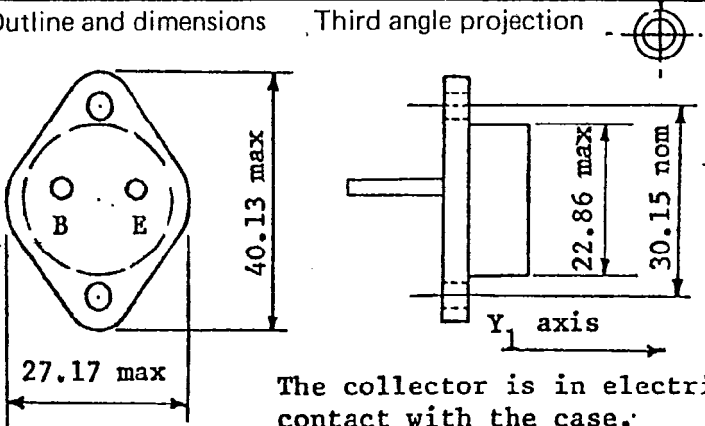


BRITISH STANDARDS INSTITUTION 2, PARK STREET, LONDON, W1A 2BS	BS CECC 50 004-119 ISSUE 1, JULY 1983  Page 1 of 30 Pages
Specification available from:— CECC 00200 AND TEXAS INSTRUMENTS LIMITED, MANTON LANE, BEDFORD, MK41 7PA TELEPHONE : BEDFORD 67466 TELEX : 82178	MANUFACTURER'S TYPE NUMBER TIPL 757 TIPL 757A
ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH BS CECC 50 000 : 1981	SEE PD 9002 AND CECC 00200 For ordering information see Clause 7
1. Outline and dimensions Third angle projection  The collector is in electrical contact with the case. Outline BS 3934 S0-127A IEC 191-2 C14A B18. Dimensions in millimetres. Marking information - See Clause 6	2. CASE RATED BIPOLAR POWER TRANSISTORS FOR HIGH VOLTAGE SWITCHING APPLICATIONS NPN TRIPLE DIFFUSED SILICON PLANAR TRANSISTORS IN HERMETICALLY SEALED METAL CASE 3. ASSESSMENT LEVEL F + ADDITIONAL TESTS

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 ($T_{case} = -65$ °C to +125 °C. See Fig. 1)

		TIPL 757	TIPL 757A
V_{CBO}	Collector-base continuous (direct) voltage. $I_E = 0$	800 V	1000V
V_{CES}	Collector-emitter continuous (direct) voltage. $V_{BE} = 0$	800V	1000V
V_{CEO}	Collector-emitter continuous (direct) voltage. $I_B = 0$	375V	420V
V_{EBO}	Emitter-base continuous (direct) voltage. $I_C = 0$	10V	10V

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

Current Ratings

4.6.	I_C	Continuous collector current	15	A
	I_{CM}	Peak collector current (pulse width < 2ms, duty cycle < 2%)	20	A

Power Ratings

	P_{tot}	Total power dissipation (see Figs 2 & 3)	200	W
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5. CHARACTERISTICS (not for inspection purposes) at $T_{case} = 25^\circ\text{C}$ unless otherwise stated

	$V_{CEO(SUS)}$	Collector-emitter sustaining voltage Inductive loop switching measurement $I_C = 100\text{mA}$, $L = 25\text{mH}$	TIPL757 TIPL757A	375 420	V V
5.1.	h_{21E}	Static forward current transfer ratio $V_{CE} = 5\text{V}$, $I_C = 500\text{mA}^*$		15 min.	60 max.
5.2.	$V_{CE(SAT)} (1)$	Collector-emitter saturation voltage $I_C = 15\text{A}$, $I_B = 3\text{A}^*$		2.5	V max.
5.2.	$V_{CE(SAT)} (3)$	Collector-emitter saturation voltage $I_C = 10\text{A}$, $I_B = 2\text{A}$		1.0	V max.
5.2.	$V_{CE(SAT)} (4)$	Collector-emitter saturation voltage $I_C = 5\text{A}$, $I_B = 1\text{A}^*$		0.5	V max.
5.2.	$V_{CE(SAT)} (5)$	Collector-emitter saturation voltage $I_C = 15\text{A}$, $I_B = 3\text{A}^*$ $T_{amb} = 100^\circ\text{C}$		5.0	V max.
5.3.	$V_{CE(SAT)} (2)$	Collector-emitter saturation voltage $I_C = 500\text{mA}$, $I_B = 50\text{mA}$		1.0	V max.
5.4.	$V_{BE(SAT)} (1)$	Base-emitter saturation voltage $I_C = 15\text{A}$, $I_B = 3\text{A}^*$		1.7	V max.
5.4.	$V_{BE(SAT)} (2)$	Base-emitter saturation voltage $I_C = 10\text{A}$, $I_B = 2\text{A}^*$		1.5	V max.
5.4.	$V_{BE(SAT)} (3)$	Base-emitter saturation voltage $I_C = 5\text{A}$, $I_B = 1\text{A}^*$		1.4	V max.
5.4.	$V_{BE(SAT)} (4)$	Base-emitter saturation voltage $I_C = 15\text{A}$, $I_B = 3\text{A}^*$ $T_{amb} = 100^\circ\text{C}$		1.8	V max.

† Measured in Groups A or C

* These parameters are measured under pulsed conditions. Pulse width 100µs

5.5.	$\dagger I_{CES(1)}$	Collector-emitter cut-off current			
		$V_{CE} = 800V$	TIPL757	1	μA max.
		$V_{CE} = 1000V$	TIPL757A	1	μA max.
5.6.	$\dagger I_{CES(2)}$	Collector-emitter leakage current @ $T_{amb} = 100^{\circ}C$			
		$V_{CE} = 800V$	TIPL757	100	μA max.
		$V_{CE} = 1000V$	TIPL757A	100	μA max.
5.5.	$\dagger I_{CEO(1)}$	Collector-emitter cut-off current			
		$V_{CE} = 375V$	TIPL757	1	μA max.
		$V_{CE} = 420V$	TIPL757A	1	μA max.
5.5.	I_{EBO}	Emitter-base cut-off current			
		$V_{EB} = 10V$ $I_C = 0$		1	mA max.
5.7.	<u>Switching Characteristics</u>				
	<u>$\dagger$Resistive Load</u> (See Figs. 3, 4, 5 and 6)				
5.7.1	t_{on}	Turn on time		0.75	μs max.
5.7.2	t_s	Storage time		0.50	μs max.
	t_f	Fall time		0.60	μs max.
		$I_C = 15A$ $V_{CC} = 0$			
		$I_{BON} = 3A$ $I_{BOFF} = 3.75A$			
		$T_{case} = 25^{\circ}C$			
	t_{on}	Turn on time		1.00	μs max.
	t_s	Storage time		3.00	μs max.
	t_f	Fall time		1.20	μs max.
		$I_C = 15A$ $V_{CC} = 250V$			
		$I_{BON} = 3A$ $I_{BOFF} = 3.75A$			
		$T_{case} = 100^{\circ}C$			
	<u>Thermal Resistance</u>				
5.9.	$R_{th(j-case)}$	Thermal resistance junction-case		0.9	$^{\circ}C/W$ max.

$\dagger$ Measured in Groups A or C

5.7. Switching Characteristics @ 25°C case temperature unless otherwise specified

Inductive Load

t_{av}	Voltage storage time	2.50 μ s
t_{rv}	Voltage rise time $I_C = 15A$	0.20 μ s
t_{fl}	Current fall time $I_{BON} = 3A$	0.30 μ s
t_{tl}	Current tail time $V_{BE(OFF)} = 10V, I_{BOFF} = 5A$	0.50 μ s
t_{xo}	Crossover time (See Figs. 1, 2) $T_{case} = 25^\circ C$	0.50 μ s
t_{sv}	Voltage storage time	3.00 μ s
t_{rv}	Voltage rise time $I_C = 15A$	0.35 μ s
t_{fl}	Current fall time $I_{BON} = 3A$	0.40 μ s
t_{tl}	Current tail time $V_{BE(OFF)} = 10V, I_{BOFF} = 5A$	0.08 μ s
t_{xo}	Crossover time (See Figs. 1, 2) $T_{case} = 100^\circ C$	0.80 μ s

NOTE 1 These parameters are measured using pulse techniques. Pulse width = 300 μ s, Duty Cycle = 2%

NOTE 2 Inductive loop switching measurement

NOTE 3 These parameters are measured with voltage sensing contacts separated from the current carrying contacts located within 0.125 inches (3.2 mm) from the device body.

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 50 004-119

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 $h_{21E} < 4$ Device considered to be short circuit if $I_{CES(1)} > 100\mu A$				II	0.15%
<u>SUBGROUP A2b</u> Collector- emitter cut-off current $I_{CES(1)}$	4.3.4. T.009	$V_{CE} = 800V$ $V_{CE} = 1000V$	-	1.0	μA	II	0.65%
Collector- emitter cut-off current $I_{CEO(1)}$	4.3.4. T.009	$V_{CE} = 375V$ $V_{CE} = 400V$	-	1.0	μA		
Collector- emitter saturation voltage $V_{CE(SAT)}(1)$	4.3.4. T.003	$I_C = 15A$ $I_B = 3A$	-	2.5	V		

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 A3</u>						I	2.5%
Static forward current transfer ratio $h_{21E(1)}$	4.3.4.	$I_C = 500mA$ $V_{CE} = 5V$	15.0	60.0			
Collector- emitter saturation voltage $V_{CE(SAT)} (4)$	4.3.4. T.003	$I_C = 5A$ $I_B = 1A$	-	0.5	V		
Base-emitter saturation voltage $V_{BE(SAT)} (1)$	4.3.4. T.004	$I_C = 15A$ $I_B = 3A$	-	1.7	V		
Collector- emitter saturation voltage $V_{CE(SAT)} (2)$	4.3.4. T.003	$I_C = 500mA$ $I_B = 50mA$	-	1.0	V		
Collector- emitter saturation voltage $V_{CE(SAT)} (3)$	4.3.4. T.003	$I_C = 10A$ $I_B = 2A$	-	1.0	V		
Emitter-base cut-off current I_{EBO}		$V_{EB} = 10V$ $I_C = 0$	-	1.0	mA		

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 A3</u> (Cont'd)							
Base-emitter saturation voltage $V_{BE(SAT)} (2)$	4.3.4. T.004.	$I_C = 10A$ $I_B = 2A$	-	1.5	V		
Base-emitter saturation voltage $V_{BE(SAT)} (3)$	4.3.4. T.004	$I_C = 5A$ $I_B = 1A$	-	1.4	V		
<u>SUBGROUP A4</u>						S4	4.0%
Switching times	4.3.4. T.041						
Turn on time t_{on}		$I_C = 15A, V_{CC} = 250V$ $I_{BON} = 3A, I_{BOFF} = 3.75A$ $T_{case} = 25^{\circ}C$	-	0.75	μS		
Storage time t_s							
Fall time t_f							
Turn on time t_{on}		$I_C = 15A, V_{CC} = 250V$ $I_{BON} = 3A, I_{BOFF} = 3.65A$ $T_{case} = 100^{\circ}C$	-	1.00	μS		
Storage time t_s			-	3.00	μS		
Fall time t_f							

D = DESTRUCTIVE
ND = NON-DESTRUCTIVE

GROUP B

Lot by Lot

EXAMINATION OR TEST	D ND	BS CECC 50000 REF	CONDITIONS at $T_{amb} = 25^{\circ}C$ unless otherwise stated	Inspection Requirements				
				LIMITS			LEVEL OF ASSMT F	
				Min	Max	Units	IL	AQL
<u>SUBGROUP B1</u> Dimensions	ND	4.2.2	Ref. IEC 191-2 C14A B18 U_1 U_2 q A		40.13 27.17 30.40 12.19	mm mm mm mm	S2	2.5%
<u>SUBGROUP B2c</u> Transient turn-off limit <u>Post-test end-points</u> $I_{CES}(1)$ h_{21E} $V_{CE(SAT)}(1)$	ND	See App. I 4.3.4 T.009 4.3.4 4.3.4 T.003	$V_{CC} = 375V, I_{C(MAX)} = 20A$ $I_{B(ON)} = 4A \text{ max.}$ $0.5A < I_{B(OFF)} < 2.0A$ $V_{BB} = 2V, V_{CE(MAX)} = 700V$ $L = 1mH, R = 16$ Conditions as for Subgroup A2. Conditions as for Subgroup A2 Conditions as for Subgroup A2	- 12.0	2.0 72.0 3.0	μA V	S4	1.5%
<u>SUBGROUP B3</u> Lead Bending	D	4.4.9.	Force = 10N	No Damage			S3	2.5%