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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 2SC4551 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 in drivers such as DC/DC converters and actuators.

In addition, a small resin-molded insulation type package contributes to high-density mounting and reduction of mounting cost.

FEATURES

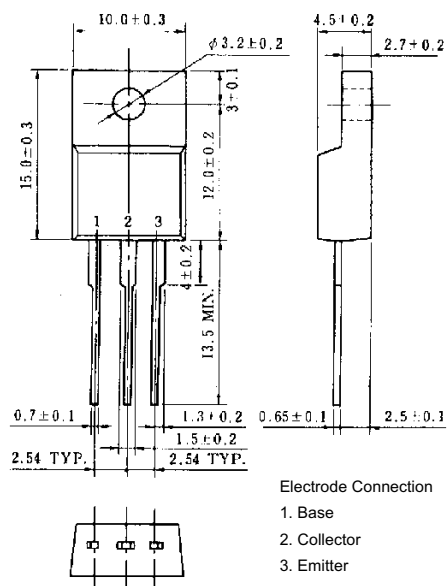
- High h_{FE} and low $V_{CE(sat)}$:
 $h_{FE} \geq 100$ ($V_{CE} = 2\text{ V}$, $I_C = 2\text{ A}$)
 $V_{CE(sat)} \leq 0.3\text{ V}$ ($I_C = 6\text{ A}$, $I_B = 0.3\text{ A}$)
- Mold package that does not require an insulating board or insulation bushing

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

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)	$I_{C(DC)}$	10	A
Collector current (pulse)	$I_{C(pulse)^*}$	20	A
Base current (DC)	$I_{B(DC)}$	5.0	A
Total power dissipation	P_T ($T_c = 25^\circ\text{C}$)	30	W
Total power dissipation	P_T ($T_a = 25^\circ\text{C}$)	2.0	W
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

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

PACKAGE DRAWING (UNIT: mm)



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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

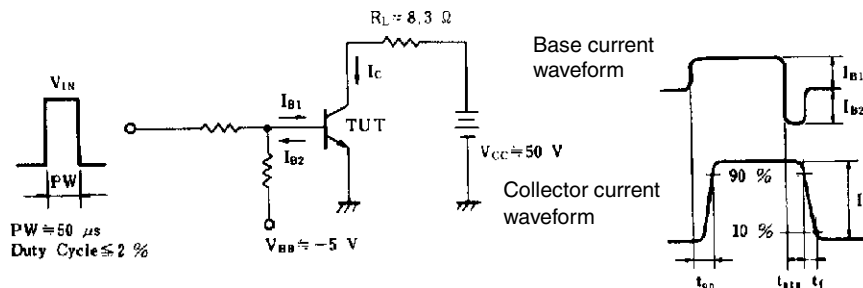
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	$V_{CE0(SUS)}$	$I_C = 6.0 A, I_B = 0.6 A, L = 1 mH$	60			V
Collector to emitter voltage	$V_{CEX(SUS)}$	$I_C = 6.0 A, I_{B1} = -I_{B2} = 0.6 A, V_{BE(OFF)} = -1.5 V, L = 180 \mu H, \text{clamped}$	60			V
Collector cutoff current	I_{CBO}	$V_{CB} = 60 V, I_E = 0$			10	μA
Collector cutoff current	I_{CER}	$V_{CE} = 60 V, R_{BE} = 50 \Omega, T_a = 125^\circ C$			1.0	mA
Collector cutoff current	I_{CEX1}	$V_{CE} = 60 V, V_{BE(OFF)} = -1.5 V$			10	μA
Collector cutoff current	I_{CEX2}	$V_{CE} = 60 V, V_{BE(OFF)} = -1.5 V, T_a = 125^\circ C$			1.0	mA
Emitter cutoff current	I_{EBO}	$V_{EB} = 5.0 V, I_C = 0$			10	μA
DC current gain	h_{FE1}^*	$V_{CE} = 2.0 V, I_C = 1.0 A$	100			
DC current gain	h_{FE2}^*	$V_{CE} = 2.0 V, I_C = 2.0 A$	100	200	400	
DC current gain	h_{FE3}^*	$V_{CE} = 2.0 V, I_C = 6.0 A$	60			
Collector saturation voltage	$V_{CE(sat)1}^*$	$I_C = 6.0 A, I_B = 0.3 A$			0.3	V
Collector saturation voltage	$V_{CE(sat)2}^*$	$I_C = 8.0 A, I_B = 0.4 A$			0.5	V
Base saturation voltage	$V_{BE(sat)1}^*$	$I_C = 6.0 A, I_B = 0.3 A$			1.2	V
Base saturation voltage	$V_{BE(sat)2}^*$	$I_C = 8.0 A, I_B = 0.4 A$			1.5	V
Collector capacitance	C_{ob}	$V_{CB} = 10 V, I_E = 0, f = 1.0 MHz$		150		pF
Gain bandwidth product	f_T	$V_{CE} = 10 V, I_C = 1.0 A$		140		MHz
Turn-on time	t_{on}	$I_C = 6.0 A, R_L = 8.3 \Omega, I_{B1} = -I_{B2} = 0.3 A, V_{CC} \equiv 50 V$ Refer to the test circuit.			0.3	μs
Storage time	t_{stg}				1.5	μs
Fall time	t_f				0.3	μs

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

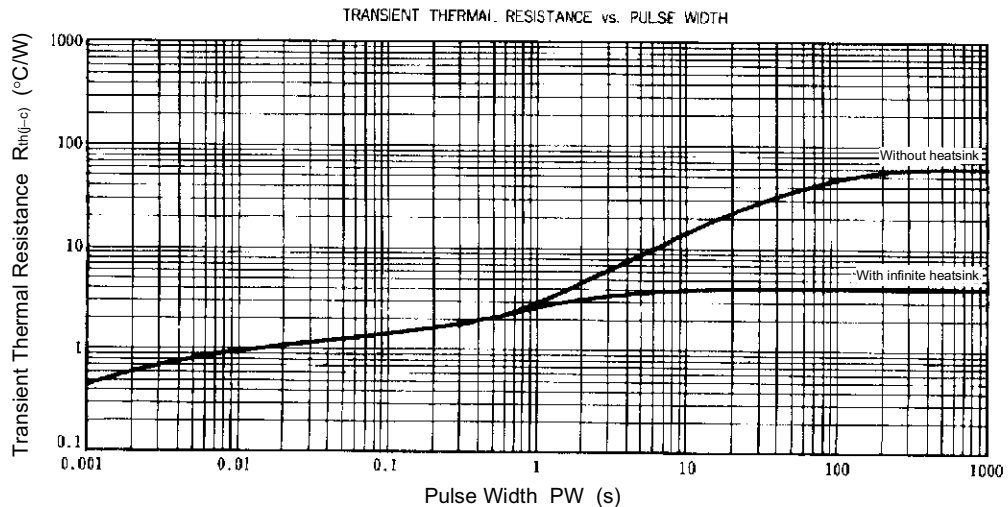
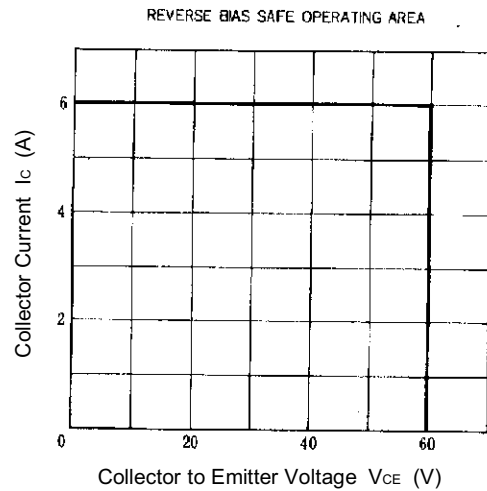
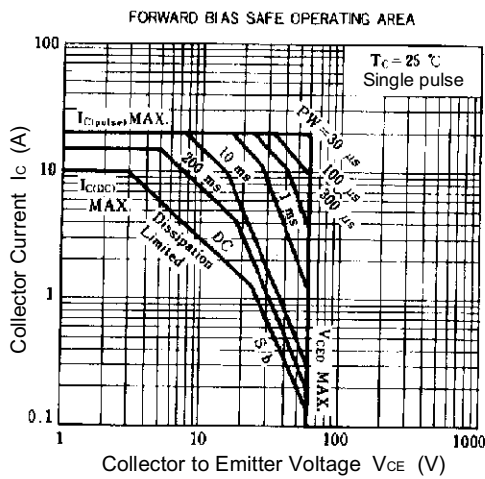
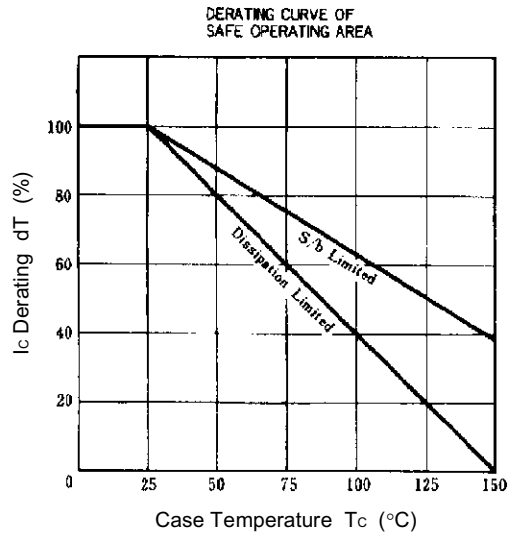
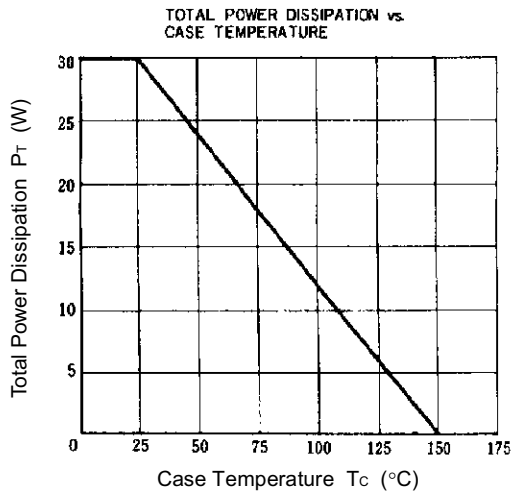
hFE CLASSIFICATION

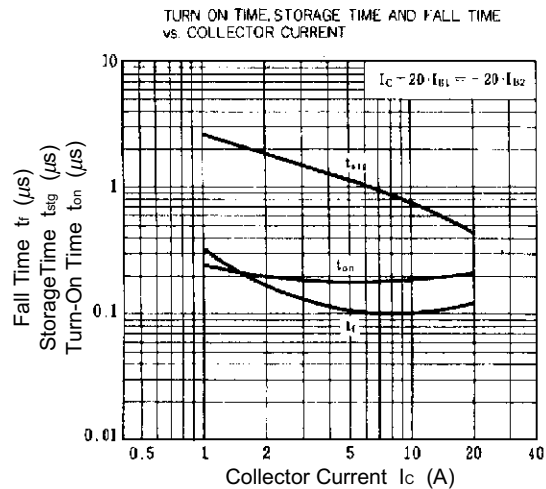
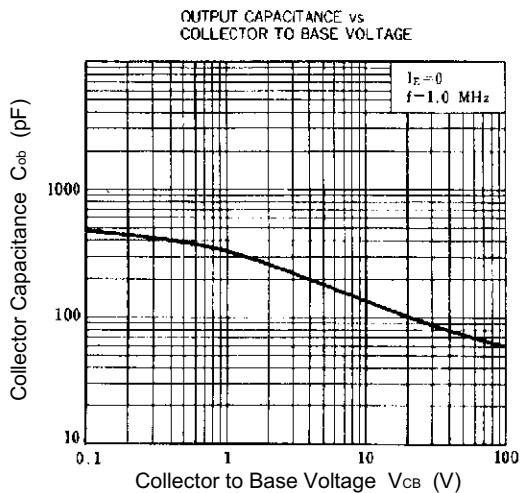
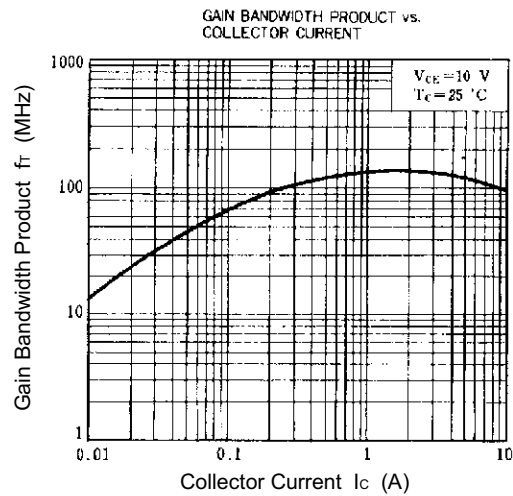
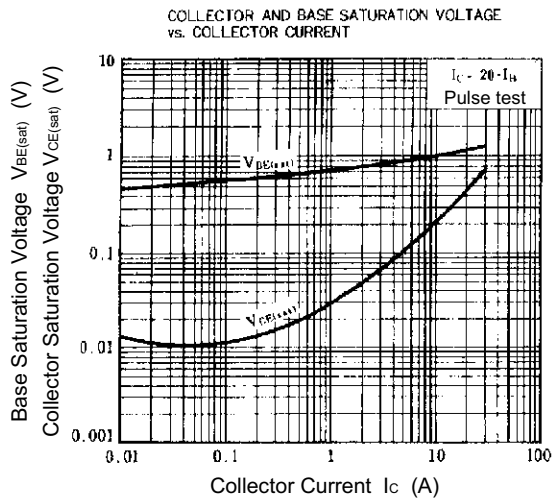
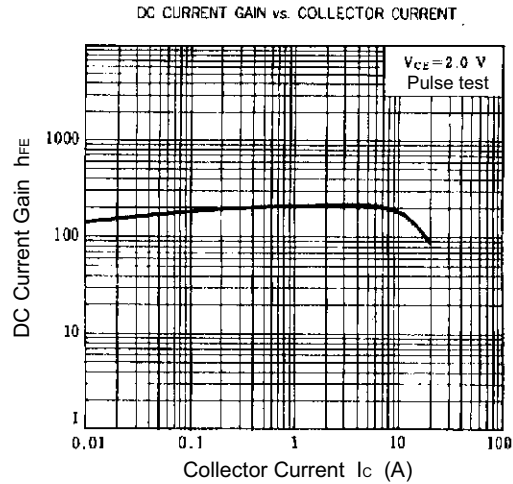
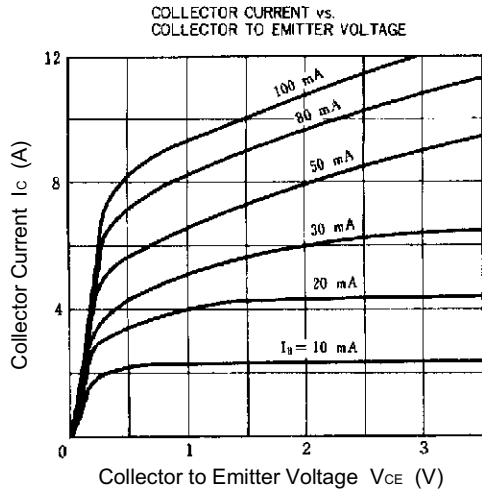
Marking	M	L	K
h_{FE2}	100 to 200	150 to 300	200 to 400

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



TYPICAL CHARACTERISTICS (Ta = 25°C)





[MEMO]

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