

To our customers,

Old Company Name in Catalogs and Other Documents

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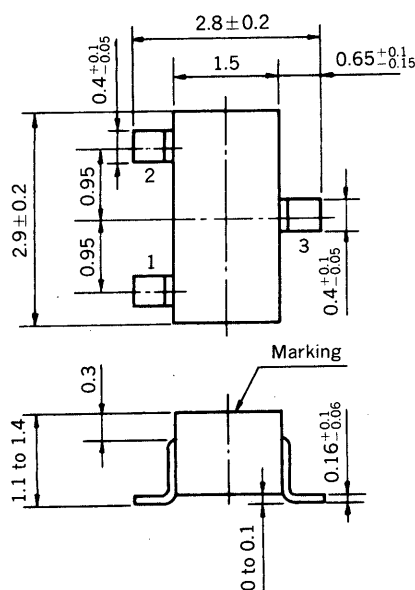
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MEDIUM SPEED SWITCHING RESISTOR BUILT-IN TYPE NPN TRANSISTOR MINI MOLD

PACKAGE DIMENSIONS

in millimeters

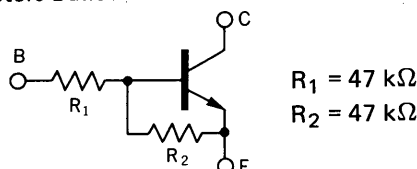


1. Emitter
2. Base
3. Collector

Marking: L31

FEATURES

- Resistors Built-in TYPE



$$R_1 = 47 \text{ k}\Omega$$

$$R_2 = 47 \text{ k}\Omega$$

- Complementary to FN1L4M

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_{CE0}	50	V
Emitter to Base Voltage	V_{EB0}	10	V
Collector Current (DC)	I_C	100	mA
Collector Current (Pulse)	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	$^\circ\text{C}$
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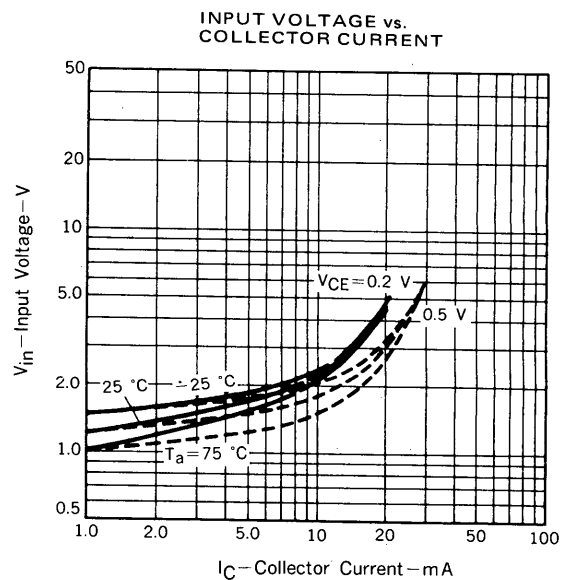
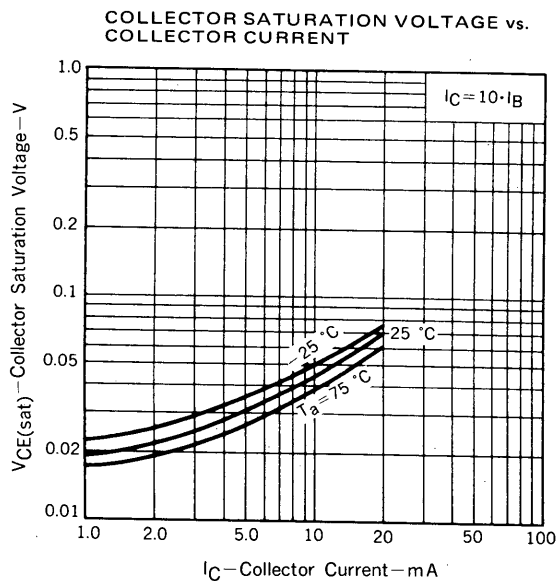
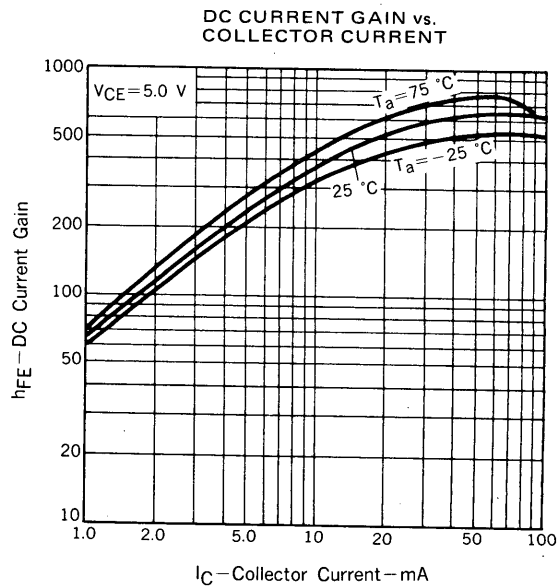
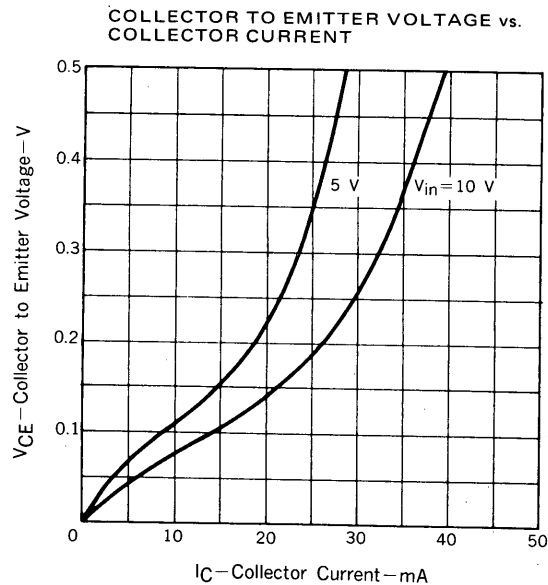
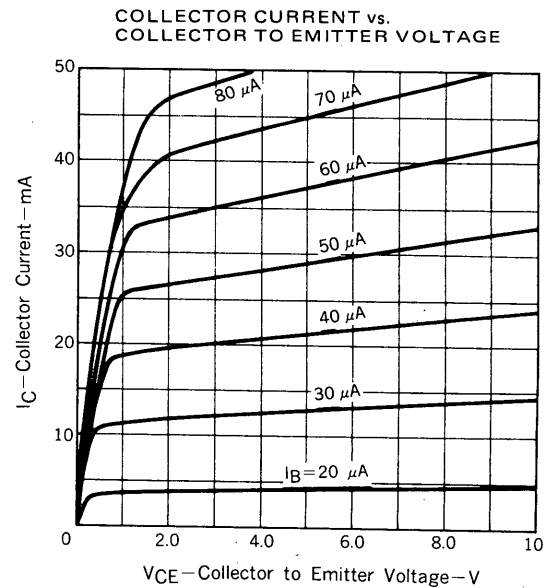
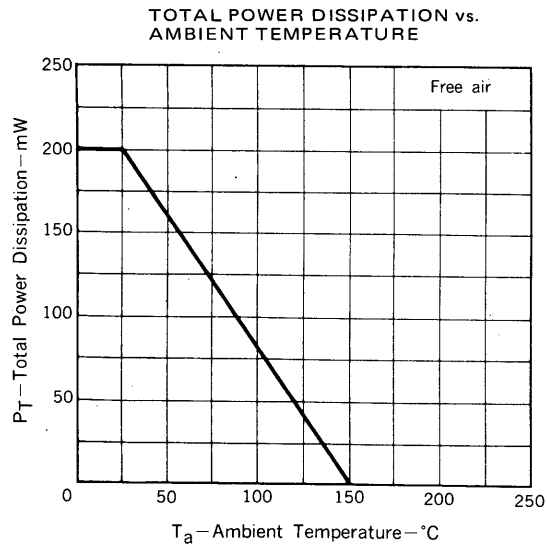
Storage Temperature Range

T_{stg}	-55 to +150	$^\circ\text{C}$
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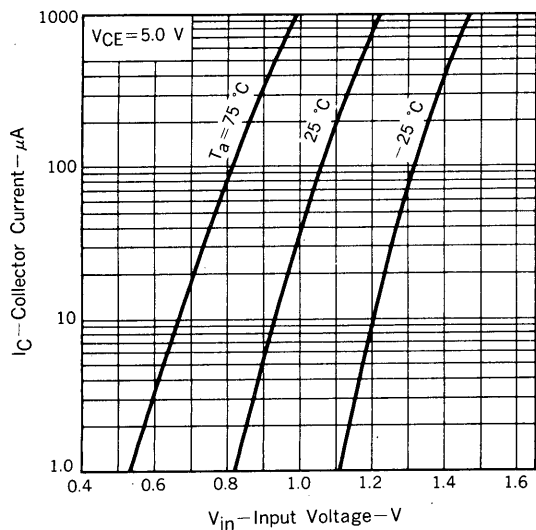
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

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}^*	85	240	340		$V_{CE} = 5.0 \text{ V}, I_C = 5.0 \text{ mA}$
DC Current Gain	h_{FE2}^*	95	640			$V_{CE} = 5.0 \text{ V}, I_C = 50 \text{ mA}$
Collector Saturation Voltage	$V_{CE(sat)}^*$		0.04	0.2	V	$I_C = 5.0 \text{ mA}, I_B = 0.25 \text{ mA}$
Low-Level Input Voltage	V_{IL}^*		1.07	0.8	V	$V_{CE} = 5.0 \text{ V}, I_C = 100 \mu\text{A}$
High-Level Input Voltage	V_{IH}^*	5.0	1.7		V	$V_{CE} = 0.2 \text{ V}, I_C = 5.0 \text{ mA}$
Input Resistor	R_1	32.9	47.0	61.1	k Ω	
Resistor Ratio	R_1/R_2	0.9	1.0	1.1		
Turn-on Time	t_{on}		0.27	0.7	μs	$V_{CC} = 5 \text{ V}, V_{in} = 5 \text{ V}$ $R_L = 1 \text{ k}\Omega$ $PW = 2 \mu\text{s}, \text{Duty Cycle} \leq 2\%$
Storage Time	t_{stg}		2.0	5.0	μs	
Turn-off Time	t_{off}		2.48	6.0	μs	

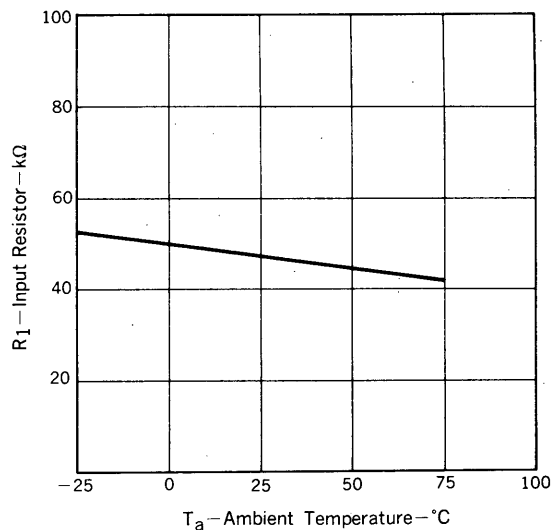
* Pulsed: $PW \leq 350 \mu\text{s}$, Duty Cycle $\leq 2\%$

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

COLLECTOR CURRENT vs.
INPUT VOLTAGE



RESISTOR vs.
AMBIENT TEMPERATURE



SWITCHING TIME vs.
COLLECTOR CURRENT

