

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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NPN SILICON EPITAXIAL TRANSISTOR FOR HIGH-SPEED SWITCHING

The 2SC4815 is a power transistor developed for high-speed switching and features low $V_{CE(sat)}$ and high h_{FE} . This transistor is ideal for use as a driver in DC/DC converters and actuators.

In addition, this transistor is available for the auto mount in the radial taping specifications and for mounting cost reduction.

FEATURES

- High h_{FE} and low $V_{CE(sat)}$:
 $V_{CE(sat)} \leq 0.3 \text{ V}$ @ $I_C = 3.0 \text{ A}$, $I_B = 0.15 \text{ A}$
 $h_{FE} \geq 100$ @ $V_{CE} = 2.0 \text{ V}$, $I_C = 1.0 \text{ A}$
- Available for auto mount in radial taping specifications

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	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)	$I_{C(pulse)}^*$	10	A
Base current (DC)	$I_{B(DC)}$	2.5	A
Total power dissipation	P_T	1.8	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

* $PW \leq 300 \mu\text{s}$, duty cycle $\leq 10\%$

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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	$V_{CE0(SUS)}$	$I_C = 5.0\text{ A}, I_B = 0.5\text{ A}, L = 1\text{ mH}$	60			V
Collector to emitter voltage	$V_{CEX(SUS)}$	$I_C = 2.5\text{ A}, I_{B1} = -I_{B2} = 0.25\text{ A}$ $V_{BE(OFF)} = -1.5\text{ V}, L = 180\text{ }\mu\text{H}, \text{Clamped}$	60			V
Collector cutoff current	I_{CBO}	$V_{CB} = 100\text{ V}, I_E = 0$			10	μA
Emitter cutoff current	I_{EBO}	$V_{EB} = 7.0\text{ V}, I_C = 0$			10	μA
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	200	400	
DC current gain	h_{FE3}^*	$V_{CE} = 2.0\text{ V}, I_C = 3.0\text{ A}$	60			
Collector saturation voltage	$V_{CE(sat)1}^*$	$I_C = 3.0\text{ A}, I_B = 0.15\text{ A}$		0.15	0.3	V
Collector saturation voltage	$V_{CE(sat)2}^*$	$I_C = 4.0\text{ A}, I_B = 0.2\text{ A}$		0.3	0.5	V
Base saturation voltage	$V_{BE(sat)1}^*$	$I_C = 3.0\text{ A}, I_B = 0.15\text{ A}$		0.9	1.2	V
Base saturation voltage	$V_{BE(sat)2}^*$	$I_C = 4.0\text{ A}, I_B = 0.2\text{ A}$		1.2	1.5	V
Collector capacitance	C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$		70		pF
Gain bandwidth product	f_T	$V_{CE} = 10\text{ V}, I_C = 0.5\text{ A}$		150		MHz
Turn-on time	t_{on}	$I_C = 3.0\text{ A}, R_L = 17\text{ }\Omega,$ $I_{B1} = -I_{B2} = 0.15\text{ A}, V_{CC} \cong 50\text{ V}$ Refer to the test circuit.		0.1		μs
Storage time	t_{stg}			1.0		μs
Fall time	t_f			0.25		μs

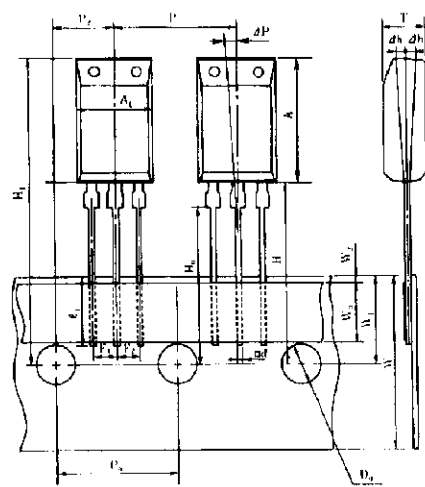
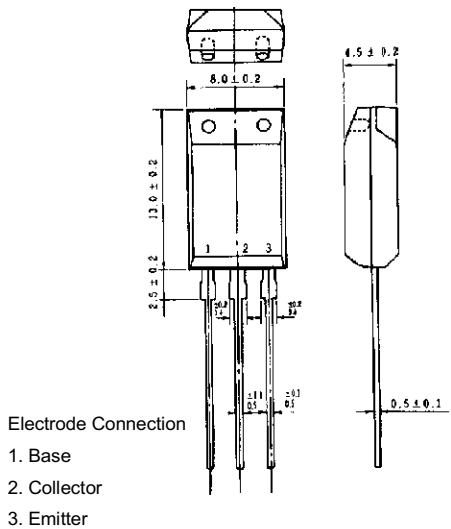
* Pulse test $PW \leq 350\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

h_{FE} CLASSIFICATION

Marking	M	L	K
h_{FE2}	100 to 200	150 to 300	200 to 400

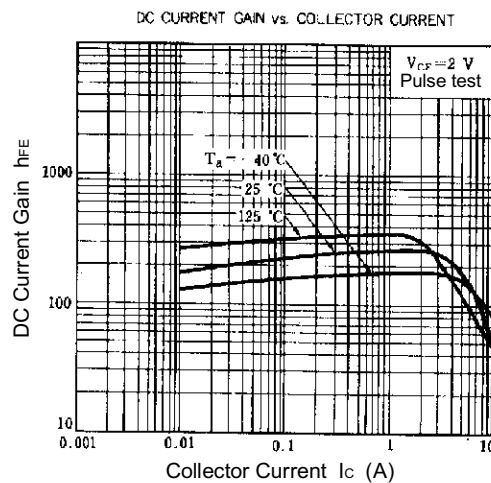
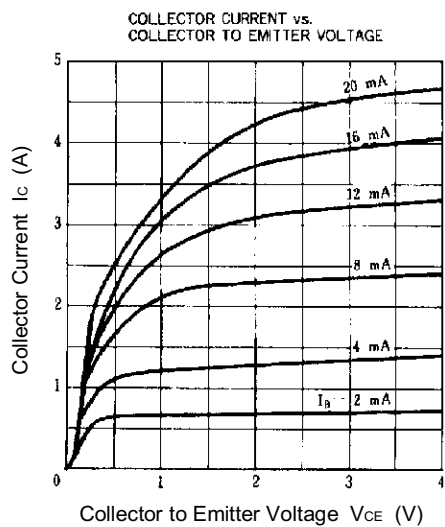
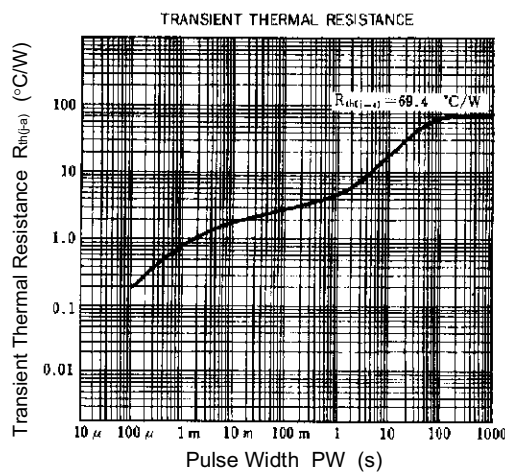
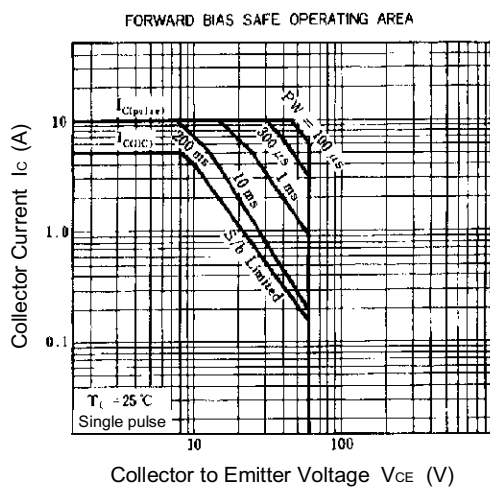
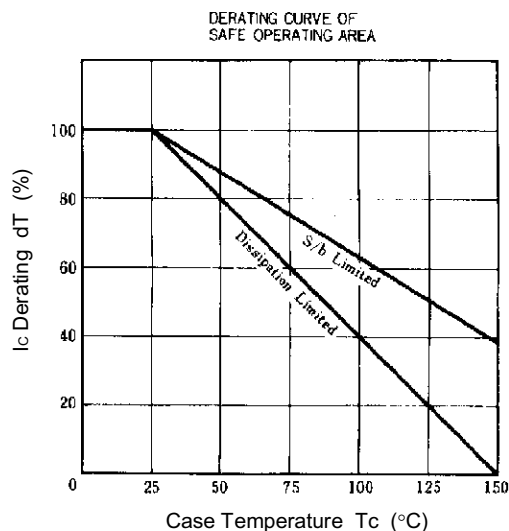
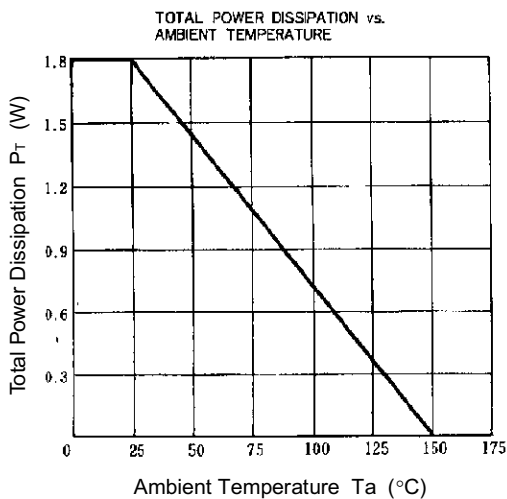
PACKAGE DRAWING (UNIT: mm)

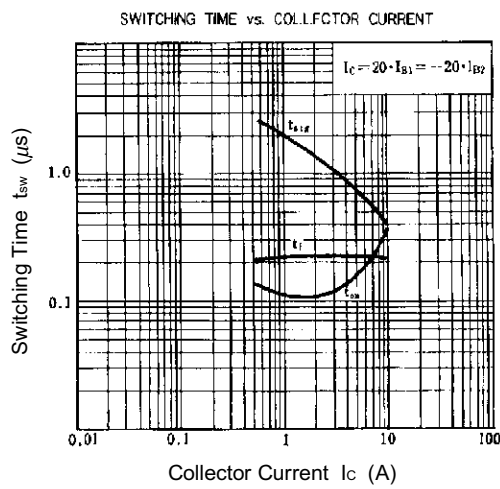
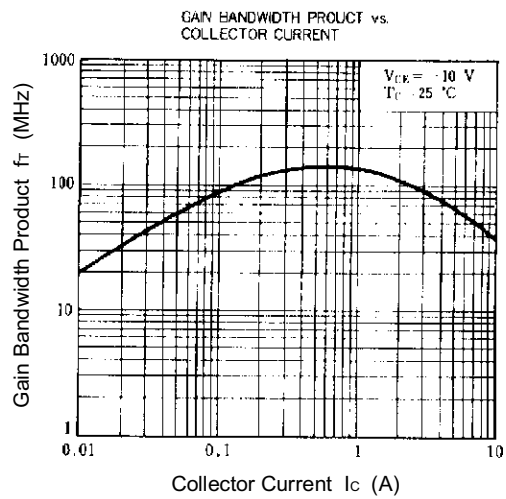
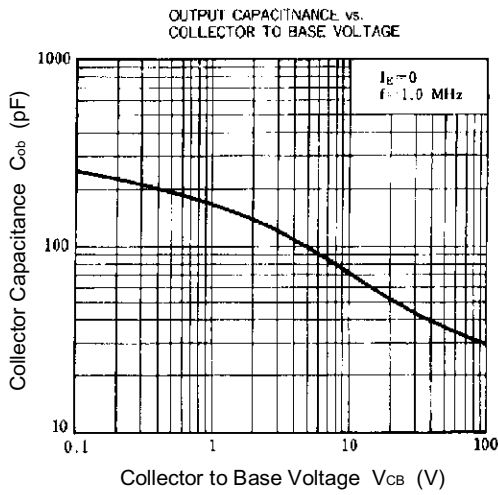
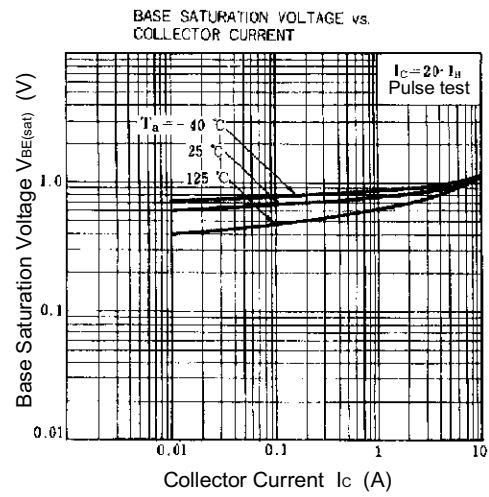
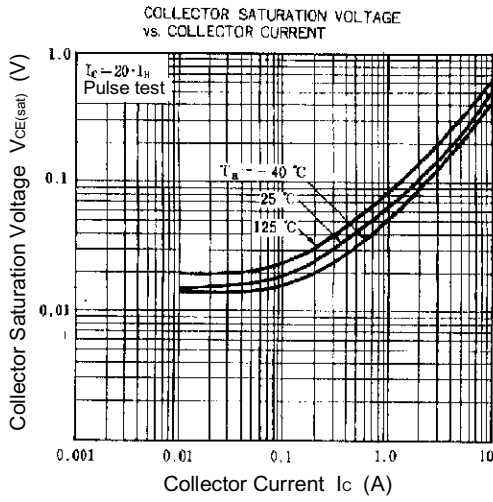
TAPING SPECIFICATION



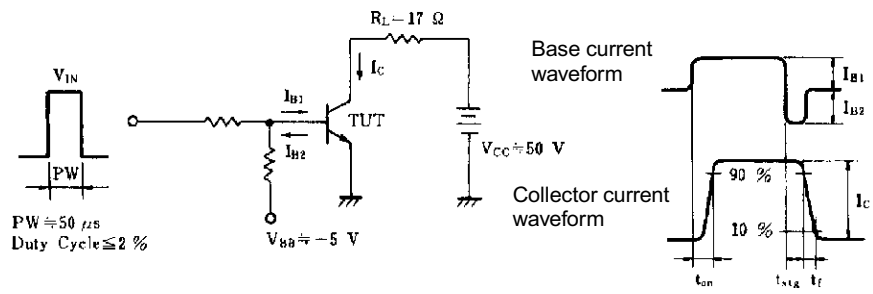
A ₁	8.0 ± 0.2
A	13.0 ± 0.2
D ₀	φ4.0 ± 0.2
d	0.5 ± 0.1
F ₁	2.5 ^{+0.4} _{-0.1}
F ₂	2.5 ^{+0.4} _{-0.1}
H	20.0 MAX.
H ₀	16.0 ± 0.5
H ₁	32.2 MAX.
Δh	0 ± 1.0
l ₁	2.5 MIN.
P	12.7 ± 1.0
P ₀	12.7 ± 0.3
P ₂	6.35 ± 0.5
ΔP	0 ± 1.3
T	4.5 ± 0.2
W	18.0 ^{+1.0} _{-0.5}
W ₀	5.0 MIN.
W ₁	9.0 ± 0.5
W ₂	0.7 or less

TYPICAL CHARACTERISTICS (Ta = 25°C)





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



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