



## DOCUMENT CHANGE REQUEST

DCR number 490 Changes required for: General

Date: 2009/04/14

Date sent: 2009/04/14

Originator: S Jeffery - ESCC

Organisation: ESA/ESTEC

Status: IMPLEMENTED

Title: Transistors Low Power NPN, based on type 2N2484

Number: 5201/001 Issue: 4

Other documents affected:

Page:

See attachment

Paragraph:

See attachment

Original wording:

Proposed wording:

Various editorial and technical changes as detailed in the attachment, which are required to make this detail spec clear, complete and consistent with the standard format and content of specifications for similar Part Types. Note that this DCR replaces the withdrawn DCR 458.

Justification:

Improve the appearance, content and clarity of the spec.

Attachments:

5201001\_Issue\_5\_-\_Draft\_B.pdf, null

Modifications:

N/A

Approval signature:

Date signed:

2009-04-14



Pages 1 to 15

## TRANSISTORS, LOW POWER, NPN

BASED ON TYPE 2N2484

ESCC Detail Specification No. 5201/001

as applicable

Issue 4.5 - Draft B	December 2008
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Document Custodian: European Space Agency - see <https://escies.org>

as applicable

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**DOCUMENTATION CHANGE NOTICE**

(Refer to <https://escies.org> for ESCC DCR content)

DCR No.	CHANGE DESCRIPTION
<del>408, 447</del>	Specification up issued to incorporate editorial and technical changes per DCR.

tbd

## 1.5

**MAXIMUM RATINGS**

The maximum ratings shall not be exceeded at any time during use or storage.

Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

Characteristics	Symbols	Maximum Ratings	Unit	Remarks
Collector-Base Voltage	$V_{CBO}$	60	V	Over entire operating temperature range
Collector-Emitter Voltage	$V_{CEO}$	60	V	
Emitter-Base Voltage	$V_{EBO}$	6	V	
Collector Current	$I_C$	50	mA	Continuous
Power Dissipation For TO-18 and CCP	$P_{tot1}$	0.36	W	At $T_{amb} \leq +25^\circ\text{C}$ Note 1
<del>For CCP</del>	<del><math>P_{tot2}</math></del>	<del>0.73 (Note 2)</del>	<del>W</del>	<del>Note 1</del>
For TO-18	$P_{tot2}$	1.2	W	At $T_{case} \leq +25^\circ\text{C}$ Note 1
Operating Temperature Range	$T_{op}$	-65 to +200	$^\circ\text{C}$	Note 2
Storage Temperature Range	$T_{stg}$	-65 to +200	$^\circ\text{C}$	Note 2
Soldering Temperature For TO-18	$T_{sol}$	+260	$^\circ\text{C}$	Note 3
For CCP		+245		Note 4

**NOTES:**

- For  $T_{amb}$  or  $T_{case} > +25^\circ\text{C}$  derate linearly to 0W at  $+200^\circ\text{C}$ .
- When mounted on a  $15 \times 15 \times 0.6\text{mm}$  ceramic substrate.
- For Variants with tin-lead plating or hot solder dip lead finish all testing performed at  $T_{amb} > +125^\circ\text{C}$  shall be carried out in a 100% inert atmosphere.
- Duration 10 seconds maximum at a distance of not less than 1.5mm from the device body and the same lead shall not be resoldered until 3 minutes have elapsed.
- Duration 5 seconds maximum and the same terminal shall not be resoldered until 3 minutes have elapsed.

[1. Thermal Resistance, Junction-to-Case only applies to TO-18 packaged Variants.

See attached

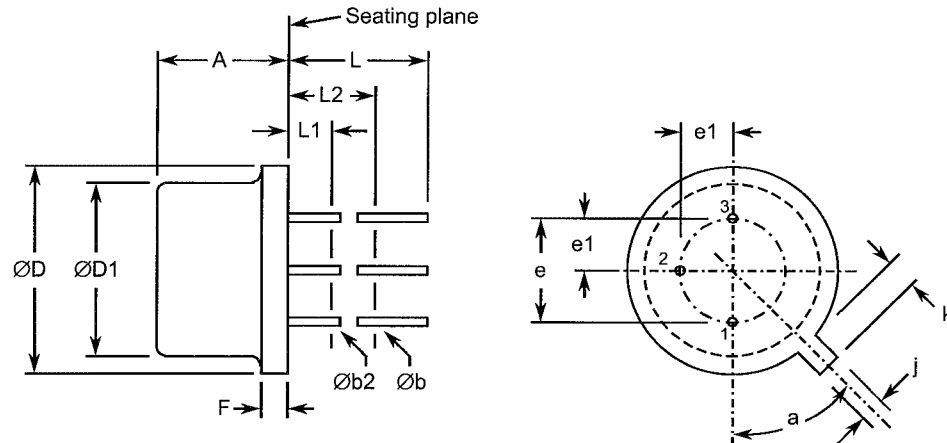
Symbol - make bigger

, and any handling,

Thermal Resistance, Junction-to-Ambient	$R_{th(j-a)}$	486	°C/W	
Thermal Resistance, Junction-to-Case	$R_{th(j-c)}$	145.8	°C/W	Note 1

## 1.6 PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

### 1.6.1 Metal Can Package (TO-18) - 3 lead



note  
addition of  
horizontal  
lines

Symbols	Dimensions mm		Notes
	Min	Max	
A	4.32	5.33	
Øb	0.406	0.533	2, 3
Øb2	0.406	0.483	2, 3
ØD	5.31	5.84	
ØD1	4.52	4.95	
e	2.54 BSC		4
e1	1.27 BSC		4
F	-	0.762	
j	0.914	1.17	
k	0.711	1.22	5
L	12.7	-	2
L1	-	1.27	3
L2	6.35	-	3
a	45° BSC		1, 4, 6

#### NOTES:

- Terminal identification is specified by reference to the tab position where lead 1 = emitter, lead 2 = base, lead 3 = collector.
- Applies to all leads.
- Øb2 applies between L1 and L2. Øb applies between L2 and 12.7mm from the seating plane. Diameter is uncontrolled within L1 and beyond 12.7mm from the seating plane.
- Leads having maximum diameter 0.483mm measured in the gauging plane 1.37(+0.025,-0)mm

## 2.4.2 High and Low Temperatures Electrical Measurements

Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions Note 1	Limits		Units
				Min	Max	
Collector-Base Cut-off Current	$I_{CBO}$	3036	$T_{amb}=+150(+0-5)^{\circ}C$ $V_{CB}=45V$ , Bias Condition D	-	10	$\mu A$
Forward-Current Transfer Ratio 2	$h_{FE2}$	3076	$T_{amb}=-55(+5-0)^{\circ}C$ $V_{CE}=5V$ $I_C=10\mu A$	20	-	-

### NOTES:

- Read and record measurements shall be performed on a sample of 5 components with 0 failures allowed. Alternatively a 100% inspection may be performed.

## 2.5 PARAMETER DRIFT VALUES

Unless otherwise specified, the measurements shall be performed at  $T_{amb}=+22 \pm 3^{\circ}C$ .

The test methods and test conditions shall be as per the corresponding test defined in Room Temperature Electrical Measurements.

The drift values ( $\Delta$ ) shall not be exceeded for each characteristic specified. The corresponding absolute limit values for each characteristic shall not be exceeded.

Characteristics	Symbols	Limits			Units
		Drift Value $\Delta$	Absolute		
			Min	Max	
Collector-Base Cut-off Current	$I_{CBO}$	$\pm 5$ or (1) $\pm 100\%$	-	10	nA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$\pm 30$ or (1) $\pm 15\%$	-	350	mV
Forward-Current Transfer Ratio 4	$h_{FE4}$	$\pm 15\%$	250	650	-

### NOTES:

- Whichever is the greater referred to the initial value.

## 2.6 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

Unless otherwise specified, the measurements shall be performed at  $T_{amb}=+22 \pm 3^{\circ}C$ .

The test methods and test conditions shall be as per the corresponding test defined in Room Temperature Electrical Measurements.



The limit values for each characteristic shall not be exceeded.

Characteristics	Symbols	Limits		Units
		Min	Max	
Collector-Base Cut-off Current	$I_{CBO}$	-	10	nA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	350	mV
Forward-Current Transfer Ratio 4	$h_{FE4}$	250	650	-

## 2.7 POWER BURN-IN CONDITIONS

Characteristics	Symbols	Test Conditions	Units
Ambient Temperature	$T_{amb}$	+20 to +50	°C
Power Dissipation	$P_{tot}$	As per Maximum Ratings. <del>Not derated</del> at the chosen $T_{amb}$	W
Collector-Base Voltage	$V_{CB}$	27	V

## 2.8 OPERATING LIFE CONDITIONS

The conditions shall be as specified for Power Burn-in.

Derate  $P_{tot1}$

using the specified  $R_{th(j-a)}$ .

P
APPENDIX 'A'
S -

AGREED DEVIATIONS FOR STMICROELECTRONICS (F)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS						
Deviations from Production Control-Chart F2	Special In-Process Control Internal Visual Inspection. For CCP packages the criteria specified for voids in the fillet and minimum die mounting material around the visible die perimeter for die mounting defects may be omitted providing that a radiographic inspection to verify the die-attach process is performed on a sample basis in accordance with STMicroelectronics procedure 0076637.						
Deviations from Room Temperature Electrical Measurements	All AC characteristics (Room Temperature Electrical Measurement Note 2) may be considered guaranteed but not tested if successful pilot lot testing has been performed on the wafer lot which includes AC characteristic measurements per the Detail Specification.						
	A summary of the pilot lot testing shall be provided if required by the Purchase Order.						
	Characteristics $h_{fe1}$ , and $C_{ibo}$ , shall be as follows:						
	Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions	Limits		Units
					Min.	Max.	
High Frequency Small Signal Current Gain 1	$h_{fe1}$	3306	$V_{CE}=5V$ $I_C=50\mu A$ $f=5MHz$ Note 2	1	-	-	
Input Capacitance	$C_{ibo}$	3240	$V_{EB}=500mV$ $I_C=0A$ $f=1MHz$ Note 2	-	15	pF	
Deviations from High and Low Temperatures Electrical Measurements	All characteristics specified may be considered guaranteed but not tested if successful pilot lot testing has been performed on the wafer lot which includes characteristic measurements at high and low temperatures per the Detail Specification. A summary of the pilot lot testing shall be provided if required by the Purchase Order.						
Deviations from Screening Tests - Chart F3	Solderability is not applicable unless specifically stipulated in the Purchase Order.						