

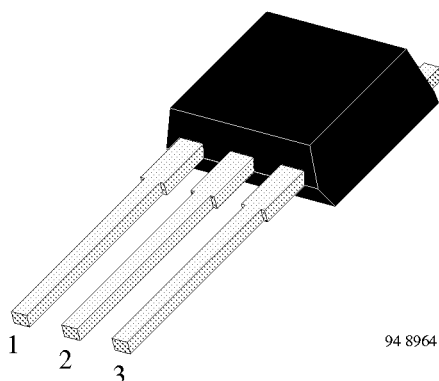
Silicon NPN High Voltage Switching Transistor

Features

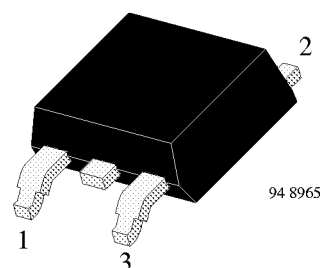
- Simple-sWitch-Off Transistor (SWOT)
- HIGH SPEED technology
- Planar passivation
- 100 kHz switching rate
- Very low switching losses
- Very low dynamic saturation
- Very low operating temperature
- Optimized RBSOA
- High reverse voltage

Applications

Electronic lamp ballast circuits
Switch-mode power supplies



BUD616A
1 Emitter 2 Collector 3 Base



BUD616A -SMD
1 Emitter 2 Collector 3 Base

Absolute Maximum Ratings

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

Parameter	Test Conditions	Symbol	Value	Unit
Collector-emitter voltage		V_{CEO}	450	V
		V_{CES}	1000	V
Emitter-base voltage		V_{EBO}	12	V
Collector current		I_C	1.6	A
Collector peak current		I_{CM}	2.4	A
Base current		I_B	0.8	A
Base peak current		I_{BM}	1.2	A
Total power dissipation	$T_{case} \leq 50^{\circ}C$	P_{tot}	20	W
Junction temperature		T_j	150	$^{\circ}C$
Storage temperature range		T_{stg}	-65 to +150	$^{\circ}C$

Maximum Thermal Resistance

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

Parameter	Test Conditions	Symbol	Value	Unit
Junction case		R_{thJC}	5	K/W

Electrical Characteristics

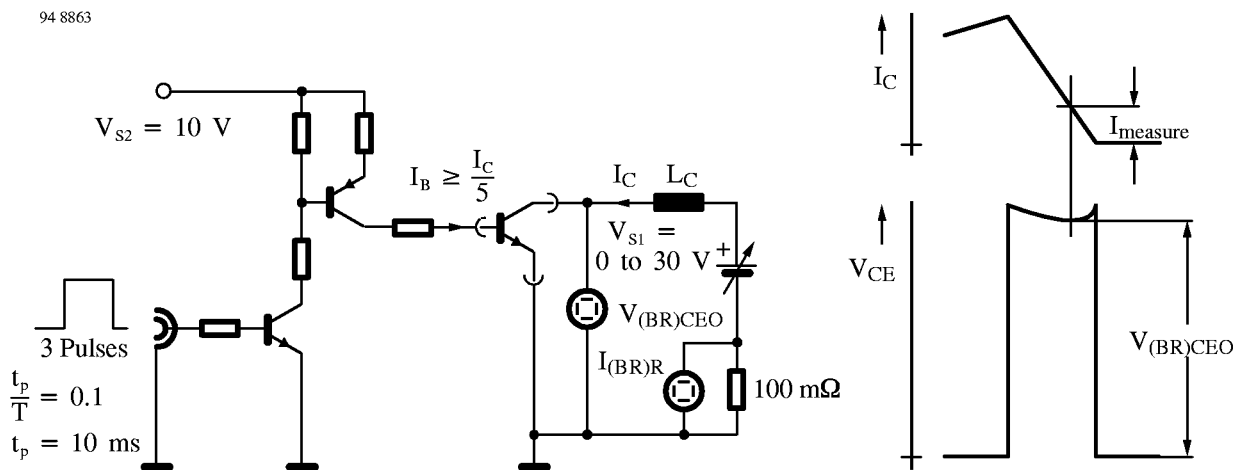
$T_{\text{case}} = 25^{\circ}\text{C}$, unless otherwise specified

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Collector cut-off current	$V_{\text{CES}} = 1000 \text{ V}$	I_{CES}			50	μA
	$V_{\text{CES}} = 1000 \text{ V}; T_{\text{case}} = 125^{\circ}\text{C}$	I_{CES}			0.5	mA
Collector-emitter breakdown voltage (figure 1)	$I_{\text{C}} = 300 \text{ mA}; L = 125 \text{ mH}; I_{\text{measure}} = 100 \text{ mA}$	$V_{(\text{BR})\text{CEO}}$	450			V
Emitter-base breakdown voltage	$I_{\text{E}} = 1 \text{ mA}$	$V_{(\text{BR})\text{EBO}}$	12			V
Collector-emitter saturation voltage	$I_{\text{C}} = 0.25 \text{ A}; I_{\text{B}} = 65 \text{ mA}$	V_{CEsat}			0.2	V
	$I_{\text{C}} = 0.8 \text{ A}; I_{\text{B}} = 250 \text{ mA}$	V_{CEsat}			0.4	V
Base-emitter saturation voltage	$I_{\text{C}} = 0.25 \text{ A}; I_{\text{B}} = 65 \text{ mA}$	V_{BEsat}			1	V
	$I_{\text{C}} = 0.8 \text{ A}; I_{\text{B}} = 250 \text{ mA}$	V_{BEsat}			1.2	V
DC forward current transfer ratio	$V_{\text{CE}} = 5 \text{ V}; I_{\text{C}} = 0.2 \text{ mA}$	h_{FE}	17			
	$V_{\text{CE}} = 5 \text{ V}; I_{\text{C}} = 300 \text{ mA}$	h_{FE}	25			
	$V_{\text{CE}} = 5 \text{ V}; I_{\text{C}} = 480 \text{ mA}$	h_{FE}	12			
	$V_{\text{CE}} = 5 \text{ V}; I_{\text{C}} = 1.6 \text{ A}$	h_{FE}	4			

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	$I_C = 250 \text{ mA}; I_{B1} = 65 \text{ mA};$ $-I_{B2} = 130 \text{ mA}; V_S = 250 \text{ V}$	t_{on}			0.2	μs
Storage time		t_s			5	μs
Fall time		t_f			0.4	μs
Turn on time	$I_C = 0.8 \text{ A}; I_{B1} = 160 \text{ mA};$ $-I_{B2} = 0.4 \text{ A}; V_S = 250 \text{ V}$	t_{on}			1	μs
Storage time		t_s			2.5	μs
Fall time		t_f			0.2	μs
Inductive load (figure 3)						
Storage time	$I_C = 250 \text{ mA}; I_{B1} = 65 \text{ mA};$ $-I_{B2} = 130 \text{ mA}; V_{\text{clamp}} = 300 \text{ V};$ $L = 200 \mu\text{H}$	t_s			5	μs
Fall time		t_f			0.3	μs
Storage time	$I_C = 0.8 \text{ A}; I_{B1} = 160 \text{ mA};$ $-I_{B2} = 0.4 \text{ A}; V_{\text{clamp}} = 300 \text{ V};$ $L = 200 \mu\text{H}$	t_s			2.5	μs
Fall time		t_f			0.15	μs



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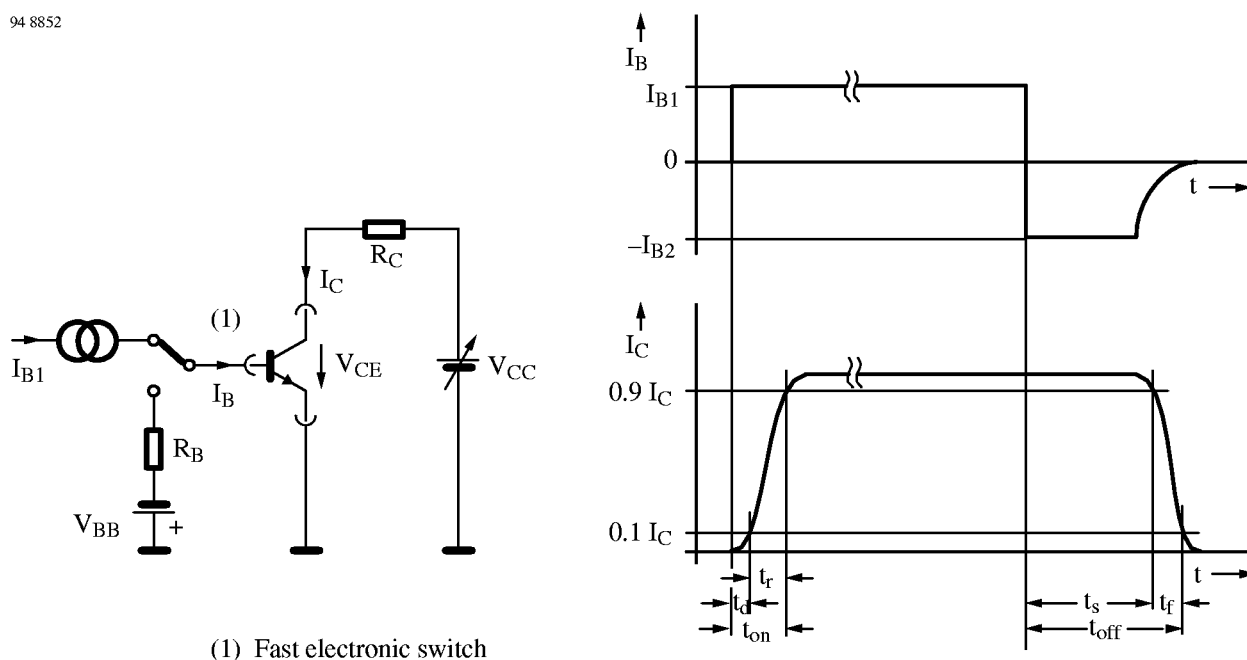


Figure 2. Test circuit for switching characteristics – resistive load

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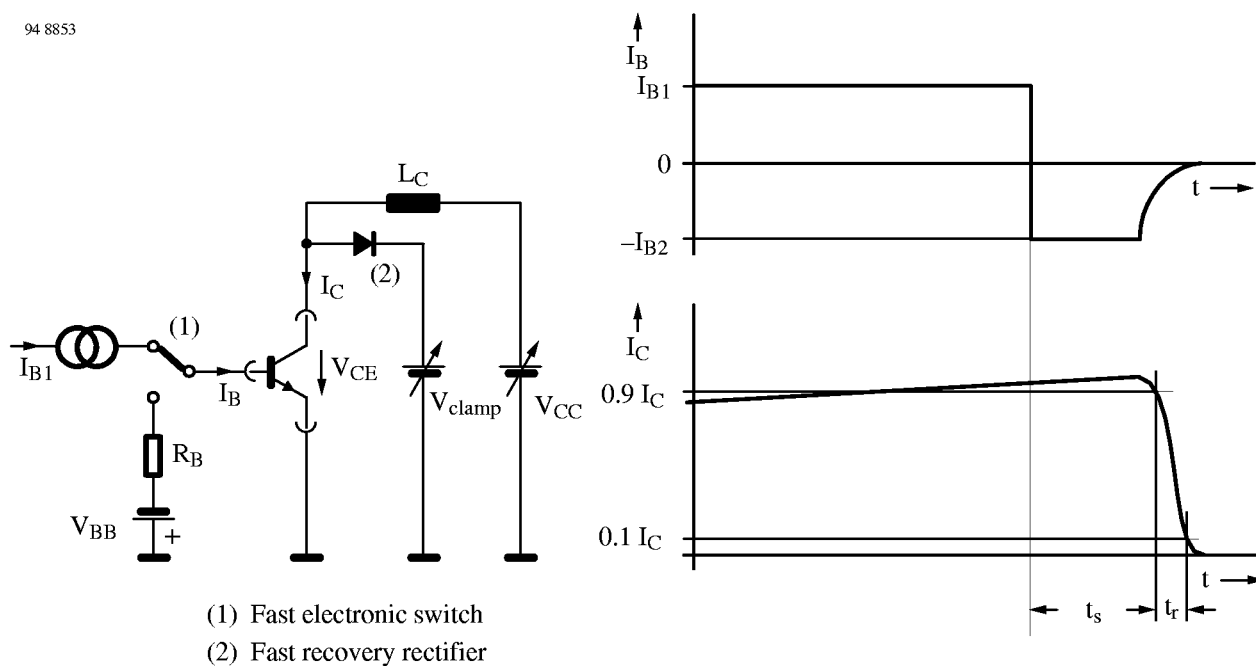


Figure 3. Test circuit for switching characteristics – inductive load

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

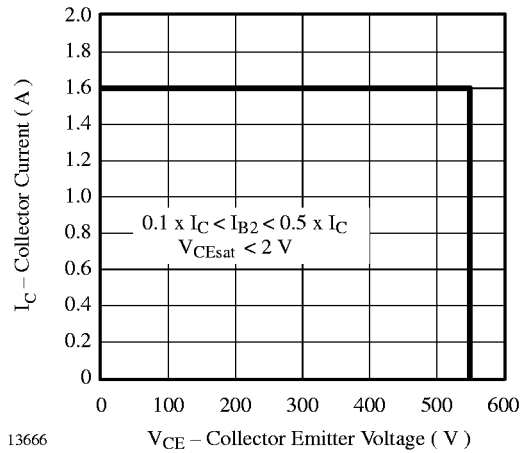


Figure 4. V_{CEW} - Diagram

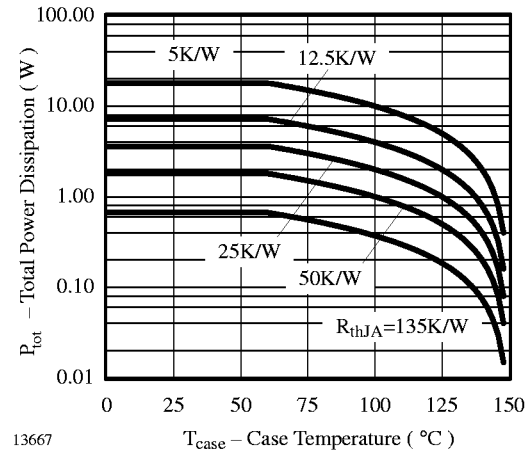


Figure 7. P_{tot} vs. T_{case}

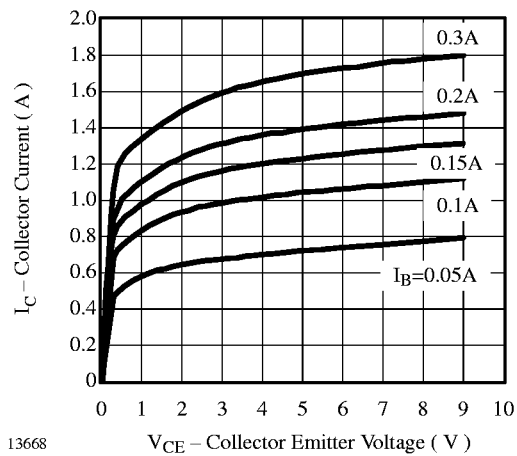


Figure 5. I_{C} vs. V_{CE}

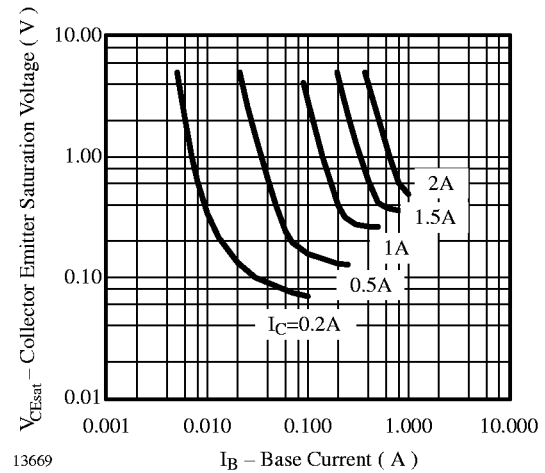


Figure 8. V_{CEsat} vs. I_{B}

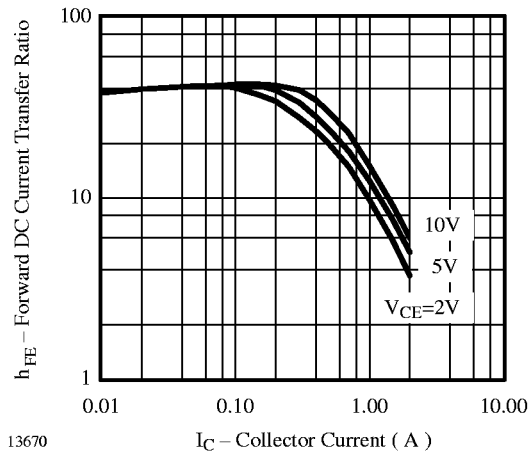


Figure 6. h_{FE} vs. I_{C}

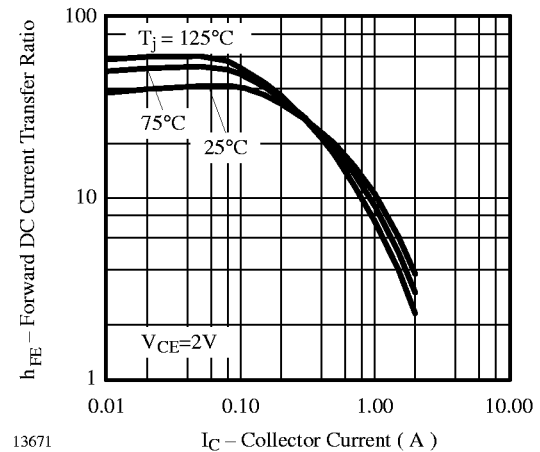


Figure 9. h_{FE} vs. I_{C}

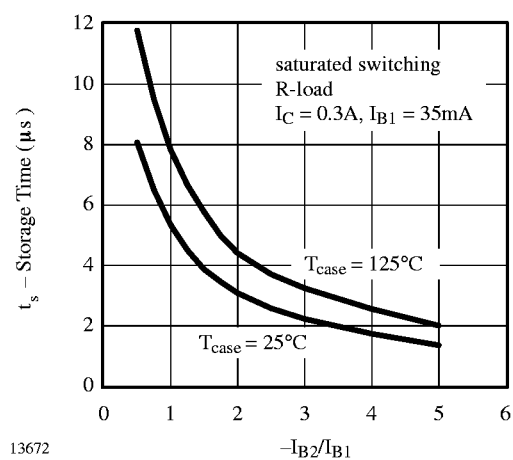


Figure 10. t_s vs. $-I_{B2}/I_{B1}$

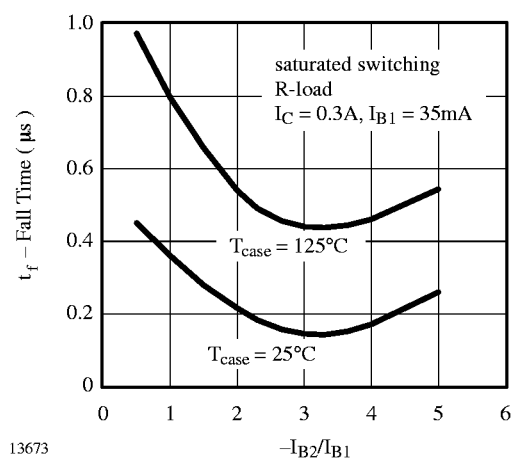


Figure 12. t_f vs. $-I_{B2}/I_{B1}$

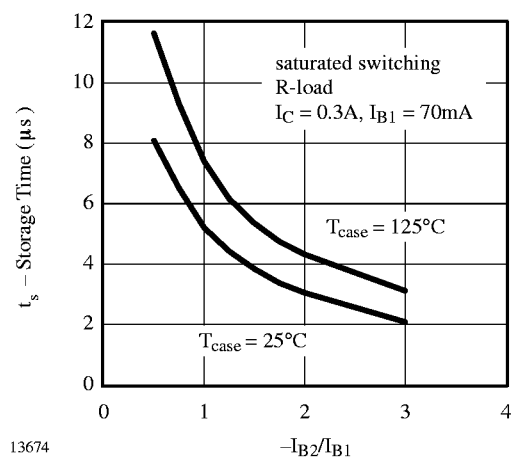


Figure 11. t_s vs. $-I_{B2}/I_{B1}$

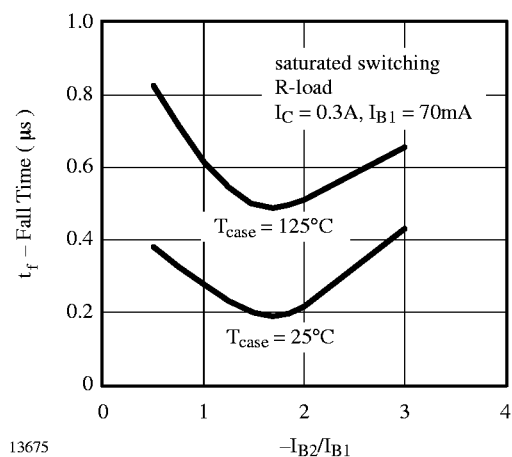
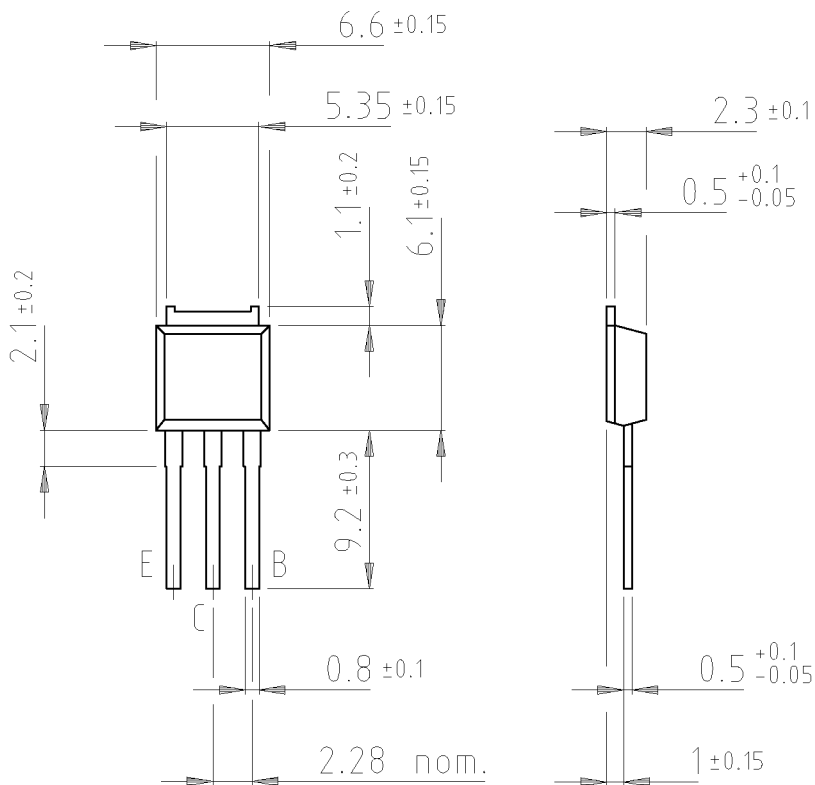
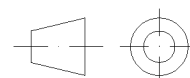


Figure 13. t_f vs. $-I_{B2}/I_{B1}$

Dimensions in mm

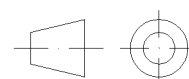
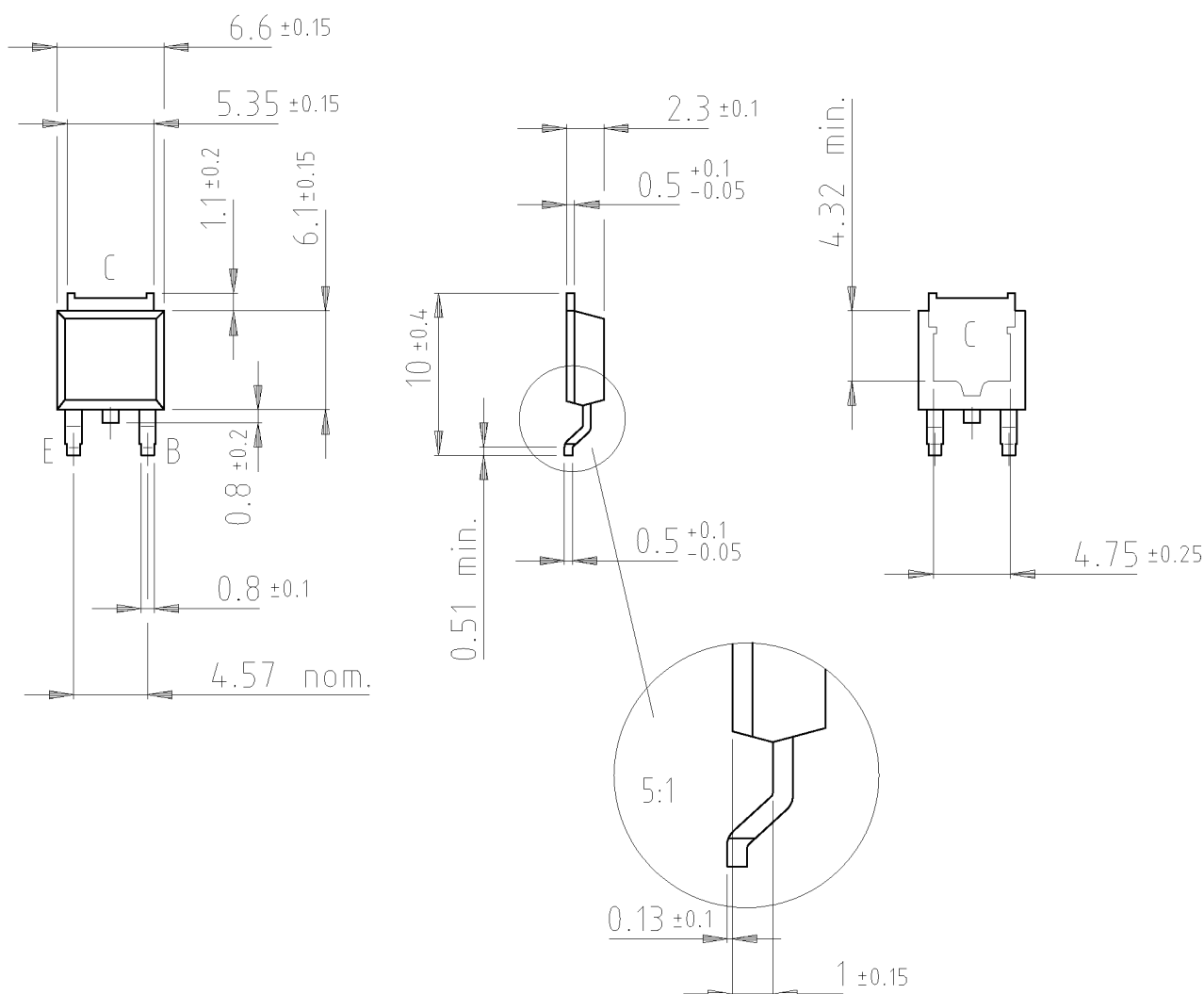


Plastic case JEDEC TO 251
Emitter connected with metallic surface



technical drawings
according to DIN
specifications

14294



technical drawings
according to DIN
specifications

14295

Plastic case JEDEC TO 252
Emitter connected with metallic surface

For ordering TO 252 add SMD to the type number (i.e. BUD616A –SMD)