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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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PNP SILICON EPITAXIAL TRANSISTOR FOR HIGH-SPEED SWITCHING

The 2SA1847 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, this transistor features a package that can be auto-mounted in radial taping specifications, thus contributing to mounting cost reduction.

FEATURES

- Auto-mount possible in radial taping specifications
- Resin-molded insulation type package with power rating of 1.8 W in stand-alone conditions
- High h_{FE} and low $V_{CE(sat)}$:
 $V_{CE(sat)} = -0.3 \text{ V MAX. @ } I_C = -6.0 \text{ V, } I_B = -0.3 \text{ A}$
 $h_{FE} \geq 100 \quad \text{@ } V_{CE} = -2.0 \text{ V, } I_C = -2.0 \text{ A}$
- Fast switching speed

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector to base voltage	V_{CBO}		-150	V
Collector to emitter voltage	V_{CEO}		-100	V
Emitter to base voltage	V_{EBO}		-7.0	V
Collector current (DC)	$I_{C(DC)}$		-10	A
Collector current (pulse)	$I_{C(pulse)}$	$PW \leq 300 \mu\text{s}$, duty cycle $\leq 2\%$	-20	A
Base current (DC)	$I_{B(DC)}$		-6.0	A
Total power dissipation	P_T	$T_a = 25^\circ\text{C}$	1.8	W
Junction temperature	T_j		150	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

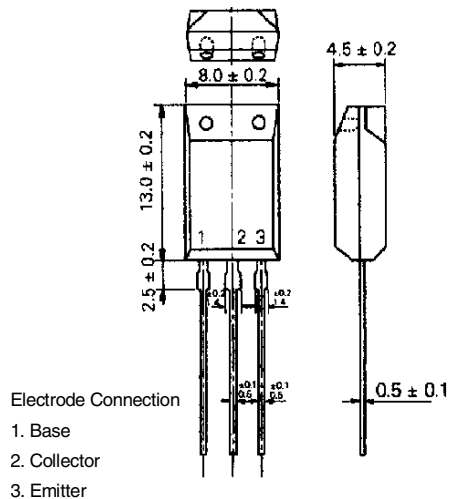
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	ICBO	V _{CB} = -100 V, I _E = 0			-10	μA
Collector cutoff current	ICER	V _{CE} = -100 V, R _{EB} = 50 Ω Ta = 125°C			-1.0	mA
Collector cutoff current	ICEX1	V _{CE} = -100 V, V _{BE(off)} = 1.5 V			-10	μA
Collector cutoff current	ICEX2	V _{CE} = -100 V, V _{BE(off)} = 1.5 V Ta = 125°C			-1.0	mA
Emitter cutoff current	IEBO	V _{EB} = -5.0 V, I _C = 0			-10	μA
DC current gain	h _{FE1} *	V _{CE} = -2.0 V, I _C = -0.5 A	100			-
DC current gain	h _{FE2} *	V _{CE} = -2.0 V, I _C = -2.0 A	100		400	-
DC current gain	h _{FE3} *	V _{CE} = -2.0 V, I _C = -6.0 A	60			-
Collector saturation voltage	V _{CE(sat)1} *	I _C = -6.0 A, I _B = -0.3 A			-0.3	V
Collector saturation voltage	V _{CE(sat)2} *	I _C = -8.0 A, I _B = -0.4 A			-0.5	V
Base saturation voltage	V _{BE(sat)1} *	I _C = -6.0 A, I _B = -0.3 A			-1.2	V
Base saturation voltage	V _{BE(sat)2} *	I _C = -8.0 A, I _B = -0.4 A			-1.5	V
Gain bandwidth product	f _T	V _{CE} = -10 V, I _C = -0.5 A		150		MHz
Collector capacitance	C _{ob}	V _{CB} = -10 V, I _E = 0, f = 1 MHz		250		pF
Turn-on time	t _{on}	I _C = -6.0 A			0.3	μs
Storage time	t _{stg}	I _{B1} = -I _{B2} = -0.3 A			1.5	μs
Fall time	t _f	R _L = 8.3 Ω, V _{CC} = -50 V			0.4	μs

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

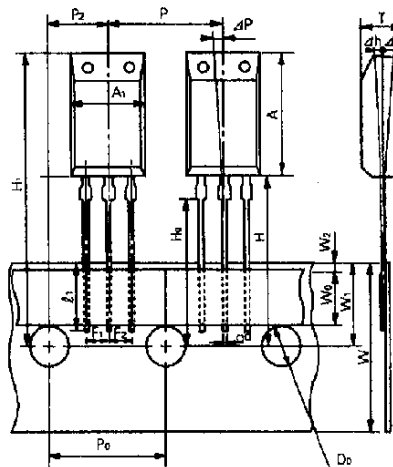
h_{FE} CLASSIFICATION

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

PACKAGE DRAWING (UNIT: mm)

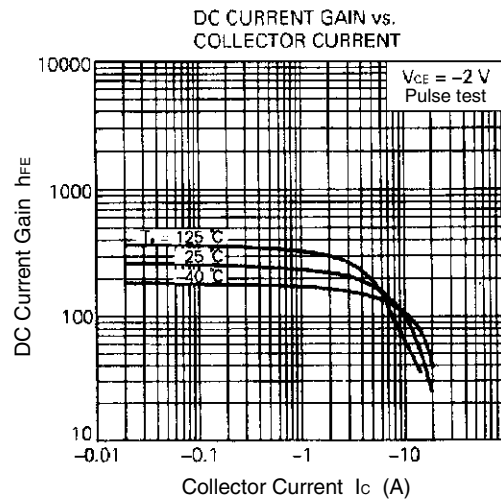
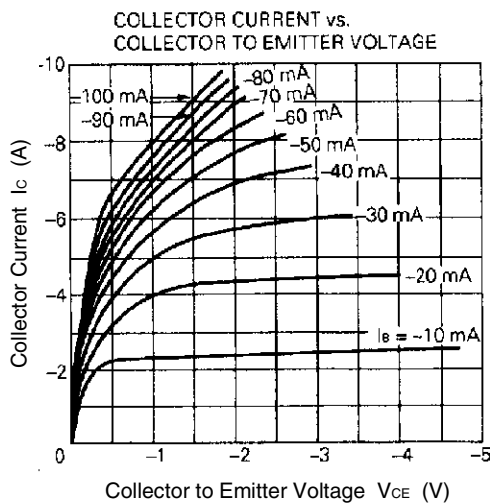
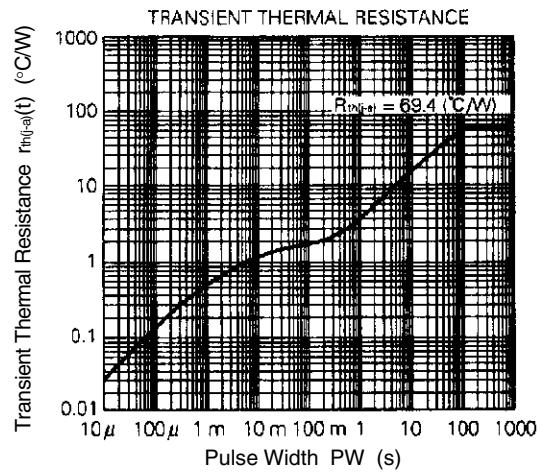
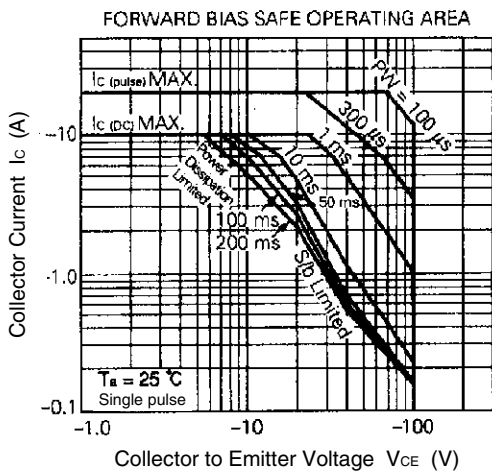
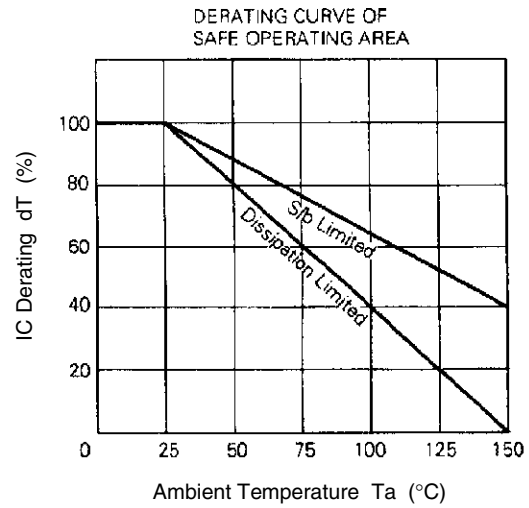
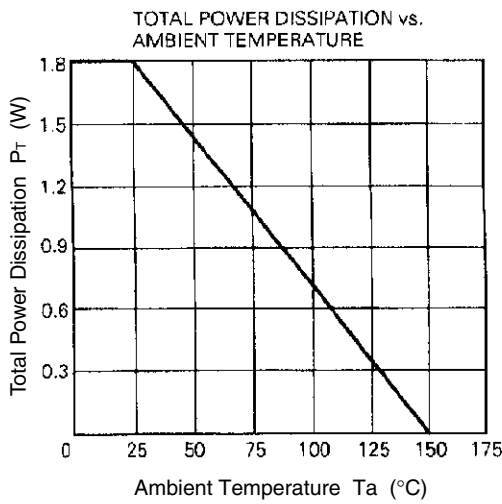


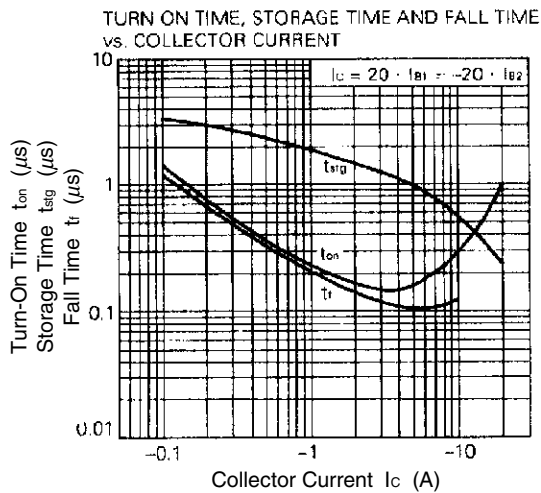
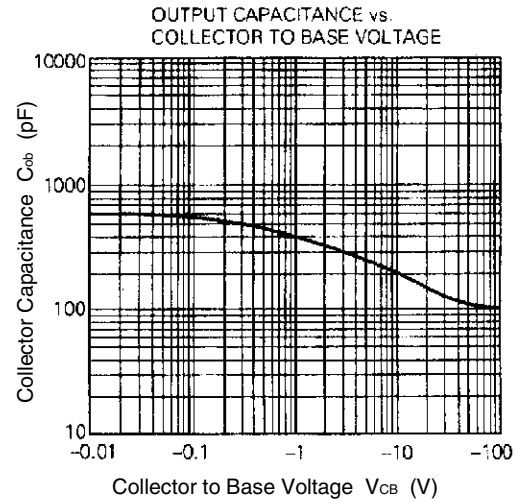
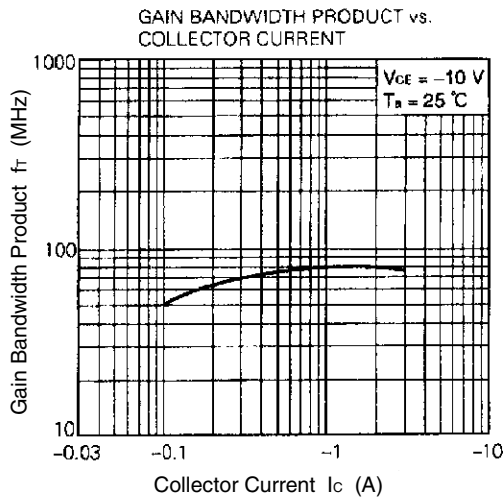
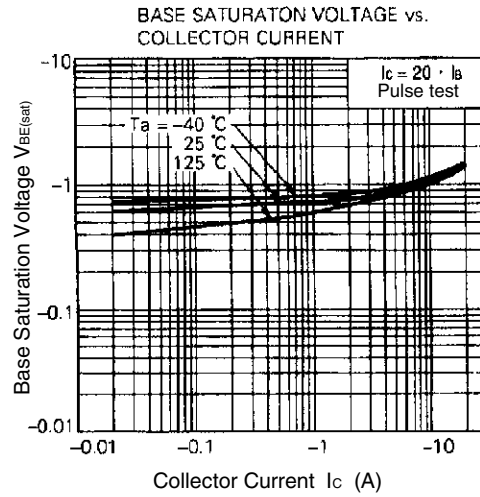
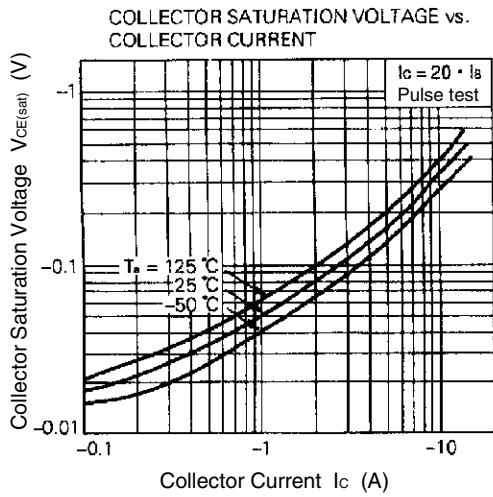
TAPING SPECIFICATION



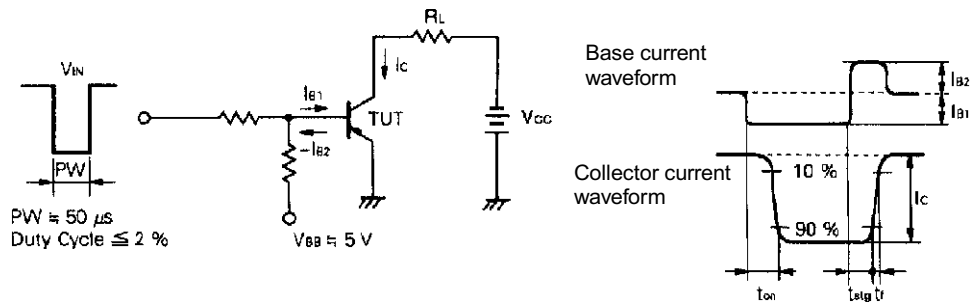
A ₁	8.0 ± 0.2
A	13.0 ± 0.2
D ₀	φ4.0 ± 0.2
d	0.5 ± 0.1
F ₁	2.5 ^{+0.4} _{-0.1}
F ₂	2.5 ^{+0.4} _{-0.1}
H	20.0 MAX.
H ₀	16.0 ± 0.5
H ₁	32.2 MAX.
Δh	0 ± 1.0
ℓ ₁	2.5 MIN.
P	12.7 ± 1.0
P ₀	12.7 ± 0.3
P ₂	6.35 ± 0.5
ΔP	0 ± 1.3
T	4.5 ± 0.2
W	18.0 ^{+1.0} _{-0.5}
W ₀	5.0 MIN.
W ₁	9.0 ± 0.5
W ₂	0.7 MIN.

TYPICAL CHARACTERISTICS (Ta = 25°C)





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



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