

# DARLINGTON POWER TRANSISTOR 2SA1840

### 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 <sub>CBO</sub>	-100	V
Collector to emitter voltage	V <sub>CEO</sub>	-100	V
Emitter to base voltage	V <sub>EBO</sub>	-8.0	V
Collector current (DC)	I <sub>C(DC)</sub>	±5.0	A
Collector current (pulse)	I <sub>C(pulse)</sub> *	±10	A
Base current (DC)	I <sub>B(DC)</sub>	-0.5	A
Total power dissipation	P <sub>T</sub> **	1.8	W
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

\* PW ≤ 300 μs, duty cycle ≤ 10%

\*\* Ta = 25°C

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**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

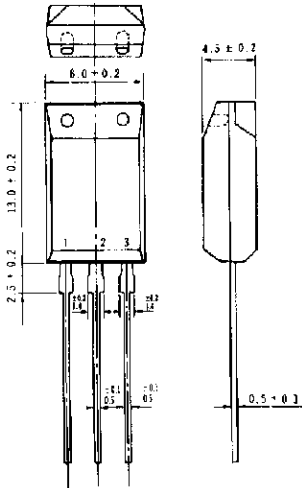
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = -100\text{ V}, I_E = 0$			-1.0	$\mu\text{A}$
Emitter cutoff current	$I_{EBO}$	$V_{EB} = -5\text{ V}, I_C = 0$			-5.0	mA
DC current gain	$h_{FE1}^*$	$V_{CE} = -2.0\text{ V}, I_C = -2.0\text{ A}$	2,000		20,000	-
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		$\mu\text{s}$
Storage time	$t_{stg}$	$R_L = 25\ \Omega, V_{CC} \cong -50\text{ V}$		1.7		$\mu\text{s}$
Fall time	$t_f$	Refer to the test circuit.		0.7		$\mu\text{s}$
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  $\leq 2\%$

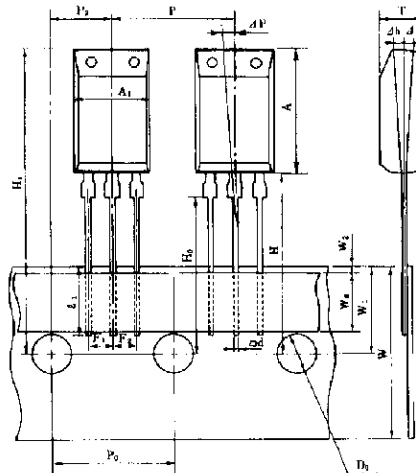
**$h_{FE}$  CLASSIFICATION**

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)**



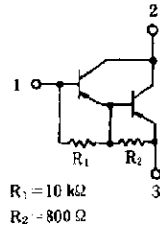
**TAPING SPECIFICATION**



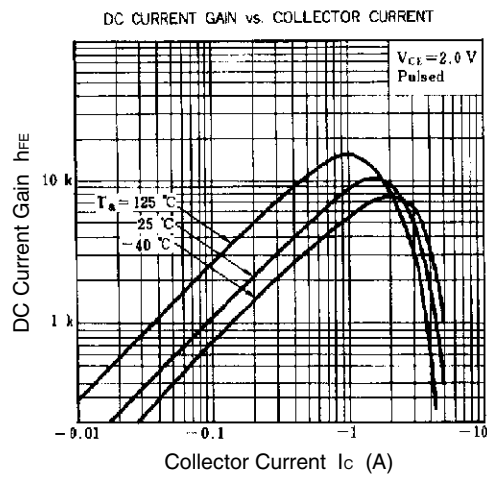
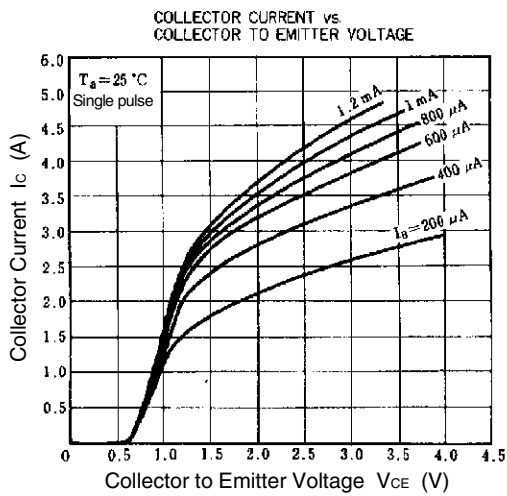
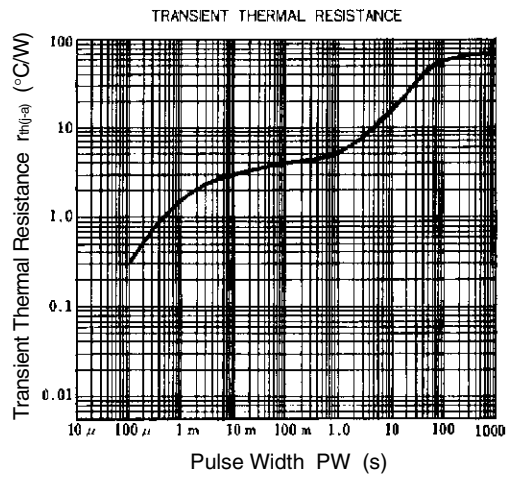
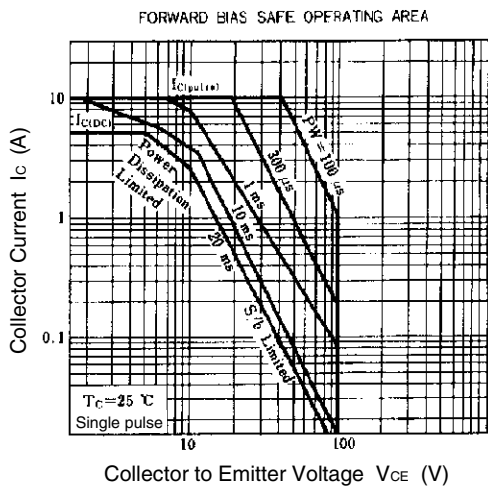
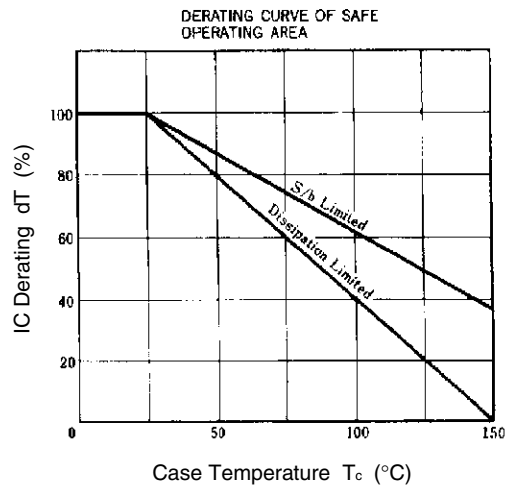
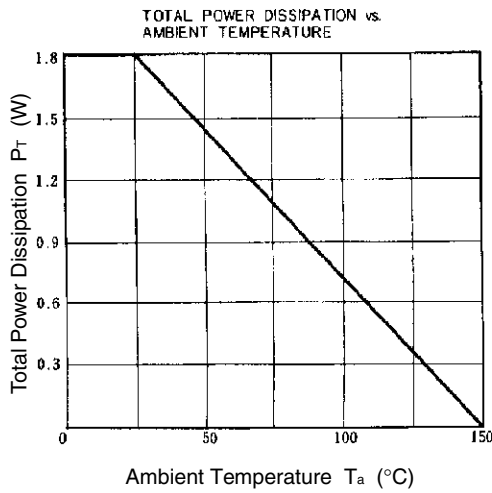
$A_1$	$8.0 \pm 0.2$
A	$13.0 \pm 0.2$
$D_0$	$\phi 4.0 \pm 0.2$
d	$0.5 \pm 0.1$
$F_1$	$2.5^{+0.4}_{-0.1}$
$F_2$	$2.5^{+0.4}_{-0.1}$
H	20.0 MAX.
$H_0$	$16.0 \pm 0.5$
$H_1$	32.2 MAX.
$d_h$	$0 \pm 1.0$
$\ell_1$	2.5 MIN.
P	$12.7 \pm 1.0$
$P_0$	$12.7 \pm 0.3$
$P_2$	$6.35 \pm 0.5$
$\Delta P$	$0 \pm 1.3$
T	$4.5 \pm 0.2$
W	$18.0^{+1.0}_{-0.5}$
$W_0$	5.0 MIN.
$W_1$	$9.0 \pm 0.5$
$W_2$	0.7 MIN.

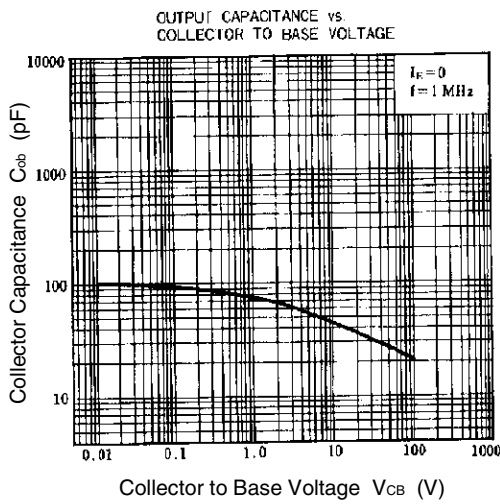
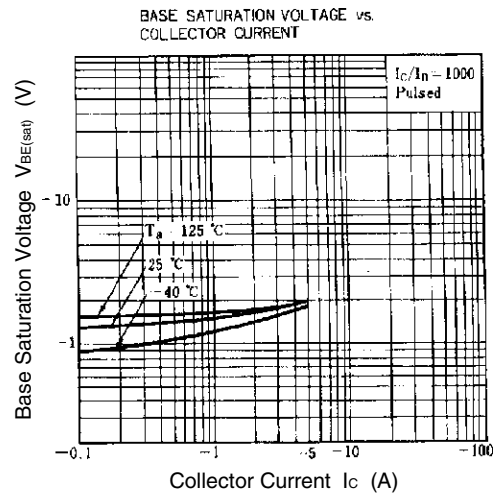
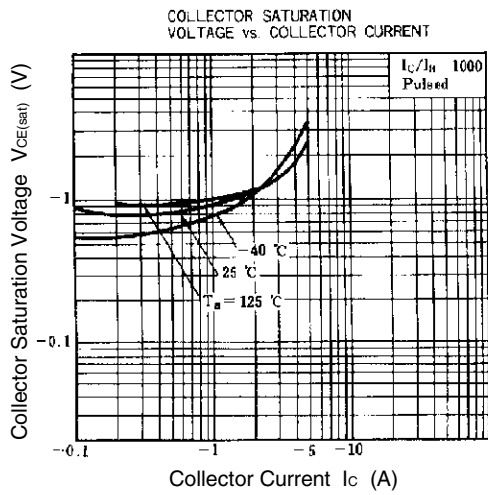
Electrode Connection

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

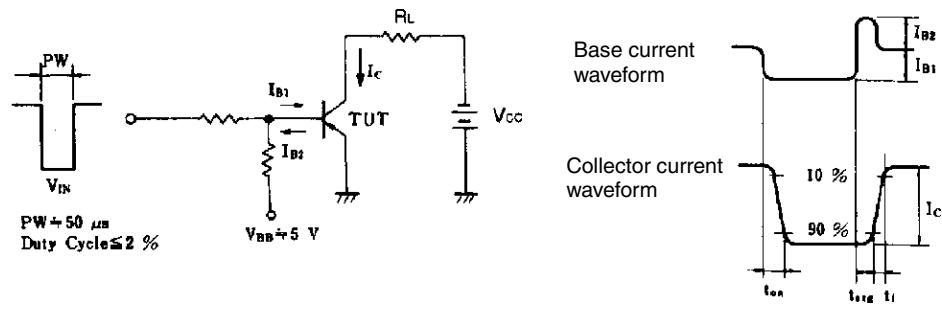


TYPICAL CHARACTERISTICS (Ta = 25°C)





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



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