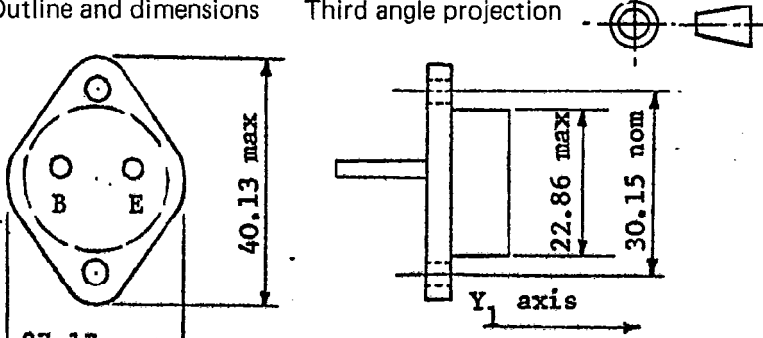


BRITISH STANDARDS INSTITUTION 2, PARK STREET, LONDON, W1A 2BS	BS CECC 50 004-116 ISSUE 1 NOVEMBER 1981
Specification available from:— AS SHOWN IN PD 9002 CECC 00200 AND TEXAS INSTRUMENTS LIMITED, MANTON LANE, BEDFORD, MK41 7PA TELEPHONE : BEDFORD 67466 TELEX : 82178	 Page 1 of 23 Pages
ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH BS CECC 50 000 : 1981	MANUFACTURER'S TYPE NUMBER TIPL 751, TIPL 751A
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	SEE PD 9002 AND CECC 00200 For ordering information see Clause 7 CASE RATED BIPOLAR POWER TRANSISTORS FOR HIGH VOLTAGE SWITCHING APPLICATIONS. NPN TRIPLE DIFFUSED SILICON PLANAR TRANSISTORS IN HERMETICALLY SEALED METAL CASE.
	ASSESSMENT LEVEL F + ADDITIONAL TESTS

4. LIMITING VALUES (absolute maximum system)

These apply over the operating temperature range unless otherwise stated.

T_{case}	Case operating temperature range	-65 °C to +200 °C
T_{stg}	Storage temperature range	-65 °C to +200 °C

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

		TIPL 751	TIPL 751A
V_{CBO}	Collector-base continuous (direct) voltage. $I_E = 0$	800V	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

I_C	Continuous collector current	4 A
I_{CM}	Peak collector current (pulse width < 10ms) (duty cycle < 2%)	8 A

Power Ratings

P_{tot}	Total power dissipation (see Figs. 2 & 3)	120 W
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5. CHARACTERISTICS (not for inspection purposes) at T_{case} 25 °C unless otherwise stated.

$V_{CE(sus)}$	Collector-emitter sustaining voltage	TIPL751	375 V	min.
	Inductive loop switching measurement	TIPL751A	420 V	min.
	$I_C = 100mA$, $L = 25$ mH			
h_{21E}	Static forward current transfer ratio			
	$V_{CE} = 5V$, $I_C = 500mA^*$		20 min.	60 max.
$V_{CE(sat)}(1)$	Collector-emitter saturation voltage			
	$I_C = 4A$, $I_B = 800mA^*$		2.5 V	max.
$V_{CE(sat)}(2)$	Collector-emitter saturation voltage			
	$I_C = 500mA$, $I_B = 50mA$		2.5 V	max.
$V_{CE(sat)}(3)$	Collector-emitter saturation voltage			
	$I_C = 2.5A$, $I_B = 500mA^*$		1 V	max.
$V_{CE(sat)}(4)$	Collector-emitter saturation voltage			
	$I_C = 1A$, $I_B = 200mA^*$		0.5 V	max.
$V_{CE(sat)}(5)$	Collector-emitter saturation voltage			
	$I_C = 4A$, $I_B = 800mA^*$ $T_{amb} = 100^\circ C$		5 V	max.
$V_{BE(sat)}(1)$	Base-emitter saturation voltage			
	$I_C = 4A$, $I_B = 800mA^*$		1.4 V	max.
$V_{BE(sat)}(2)$	Base-emitter saturation voltage			
	$I_C = 2.5A$, $I_B = 500mA^*$		1.2 V	max.
$V_{BE(sat)}(3)$	Base-emitter saturation voltage			
	$I_C = 1A$, $I_B = 200mA^*$		1 V	max.
$V_{BE(sat)}(4)$	Base-emitter saturation voltage			
	$I_C = 4A$, $I_B = 800mA^*$ @ $T_{amb} = 100^\circ C$		1.3 V	max.

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

† Measured in Groups A or C.

† $I_{CES(1)}$	Collector-emitter cut-off current				
	$V_{CE} = 800V$	TIPL 751	1	μA	max.
	$V_{CE} = 1000V$	TIPL 751A	1	μA	max.
† $I_{CES(2)}$	Collector-emitter leakage current				
	@ $T_{amb} = 100^{\circ}C$.				
	$V_{CE} = 800V$	TIPL 751	100	μA	max.
	$V_{CE} = 1000V$	TIPL 751A	100	μA	max.
† $I_{CEO(1)}$	Collector-emitter cut-off current				
	$V_{CE} = 375V$	TIPL 751	1	μA	max.
	$V_{CE} = 420V$	TIPL 751A	1	μA	max.
I_{EBO}	Emitter-base cut-off current				
	$V_{EB} = 10V$ $I_C = 0$		1	mA	max.

SWITCHING CHARACTERISTICS

† Resistive Load (see Figs. 4, 5, and 6)

t_{on}	Turn on time	0.55 μs	max.
t_s	Storage time	2.5 μs	max.
t_f	Fall time	0.5 μs	max.
	$I_C = 4A, V_{CC} = 200V, I_{B1} = I_{B2} = 800mA$		
	$T_{case} = 25^{\circ}C$.		

† Measured in Groups A or C

Inductive Load (see Figs. 7 & 8)

t_{sv}	Voltage storage time	2.50 μs	max.
t_{rv}	Voltage rise time	0.30 μs	max.
t_{fc}	Current fall time	0.25 μs	max.
t_{ti}	Current fail time	0.15 μs	max.
t_{xo}	Crossover time		
	$I_C = 4A, I_{Bon} = 800mA, V_{BB} = 5V$	0.40 μs	max.
	$T_{case} = 25^\circ C, V_{CC} = 250V$		
t_{sv}	Voltage storage time	3.00 μs	max.
t_{rv}	Voltage rise time	0.50 μs	max.
t_{fi}	Current fall time	0.25 μs	max.
t_{ti}	Current fail time	0.15 μs	max.
t_x	Crossover time	0.75 μs	max.
	$I_C = 4A, I_{Bon} = 800mA, V_{BB} = 5V$		
	$T_{case} = 100^\circ C, V_{CC} = 250V$		
$R_{th(j,case)}$	Thermal resistance junction to case	1.46 $^\circ C W^{-1}$	max.

6. MARKING

6.1. Each device shall bear the following marking:

- (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 50 004-116.

7. ORDERING INFORMATION

Orders for these transistors should contain the following minimum information:

- (a) The device type and this detail specification number.
- (b) The quantity required
- (c) If required, screening sequence from Appendix VI of CECC 50 000.
- (d) Level of quality assessment as defined in Appendix IIA of CECC 50 000.

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

D = Destructive ND = Non-Destructive Group A Lot by Lot								
EXAMINATION OR TEST	D ND	REF BS CECC 50 000	CONDITIONS at $T_{case} = 25^{\circ}C$ unless otherwise stated	Inspection Requirements				
				LIMITS			LEVEL OF ASSMT F	
				Min.	Max.	Units	IL	AQL
<u>SUBGROUP A1</u> Visual Inspection	ND	4.2.1.					I	0.65%
<u>SUBGROUP A2a</u> Non- Operatives	ND	4.3.4.					II	.15%
<u>SUBGROUP A2b</u> Collector- emitter cut-off- current $I_{CES}(1)$ Collector- emitter saturation voltage $V_{CE}(sat)(1)$	ND	4.3.4. T.009	$V_{CE} = 800V$ TIPL751 $= 1000V$ TIPL751A $V_{BE} = 0$ $I_C = 4A$ $I_B = 800mA$		1.0 1.0	μA μA	II	0.65%
<u>SUBGROUP A3</u> Forward current transfer ratio. h_{21E}	ND	4.3.4. T.006	$V_{CE} = 5V$ $I_C = 500mA$	20.0	60.0		I	4.0%

8. INSPECTION REQUIREMENTS

Group A Lot by Lot								
D = Destructive ND = Non-Destructive								
EXAMINATION OR TEST	D ND	REF BS CECC 50 000	CONDITIONS at T _{case} = 25 °C unless otherwise stated	Inspection Requirements				
				LIMITS			LEVEL OF ASSMT F	
				Min.	Max.	Units	IL	AQL
SUBGROUP A3 (Cont'd)								
Collector-emitter saturation voltage	ND	4.3.4. T.003						
V _{CE(sat)} (2)			I _C = 500mA, I _B = 50mA	-	2.5	V		
V _{CE(sat)} (3)			I _C = 2.5A, I _B = 500mA	-	1.0	V		
V _{CE(sat)} (4)			I _C = 1A, I _B = 200mA	-	0.5	V		
Base-emitter saturation voltage	ND	4.3.4. T.004						
V _{BE(sat)} (1)			I _C = 4A I _B = 800mA	-	1.4	V		
V _{BE(sat)} (2)			I _C = 2.5A I _B = 500mA	-	1.2	V		
V _{BE(sat)} (3)			I _C = 1A I _B = 200mA	-	1.0	V		
Collector cut-off current I _{CEO} (1)	ND	4.3.4. T.009	V _{CE} = 375V TIPL751 = 420V TIPL751A I _B = 0	-	1.0	µA		
				-	1.0	µA		