

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

BS CECC 50 004-127

ISSUE 1,

JUNE 1983



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ELECTRONIC COMPONENTS OF ASSESSED QUALITY
DETAIL SPECIFICATION IN ACCORDANCE WITH

BS CECC 50 000 : 1981

MANUFACTURER'S TYPE NUMBER

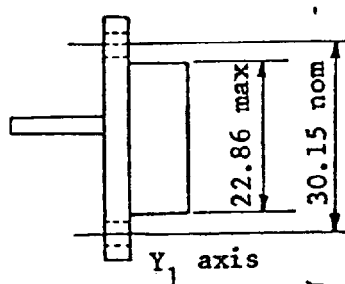
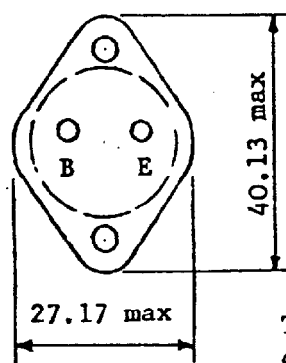
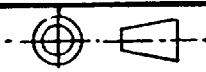
2N6542, 2N6543

SEE PD 9002 AND CECC 00200

For ordering information
see Clause 72. CASE RATED BIPOLAR POWER
TRANSISTORS FOR HIGH VOLTAGE
SWITCHING APPLICATIONSNPN TRIPLE DIFFUSED SILICON
PLANAR TRANSISTORS IN
HERMETICALLY SEALED METAL
CASE3. 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. 10)

			<u>2N6542</u>	<u>2N6543</u>
4.3.	V_{CBO}	Collector-base continuous (direct) voltage. $I_E = 0$	650V	850V
4.4.	V_{CEX}	Collector-emitter continuous (direct) voltage. $V_{EB} = 1.5V$	350V	450V
4.4.	V_{CEO}	Collector-emitter continuous (direct) voltage. $I_B = 0$	300V	400V
4.4.	V_{CEV}	Collector-emitter continuous (direct) voltage.	650V	850V
4.5.	V_{EBO}	Emitter-base continuous (direct) voltage. $I_C = 0$	8V	8V

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

4.6. Current Ratings

I_C	Continuous collector current	5	A
I_{CM}	Peak collector current (Note 1)	10	A

4.7. I_B	Continuous base current	5	A
I_{BM}	Peak base current (Note 1)	10	A

4.9. Power Ratings

4.9.1. P_{tot}	Total power dissipation (see Figs. 5 & 6) at $T = 25^\circ\text{C}$	100	W
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5. CHARACTERISTICS (not for inspection purposes) at $T_{case} = 25^\circ\text{C}$ unless otherwise specified.

$V_{CEO(SUS)}$	Collector-emitter sustaining voltage (See Note 2) $I_C = 100\text{mA}, I_B = 0$	2N6542	300	V min.
		2N6543	400	V min.
$V_{CEX(SUS)}(1)$	Collector-emitter sustaining voltage $I_C = 2.6\text{A}, T_{case} = 100^\circ\text{C}$ $V_{clamp} = \text{rated } V_{CEX}$	2N6542	350	V min.
		2N6543	450	V min.
$V_{CEX(SUS)}(2)$	Collector-emitter sustaining voltage $I_C = 5.0\text{A}, T_{case} = 100^\circ\text{C}$ $V_{clamp} = \text{rated } V_{CEO} - 100\text{V}$	2N6542	200	V min.
		2N6543	300	V min.

5.1. $\dagger h_{21E(1)}$	Forward current transfer ratio* $V_{CE} = 3\text{V}, I_C = 3.0\text{A}$	7 min.	35 max.
$\dagger h_{21E(2)}$	$V_{CE} = 2\text{V}, I_C = 1.5\text{A}$	12 min.	60 max.
5.2. $\dagger V_{CE(SAT)}(1)$	Collector-emitter saturation voltage* $I_C = 5.0\text{A}, I_B = 1.0\text{A}$	5.0	V max.
5.3. $\dagger V_{CE(SAT)}(2)$	Collector-emitter saturation voltage* $I_C = 3.0\text{A}, I_B = 0.6\text{A}$	1.0	V max.
$\dagger V_{CE(SAT)}(3)$	Collector-emitter saturation voltage* $I_C = 3.0\text{A}, I_B = 0.6\text{A}$ $T_{case} = 100^\circ\text{C}$	2.0	V max.

$\dagger$ Measured in Groups A or C

* These parameters are measured under pulsed conditions. Pulse width 300 μs , Duty Cycle = 2%

Note 1: Pulse test. Pulse width = 5ms

Note 2: Inductive Loop switching measurement

5.4. †	$V_{BE(SAT)}(1)$	Base-emitter saturation voltage*	
	$I_C = 3.0A, I_B = 0.6A$		1.4 V max.
	†	$V_{BE(SAT)}(2)$	Base-emitter saturation voltage*
		$I_C = 3.0A, I_B = 0.6A, T_{case} = 100^\circ C$	1.4 V max.
5.5. †	$I_{CEX}(1)$	Collector cut-off current	
		$V_{CEX} = \text{rated value}, -V_{BE} = 1.5V$	0.5 mA max.
5.6. †	$I_{CEX}(2)$	Collector-cut-off current	
		$V_{CEX} = \text{rated value}, -V_{BE} = 1.5V$	3.0 mA max.
		$T_{case} = 100^\circ C$	
	$I_{CER}(2)$	Collector cut-off current	
		$R = 50\Omega, T_{case} = 100^\circ C$	3.0 mA max.
		$V_{CE} = \text{rated value.}$	
	I_{EBO}	Emitter cut-off current	
		$V_{EB} = 8V, I_C = 0$	1.0 mA max.
5.7.	<u>Switching Characteristics</u>		
	f_T	Current gain band-width product	
		$I_C = 200mA, V_{CE} = 10V, f = 1MHz$	6 min. 28 max. MHz
	C_{ob}	Output capacitance	
		$V_{CB} = 10V, I_C = 0, f_{test} = 1 MHz$	50 min. 200 max. pF
5.7.1 †	<u>Resistive Load</u> (See Figs. 3 & 4)		
	t_{on}	Turn on time	0.75 μS max.
		$I_C = 3A, V_{CC} = 250V$	
	t_s	Storage time	4.00 μS max.
		$I_{BON} = I_{BOFF} = 0.6A$	
	t_f	Fall time	0.80 μS max.
5.7.1.†	<u>Inductive Load</u> (See Figs. 1 & 2)		
	t_{sv}	Storage time	0.8 μS max.
		$I_C = 3A, V_{clamp} = \text{rated } V_{CEX}$	
	t_c	Crossover time	0.3 μS max.
		$I_{BON} = 0.6A, V_{BE(OFF)} = 5V$	

† Measured in Groups A or C

* These parameters are measured under pulsed conditions. Pulse width 300 μS , Duty Cycle = 2%

5.7.1. Inductive Load (Cont'd)

t_{fi}	Fall time	0.2 μ S max.
t_{sv}	Storage time $I_C = 3A, V_{clamp} = \text{rated } V_{CEX}$	4.0 μ S max.
t_c	Crossover time $I_{BON} = 0.6A, V_{BE(OFF)} = 5V$	0.6 μ S max.
t_{fi}	Fall time $T_{case} = 100^\circ C$	0.8 μ S max.
$R_{th(jc)}$	Thermal resistance junction to case	1.17 $^\circ C/W$ max.

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 50 004-127.

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.

8. INSPECTION REQUIREMENTS

ALL GROUP A TESTS ARE NON-DESTRUCTIVE

GROUP A

Lot by Lot

EXAMINATION OR TEST	BS CECC 50000 REF	CONDITIONS at $T_{amb} = 25^{\circ}C$ unless otherwise stated	INSPECTION REQUIREMENTS				
			LIMITS			LEVEL OF ASSMT F	
			MIN	MAX	UNIT	IL	AQL
<u>SUBGROUP A1</u> Visual Inspection	4.2.1.					I	1.5%
<u>SUBGROUP A2a</u> Non-operatives Open Circuit Short Circuit	4.3.4.	Device considered to be open circuit if h_{21E} Device is considered to be short circuit if $I_{CEX(1)}$	2.0	- 50.0	 mA	 II	 0.15%
<u>SUBGROUP A2b</u> Collector cut- off current $I_{CEX(1)}$ Collector- emitter saturation voltage $V_{CE(SAT)}(1)$	4.3.4. T.009 4.3.4. T.003	V_{CEX} = rated value V_{EB} = 1.5V I_C = 5.0A I_B = 1.0A		0.5 5.0	mA V	II	0.65%
<u>SUBGROUP A3</u> Forward current* transfer ratio $h_{21E(1)}$ $h_{21E(2)}$	4.3.4. T.006	$V_{CE} = 3.0V, I_C = 3.0A$ $V_{CE} = 2.0V, I_C = 1.5A$	7.0 12.0	35.0 60.0		I	2.5%

* These parameters measured under pulse conditions. Pulse width 500µs, Duty Cycle <2%

8. INSPECTION REQUIREMENTS

EXAMINATION OR TEST	BS CECC 50000 REF	CONDITIONS at $T_{amb} = 25^{\circ}C$ unless otherwise stated	INSPECTION REQUIREMENTS				
			LIMITS			LEVEL OF ASSMT F	
			MIN	MAX	UNIT	IL	AQL
<u>SUBGROUP A3</u> (Cont'd)						I	2.5%
Collector- * emitter saturation voltage							
$V_{CE(SAT)} (3)$	4.3.4. T.003	$I_C = 3.0A, I_B = 0.6A$ $T_{case} = 100^{\circ}C$		2.0	V		
$V_{CE(SAT)} (2)$	T.003	$I_C = 3.0A, I_B = 0.6A$		1.0	V		
Base-emitter* saturation voltage	4.3.4.						
$V_{BE(SAT)} (1)$	T.004	$I_C = 3.0A, I_B = 0.6A$		1.4	V		
$V_{BE(SAT)} (2)$	T.004	$I_C = 3.0A, I_B = 0.6A$ $T_{case} = 100^{\circ}C$		1.4	V		
<u>SUBGROUP A4</u>						S4	4.0%
<u>Switching times</u>	4.3.4.						
Turn on time t_{on}	T.041	<u>Resistive load</u> (see figs. 3, 4, 5 and 6)		0.75	μS		
Storage time t_s		$I_C = 3.0A, V_{CC} = 250V$		4.00	μS		
Fall time t_f		$I_{BON} = I_{BOFF} = 0.6A$		0.80	μS		
Storage time t_{sv}		<u>Inductive Load</u> (see figs. 1 and 2)					
Crossover time t_c		$I_C = 3.0A$		2.0	μS		
Fall Time t_{fi}		$V_{clamp} = \text{Rated } V_{CEX}$		0.6	μS		
		$I_{BON} = 0.6A, V_{BE(OFF)} = 5V$		0.4	μS		

* These parameters measured under pulse conditions. Pulse width 300 μS , Duty Cycle <2%

ALL GROUP A TESTS ARE NON-DESTRUCTIVE

Lot by Lot

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