DOCUMENT CHANGE REQUEST

DCR number 498	Changes required for: General		Originator: S Jeffery - ESCC
Date: 2009/04/14	Date sent: 2009/04/14		Organisation: ESA/ESTEC
Status: IMPLEMENTED			

Title:	Transistors Low Power RF NPN, based on type 2N3019		
Number:	5201/011	Issue:	2

Other documents affected:

Page:

See attached mark-up of 5201/011 (Issue 3 - Draft B). Note that this mark-up also includes the change of DCR 447 (DCR 447 was approved 16th December 2008); it is proposed that once this DCR has been approved, DCR 447 is introduced concurrently.

Paragraph:

See attached mark-up of 5201/011 (Issue 3 - Draft B). Note that this mark-up also includes the change of DCR 447 (DCR 447 was approved 16th December 2008); it is proposed that once this DCR has been approved, DCR 447 is introduced concurrently.

Original wording:

Proposed wording:

To introduce a number of editorial and technical changes (see the attached mark-up) 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 Note that this DCR replaces the withdrawn DCR 469.

Justification:

Improve the appearance, content and clarity of the spec.

Attachments:
5201011_Issue_3_-_Draft_B.pdf, null
Modifications:
N/A
Approval signature:
Date signed:
2009-04-14

ESCC
European Space Components Coordination

Pages 1 to 15

TRANSISTORS, LOW POWER, RF, NPN

BASED ON TYPE 2N3019

ESCC Detail Specification No. 5201/011

as applicable

Issue ~~2~~ 3 - Draft B	~~February 2008~~

Document Custodian: European Space Agency - see https://escies.org as applicable

LEGAL DISCLAIMER AND COPYRIGHT

DOCUMENTATION CHANGE NOTICE

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

DCR No.	CHANGE DESCRIPTION
~~187, 266~~	Specification up issued to incorporate editorial and technical changes per DCRs.

447, tbd

1. GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics and test and inspection data for the component type variants and/or the range of components specified below. It supplements the requirements of, and shall be read in conjunction with, the ESCC Generic Specification listed under Applicable Documents.

1.2 APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:

(a) ESCC Generic Specification No. 5000
(b) MIL-STD-750, Test Methods and Procedures for Semiconductor Devices

1.3 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. 21300 shall apply.

1.4 THE ESCC COMPONENT NUMBER AND COMPONENT TYPE VARIANTS

1.4.1 The ESCC Component Number

The ESCC Component Number shall be constituted as follows:

Example: 520101103

- Detail Specification Reference: 5201011
- Component Type Variant Number: 03 (as required)

1.4.2 Component Type Variants

The component type variants applicable to this specification are as follows:

/ Terminal

Variant Number	Based on Type	Case	Lead Material and Finish	Weight max g
03	2N3019	TO-39	D2	2
04	2N3019	TO-39	D3 or D4	2

/terminal

The lead material and finish shall be in accordance with the requirements of ESCC Basic Specification No. 23500.

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}	140	V	Over entire operating temperature range
Collector-Emitter Voltage	V_{CEO}	80	V	
Emitter-Base Voltage	V_{EBO}	7	V	
Collector Current	I_C	1	A	Continuous
Power Dissipation	P_{tot1}	0.8	W	At $T_{amb} \leq +25°C$ ~~Note 1~~
	P_{tot2}	5	W	At $T_{case} \leq +25°C$ ~~Note 1~~
Operating Temperature Range	T_{op}	-65 to +200	°C	Note ~~2~~ 1
Storage Temperature Range	T_{stg}	-65 to +200	°C	Note ~~2~~ 1
Soldering Temperature	T_{sol}	+260	°C	Note ~~3~~ 2

see attached

make ° bigger

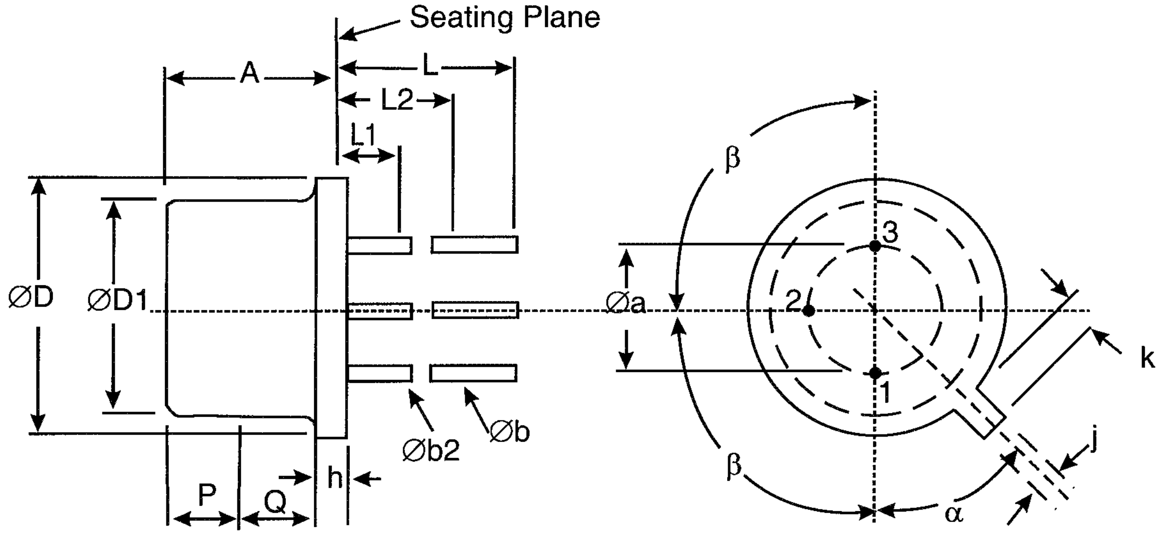
NOTES:

~~1. For T_{amb} or T_{case} > +25°C, derate linearly to 0W at +200°C.~~

1. ~~2.~~ For Variants with tin-lead plating or hot solder dip lead finish all testing , and any handling, performed at T_{amb} > +125°C shall be carried out in a 100% inert atmosphere.
2. ~~3.~~ 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.

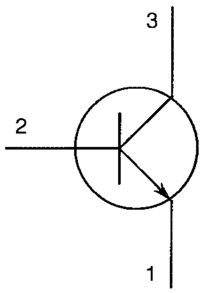
1.6 PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

Metal Can Package (TO-39) - 3 lead



Thermal Resistance, Junction-to-Ambient	$R_{th(j-a)}$	218.8	°C/W	
Thermal Resistance, Junction-to-Case	$R_{th(j-c)}$	35	°C/W	

1.7 FUNCTIONAL DIAGRAM



1. Emitter.
2. Base.
3. Collector.

NOTES:

1. The collector is internally connected to the case.

1.8 MATERIALS AND FINISHES

Materials and finishes shall be as follows:

a) Case
The case shall be hermetically sealed and have a metal body with hard glass seals.

b) Leads / Terminals
As specified in Component Type Variants.

2. REQUIREMENTS

2.1 GENERAL

The complete requirements for procurement of the components specified herein are as stated in this specification and the ESCC Generic Specification. Permitted deviations from the Generic Specification, applicable to this specification only, are listed below.

Permitted deviations from the Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirement and do not affect the component's reliability, are listed in the appendices attached to this specification.

2.1.1 Deviations from the Generic Specification

2.1.1.1 Deviation from Screening Tests - Chart F3

High Temperature Reverse Bias Burn-in and the subsequent Final Measurements for HTRB shall be omitted.

2.2 MARKING

The marking shall be in accordance with the requirements of ESCC Basic Specification No. 21700 and as follows.

The information to be marked on the component shall be:

Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions	Limits		Units
				Min	Max	
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	3001	I_C = 100µA, Bias Condition D	140	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	3011	I_C = 30mA, Bias Condition D Note 1	80	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	3026	I_E = 100µA, Bias Condition D	7	-	V
Collector-Emitter Cut-off Current	I_{CES}	3041	V_{CE} = 90V, Bias Condition C	-	10	nA
Emitter-Base Cut-off Current	I_{EBO}	3061	V_{EB} = 5V, Bias Condition D	-	10	nA
Collector-Emitter Saturation Voltage	$V_{CE(sat)1}$	3071	I_C=150mA I_B=15mA Note 1	-	200	mV
	$V_{CE(sat)2}$	3071	I_C=500mA I_B=50mA Note 1	-	500	mV
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	3066	Test Condition A I_C=150mA I_B=15mA Note 1	-	1.1	V
Forward-Current Transfer Ratio	h_{FE1}	3076	V_{CE}=10V ; I_C = 150mA Note 1	100	300	-
	h_{FE2}	3076	V_{CE}=10V ; I_C = 100µA Note 1	50	200	-
	h_{FE3}	3076	V_{CE}=10V ; I_C = 10mA Note 1	90	-	-
	h_{FE4}	3076	V_{CE}=10V ; I_C = 500mA Note 1	50	200	-
	h_{FE5}	3076	V_{CE}=10V ; I_C = 1A Note 1	15	-	-
Magnitude of small-signal short-circuit forward-current transfer ratio	$\|h_{fe}\|$	3306	V_{CE}=10V, I_C=50mA f=20MHz Note 2	5	20	–
Small signal short-circuit forward-current transfer ratio	h_{fe}	3206	V_{CE}=5V, I_C=1mA f=1kHz Note 2	80	400	-

upper case

Characteristics	Symbols	Limits		Units
		Min	Max	
Collector-Emitter Cut-off Current	I_{CES}	-	10	nA
Forward-Current Transfer Ratio 1	h_{FE1}	100	300	-
Collector-Emitter Saturation Voltage 2	$V_{CE(sat)2}$	-	800	mV

2.7 POWER BURN-IN CONDITIONS

Characteristics	Symbols	Conditions	Units
Ambient Temperature	T_{amb}	+25 (+0 -5)	°C
Power Dissipation	P_{tot}	800	mW
Collector-Base Voltage	V_{CB}	60	V

2.8 OPERATING LIFE CONDITIONS

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

APPENDIX 'A'

AGREED DEVIATIONS FOR STMICROELECTRONICS (F)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
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.
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.

(Approved DCR 447 refers) →