

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)	$I_{C(DC)}$		± 2.5	A
Collector current (pulse)	$I_{C(pulse)}$	$PW \leq 300 \mu\text{s}$, duty cycle $\leq 10\%$	± 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	$^\circ\text{C}$

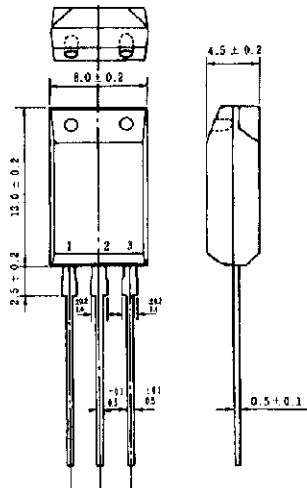
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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = 120\text{ V}, I_E = 0$			50	μA
Emitter cutoff current	I_{EBO}	$V_{EB} = 5\text{ V}, I_C = 0$			50	μA
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		μs
Storage time	t_{stg}	$R_L = 8.0\ \Omega, V_{CC} = 12\text{ V}$		2.0		μs
Fall time	t_f	Refer to the test circuit.		0.5		μs

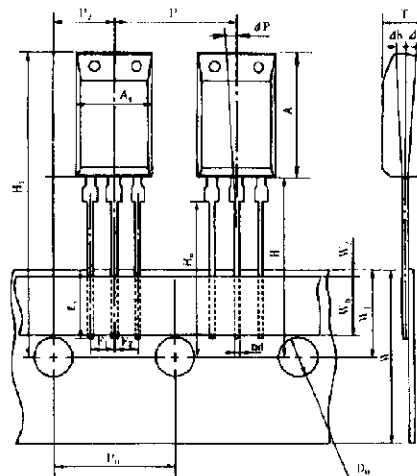
* Pulse test $PW \leq 350\ \mu\text{s}$, duty cycle $\leq 2\%$

PACKAGE DRAWING (UNIT: mm) TAPING SPECIFICATION



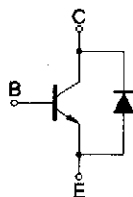
Electrode Connection

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

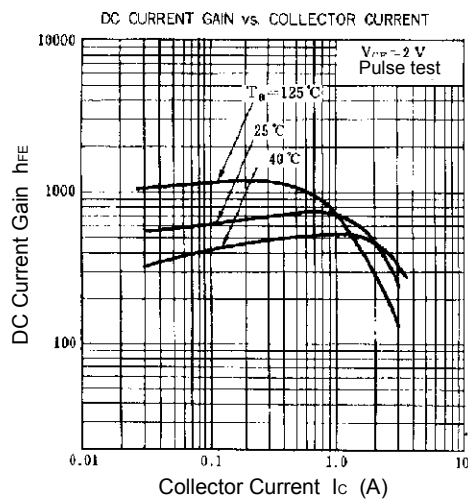
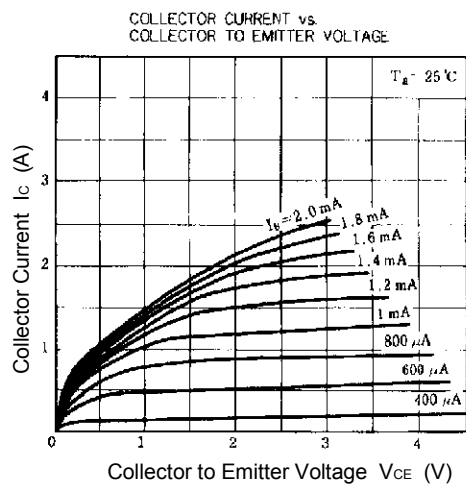
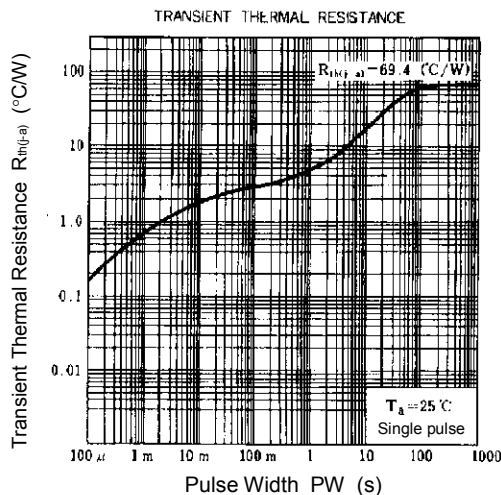
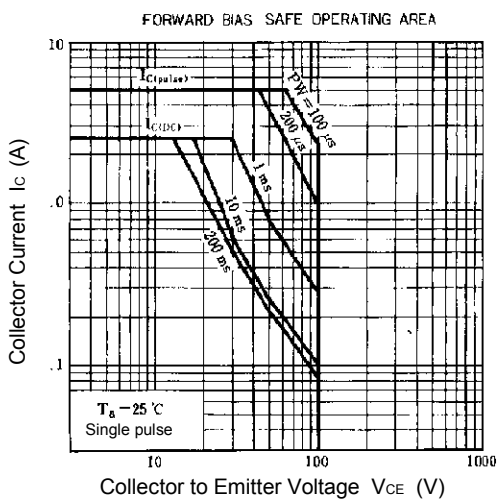
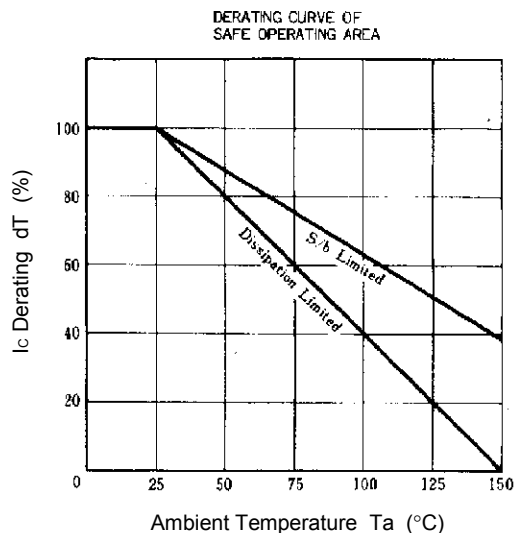
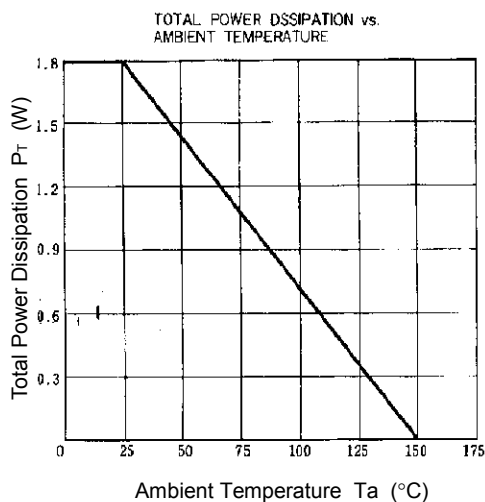


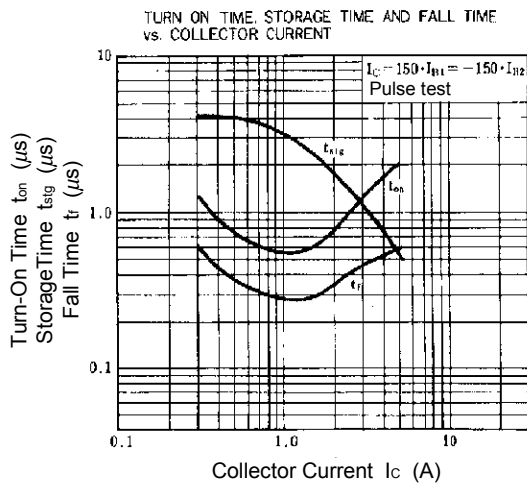
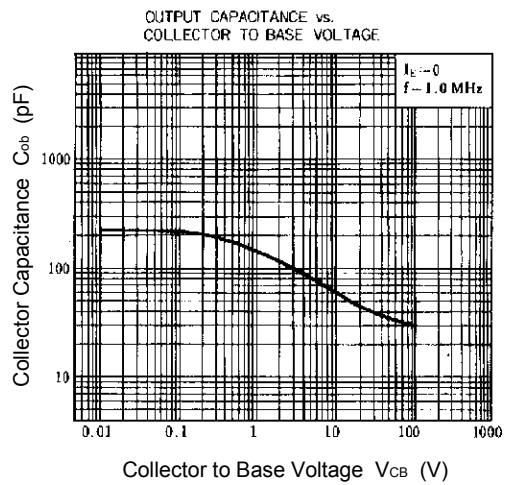
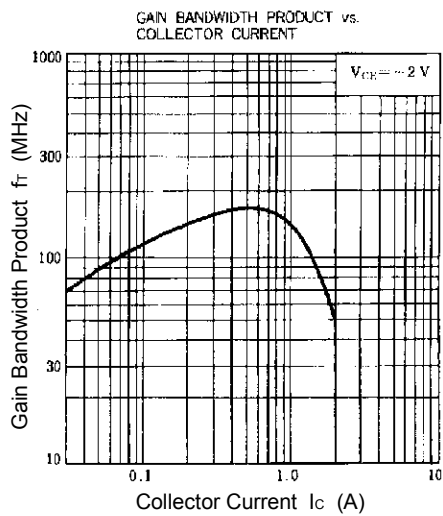
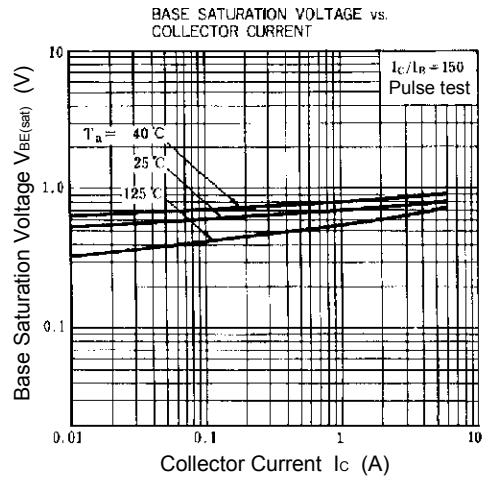
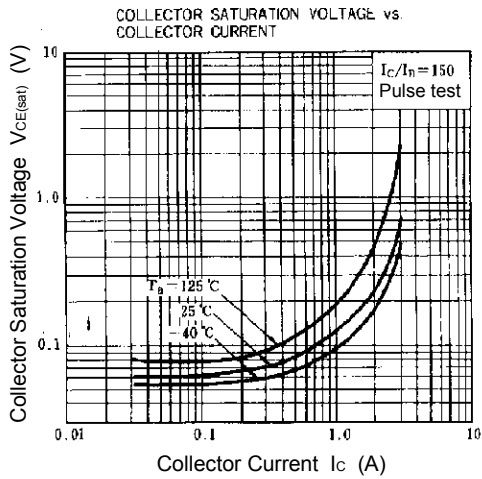
A ₁	8.0 ± 0.2
A	13.0 ± 0.2
D ₀	∅4.0 ± 0.2
d	0.5 ± 0.1
F ₁	2.5 ^{+0.4} _{-0.1}
F ₂	2.5 ^{+0.4} _{-0.1}
H	20.0 MAX.
H ₀	16.0 ± 0.5
H ₁	32.2 MAX.
dh	0 ± 1.0
l ₁	2.5 MIN.
P	12.7 ± 1.0
P ₀	12.7 ± 0.3
P ₂	6.35 ± 0.5
ΔP	0 ± 1.3
T	4.5 ± 0.2
W	18.0 ^{+1.0} _{-0.5}
W ₀	5.0 MIN.
W ₁	9.0 ± 0.5
W ₂	0.7 MAX.

EQUIVALENT CIRCUIT

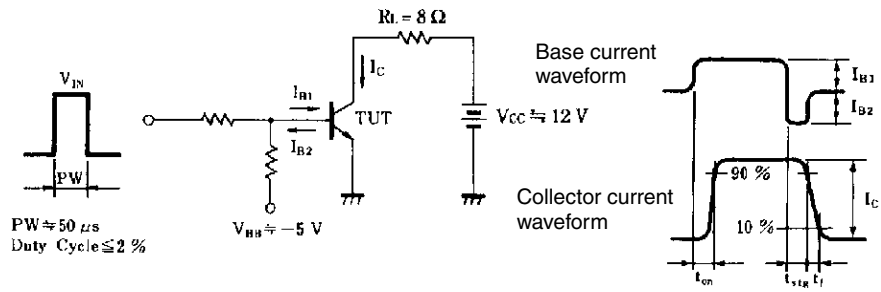


TYPICAL CHARACTERISTICS (Ta = 25°C)





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



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