

BRITISH STANDARDS INSTITUTION

2, PARK STREET, LONDON, W1A 2BS

Specification available from:—

CECC 00200 AND

TEXAS INSTRUMENTS LIMITED,
MANTON LANE, BEDFORD, MK41 7PA

TELEPHONE : BEDFORD 67466 TELEX : 82178

ELECTRONIC COMPONENTS OF ASSESSED QUALITY
DETAIL SPECIFICATION IN ACCORDANCE WITH

BS CECC 50 000 : 1981

BS CECC 50 003-048

ISSUE 1

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Page 1 of 16 Pages

MANUFACTURER'S TYPE NUMBER

2N5301, 2N5302, 2N5303

SEE PD 9002 AND CECC 00200

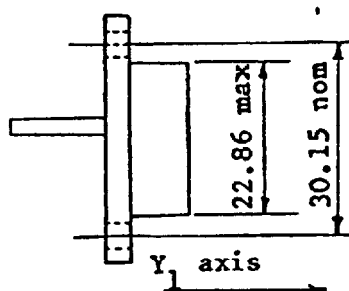
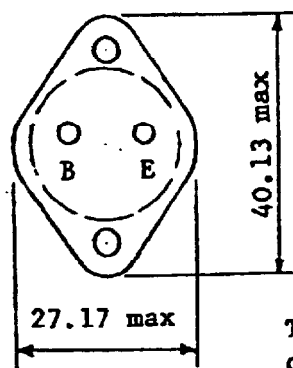
For ordering information
see Clause 7

2. CASE RATED BIPOLAR POWER
TRANSISTORS FOR LOW
FREQUENCY AMPLIFIER
APPLICATIONS

NPN SILICON EPIBASE
TRANSISTORS IN HERMETICALLY
SEALED METAL CASE

3. ASSESSMENT LEVEL F
+ ADDITIONAL TESTS

1. Outline and dimensions Third angle projection



The collector is in electrical
contact with the case.

Outline BS 3934 SO-127A

IEC 191-2 C14A B18. Dimensions in millimetres.

Marking information - See Clause 6

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. 1)

			2N5301	2N5302	2N5303
4.3.	V_{CBO}	Collector-base continuous (direct) voltage. $I_E = 0$	40V	60V	80V
4.4.	V_{CEO}	Collector-emitter continuous (direct) voltage. $I_B = 0$	40V	60V	80V
4.5.	V_{EBO}	Emitter-base continuous (direct) voltage. $I_C = 0$	5V	5V	5V

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



Documents

Document Sharing Hub

Current Ratings

4.6.	I_C	Continuous collector current	2N5301) 2N5302)	30	A
			2N5303	20	A
	I_{CM}	Peak collector current		50	A
4.7.	I_B	Continuous base current		7.5	A

4.8. Power Ratings

4.8.1.	P_{tot}	Total power dissipation (see Figs. 7 and 8 for derating curve and/or area of safe operation)		200	W
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5. CHARACTERISTICS (not for inspection purposes) @ $T_{case} = 25^\circ C$ unless otherwise stated.

5.1.	$h_{21E(1)}$	Static forward current transfer ratio			
		$V_{CE} = 2V, I_C = 15A^*$	2N5301) 2N5302)	15 min.	100 max.
		Static forward current transfer ratio			
		$V_{CE} = 2V, I_C = 10A^*$	2N5303	15 min.	150 max.
5.2.	$h_{21E(2)}$	Static forward current transfer ratio			
		$V_{CE} = 2V, I_C = 20A^*$	2N5303	5 min.	
		Static forward current transfer ratio			
		$V_{CE} = 2V, I_C = 30A^*$	2N5301) 2N5302)	5 min.	
	$h_{21E(3)}$	Static forward current transfer ratio			
		$V_{CE} = 2V, I_C = 1A^*$	2N5301) 2N5302) 2N5303)	40 min.	
5.3.	f_T	Transition Frequency			
		$V_{CE} = 10V, I_C = 1A$		2	MHz min.
		$f = 1MHz$			

* These parameters are measured under pulsed conditions. Pulse width = 300 μ s, Duty Cycle = < 10%.

† Measured in Group A or C.

5. CHARACTERISTICS (Cont'd)

5.4.	$\dagger I_{CEX(1)}$	Collector-emitter cut-off current						
		$V_{CE} = 40V, V_{EB} = 1.5V$	2N5301	1	mA	max.		
		$V_{CE} = 60V, V_{EB} = 1.5V$	2N5302	1	mA	max.		
		$V_{CE} = 80V, V_{EB} = 1.5V$	2N5303	1	mA	max.		
	$\dagger I_{CEX(2)}$	Collector-emitter leakage current @ $T_{amb} = 150^{\circ}C$						
		$V_{CE} = 40V, V_{EB} = 1.5V$	2N5301)					
		$V_{CE} = 60V, V_{EB} = 1.5V$	2N5302)	10	mA	max.		
		$V_{CE} = 80V, V_{EB} = 1.5V$	2N5303)					
	$\dagger I_{CEO(1)}$	Collector-emitter cut-off current						
		$V_{CE} = 40V, I_B = 0$	2N5301	5	mA	max.		
		$V_{CE} = 60V, I_B = 0$	2N5302	5	mA	max.		
		$V_{CE} = 80V, I_B = 0$	2N5303	5	mA	max.		
	$\dagger I_{CBO(1)}$	Collector-emitter cut-off current						
		$V_{CB} = 40V, I_E = 0$	2N5301)					
		$V_{CB} = 60V, I_E = 0$	2N5302)	1	mA	max.		
		$V_{CB} = 80V, I_E = 0$	2N5303)					
	$\dagger I_{EBO}$	Emitter-base cut-off current						
		$V_{EB} = 5V, I_C = 0$		5	mA	max.		
5.6.	$\dagger V_{CE(SAT)(1)}$	Collector-emitter saturation voltage						
		$I_C = 10A, I_B = 1A^*$	2N5301	0.75	V	max.		
			2N5302	0.75	V	max.		
			2N5303	1.0	V	max.		
	$\dagger V_{CE(SAT)(2)}$	Collector-emitter saturation voltage						
		$I_C = 15A, I_B = 1.5A^*$	2N5303	1.5	V	max.		
		Collector-emitter saturation voltage						
		$I_C = 20A, I_B = 2.0A^*$	2N5301)	2.0	V	max.		
			2N5302)					

* These parameters are measured under pulsed conditions. Pulse width = 300 μ S, Duty Cycle = < 10%.

$\dagger$ Measured in Group A or C

5. CHARACTERISTICS (Cont'd)

5.6.	$\dagger V_{CE(SAT)} (3)$	Collector-emitter saturation voltage						
		$I_C = 20A, I_B = 4A^*$	2N5303	2.0	V	max.		
		Collector-emitter saturation voltage						
		$I_C = 30A, I_B = 6.0A^*$	2N5301) 2N5302)	3.0	V	max.		
5.7.	$\dagger V_{BE(SAT)} (1)$	Base-emitter saturation voltage						
		$I_C = 10A, I_B = 1A^*$	ALL	1.7	V	max.		
	$\dagger V_{BE(SAT)} (2)$	Base-emitter saturation voltage						
		$I_C = 15A, I_B = 1.5A^*$	2N5301	1.8	V	max.		
			2N5302	1.8	V	max.		
			2N5303	2.0	V	max.		
	$\dagger V_{BE(SAT)} (3)$	Base-emitter saturation voltage						
		$I_C = 20A, I_B = 2A^*$	2N5301	2.5	V	max.		
			2N5302	2.5	V	max.		
		$I_C = 20A, I_B = 4A^*$	2N5303	2.5	V	max.		
	$\dagger V_{BE(1)}$	Base-emitter voltage						
		$V_{CE} = 2V, I_C = 10A^*$	2N5303	1.5	V	max.		
		Base-emitter voltage						
		$V_{CE} = 2V, I_C = 15A^*$	2N5301) 2N5302)	1.7	V	max.		
	$\dagger V_{BE(2)}$	Base-emitter voltage						
		$V_{CE} = 4V, I_C = 20A^*$	2N5303	2.5	V	max.		
		Base-emitter voltage						
		$V_{CE} = 4V, I_C = 30A^*$	2N5301) 2N5302)	3.0	V	max.		
5.8.	$R_{th(j,case)}$	Thermal resistance junction to case		0.875°C/W		max.		

* These parameters are measured under pulse conditions. Pulse width = 300μs, Duty Cycle = < 10%

† Measured in Group 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 50 003-048.

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.