

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

The 2SC4550 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

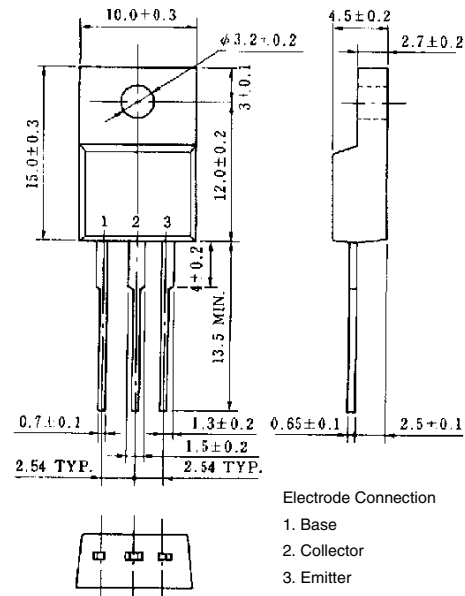
- High  $h_{FE}$  and low  $V_{CE(sat)}$ :  
 $h_{FE} \geq 100$  ( $V_{CE} = 2\text{ V}$ ,  $I_C = 1.5\text{ A}$ )  
 $V_{CE(sat)} \leq 0.3\text{ V}$  ( $I_C = 4\text{ A}$ ,  $I_B = 0.2\text{ A}$ )
- Mold package that does not require an insulating board or insulation bushing

#### 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)	$I_{C(DC)}$	7.0	A
Collector current (pulse)	$I_{C(pulse)^*}$	14	A
Base current (DC)	$I_{B(DC)}$	3.5	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)**

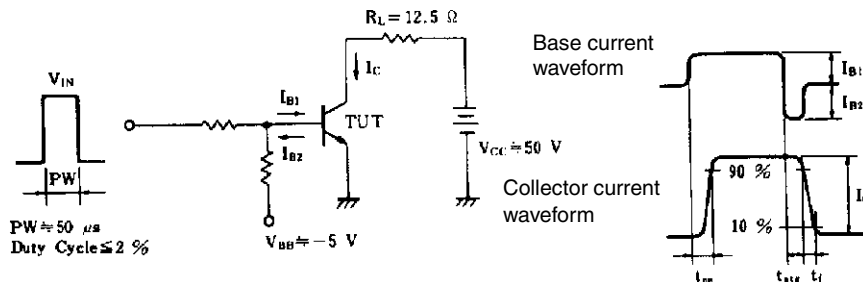
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	$V_{CE0(SUS)}$	$I_C = 4.0\text{ A}, I_B = 0.4\text{ A}, L = 1\text{ mH}$	60			V
Collector to emitter voltage	$V_{CEX(SUS)}$	$I_C = 4.0\text{ A}, I_{B1} = -I_{B2} = 0.4\text{ A}, V_{BE(OFF)} = -1.5\text{ V}, L = 180\text{ }\mu\text{H}, \text{ clamped}$	60			V
Collector cutoff current	$I_{CBO}$	$V_{CB} = 60\text{ V}, I_E = 0$			10	$\mu\text{A}$
Collector cutoff current	$I_{CER}$	$V_{CE} = 60\text{ V}, R_{BE} = 50\text{ }\Omega, T_a = 125^\circ\text{C}$			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	$h_{FE1}^*$	$V_{CE} = 2.0\text{ V}, I_C = 0.7\text{ A}$	100			
DC current gain	$h_{FE2}^*$	$V_{CE} = 2.0\text{ V}, I_C = 1.5\text{ A}$	100	200	400	
DC current gain	$h_{FE3}^*$	$V_{CE} = 2.0\text{ V}, I_C = 4.0\text{ A}$	60			
Collector saturation voltage	$V_{CE(sat)1}^*$	$I_C = 4.0\text{ A}, I_B = 0.2\text{ A}$			0.3	V
Collector saturation voltage	$V_{CE(sat)2}^*$	$I_C = 6.0\text{ A}, I_B = 0.3\text{ A}$			0.5	V
Base saturation voltage	$V_{BE(sat)1}^*$	$I_C = 4.0\text{ A}, I_B = 0.2\text{ A}$			1.2	V
Base saturation voltage	$V_{BE(sat)2}^*$	$I_C = 6.0\text{ A}, I_B = 0.3\text{ A}$			1.5	V
Collector capacitance	$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$		100		pF
Gain bandwidth product	$f_T$	$V_{CE} = 10\text{ V}, I_C = 1.0\text{ A}$		150		MHz
Turn-on time	$t_{on}$	$I_C = 4.0\text{ A}, R_L = 12.5\text{ }\Omega, I_{B1} = -I_{B2} = 0.2\text{ A}, V_{CC} \equiv 50\text{ V}$ Refer to the test circuit.		0.1	0.3	$\mu\text{s}$
Storage time	$t_{stg}$			1.0	1.5	$\mu\text{s}$
Fall time	$t_f$			0.1	0.3	$\mu\text{s}$

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

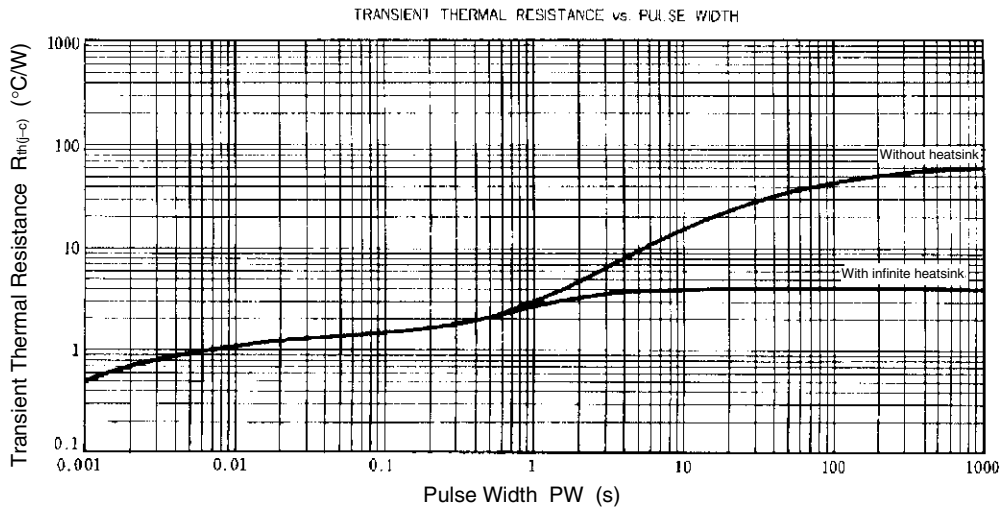
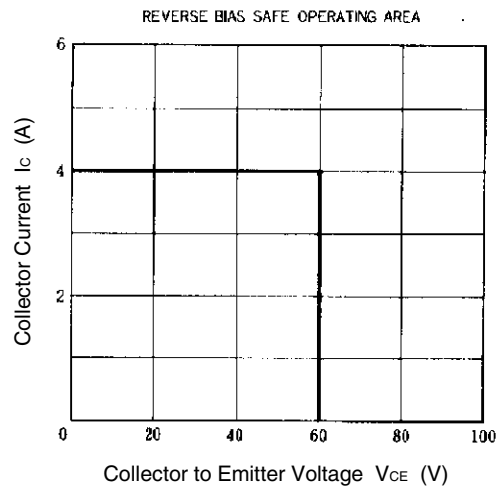
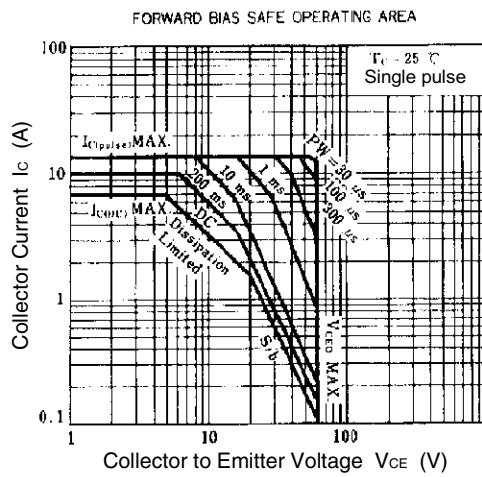
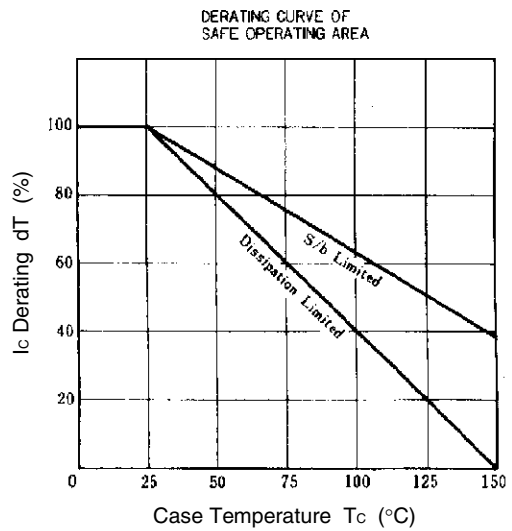
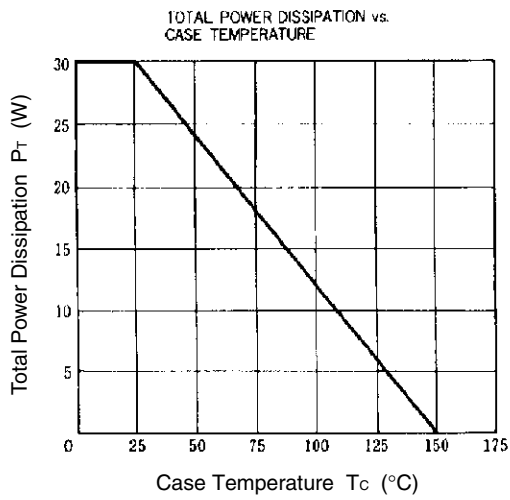
**hFE CLASSIFICATION**

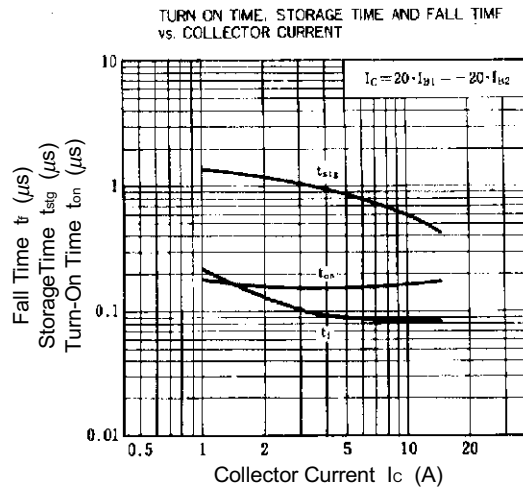
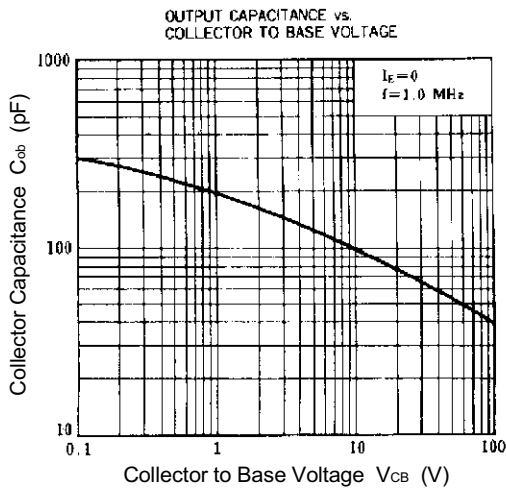
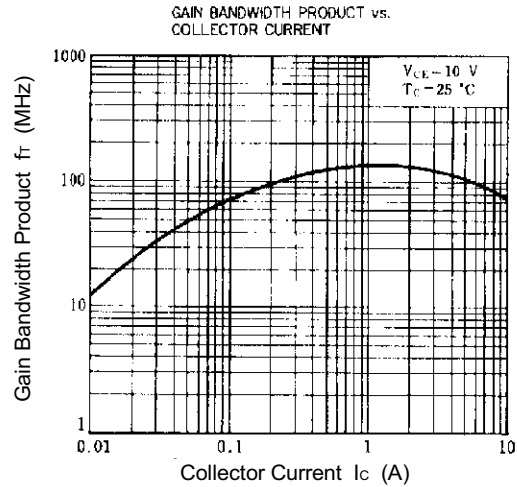
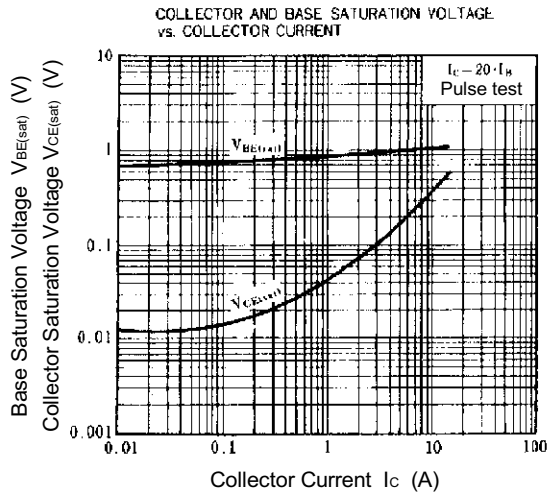
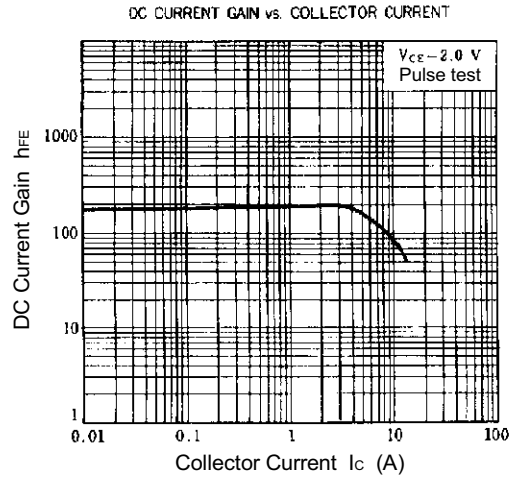
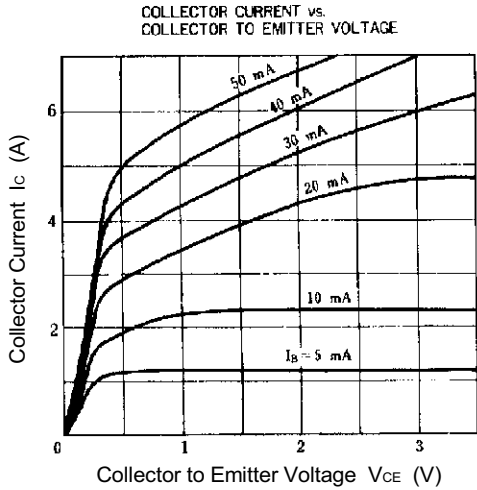
Marking	M	L	K
$h_{FE2}$	100 to 200	150 to 300	200 to 400

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



TYPICAL CHARACTERISTICS (Ta = 25°C)





[MEMO]

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