SLOVENSKI STANDARD
SIST EN 150007:2002

01-september-2002

Blank detail specification: Case-rated bipolar transistors for high frequency amplification

Blank Detail Specification: Case-rated bipolar transistors for high frequency amplification

Vordruck für Bauartspezifikation: Auf Gehäusetemperatur bezogene Transistoren für HF-Verstärkung

Spécification particulière cadre: Transistors bipolaires à température ambiante spécifiée, pour amplification de haute fréquence

Ta slovenski standard je istoveten z: **EN 150007:1991**

ICS:

31.080.30 Tranzistorji Transistors

SIST EN 150007:2002 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 150007

December 1991

UDC:

Descriptors: Quality, electronic components, transistors

English version

Blank Detail Specification: Case-rated bipolar transistors for high frequency amplification

Spécification Particulière Cadre: Transistors bipolaires à température ambiante spécifiée, pour amplification de haute fréquence

Vordruck für Bauartspezifikation: Auf Gehäusetemperatur bezogene Transistoren für HF-Verstärkung

This European Standard was approved by the CENELEC Electronic Components Committee (CECC) on 25 November 1991. The text of this standard consists of the text of CECC 50007 Issue 2 1980 of the corresponding CECC Specification. CENELEC members are bound to comply with CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the General Secretariat of the CECC or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CECC General Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and United Kingdom. The membership of the CECC is identical, with the exception of the national electrotechnical committees of Greece, Iceland and Luxembourg.

CECC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B-1050 Brussels

Contents

The numbers between square brackets on the first page correspond to the following indications.

Identification of the detail specification

[1] The name of the National Standards Organization under whose authority the detail specification is drafted.
[2] The CECC number of the relevant blank detail specification.
[3] The number and issue number of the national generic specification.
[4] The national number of the detail specification, date of issue and any further information required by the national system.

Identification of the component

[5] A short description of the type of component.
[6] Information on typical construction (where applicable).
[7] Outline drawing and/or reference to the relevant document for outlines.
[8] Application or group of applications covered.
[9] Reference data on the most important properties, to allow comparison between the various component types.

This layout may be used by the other member countries of the CECC.

NOTE When a device is so designed that it can satisfy several applications, this should be stated in the detail specification, in which case the characteristics and inspection requirements relevant to these applications should be met simultaneously (these may appear in different columns of a blank detail specification or in different blank detail specifications, as the case may be).

[1]	page: of:	CECC 50007 Issue 2 [2]
ELECTRONIC COMPONENT OF ASSESSED QUALITY IN ACCORDANCE WITH: [3]		[4]

DETAIL SPECIFICATION FOR: BIPOLAR TRANSISTOR(S) [5]

TYPE NUMBER(S):

CONSTRUCTION: Semiconductor material: germanium/silicon/etc.
Polarity: NPN/PNP
Case material: glass/metal/plastic/other

[6]

1 Mechanical description [7]

Outline references (code A) from IEC 191-2:

National:

OR

Base and case references (codes B + C) from IEC 191-2:

National:

AND/OR

Outline drawing

TERMINAL CONNECTED TO CASE: (if any)
MARKING: letters and figures or colour code

2 Electrical application [8]

power : CASE-RATED
frequency : HIGH
use : AMPLIFICATION

3 Levels of quality assessment

F – L
E – refer to CECC 50000 Appendix II A

4 Limiting values (absolute maximum system) [9]

These apply over the operating temperature range, unless otherwise stated.

4.1 Minimum and maximum operating case temperature	T_{case}	max min
4.2 Minimum and maximum storage temperature	T_{stg}	max min
4.3 One (preferably V_{CBO}) or more of the following shall be specified:		
Maximum collector-to-base continuous (direct) voltage	V_{CBO}	max
Maximum collector-emitter continuous (direct) voltage with reverse base voltage	V_{CEX}	max
Maximum collector-emitter continuous (direct) voltage with base short-circuited	V_{CES}	max
4.4 Maximum collector-to-emitter continuous (direct) voltage	V_{CEO}	max
and/or:		
Maximum collector-emitter continuous (direct) voltage with specified external resistance R_{BE}	V_{CER}	max
4.5 Maximum emitter-to-base continuous (direct) reverse voltage	V_{EBO}	max

See the relevant qualified Parts List for availability of components qualified under this detail specification.

4.6 Either:		
Maximum collector current (d.c. or mean value)	I_C or $I_{C(AV)}$	max
or:		
Maximum emitter current (d.c. or mean value)	I_E or $I_{E(AV)}$	max
4.7 Either:		
Maximum peak collector current	I_{CM}	max
or:		
Maximum peak emitter current	I_{EM}	max
4.8 Maximum base-current (d.c. or mean value)	I_B or $I_{B(AV)}$	max
4.9 Power dissipation		
4.9.1 Maximum total power dissipation as a function of temperature	P_{tot}	max (T)
or:		
4.9.2 Maximum virtual (equivalent) junction temperature, and absolute limit of power dissipation	$T_{(vj)}$ } P_{tot} }	max
4.10 Area of safe operation (e.g. curves I_C versus V_{CE}), d.c. and, where appropriate, pulse		
4.11 Where appropriate: endurance to mismatch under specified conditions	t	max

5 Characteristics See clause 6 for inspection requirements

The characteristics marked x shall be given, at T_{case} = 25 °C unless otherwise stated.

Sign* indicates characteristic is verified under the inspection requirements.

Signs between brackets correspond to characteristics indicated "where appropriate", or given as alternative.

*	**5.1** Minimum and maximum static values of the common-emitter forward current transfer ratio at specified V_{CE} and I_C (or V_{CB} and I_E), preferably at typical operating current. (d.c or pulse as specified)	$h_{21E(1)}$	x
(*)	**5.2** Where appropriate: Minimum static value of the common-emitter forward current transfer ratio, at specified low V_{CE} and high I_C (d.c. or pulse as specified)	$h_{21E(2)}$	x
*	**5.3** Either: Minimum and where appropriate maximum transition frequency at specified V_{CE}, I_C and f	f_T	(x)
	or: Minimum and, where appropriate, maximum value of the modulus of the forward transfer scattering parameter at specified V_{CE}, I_C, f and mount impedance (preferably 50 Ω)	$\lvert s_{21e} \rvert$	(x)
*	**5.4** Leakage currents:		x
	5.4.1 Preferably: Maximum collector-base cut-off current with the emitter open-circuited, preferably at maximum rated V_{CBO}	$I_{CBO(1)}$	(x)
	or otherwise: Maximum collector-emitter cut-off current, under specified base-emitter bias conditions, preferably at maximum rated V_{CEX}	$I_{CEX(1)}$	(x)
	5.4.2 Where appropriate: Maximum collector-emitter leakage current with specified base-emitter resistance, preferably at maximum V_{CER}	$I_{CER(1)}$	(x)
	5.4.3 Where appropriate: Maximum collector-emitter leakage current with the base short-circuited to the emitter, preferably at maximum rated V_{CES}	$I_{CES(1)}$	(x)
	5.4.4 Where appropriate: Maximum collector-emitter cut-off current with the base open-circuited, preferably at maximum rated V_{CEO}	I_{CEO}	(x)

* **5.5** Leakage currents at high temperature			x
5.5.1 Preferably:			
Maximum collector-base cut-off current at V_{CB} preferably between 65 % and 85 % of maximum rated V_{CBO}, $I_{E=0}$ and at a high temperature (see **4.3.4** of CECC 50000)		$I_{CBO(2)}$	(x)
or otherwise:			
Maximum collector-emitter cut-off current under specified base-emitter bias conditions, at V_{CE} preferably between 65 % and 85 % of maximum rated V_{CEX} and at a high temperature (see **4.3.4** of CECC 50000)		$I_{CEX(2)}$	(x)
5.5.2 Where appropriate: Maximum collector-emitter leakage current with specified base-emitter resistance, at V_{CE} preferably between 65 % and 85 % of maximum rated V_{CER} and at a high temperature (see **4.3.4** of CECC 50000)		$I_{CER(2)}$	(x)
5.5.3 Where appropriate: Maximum collector-emitter leakage current with the base short-circuited to the emitter, at V_{CE} preferably between 65 % and 85 % of maximum rated V_{CES} and at a high temperature (see **4.3.4** of CECC 50000)		$I_{CES(2)}$	(x)
* **5.6** Maximum collector-emitter saturation voltage at specified I_B and high I_C (d.c. or pulse as specified)		V_{CEsat}	x
* **5.7** Either:			
Minimum output power into the load at a specified input power and at a high frequency and, where appropriate, at another lower frequency, preferably for the same specified conditions of circuit and bias		P_{out}	(x)
or:			
Minimum power gain, preferably in the same conditions as for P_{out}		G_P	(x)
5.8 Where appropriate: Minimum efficiency, preferably overall or alternatively, minimum collector efficiency (see note), in the same conditions as for P_{out} in **5.7**		η_{tot} ηC	(x) (x)
* **5.9** Capacitances:		x	x
5.9.1 Maximum output capacitance at specified V_{CB} and f, $I_E = 0$		C_{22b}	x
5.9.2 Where appropriate: Maximum input capacitance at specified V_{EB} and f, $I_C = 0$		C_{11b}	(x)
5.9.3 Where appropriate: Maximum reverse transfer capacitance at specified V_{CE} and f, $I_B = 0$		C_{12e}	(x)
(*) **5.10** Where appropriate: Intermodulation factor or other linearity criterion			(x)
5.11 When virtual junction temperature is quoted as a rating: Maximum value of thermal resistance junction to case shall be given		$R_{th(j\text{-}case)}$	(x)
5.12 Where appropriate: curves of maximal thermal impedance under pulse conditions		$Z_{(th)p}$	(x)

Note to 5.8:

$$\eta_{tot} = \frac{P_{out}}{P_{in} + P_{(d.c.)}} \qquad \eta_C = \frac{P_{out}}{P_{C\ (d.c.)}}$$

6 Test conditions and inspection requirements

These are given in the following tables, where the values and exact test conditions to be used should be specified as required in the detail specification relevant to a given type, in line with the indications given in CECC 50000 for the relevant test.

The tables refer to two levels of quality assessment arbitrarily designated F and L, it being understood that there may be other level in other blank detail specifications.

All references to clause numbers are made with respect to CECC 50000 unless otherwise stated.

7 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 II A of CECC 50000, and, if required, screening sequence as defined in Appendix VI of CECC 50000

— any other particulars

Example: Type number — Detail specification number — issue number — level.

Group A — Lot by lot

All tests are non-destructive (**3.5.6** of CECC 50000)

AQL: given in %
⊕ 1 % if more than 3 tests

Examination or test	Ref.	Conditions at T_{case} = 25 °C unless otherwise stated	Inspection requirements				
			Limits	Levels			
				F		L	
				IL	AQL	IL	AQL
Sub-group A1 Visual inspection	**4.2.1**	**4.2.1**	**4.2.1**	I	1,5	I	1,5
Sub-group A2a Non-operative devices	4.3.4(1)	h_{21E} < 5 (except when specified value is ⩽ 20)	min.	II	0,15	II	0,15
		Leak current (such as I_{CBO}) > 100 relevant max. specified	max.				
Sub-group A2b Leakage current(s) Either:				II	0,65 ⊕	II	0,65 ⊕
Collector-base cut-off current $I_{CBO(1)}$	4.3.4 T.001	V_{CB} = preferably V_{CBO} max. I_E = 0	(max)				
or: Collector-emitter cut-off current $I_{CEX(1)}$	4.3 4 T.009	V_{CE} = preferably V_{CEX} max V_{BE} = X specified	(max)				
where appropriate: Collector-emitter leakage current $I_{CER(1)}$	4.3.4 T.009	V_{CE} = preferably V_{CER} max R_{BE} = R specified	(max)				
where appropriate: Collector-emitter leakage current $I_{CES(1)}$	4.3.4 T.009	V_{CE} = preferably V_{CES} max V_{BE} = 0	(max)				
where appropriate: Collector-emitter cut-off current I_{CEO}	4.3.4 T.009	V_{CE} = preferably V_{CEO} max I_B = 0	(max)				
Static value of common-emitter forward-current transfer ratio $h_{21E(1)}$	4.3.4 T.006	V_{CE} (V_{CB}) = specified I_C (I_E) = specified (preferably typical value) dc or pulse as specified (note 1)	max min				
Output power P_{out} or, where appropriate Power gain G_p	→	Conditions and circuit as specified (see **5.7** of this document)	(min) (min)				

NOTE 1 See relevant conditions under CHARACTERISTICS. If pulse measurement is used, the conditions should preferably be: pulse width tp = 300 μs duty factor ⩽ 2 %