

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

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PNP SILICON EPITAXIAL TRANSISTOR  
FOR HIGH-SPEED SWITCHING

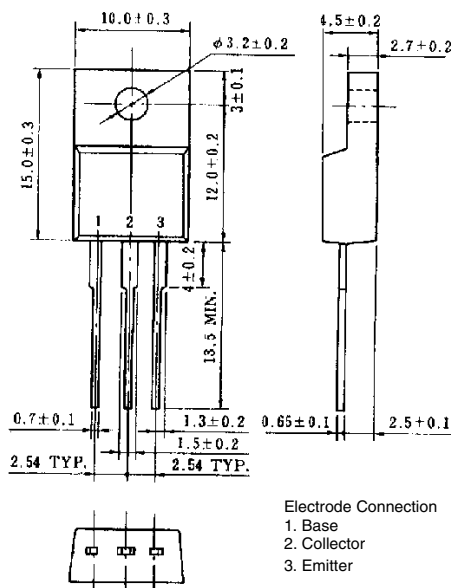
The 2SA1744 is a power transistor developed for high-speed switching and features a high  $h_{FE}$  at Low  $V_{CE(sat)}$ . This transistor is ideal for use as a driver in DC/DC converters and actuators.

In addition, a small resin-molded insulation type package contributes to high-density mounting and reduction of mounting cost.

FEATURES

- High  $h_{FE}$  and low  $V_{CE(sat)}$ :  
 $h_{FE} \geq 100$  ( $V_{CE} = -2$  V,  $I_C = -3$  A)  
 $V_{CE(sat)} \leq 0.3$  V ( $I_C = -8$  A,  $I_B = -0.4$  A)
- Full-mold package that does not require an insulating board or bushing

PACKAGE DRAWING (UNIT: mm)



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

Parameter	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	-100	V
Collector to emitter voltage	$V_{CEO}$	-60	V
Emitter to base voltage	$V_{EBO}$	-7.0	V
Collector current (DC)	$I_{C(DC)}$	-15	A
Collector current (pulse)	$I_{C(pulse)^*}$	-30	A
Base current (DC)	$I_{B(DC)}$	-7.5	A
Total power dissipation	$P_T$ ( $T_C = 25^\circ\text{C}$ )	30	W
Total power dissipation	$P_T$ ( $T_A = 25^\circ\text{C}$ )	2.0	W
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

\*  $PW \leq 300 \mu\text{s}$ , duty cycle  $\leq 10\%$

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**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

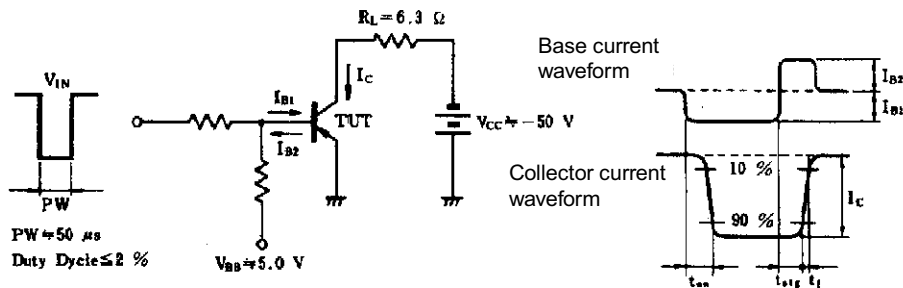
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	V <sub>CEO(SUS)</sub>	I <sub>C</sub> = -8.0 A, I <sub>B</sub> = -0.8 A, L = 1 mH	-60			V
Collector to emitter voltage	V <sub>CEX(SUS)</sub>	I <sub>C</sub> = -8.0 A, I <sub>B1</sub> = -I <sub>B2</sub> = -0.8 A, V <sub>BE(OFF)</sub> = 1.5 V, L = 180 μH, clamped	-60			V
Collector cutoff current	I <sub>CBO</sub>	V <sub>CB</sub> = -60 V, I <sub>E</sub> = 0			-10	μA
Collector cutoff current	I <sub>CER</sub>	V <sub>CE</sub> = -60 V, R <sub>BE</sub> = 50 Ω, T <sub>A</sub> = 125°C			-1.0	mA
Collector cutoff current	I <sub>CEx1</sub>	V <sub>CE</sub> = -60 V, V <sub>BE(OFF)</sub> = 1.5 V			-10	μA
Collector cutoff current	I <sub>CEx2</sub>	V <sub>CE</sub> = -60 V, V <sub>BE(OFF)</sub> = 1.5 V, T <sub>A</sub> = 125°C			-1.0	mA
Emitter cutoff current	I <sub>EBO</sub>	V <sub>EB</sub> = -5.0 V, I <sub>C</sub> = 0			-10	μA
DC current gain	h <sub>FE1</sub> *	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -1.5 A	100			
DC current gain	h <sub>FE2</sub> *	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -3.0 A	100		400	
DC current gain	h <sub>FE3</sub> *	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -8.0 A	60			
Collector saturation voltage	V <sub>CE(sat)1</sub> *	I <sub>C</sub> = -8.0 A, I <sub>B</sub> = -0.4 A			-0.3	V
Collector saturation voltage	V <sub>CE(sat)2</sub> *	I <sub>C</sub> = -12 A, I <sub>B</sub> = -0.6 A			-0.5	V
Base saturation voltage	V <sub>BE(sat)1</sub> *	I <sub>C</sub> = -8.0 A, I <sub>B</sub> = -0.4 A			-1.2	V
Base saturation voltage	V <sub>BE(sat)2</sub> *	I <sub>C</sub> = -12 A, I <sub>B</sub> = -0.6 A			-1.5	V
Collector capacitance	C <sub>ob</sub>	V <sub>CB</sub> = -10 V, I <sub>E</sub> = 0, f = 1.0 MHz		300		pF
Gain bandwidth product	f <sub>T</sub>	V <sub>CE</sub> = -10 V, I <sub>C</sub> = -1.5 A		80		MHz
Turn-on time	t <sub>on</sub>	I <sub>C</sub> = -8.0 A, R <sub>L</sub> = 6.3 Ω, I <sub>B1</sub> = -I <sub>B2</sub> = -0.4 A, V <sub>CC</sub> ≅ -50 V Refer to the test circuit.			0.3	μs
Storage time	t <sub>stg</sub>				1.5	μs
Fall time	t <sub>f</sub>				0.3	μs

\* Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

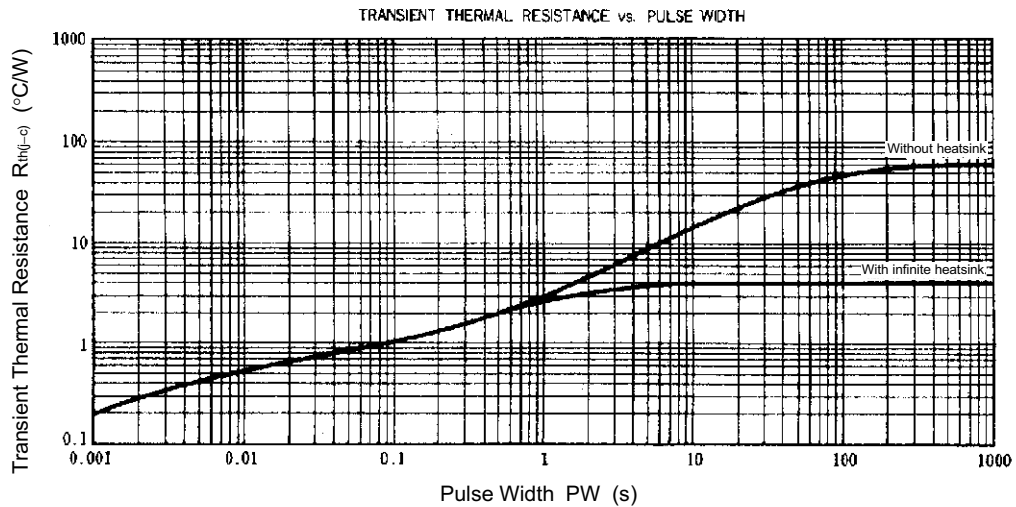
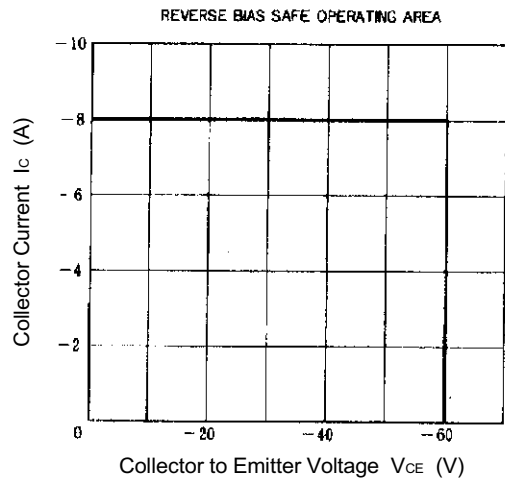
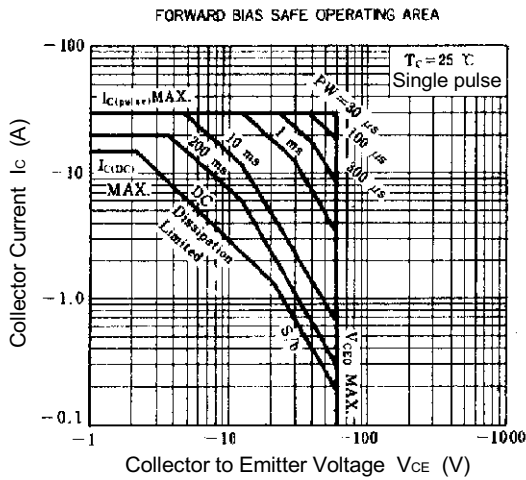
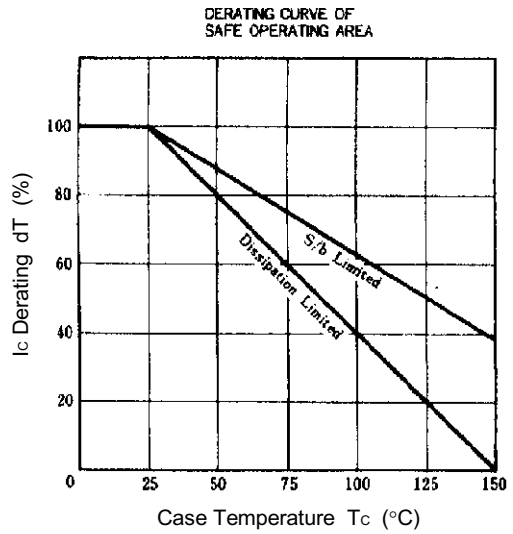
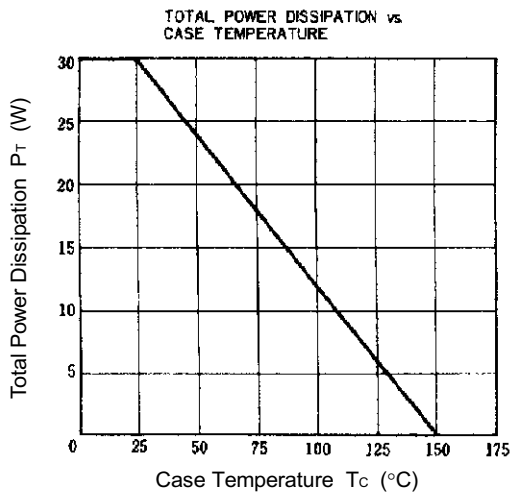
**h<sub>FE</sub> CLASSIFICATION**

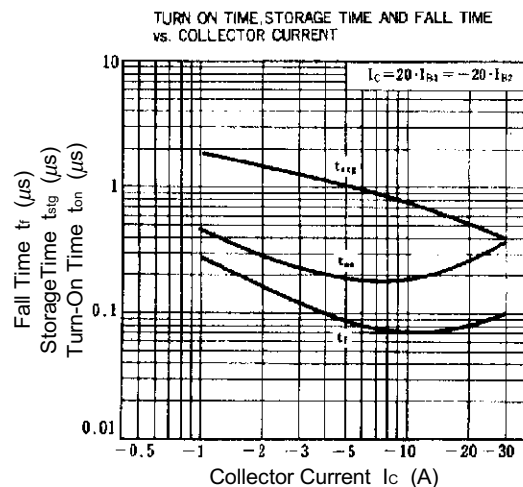
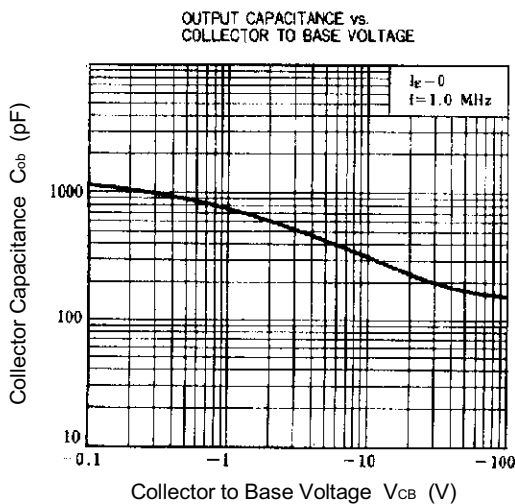
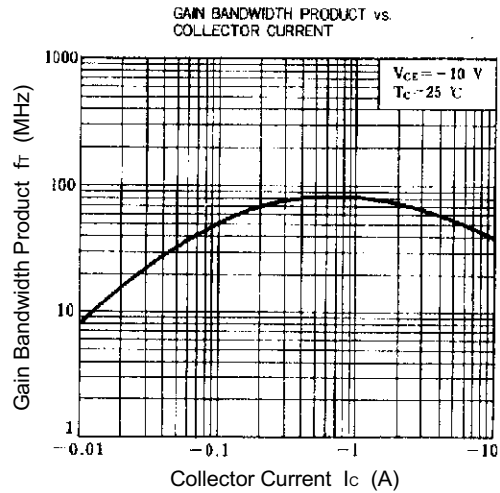
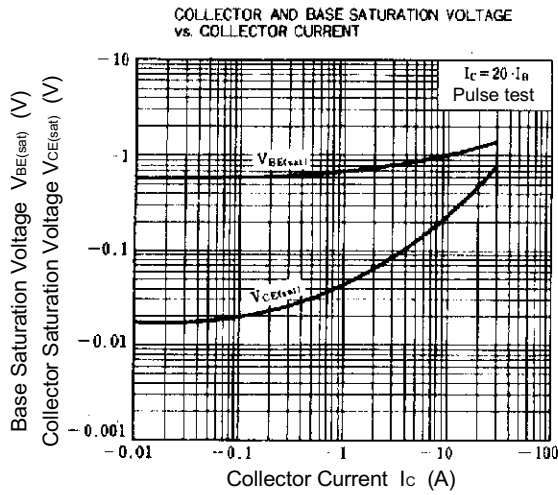
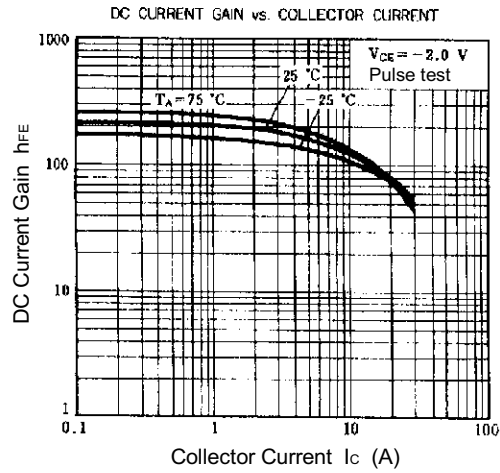
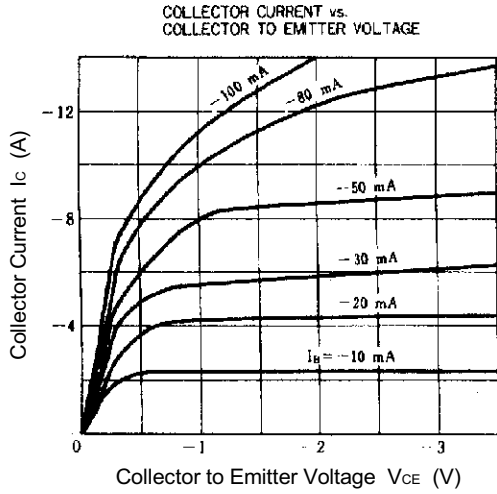
Marking	M	L	K
h <sub>FE2</sub>	100 to 200	150 to 300	200 to 400

**SWITCHING TIME (t<sub>on</sub>, t<sub>stg</sub>, t<sub>f</sub>) TEST CIRCUIT**



TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)





[MEMO]

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