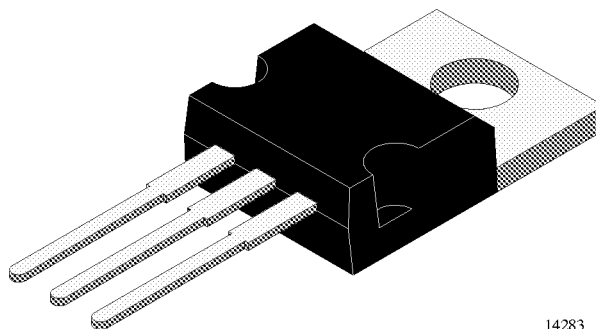


Silicon NPN High Voltage Switching Transistor

Features

- Monolithic integrated C-E-free-wheel diode
- 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



14283

Applications

Electronic lamp ballast circuits
Switch-mode power supplies

Absolute Maximum Ratings

$T_{case} = 25^{\circ}C$, 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	$T_{case} \leq 25^{\circ}C$	P_{tot}	40	W
Junction temperature		T_j	150	$^{\circ}C$
Storage temperature range		T_{stg}	-65 to +150	$^{\circ}C$

Maximum Thermal Resistance

$T_{case} = 25^{\circ}C$, unless otherwise specified

Parameter	Test Conditions	Symbol	Value	Unit
Junction case		R_{thJC}	3.12	K/W

Electrical Characteristics

$T_{\text{case}} = 25^{\circ}\text{C}$, unless otherwise specified

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Transistor						
Collector cut-off current	$V_{\text{CES}} = 700 \text{ V}$	I_{CES}			50	μA
	$V_{\text{CES}} = 700 \text{ V}; T_{\text{case}} = 150^{\circ}\text{C}$	I_{CES}			0.5	mA
Collector-emitter breakdown voltage (figure 1)	$I_{\text{C}} = 300 \text{ mA}; L = 125 \text{ mH}; I_{\text{measure}} = 100 \text{ mA}$	$V_{(\text{BR})\text{CEO}}$	400			V
Emitter-base breakdown voltage	$I_{\text{E}} = 1 \text{ mA}$	$V_{(\text{BR})\text{EBO}}$	11			V
Collector-emitter saturation voltage	$I_{\text{C}} = 850 \text{ mA}; I_{\text{B}} = 210 \text{ mA}$	V_{CEsat}			0.2	V
Base-emitter saturation voltage	$I_{\text{C}} = 850 \text{ mA}; I_{\text{B}} = 210 \text{ mA}$	V_{BEsat}			1	V
DC forward current transfer ratio	$V_{\text{CE}} = 2 \text{ V}; I_{\text{C}} = 10 \text{ mA}$	h_{FE}	10			
	$V_{\text{CE}} = 2 \text{ V}; I_{\text{C}} = 850 \text{ mA}$	h_{FE}	10			
	$V_{\text{CE}} = 5 \text{ V}; I_{\text{C}} = 5 \text{ A}$	h_{FE}	4			
Collector-emitter working voltage	$V_{\text{S}} = 50 \text{ V}; L = 1 \text{ mH}; I_{\text{C}} = 5 \text{ A}; I_{\text{B1}} = 1.7 \text{ A}; -I_{\text{B2}} = 0.5 \text{ A}; -V_{\text{BB}} = 5 \text{ V}$	V_{CEW}	500			V
Dynamic saturation voltage	$I_{\text{C}} = 2.5 \text{ A}; I_{\text{B}} = 0.5 \text{ A}; t = 1 \mu\text{s}$	V_{CEsatdyn}			12	V
	$I_{\text{C}} = 2.5 \text{ A}; I_{\text{B}} = 0.5 \text{ A}; t = 3 \mu\text{s}$	V_{CEsatdyn}			3	V
Gain bandwidth product	$I_{\text{C}} = 500 \text{ mA}; V_{\text{CE}} = 10 \text{ V}; f = 1 \text{ MHz}$	f_{T}	4			MHz
Free-wheel diode						
Forward voltage	$I_{\text{F}} = 1.67 \text{ A}$	V_{F}			1.2	V

Switching Characteristics

$T_{\text{case}} = 25^{\circ}\text{C}$, unless otherwise specified

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Resistive load (figure 2)						
Turn on time	$I_{\text{C}} = 0.85 \text{ A}; I_{\text{B1}} = 0.2 \text{ A}; -I_{\text{B2}} = 0.4 \text{ A}; V_{\text{S}} = 250 \text{ V}$	t_{on}			0.2	μs
Storage time		t_{s}			3	μs
Fall time		t_{f}			0.4	μs

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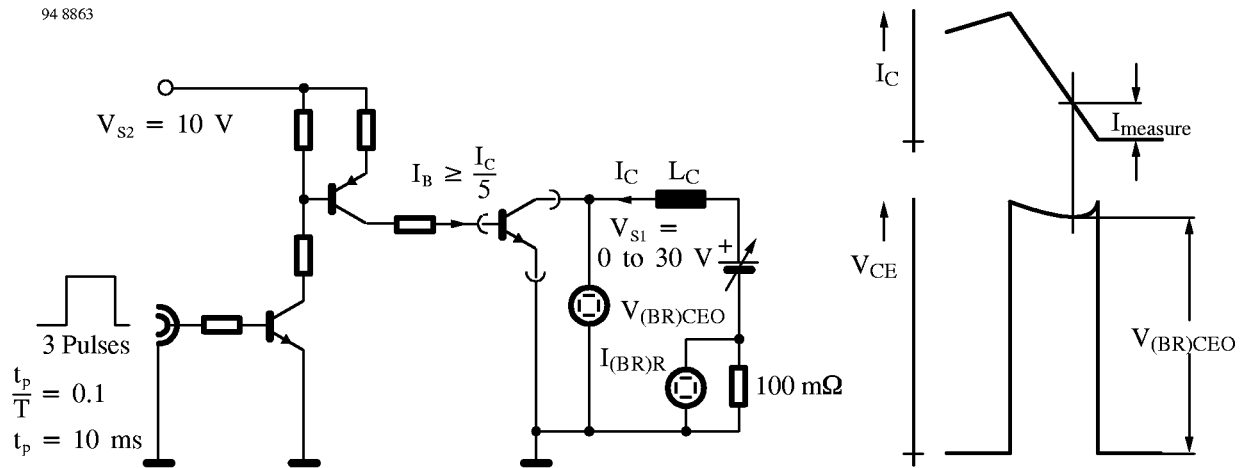
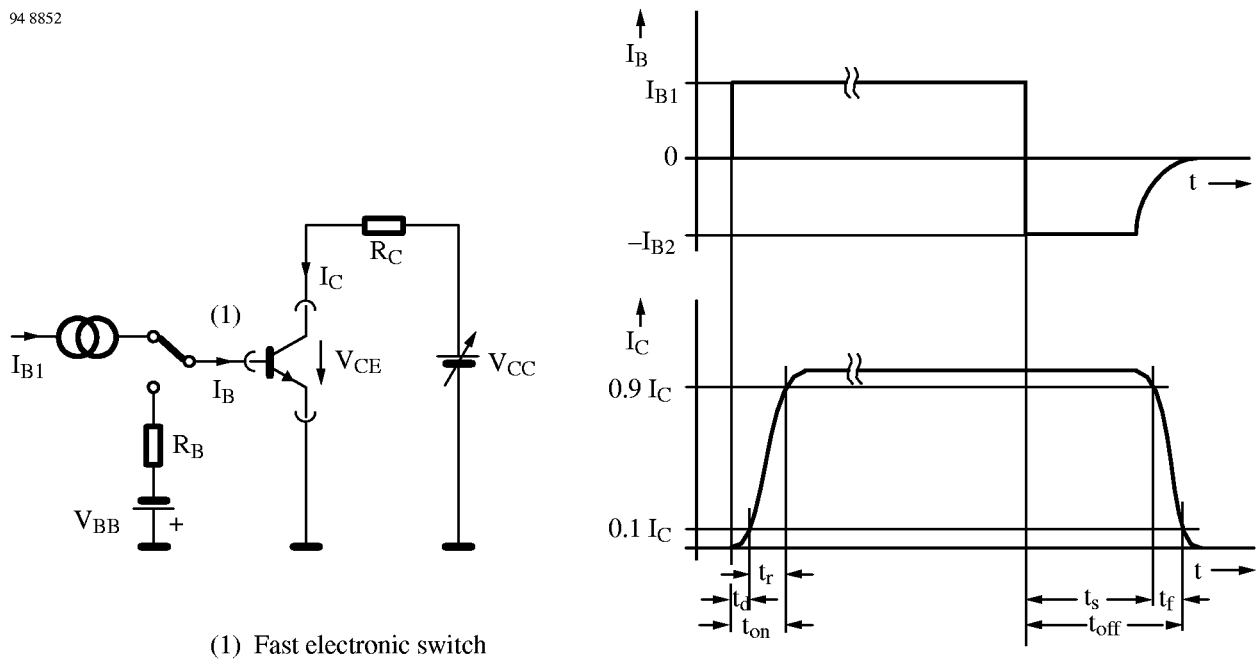


Figure 1. Test circuit for $V_{(BR)CEO}$

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(1) Fast electronic switch

Figure 2. Test circuit for switching characteristics – resistive load

Typical Characteristics ($T_{\text{case}} = 25_{\text{C}}$ unless otherwise specified)

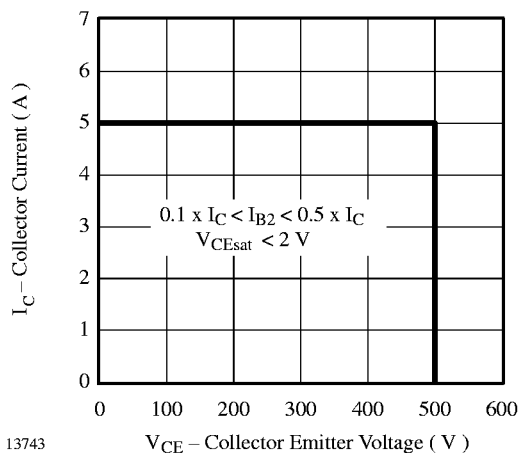


Figure 3. V_{CEW} - Diagram

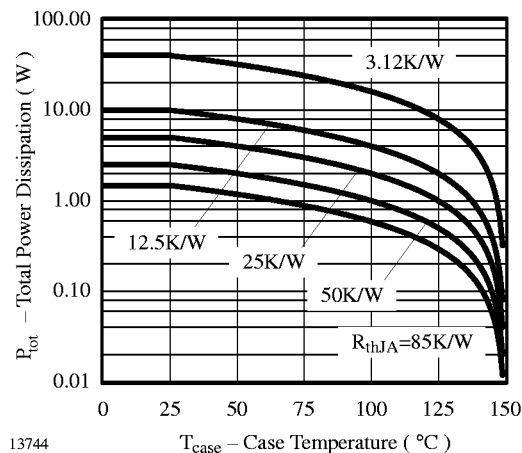


Figure 6. P_{tot} vs. T_{case}

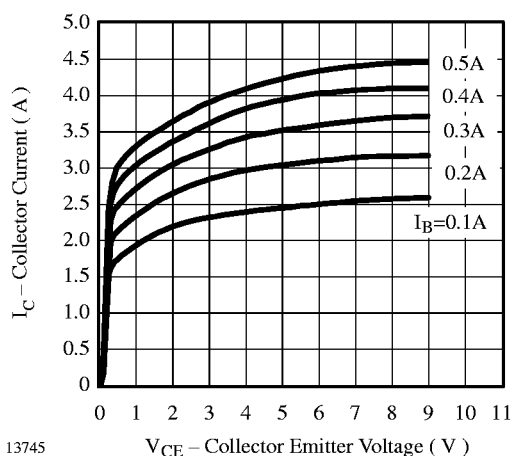


Figure 4. I_{C} vs. V_{CE}

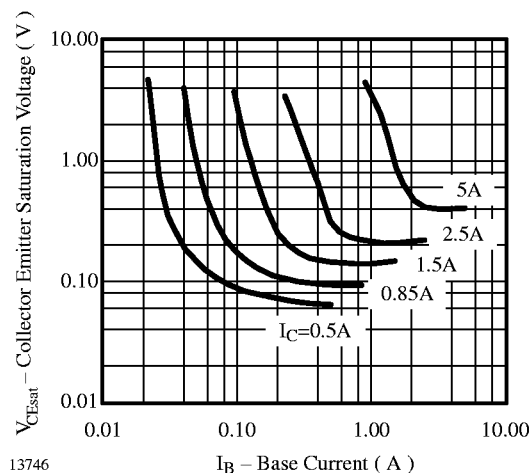


Figure 7. V_{CEsat} vs. I_{B}

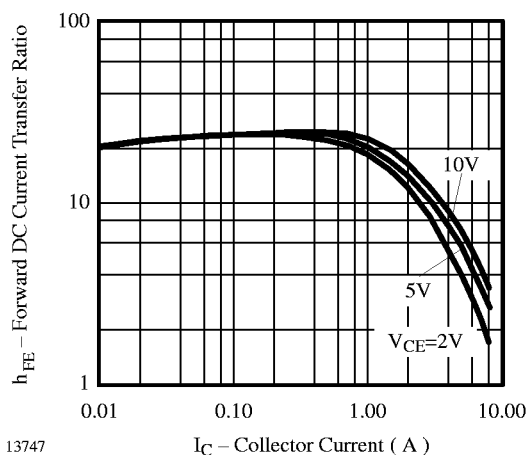


Figure 5. h_{FE} vs. I_{C}

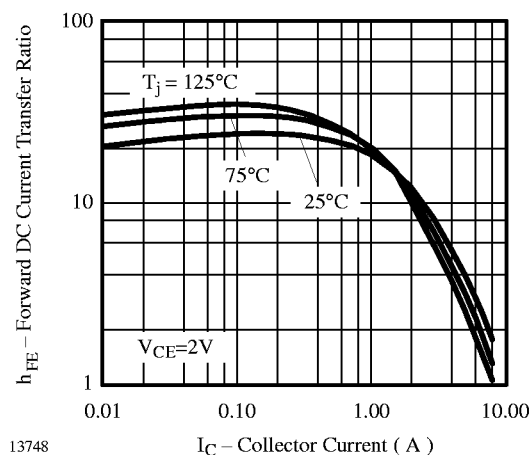


Figure 8. h_{FE} vs. I_{C}

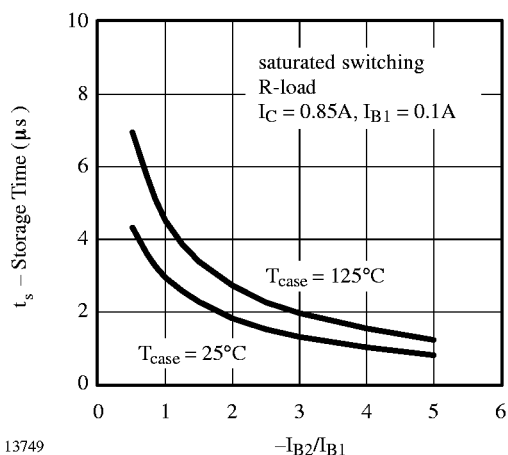


Figure 9. t_s vs. $-I_{B2}/I_{B1}$

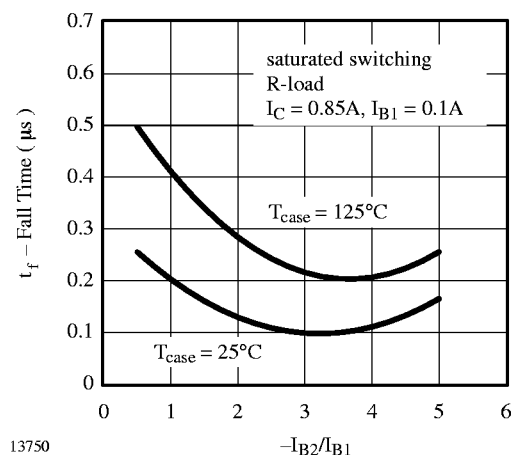


Figure 12. t_f vs. $-I_{B2}/I_{B1}$

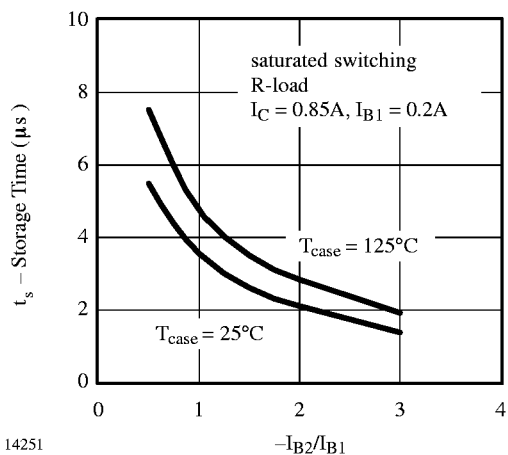


Figure 10. t_s vs. $-I_{B2}/I_{B1}$

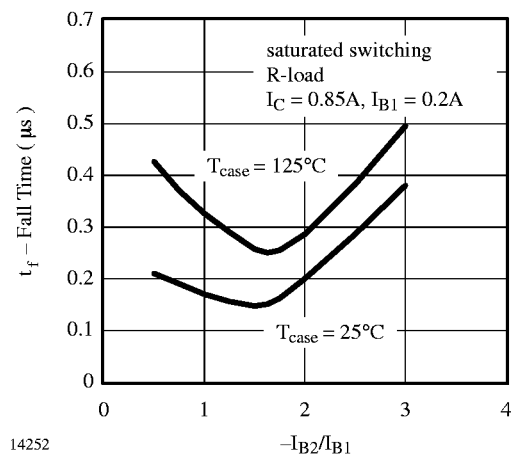


Figure 13. t_f vs. $-I_{B2}/I_{B1}$

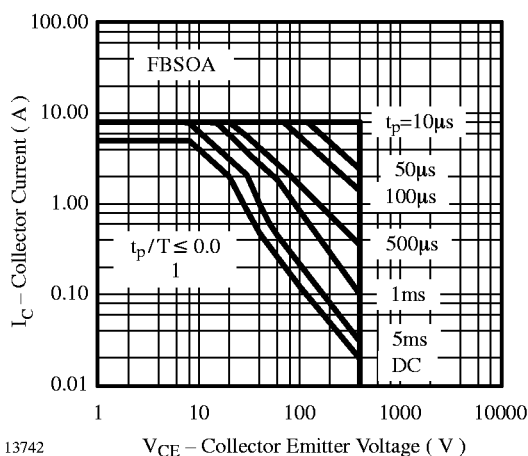


Figure 11. I_C vs. V_{CE}

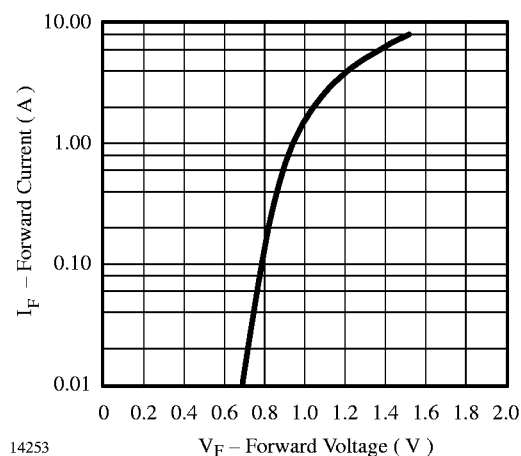


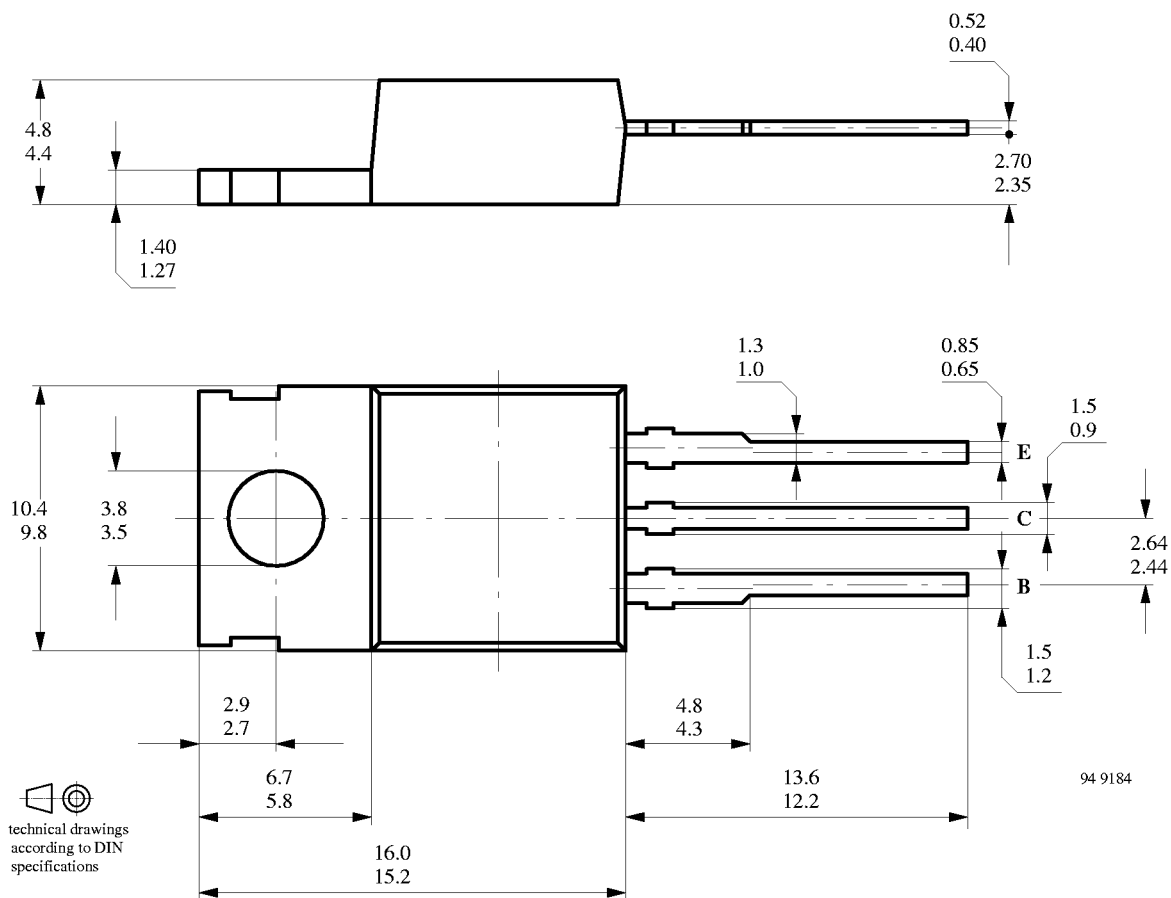
Figure 14. I_F vs. V_F

BUF725D

Vishay Telefunken



Dimensions in mm



Collector connected with metallic surface

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