

BRITISH STANDARDS INSTITUTION

2, PARK STREET, LONDON, W1A 2BS

Specification available from:— AS SHOWN IN PD 9002, and
CECC 00200

SEMELAB MANUFACTURING LTD.,
COVENTRY ROAD,
LUTTERWORTH, LEICESTERSHIRE.

TELEPHONE (045 55) 4711 TELEX 341927

BS CECC 50 004-045



ISSUE 1 21st August 1978

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ELECTRONIC COMPONENTS OF ASSESSED QUALITY
DETAIL SPECIFICATION IN ACCORDANCE WITH
BS CECC 50 000:1977

MANUFACTURER'S TYPE NUMBER
See PD9002 and CECC 00200

BUX20 BUX21 BUX22
BUX23 BUX24 BUX25

For ordering information
see clause 5

2.

CASE RATED BIPOLAR SWITCHING
TRANSISTORS

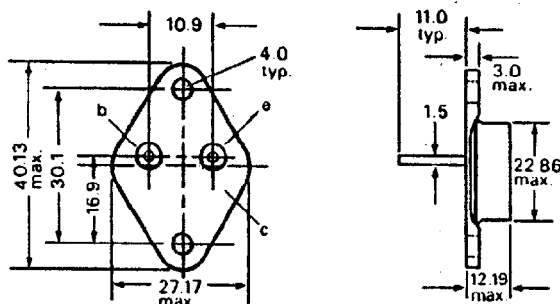
NPN SILICON TRANSISTOR IN
HERMETICALLY SEALED METAL
CASE

3.

ASSESSMENT LEVELS
F AND L

1: Outline and dimensions

Third angle projection



For detail dimensions see IEC-191-2 C14A and figure 4
Equivalent To BS3934 SO-127A JEDEC TO-3 mod.

Marking information see clause 6

4. LIMITING VALUES (Absolute maximum system)

4.1 Case operating temperature range

4.2 Storage temperature range

4.9.1 Maximum total power dissipation $T_{case} = 25^{\circ}C$

4.9.2 Virtual junction temperature

Symbol	Min.	Max.	Units
T_{case}	-55	150	$^{\circ}C$
T_{stg}	-65	200	$^{\circ}C$
P_{tot}	-	350	W
T_{vj}	-	200	$^{\circ}C$

VOLTAGES AND CURRENTS

TYPE	V_{CBO} max. V	V_{CEO} max. V	V_{CEX} max. V $V_{EB} = 1.5 V$	V_{CER} max. V $R_{BE} = 100 \Omega$	V_{EBO} max. V	I_C max. A	I_{CH} max. A $t < 10 ms$	I_B max. A
BUX20	160	125	160	150	7	50	60	10
BUX21	250	200	250	240	7	40	50	8
BUX22	300	250	300	300	7	40	50	8
BUX23	400	325	400	390	7	30	40	6
BUX24	450	400	450	440	7	20	30	4
BUX25	500	500	500	500	7	15	20	3

(For derating curve see figure 1)

(For safe operating area see figure 2)

Refer to Qualified Products List PD 9002 or CECC 00200 for details of manufacturers approved to this specification



Documents

Document Sharing Hub

5. CHARACTERISTICS

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

Clause CECC 50 004	Meas.	PARAMETER AND TEST CONDITIONS	Symbol	Min.	Max.	Units
5.1	+	Static value of common-emitter forward current transfer ratio * $V_{\text{CE}} = 2 \text{ V}$ $I_{\text{C}} = 25 \text{ A}$ BUX20 $V_{\text{CE}} = 2 \text{ V}$ $I_{\text{C}} = 12 \text{ A}$ BUX21 $V_{\text{CE}} = 4 \text{ V}$ $I_{\text{C}} = 10 \text{ A}$ BUX22 $V_{\text{CE}} = 4 \text{ V}$ $I_{\text{C}} = 8 \text{ A}$ BUX23 $V_{\text{CE}} = 4 \text{ V}$ $I_{\text{C}} = 6 \text{ A}$ BUX24 $V_{\text{CE}} = 4 \text{ V}$ $I_{\text{C}} = 4 \text{ A}$ BUX25	$h_{21\text{E}(1)}$	20 20 20 15 15 15	60 60 60 60 60 60	- - - - - -
5.1		Static value of common-emitter forward current transfer ratio * $V_{\text{CE}} = 4 \text{ V}$ $I_{\text{C}} = 50 \text{ A}$ BUX20 $V_{\text{CE}} = 4 \text{ V}$ $I_{\text{C}} = 25 \text{ A}$ BUX21 $V_{\text{CE}} = 4 \text{ V}$ $I_{\text{C}} = 20 \text{ A}$ BUX22 $V_{\text{CE}} = 4 \text{ V}$ $I_{\text{C}} = 16 \text{ A}$ BUX23 $V_{\text{CE}} = 4 \text{ V}$ $I_{\text{C}} = 12 \text{ A}$ BUX24 $V_{\text{CE}} = 4 \text{ V}$ $I_{\text{C}} = 8 \text{ A}$ BUX25	$h_{21\text{E}(2)}$	10 10 10 8 8 8	- - - - - -	- - - - - -
5.2	+	Collector-emitter saturation voltage * $I_{\text{C}} = 50 \text{ A}$ $I_{\text{B}} = 5 \text{ A}$ BUX20 $I_{\text{C}} = 25 \text{ A}$ $I_{\text{B}} = 3 \text{ A}$ BUX21 $I_{\text{C}} = 20 \text{ A}$ $I_{\text{B}} = 2.5 \text{ A}$ BUX22 $I_{\text{C}} = 16 \text{ A}$ $I_{\text{B}} = 3.2 \text{ A}$ BUX23 $I_{\text{C}} = 12 \text{ A}$ $I_{\text{B}} = 2.4 \text{ A}$ BUX24 $I_{\text{C}} = 8 \text{ A}$ $I_{\text{B}} = 1.6 \text{ A}$ BUX25	$V_{\text{CEsat}(1)}$	- - - - - -	1.2 1.5 1.5 1.0 1.0 1.0	V V V V V V
5.3	+	Collector-emitter saturation voltage * $I_{\text{C}} = 25 \text{ A}$ $I_{\text{B}} = 2.5 \text{ A}$ BUX20 $I_{\text{C}} = 12 \text{ A}$ $I_{\text{B}} = 1.2 \text{ A}$ BUX21 $I_{\text{C}} = 10 \text{ A}$ $I_{\text{B}} = 1.0 \text{ A}$ BUX22 $I_{\text{C}} = 8 \text{ A}$ $I_{\text{B}} = 1.6 \text{ A}$ BUX23 $I_{\text{C}} = 6 \text{ A}$ $I_{\text{B}} = 1.2 \text{ A}$ BUX24 $I_{\text{C}} = 4 \text{ A}$ $I_{\text{B}} = 0.8 \text{ A}$ BUX25	$V_{\text{CEsat}(2)}$	- - - - - -	0.6 0.6 1.0 0.8 0.6 0.6	V V V V V V

* Measured under pulse conditions: pulse length = 300 μs , duty cycle = 2.0%

+ Parameters which are verified in groups A and C.

5. CHARACTERISTICS

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

Clause CECC 50 001	Meas.	PARAMETER AND TEST CONDITIONS	Symbol	Min.	Max.	Units
5.4	+	Base-emitter saturation voltage * $I_C = 50\text{ A } I_B = 5\text{ A } \text{BUX20}$ $I_C = 25\text{ A } I_B = 3\text{ A } \text{BUX21}$ $I_C = 20\text{ A } I_B = 2.5\text{ A } \text{BUX22}$ $I_C = 16\text{ A } I_B = 3.2\text{ A } \text{BUX23}$ $I_C = 12\text{ A } I_B = 2.4\text{ A } \text{BUX24}$ $I_C = 8\text{ A } I_B = 1.6\text{ A } \text{BUX25}$	V_{BEsat}	-	2.0 1.5 1.5 1.5 1.5 1.5	V V V V V V
5.5	+	Collector-emitter cut-off current $V_{CE} = 80\% \text{ of rated } V_{CE0} \quad I_B = 0$	I_{CEO}	-	3.0	mA
5.5	+	Collector-emitter leakage current $V_{CE} = \text{rated } V_{CEX} \quad V_{EB} = 1.5\text{ V}$	$I_{CEX(1)}$	-	3.0	mA
5.6	+	Collector-emitter leakage current $V_{CE} = \text{rated } V_{CEX} \quad V_{EB} = 1.5\text{ V}$ $T_{case} = 125^{\circ}C$	$I_{CEX(2)}$	-	12.0	mA
	+	Emitter-base cut-off current $V_{EB} = 5\text{ V } I_C = 0$	I_{EB0}	-	1.0	mA
	+	Collector-emitter sustaining voltage * $I_C = 200\text{ mA } I_B = 0 \quad \text{BUX20}$ BUX21 BUX22 BUX23 BUX24 BUX25	V_{CE0sus}	125 200 250 325 400 500	- - - - - -	V V V V V V
		Emitter base breakdown voltage $I_E = 50\text{ mA } I_C = 0$	$V_{(BR)EBO}$	7	-	V
	+	Secondary breakdown collector current $V_{CE} = 19\text{ V } t = 1\text{ s } \text{BUX20}$ $V_{CE} = 15.5\text{ V } \text{BUX21}$ $V_{CE} = 16\text{ V } \text{BUX22}$ $V_{CE} = 16\text{ V } \text{BUX23}$ $V_{CE} = 19\text{ V } \text{BUX24}$ $V_{CE} = 25\text{ V } \text{BUX25}$	$I_{S/B(1)}$	18.5 22 22 22 18 14	- - - - - -	A A A A A A
		Secondary breakdown collector current $V_{CE} = 40\text{ V } t = 1\text{ s } \text{BUX20}$ $V_{CE} = 140\text{ V } \text{Other types}$	$I_{S/B(2)}$	1.5 0.15	- -	A A

* Measured under pulse conditions: pulse length = 300 μ s, duty cycle = 2%
+ Parameters which are verified in groups A and C.

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5. CHARACTERISTICS

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

Clause CECC 50 001	Meas.	PARAMETER AND TEST CONDITIONS	Symbol	Min.	Max.	Units
5.7.1	+	Turn-on time. See figure 3. $I_C = 50 \text{ A}$ $I_{B1} = 5.0 \text{ A}$ BUX20 $I_C = 25 \text{ A}$ $I_{B1} = 3.0 \text{ A}$ BUX21 $I_C = 20 \text{ A}$ $I_{B1} = 2.5 \text{ A}$ BUX22 $I_C = 16 \text{ A}$ $I_{B1} = 3.2 \text{ A}$ BUX23 $I_C = 12 \text{ A}$ $I_{B1} = 2.4 \text{ A}$ BUX24 $I_C = 8 \text{ A}$ $I_{B1} = 1.6 \text{ A}$ BUX25	t_{on}	-	1.5 1.2 1.3 1.3 1.6 1.8	μs μs μs μs μs μs
5.7.1	+	Fall-time. See figure 3. $I_C = 50 \text{ A}$ $I_{B1} = -I_{B2} = 5.0 \text{ A}$ BUX20 $I_C = 25 \text{ A}$ $I_{B1} = -I_{B2} = 3.0 \text{ A}$ BUX21 $I_C = 20 \text{ A}$ $I_{B1} = -I_{B2} = 2.5 \text{ A}$ BUX22 $I_C = 16 \text{ A}$ $I_{B1} = -I_{B2} = 3.2 \text{ A}$ BUX23 $I_C = 12 \text{ A}$ $I_{B1} = -I_{B2} = 2.4 \text{ A}$ BUX24 $I_C = 8 \text{ A}$ $I_{B1} = -I_{B2} = 1.6 \text{ A}$ BUX25	t_f	-	0.3 0.4 0.5 1.2 1.4 1.6	μs μs μs μs μs μs
5.7.2	+	Storage time. See figure 3. $I_C = 50 \text{ A}$ $I_{B1} = -I_{B2} = 5.0 \text{ A}$ BUX20 $I_C = 25 \text{ A}$ $I_{B1} = -I_{B2} = 3.0 \text{ A}$ BUX21 $I_C = 20 \text{ A}$ $I_{B1} = -I_{B2} = 2.5 \text{ A}$ BUX22 $I_C = 16 \text{ A}$ $I_{B1} = -I_{B2} = 3.2 \text{ A}$ BUX23 $I_C = 12 \text{ A}$ $I_{B1} = -I_{B2} = 2.4 \text{ A}$ BUX24 $I_C = 8 \text{ A}$ $I_{B1} = -I_{B2} = 1.6 \text{ A}$ BUX25	t_s	-	1.2 1.8 2.0 2.5 3.0 5.0	μs μs μs μs μs μs
5.7.2		Transition frequency $V_{CE} = 15 \text{ V}$ $I_C = 1 \text{ A}$ $f = 10 \text{ MHz}$	f_T	0	-	Hz
5.9		Thermal resistance junction to case	$R_{\text{th } j\text{-case}}$	-	0.5	$^{\circ}\text{C/W}$

* Measured under pulse conditions: pulse length = 300 μs , duty cycle = 2.0%
+ Parameters which are verified in groups A and C.

6. MARKING

6.1 Each device shall bear the following marking:

- (a) Terminal identification
- (b) Type number
- (c) Date code
- (d) Manufacturer's trademark or factory identification code

6.2 Each package containing one or more of these transistors shall bear the above markings b, c and d and in addition, this detail specification number BS CECC 50 004-045 Issue 1 dated August 1978

7. ORDERING INFORMATION

Orders for these transistors should contain the following minimum information:

- (a) The device type and this detail specification number.
- (b) The quantity required.
- (c) If required, screening sequence from Appendix VI of CECC 50 000.
- (d) Level of quality assessment as defined in Appendix IIA of CECC 50 000.