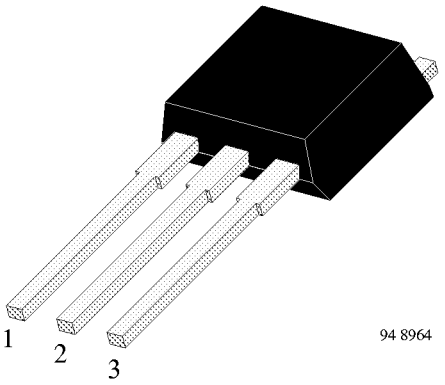
Silicon NPN High Voltage Switching Transistor

Features

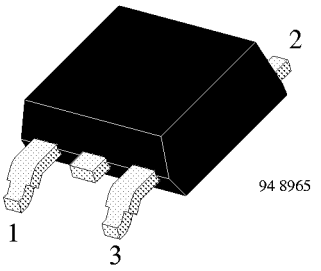
- Simple-sWitch-Off Transistor (SWOT)
- HIGH SPEED technology
- Planar passivation
- 100 kHz switching rate
- Very low switching losses
- Very low dynamic saturation
- Very low operating temperature
- Optimized RBSOA
- High reverse voltage

Applications

Electronic lamp ballast circuits
Switch-mode power supplies



BUD630
1 Base 2 Collector 3 Emitter



BUD630 –SMD 1 Base
2 Collector 3 Emitter

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	6	A
Collector peak current		I_{CM}	9	A
Base current		I_B	3	A
Base peak current		I_{BM}	4.5	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
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 = 1 A; I_B = 0.25 A	V_{CEsat}			0.2	V
	I_C = 3 A; I_B = 1 A	V_{CEsat}			0.4	V
Base-emitter saturation voltage	I_C = 1 A; I_B = 0.25 A	V_{BEsat}			1	V
	I_C = 3 A; I_B = 1 A	V_{BEsat}			1.2	V
DC forward current transfer ratio	V_{CE} = 2 V; I_C = 10 mA	h_{FE}	15			
	V_{CE} = 2 V; I_C = 1 A	h_{FE}	15			
	V_{CE} = 2 V; I_C = 3 A	h_{FE}	7			
	V_{CE} = 5 V; I_C = 6 A	h_{FE}	4			
Collector-emitter working voltage	V_S = 50 V; L = 1 mH; I_C = 6 A; I_{B1} = 2 A; $-I_{B2}$ = 0.6 A; $-V_{BB}$ = 5 V	V_{CEW}	500			V
Dynamic saturation voltage	I_C = 3 A; I_B = 0.6 A; t = 1 µs	$V_{CEsatdyn}$		5	10	V
	I_C = 3 A; I_B = 0.6 A; t = 3 µs	$V_{CEsatdyn}$		1	2.5	V
Gain bandwidth product	I_C = 200 mA; V_{CE} = 10 V; f = 1 MHz	f_T	4			MHz

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 = 1 A; I_{B1} = 0.25 A;	t_{on}		0.15	0.25	µs
Storage time	$-I_{B2}$ = 0.5 A; V_S = 250 V	t_s		2.2	3	µs
Fall time		t_f		0.3	0.4	µs
Turn on time	I_C = 3 A; I_{B1} = 0.6 A;	t_{on}		0.35	0.5	µs
Storage time	$-I_{B2}$ = 1.5 A; V_S = 250 V	t_s		1.2	2	µs
Fall time		t_f		0.1	0.15	µs
Inductive load (figure 3)						
Storage time	I_C = 1 A; I_{B1} = 0.25 A; $-I_{B2}$ = 0.5 A;	t_s		2.3	3	µs
Fall time	V_{clamp} = 300 V; L = 200 µH	t_f		0.2	0.3	µs
Storage time	I_C = 3 A; I_{B1} = 0.6 A; $-I_{B2}$ = 1.5 A;	t_s		1.3	2	µs
Fall time	V_{clamp} = 300 V; L = 200 µH	t_f		0.1	0.15	µs

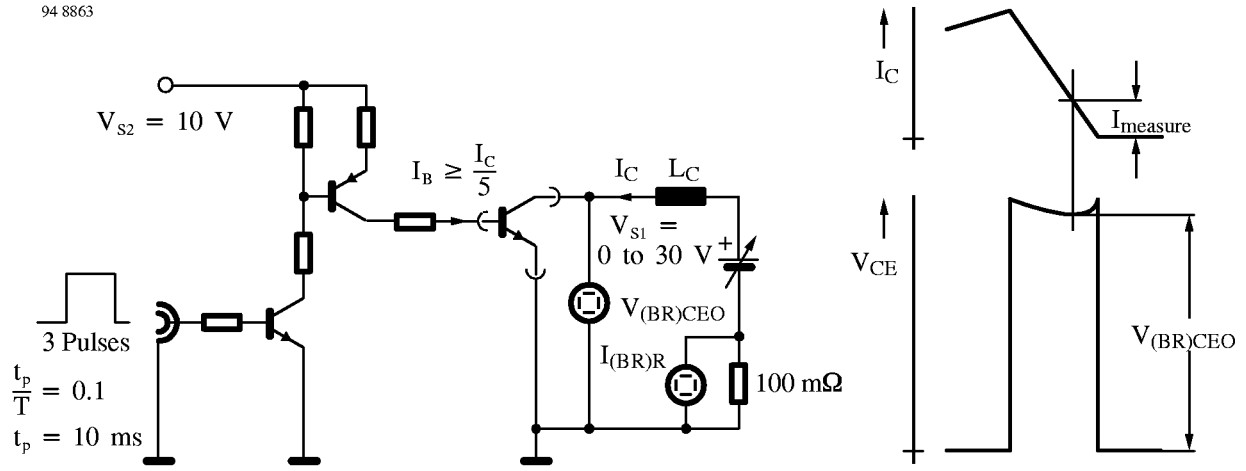


Figure 1. Test circuit for $V_{(BR)CE0}$

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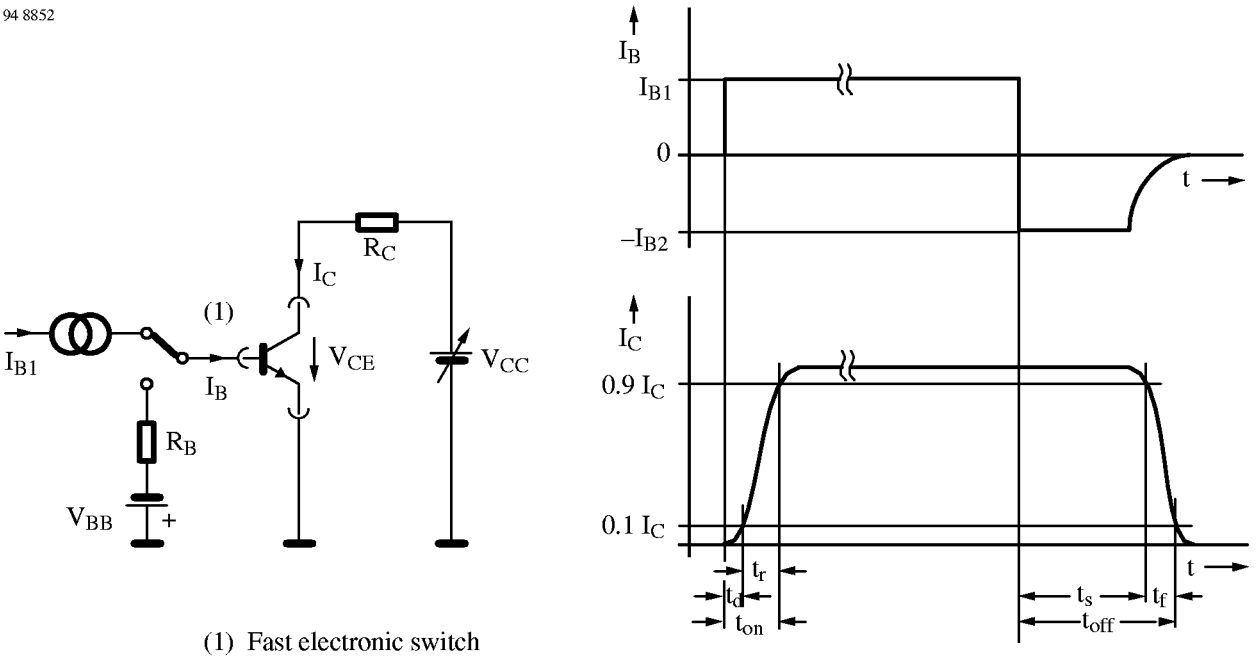

(1) Fast electronic switch

Figure 2. Test circuit for switching characteristics – resistive load

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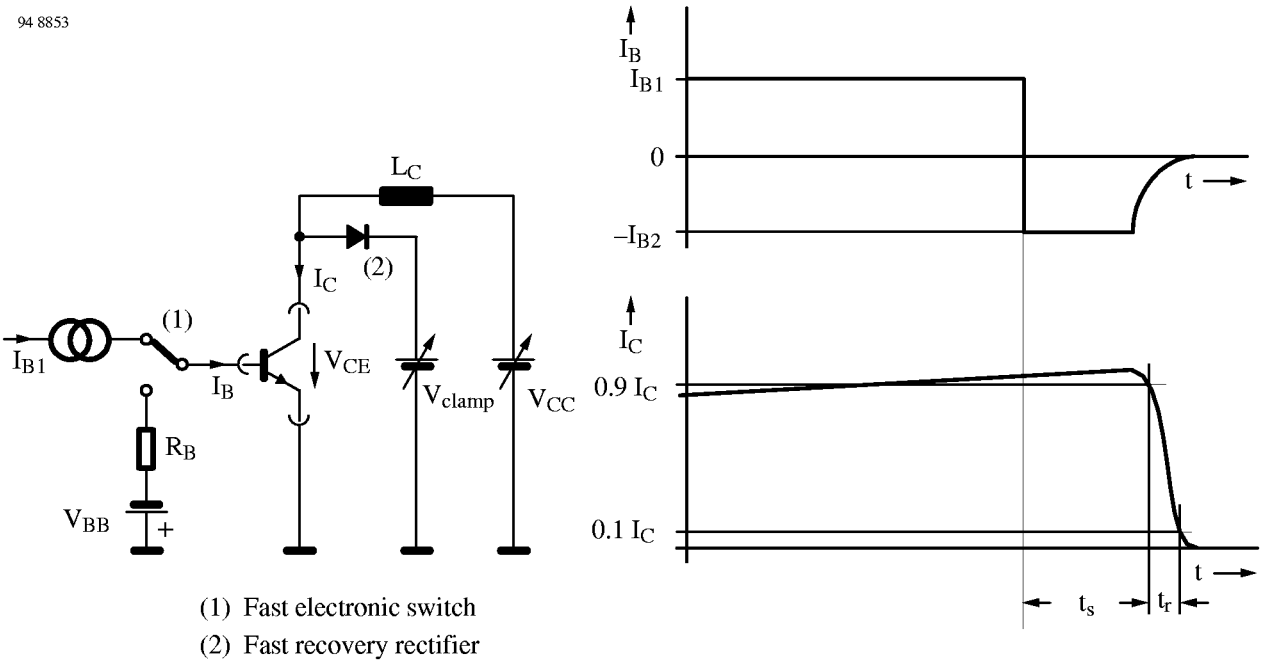


(1) Fast electronic switch
(2) Fast recovery rectifier

Figure 3. Test circuit for switching characteristics – inductive load

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

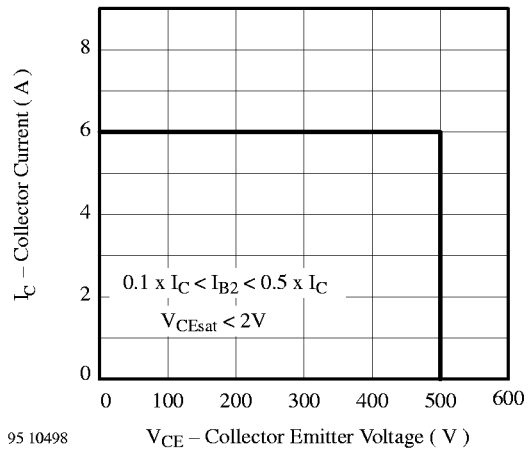


Figure 4. V_{CEW} – Diagram

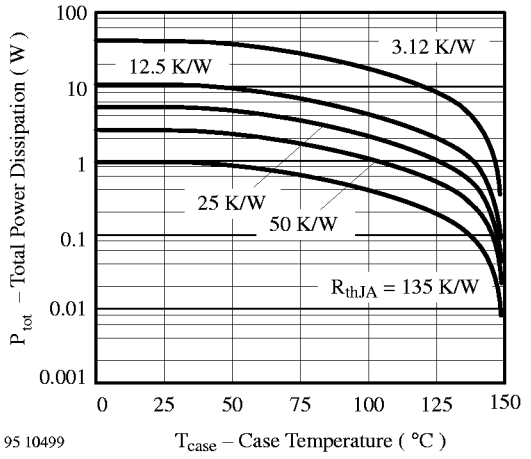


Figure 7. P_{tot} vs.T_{case}

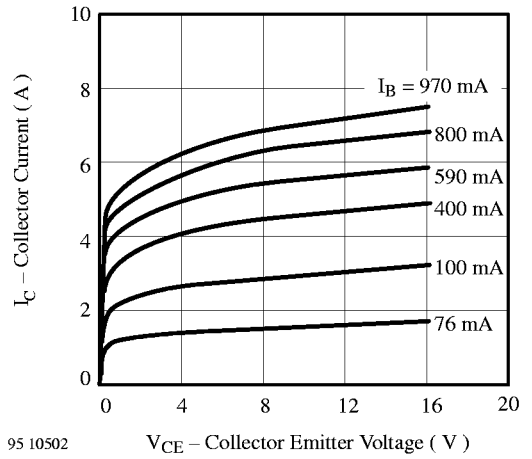


Figure 5. I_C vs. V_{CE}

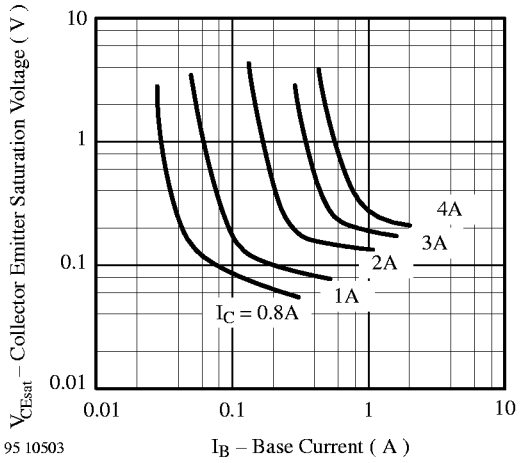


Figure 8. V_{CEsat} vs. I_B

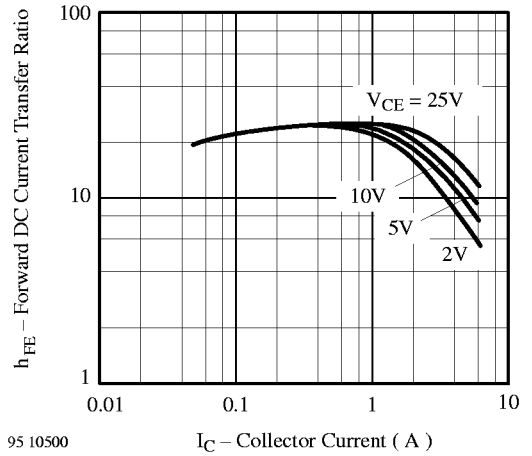


Figure 6. h_{FE} vs. I_C

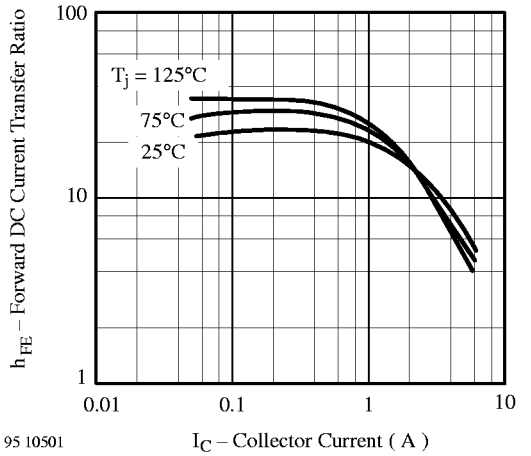


Figure 9. h_{FE} vs. I_C

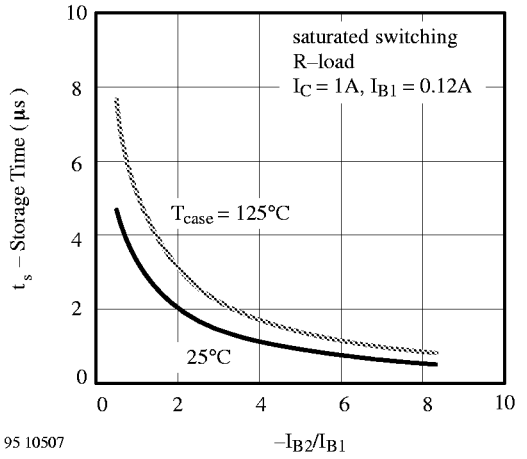


Figure 10. t_s vs. $-I_{B2}/I_{B1}$

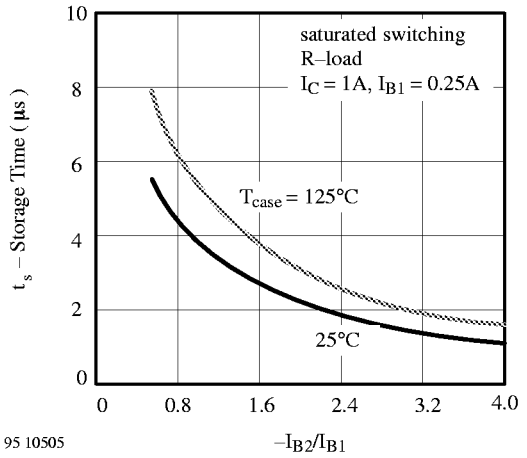


Figure 11. t_s vs. $-I_{B2}/I_{B1}$

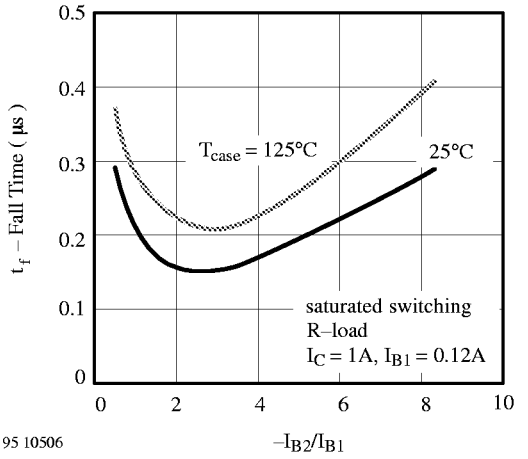


Figure 12. t_f vs. $-I_{B2}/I_{B1}$

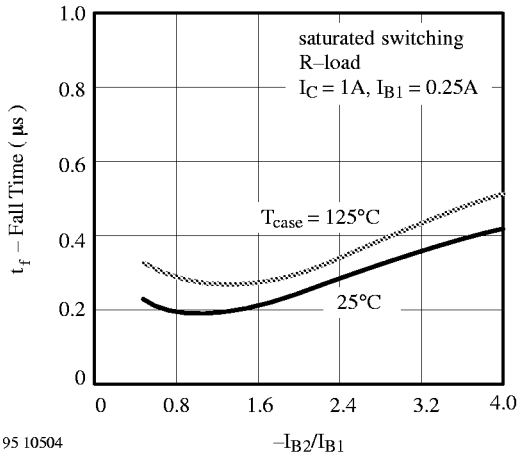
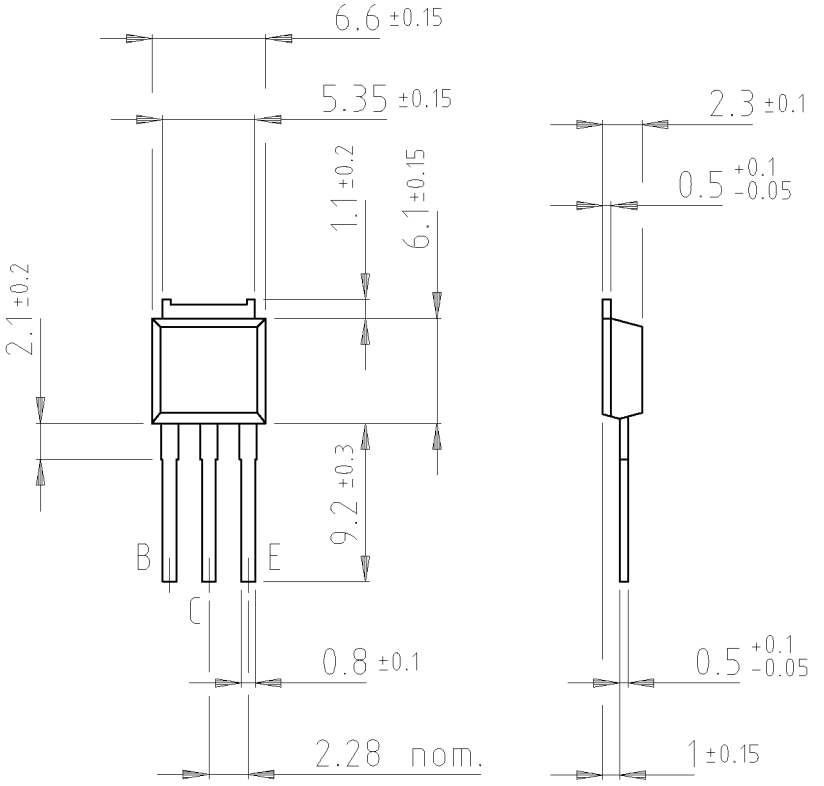


Figure 13. t_f vs. $-I_{B2}/I_{B1}$

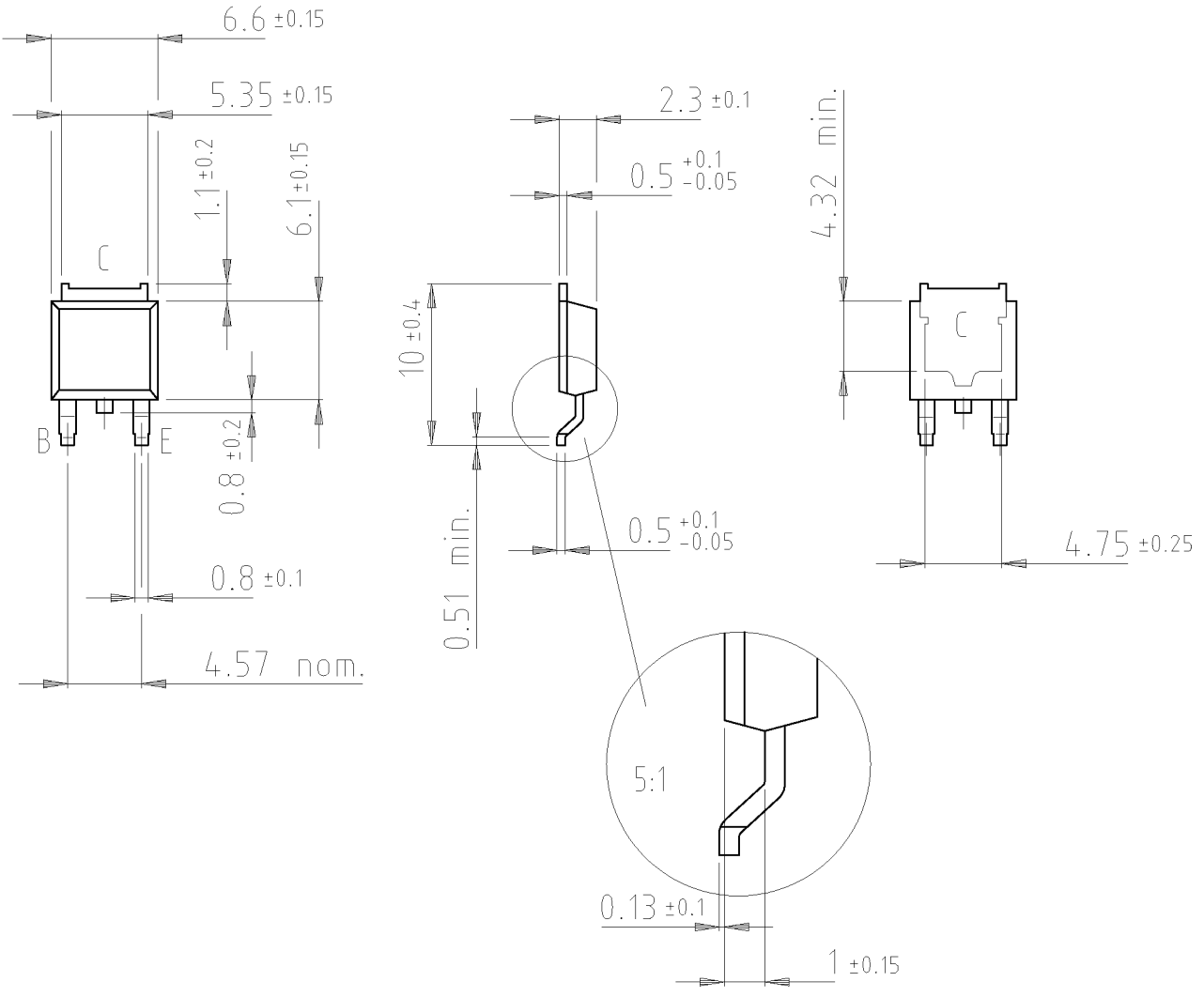
Dimensions in mm



technical drawings according to DIN specifications

Plastic case JEDEC TO 251
Collector connected with metallic surface

14292



Plastic case JEDEC TO 252
Collector connected with metallic surface

14293

technical drawings
according to DIN
specifications

For ordering TO 252 add SMD to the type number (i.e. BUD630 –SMD)