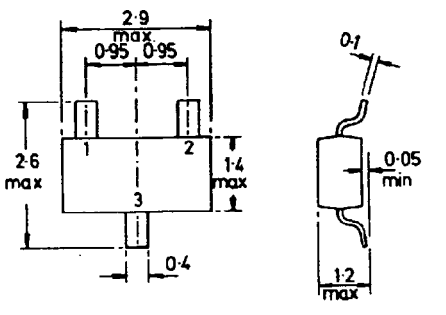


BRITISH STANDARDS INSTITUTION 2, PARK STREET, LONDON W1A 2BS	BS-CECC 50004/070 ISSUE 1, DECEMBER 1980
Specification available from:- As shown in PD 9002 and/or CECC 00200 and FERRANTI ELECTRONICS LIMITED FIELDS NEW ROAD, CHADDERTON, OLDHAM OL9 8NP TELEPHONE 061-624 0515, TELEX 668038	
ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH BS-CECC 50000: 1977	MANUFACTURER'S TYPE NUMBERS BSS69, BSS69R BSS70, BSS70R
Outline and dimensions Third angle projection  Dimensions in millimetres OUTLINE: SOT-23. For detail dimensions see Annex I Marking information see page 3	For ordering information see page 3 PNP SILICON AMBIENT RATED SWITCHING TRANSISTORS IN PLASTIC ENCAPSULATION ASSESSMENT LEVEL F PLUS ADDITIONAL TESTS

4. Limiting values (over the full temperature range unless otherwise stated).

Absolute maximum system		Min.	Max.	Units
T_{amb}	Ambient operating temperature range	-65.0	+175.0	°C
T_{stg}	Storage temperature range	-65.0	+175.0	°C
V_{CBO}	Collector-base continuous (direct) voltage		-40.0	V
V_{CEO}	Collector-emitter continuous (direct) voltage with zero base current		-40.0	V
V_{EBO}	Emitter-base continuous (direct) reverse voltage		-5.0	V
I_C	Continuous (direct) collector current		-100.0	mA
I_B	Continuous (direct) base current		-50.0	mA
I_{CM}	Peak collector current		-200.0	mA
P_{tot}	Power dissipation at $T_{amb} = 25^\circ\text{C}^*$		300.0	mW

*See Fig. 1 – Derating curve; P_{tot} is calculated assuming that the device is mounted on a ceramic substrate measuring $10 \times 8 \times 0.6\text{mm}$.

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

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5. Characteristics (not for inspection purposes) at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated.

			Min.	Max.	Unit
$h_{21E(1)}$	Static forward current transferratio at $V_{CE} = -1\text{V}$ $I_C = -10\text{mA}$	BSS69/R BSS70/R	50.0 100.0	150.0 300.0	
$h_{21E(2)}$	Static forward current transferratio at $V_{CE} = -1\text{V}$ $I_C = -50\text{mA}$	BSS69/R BSS70/R	30.0 60.0		
$h_{21E(3)}$	Static forward current transferratio at $V_{CE} = -1\text{V}$ $I_C = -1\text{mA}$	BSS69/R BSS70/R	35.0 70.0		
$h_{21E(4)}$	Static forward current transferratio at $V_{CE} = -1\text{V}$ $I_C = -100\mu\text{A}$	BSS69/R BSS70/R	20.0 40.0		
$I_{CES(1)}$	Collector-emitter leakage current at $V_{CES} = -30\text{V}$			50.0	nA
$I_{CES(2)}$	Collector-emitter leakage current at $V_{CES} = -30\text{V}$, $T_{amb} = 100^{\circ}\text{C}$			5.0	μA
$V_{BE(sat)(1)}$	Base-emitter saturation voltage at $I_B = -5\text{mA}$, $I_C = -50\text{mA}$			0.95	V
$V_{BE(sat)(2)}$	Base-emitter saturation voltage at $I_B = -1\text{mA}$, $I_C = -10\text{mA}$		0.65	0.85	V
$V_{CE(sat)(1)}$	Collector-emitter saturation voltage at $I_B = -5\text{mA}$, $I_C = -50\text{mA}$			0.40	V
$V_{CE(sat)(2)}$	Collector-emitter saturation voltage at $I_B = -1\text{mA}$, $I_C = -10\text{mA}$			0.25	V
f_T	Transition frequency at $V_{CE} = -20\text{V}$, $I_C = -10\text{mA}$ $f = 100\text{MHz}$	BSS69/R BSS70/R	220.0 250.0		MHz MHz
C_{22b}	Output capacitance at $V_{CB} = -5\text{V}$, $I_E = 0$, $f = 1\text{MHz}$			4.5	pF
C_{11b}	Input capacitance at $V_{EB} = -0.5\text{V}$, $I_C = 0$, $f = 1\text{MHz}$			10.0	pF
t_s, t_d, t_r, t_f	Switching times at $V_{CC} = -3\text{V}$, $I_C \approx 10\text{mA}$ $I_{B1} \approx I_{B2} \approx -1\text{mA}$	(Storage time) t_s^* (Delay time) $t_d^{\dagger}$ (Rise time) $t_r^{\dagger}$ (Fall time) t_f^*		225.0 35.0 35.0 75.0	ns ns ns ns

*See Fig. 2 – Storage and fall time test circuit.

 $\dagger$ See Fig. 3 – Delay and rise time test circuit.

Marking

(1) Each transistor shall bear the following marking (where space permits).

- a. Terminal identification. Identification of terminals differs between those devices whose type numbers include the suffix 'R' and that without this suffix. Terminals (see page 1) are identified as follows:

For device without suffix	For device with suffix 'R'
1 = emitter	1 = base
2 = base	2 = emitter
3 = collector	3 = collector

- b. The manufacturer's type number as identified by the following code:

BSS69:L2	BSS69R:L5
BSS70:L3	BSS70R:L6

And if required, the manufacturer's individual trade mark or factory identification code.

(2) Each package containing one or more of these transistors shall bear all the above marking except 'a' and in addition:

- c. The date code.
- d. Factory identification code or manufacturer's trade mark.
- e. The BS detail specification number i.e. BS-CECC 50004/070.

Related documents

BS 6001 'Sampling procedures and tables for inspection by attributes'

BS E9000 'General requirements for electronic components of assessed quality'

BS CECC 50000 'Harmonized system for quality assessment for electronic components: Generic specification for discrete semiconductor devices'

Ordering information

Orders for components to this specification shall include the following minimum information:

- 1. Quantity
- 2. Type number
- 3. Specification number, issue number and date.

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6. Test conditions and inspection requirements

Note: Devices subjected to tests marked 'D' shall not be accepted for release.

GROUP A

Lot by lot

Examination or test	BS-CECC 50000 ref.	Conditions at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated	Type	Inspection requirements				
				Quality level F +				
				Limits		Units	IL	AQL %
				Min.	Max.			
Subgroup A1 Visual inspection	4.2.1		All				I	0.65
Subgroup A2a Short circuit $I_{CES(1)}$	4.3.4/T-009	$V_{CE} = -30\text{V}$	All		5.0	μA	II	0.15
Open circuit $h_{21E(1)}$	4.3.4/T-006	$V_{CE} = -1\text{V}$ $I_C = -10\text{mA}$	All	5.0				
Subgroup A2b $I_{CES(1)}$	4.3.4/T-009	$V_{CE} = -30\text{V}$	All		50.0	nA	II	0.65
$V_{CE(sat)(1)}$	4.3.3/T-004	$I_B = -5\text{mA}$ $I_C = -50\text{mA}$	All		0.40	V		
$h_{21E(1)}$	4.3.4/T-006	$V_{CE} = -1\text{V}$ $I_C = -10\text{mA}$	BSS69/R BSS70/R	50.0 100.0	150.0 300.0			
Subgroup A3 $V_{BE(sat)(1)}$	4.3.4/T-004	$I_B = -5\text{mA}$ $I_C = -50\text{mA}$	All		0.95	V	I	2.5
$V_{BE(sat)(2)}$	4.3.4/T-004	$I_B = -1\text{mA}$ $I_C = -10\text{mA}$	All	0.65	0.85	V		
$V_{CE(sat)(2)}$	4.3.4/T-003	$I_B = -1\text{mA}$ $I_C = -10\text{mA}$	All		0.25	V		
$h_{21E(2)}$	4.3.4/T-006	$V_{CE} = -1\text{V}$ $I_C = -50\text{mA}$	BSS69/R BSS70/R	30.0 60.0				
Subgroup A4 f_T	4.3.4/T-041	$V_{CE} = -20\text{V}$ $I_C = -10\text{mA}$ $f = 100\text{MHz}$	BSS69/R BSS70/R	200.0 250.0		MHz MHz	I	2.5
t_s		$V_{CC} = -3\text{V}$ $I_C \approx -10\text{mA}$ $I_{B1} \approx I_{B2} \approx -1\text{mA}^*$ See fig. 2	All		225.0	ns		

*See Fig. 2

GROUP B
Lot by lot

Examination or test	BS-CECC 50000 ref.	Conditions at T _{amb} = 25°C unless otherwise stated	Type	Inspection requirements				
				Quality level F+				
				Limits		Units	IL	AQL %
				Min.	Max.			
Subgroup B1 Dimensions	4.2.2	See Annex I	D H _E		2.9 2.75	mm mm	S2	2.5
Subgroup B4 Solderability	4.4.7			Good wetting			S4	2.5
Subgroup B5 Change of temperature followed by: Accelerated damp heat (D)	4.4.4	IEC 68.2.14 Test Nc – 55 to + 125°C					S4	2.5
	4.4.2	Method 1						
Final measurements I _{CES(1)} V _{CE(sat)(1)} h _{21E(1)}	4.3.4/T-009 4.3.4/T-003 4.3.4/T-006	Conditions and limits as for subgroup A2b						
Subgroup B8 Electrical endurance	4.5.2.3	Electrical operation Duration = 168 ⁺⁷² _{–10} hours					S4	1.5
Final measurements I _{CES(1)} V _{CE(sat)(1)} h _{21E(1)}	4.3.4/T-009 4.3.4/T-003 4.3.4/T-006	Conditions as for subgroup A2b	All		100.0	nA		
			All		0.48	V		
			BSS69/R	40.0	180.0			
			BSS70/R	80.0	360.0			
CTR information	Attributes information for subgroups B4, B5 and B8							