

BRITISH STANDARDS INSTITUTION

2, PARK STREET, LONDON, W1A 2BS

BS CECC 50 004-138
ISSUE 1,
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Specification available from:—

CECC 00200 AND

TEXAS INSTRUMENTS LIMITED,
MANTON LANE, BEDFORD, MK41 7PA

TELEPHONE : BEDFORD 67466 TELEX : 82178

Page 1 of 26 Pages

ELECTRONIC COMPONENTS OF ASSESSED QUALITY
DETAIL SPECIFICATION IN ACCORDANCE WITH

BS CECC 50 000 : 1981

MANUFACTURER'S TYPE NUMBER

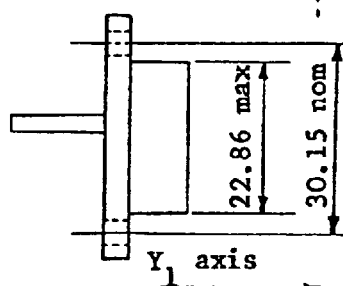
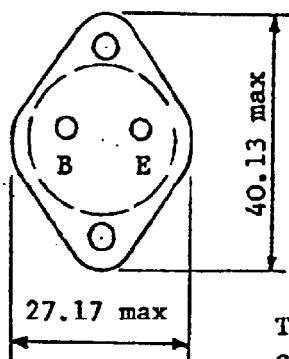
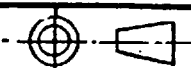
TIPL773, TIPL773A, TIPL773B

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 SO-127A

IEC 191-2 C14A B18. Dimensions in millimetres.

Marking information - See Clause 6

2.

CASE RATED DARLINGTON
CONNECTED 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 $-65^{\circ}C$ to $+200^{\circ}C$

4.2. T_{stg} Storage temperature range $-65^{\circ}C$ to $+200^{\circ}C$

Voltage Ratings ($T_{case} = -65^{\circ}C$ to $+125^{\circ}C$. See Fig. 6)

		TIPL773	TIPL773A	TIPL773B
4.3.	V_{CBO} Collector-base continuous (direct) voltage. $I_E = 0$	950V	1050V	1150V
4.4.	V_{CES} Collector-emitter continuous (direct) voltage. $V_{BE} = 0$	950V	1050V	1150V
4.4.	V_{CEO} Collector-emitter continuous (direct) voltage. $I_B = 0$	600V	700V	800V
4.5.	V_{EBO} Emitter-base continuous (direct) voltage. $I_C = 0$	6V	6V	6V

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



Documents

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			TIPL773	TIPL773A	TIPL773B
4.6	I_C	Continuous collector current	20A	20A	20A
	I_{CM}	Peak collector current (note 1)	55A	55A	55A
4.9	<u>Power Ratings</u>				
4.9.1	P_{tot}	Maximum continuous power dissipation at 25°C (see Figs. 2, 3, 4 & 5)	← 100W →		
5.	<u>CHARACTERISTICS</u> at 25°C unless otherwise specified (not for inspection purposes)				
	$V_{CEO(SUS)}$	Collector-emitter sustaining (note 2) $I_C = 100mA, L = 25mH$	1000V	700V	800V min.
	$V_{CEX(SUS)}$	Collector-emitter sustaining voltage. (Fig. 1A) $I_{BOFF} = 1A, I_C = 6A$	710	860	970 min.
5.1.	$h_{21E(1)}$	Forward current transfer ratio.* $V_{CE} = 5V, I_C = 500mA$	50	50	50 min.
5.2.	$V_{CE(SAT)(1)}$	Collector-emitter saturation voltage* $I_C = 15A, I_B = 300mA$ $I_C = 12.5A, I_B = 250mA$ $I_C = 10.0A, I_B = 200mA$	2.5V max.	2.5V max.	2.5V max.
5.3.	$V_{CE(SAT)(2)}$	Collector-emitter saturation voltage. $I_C = 500mA, I_B = 50mA$	ALL TYPES	1.5V max.	
5.4.	$V_{BE(SAT)(1)}$	Base-emitter saturation voltage $I_C = 15A, I_B = 300mA$ $I_C = 12.5A, I_B = 250mA$ $I_C = 10.0A, I_B = 200mA$	4.0V max.	4.0V max.	4.0V max.

† Measured in Groups A or C

* These parameters are measured using pulse techniques, pulse width < 300µs, Duty Cycle < 2%

Note 1: Pulse test, pulse duration = 300µs

Note 2: Inductive loop switching measurement.

5. CHARACTERISTICS (Cont'd)

TIPL773

TIPL773A

TIPL773B

$\dagger v_{CE(SAT)} (3)$	Collector-emitter saturation voltage*		
	$I_C = 10A, I_B = 200mA$	2.2V max.	
	$I_C = 7.5A, I_B = 150mA$		2.2V max.
	$I_C = 5.0A, I_B = 100mA$		2.2V max.
$\dagger v_{CE(SAT)} (4)$	$I_C = 3A, I_B = 60mA$	2.0V max.	
	$I_C = 2.5A, I_B = 50mA$		2.0V max.
	$I_C = 1.0A, I_B = 20mA$		2.0V max.
$\dagger v_{BE(SAT)} (3)$	Base-emitter saturation voltage*		
	$I_C = 10A, I_B = 200mA$	3.5V max.	
	$I_C = 7.5A, I_B = 150mA$		3.5V max.
	$I_C = 5.0A, I_B = 100mA$		3.5V max.
$\dagger v_{BE(SAT)} (4)$	$I_C = 3A, I_B = 60mA$	3.0V max.	
	$I_C = 2.5A, I_B = 50mA$		3.0V max.
	$I_C = 1.0A, I_B = 20mA$		3.0V max.

5.5. Leakage Currents

$\dagger I_{CES(1)}$	Collector-emitter cut-off current.		
	$V_{BE} = 0$		
	$V_{CE} = 950V$	100 μA max.	
	$V_{CE} = 1050V$		100 μA max.
	$V_{CE} = 1150V$		100 μA max.
$\dagger I_{CEX(1)}$	Collector-emitter cut-off current.		
	$1.5V < V_{EB} < 6V$		
	$V_{CE} = 950V$	100 μA max.	
	$V_{CE} = 1050V$		100 μA max.
	$V_{CE} = 1150V$		100 μA max.

* These parameters are measured using pulse techniques, pulse width < 300 μs , Duty Cycle < 2%

† Measured in Groups A or C

5. CHARACTERISTICS (Cont'd)

TIPL773
TIPL773A
TIPL773B
 I_{CEO} Collector cut-off current
($I_B = 0$)

 $V_{CE} = 600V$

100 μ A max.

 $V_{CE} = 700V$

100 μ A max.

 $V_{CE} = 800V$

100 μ A max.

 I_{EBO} Emitter cut-off current

 $V_{EB} = 6V, I_C = 0$
 $\longleftrightarrow$ 10mA max. $\longrightarrow$

5.6. $I_{CES(2)}$ Collector cut-off current
 $T_{case} = 100^\circ C$
 $V_{CE} = 950V$

1.0mA max.

 $V_{CE} = 1050V$

1.0mA max.

 $V_{CE} = 1150V$

1.0mA max.

5.7. Switching Characteristics (See Figs. 1 & 2)

Resistive Load (See Fig. 1b)

5.7.1. TIPL773

t_{on}	Turn on time	($I_C = 15.0A, V_{CE} = 250V$)	1.25 μ s	max.
		()		
t_s	Storage time	($I_{BOFF} = 1.5A$)	3.00 μ s	max.
		()		
t_f	Fall time	($T_{case} = 25^\circ C$)	1.00 μ s	max.
		()		
t_{on}	Turn on time	($I_C = 15.0A, V_{CE} = 250V$)	2.00 μ s	max.
		()		
t_s	Storage time	($I_{BOFF} = 1.5A$)	4.00 μ s	max.
		()		
t_f	Fall time	($T_{case} = 100^\circ C$)	2.00 μ s	max.
		()		

† Measured in Groups A or C

5. CHARACTERISTICS (Cont'd)

5.7.1. TIPL773A

t_{on}	Turn on time	($I_C = 12.5A, V_{CE} = 250V$) ()	1.25 μs max.
t_s	Storage time	($I_{BOFF} = 1.5A$) ()	3.50 μs max.
t_f	Fall time	($T_{case} = 25^\circ C$) ()	1.00 μs max.
t_{on}	Turn on time	($I_C = 12.5A, V_{CE} = 250V$) ()	2.00 μs max.
t_s	Storage time	($I_{BOFF} = 1.5A$) ()	5.00 μs max.
t_f	Fall time	($T_{case} = 100^\circ C$) ()	

TIPL773B

t_{on}	Turn on time	($I_C = 10A, V_{CE} = 250V$) ()	1.05 μs max.
t_s	Storage time	($I_{BOFF} = 1.5A$) ()	4.00 μs max.
t_f	Fall time	($T_{case} = 25^\circ C$) ()	1.00 μs max.
t_{on}	Turn on time	($I_C = 10A, V_{CE} = 250V$) ()	2.00 μs max.
t_s	Storage time	($I_{BOFF} = 1.5A$) ()	6.00 μs max.
t_f	Fall time	($T_{case} = 100^\circ C$) ()	2.00 μs max.

5.9. R_{ojc} Thermal resistance junction-case

TIPL773	)	
TIPL773A	)	0.97 $^\circ C/W$
TIPL773B	)	

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 50 004-138

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 $T_{amb} = 25^{\circ}\text{C}$ 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	A device is considered to be open circuit if $h_{21E(1)} < 5$ A device is considered to be short circuit if $I_{CES(1)} > 10 \text{ mA}$				II	0.15
<u>SUBGROUP A2b</u> Collector- emitter cut-off current $I_{CES(1)}$ Collector- emitter cut-off current $I_{CEX(1)}$	4.3.4 T.009 T.009	$V_{BE} = 0$ $V_{CE} = 950\text{V}$ TIPL773 $V_{CE} = 1050\text{V}$ TIPL773A $V_{CE} = 1150\text{V}$ TIPL773B $1.5\text{V} < V_{EB} < 6.0\text{V}$ $V_{CE} = 950\text{V}$ TIPL773 $V_{CE} = 1050\text{V}$ TIPL773A $V_{CE} = 1150\text{V}$ TIPL773B		100.0 100.0 100.0 100.0 100.0 100.0	μA μA μA μA μA μA	II	0.65

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 A2b</u> (Cont'd)	4.3.4 T.009					II	0.65%
Collector-emitter cut-off current $I_{CEO}(1)$		$I_B = 0$ $V_{CE} = 600V$ TIPL773 $V_{CE} = 700V$ TIPL773A $V_{CE} = 800V$ TIPL773B		100.0 100.0 100.0	μA μA μA		
Collector-emitter saturation voltage $V_{CE(SAT)}(1)$	4.3.4. T.003	$I_C = 15A$) $I_B = 300mA$) TIPL773 $I_C = 12.5A$) $I_B = 10.0A$) TIPL773A $I_C = 10.0A$) $I_B = 200mA$) TIPL773B		4.0 4.0 4.0	V V V		
<u>SUBGROUP A3</u>						I	2.5%
Static forward current transfer ratio $h_{21E}(1)$	4.3.4 T.006	$V_{CE} = 5.0V$ $I_C = 500mA$	50.0				
Collector-emitter saturation voltage $V_{CE(SAT)}(2)$	4.3.4	$I_C = 500mA$) $I_B = 50mA$) ALL TYPES		1.5	V		
$V_{CE(SAT)}(3)$		$I_C = 7.5A$) $I_B = 150mA$) TIPL773		2.2	V		
		$I_C = 7.5A$) $I_B = 150mA$) TIPL773A		2.2	V		
		$I_C = 5.0A$) $I_B = 100mA$) TIPL773B		2.2	V		



Documents

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