Toohong

2SC4554

NPN SILICON EPITAXIAL TRANSISTOR FOR SWITCHING

The 2SC4554 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

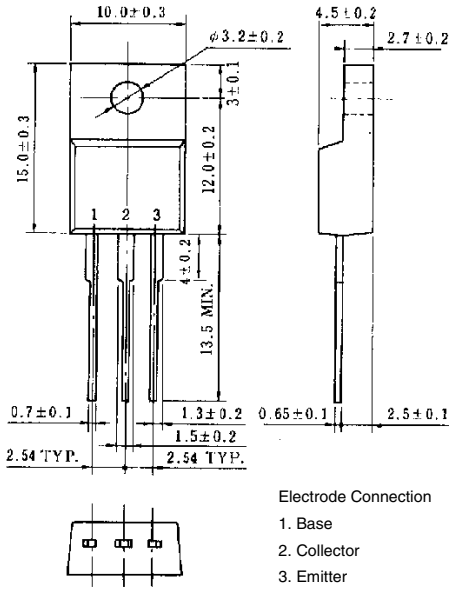
- High h_{FE} and low $V_{CE(sat)}$:
  $h_{FE} \cong 800$ (V_{CE} = 2 V, I_C = 5 A)
  $V_{CE(sat)} \cong 0.12$ V (I_C = 5 A, I_B = 0.05 A)
- On-chip C to E damper diode
- Mold package that does not require an insulating board or insulation bushing

ABSOLUTE MAXIMUM RATINGS (Ta = 25°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)	$I_{C(DC)}$	±15	A
Collector current (pulse)	$I_{C(pulse)}$*	±22	A
Base current (DC)	$I_{B(DC)}$	4.0	A
Total power dissipation	P_T (T_C = 25°C)	35	W
Total power dissipation	P_T (T_a = 25°C)	2.0	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	−55 to +150	°C

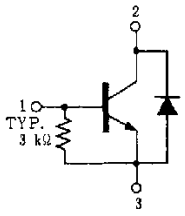
* PW ≤ 10 ms, duty cycle ≤ 50%

PACKAGE DRAWING (UNIT: mm)



Electrode Connection
1. Base
2. Collector
3. Emitter

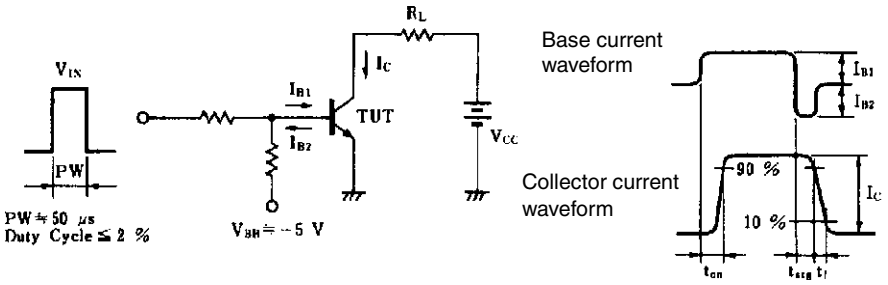
EQUIVALENT CIRCUIT



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

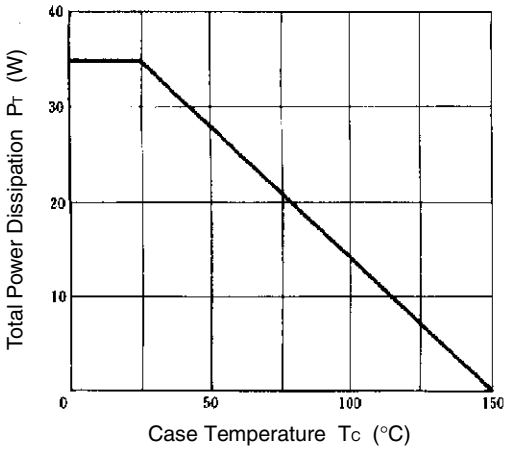
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 100 V, I_E = 0			10	μA
Emitter cutoff current	I_{EBO}	V_{EB} = 5.0 V, I_C = 0			17	mA
DC current gain	h_{FE1}	V_{CE} = 2.0 V, I_C = 5.0 A	450	800	2,000	
DC current gain	h_{FE2}	V_{CE} = 2.0 V, I_C = 10 A	150			
Collector saturation voltage	$V_{CE(sat)1}$	I_C = 5.0 A, I_B = 100 mA			0.25	V
Collector saturation voltage	$V_{CE(sat)2}$	I_C = 5.0 A, I_B = 50 mA		0.12	0.3	V
Collector saturation voltage	$V_{CE(sat)3}$	I_C = 10 A, I_B = 200 mA			0.4	V
Collector saturation voltage	$V_{CE(sat)4}$	I_C = 10 A, I_B = 100 mA			0.75	V
Base saturation voltage	$V_{BE(sat)}$	I_C = 10 A, I_B = 100 mA			1.2	V
Gain bandwidth product	f_T	V_{CE} = 5.0 V, I_C = 1.0 A		100		MHz
Collector capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz		210		pF
Turn-on time	t_{on}	I_C = 8.0 A, R_L = 2.0 Ω, I_{B1} = −I_{B2} = 80 mA, V_{CC} ≅ 16 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} = 10 A		1.6		V

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

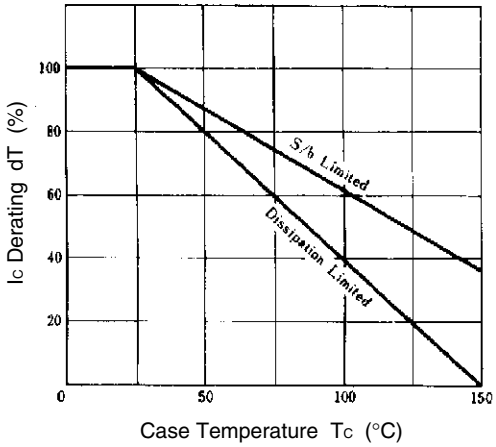


TYPICAL CHARACTERISTICS (Ta = 25°C)

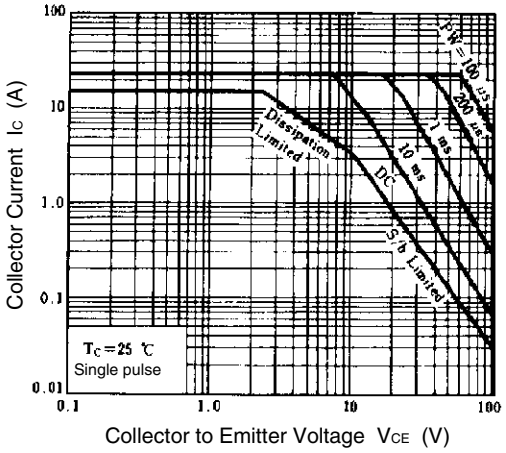
TOTAL POWER DISSIPATION vs CASE TEMPERATURE



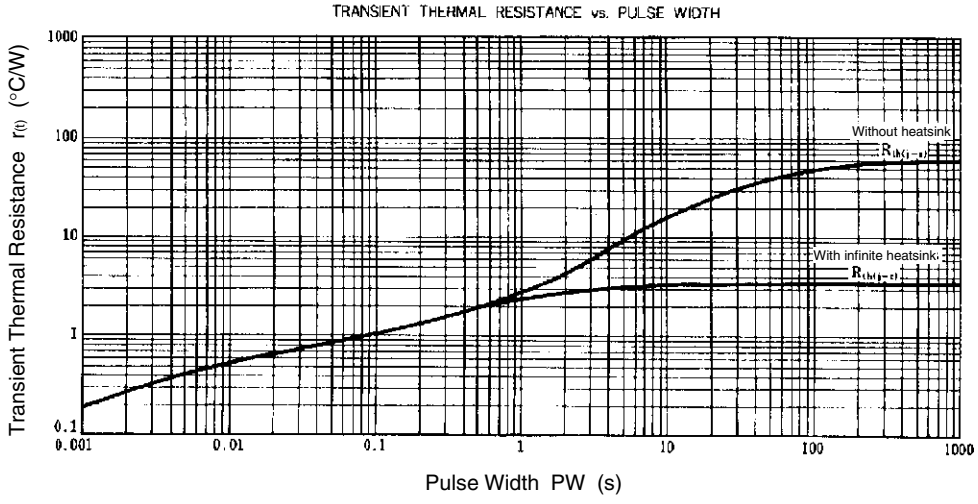
DERATING CURVE OF SAFE OPERATING AREA

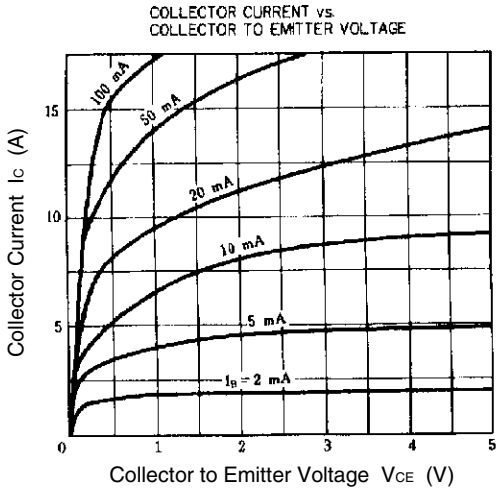


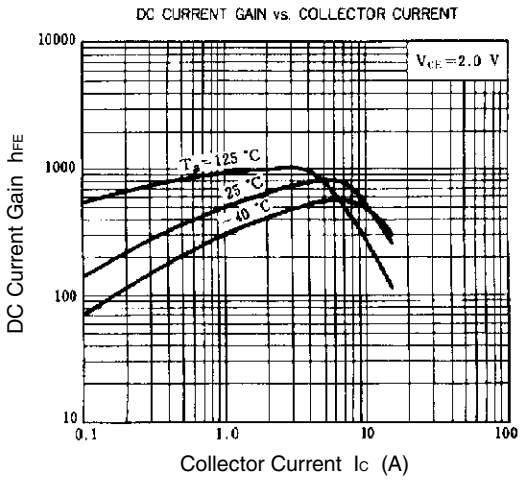
FORWARD BIAS SAFE OPERATING AREA

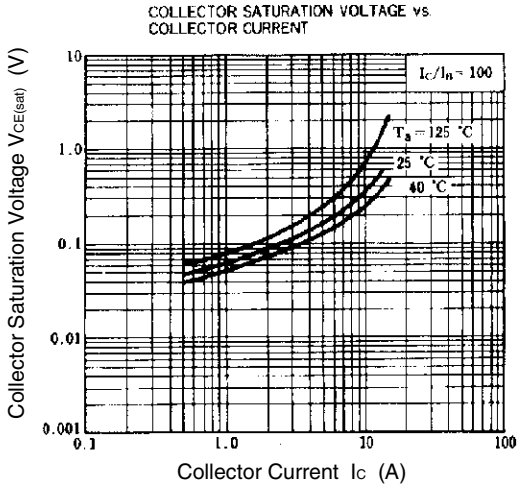


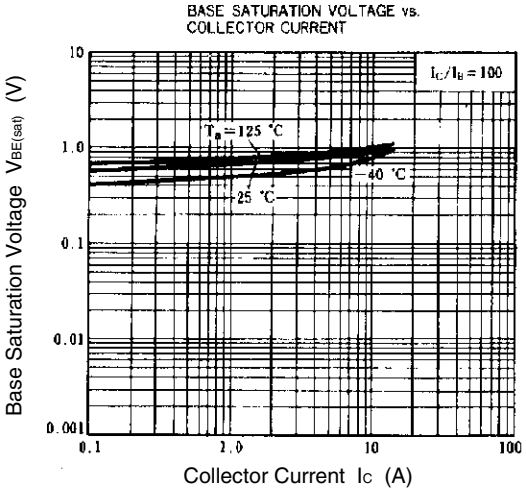
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH




COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE
100 mA
50 mA
20 mA
10 mA
5 mA
I_B = 2 mA
Collector Current I_C (A)
Collector to Emitter Voltage V_{CE} (V)


DC CURRENT GAIN vs. COLLECTOR CURRENT
V_{CE} = 2.0 V
T_a = 125 °C
25 °C
−40 °C
DC Current Gain h_{FE}
Collector Current I_C (A)


COLLECTOR SATURATION VOLTAGE vs.
COLLECTOR CURRENT
I_C/I_B = 100
T_a = 125 °C
25 °C
−40 °C
Collector Saturation Voltage $V_{CE(sat)}$ (V)
Collector Current I_C (A)


BASE SATURATION VOLTAGE vs.
COLLECTOR CURRENT
I_C/I_B = 100
T_a = 125 °C
−40 °C
25 °C
Base Saturation Voltage $V_{BE(sat)}$ (V)
Collector Current I_C (A)