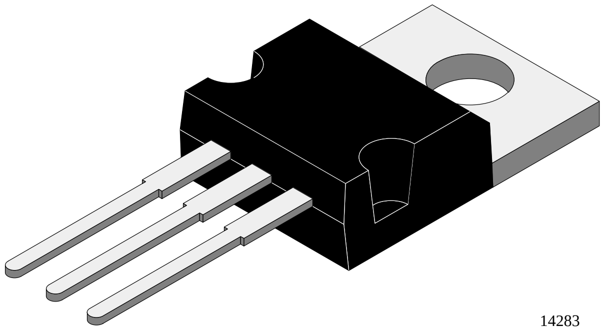
BUF744

Silicon NPN High Voltage Switching Transistor

Features

- **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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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	8	A
Collector peak current		I_{CM}	12	A
Base current		I_B	4	A
Base peak current		I_{BM}	6	A
Total power dissipation	$T_{case} \leq 25^\circ C$	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} = 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 = 500 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 = 1.3 A; I_B = 0.3 A	V_{CEsat}		0.1	0.2	V
	I_C = 4 A; I_B = 1.3 A	V_{CEsat}		0.2	0.4	V
Base-emitter saturation voltage	I_C = 1.3 A; I_B = 0.3 A	V_{BEsat}		0.9	1	V
	I_C = 4 A; I_B = 1.3 A	V_{BEsat}		1	1.2	V
DC forward current transfer ratio	V_{CE} = 2 V; I_C = 10 mA	h_{FE}	15	18		
	V_{CE} = 2 V; I_C = 1.3 A	h_{FE}	12	18		
	V_{CE} = 2 V; I_C = 4 A	h_{FE}	6			
	V_{CE} = 5 V; I_C = 8 A	h_{FE}	4			
Collector-emitter working voltage	V_S = 50 V; L = 1 mH; I_C = 8 A; I_{B1} = 2.7 A; $–I_{B2}$ = 0.8 A; $–V_{BB}$ = 5 V	V_{CEW}	500			V
Dynamic saturation voltage	I_C = 4 A; I_B = 0.8 A; t = 1 µs	$V_{CEsatdyn}$		7.5	15	V
	I_C = 4 A; I_B = 0.8 A; t = 3 µs	$V_{CEsatdyn}$		1.5	4	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 = 3 A; I_{B1} = 0.7 A; $–I_{B2}$ = 1.5 A; V_S = 125 V	t_{on}		0.85	1.2	µs
Storage time		t_s		1	1.7	µs
Fall time		t_f		0.15	0.3	µs
Inductive load (figure 3)						
Storage time	I_C = 3 A; I_{B1} = 0.7 A; $–I_{B2}$ = 1.5 A; V_S = 125 V; V_{clamp} = 300 V; $–V_{BE}$ = 5 V; L = 200 µH; T_{case} = 25°C	t_s		1.5	2.5	µs
Fall time		t_f		0.1	0.2	µs
Storage time	I_C = 3 A; I_{B1} = 0.7 A; $–I_{B2}$ = 1.5 A; V_S = 125 V; V_{clamp} = 300 V; $–V_{BE}$ = 5 V; L = 200 µH; T_{case} = 100°C	t_s		2		µs
Fall time		t_f		0.14		µs

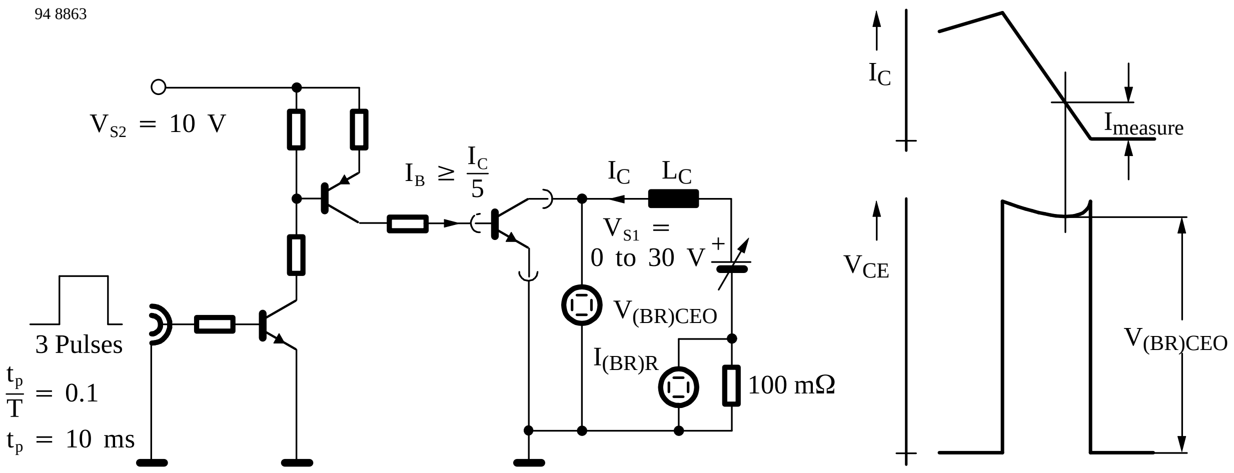

Figure 1. Test circuit for $V_{(BR)CE0}$

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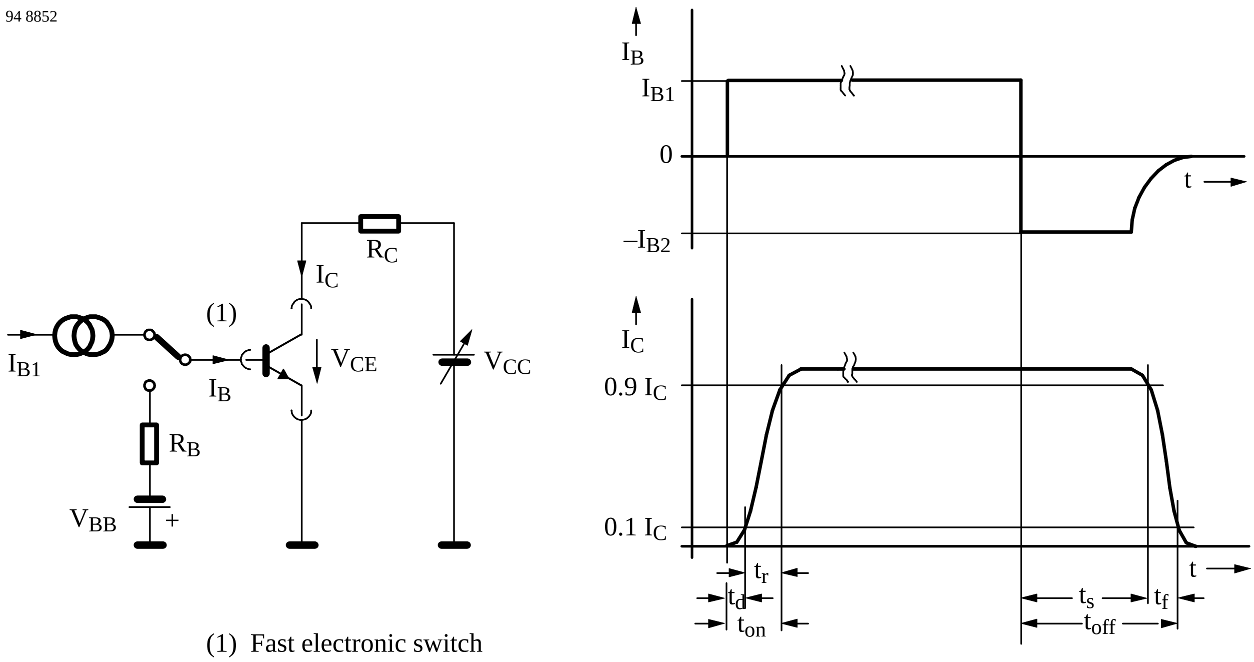

(1) Fast electronic switch

Figure 2. Test circuit for switching characteristics – resistive load

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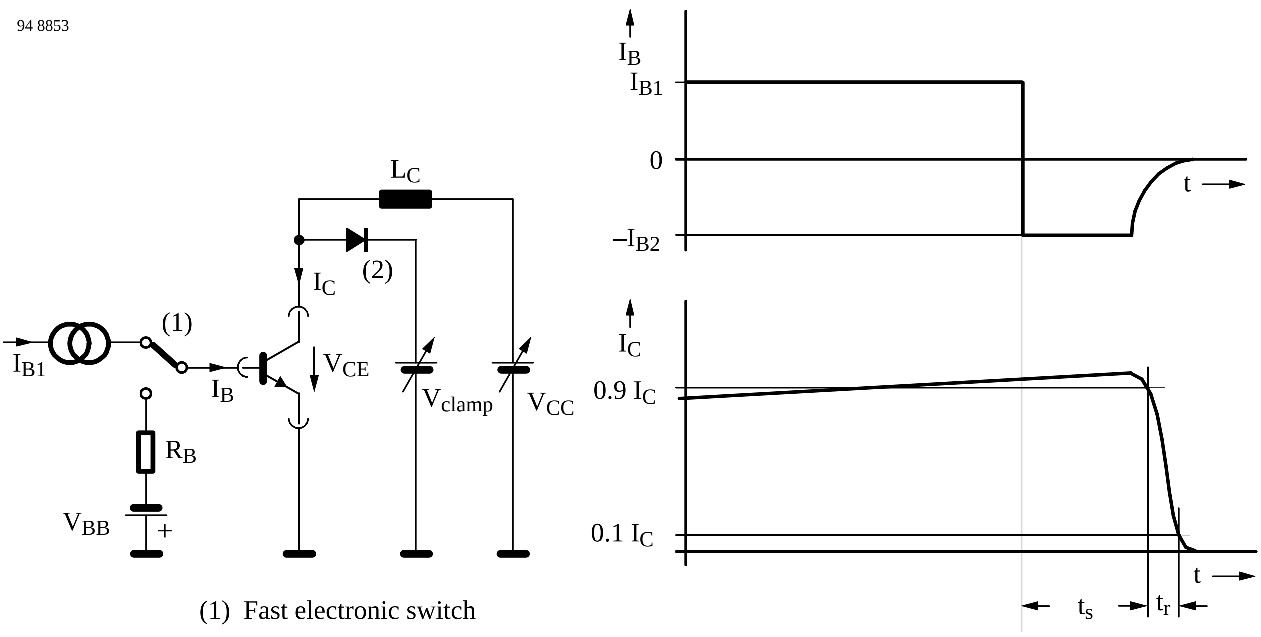

(1) Fast electronic switch
(2) Fast recovery rectifier

Figure 3. Test circuit for switching characteristics – inductive load

Typical Characteristics (T$_{case}$ = 25°C unless otherwise specified)

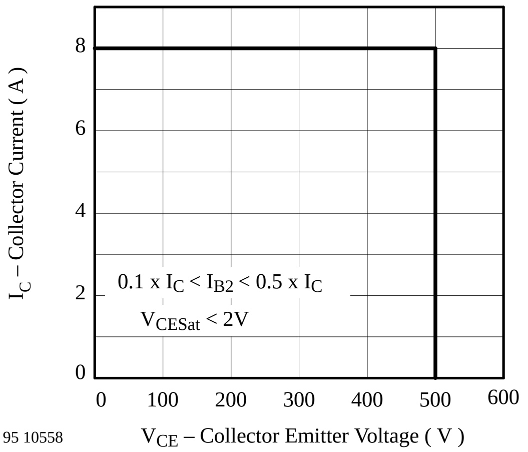

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Figure 4. V$_{CEW}$ – Diagram

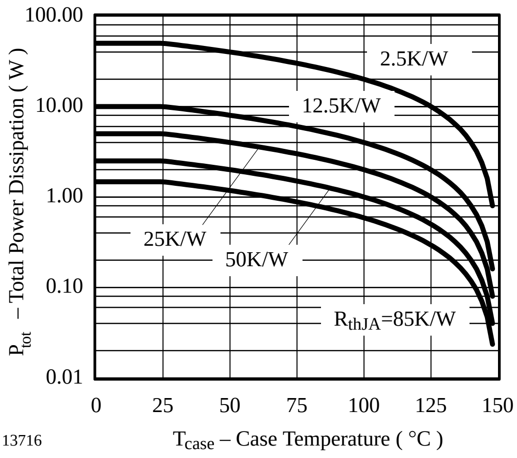

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Figure 7. P$_{tot}$ vs.T$_{case}$

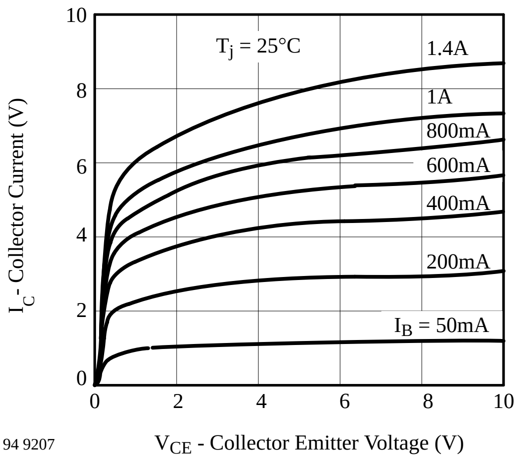

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Figure 5. I$_C$ vs. V$_{CE}$

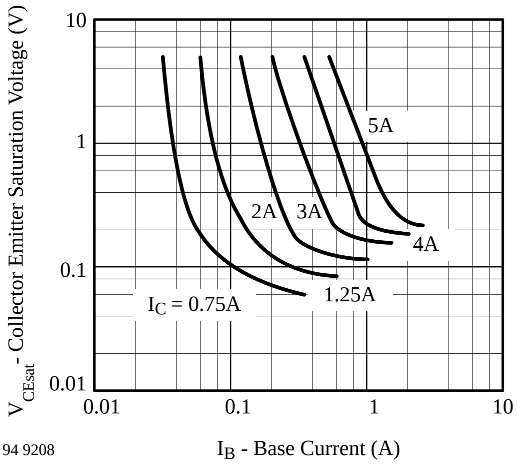

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Figure 8. V$_{CEsat}$ vs. I$_B$

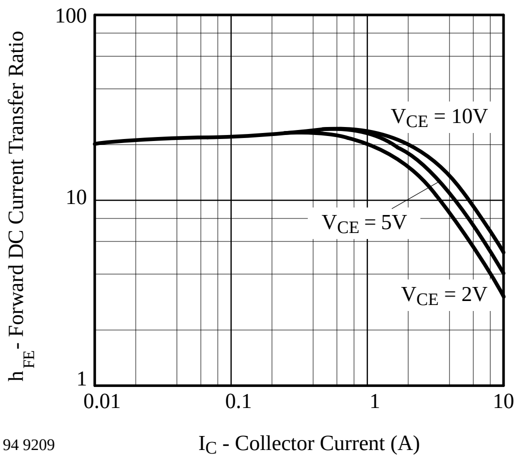

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Figure 6. h$_{FE}$ vs. I$_C$

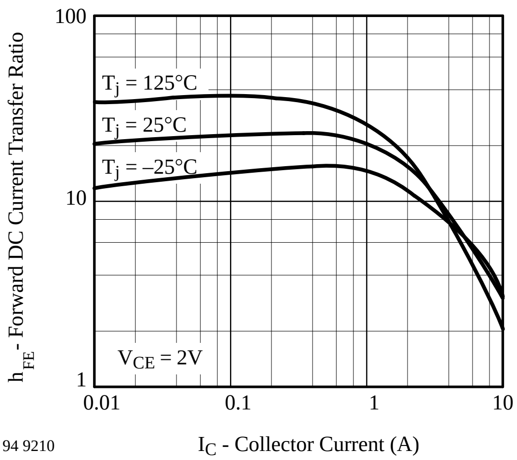

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Figure 9. h$_{FE}$ vs. I$_C$

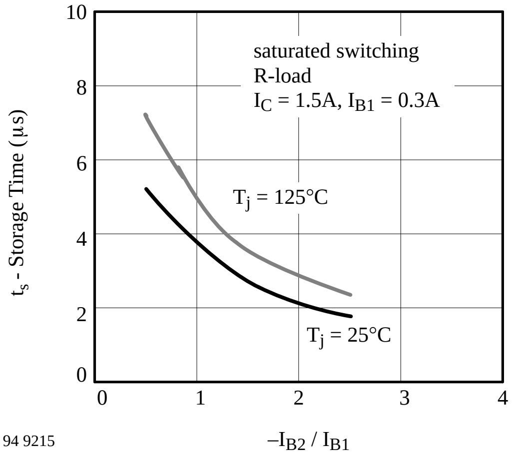


Figure 10. t_s vs. $–I_{B2}/I_{B1}$

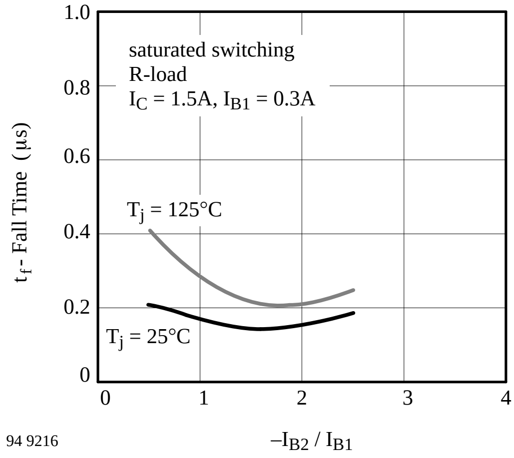


Figure 13. t_f vs. $–I_{B2}/I_{B1}$

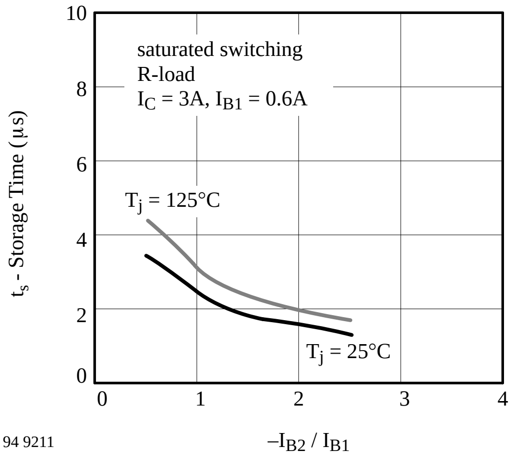


Figure 11. t_s vs. $–I_{B2}/I_{B1}$

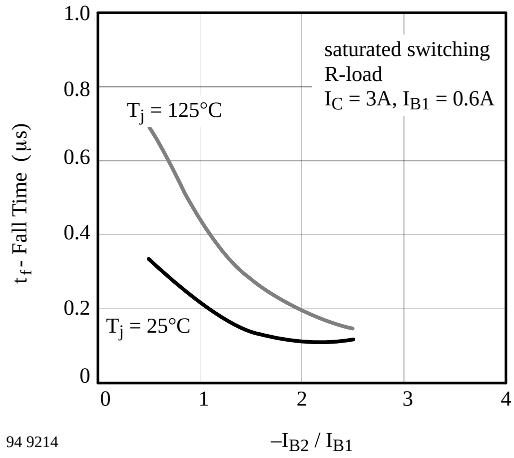


Figure 14. t_f vs. $–I_{B2}/I_{B1}$

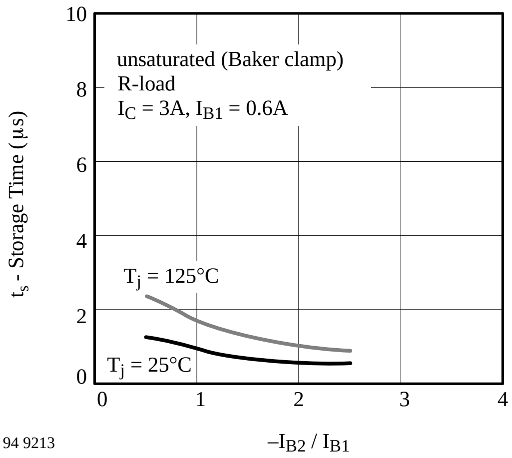


Figure 12. t_s vs. $–I_{B2}/I_{B1}$

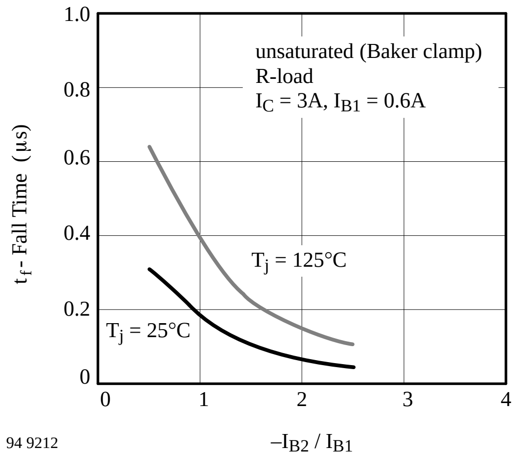


Figure 15. t_f vs. $–I_{B2}/I_{B1}$

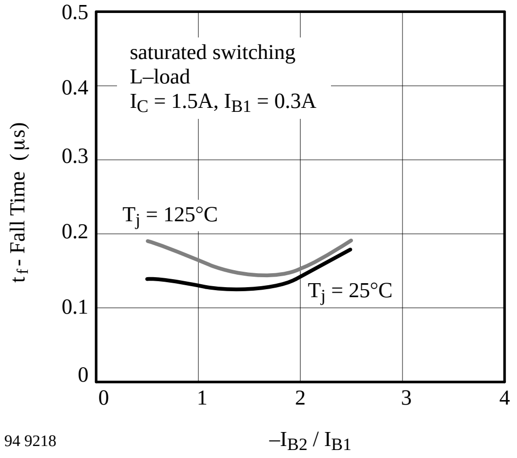
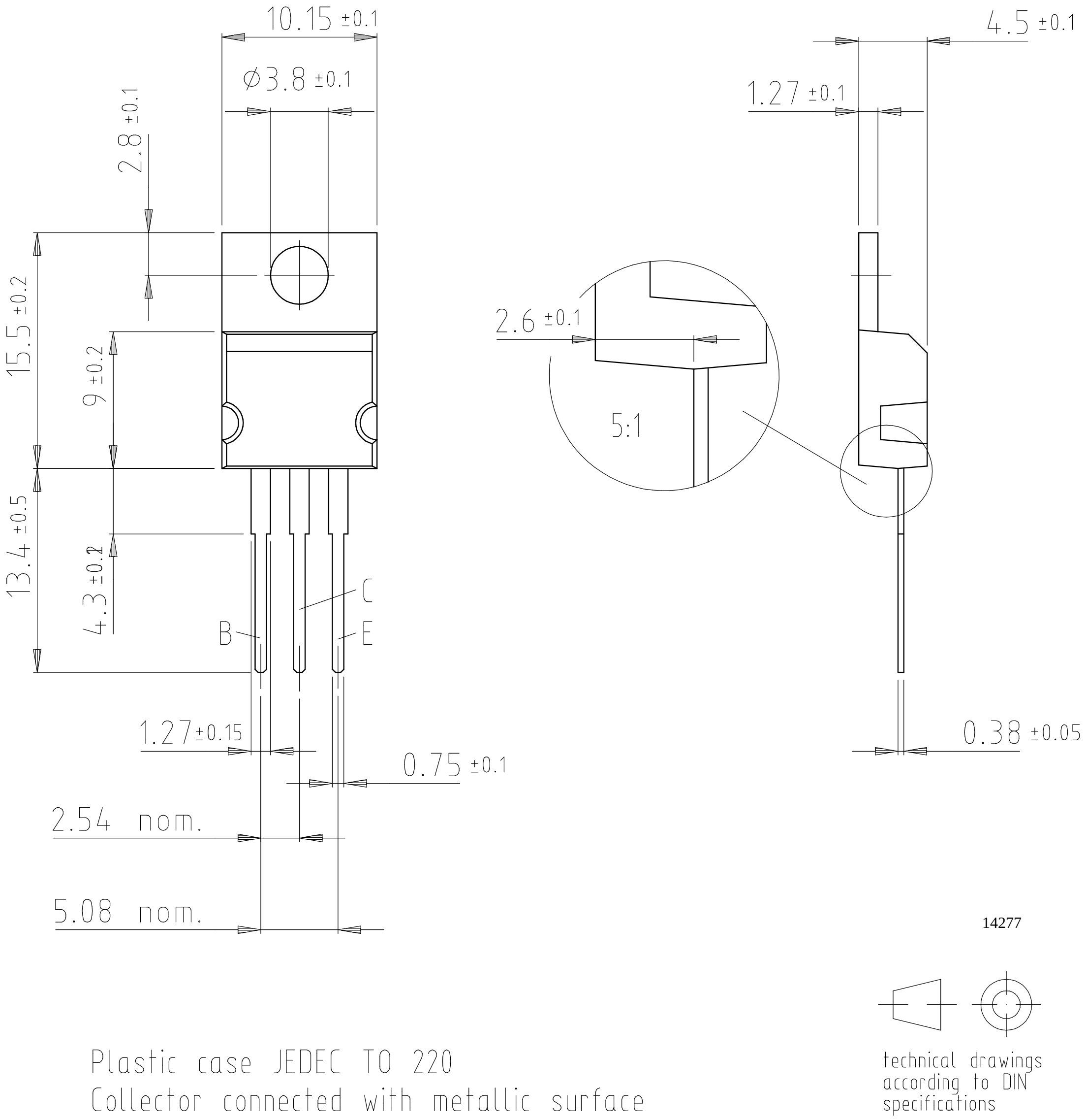


Figure 16. t_f vs. $-I_{B2}/I_{B1}$

Dimensions in mm



Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.

2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

TEMIC TELEFUNKEN microelectronic GmbH semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively

2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA

3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

TEMIC can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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