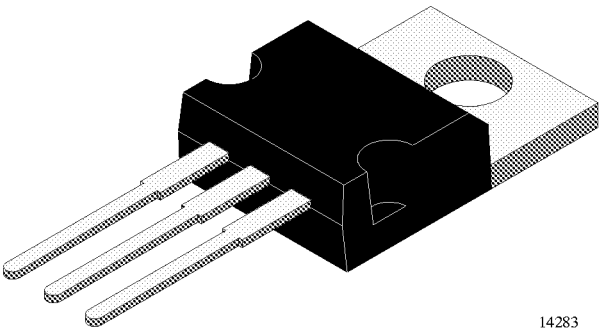
Silicon NPN High Voltage Switching Transistor

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

Absolute Maximum Ratings

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

Parameter	Test Conditions	Symbol	Value	Unit
Collector-emitter voltage		V_{CEO}	600	V
		V_{CES}	1200	V
Emitter-base voltage		V_{EBO}	9	V
Collector current		I_C	3	A
Collector peak current		I_{CM}	5	A
Base current		I_B	2	A
Base peak current		I_{BM}	4	A
Total power dissipation	$T_{case} \leq 25°C$	P_{tot}	50	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}	2.5	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} = 1200 V	I_{CES}			100	µA
	V_{CE} = 1200 V; T_{case} = 150°C	I_{CES}			1	mA
Collector-emitter breakdown voltage (figure 1)	I_C = 300 mA; L = 125 mH; $I_{measure}$ = 100 mA	$V_{(BR)CEO}$	550			V
Emitter cut-off current	V_{EB} = 9 V	$I_{(EBO}$			10	µA
Collector-emitter saturation voltage	I_C = 0.5 A; I_B = 0.13 A	V_{CEsat}			0.25	V
	I_C = 1.5 A; I_B = 0.5 A	V_{CEsat}			0.5	V
Base-emitter saturation voltage	I_C = 0.5 A; I_B = 0.13 A	V_{BEsat}			1	V
	I_C = 1.5 A; I_B = 0.5 A	V_{BEsat}			1.1	V
DC forward current transfer ratio	V_{CE} = 2 V; I_C = 10 mA	h_{FE}	15			
	V_{CE} = 2 V; I_C = 0.5 A	h_{FE}	12			
	V_{CE} = 2 V; I_C = 1.5 A	h_{FE}	6			
	V_{CE} = 5 V; I_C = 3 A	h_{FE}	4			
Collector-emitter working voltage	I_C = 3 A; I_{B1} = 1 A; $-I_{B2}$ = 0.3 A	V_{CEW}	650			V
Dynamic saturation voltage	I_C = 1.5 A; I_B = 0.3 A; t = 1 µs	$V_{CEsatdyn}$			15	V
	I_C = 1.5 A; I_B = 0.3 A; t = 3 µs	$V_{CEsatdyn}$			7.5	V

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 = 0.5 A; I_{B1} = 0.13 A; $-I_{B2}$ = 0.25 A	t_{on}			0.5	µs
Storage time		t_s			4	µs
Fall time		t_f			0.5	µs
Turn on time	I_C = 1.5 A; I_{B1} = 0.3 A; $-I_{B2}$ = 0.75 A	t_{on}			0.8	µs
Storage time		t_s			2.5	µs
Fall time		t_f			0.2	µs
Inductive load (figure 3)						
Storage time	I_C = 0.5 A; I_{B1} = 0.13 A; $-I_{B2}$ = 0.25 A	t_s			4.5	µs
Fall time		t_f			0.35	µs
Storage time	I_C = 1.5 A; I_{B1} = 0.3 A; $-I_{B2}$ = 0.75 A	t_s			2.5	µs
Fall time		t_f			0.2	µs

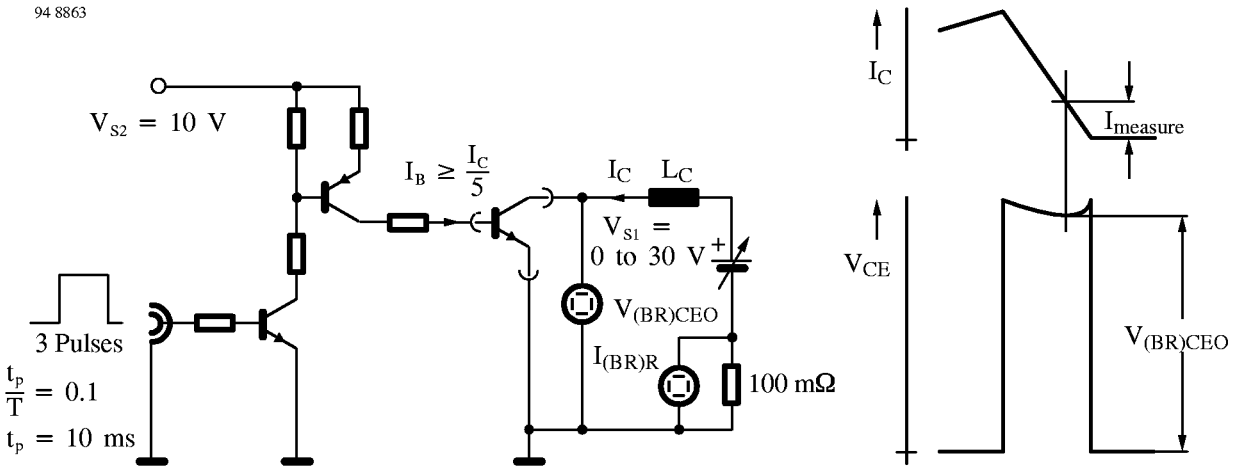


Figure 1. Test circuit for $V_{(BR)CE0}$

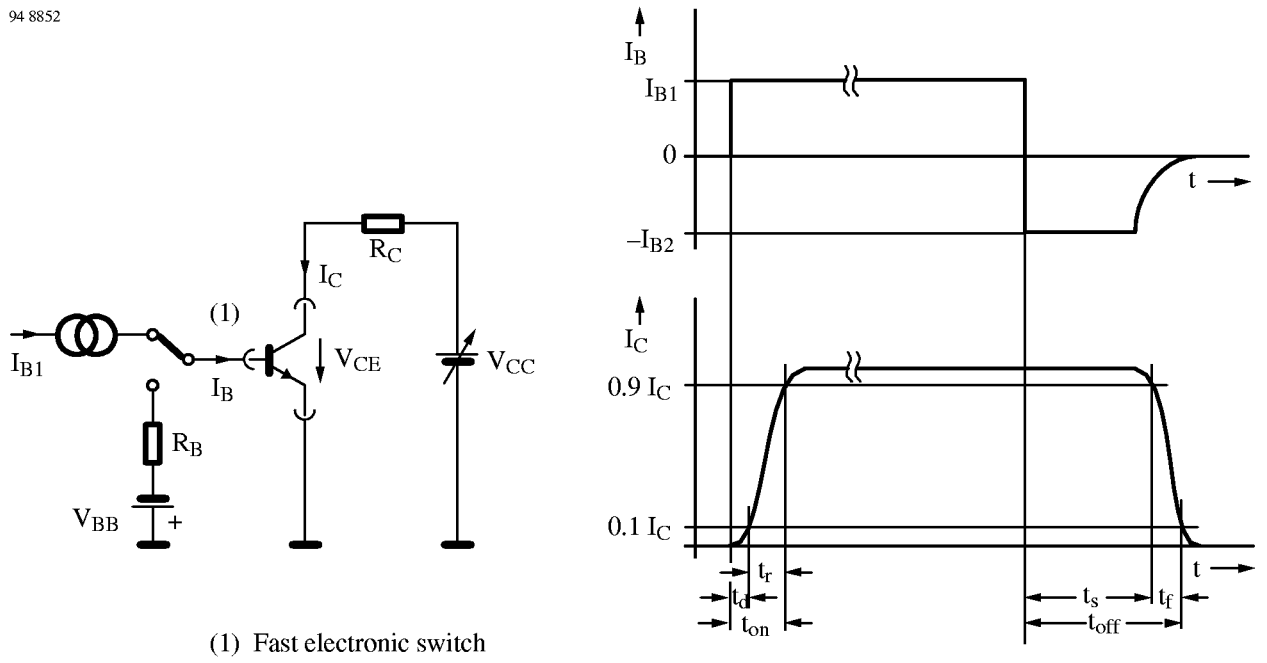


Figure 2. Test circuit for switching characteristics – resistive load

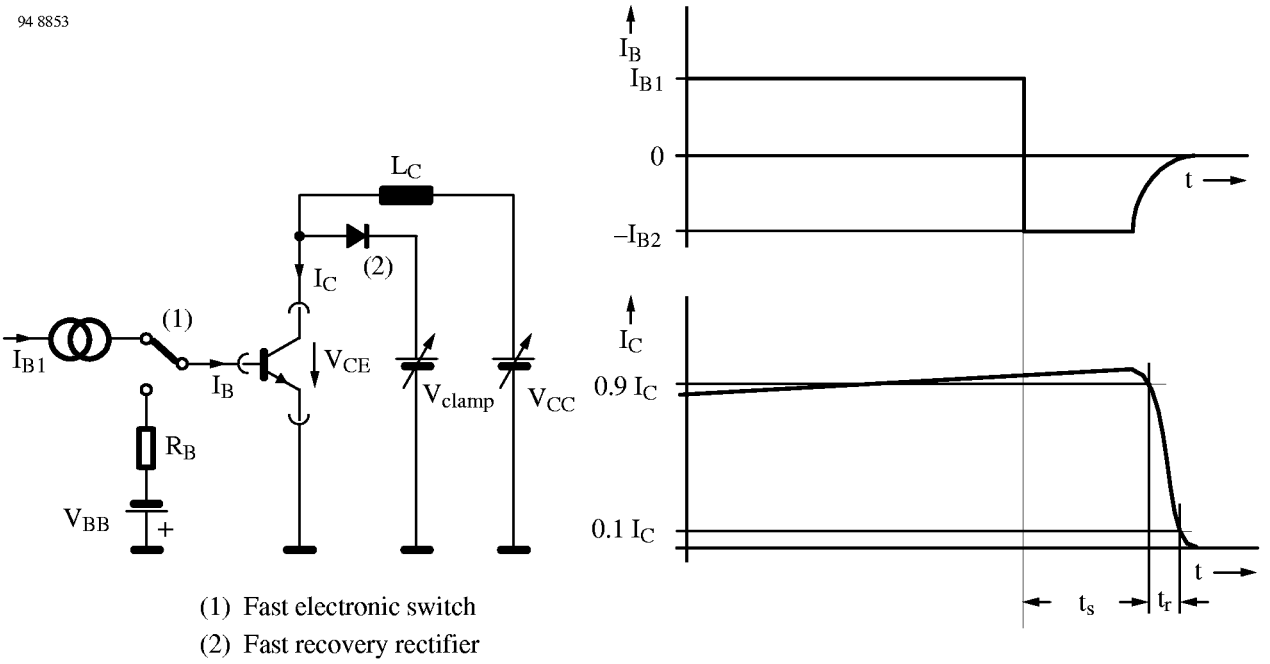


Figure 3. Test circuit for switching characteristics – inductive load

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

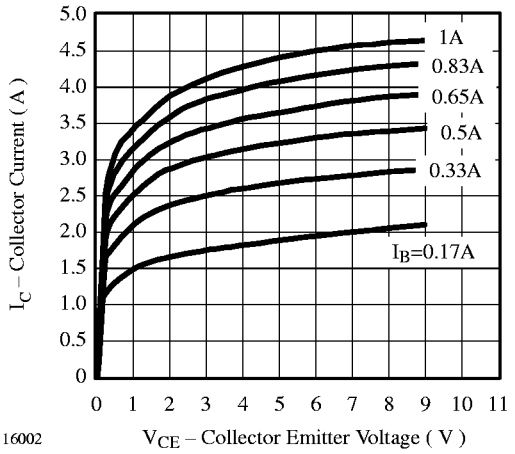


Figure 4. I_C vs. V_{CE}

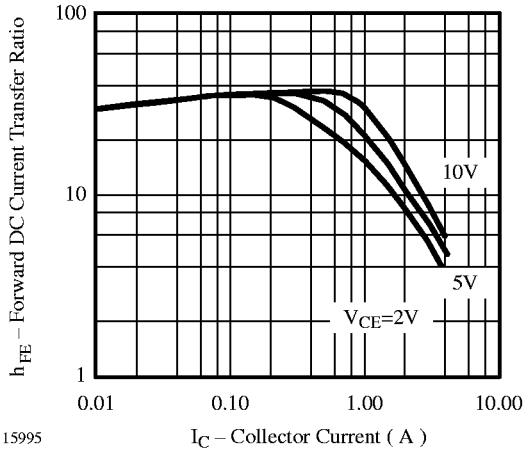


Figure 5. h_{FE} vs. I_C

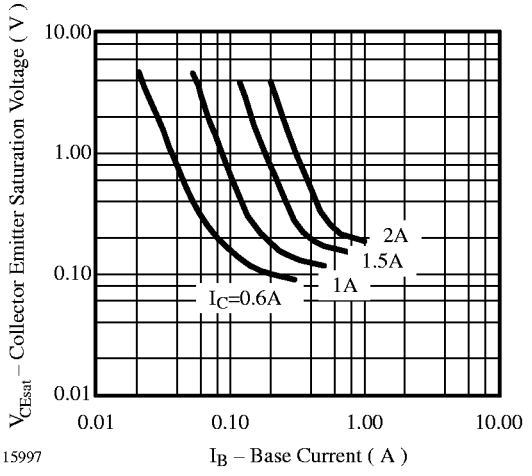


Figure 6. V_{CEsat} vs. I_B

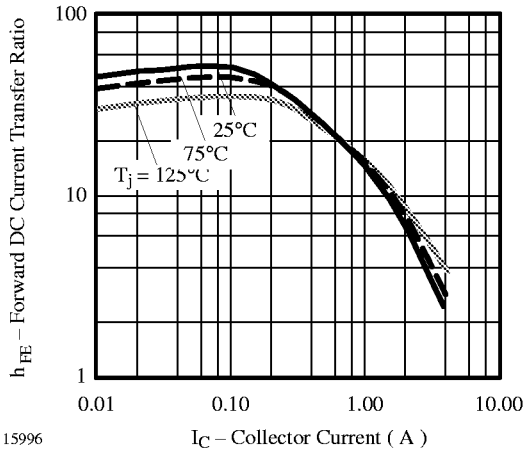


Figure 7. h_{FE} vs. I_C

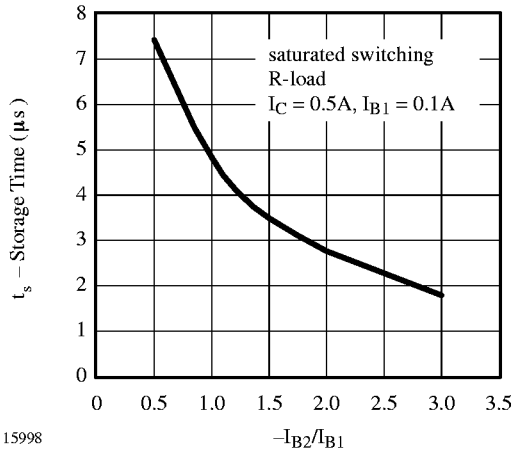


Figure 8. t_s vs. $-I_{B2}/I_{B1}$

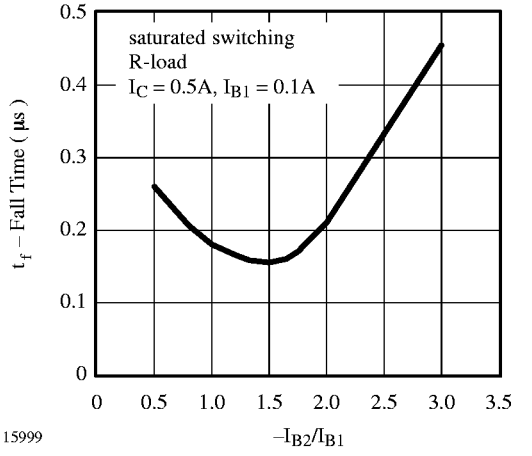
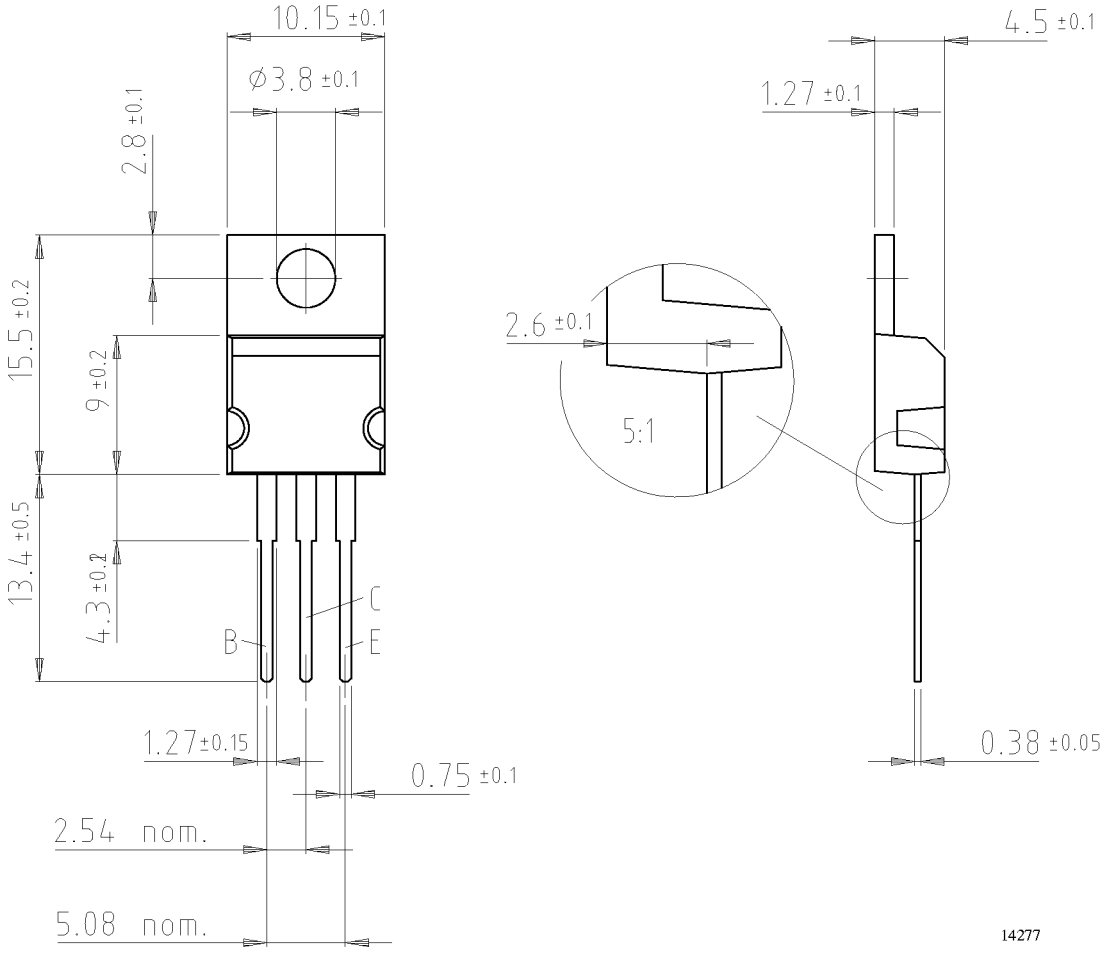


Figure 9. t_f vs. $-I_{B2}/I_{B1}$

Dimensions in mm



Plastic case JEDEC TO 220
Collector connected with metallic surface