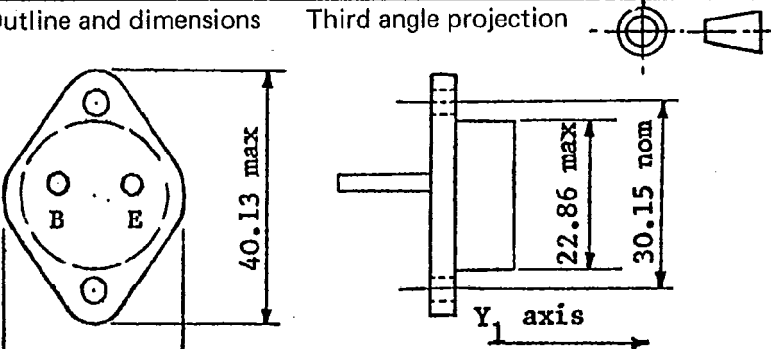


BRITISH STANDARDS INSTITUTION 2, PARK STREET, LONDON, W1A 2BS Specification available from:— AS SHOWN IN PD 9002 CECC 00200 AND TEXAS INSTRUMENTS LIMITED, MANTON LANE, BEDFORD, MK41 7PA TELEPHONE : BEDFORD 67466 TELEX : 82178	BS CECC 50 004-117 ISSUE 1 OCTOBER 1982  Page 1 of 25 Pages
ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH BS CECC 50 000 : 1981	MANUFACTURER'S TYPE NUMBER TIPL 752, TIPL 752A TIPL 753, TIPL 753A
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 Page 6	SEE PD 9002 AND CECC 00200 For ordering information see 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 PLUS 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 ($T_{case} = -65\text{ °C to }+125\text{ °C}$. See Fig. 1)

			TIPL752, 753	TIPL752A, 753A
4.3	V_{CBO}	Collector-base continuous (direct) voltage. $I_E = 0$	800 V	1000 V
4.4	V_{CES}	Collector-emitter continuous (direct) voltage. $V_{BE} = 0$	800 V	1000 V
	V_{CEO}	Collector-emitter continuous (direct) voltage. $I_B = 0$	350 V	400 V
4.5	V_{EBO}	Emitter-base continuous (direct) voltage. $I_C = 0$	10 V	10 V

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	
		TIPL 752/752A	6A
		TIPL 753/753A	8A
4.6.	I_{CM}	Peak Collector Current	
		TIPL 752/752A	12A
		TIPL 753/753A	14A

Power Ratings

4.9.1.	P_{tot}	Total power dissipation (see Figs 2 & 3)	150W
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5.0 CHARACTERISTICS (not for inspection purposes) at 25 °C unless otherwise stated.

	V_{CEO}	Collector-emitter sustaining voltage Inductive loop switching measurement $I_C = 100mA, L = 25mH$	
		TIPL 752/753	350V min.
		TIPL 752A/753A	400V min.
5.1.	h_{21E}	Static forward current transfer ratio* $V_{CE} = 5V, I_C = 500mA$	
		TIPL 752/752A	15 min. 60 max.
		TIPL 753/753A	20 min. 60 max.
5.2.	$^{\dagger}V_{CE(sat)}(1)$	Collector-emitter saturation voltage* $I_C = 6A, I_B = 1.2A$	
		TIPL 752/752A	2.5V max.
		$I_C = 8A, I_B = 1.6A$	
		TIPL 753/753A	2.5V max.
	$^{\dagger}V_{CE(sat)}(3)$	Collector-emitter saturation voltage* $I_C = 4A, I_B = 800mA$	
		TIPL 752/752A	1V max.
		$I_C = 5A, I_B = 1A$	
		TIPL 753/753A	1V max.
	$^{\dagger}V_{CE(sat)}(4)$	Collector-emitter saturation voltage* $I_C = 2A, I_B = 400mA$	
			0.5V max.

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

† Measured in Groups A or C.

5.4.	$V_{CE(sat)}(5)$	Collector-emitter saturation voltage*	
		$I_C = 6A, \quad I_B = 1.2A$	
		TIPL 752/752A	5V max.
		$I_C = 8A, \quad I_B = 1.6A$	
		TIPL 753/753A	5V max.
		at $T_{amb} = 100^\circ C$	
5.4.	$V_{BE(sat)}(1)$	Base emitter saturation voltage *	
		$I_C = 6A, \quad I_B = 1.2A$	
		TIPL 752/752A	1.5V max.
		$I_C = 8A, \quad I_B = 1.6A$	
		TIPL 753/753A	1.5V max.
	$V_{BE(sat)}(3)$	Base emitter saturation voltage *	
		$I_C = 4A, \quad I_B = 0.8A$	
		TIPL 752/752A	1.3V max.
		$I_C = 5A, \quad I_B = 1.0A$	
		TIPL 753/753A	1.1V max.
	$V_{BE(sat)}(4)$	Base emitter saturation voltage *	
		$I_C = 2A, \quad I_B = 0.4A$	
		TIPL 752/752A	1.1V max.
		$I_C = 2A, \quad I_B = 0.4A$	
		TIPL 753/753A	0.9V max.
	$V_{BE(sat)}(5)$	Base emitter saturation voltage *	
		$I_C = 6A, \quad I_B = 1.2A$	
		TIPL 752/752A	1.4V max.
		$I_C = 8A, \quad I_B = 1.6A$	
		TIPL 753/753A	1.4V max.
		at $T_{amb} = 100^\circ C$	
5.5.	$I_{CES}(1)$	Collector-emitter cut-off current	
		$V_{CE} = 800V, \quad$	TIPL 752/753
			1 μA max.
		$V_{CE} = 1000V, \quad$	TIPL 752/752A
			1 μA max.
	$I_{CEO}(1)$	Collector cut-off current (open base)	
		$V_{CE} = 350V, \quad$	TIPL 752/753
			1 μA max.
		$V_{CE} = 400V, \quad$	TIPL 753/753A
			1 μA max.

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

† Measured in Groups A or C.

5.6.	$\dagger I_{CES(2)}$	Collector-emitter cut-off current at 100 °C.	
		$V_{CE} = 800V,$	TIPL 752/753
		$V_{CE} = 1000V,$	TIPL 752A/753A
		at $T_{amb} = 100\text{ °C}$	
	I_{EBO}	Emitter-base cut-off current	
		$V_{EB} = 10V, I_C = 0$	1mA max.

5.7. SWITCHING CHARACTERISTICS

5.7.1. Resistive Load (see Figs. 4 & 5)

$\dagger t_{on}$	Turn on time	TIPL 752/752A	1µs max.
		TIPL 753/753A	0.8 µs max.
$\dagger t_s$	Storage Time	ALL	2.5 µs max.
$\dagger t_f$	Fall Time	ALL	0.45µs max.
		$I_C = 6A, V_{CC} = 100V, I_{B1} = I_{B2} = 1.2A$	
		$T_{case} = 25\text{ °C}$	TIPL 752/752A
		$I_C = 8A, V_{CC} = 200V, I_{B1} = I_{B2} = 1.6A$	
		$T_{case} = 25\text{ °C}$	TIPL 753/753A
t_{on}	Turn on time	TIPL 752/752A	2.5 µs max.
		TIPL 753/753A	1.4 µs max.
t_s	Storage time	ALL	300 µs max.
t_f	Fall time	ALL	1 µs max.
		$I_C = 6A, V_{CC} = 100V, I_{B1} = I_{B2} = 1.2A$	
		$T_{case} = 100\text{ °C}$	TIPL 752/752A
		$I_C = 8A, V_{CC} = 200V, I_{B1} = I_{B2} = 1.6A$	
		$T_{case} = 100\text{ °C}$	TIPL 753/753A

5.7.1. Inductive Load (see Figs. 7 & 8)

$\dagger t_{sv}$	Voltage storage time	ALL	2.5 µs max.
t_{rv}	Voltage rise time	ALL	200 ns max.
$\dagger t_{fi}$	Current fall time	ALL	150 ns max.
t_{ti}	Current tail time	ALL	50 ns max.

† Measured in Groups A or C

$\dagger t_{xo}$	Crossover time	ALL	300ns max.
	$I_C = 6A, V_{BEoff} = 10V, I_{B1} = 1.2A$		
	$T_{case} = 25^\circ C$	TIPL 752/752A	
	$I_C = 8A, V_{BEoff} = 10V, I_{B1} = 1.6A$		
	$T_{case} = 100^\circ C$	TIPL 753/753A	
$\dagger t_{sv}$	Voltage storage time	ALL	3ns max.
t_{rv}	Voltage rise time	ALL	300ns max.
$\dagger t_{fi}$	Current fall time	ALL	150ns max.
t_{ti}	Current tail time	ALL	50ns max.
$\dagger t_{xo}$	Crossover time	ALL	500ns max.
	$I_C = 6A, V_{BEoff} = 10V, I_{B1} = 1.2A$		
	$T_{case} = 100^\circ C$	TIPL 752/752A	
	$I_C = 8A, V_{BEoff} = 10V, I_{B1} = 1.6A$		
	$T_{case} = 100^\circ C$	TIPL 753/753A	
5.9.	$R_{th(j.case)}$	Thermal resistance junction to case	$1.17^\circ CW^{-1}$ max.

$\dagger$ Measured in Groups A or C.

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.
 - (e) Mark of conformity unless a Certificate of Conformity is used.
- 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 50 004-117.

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

GROUP A ALL TESTS ARE NON-DESTRUCTIVE 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	4.3.4.	Device considered to be open circuit if $h_{21E} < 5$. Device considered to be short circuit if $I_{CES(1)} > 100mA$				II	.15%
<u>SUBGROUP A2b</u> Collector- emitter cut-off current $I_{CES(1)}$ Collector emitter cut-off current $I_{CEO(1)}$ Collector- emitter saturation voltage $V_{CE(sat(1))}$	4.3.4. T.009 4.3.4. T.009 4.3.4. T.003	$V_{CE} = 800V$ TIPL 752/753 $V_{CE} = 1000V$ TIPL 752A/753A $V_{BE} = 0V$ $V_{CE} = 350V$ TIPL 752/753 $V_{CE} = 400V$ TIPL 752A/753A $I_C = 6A$ TIPL 752/752A $I_B = 1.2A$ $I_C = 8A$ TIPL 753/753A $I_B = 1.6A$	- - - - - -	1.0 1.0 1.0 1.0 2.5 2.5	μA μA μA μA V V	II	0.65%

8. INSPECTION REQUIREMENTS

ALL 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}	4.3.4. T.006	$V_{CC} = 5V$ $I_C = 500mA$ TIPL 752/A TIPL 753/A	15.0 20.0	60.0 60.0			
Collector- emitter saturation voltage $V_{CE(sat)}(3)$	4.3.4. T.003	$I_C = 4A$ TIPL 752/A $I_B = 0.8A$ $I_C = 5A$ TIPL 753/A $I_B = 1.0A$	-	1.0	V		
Collector- emitter saturation voltage $V_{CE(sat)}(4)$	4.3.4. T.003	$I_C = 2A$ ALL $I_B = 0.4A$ ALL	-	0.5	V		
Base-emitter saturation voltage $V_{BE(sat)}(1)$	4.3.4. T.002	$I_C = 6A$ TIPL 752/A $I_B = 1.2A$ $I_C = 8A$ TIPL 753/A $I_B = 1.6A$	-	1.5 1.5	V V		