

## PNP SILICON EPITAXIAL POWER TRANSISTOR FOR HIGH-SPEED SWITCHING

The 2SA1843 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-mounting 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  $V_{CE(sat)}$ :  
 $V_{CE(sat)} \leq -0.3 \text{ V}$  @  $I_C = -3.0 \text{ A}$ ,  $I_B = -0.15 \text{ A}$   
 $h_{FE} \geq 100$  @  $V_{CE} = -2.0 \text{ V}$ ,  $I_C = -1.0 \text{ A}$
- Fast switching speed

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector to base voltage	$V_{CBO}$		-100	V
Collector to emitter voltage	$V_{CEO}$		-60	V
Emitter to base voltage	$V_{EBO}$		-7.0	V
Collector current (DC)	$I_{C(DC)}$		-5.0	A
Collector current (pulse)	$I_{C(pulse)}$	$PW \leq 300 \mu s$ , duty cycle $\leq 2\%$	-10	A
Base current (DC)	$I_{B(DC)}$		-2.5	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	$I_{CBO}$	$V_{CB} = -60\text{ V}$ , $I_E = 0$			-10	$\mu\text{A}$
Collector cutoff current	$I_{CER}$	$V_{CE} = -60\text{ V}$ , $R_{EB} = 50\ \Omega$ $T_a = 125^\circ\text{C}$			-1.0	mA
Collector cutoff current	$I_{CEX1}$	$V_{CE} = -60\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$			-10	$\mu\text{A}$
Collector cutoff current	$I_{CEX2}$	$V_{CE} = -60\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ $T_a = 125^\circ\text{C}$			-1.0	mA
Emitter cutoff current	$I_{EBO}$	$V_{EB} = -5.0\text{ V}$ , $I_C = 0$			-10	$\mu\text{A}$
DC current gain	$h_{FE1}^*$	$V_{CE} = -2.0\text{ V}$ , $I_C = -0.5\text{ A}$	100			—
DC current gain	$h_{FE2}^*$	$V_{CE} = -2.0\text{ V}$ , $I_C = -1.0\text{ A}$	100		400	—
DC current gain	$h_{FE3}^*$	$V_{CE} = -2.0\text{ V}$ , $I_C = -3.0\text{ A}$	60			—
Collector saturation voltage	$V_{CE(sat)1}^*$	$I_C = -3.0\text{ A}$ , $I_B = -0.15\text{ A}$			-0.3	V
Collector saturation voltage	$V_{CE(sat)2}^*$	$I_C = -4.0\text{ A}$ , $I_B = -0.2\text{ A}$			-0.5	V
Base saturation voltage	$V_{BE(sat)1}^*$	$I_C = -3.0\text{ A}$ , $I_B = -0.15\text{ A}$			-1.2	V
Base saturation voltage	$V_{BE(sat)2}^*$	$I_C = -4.0\text{ A}$ , $I_B = -0.2\text{ A}$			-1.5	V
Gain bandwidth product	$f_T$	$V_{CE} = -10\text{ V}$ , $I_C = -0.5\text{ A}$		80		MHz
Collector capacitance	$C_{ob}$	$V_{CB} = -10\text{ V}$ , $I_E = 0$ , $f = 1\text{ MHz}$		130		pF
Turn-on time	$t_{on}$	$I_C = -3.0\text{ A}$ $I_{B1} = -I_{B2} = -0.15\text{ A}$ $R_L = 17\ \Omega$ , $V_{CC} = -50\text{ V}$		0.15		$\mu\text{s}$
Storage time	$t_{stg}$			1.0		$\mu\text{s}$
Fall time	$t_f$			0.1		$\mu\text{s}$

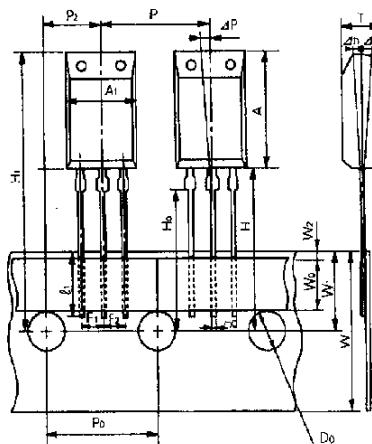
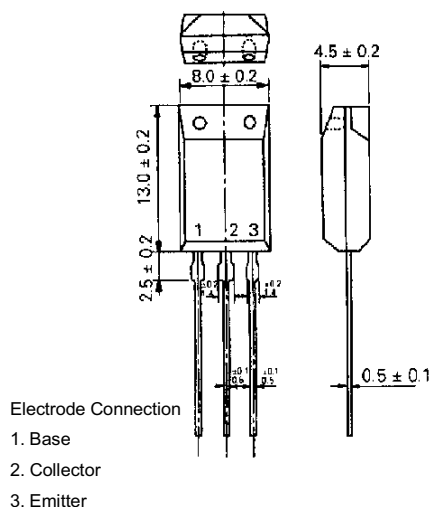
\* Pulse test  $PW \leq 350\ \mu\text{s}$ , duty cycle  $\leq 2\%$ 

## hFE CLASSIFICATION

Marking	M	L	K
hFE	100 to 200	150 to 300	200 to 400

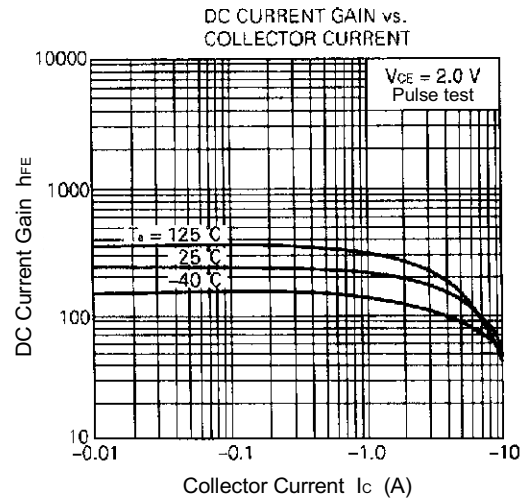
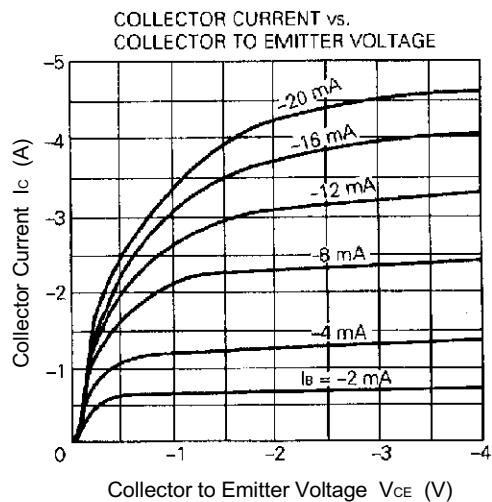
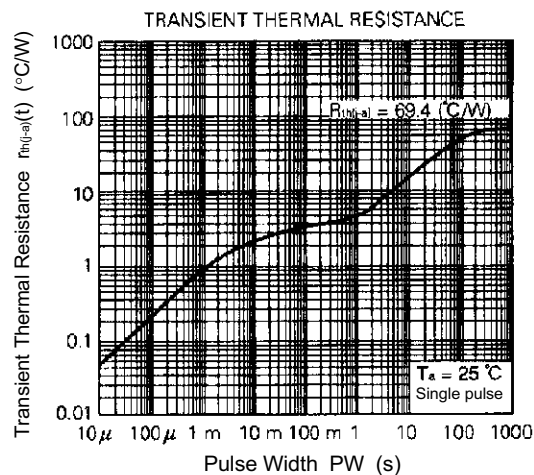
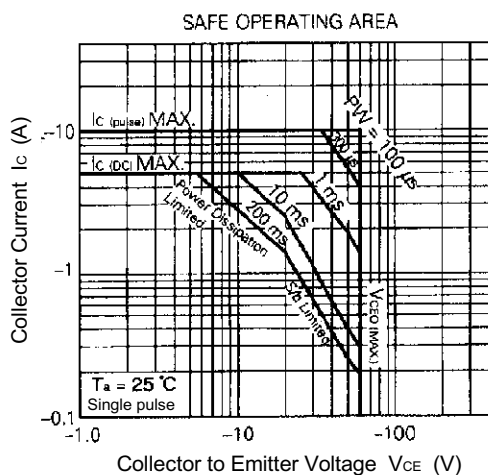
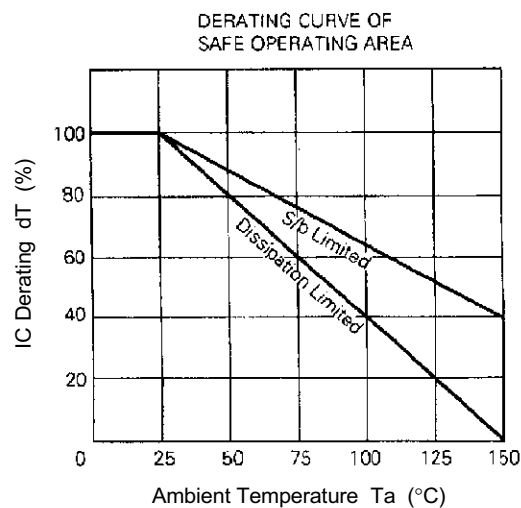
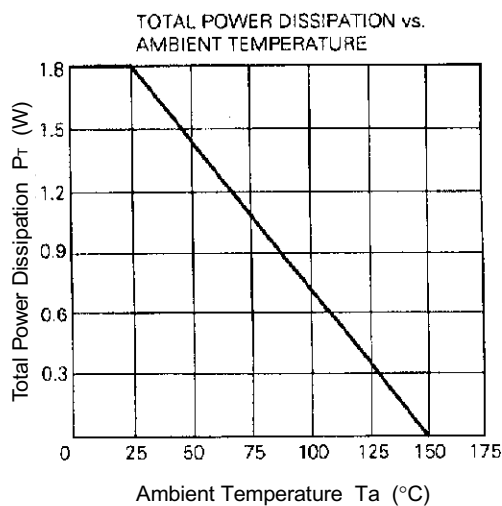
## PACKAGE DRAWING (UNIT: mm)

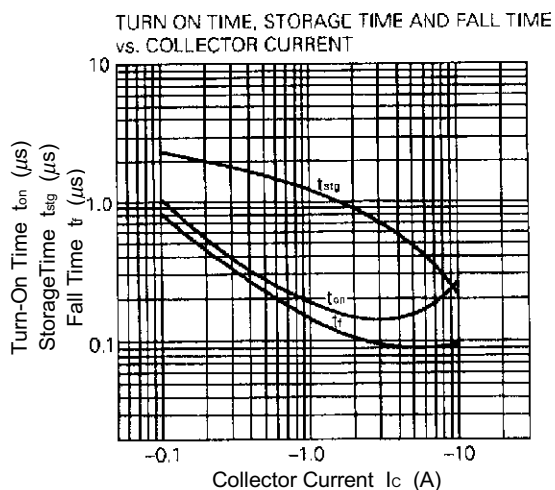
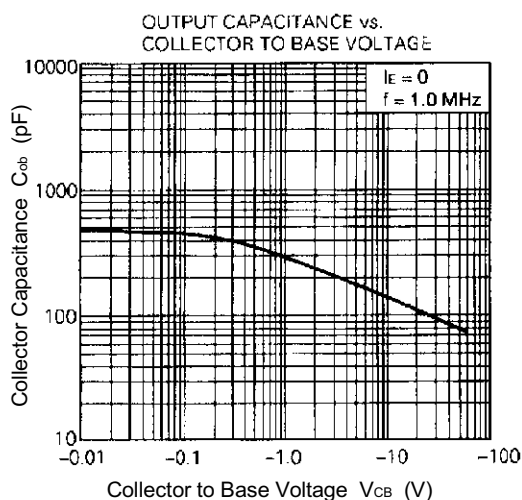
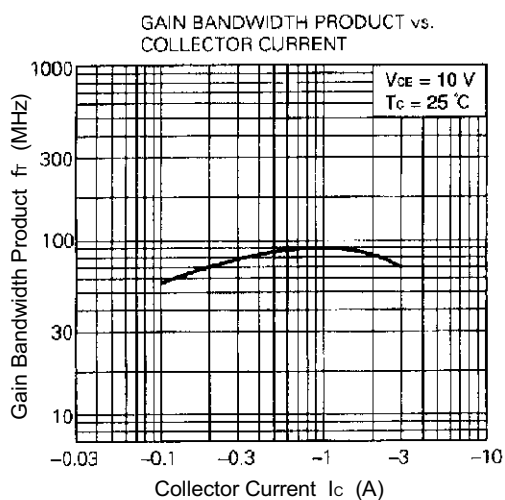
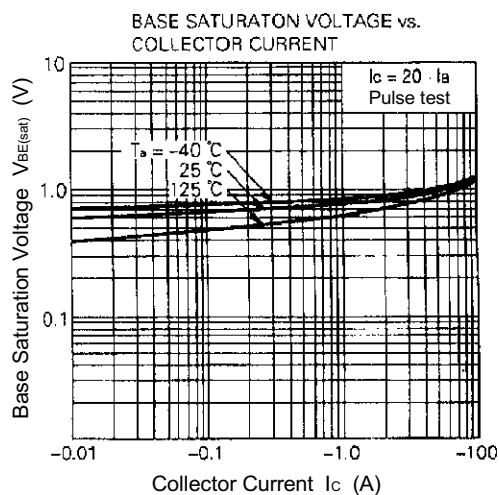
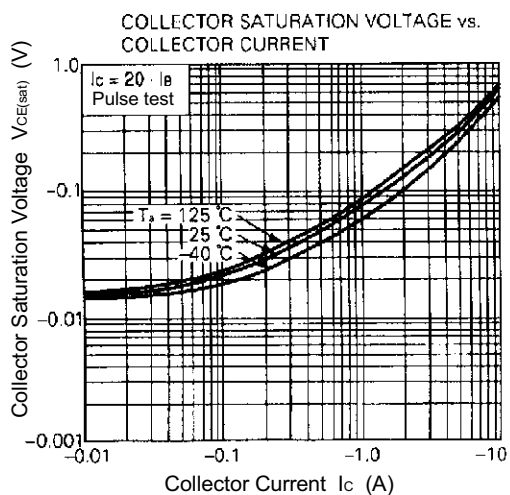
## TAPING SPECIFICATION



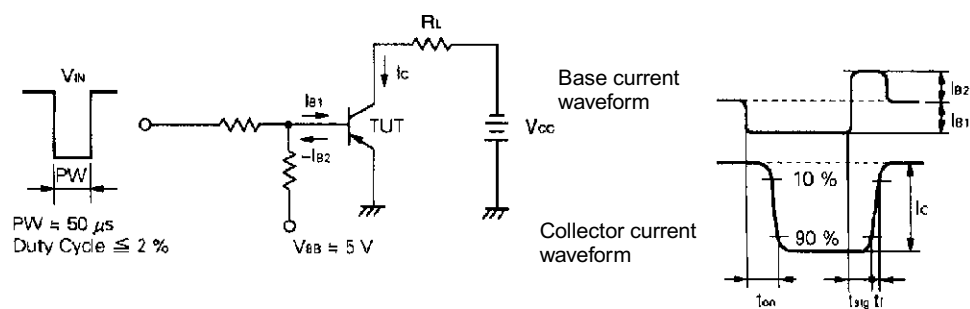
$A_1$	$8.0 \pm 0.2$
$A$	$13.0 \pm 0.2$
$D_0$	$\phi 4.0 \pm 0.2$
$d$	$0.5 \pm 0.1$
$F_1$	$2.5^{+0.4}_{-0.1}$
$F_2$	$2.5^{+0.4}_{-0.1}$
$H$	20.0 MAX.
$H_0$	$16.0 \pm 0.5$
$H_1$	32.2 MAX.
$dH$	$0 \pm 1.0$
$L_1$	2.5 MIN.
$P$	$12.7 \pm 1.0$
$P_0$	$12.7 \pm 0.3$
$P_2$	$6.35 \pm 0.5$
$dP$	$0 \pm 1.3$
$T$	$4.5 \pm 0.2$
$W$	$18.0^{+0.5}_{-0.5}$
$W_0$	5.0 MIN.
$W_1$	$9.0 \pm 0.5$
$W_2$	0.7 MIN.

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





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



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