NEC

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.

★ ORDERING INFORMATION

PART NUMBER	PACKAGE
2SA1841	MP-10

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°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)	$I_{C(pulse)}$ **Note**	–16	A
Base Current (DC)	$I_{B(DC)}$	–0.8	A
Total Power Dissipation (T_A = 25°C)	P_T	1.8	W
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

Note PW ≤ 10 ms, Duty Cycle ≤ 2%

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The mark ★ shows major revised points.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

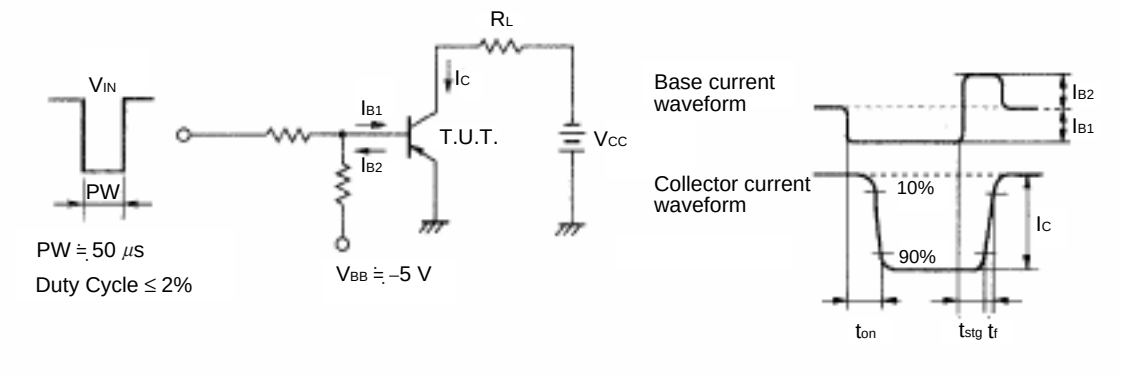
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	V_{CB} = –100 V, I_E = 0 A			–1.0	μA
Emitter Cut-off Current	I_{EBO}	V_{EB} = –5.0 V, I_C = 0 A			–5.0	mA
DC Current Gain **Note**	h_{FE1}	V_{CE} = –2.0 V, I_C = –4.0 A	4000		20000	
	h_{FE2}	V_{CE} = –2.0 V, I_C = –8.0 A	500			
Collector Saturation Voltage **Note**	$V_{CE(sat)}$	I_C = –4.0 A, I_B = –4.0 mA			–1.5	V
Base Saturation Voltage **Note**	$V_{BE(sat)}$	I_C = –4.0 A, I_B = –4.0 mA			–2.0	V
Turn-on Time	t_{on}	I_C = –4.0 A		0.2		μs
Storage Time	t_{stg}	I_{B1} = –I_{B2} = –4.0 mA		1.5		μs
Fall Time	t_f	R_L = 12.5 Ω, V_{CC} = –50 V		0.7		μs

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

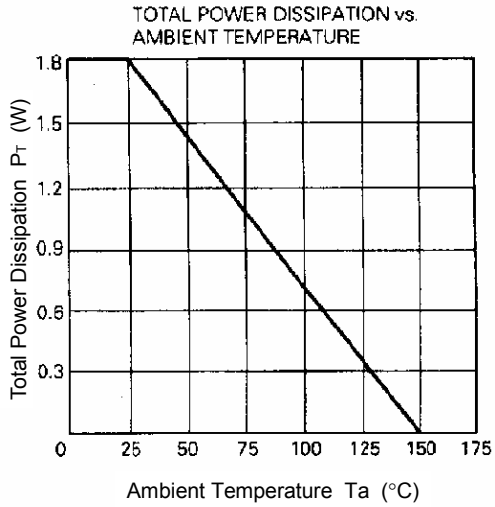
★ h_{FE} CLASSIFICATION

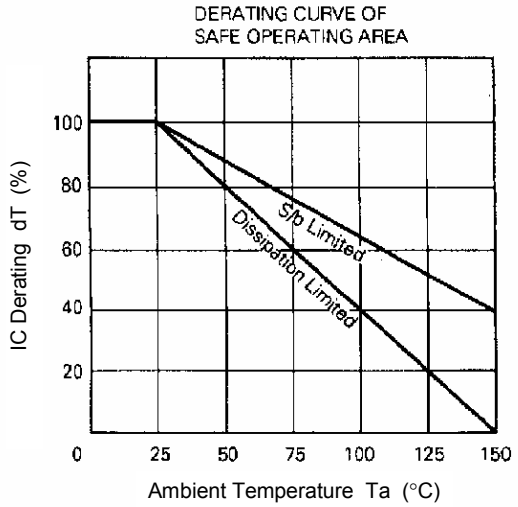
Marking	L	K
h_{FE1}	4000 to 10000	8000 to 20000

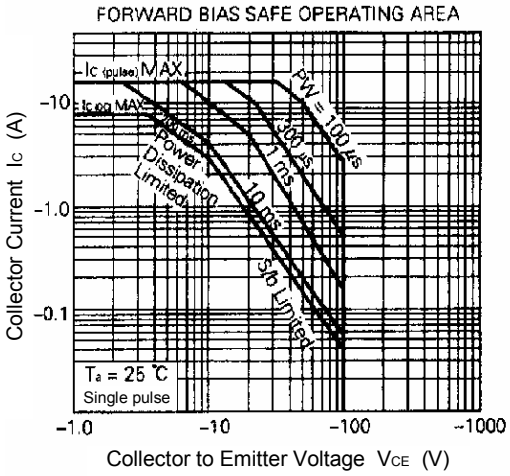
SWITCHING TIME (t_{on}, t_{stg}, t_f) TEST CIRCUIT

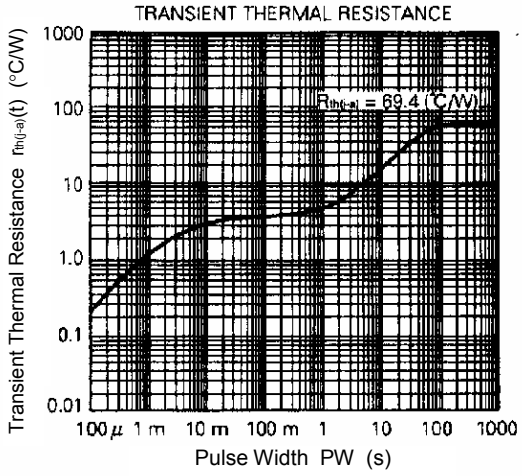


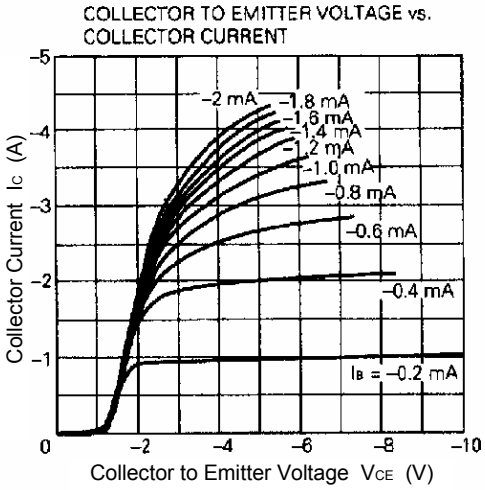
TYPICAL CHARACTERISTICS (T_A = 25°C)

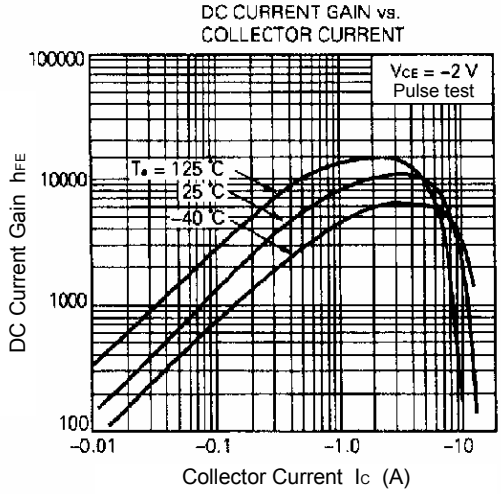




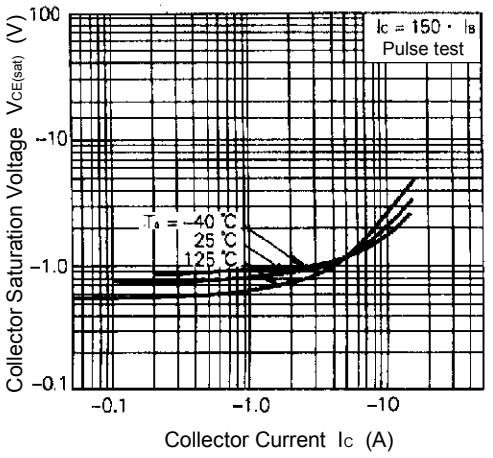




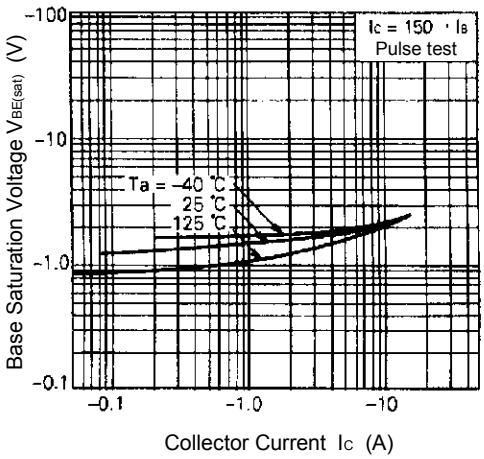




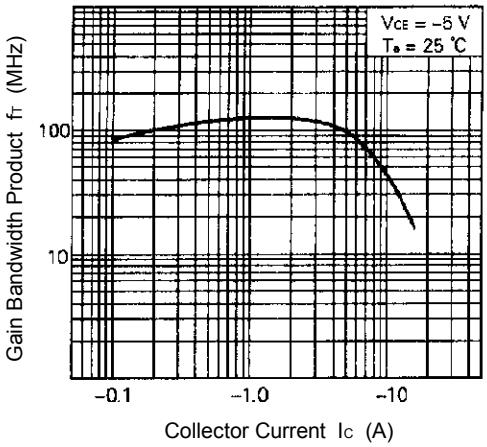
BASE AND COLLECTOR SATURATON VOLTAGE vs. COLLECTOR CURRENT



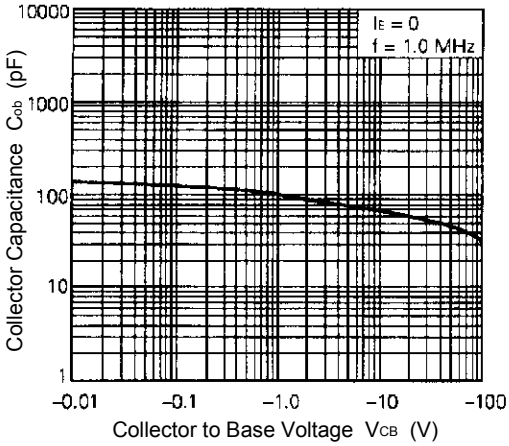
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT

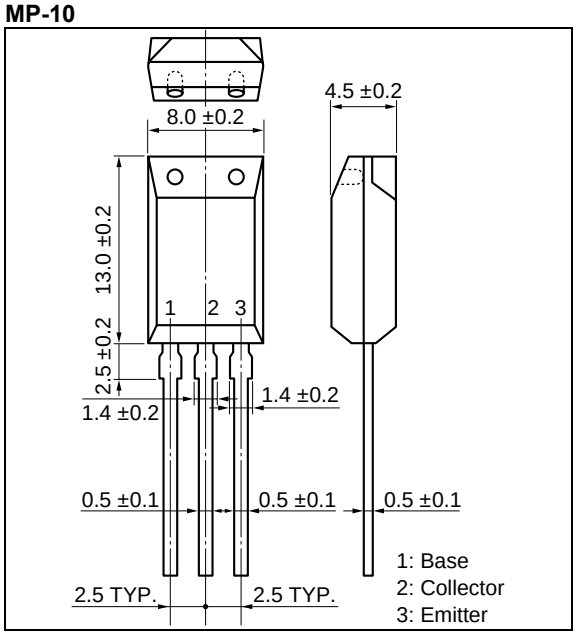


OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE

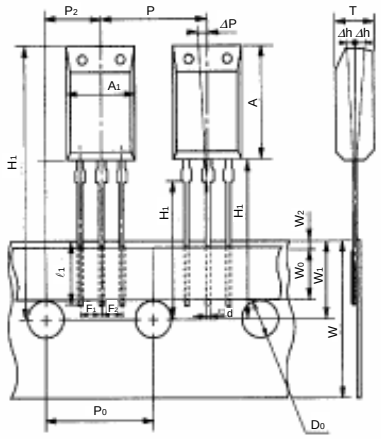


★ PACKAGE DRAWING (Unit: mm)

MP-10

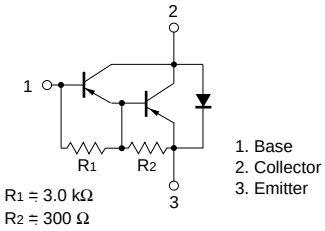


TAPING SPECIFICATION



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.

EQUIVALENT CIRCUIT



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