

NPN SILICON EPITAXIAL TRANSISTOR FOR HIGH-SPEED SWITCHING

The 2SC4553 is a power transistor designed especially for low collector saturation voltage and features large current switching at a low power dissipation. In addition, a high h_{FE} enables alleviation of the driver load.

FEATURES

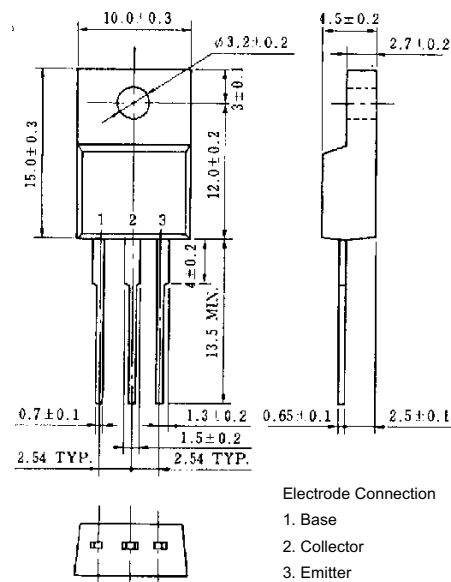
- High h_{FE} and low $V_{CE(sat)}$:
 $h_{FE} \cong 800$ ($V_{CE} = 2\text{ V}$, $I_C = 3\text{ A}$)
 $V_{CE(sat)} \cong 0.12\text{ V}$ ($I_C = 3\text{ A}$, $I_B = 0.03\text{ A}$)
- On-chip C to E damper diode
- Mold package that does not require an insulating board or insulation bushing

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

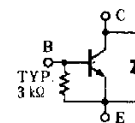
Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	100	V
Collector to emitter voltage	V_{CEO}	100	V
Emitter to base voltage	V_{EBO}	7.0	V
Collector current (DC)	$I_{C(DC)}$	± 7.5	A
Collector current (pulse)	$I_{C(pulse)^*}$	± 10	A
Base current (DC)	$I_{B(DC)}$	2.0	A
Total power dissipation	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	$^\circ\text{C}$

* $PW \leq 10\text{ ms}$, duty cycle $\leq 50\%$

PACKAGE DRAWING (UNIT: mm)



EQUIVALENT CIRCUIT

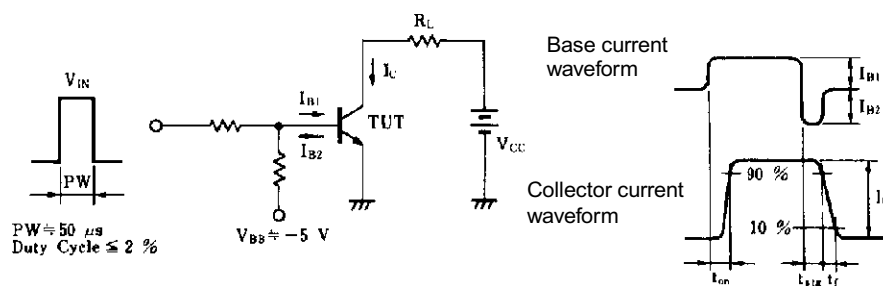


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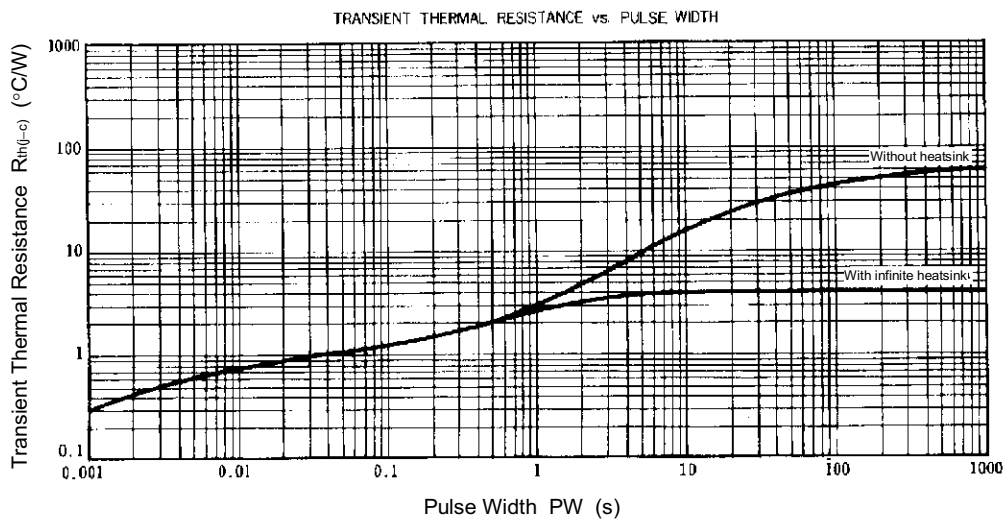
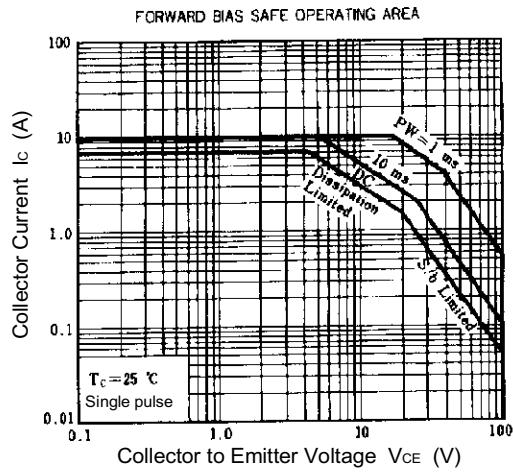
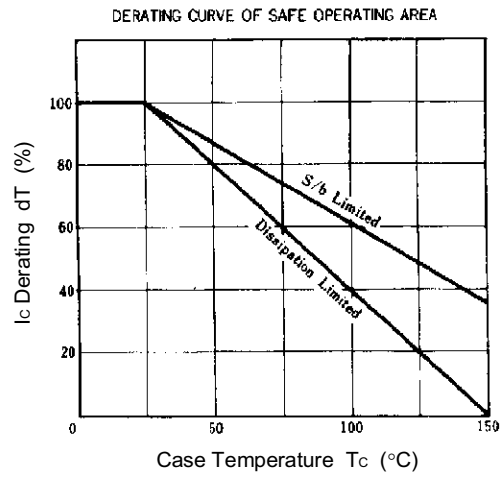
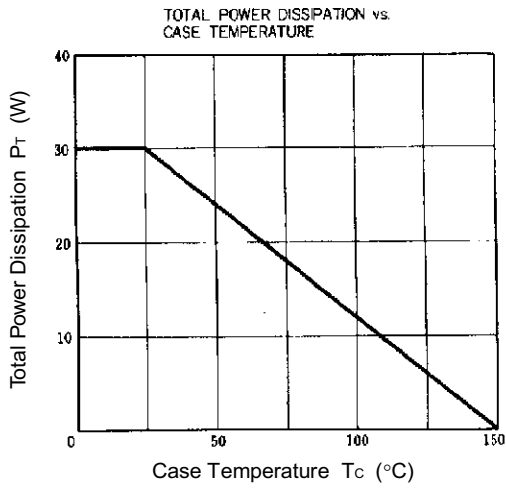
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

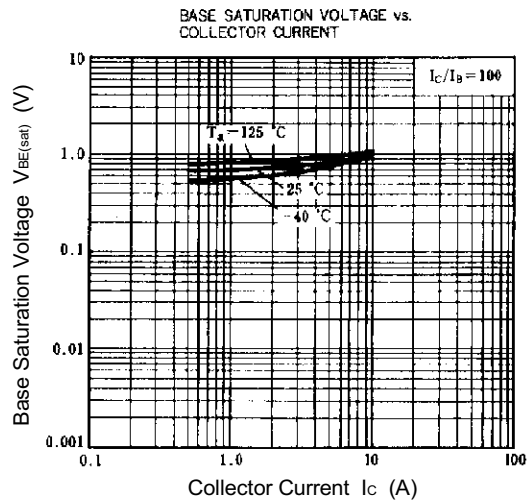
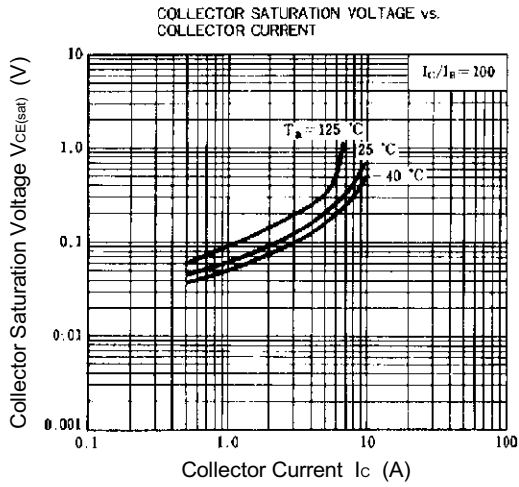
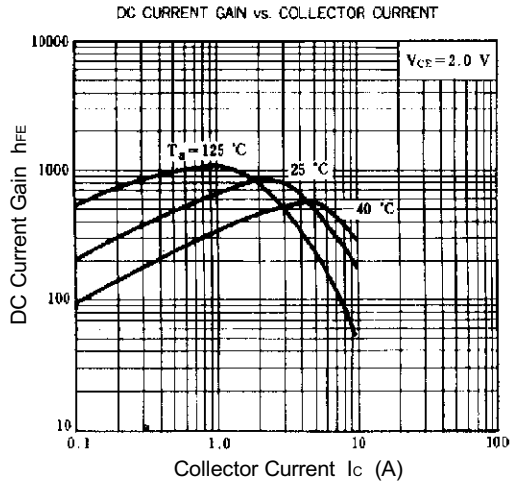
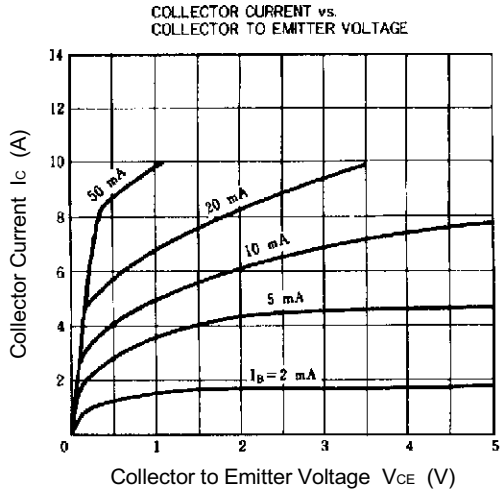
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = 100\text{ V}, I_E = 0$			10	μA
Emitter cutoff current	I_{EBO}	$V_{EB} = 5.0\text{ V}, I_C = 0$			17	mA
DC current gain	h_{FE1}	$V_{CE} = 2.0\text{ V}, I_C = 3.0\text{ A}$	450	800	2,000	
DC current gain	h_{FE2}	$V_{CE} = 2.0\text{ V}, I_C = 5.0\text{ A}$	150			
Collector saturation voltage	$V_{CE(sat)1}$	$I_C = 3.0\text{ A}, I_B = 60\text{ mA}$			0.2	V
Collector saturation voltage	$V_{CE(sat)2}$	$I_C = 3.0\text{ A}, I_B = 30\text{ mA}$		0.12	0.3	V
Collector saturation voltage	$V_{CE(sat)3}$	$I_C = 5.0\text{ A}, I_B = 100\text{ mA}$			0.4	V
Collector saturation voltage	$V_{CE(sat)4}$	$I_C = 5.0\text{ A}, I_B = 50\text{ mA}$			0.55	V
Base saturation voltage	$V_{BE(sat)}$	$I_C = 5.0\text{ A}, I_B = 50\text{ mA}$			1.2	V
Gain bandwidth product	f_T	$V_{CE} = 5.0\text{ V}, I_C = 0.5\text{ A}$		100		MHz
Collector capacitance	C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$		110		pF
Turn-on time	t_{on}	$I_C = 5.0\text{ A}, R_L = 3.0\ \Omega,$ $I_{B1} = -I_{B2} = 100\text{ mA}, V_{CC} \cong 16\text{ V}$ Refer to the test circuit.		0.5		μs
Storage time	t_{stg}			2.0		μs
Fall time	t_f			0.5		μs
Diode forward voltage	V_{DF}	$I_{DF} = 5.0\text{ A}$		1.4		V

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



TYPICAL CHARACTERISTICS (Ta = 25°C)





[MEMO]

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