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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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SILICON POWER TRANSISTOR

2SA1744

PNP SILICON EPITAXIAL TRANSISTOR FOR HIGH-SPEED SWITCHING

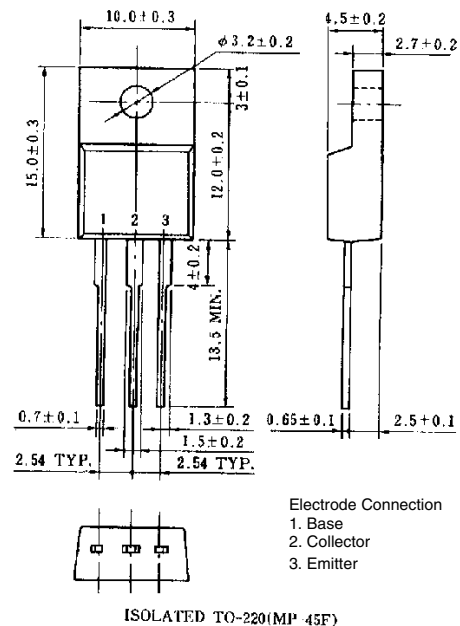
The 2SA1744 is a power transistor developed for high-speed switching and features a high h_{FE} at Low $V_{CE(sat)}$. This transistor is ideal for use as a driver in DC/DC converters and actuators.

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 $V_{CE(sat)}$:
 $h_{FE} \geq 100$ ($V_{CE} = -2\text{ V}$, $I_C = -3\text{ A}$)
 $V_{CE(sat)} \leq 0.3\text{ V}$ ($I_C = -8\text{ A}$, $I_B = -0.4\text{ A}$)
- 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	$^\circ\text{C}$

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

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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

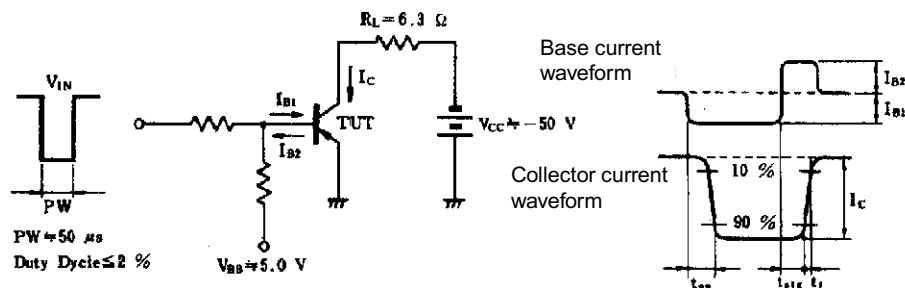
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	V _{CE0(SUS)}	I _C = -8.0 A, I _B = -0.8 A, L = 1 mH	-60			V
Collector to emitter voltage	V _{CEX(SUS)}	I _C = -8.0 A, I _{B1} = -I _{B2} = -0.8 A, V _{BE(OFF)} = 1.5 V, L = 180 μH, clamped	-60			V
Collector cutoff current	I _{CBO}	V _{CB} = -60 V, I _E = 0			-10	μA
Collector cutoff current	I _{CER}	V _{CE} = -60 V, R _{BE} = 50 Ω, T _A = 125°C			-1.0	mA
Collector cutoff current	I _{CEX1}	V _{CE} = -60 V, V _{BE(OFF)} = 1.5 V			-10	μA
Collector cutoff current	I _{CEX2}	V _{CE} = -60 V, V _{BE(OFF)} = 1.5 V, T _A = 125°C			-1.0	mA
Emitter cutoff current	I _{EBO}	V _{EB} = -5.0 V, I _C = 0			-10	μA
DC current gain	h _{FE1} *	V _{CE} = -2.0 V, I _C = -1.5 A	100			
DC current gain	h _{FE2} *	V _{CE} = -2.0 V, I _C = -3.0 A	100		400	
DC current gain	h _{FE3} *	V _{CE} = -2.0 V, I _C = -8.0 A	60			
Collector saturation voltage	V _{CE(sat)1} *	I _C = -8.0 A, I _B = -0.4 A			-0.3	V
Collector saturation voltage	V _{CE(sat)2} *	I _C = -12 A, I _B = -0.6 A			-0.5	V
Base saturation voltage	V _{BE(sat)1} *	I _C = -8.0 A, I _B = -0.4 A			-1.2	V
Base saturation voltage	V _{BE(sat)2} *	I _C = -12 A, I _B = -0.6 A			-1.5	V
Collector capacitance	C _{ob}	V _{CB} = -10 V, I _E = 0, f = 1.0 MHz		300		pF
Gain bandwidth product	f _T	V _{CE} = -10 V, I _C = -1.5 A		80		MHz
Turn-on time	t _{on}	I _C = -8.0 A, R _L = 6.3 Ω, I _{B1} = -I _{B2} = -0.4 A, V _{CC} ≅ -50 V Refer to the test circuit.			0.3	μs
Storage time	t _{stg}				1.5	μs
Fall time	t _f				0.3	μs

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

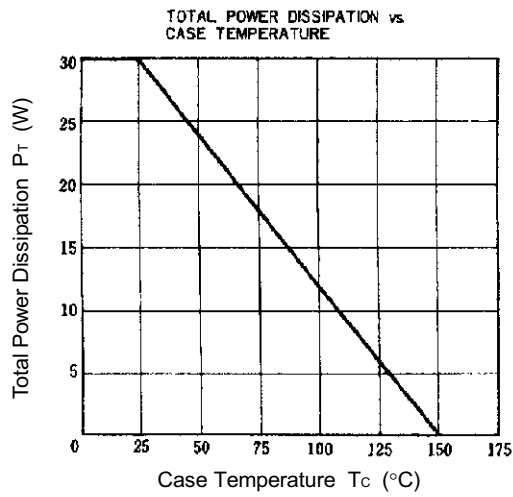
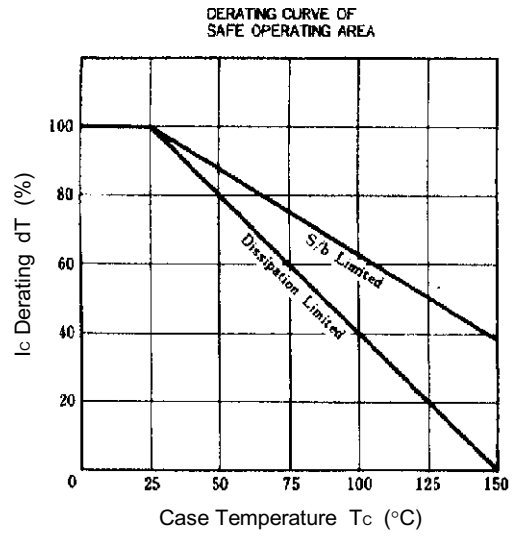
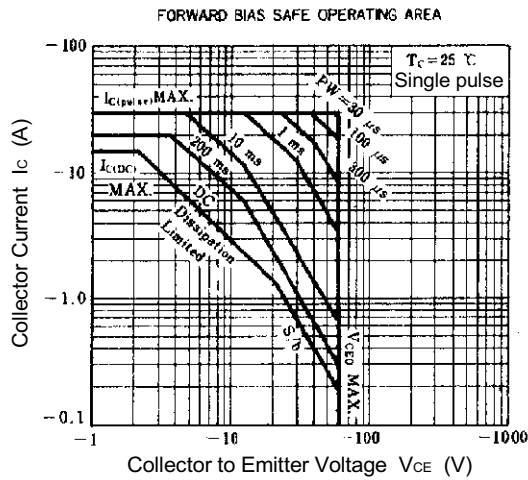
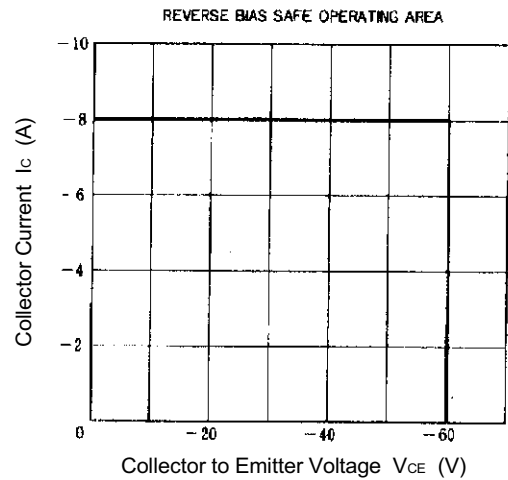
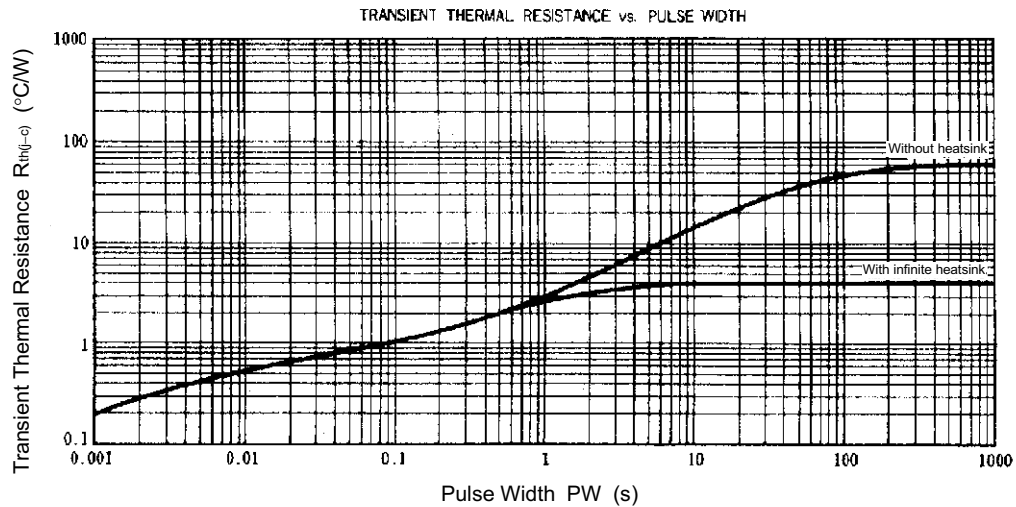
h_{FE} CLASSIFICATION

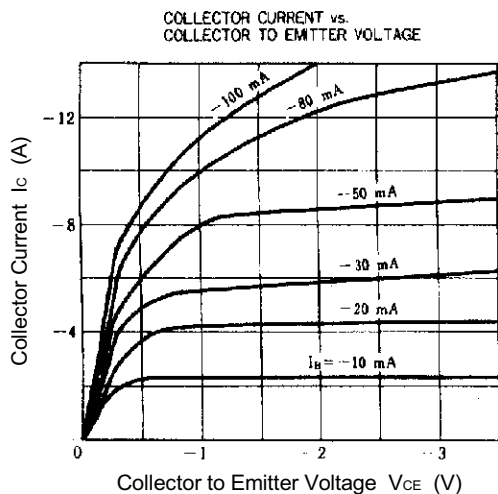
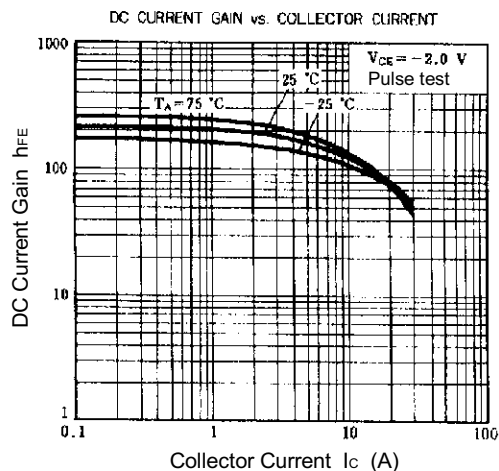
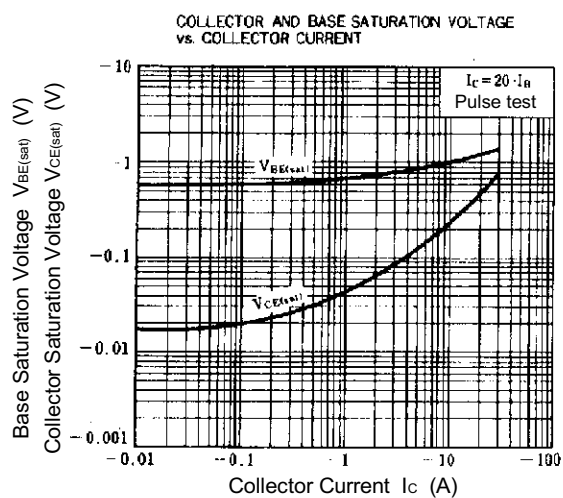
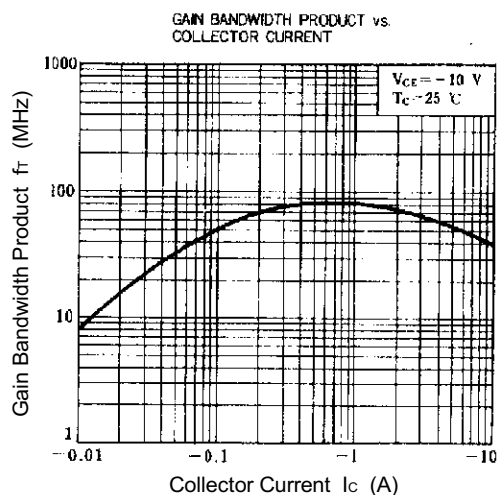
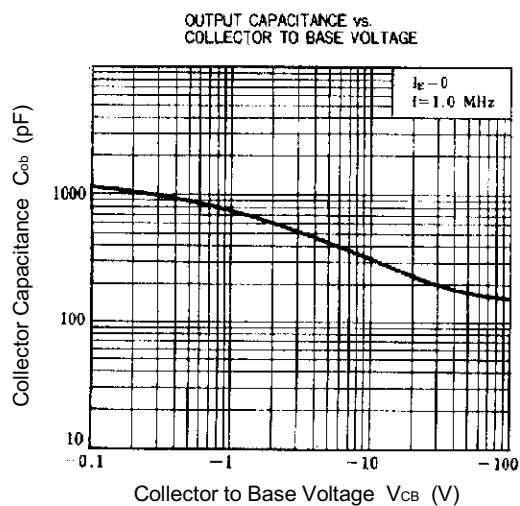
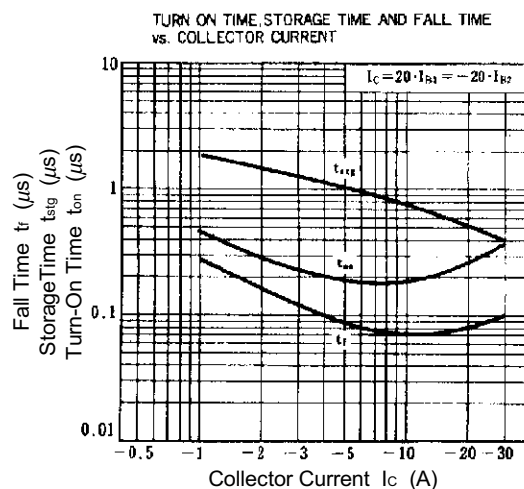
Marking	M	L	K
h _{FE2}	100 to 200	150 to 300	200 to 400

SWITCHING TIME (t_{on}, t_{stg}, t_f) TEST CIRCUIT



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





[MEMO]

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