

### NPN SILICON EPITAXIAL TRANSISTOR FOR HIGH-SPEED SWITCHING

The 2SC4814 is a power transistor featuring low-saturation voltage and high  $h_{FE}$ . This transistor is ideal for high-precision control such as PWM control for pulse motors or brushless motors in OA and FA equipment and for solenoid driving in automotive equipment.

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

#### FEATURES

- Low  $V_{CE(sat)}$ :  $V_{CE(sat)} \leq 0.3 \text{ V}$  @  $I_C = 1.5 \text{ A}$ ,  $I_B = 10 \text{ mA}$
- High  $h_{FE}$ :  $h_{FE} = 300 \text{ to } 1,200$  @  $V_{CE} = 2.0 \text{ V}$ ,  $I_C = 1.0 \text{ A}$
- On-chip dumper-diode
- Auto-mounting possible in radial taping specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector to base voltage	$V_{CBO}$		120	V
Collector to emitter voltage	$V_{CEO}$		100	V
Emitter to base voltage	$V_{EBO}$		7.0	V
Collector current (DC)	$I_{C(DC)}$		$\pm 2.5$	A
Collector current (pulse)	$I_{C(pulse)}$	$PW \leq 300 \mu\text{s}$ , duty cycle $\leq 10\%$	$\pm 5.0$	A
Base current (DC)	$I_{B(DC)}$		1.0	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	$^\circ\text{C}$

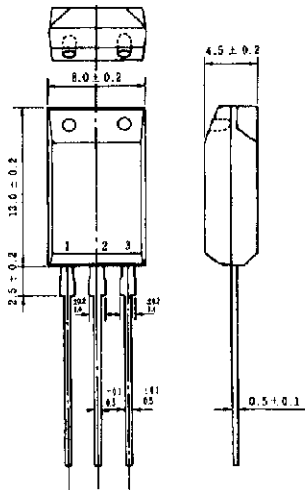
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**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = 120\text{ V}, I_E = 0$			50	$\mu\text{A}$
Emitter cutoff current	$I_{EBO}$	$V_{EB} = 5\text{ V}, I_C = 0$			50	$\mu\text{A}$
DC current gain	$h_{FE1}^*$	$V_{CE} = 2\text{ V}, I_C = 1.0\text{ A}$	300	700	1,200	—
DC current gain	$h_{FE2}^*$	$V_{CE} = 2\text{ V}, I_C = 1.5\text{ A}$	250	600		—
Collector saturation voltage	$V_{CE(sat)}^*$	$I_C = 1.5\text{ A}, I_B = 10\text{ mA}$			0.3	V
Base saturation voltage	$V_{BE(sat)}^*$	$I_C = 1.5\text{ A}, I_B = 10\text{ mA}$			1.3	V
Gain bandwidth product	$f_T$	$V_{CE} = 10\text{ V}, I_C = 1.0\text{ A}$		60		MHz
Collector capacitance	$C_{ob}$	$V_{CE} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$		40		pF
Turn-on time	$t_{on}$	$I_C = 1.5\text{ A}, I_{B1} = -I_{B2} = 10\text{ mA}$		0.5		$\mu\text{s}$
Storage time	$t_{stg}$	$R_L = 8.0\ \Omega, V_{CC} = 12\text{ V}$		2.0		$\mu\text{s}$
Fall time	$t_f$	Refer to the test circuit.		0.5		$\mu\text{s}$

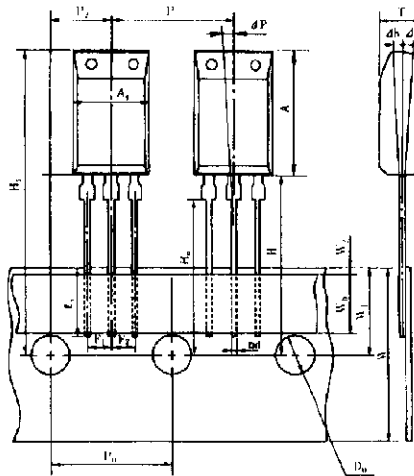
\* Pulse test  $PW \leq 350\ \mu\text{s}$ , duty cycle  $\leq 2\%$

**PACKAGE DRAWING (UNIT: mm) TAPING SPECIFICATION**



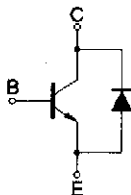
Electrode Connection

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

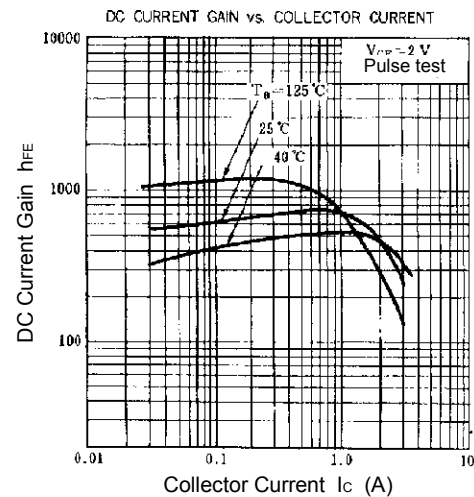
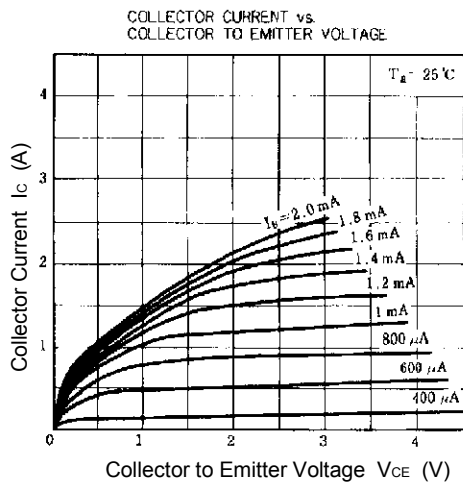
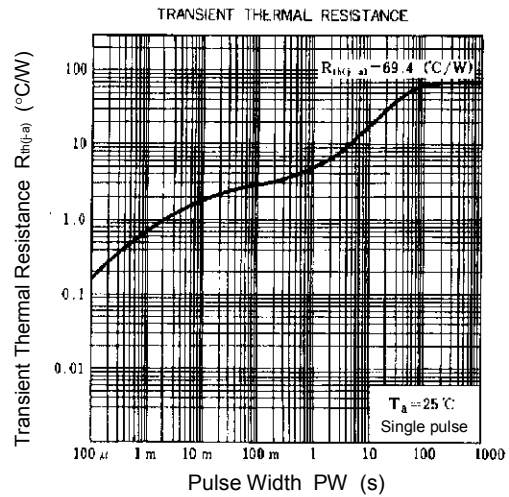
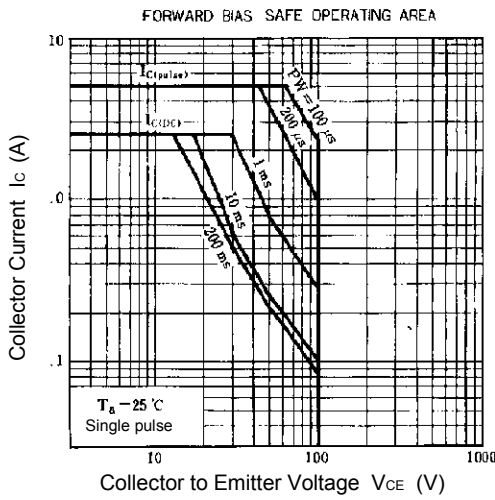
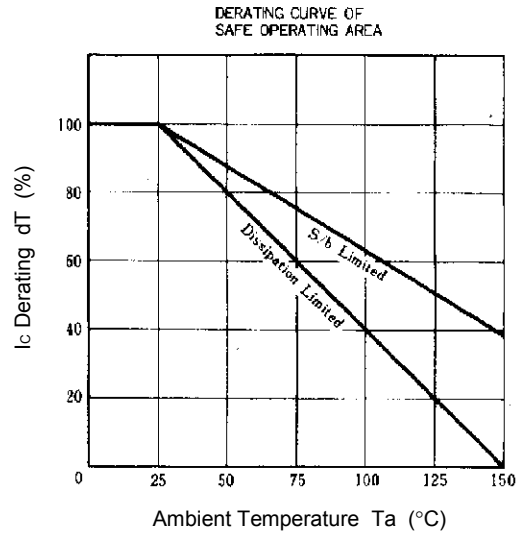
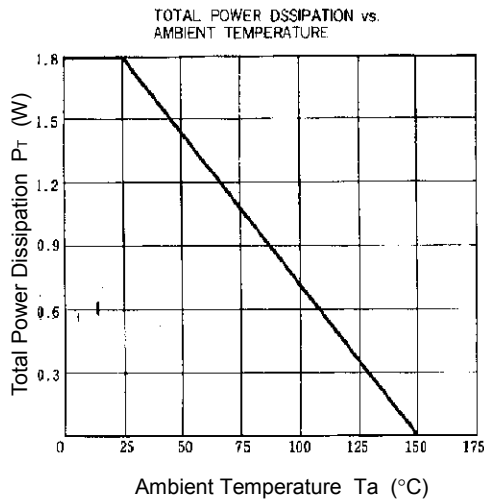


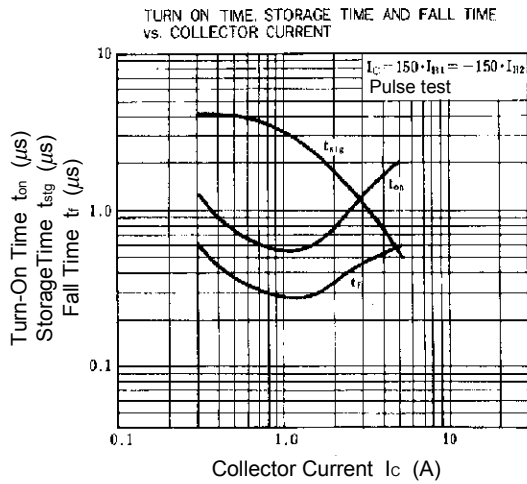
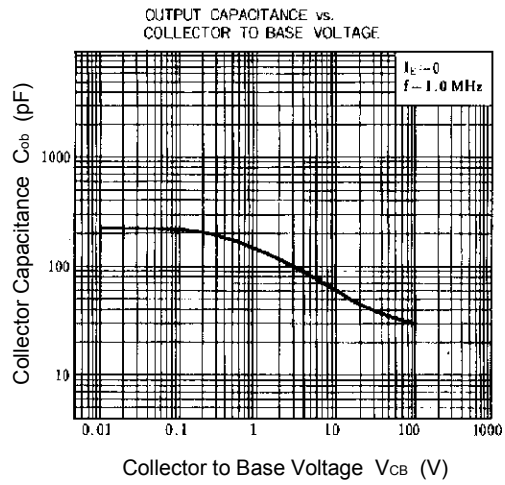
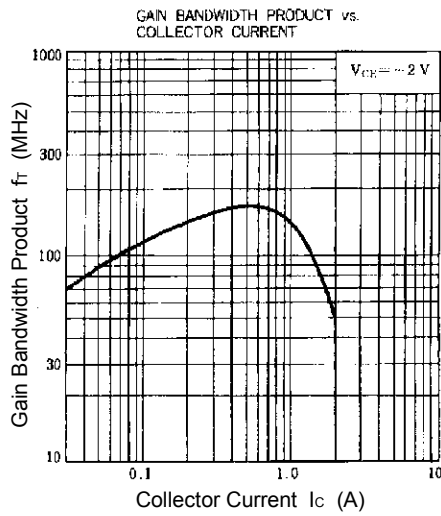
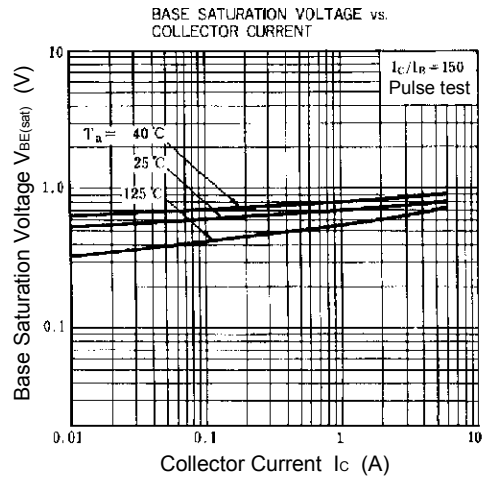
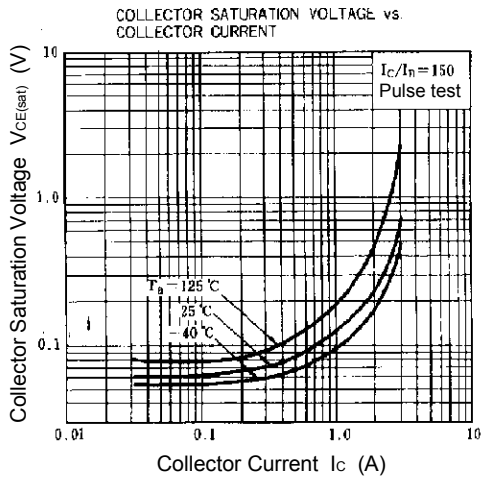
A <sub>1</sub>	8.0 ± 0.2
A	13.0 ± 0.2
D <sub>0</sub>	∅4.0 ± 0.2
d	0.5 ± 0.1
F <sub>1</sub>	2.5 <sup>+0.4</sup> <sub>-0.1</sub>
F <sub>2</sub>	2.5 <sup>+0.4</sup> <sub>-0.1</sub>
H	20.0 MAX.
H <sub>0</sub>	16.0 ± 0.5
H <sub>1</sub>	32.2 MAX.
dh	0 ± 1.0
e <sub>1</sub>	2.5 MIN.
P	12.7 ± 1.0
P <sub>0</sub>	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 MAX.

**EQUIVALENT CIRCUIT**

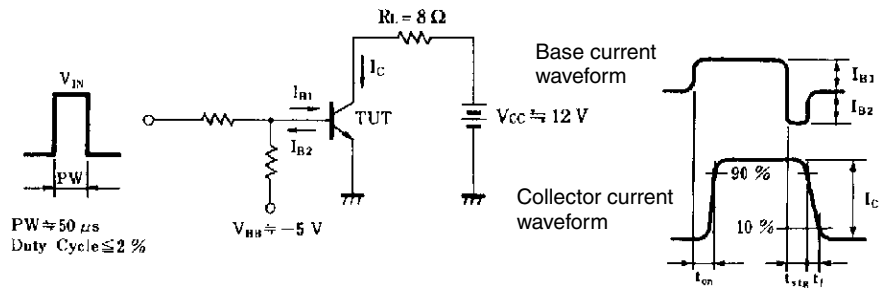


TYPICAL CHARACTERISTICS (Ta = 25°C)





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



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