



**SLOVENSKI STANDARD**  
**SIST EN 150004:2002**

**01-september-2002**

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**Blank detail specification: Bipolar transistors for switching applications**

Blank Detail Specification: Bipolar transistors for switching applications

Vordruck für Bauartspezifikation: Bipolare Transistoren für Schalteranwendungen

Spécification particulière cadre: Transistors bipolaires de commutation

**Ta slovenski standard je istoveten z: EN 150004:1991**

[SIST EN 150004:2002](https://standards.iteh.ai/catalog/standards/sist/c52c2ae7-d7a3-4796-8d08-5b5e200e2961/sist-en-150004-2002)

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**ICS:**

31.080.30      Tranzistorji                      Transistors

**SIST EN 150004:2002**                      **en**

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EUROPEAN STANDARD  
 NORME EUROPÉENNE  
 EUROPÄISCHE NORM

EN 150004

December 1991

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## Blank Detail Specification: Bipolar transistors for switching applications

Spécification Particulière Cadre: Transistors  
 bipolaires de commutation

Vordruck für Bauartspezifikation: Bipolare  
 Transistoren für Schalteranwendungen

### iTeh STANDARD PREVIEW

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 50004 Issue 3 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.

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## 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

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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).

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[4]	page: of:	CECC 50004 Issue 3 	[2]												
[3]	[4]														
<p>DETAIL SPECIFICATION FOR: BIPOLAR TRANSISTOR(S) [5]</p> <p>TYPE NUMBER(S)</p> <p>CONSTRUCTION: Semiconductor material: germanium/silicon/etc. . .</p> <p>Polarity: NPN/PNP</p> <p>Case material: glass/metal/plastic/other</p> <p>[6]</p>															
<p><b>1 Mechanical description</b> [7]</p> <p>Outline references (code A) from IEC 191-2: National:</p> <p>OR</p> <p>Base and case references (codes B + C) from IEC 191-2: National:</p> <p>AND/OR</p> <p>Outline drawing</p> <p>TERMINAL CONNECTED TO CASE: (if any)</p> <p>MARKING: letters and figures or colour code</p>	<p><b>2 Electrical application</b> [8]</p> <p>power : AMBIENT-RATED/CASE-RATED</p> <p>use : SWITCHING</p> <p><b>3 Levels of quality assessment</b></p> <p>E — refer to CECC 50000 Appendix II A F – L</p>														
<p><b>4 Limiting values (absolute maximum system)</b> [9]</p> <p>These apply over the operating temperature range, unless otherwise stated.</p> <table border="0"> <tr> <td data-bbox="216 1512 1176 1545">4.1 Minimum and maximum operating ambient or case temperatures</td> <td data-bbox="1176 1512 1364 1545"><math>T_{amb}</math> or <math>T_{case}</math></td> <td data-bbox="1364 1512 1462 1545">max min</td> </tr> <tr> <td data-bbox="216 1579 1176 1612">4.2 Minimum and maximum storage temperatures</td> <td data-bbox="1176 1579 1364 1612"><math>T_{stg}</math></td> <td data-bbox="1364 1579 1462 1612">max min</td> </tr> <tr> <td data-bbox="216 1646 1176 1713">4.3 Collector-base voltage: Maximum continuous (direct) collector-to-base voltage</td> <td data-bbox="1176 1646 1364 1713"><math>V_{CBO}</math></td> <td data-bbox="1364 1646 1462 1713">max</td> </tr> <tr> <td data-bbox="216 1724 1176 1948">4.4 Collector-emitter voltage. One (preferably <math>V_{CEO}</math>) or more of the following shall be specified: Maximum collector-emitter continuous (direct) voltage with zero base current Maximum collector-emitter continuous (direct) voltage with reverse base voltage Maximum collector-emitter continuous (direct) voltage with base short-circuited to emitter</td> <td data-bbox="1176 1724 1364 1948"><math>V_{CEO}</math> <math>V_{CEX}</math> <math>V_{CES}</math></td> <td data-bbox="1364 1724 1462 1948">max max max</td> </tr> </table>				4.1 Minimum and maximum operating ambient or case temperatures	$T_{amb}$ or $T_{case}$	max min	4.2 Minimum and maximum storage temperatures	$T_{stg}$	max min	4.3 Collector-base voltage: Maximum continuous (direct) collector-to-base voltage	$V_{CBO}$	max	4.4 Collector-emitter voltage. One (preferably $V_{CEO}$ ) or more of the following shall be specified: Maximum collector-emitter continuous (direct) voltage with zero base current Maximum collector-emitter continuous (direct) voltage with reverse base voltage Maximum collector-emitter continuous (direct) voltage with base short-circuited to emitter	$V_{CEO}$ $V_{CEX}$ $V_{CES}$	max max max
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See the relevant Qualified Parts List for availability of components qualified under this detail specification.															

	Maximum collector-emitter continuous (direct) voltage with specified external resistance $R_{BE}$	$V_{CER}$	max
4.5	Emitter-base voltage: Maximum continuous (direct) emitter-to-base voltage	$V_{EBO}$	max
4.6	Maximum collector current, continuous and, where appropriate peak repetitive under specified conditions	$(I_C)(I_{CM})$	max
4.7	Where appropriate: Maximum base current, continuous; peak repetitive value under specified conditions may be added	$(I_B)$ $(I_{BM})$	max max
4.8	Where appropriate: Maximum emitter current, continuous; peak repetitive value under specified conditions may be added	$(I_E)$ $(I_{EM})$	max max
4.9	Power dissipation: Any special requirements for ventilation/mounting should be specified		
4.9.1	Maximum total power dissipation as a function of temperature or:	$P_{tot}$ max (T)	
4.9.2	Maximum virtual (equivalent) junction temperature, and absolute limit of power dissipation	$T_{(vj)}$ } $P_{tot}$ }	max
4.10	For case-rated types and where appropriate for ambient-rated types: — Area of safe operation (e. g. curves $I_C$ versus $V_{CE}$ , d.c. and, where appropriate, pulse		
5	<b>Characteristics</b> See clause 6 for inspection requirements		
	The characteristics marked x shall be given, at $T_{amb}$ or $T_{case} = 25^\circ C$ unless otherwise stated.		
	Sign * indicates parameter is verified under the Inspection requirements.		
	Signs between <u>brackets</u> correspond to characteristics indicated "where appropriate", or given as alternative.		
5.1*	Minimum static value of common-emitter forward current transfer ratio at specified $V_{CE}$ and $I_C$ (or $V_{CB}$ and $I_B$ ), preferably at typical operating current (d.c. or pulse, as specified)	$h_{21E}$	x
5.2*	Maximum collector-emitter saturation voltage at high $I_C$ and specified $I_B$ (d.c. or pulse, as specified)	$V_{CE sat(1)}$	x
5.3(*)	Where appropriate: Maximum collector-emitter saturation voltage at specified $I_B$ and value of $I_C$ as for $h_{21E}$ in 5.1 (d.c. or pulse, as specified)	$V_{CE sat(2)}$	(x)
	NOTE When the value of $V_{CE}$ specified for $h_{21E}$ has the same voltage as the limit for $V_{CE sat(2)}$ this characteristic need not to be given		
5.4*	Maximum base-to-emitter saturation voltage under same conditions as in 5.2	$V_{BE sat}$	x
5.5*	Leakage currents: One (preferably $I_{CBO}$ ) or more of the following shall be specified:		x
	Maximum collector-base cut-off current with the emitter open-circuited, preferably at maximum rated $V_{CBO}$	$I_{CBO(1)}$	(x)
	Maximum collector-emitter cut-off current, under specified base-emitter bias conditions, preferably at maximum rated $V_{CEX}$	$I_{CEX(1)}$	(x)
	Maximum collector-emitter leakage current with specified base-emitter resistance, preferably at maximum rated $V_{CER}$	$I_{CER(1)}$	(x)



	Maximum collector-emitter leakage current with the base short-circuited to the emitter, preferably at maximum rated $V_{CES}$	$I_{CES(1)}$	(x)
	Maximum collector-emitter cut-off current with the base open-circuited, preferably at maximum rated $V_{CEO}$	$I_{CEO(1)}$	(x)
5.6*	Leakage-currents at high temperature		x
	One (preferably $I_{CBO}$ ) or more of the following shall be specified:	$I_{CBO(1)}$	(x)
	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 4.3.3 of CECC 50000)		
	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 4.3.3 of CECC 50000)	$I_{CEX(2)}$	(x)
	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 4.3.3 of CECC 50000)	$I_{CER(2)}$	(x)
	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 4.3.3 of CECC 50000)	$I_{CES(2)}$	(x)
	Maximum collector-emitter cut-off current with the base open-circuited, at $V_{CE}$ preferably between 65 % and 85 % of maximum rated $V_{CEO}$ and at a high temperature (see 4.3.3 of CECC 50000)	$I_{CEO(2)}$	(x)
5.7*	Switching times and transition frequency Preferably:		x
5.7.1	Maximum switching times, with at least two different times specified, with specified circuit diagram and bias voltages and with $I_C$ , $I_{B1}$ , $I_{B2}$ specified (given as nominal values) or otherwise:	$t_{.}$ $t_{.}$	(x) (x)
5.7.2	Maximum storage time in a specified test circuit and under specified conditions and Minimum transition frequency at specified $f$ , $V_{CE}$ and $I_C$	$t_s$ $f_T$	(x) (x)
5.8*	Maximum output capacitance at specified $V_{CB}$ , $I_E = 0$ , $f = 1$ MHz for ambient-rated devices. Where appropriate for case-rated devices.	$C_{22b}$	x (x)
5.9	When virtual junction temperature is quoted as a rating: The maximum value of thermal resistance junction to ambient or case shall be given.	or $R_{th(j,amb)}$ $R_{th(j,case)}$	(x) (x)
5.10	Where appropriate: curves of maximum thermal impedance under pulse conditions.	$Z_{(th)p}$	(x)