

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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**PNP SILICON EPITAXIAL TRANSISTOR (DARLINGTON CONNECTION)
FOR HIGH-SPEED SWITCHING**

The 2SA1840 is a high-speed Darlington power transistor. This transistor is ideal for high-precision control such as PWM control for pulse motors or brushless motors in OA and FA equipment.

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

FEATURES

- Auto-mounting possible in radial taping specifications
- Resin-molded insulation type package with power rating of 1.8 W in stand-alone conditions
- On-chip C-to-E reverse diode
- Fast switching speed

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V _{CBO}	-100	V
Collector to emitter voltage	V _{CEO}	-100	V
Emitter to base voltage	V _{EBO}	-8.0	V
Collector current (DC)	I _{C(DC)}	±5.0	A
Collector current (pulse)	I _{C(pulse)} *	±10	A
Base current (DC)	I _{B(DC)}	-0.5	A
Total power dissipation	P _T **	1.8	W
Junction temperature	T _j	150	°C
Storage temperature	T _{stg}	-55 to +150	°C

* PW ≤ 300 μs, duty cycle ≤ 10%

** Ta = 25°C

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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = -100\text{ V}, I_E = 0$			-1.0	μA
Emitter cutoff current	I_{EBO}	$V_{EB} = -5\text{ V}, I_C = 0$			-5.0	mA
DC current gain	h_{FE1}^*	$V_{CE} = -2.0\text{ V}, I_C = -2.0\text{ A}$	2,000		20,000	-
DC current gain	h_{FE2}^*	$V_{CE} = -2.0\text{ V}, I_C = -4.0\text{ A}$	500			-
Collector saturation voltage	$V_{CE(sat)}^*$	$I_C = -2.0\text{ A}, I_B = -2.0\text{ mA}$		-0.9	-1.5	V
Base saturation voltage	$V_{BE(sat)}^*$	$I_C = -2.0\text{ A}, I_B = -2.0\text{ mA}$		-1.5	-2.0	V
Turn-on time	t_{on}	$I_C = -2.0\text{ A}, I_{B1} = -I_{B2} = -2.0\text{ mA}$		0.7		μs
Storage time	t_{stg}	$R_L = 25\ \Omega, V_{CC} \cong -50\text{ V}$		1.7		μs
Fall time	t_f	Refer to the test circuit.		0.7		μs
Collector capacitance	C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$		45		pF

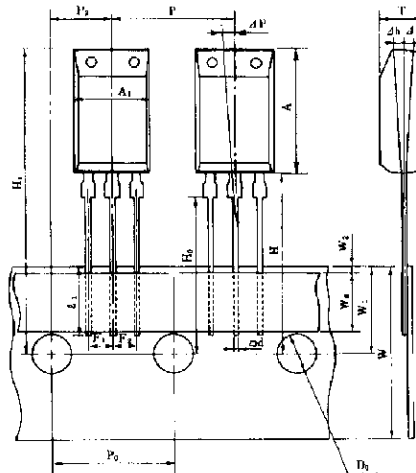
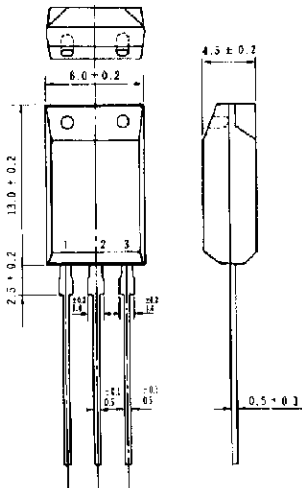
* Pulse test $PW \leq 350\ \mu\text{s}$, Duty Cycle $\leq 2\%$

h_{FE} CLASSIFICATION

Marking	M	L	K
h_{FE1}	2,000 to 5,000	4,000 to 10,000	8,000 to 20,000

PACKAGE DRAWING (UNIT: mm)

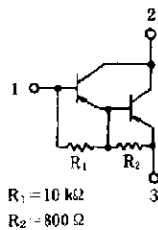
TAPING SPECIFICATION



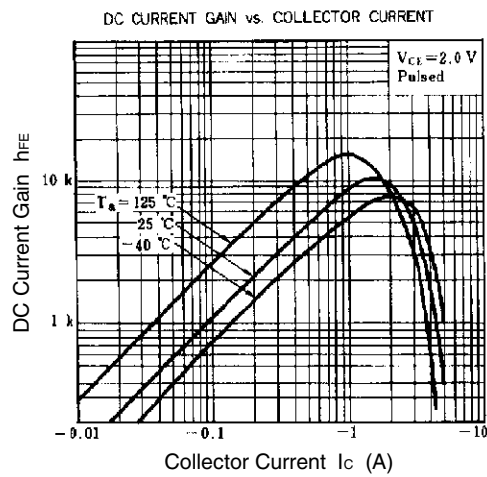
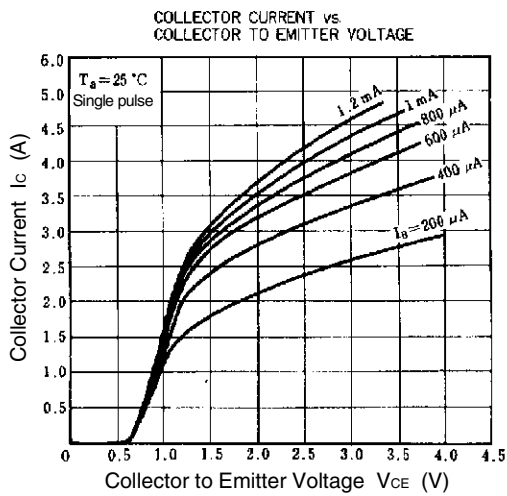
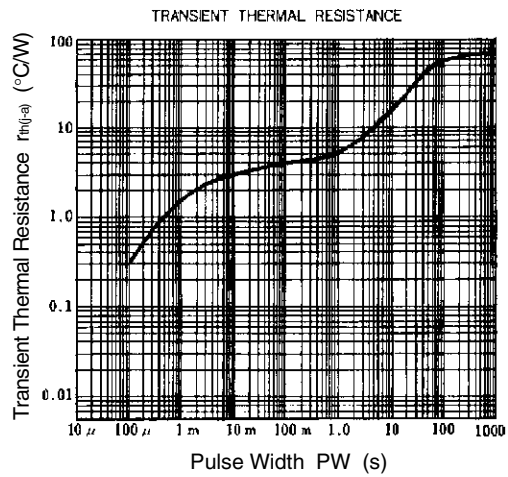
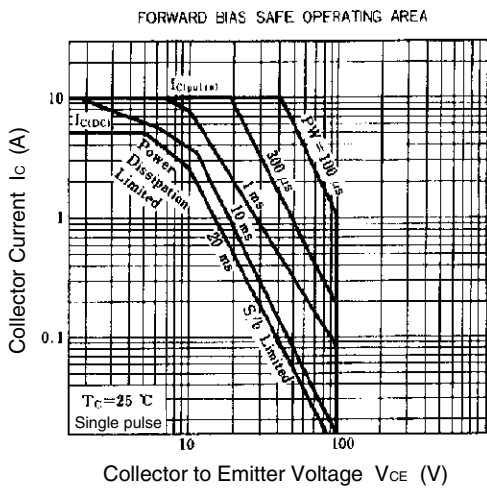
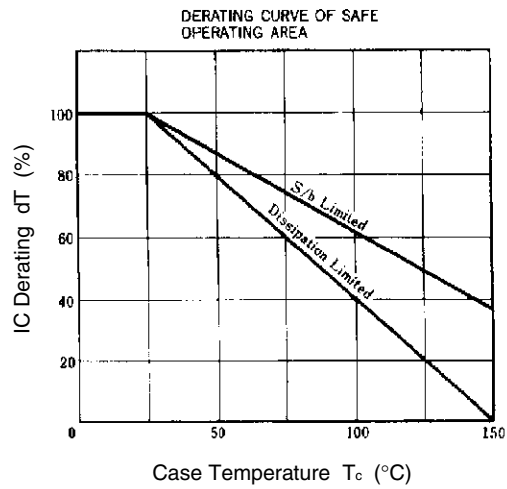
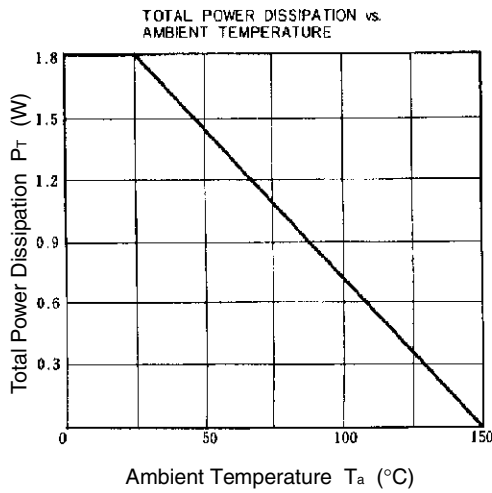
A_1	8.0 ± 0.2
A	13.0 ± 0.2
D_0	$\phi 4.0 \pm 0.2$
d	0.5 ± 0.1
F_1	$2.5^{+0.4}_{-0.1}$
F_2	$2.5^{+0.4}_{-0.1}$
H	20.0 MAX.
H_0	16.0 ± 0.5
H_1	32.2 MAX.
d_h	0 ± 1.0
ℓ_1	2.5 MIN.
P	12.7 ± 1.0
P_0	12.7 ± 0.3
P_2	6.35 ± 0.5
ΔP	0 ± 1.3
T	4.5 ± 0.2
W	$18.0^{+1.0}_{-0.5}$
W_0	5.0 MIN.
W_1	9.0 ± 0.5
W_2	0.7 MIN.

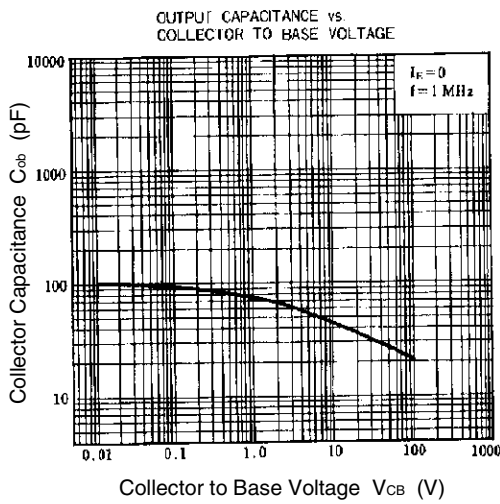
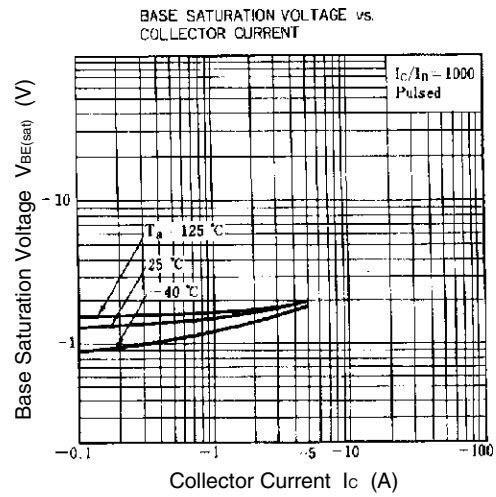
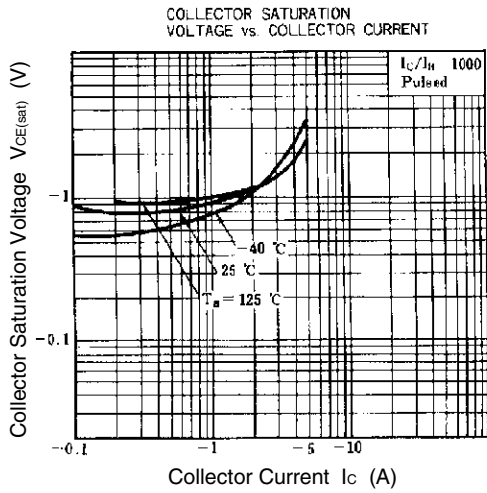
Electrode Connection

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

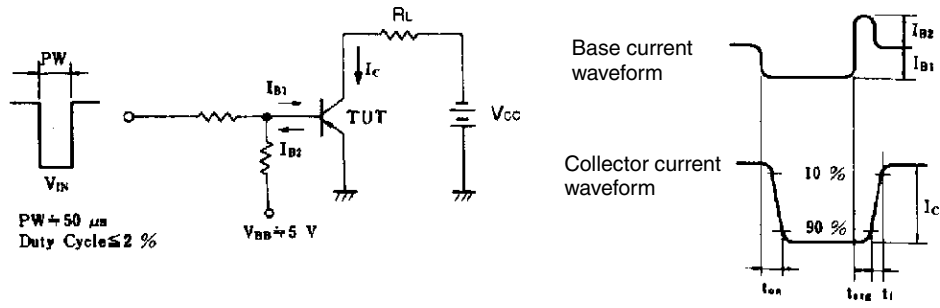


TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)





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



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