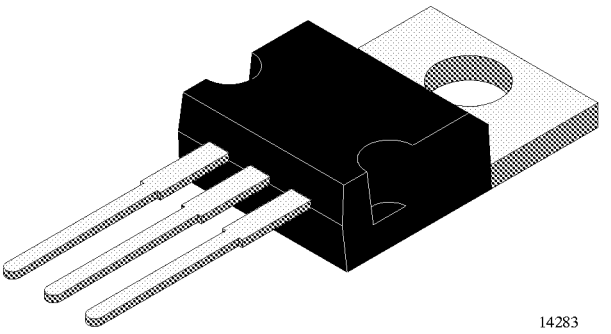
Silicon NPN High Voltage Switching Transistor

Features

- Simple-sWitch-Off Transistor (SWOT)
- HIGH SPEED technology
- Planar passivation
- 100 kHz switching rate
- Very low switching losses
- Very low dynamic saturation
- Very low operating temperature
- Optimized RBSOA
- High reverse voltage



Applications

Electronic lamp ballast circuits
Switch-mode power supplies

Absolute Maximum Ratings

T_{case} = 25°C, unless otherwise specified

Parameter	Test Conditions	Symbol	Value	Unit
Collector-emitter voltage		V_{CEO}	400	V
		V_{CEW}	500	V
		V_{CES}	700	V
Emitter-base voltage		V_{EBO}	9	V
Collector current		I_C	14	A
Collector peak current		I_{CM}	21	A
Base current		I_B	7	A
Base peak current		I_{BM}	10	A
Total power dissipation	$T_{case} \leq 25°C$	P_{tot}	80	W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	–65 to +150	°C

Maximum Thermal Resistance

T_{case} = 25°C, unless otherwise specified

Parameter	Test Conditions	Symbol	Value	Unit
Junction case		R_{thJC}	1.56	K/W

Electrical Characteristics

T_{case} = 25°C, unless otherwise specified

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Collector cut-off current	V_{CE} = 700 V	I_{CES}			50	µA
	V_{CE} = 700 V; T_{case} = 150°C	I_{CES}			0.5	mA
Collector-emitter breakdown voltage (figure 1)	I_C = 300 mA; L = 125 mH; $I_{measure}$ = 100 mA	$V_{(BR)CEO}$	400			V
Emitter-base breakdown voltage	I_E = 1 mA	$V_{(BR)EBO}$	9			V
Collector-emitter saturation voltage	I_C = 2.3 A; I_B = 0.6 A	V_{CEsat}		0.1	0.2	V
	I_C = 7 A; I_B = 2.3 A	V_{CEsat}		0.2	0.4	V
Base-emitter saturation voltage	I_C = 2.3 A; I_B = 0.6 A	V_{BEsat}		0.9	1	V
	I_C = 7 A; I_B = 2.3 A	V_{BEsat}		1	1.2	V
DC forward current transfer ratio	V_{CE} = 2 V; I_C = 10 mA	h_{FE}	15			
	V_{CE} = 2 V; I_C = 2.3 A	h_{FE}	15			
	V_{CE} = 2 V; I_C = 7 A	h_{FE}	7			
	V_{CE} = 5 V; I_C = 14 A	h_{FE}	4			
Collector-emitter working voltage	V_S = 50 V; L = 1 mH; I_C = 14 A; I_{B1} = 4.7 A; $-I_{B2}$ = 1.4 A; $-V_{BB}$ = 5 V	V_{CEW}	500			V
Dynamic saturation voltage	I_C = 7 A; I_B = 1.4 A; t = 1 µs	$V_{CEsatdyn}$		8	12	V
	I_C = 7 A; I_B = 1.4 A; t = 3 µs	$V_{CEsatdyn}$		1.6	3	V
Gain bandwidth product	I_C = 500 mA; V_{CE} = 10 V; f = 1 MHz	f_T	4			MHz

Switching Characteristics

T_{case} = 25°C, unless otherwise specified

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Resistive load (figure 2)						
Turn on time	I_C = 2.3 A; I_{B1} = 0.6 A; $-I_{B2}$ = 1.15 A; V_S = 250 V	t_{on}		0.15	0.25	µs
Storage time		t_s		2.5	3	µs
Fall time		t_f		0.25	0.35	µs
Turn on time	I_C = 7 A; I_{B1} = 1.4 A; $-I_{B2}$ = 3.5 A; V_S = 250 V	t_{on}		0.45	0.6	µs
Storage time		t_s		1.25	1.5	µs
Fall time		t_f		0.09	0.1	µs
Inductive load (figure 3)						
Storage time	I_C = 2.3 A; I_{B1} = 0.6 A; $-I_{B2}$ = 1.15 A; V_{clamp} = 300 V; L = 200 µH	t_s		2.8	3.5	µs
Fall time		t_f		0.1	0.15	µs
Storage time	I_C = 7 A; I_{B1} = 1.4 A; $-I_{B2}$ = 3.5 A; V_{clamp} = 300 V; L = 200 µH	t_s		1.5	1.8	µs
Fall time		t_f		0.05	0.1	µs

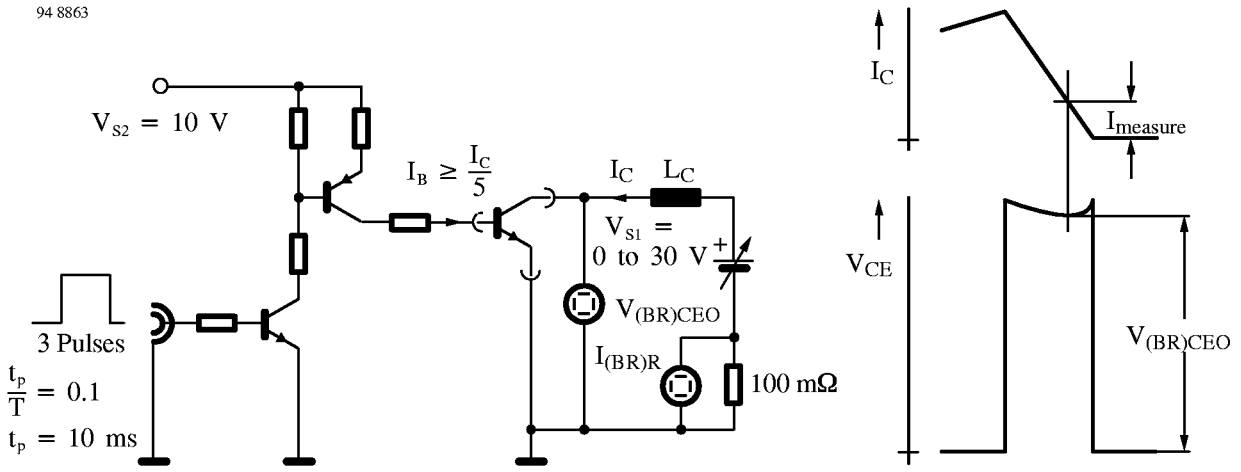


Figure 1. Test circuit for $V_{(BR)CE0}$

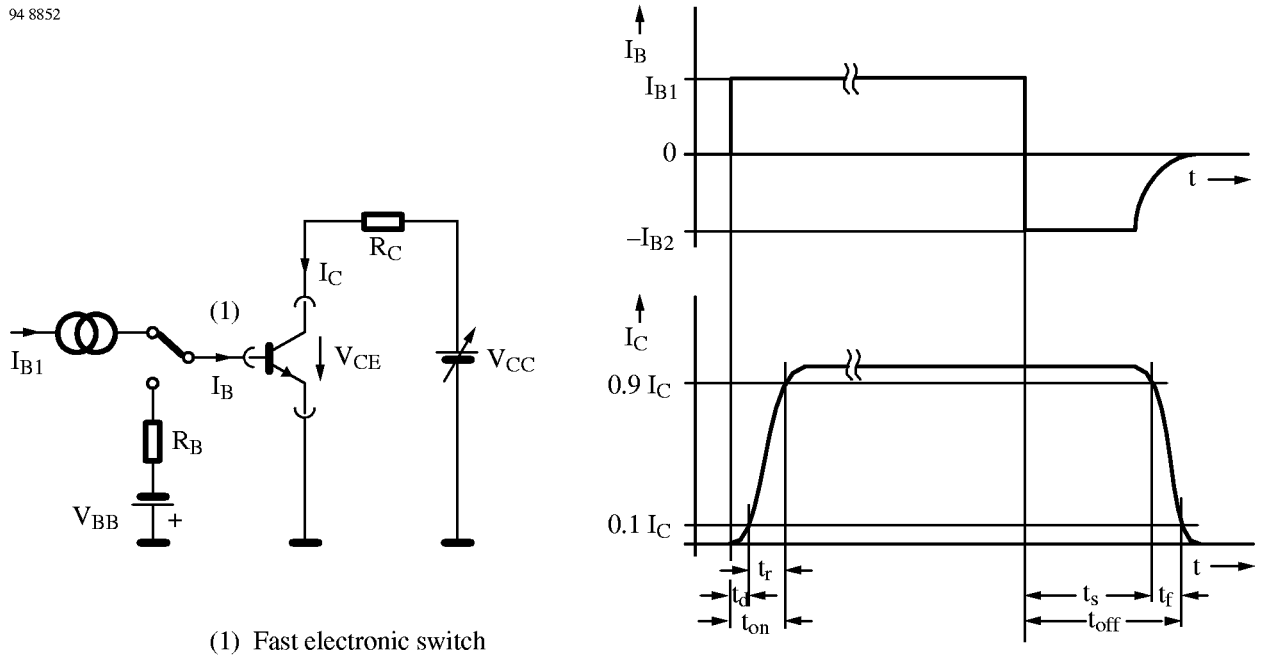


Figure 2. Test circuit for switching characteristics – resistive load

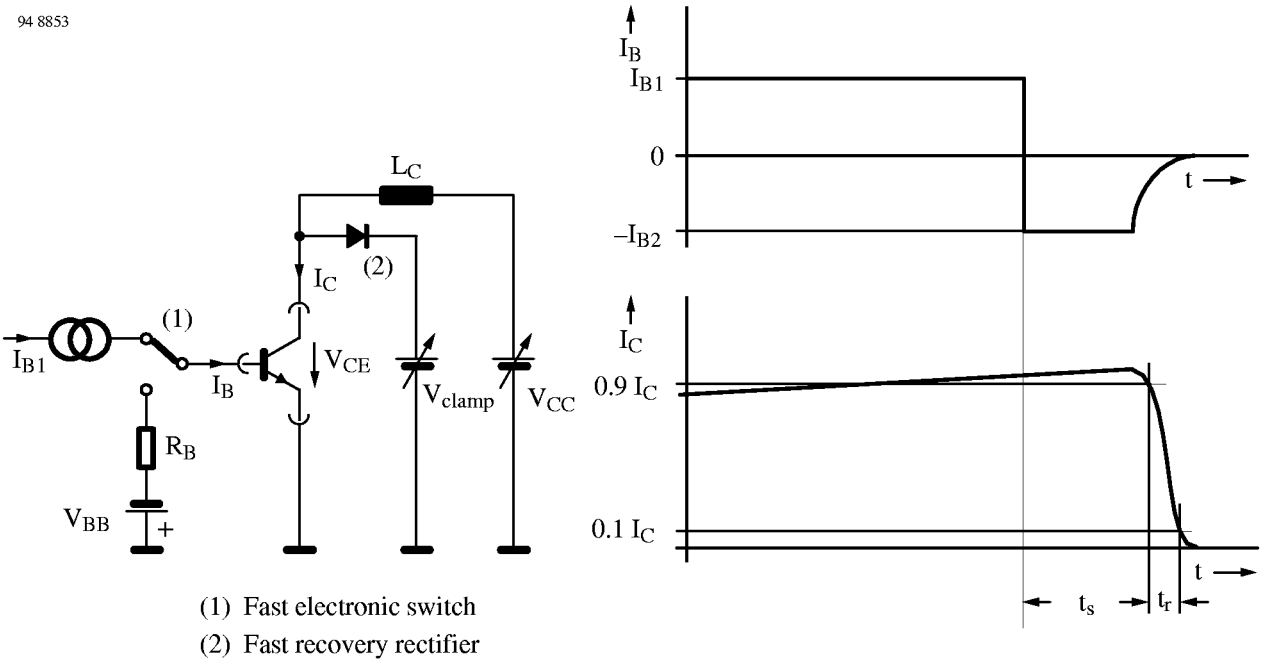


Figure 3. Test circuit for switching characteristics – inductive load

Typical Characteristics (T_{case} = 25_C unless otherwise specified)

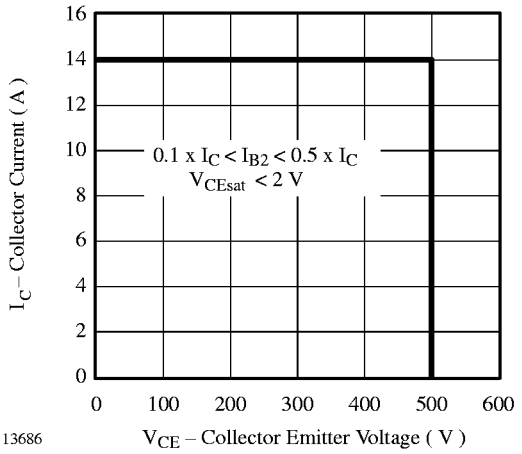


Figure 4. V_{CEW} – Diagram

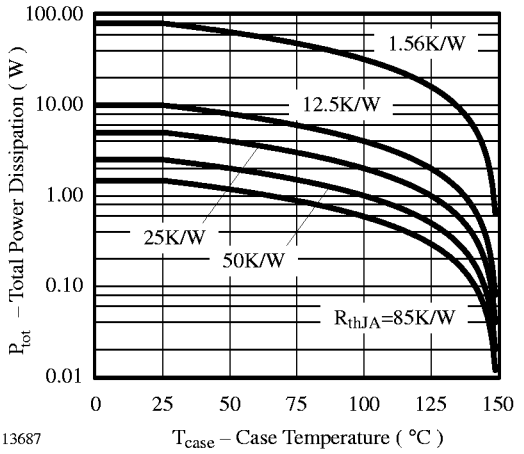


Figure 7. P_{tot} vs.T_{case}

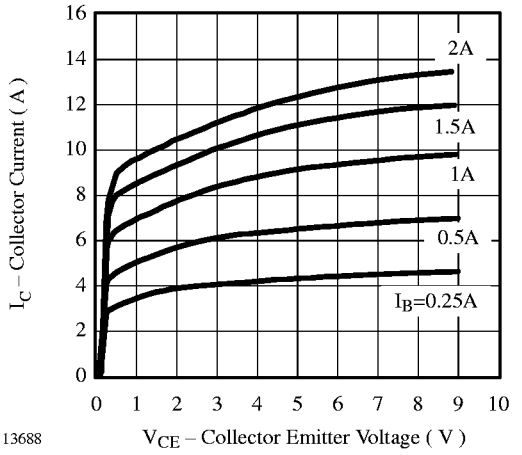


Figure 5. I_C vs. V_{CE}

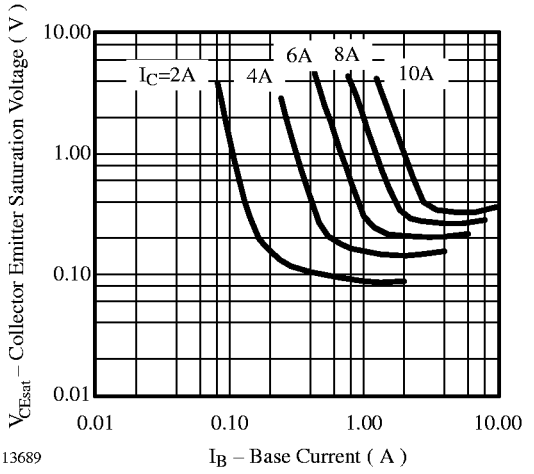


Figure 8. V_{CEsat} vs. I_B

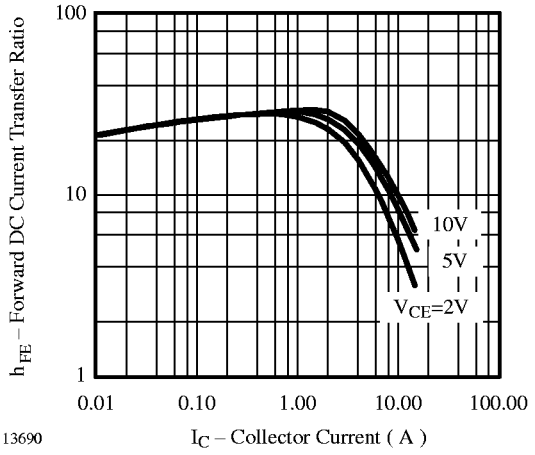


Figure 6. h_{FE} vs. I_C

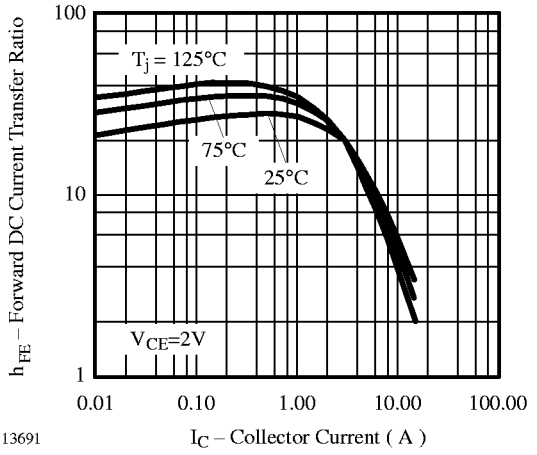


Figure 9. h_{FE} vs. I_C

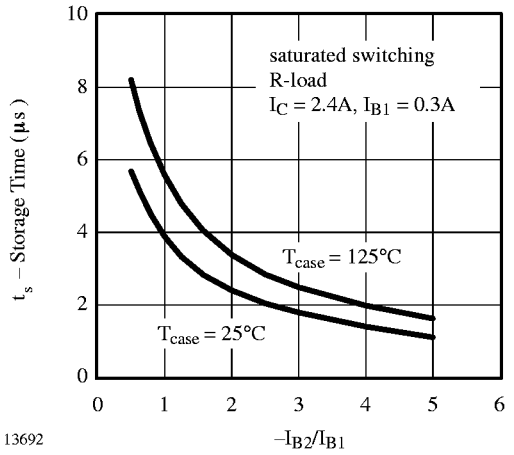


Figure 10. t_s vs. $-I_{B2}/I_{B1}$

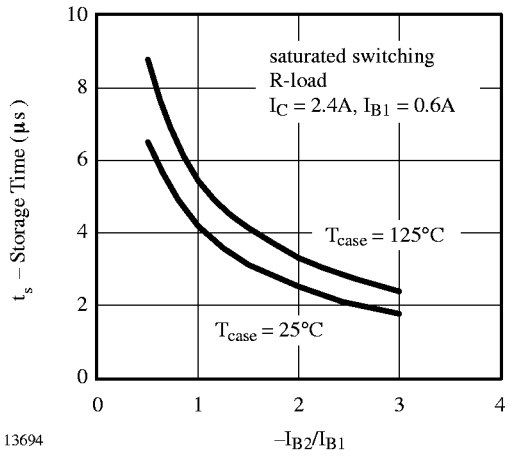


Figure 11. t_s vs. $-I_{B2}/I_{B1}$

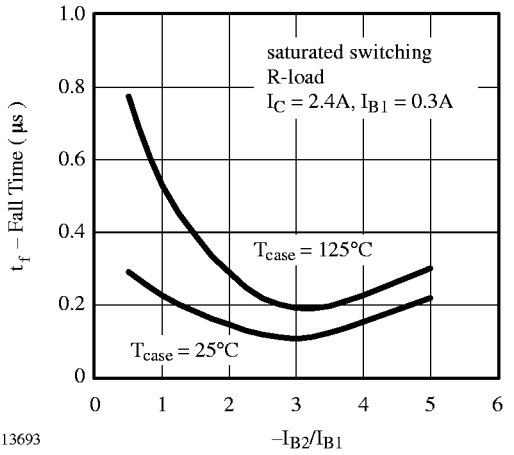


Figure 12. t_f vs. $-I_{B2}/I_{B1}$

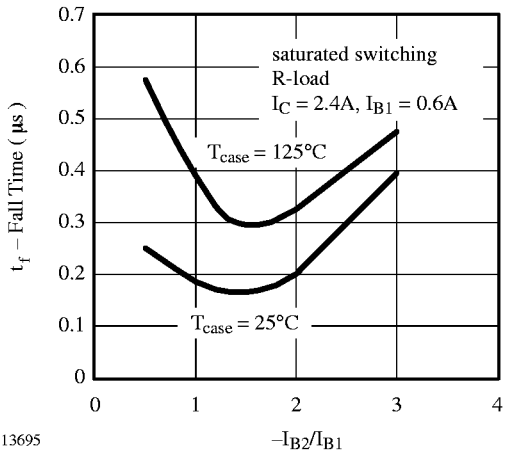
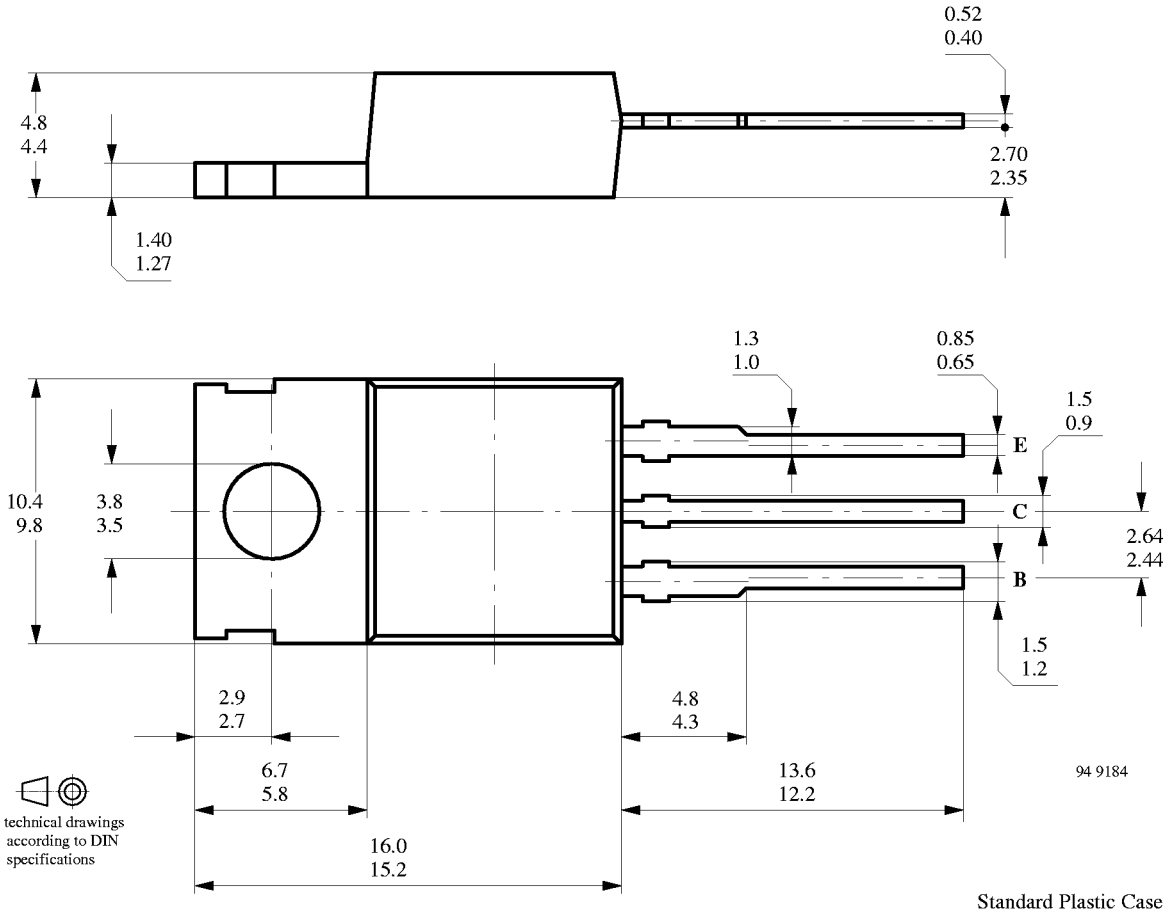


Figure 13. t_f vs. $-I_{B2}/I_{B1}$

Dimensions in mm



Collector connected with metallic surface

Standard Plastic Case
14A 3 DIN 41 869
JEDEC TO 220