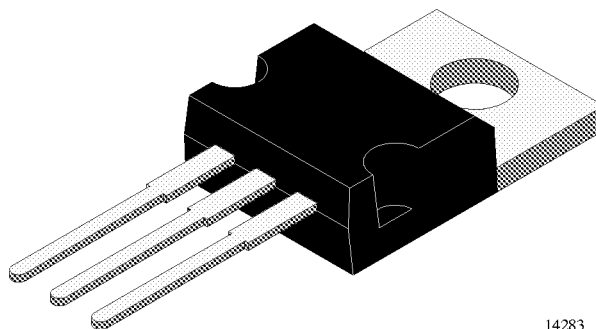




Silicon NPN High Voltage Switching Transistor

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



14283

Applications

Electronic lamp ballast circuits
Switch-mode power supplies

Absolute Maximum Ratings

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

Parameter	Test Conditions	Type	Symbol	Value	Unit
Collector-emitter voltage		BUF640	V_{CEO}	400	V
		BUF640A	V_{CEO}	450	V
		BUF640	V_{CES}	850	V
		BUF640A	V_{CES}	1000	V
Emitter-base voltage			V_{EBO}	9	V
Collector current			I_{C}	6	A
Collector peak current			I_{CM}	9	A
Base current			I_{B}	3	A
Base peak current			I_{BM}	5	A
Total power dissipation	$T_{\text{case}} \leq 25^{\circ}\text{C}$		P_{tot}	70	W
Junction temperature			T_{j}	150	$^{\circ}\text{C}$
Storage temperature range			T_{stg}	-65 to +150	$^{\circ}\text{C}$

Maximum Thermal Resistance

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

Parameter	Test Conditions	Symbol	Value	Unit
Junction case		R_{thJC}	1.78	K/W

Electrical Characteristics

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

Parameter	Test Conditions	Type	Symbol	Min	Typ	Max	Unit
Collector cut-off current	$V_{\text{CE}} = 850 \text{ V}$	BUF640	I_{CES}			100	μA
	$V_{\text{CE}} = 1000 \text{ V}$	BUF640A	I_{CES}			100	μA
	$V_{\text{CE}} = 850 \text{ V}; T_{\text{case}} = 150^{\circ}\text{C}$	BUF640	I_{CES}			0.5	mA
	$V_{\text{CE}} = 1000 \text{ V}; T_{\text{case}} = 150^{\circ}\text{C}$	BUF640A	I_{CES}			0.5	mA
Collector-emitter breakdown voltage (figure 1)	$I_{\text{C}} = 500 \text{ mA}; L = 125 \text{ mH}; I_{\text{measure}} = 100 \text{ mA}$	BUF640	$V_{(\text{BR})\text{CEO}}$	400			V
		BUF640A	$V_{(\text{BR})\text{CEO}}$	450			V
Emitter-base breakdown voltage	$I_{\text{E}} = 1 \text{ mA}$		$V_{(\text{BR})\text{EBO}}$	9			V
Collector-emitter saturation voltage	$I_{\text{C}} = 1 \text{ A}; I_{\text{B}} = 0.1 \text{ A}$		V_{CEsat}			0.5	V
	$I_{\text{C}} = 2.5 \text{ A}; I_{\text{B}} = 0.5 \text{ A}$		V_{CEsat}			0.75	V
Base-emitter saturation voltage	$I_{\text{C}} = 1 \text{ A}; I_{\text{B}} = 0.1 \text{ A}$		V_{BEsat}			1.1	V
	$I_{\text{C}} = 2.5 \text{ A}; I_{\text{B}} = 0.5 \text{ A}$		V_{BEsat}			1.2	V
DC forward current transfer ratio	$V_{\text{CE}} = 2 \text{ V}; I_{\text{C}} = 0.1 \text{ A}$		h_{FE}	15			
	$V_{\text{CE}} = 2 \text{ V}; I_{\text{C}} = 1 \text{ A}$		h_{FE}	15			
	$V_{\text{CE}} = 2 \text{ V}; I_{\text{C}} = 2.5 \text{ A}$		h_{FE}	8			
	$V_{\text{CE}} = 5 \text{ V}; I_{\text{C}} = 5 \text{ A}$		h_{FE}	4			
Collector-emitter working voltage	$V_{\text{S}} = 50 \text{ V}; L = 1 \text{ mH}; I_{\text{C}} = 2.5 \text{ A}; I_{\text{B1}} = 0.5 \text{ A}; -I_{\text{B2}} = 0.5 \text{ A}; -V_{\text{BE(off)}} = 5 \text{ V}$	BUF640A	V_{CEW}	550			V

Switching Characteristics

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

Parameter	Test Conditions	Type	Symbol	Min	Typ	Max	Unit
Resistive load (figure 2)							
Turn on time	$I_C = 2.5 \text{ A}; I_{B1} = 0.5 \text{ A};$ $-V_{BB} = 0; R_{BB} = 0.6 \Omega$		t_{on}			0.7	μs
Storage time			t_s			1.8	μs
Fall time			t_f			0.4	μs
Turn on time	$I_C = 2.5 \text{ A}; I_{B1} = 0.5 \text{ A};$ $-I_{B2} = 1.25 \text{ A}; V_S = 150 \text{ V}$		t_{on}			0.7	μs
Storage time			t_s			1.8	μs
Fall time			t_f			0.4	μs
Inductive load (figure 3)							
Storage time	$I_C = 2.5 \text{ A}; I_{B1} = 0.5 \text{ A};$ $-V_{BE(off)} = 0; R_{BB} = 0.6 \Omega$ $V_{clamp} = 300 \text{ V}; L = 200 \mu\text{H}$		t_s		1.6	2.2	μs
Fall time			t_f		0.13	0.2	μs
Storage time	$I_C = 2.5 \text{ A}; I_{B1} = 0.5 \text{ A};$ $-I_{B2} = 1.25 \text{ A}; V_{clamp} = 300 \text{ V};$ $L = 200 \mu\text{H}$		t_s		1.7	2.5	μs
Fall time			t_f		0.15	0.25	μs

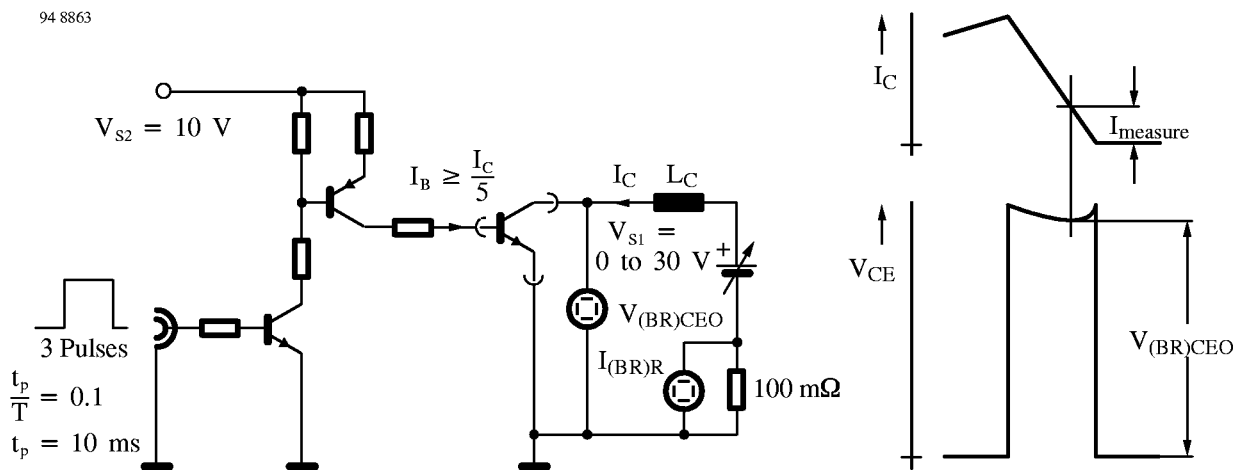


Figure 1. Test circuit for $V_{(BR)CEO}$

94 8852

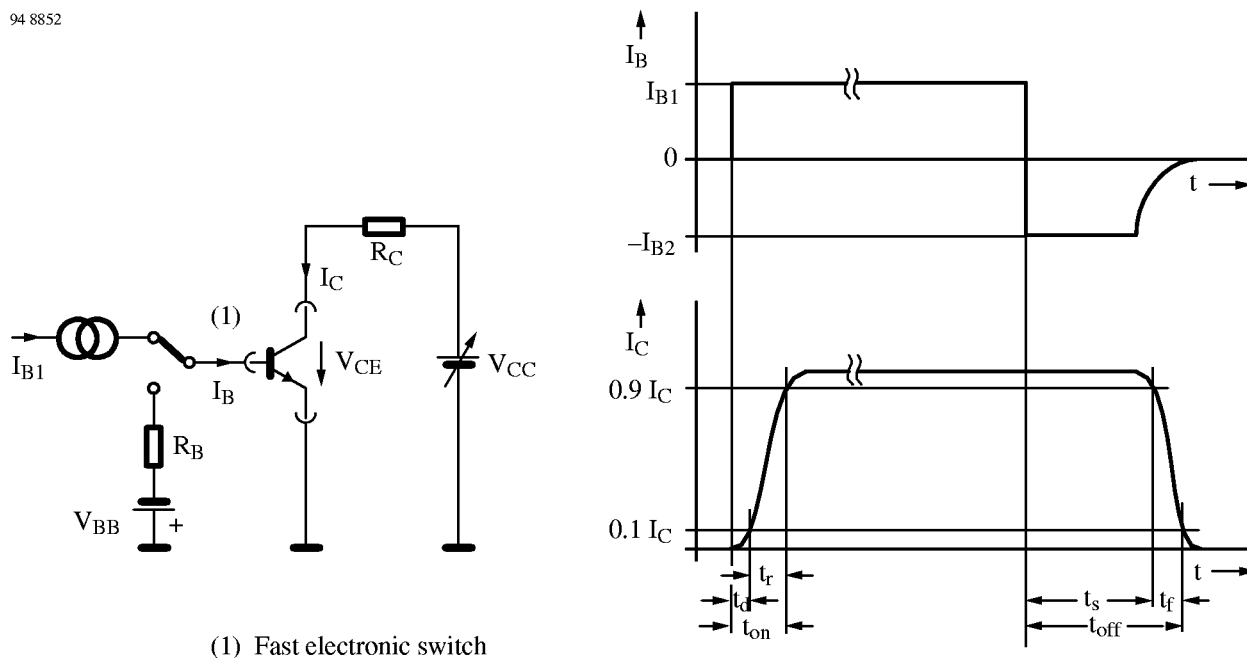


Figure 2. Test circuit for switching characteristics – resistive load

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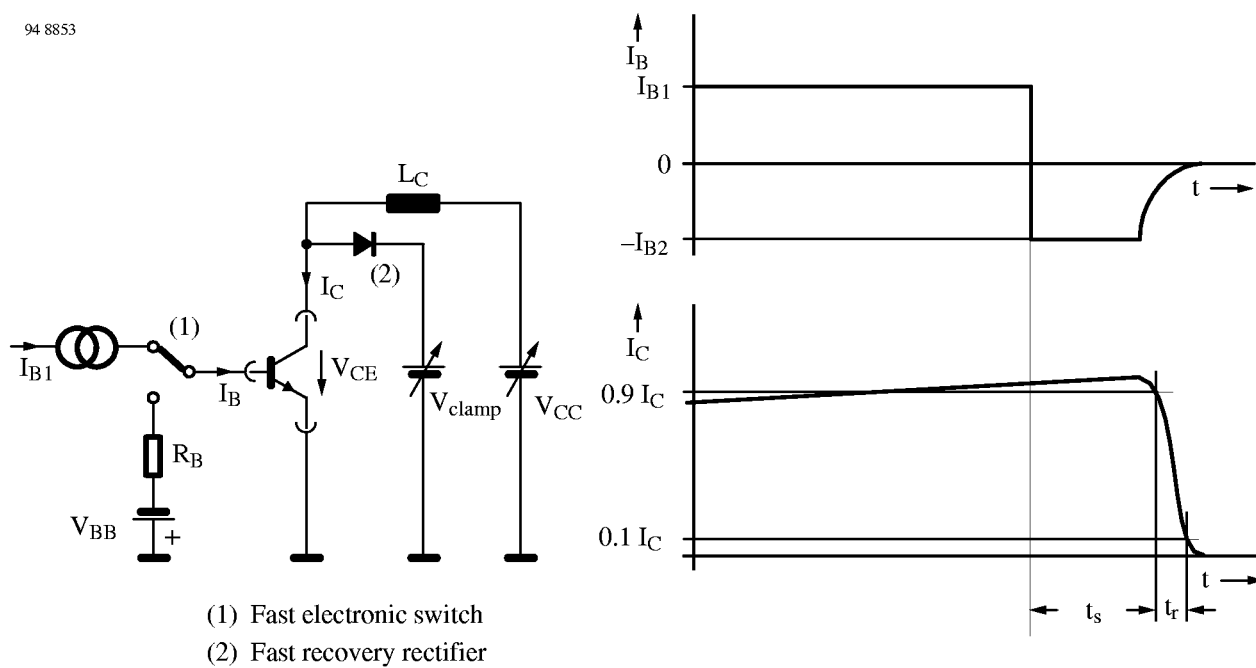


Figure 3. Test circuit for switching characteristics – inductive load

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

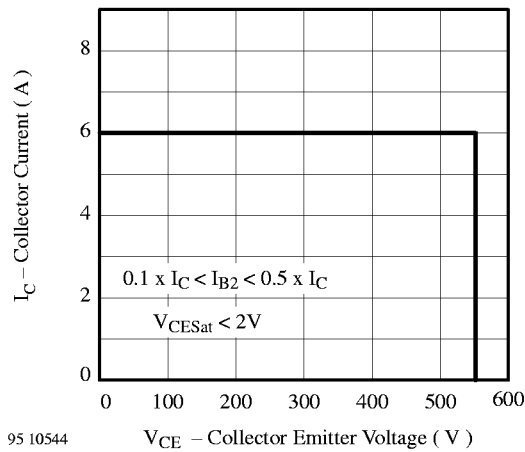


Figure 4. V_{CEW} - Diagram

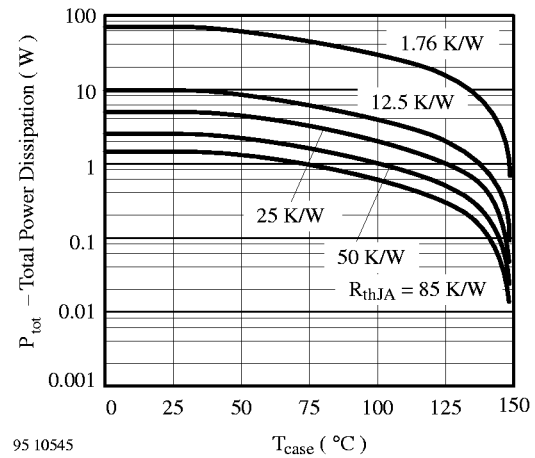


Figure 7. P_{tot} vs. T_{case}

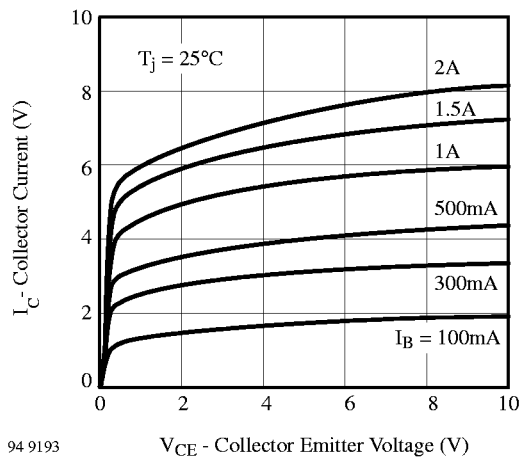


Figure 5. I_C vs. V_{CE}

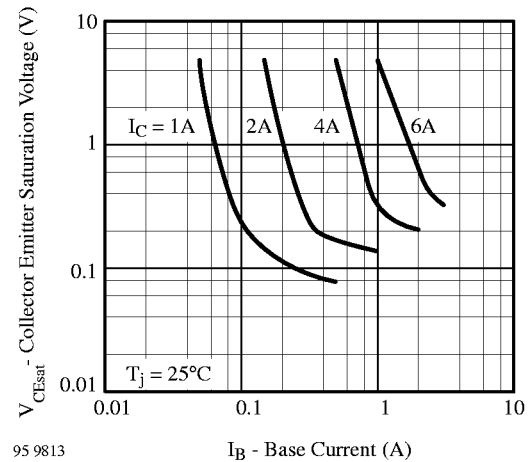


Figure 8. V_{CESat} vs. I_B

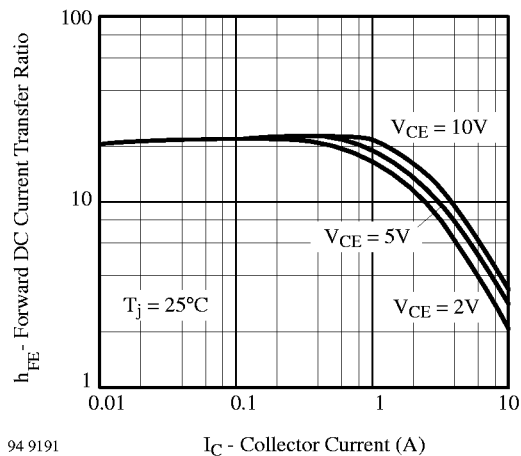


Figure 6. h_{FE} vs. I_C

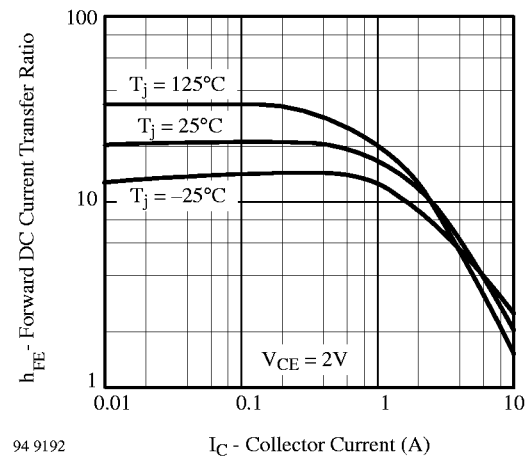


Figure 9. h_{FE} vs. I_C

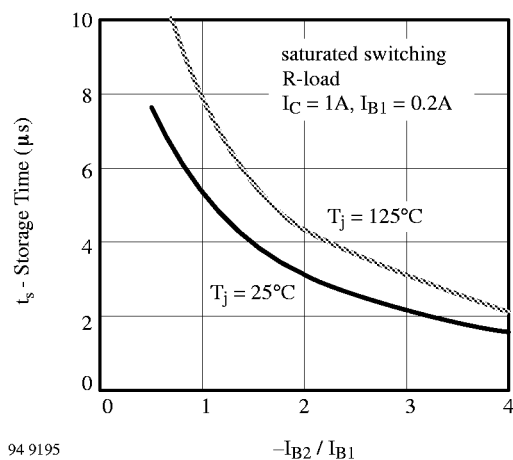


Figure 10. t_s vs. $-I_{B2}/I_{B1}$

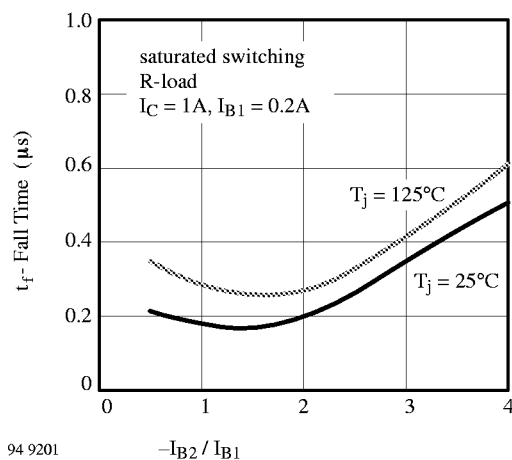


Figure 13. t_f vs. $-I_{B2}/I_{B1}$

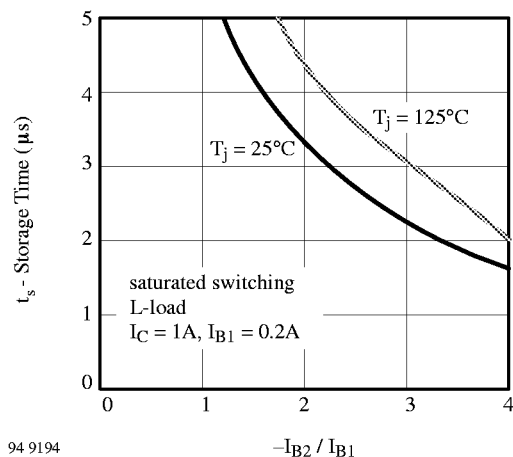


Figure 11. t_s vs. $-I_{B2}/I_{B1}$

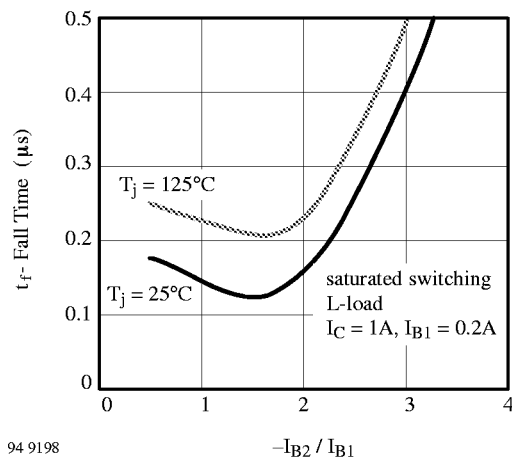


Figure 14. t_f vs. $-I_{B2}/I_{B1}$

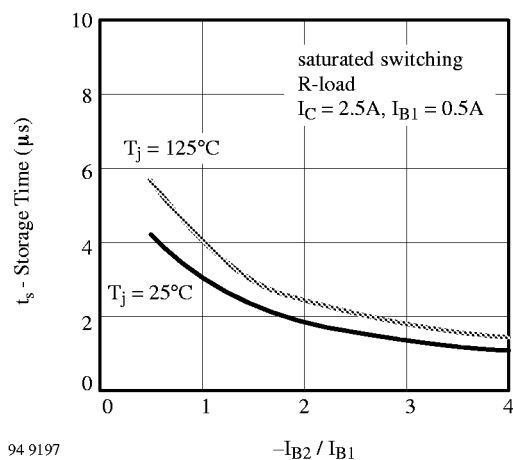


Figure 12. t_s vs. $-I_{B2}/I_{B1}$

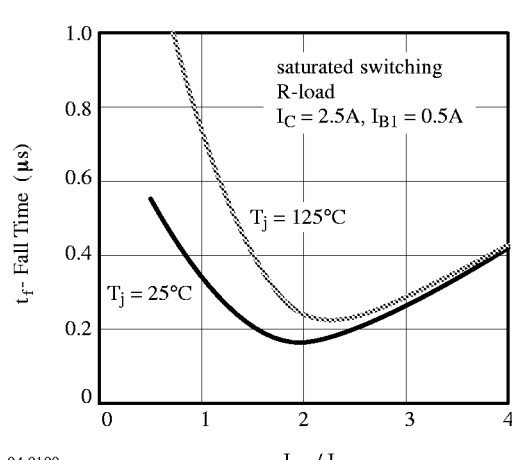


Figure 15. t_f vs. $-I_{B2}/I_{B1}$

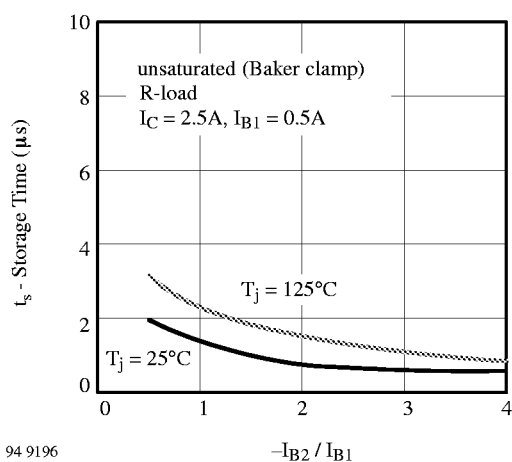


Figure 16. t_s vs. $-I_{B2}/I_{B1}$

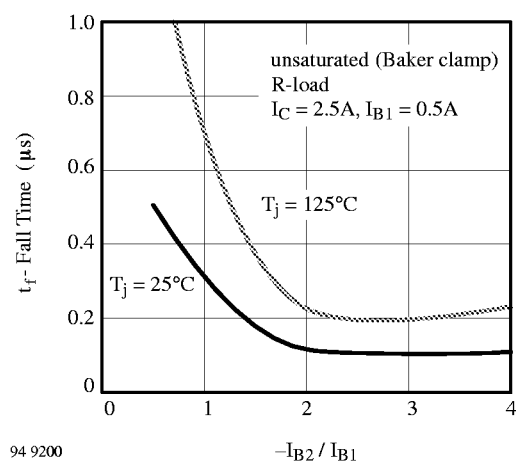


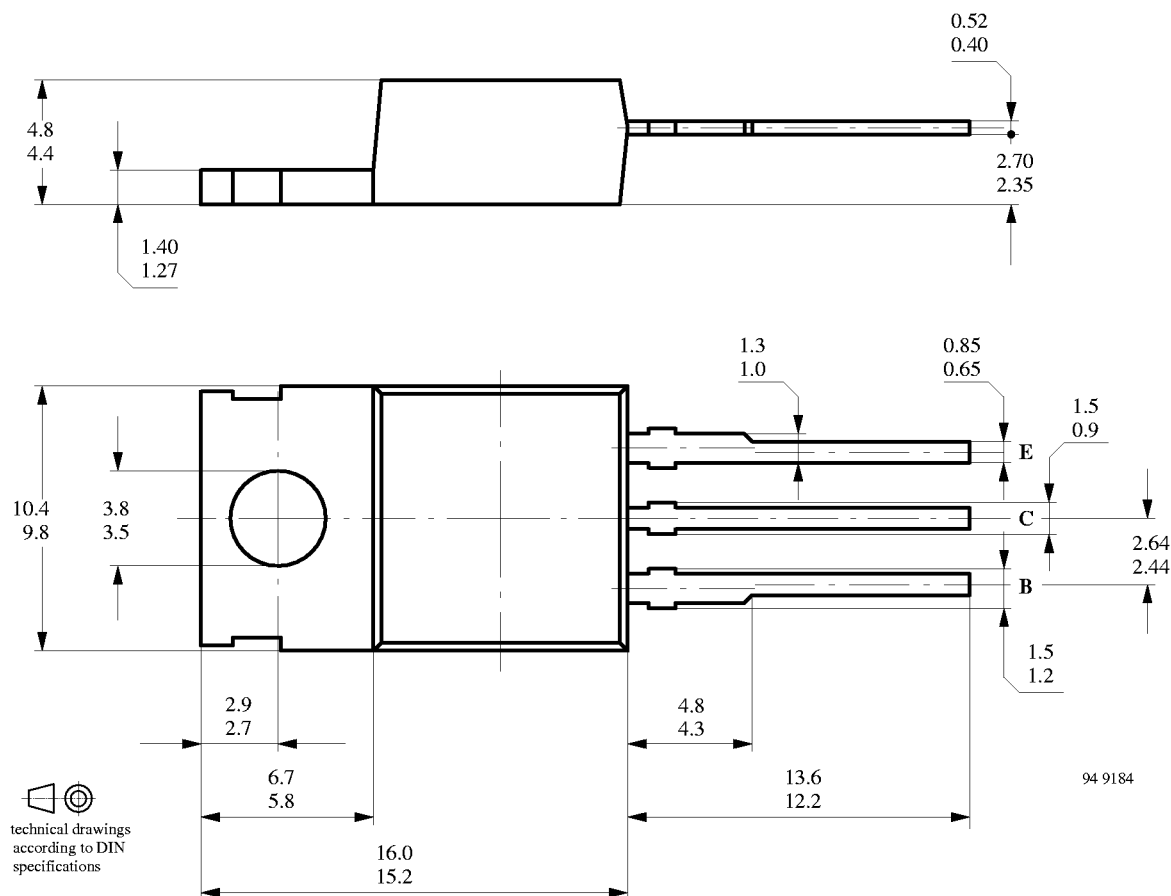
Figure 17. t_f vs. $-I_{B2}/I_{B1}$

BUF640 • BUF640A

Vishay Telefunken



Dimensions in mm



Collector connected with metallic surface

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