

# DARLINGTON POWER TRANSISTOR

# 2SA1841

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

### DESCRIPTION

The 2SA1841 is a high-speed Darlington power transistor. This transistor is ideal for high-precision control such as PWM control for pulse motors 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
- High DC current amplifiers due to Darlington connection  
 $h_{FE} = 4000$  to  $20000$  ( $V_{CE} = -2.0$  V,  $I_C = -4.0$  A)
- On-chip C-to-E reverse diode
- Fast switching speed

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

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)	$I_{C(DC)}$	-8.0	A
Collector Current (pulse)	$I_{C(pulse)}$ <sup>Note</sup>	-16	A
Base Current (DC)	$I_{B(DC)}$	-0.8	A
Total Power Dissipation ( $T_A = 25^\circ\text{C}$ )	$P_T$	1.8	W
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

**Note**  $PW \leq 10$  ms, Duty Cycle  $\leq 2\%$

### ★ ORDERING INFORMATION

PART NUMBER	PACKAGE
2SA1841	MP-10

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

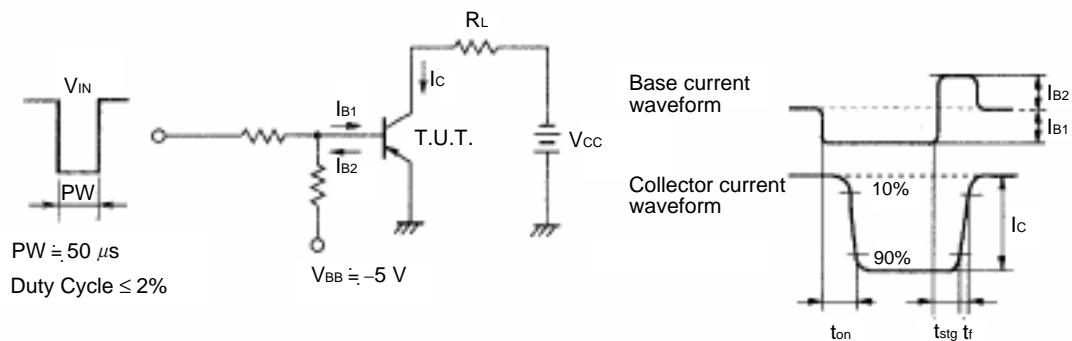
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I <sub>CBO</sub>	V <sub>CB</sub> = -100 V, I <sub>E</sub> = 0 A			-1.0	μA
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> = -5.0 V, I <sub>C</sub> = 0 A			-5.0	mA
DC Current Gain <sup>Note</sup>	h <sub>FE1</sub>	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -4.0 A	4000		20000	
	h <sub>FE2</sub>	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -8.0 A	500			
Collector Saturation Voltage <sup>Note</sup>	V <sub>CE(sat)</sub>	I <sub>C</sub> = -4.0 A, I <sub>B</sub> = -4.0 mA			-1.5	V
Base Saturation Voltage <sup>Note</sup>	V <sub>BE(sat)</sub>	I <sub>C</sub> = -4.0 A, I <sub>B</sub> = -4.0 mA			-2.0	V
Turn-on Time	t <sub>on</sub>	I <sub>C</sub> = -4.0 A		0.2		μs
Storage Time	t <sub>stg</sub>	I <sub>B1</sub> = -I <sub>B2</sub> = -4.0 mA		1.5		μs
Fall Time	t <sub>f</sub>	R <sub>L</sub> = 12.5 Ω, V <sub>CC</sub> = -50 V		0.7		μs

**Note** Pulsed test PW ≤ 350 ms, Duty Cycle ≤ 2%

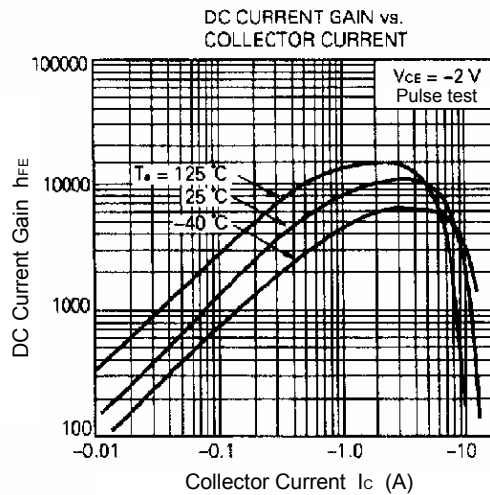
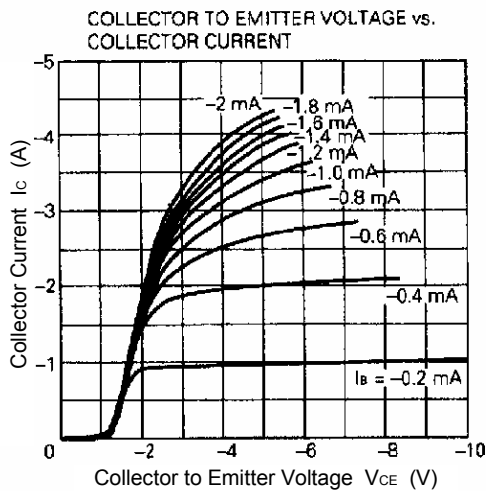
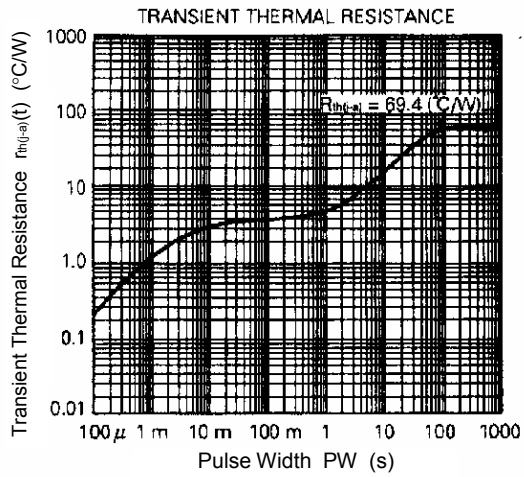
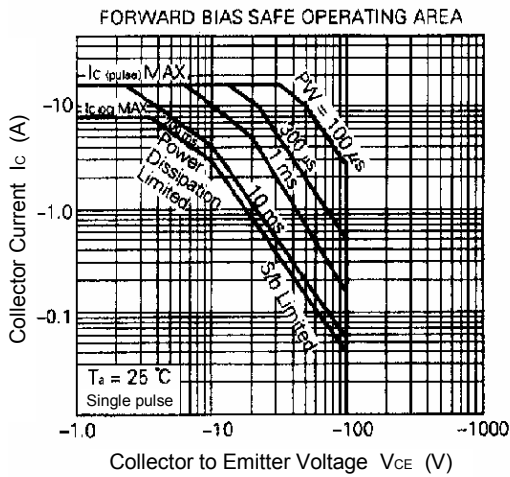
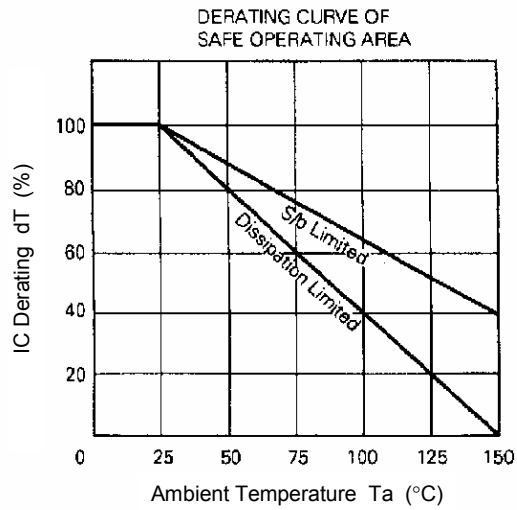
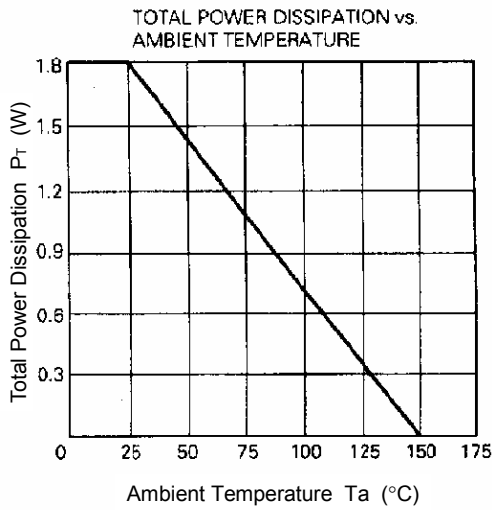
★ **h<sub>FE</sub> CLASSIFICATION**

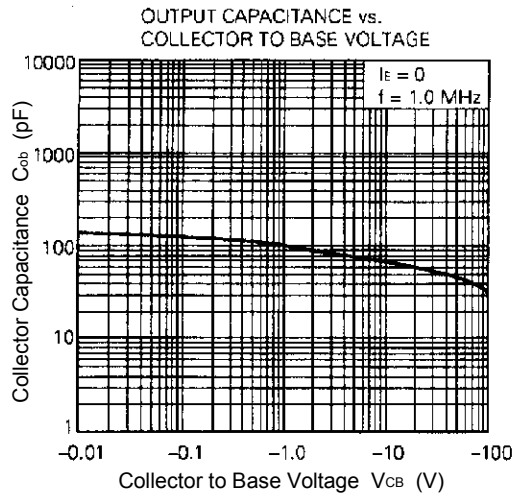
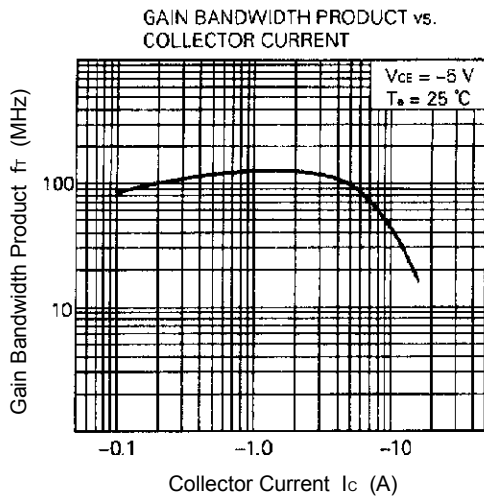
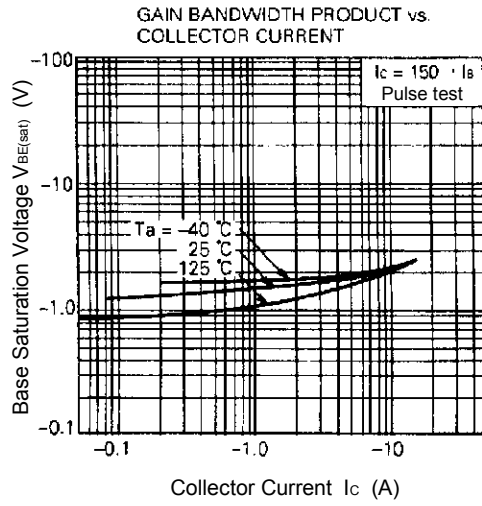
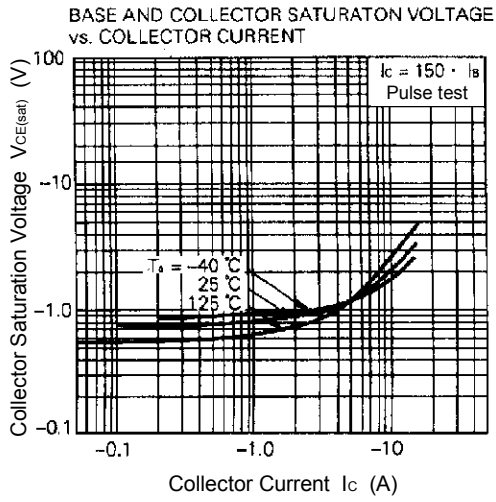
Marking	L	K
h <sub>FE1</sub>	4000 to 10000	8000 to 20000

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



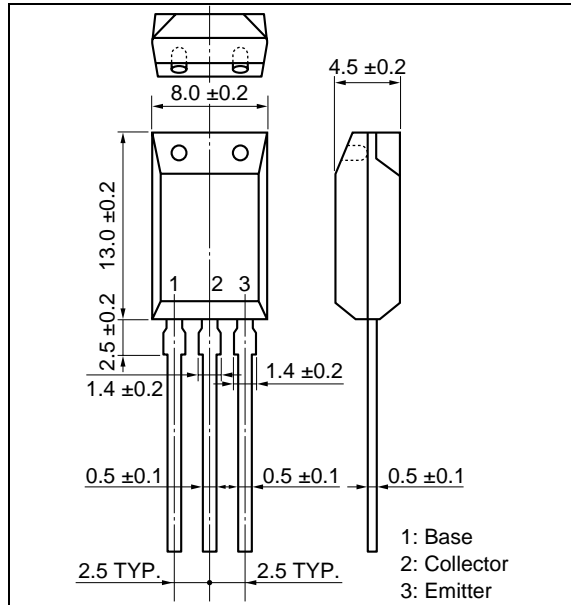
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



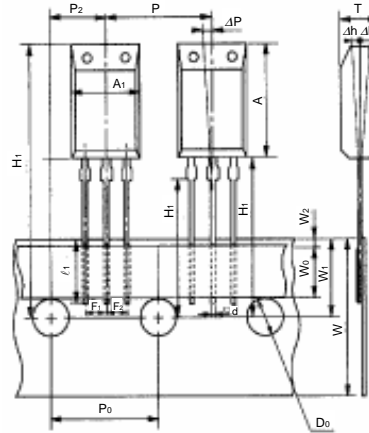


★ PACKAGE DRAWING (Unit: mm)

MP-10

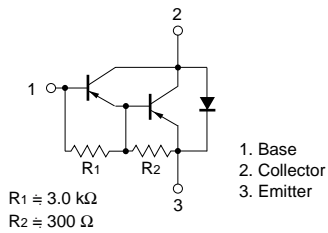


TAPING SPECIFICATION



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

EQUIVALENT CIRCUIT



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