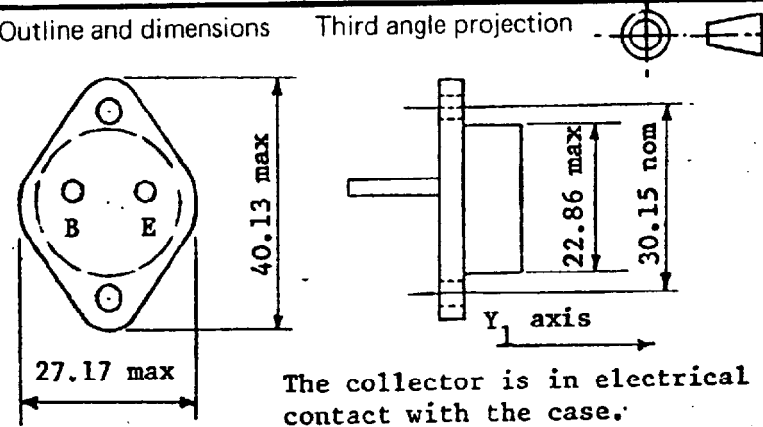


BRITISH STANDARDS INSTITUTION 2, PARK STREET, LONDON, W1A 2BS	BS CECC 50 004-130 ISSUE 1 JUNE 1983
Specification available from:— CECC 00200 AND TEXAS INSTRUMENTS LIMITED, MANTON LANE, BEDFORD, MK41 7PA TELEPHONE : BEDFORD 67466 TELEX : 82178	 Page 1 of 22 Pages
ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH BS CECC 50 000 : 1981	MANUFACTURER'S TYPE NUMBER BUX48, BUX48A
1. Outline and dimensions Third angle projection  Outline BS 3934 SO-127A IEC 191-2 C14A B18. Dimensions in millimetres. Marking information - See Clause 6	SEE PD 9002 AND CECC 00200 For ordering information see Clause 7 2. CASE RATED BIPOLAR POWER TRANSISTORS FOR HIGH VOLTAGE SWITCHING APPLICATIONS. NPN TRIPLE DIFFUSED SILICON PLANAR TRANSISTORS IN HERMETICALLY SEALED METAL CASE. 3. ASSESSMENT LEVEL F + ADDITIONAL TESTS

4. LIMITING VALUES (absolute maximum system)

These apply over the operating temperature range unless otherwise stated.

4.1.	T_{case}	Case operating temperature range	-65 °C to +200 °C
4.2.	T_{stg}	Storage temperature range	-65 °C to +200 °C

Voltage Ratings ($T_{case} = -65\text{ °C to }+125\text{ °C}$. See Fig. 7)

		BUX 48	BUX 48A
4.3.	V_{CBO} Collector-base continuous (direct) voltage. $I_E = 0$	850V	1000V
4.4.	V_{CEX} Collector-emitter continuous (direct) voltage. $V_{EB} = 2.5V$	850V	1000V
	V_{CEO} Collector-emitter continuous (direct) voltage. $I_B = 0$	400V	450V
	V_{CER} Collector-emitter continuous (direct) voltage. $R_{BE} = 10\Omega$	850V	1000V
4.5.	V_{EBO} Emitter-base continuous (direct) voltage $I_C = 0$	7V	7V

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

4.6. Current Ratings

I_C	Continuous collector current	15	A
I_{CM}	Peak collector current (note 1)	30	A
I_{CSM}	Non-repetitive collector surge current.	55	A

4.9. Power Ratings

4.9.1.	P_{tot}	Total power dissipation at $T_{case} = 25^\circ C$ (see Figs. 2 & 3)	180	W
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5. CHARACTERISTICS (not for inspection purposes) at $T_{case} = 25^\circ C$ unless otherwise stated.

$V_{CEO(sus)}$	Collector-emitter sustaining voltage (inductive loop switching measurement)			
	$I_C = 200mA$ $L = 25\text{ mH}$			
		BUX 48	400	V min.
		BUX 48A	450	V min.

5.1.	$h_{21E(1)}$	Static forward current transfer ratio*		
		$I_C = 500mA$ $V_{CE} = 5V$	12	min.

5.2.	$+V_{CE(sat)(1)}$	Collector emitter saturation voltage*		
		$I_C = 10A$ $I_B = 2A$ BUX 48	1.5	V max
		$I_C = 8A$ $I_B = 1.6A$ BUX 48A	1.5	V max.

	$+V_{CE(sat)(2)}$	Collector emitter saturation voltage*		
		$I_C = 500mA$ $I_B = 50mA$ BUX 48/A	1.5	V max.

	$+V_{CE(sat)(3)}$	Collector emitter saturation voltage*		
		$I_C = 15A$ $I_B = 3.0A$ BUX 48	5.0	V max.
		$I_C = 12A$ $I_B = 2.4A$ BUX 48A	5.0	V max.

5.4.	$+V_{BE(sat)}$	Base-emitter saturation voltage*		
		$I_C = 10A$ $I_B = 2.0A$ BUX 48	1.6	V max.
		$I_C = 8A$ $I_B = 1.6A$ BUX 48A	1.6	V max.

* These parameters are measured under pulsed conditions. Pulse width = 300 μ S, Duty Cycle = 2%

† Measured in Groups A or C

NOTE 1: Pulse test, pulse duration = 2ms

5. CHARACTERISTICS (Cont'd)

5.5.	$\dagger I_{CEX(1)}$	Collector-emitter cut-off current					
		$V_{EB} = 2.5V$	$V_{CE} = 850V$	BUX 48	0.2mA	max.	
			$V_{CE} = 1000V$	BUX 48A	0.2mA	max	
	$\dagger I_{CER(1)}$	Collector-emitter cut-off current					
		$R_{BE} = 10$	$V_{CE} = 850V$	BUX 48	0.5mA	max.	
			$V_{CE} = 1000V$	BUX 48A	0.5mA	max.	
5.6.	$\dagger I_{CEX(2)}$	Collector-emitter cut-off current					
		$V_{EB} = 2.5V$					
		$V_{CE} = 850V$	$T_{case} = 125^{\circ}C$	BUX 48	2.0mA	max.	
		$V_{CE} = 1000V$	$T_{case} = 125^{\circ}C$	BUX 48A	2.0mA	max.	
	$\dagger I_{CER(2)}$	Collector-emitter cut-off current					
		$R_{BE} = 10$	$T_{case} = 125^{\circ}C$				
		$V_{CE} = 850V$		BUX 48	4.0mA	max.	
		$V_{CE} = 1000V$		BUX 48A	4.0mA	max.	
	I_{EBO}	Emitter cut-off current					
		$V_{EB} = 5V$	$I_E = 0$		1.0mA	max.	
	V_{EBO}	Emitter-base continuous direct voltage					
		$I_E = 0.5A$	$I_C = 0$		7.0 V	max.	

5.7. Switching Characteristics at 25°C (unless otherwise stated)

5.7.1.† Resistive Load

t_{on}	Turn-on time				1.0µs	max.
t_s	Storage time				3.0µs	max.
t_f	Fall time				0.80µs	max.
		$I_C = 10A$	$V_{CC} = 150V$	BUX 48		
		$I_{BON} = 2.0A$	$I_{BOFF} = 2.0A$			
		$T_{case} = 25^{\circ}C$				

† Measured in Groups A or C

5. CHARACTERISTICS (Cont'd)

5.7. Switching Characteristics (Cont'd)

5.7.1. † Resistive Load (Cont'd)

t_{on}	Turn-on time	1.0	μs	max.
t_s	Storage time	2.0	μs	max.
t_f	Fall time	0.80	μs	max

$$I_C = 8.0A, \quad V_{CC} = 150V \quad \text{BUX 48A}$$

$$I_{BON} = 1.6A, \quad I_{BOFF} = 1.6A$$

$$T_{case} = 25^\circ C$$

Inductive Load (See Fig. 1)

t_s	Storage time	3.0	μs	max.
t_f	Fall time	0.5	μs	max.

$$I_C = 10A, \quad V_{CC} = 300V \quad \text{BUX 48}$$

$$I_{BON} = 1.6A, \quad -V_B = 5V$$

$$L_B = 3mH, \quad T_{case} = 100^\circ C$$

t_s	Storage time	3.0	μs	max.
t_f	Fall time	0.5	μs	max.

$$I_C = 8A, \quad V_{CC} = 300V \quad \text{BUX 48A}$$

$$I_{BON} = 2A, \quad -V_B = 5V$$

$$L_B = 3mH, \quad T_{case} = 100^\circ C$$

† Measured in Groups A or C

6.0 MARKING

6.1. Each device shall bear the following markings:-

- (a) Terminal identification
- (b) Type Number
- (c) Date Code
- (d) Manufacturer's trade mark 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 50 004-130.

7.0 ORDERING INFORMATION

The following minimum information is necessary to order a specific device, unless otherwise specified.

- precise type number
- CECC reference of detail specification with issue number and/or date when relevant.
- level of quality assessment as defined in Appendix IIA of CECC 50 000, and, if required, screening sequence as defined in Appendix VI of CECC 50 000.
- any other particulars

Example:- Type number-Detail specification number-Issue number-Level

RELATED DOCUMENTS

BS 2011/IEC 68	Methods for the environmental testing of electronic components and electronic equipment.
BS 3934/IEC 191	Dimensions of semiconductor devices.
BS E9000/ CECC 00 100 to 00 113	General requirements for electronic components of assessed quality.
BS E9007/CECC 00 007	Sampling plans and procedures for inspection by attributes.
BS/CECC 50 000	Harmonised generic specification for discrete semiconductor devices.
IEC 147-2	General principles of measuring methods.
PD 9002/CECC 00 200	Component selection guide.

ISSUE 1, JUNE 1983

8. INSPECTION REQUIREMENTS

ALL TESTS ARE NON-DESTRUCTIVE

GROUP A
Lot by Lot

EXAMINATION OR TEST	BS CECC 50000 REF	CONDITIONS at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated	INSPECTION REQUIREMENTS				
			LIMITS			LEVEL OF ASSMT F	
			MIN	MAX	UNIT	IL	AQL
<u>SUBGROUP A1</u> Visual Inspection	4.2.1.					I	1.5%
<u>SUBGROUP A2a</u> Non-operatives Open Circuit Short Circuit	4.3.4.	Device considered to be open circuit if $h_{21E} < 4$. Device considered to be short circuit if $I_{CEX(1)} > 200\text{mA}$.				II	0.15%
<u>SUBGROUP A2b</u> Collector- emitter cut-off current $I_{CEX(1)}$ Collector- emitter cut-off current $I_{CER(1)}$ Collector- emitter saturation voltage $V_{CE(SAT)}(1)$	4.3.4. T.009 4.3.4. T.009 4.3.4. T.003	$V_{EB} = 2.5\text{V}$ $V_{CE} = 850.0\text{V}$ BUX48 $V_{CE} = 1000.0\text{V}$ BUX48A $R_{BE} = 10\ \Omega$ $V_{CE} = 850.0\text{V}$ BUX48 $V_{CE} = 1000.0\text{V}$ BUX48A $I_C = 15\text{A}$ $I_B = 3\text{A}$ BUX48 $I_C = 12\text{A}$ $I_B = 2.4\text{A}$ BUX48A		0.2 0.2 0.5 0.5 5.0 5.0	mA mA mA mA V V	II	0.65%

8. INSPECTION REQUIREMENTS

ISSUE 1, JUNE 1983

ALL GROUP A TESTS ARE NON-DESTRUCTIVE

GROUP A
Lot by Lot

EXAMINATION OR TEST	BS CECC 50000 REF	CONDITIONS at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated	INSPECTION REQUIREMENTS				
			LIMITS			LEVEL OF ASSMT F	
			MIN	MAX	UNIT	IL	AQL
<u>SUBGROUP A3</u>						I	2.5%
Static forward current transfer ratio $h_{21E(1)}$	4.3.4. T.006	$I_C = 500\text{mA}$ $V_{CE} = 5\text{V}$	12.0				
Collector-emitter saturation voltage $V_{CE(SAT)} (2)$	4.3.4. T.003	$I_C = 500\text{mA}$) $I_B = 50\text{mA}$) BUX48/48A		1.5	V		
Collector-emitter saturation voltage $V_{CE(SAT)} (3)$	4.3.4. T.003	$I_C = 15\text{A}, I_B = 3\text{A}$ BUX48 $I_C = 12\text{A}, I_B = 2.4\text{A}$ BUX48A		5.0	V		
Base-emitter saturation voltage $V_{BE(SAT)}$	4.3.4. T.004	$I_C = 10\text{A}, I_B = 2.0\text{A}$ BUX48 $I_C = 8\text{A}, I_B = 1.6\text{A}$ BUX48A		1.6 1.6	V V		
<u>SUBGROUP A4</u>						S4	4.0%
Switching times	4.3.4.7 T.041						
Turn-on time t_{on}		BUX48 $I_C = 10\text{A}, V_{CC} = 150\text{V}$		1.0	μs		
Storage time t_s		$I_{BON} = 2.0\text{A}, I_{BOFF} = 2.0\text{A}$		3.0	μs		
Fall time t_f				0.80	μs		
Turn-on time t_{on}		BUX48A $I_C = 8\text{A}, V_{CC} = 150\text{V}$		1.0	μs		
Storage time t_s		$I_{BON} = 1.6\text{A}, I_{BOFF} = 1.6\text{A}$		3.0	μs		
Fall time t_f				0.80	μs		