

BRITISH STANDARDS INSTITUTION

2, PARK STREET, LONDON, W1A 2BS

Specification available from:— AS SHOWN IN PD 9002, and
CECC 00200SEMELAB MANUFACTURING LTD.,
COVENTRY ROAD,
LUTTERWORTH, LEICESTERSHIRE.

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BS CECC 50 004-042**ISSUE 2** June 1982

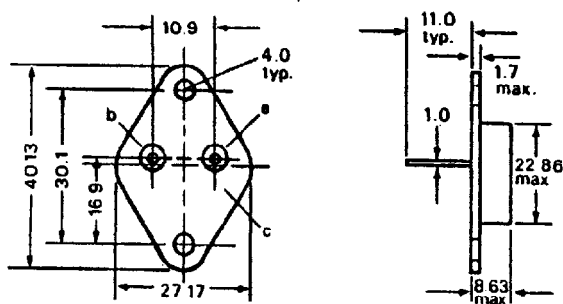
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ELECTRONIC COMPONENTS OF ASSESSED QUALITY
DETAIL SPECIFICATION IN ACCORDANCE WITH
BS CECC 50 000:1981**MANUFACTURER'S TYPE NUMBER**

See PD 9002 and CECC 00200

2N3055**1. Outline and dimensions**

Third angle projection



For detail dimensions see IEC-191-2 III-14B and II-18

Equivalent To BS3934

Marking information see clause 6

For ordering information
see clause 5**2.**CASE RATED BIPOLAR
SWITCHING TRANSISTOR
100V, 15A, 115WSILICON NPN TRANSISTOR
GLASS-METAL SEAL**3.**

LEVEL F

4. LIMITING VALUES (Absolute maximum system)

These apply over the full temperature range unless otherwise stated

	Symbol	Min.	Max.	Unit
4.1 Case operating temperature range	T_{case}	-55	+150	$^{\circ}C$
4.2 Storage temperature range	T_{stg}	-55	+150	$^{\circ}C$
4.3 Continuous (direct) collector-base voltage	V_{CBO}		100	V
4.4 Continuous (direct) collector-emitter voltage with zero base current	V_{CEO}		60	V
4.4 Continuous (direct) collector-emitter voltage with reverse bias voltage	V_{CEX}		90	V
4.4 Continuous (direct) collector-emitter breakdown voltage with base-emitter resistance $R_{BE} = 100 \text{ ohms}$, $I_C = 0.2 \text{ A}$	V_{CER}	90		V
4.5 Continuous (direct) emitter-base voltage	V_{EB0}		7	V
4.6 Continuous (direct) collector current	I_C		15	A
4.6 Peak repetitive collector current	I_{CM}		15	A
4.7 Continuous (direct) base current	I_B		7	A
4.7 Peak repetitive base current	I_{BM}		7	A
4.9.1 Total power dissipation at $T_{case} = 25^{\circ}C$ (for derating of P_{tot} vs T_{case} see Fig.1)	P_{tot}		115	W
4.10 For safe operating area rating see Fig.2				

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

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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 at $V_{\text{CE}} = 4 \text{ V}$, $I_{\text{C}} = 4 \text{ A}$ *	$h_{21\text{E}}$	20		
5.2	+	Collector-emitter saturation voltage at $I_{\text{C}} = 10 \text{ A}$, $I_{\text{B}} = 2.0 \text{ A}$ *	$V_{\text{CE(sat)1}}$		4	V
5.3	+	Collector-emitter saturation voltage at $I_{\text{C}} = 4 \text{ A}$, $I_{\text{B}} = 0.4 \text{ A}$ *	$V_{\text{CE(sat)2}}$		1.1	V
5.4	+	Base-emitter saturation voltage at $I_{\text{C}} = 10 \text{ A}$, $I_{\text{B}} = 2.0 \text{ A}$ *	$V_{\text{BE(sat)}}$		2.5	V
5.5	+	Collector-base cut-off current with emitter open circuit at $V_{\text{CB0}} = 100 \text{ V}$	$I_{\text{CB0(1)}}$		1.0	mA
5.5	+	Collector-emitter cut-off current with $V_{\text{EB}} = 1.5 \text{ V}$, $V_{\text{CEX}} = 100 \text{ V}$	$I_{\text{CEX(1)}}$		1.0	mA
5.5	+	Collector-emitter cut-off current with base open circuit, $V_{\text{CEO}} = 30 \text{ V}$	$I_{\text{CEO(1)}}$		0.7	mA
	+	Emitter-base cut-off current with collector open circuit, $V_{\text{CB}} = 7 \text{ V}$	I_{EB0}		5.0	mA
5.6		Collector-base cut-off current with $V_{\text{CB0}} = 100 \text{ V}$ and $T_{\text{case}} = 150^{\circ}\text{C}$	$I_{\text{CB0(2)}}$		5.0	mA
5.6		Collector-emitter cut-off current with $V_{\text{EB}} = 1.5 \text{ V}$, $V_{\text{CEX}} = 100 \text{ V}$, $T_{\text{case}} = 150^{\circ}\text{C}$	$I_{\text{CEX(2)}}$		5.0	mA
5.7.1	+	Turn-on time at $I_{\text{C}} = 4 \text{ A}$, $I_{\text{B1}} = 0.4 \text{ A}$	t_{on}		6.0	μs
5.7.1	+	Fall time at $I_{\text{C}} = 4 \text{ A}$, $I_{\text{B2}} = I_{\text{B1}} = 0.4 \text{ A}$	t_{f}		6.5	μs
5.7.2	+	Storage time at $I_{\text{C}} = 4 \text{ A}$, $I_{\text{B1}} = 0.4 \text{ A}$	t_{s}		4.5	μs

* Measured under pulse conditions: pulse length = 300 μs , duty cycle = 1.0%

+ 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 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 - 042 Issue 2 dated June 1982

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 50000.
- (d) Level of quality assessment as defined in Appendix IIA of CECC 50000.

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8. TEST CONDITIONS AND INSPECTION REQUIREMENTS

GROUP A - LOT-BY-LOT

Note:- All devices, subjected to Tests marked 'D' which are destructive, shall not be accepted for release.
(See 3.5.6 of BS CECC 50 000).

EXAMINATION OR TEST	REF. BS CECC 50 000	CONDITIONS $T_{\text{case}} = 25^{\circ}\text{C}$ unless otherwise stated	INSPECTION REQUIREMENTS			
			LIMITS		LEVEL	
			Min	Max	F	
					IL	AQL
<u>SUBGROUP A1</u> Visual inspection	4.2.1				I	0.65%
<u>SUBGROUP A2a</u> Non-operatives OPEN CIRCUIT SHORT CIRCUIT		Device considered to be open circuit if $h_{21E}(1) < 5$ Device considered to be short circuit if $I_{CB0}(1) > 50 \text{ mA}$			II	0.15%
<u>SUBGROUP A2b</u> Collector-base cut-off current $I_{CB0}(1)$	4.3.4 T.001	$V_{CB} = 100 \text{ V}$ $I_E = 0$		1.0 mA	II	1.0%
Collector-emitter leakage current $I_{CEX}(1)$	4.3.4 T.009	$V_{CE} = 100 \text{ V}$ $V_{EB} = -1.5 \text{ V}$		1.0 mA		
Collector-emitter leakage current $I_{CE0}(1)$	4.3.4 T.009	$V_{CE} = 30 \text{ V}$ $I_B = 0$		0.7 mA		
Collector-emitter breakdown voltage V_{CER}	Appendix II	$I_C = 0.2 \text{ A}$ $R_{BE} = 100 \Omega$	90 V			
Collector-emitter saturation voltage $V_{CE(sat)} 1 *$	4.3.4 T.003	$I_C = 10 \text{ A}$ $I_B = 2.0 \text{ A}$		4 V		
<u>SUBGROUP A3</u> Static value of common emitter forward current transfer ratio $h_{21E} *$	4.3.4 T.006	$V_{CE} = 4 \text{ V}$ $I_C = 4 \text{ A}$	20		I	2.5%
Collector-emitter saturation voltage $V_{CE(sat)} 2 *$	4.3.4 T.003	$I_C = 4 \text{ A}$ $I_B = 0.4 \text{ A}$		1.1 V		
Base-emitter saturation voltage $V_{BE(sat)} *$	4.3.4 T.004	$I_C = 10 \text{ A}$ $I_B = 2.0 \text{ A}$		2.5 V		

* Measured under pulse conditions: pulse length = 300 μs , duty cycle = 1.0 %

8. TEST CONDITIONS AND INSPECTION REQUIREMENTS

GROUP A - LOT-BY-LOT

Note:- All devices, subjected to Tests marked 'D' which are destructive, shall not be accepted for release.
(See 3.5.6 of BS CECC 50 000).

EXAMINATION OR TEST	REF. BS CECC 50 000	CONDITIONS $T_{\text{case}} = 25^{\circ}\text{C}$ unless otherwise stated	INSPECTION REQUIREMENTS			
			LIMITS		LEVEL	
			Min	Max	F	
					IL	AQL
<u>SUBGROUP A4</u>						
Turn-on time t_{on}	Fig. 3	$I_{\text{C}} = 4 \text{ A}$ $I_{\text{B1}} = 0.4 \text{ A}$ Nominal values $I_{\text{B2}} = 0.4 \text{ A}$ $R_1 = 10 \Omega$ $R_2 = 15 \Omega$ $R_3 = 4.7 \Omega$ $V_{\text{in}} = 11 \text{ V}$ $t_{\text{r}} = 50 \text{ ns max}$ $t_{\text{f}} = 50 \text{ ns max}$ $V_{\text{CC}} = 20 \text{ V}$ $V_{\text{BB}} = 6 \text{ V}$ $P_{\text{W}} = 20 \mu\text{s}$ Duty cycle < 1.0%		6.0 μs	S4	4.0%
Storage time t_{s}	Fig. 3	Conditions as for t_{on}		4.5 μs		
Fall time t_{f}	Fig. 3	Conditions as for t_{on}		6.5 μs		