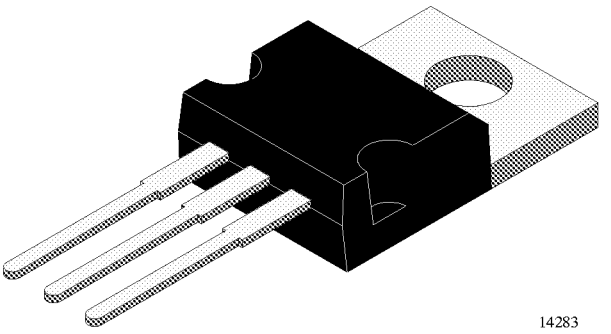
Silicon NPN High Voltage Switching Transistor

Features

- Monolithic integrated C-E-free-wheel diode
- **S**imple-s**W**itch-**O**ff **T**ransistor (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



14283

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}	11	V
Collector current		I_C	5	A
Collector peak current		I_{CM}	7.5	A
Base current		I_B	2.5	A
Base peak current		I_{BM}	3.5	A
Total power dissipation	$T_{case} \leq 25°C$	P_{tot}	40	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}	3.12	K/W

Electrical Characteristics

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

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Transistor						
Collector cut-off current	V_{CES} = 700 V	I_{CES}			50	µA
	V_{CES} = 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	$V_{(BR)EBO}$	11			V
Collector-emitter saturation voltage	I_C = 850 mA; I_B = 210 mA	V_{CEsat}			0.2	V
Base-emitter saturation voltage	I_C = 850 mA; I_B = 210 mA	V_{BEsat}			1	V
DC forward current transfer ratio	V_{CE} = 2 V; I_C = 10 mA	h_{FE}	10			
	V_{CE} = 2 V; I_C = 850 mA	h_{FE}	10			
	V_{CE} = 5 V; I_C = 5 A	h_{FE}	4			
Collector-emitter working voltage	V_S = 50 V; L = 1 mH; I_C = 5 A; I_{B1} = 1.7 A; $-I_{B2}$ = 0.5 A; $-V_{BB}$ = 5 V	V_{CEW}	500			V
Dynamic saturation voltage	I_C = 2.5 A; I_B = 0.5 A; t = 1 µs	$V_{CEsatdyn}$			12	V
	I_C = 2.5 A; I_B = 0.5 A; t = 3 µs	$V_{CEsatdyn}$			3	V
Gain bandwidth product	I_C = 500 mA; V_{CE} = 10 V; f = 1 MHz	f_T	4			MHz
Free-wheel diode						
Forward voltage	I_F = 1.67 A	V_F			1.2	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 = 0.85 A; I_{B1} = 0.2 A; $-I_{B2}$ = 0.4 A; V_S = 250 V	t_{on}			0.2	µs
Storage time		t_s			3	µs
Fall time		t_f			0.4	µs

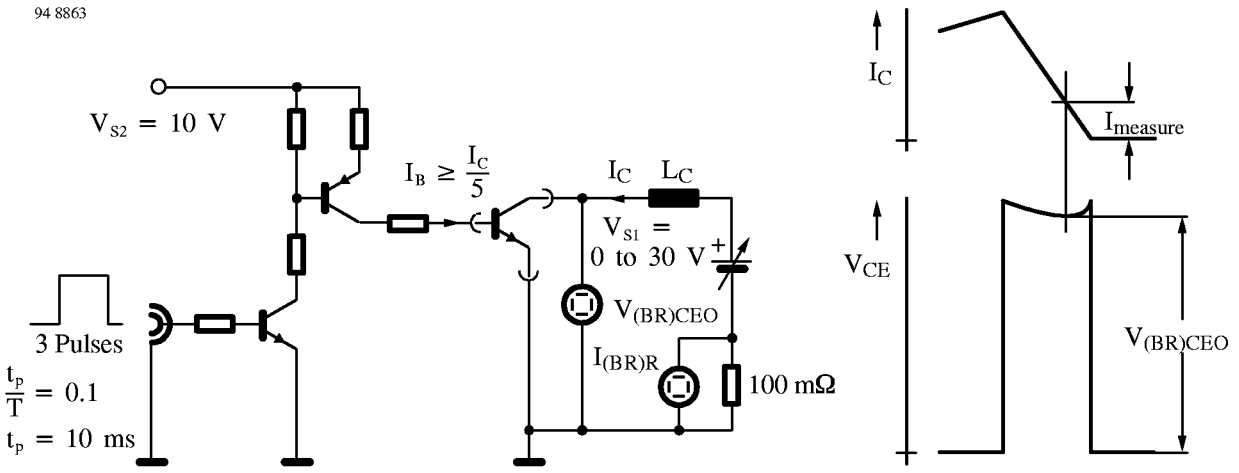


Figure 1. Test circuit for $V_{(BR)CE0}$

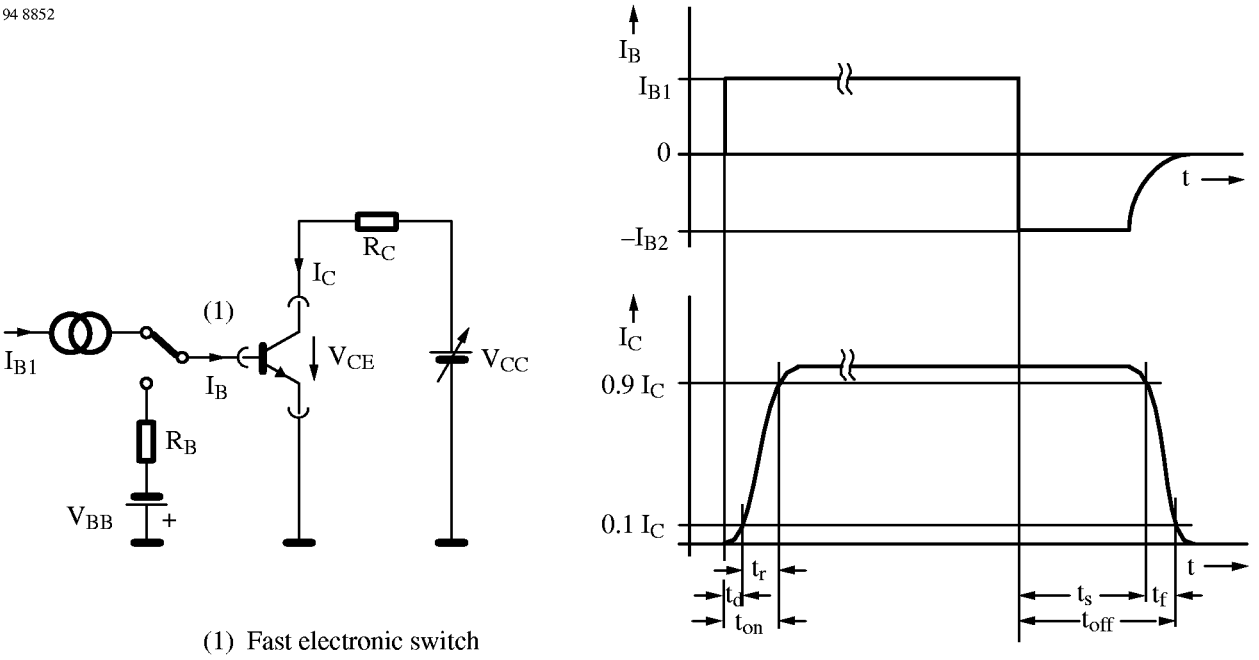


Figure 2. Test circuit for switching characteristics – resistive load

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

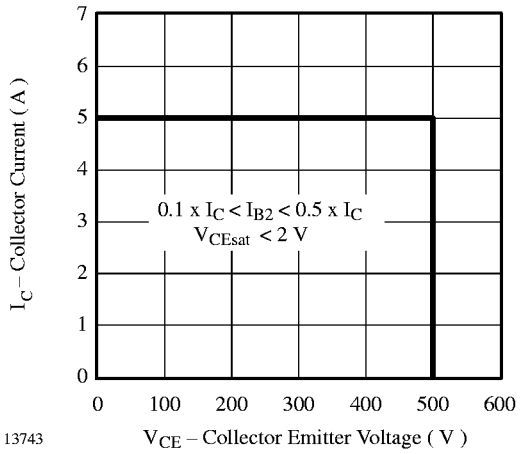


Figure 3. V_{CEW} – Diagram

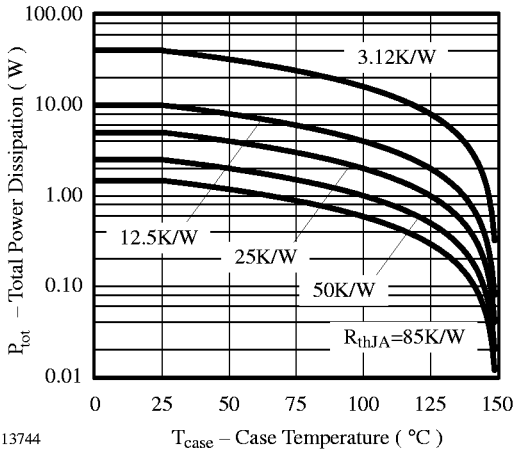


Figure 6. P_{tot} vs. T_{case}

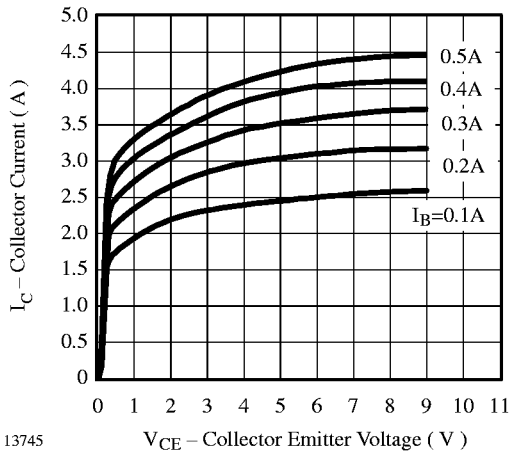


Figure 4. I_C vs. V_{CE}

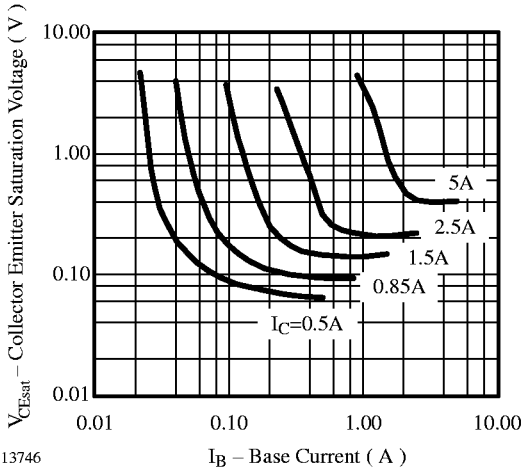


Figure 7. V_{CEsat} vs. I_B

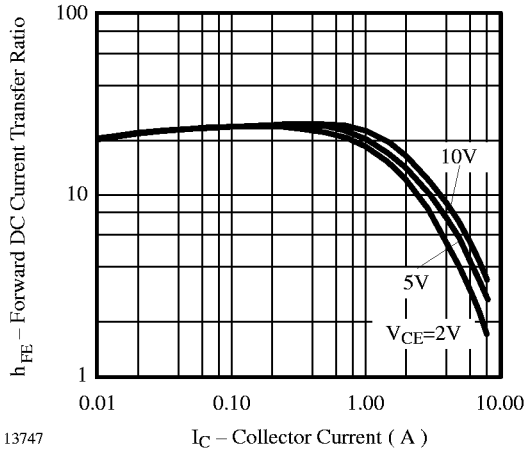


Figure 5. h_{FE} vs. I_C

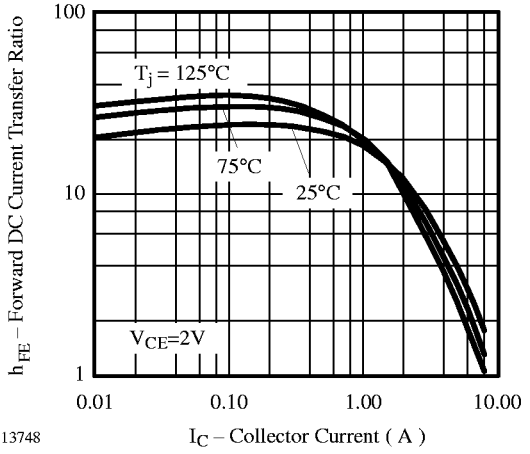


Figure 8. h_{FE} vs. I_C

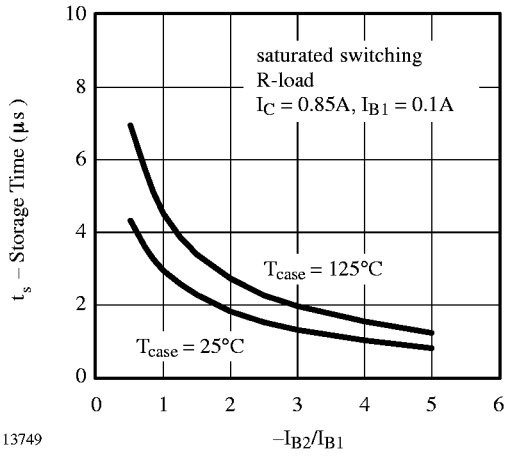


Figure 9. t_s vs. $-I_{B2}/I_{B1}$

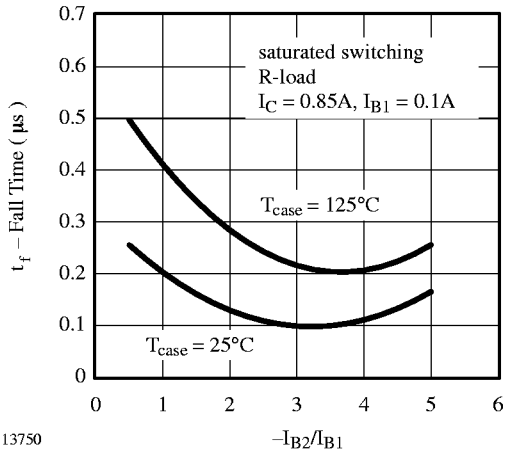


Figure 12. t_f vs. $-I_{B2}/I_{B1}$

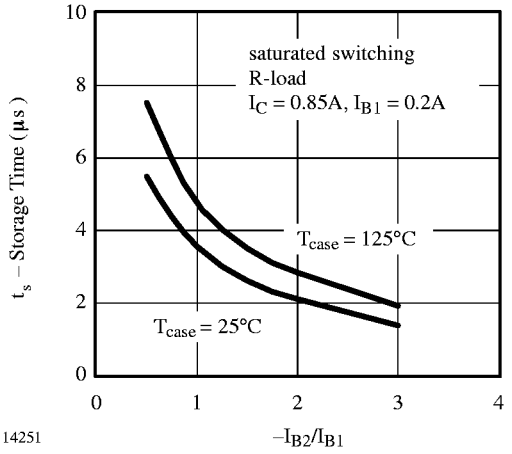


Figure 10. t_s vs. $-I_{B2}/I_{B1}$

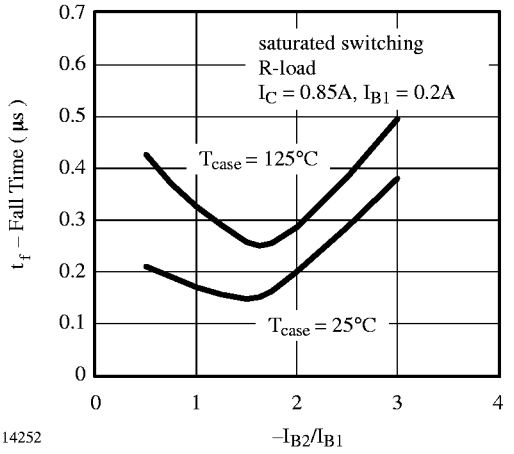


Figure 13. t_f vs. $-I_{B2}/I_{B1}$

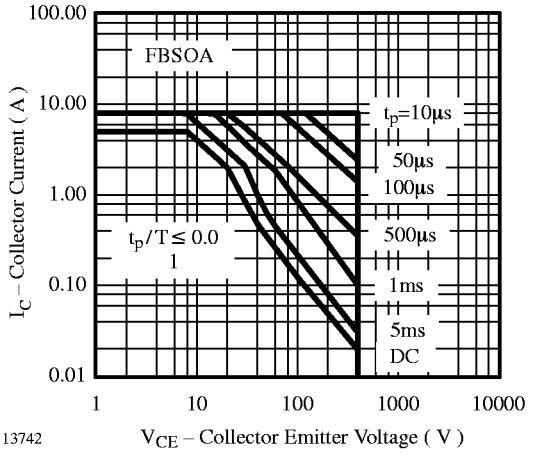


Figure 11. I_C vs. V_{CE}

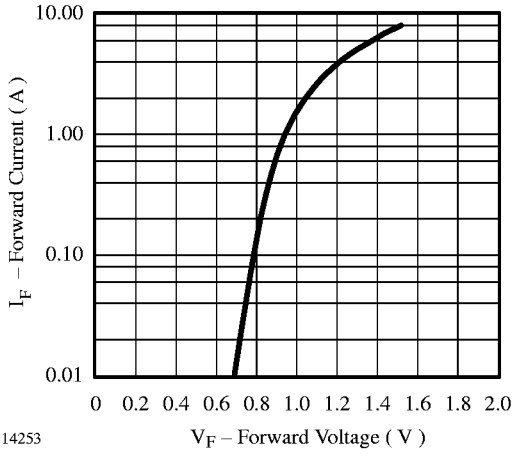
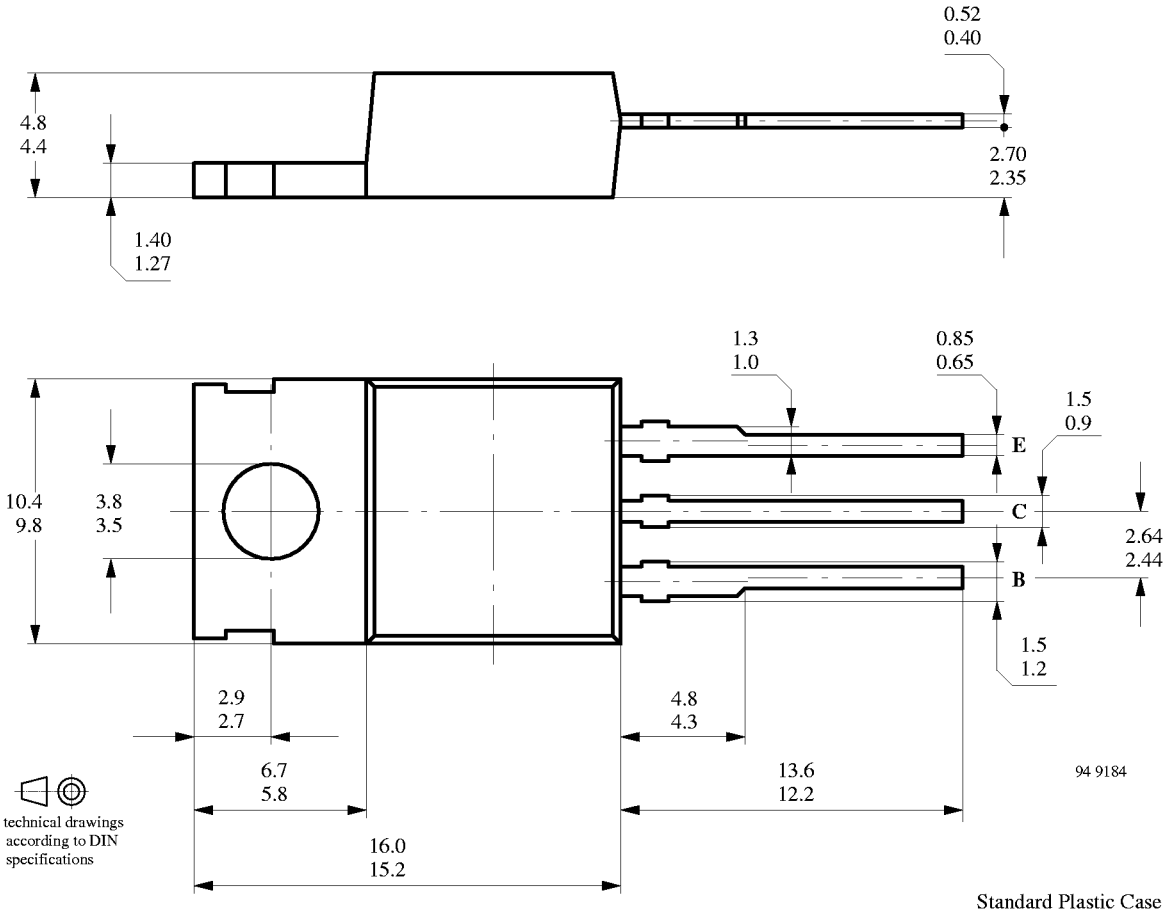


Figure 14. I_F vs. V_F

Dimensions in mm



Collector connected with metallic surface

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