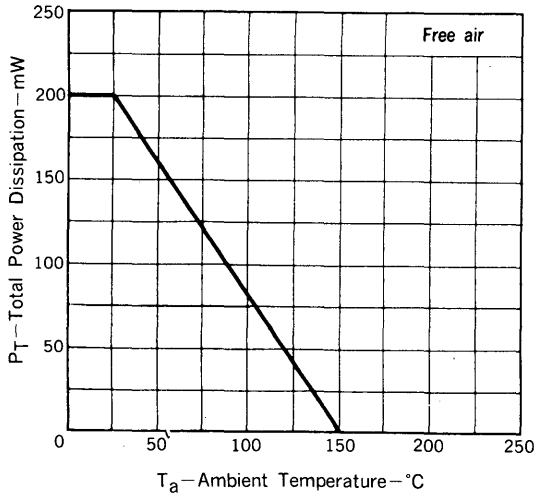
ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	$I_{CBO}$			-100	nA	$V_{CB} = -50\text{ V}, I_E = 0$
DC Current Gain	$h_{FE1}^*$	60	85	195		$V_{CE} = -5.0\text{ V}, I_C = -5.0\text{ mA}$
DC Current Gain	$h_{FE2}^*$	90	145			$V_{CE} = -5.0\text{ V}, I_C = -50\text{ mA}$
Collector Saturation Voltage	$V_{CE(sat)}^*$		-0.05	-0.2	V	$I_C = -5.0\text{ mA}, I_B = -0.25\text{ mA}$
Low-Level Input Voltage	$V_{IL}^*$		-1.17	-0.8	V	$V_{CE} = -5.0\text{ V}, I_C = -100\text{ }\mu\text{A}$
High-Level Input Voltage	$V_{IH}^*$	-4.0	-2.0		V	$V_{CE} = -0.2\text{ V}, I_C = -5.0\text{ mA}$
Input Resistor	$R_1$	15.4	22.0	28.6	k $\Omega$	
Resistor Ratio	$R_1/R_2$	0.9	1.0	1.1		
Turn-on Time	$t_{on}$		0.23	0.5	$\mu\text{s}$	$V_{CC} = -5\text{ V}, V_{in} = -5\text{ V}$
Storage Time	$t_{stg}$		0.8	3.0	$\mu\text{s}$	$R_L = 1\text{ k}\Omega$
Turn-off Time	$t_{off}$		1.1	3.5	$\mu\text{s}$	$PW = 2\text{ }\mu\text{s}, \text{Duty Cycle} \leq 2\%$

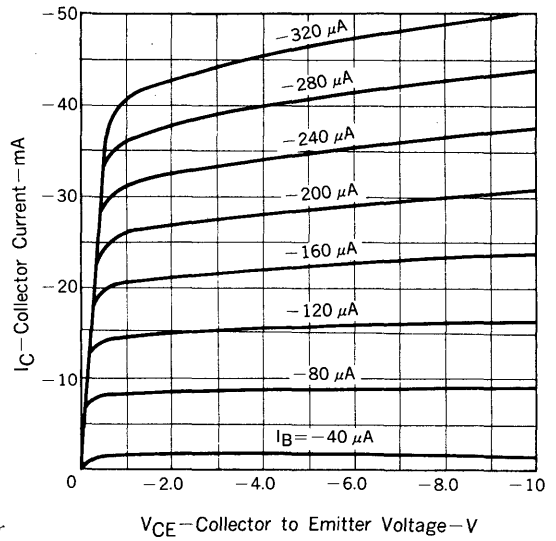
\* Pulsed:  $PW \leq 350\text{ }\mu\text{s}, \text{Duty Cycle} \leq 2\%$

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

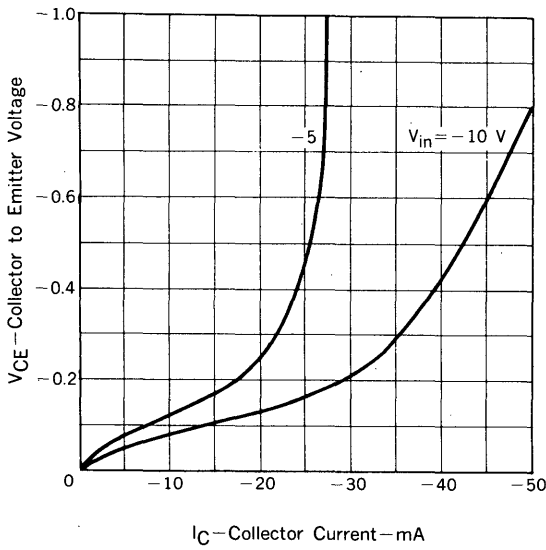
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



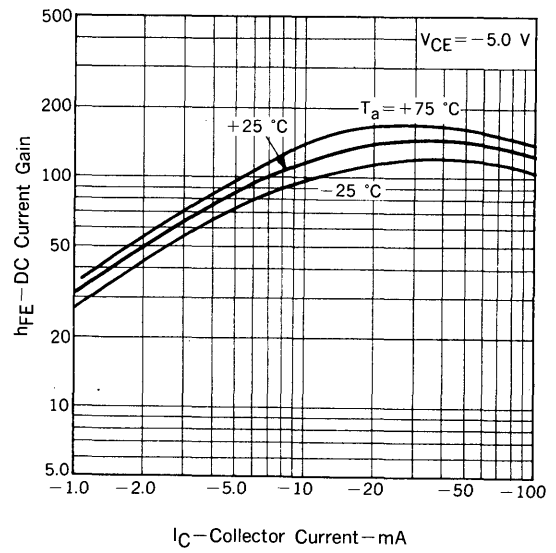
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



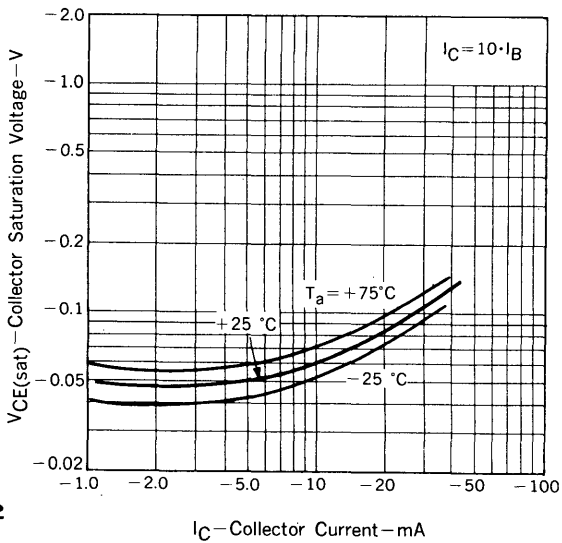
COLLECTOR TO EMITTER VOLTAGE vs. COLLECTOR CURRENT



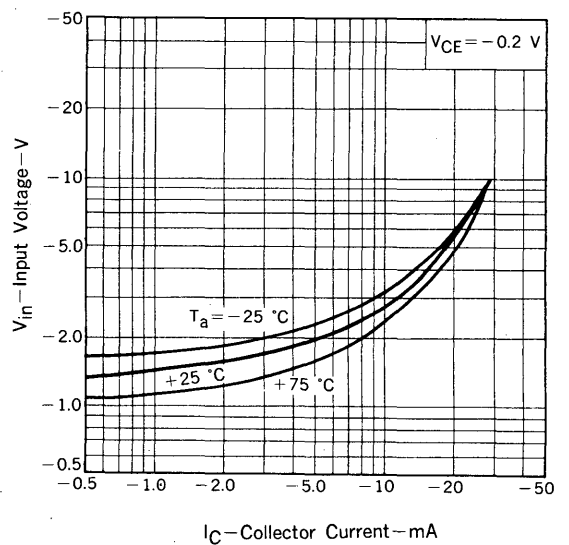
DC CURRENT GAIN vs. COLLECTOR CURRENT



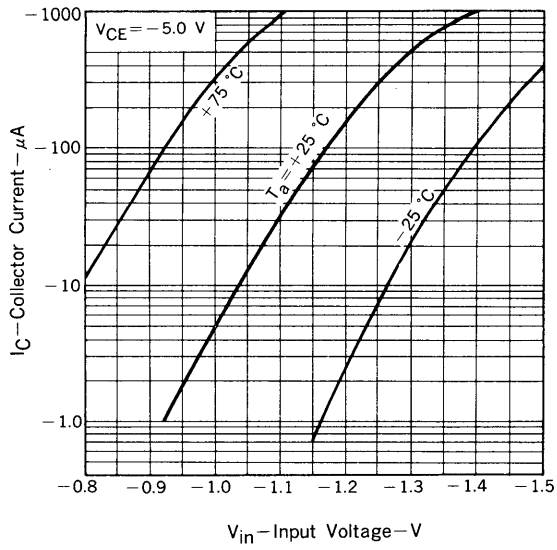
COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



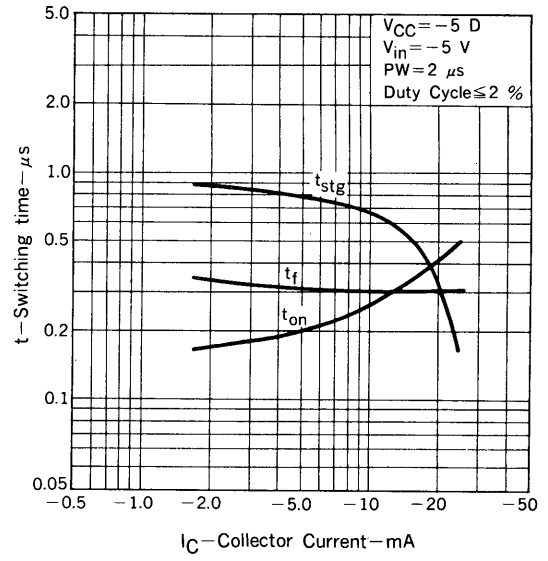
INPUT VOLTAGE vs. COLLECTOR CURRENT



COLLECTOR CURRENT vs. INPUT VOLTAGE



SWITCHING TIME vs. COLLECTOR CURRENT



RESISTOR vs. AMBIENT TEMPERATURE

