DOCUMENT CHANGE REQUEST

DCR number 508	Changes required for: General	Originator: S Jeffery - ESCC
Date: 2009/04/29	Date sent: 2009/04/29	Organisation: ESA/ESTEC
Status: IMPLEMENTED		

Title:	Transistors Matched Dual PNP, based on types 2N3810 and 2N3811		
Number:	5207/005	Issue:	2

Other documents affected:

Page:

See attached mark-up of 5207/005 (Issue 3 - Draft A). 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 5207/005 (Issue 3 - Draft A). 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.

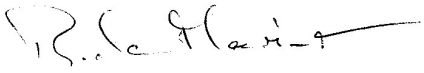
Original wording:

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.

Justification:

Improve the appearance, content and clarity of the spec.

Attachments:
5207005_Issue_3_-_Draft_A.pdf, null
Modifications:
Page 6: original Note 3 to Maximum Ratings, add ", and any handling,"between "testing" and "performed".
Approval signature:

Date signed:
2009-04-29

Pages 1 to 16

TRANSISTORS, MATCHED DUAL, PNP

BASED ON TYPE 2N3810

ESCC Detail Specification No. 5207/005

as applicable

Issue ~~2~~ 3 - Draft A	~~April 2008~~

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
~~187332~~ 447, tbd	Specification up issued to incorporate editorial and technical changes per DCRs.

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}	-5	V	
Collector Current	I_C	50	mA	Continuous
Power Dissipation (One Section)				At $T_{amb} \leq +25°C$ Note 1
For TO-78 and CCP	P_{totO1}	0.5	W	
For CCP	P_{totO2}	0.6 (Note 2)	W	
For TO-78	P_{totO} 2	0.5	W	At $T_{case} \leq +25°C$ Note 1
Power Dissipation (Both Sections)				At $T_{amb} \leq +25°C$ Note 1
For TO-78 and CCP	P_{totB1}	0.6	W	
For CCP	P_{totB2}	1.2 (Note 2)	W	
For TO-78	P_{totB} 2	0.6	W	At $T_{case} \leq +25°C$ Note 1
Operating Temperature Range	T_{op}	-55 to +200	°C	Note 2
Storage Temperature Range	T_{stg}	-65 to +200	°C	Note 2
Soldering Temperature For TO-78 For CCP	T_{sol}	 +260 +245	°C	 Note 3 Note 4

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see attached

NOTES:

1. ~~For T_{amb} or $T_{case} > +25°C$, derate linearly to 0W at +200°C~~ Thermal resistance, Junction-to-Case
2. ~~When mounted on a 15 x 15 x 0.6mm ceramic substrate~~
2. For Variants with tin-lead plating or hot solder dip lead finish all testing performed at $T_{amb} > +125°C$ shall be carried out in a 100% inert atmosphere.
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.
4. Duration 5 seconds maximum and the same terminal shall not be resoldered until 3 minutes have elapsed.

only applies to TO-78 packaged Variants.

Thermal Resistance, Junction-to-Ambient	$R_{th(j-a)}$	350 291.7	°C/W	For one section For both sections
Thermal Resistance, Junction-to-Case	$R_{th(j-c)}$	350 291.7	°C/W	For one section For both sections Note 1

Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions	Limits		Units
				Min	Max	
Small-Signal Short-Circuit Forward-Current Transfer Ratio	h_{fe}	3206	I_C=-1mA, V_{CE}=-10V f=1kHz Note 3	150	600	-
Spot Noise Figure	NF1	3246	V_{CE}=-5V I_C=-200µA R_s=2kΩ f=100Hz BW=20Hz Note 3	-	7	dB
	NF2	3246	V_{CE}=-5V I_C=-200µA R_s=2kΩ f=1kHz BW=200Hz Note 3	-	3	dB
Wide-Band Noise Figure	NF_w	3246	V_{CE}=-5V I_C=-200µA R_s=2kΩ 10Hz≤f≤15.7kHz Note 3	-	3.5	dB
Output Capacitance	C_{obo}	3236	V_{CB}=-5V, I_E=0A 100kHz≤f≤1MHz Note 3	-	6	pF
Input Capacitance	C_{ibo}	3240	V_{EB}=-500mV, I_C=0A 100kHz≤f≤1MHz Note 3	-	15	pF
Small-Signal Input Impedance	h_{ie}	3201	V_{CE}=-10V I_C=-1mA f=1kHz Note 3	3	30	kΩ

NOTES:

1. Pulsed measurement: Pulse Width ≤ 300µs, Duty Cycle ≤ 2%.
2. Any device whose measurement values exceed the specified limits shall be removed from the lot, but only count for PDA when such values exceed twice the specified limits (i.e. > 10mV or > 6mV).
3. For AC characteristics read and record measurements shall be performed on a sample of 32 components with 0 failures allowed. Alternatively a 100% inspection may be performed.

2.4.2 High and Low Temperatures Electrical Measurements

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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)°C V_{CB}=-50V, Bias Condition D	-	-10	µA

Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions Note 1	Limits		Units
				Min	Max	
Forward-Current Transfer Ratio 2	h_{FE2}	3076	T_{amb}=-55(+5-0)°C V_{CE}=-5V I_C=-100µA	60	-	-
Forward-Current Transfer Ratio Comparison	h_{FE2-1}/ h_{FE2-2}	3076	T_{amb}=-55 to + 125°C V_{CE}=-5V, I_C=-100µA	0.85	1.18	-
Base-Emitter Voltage Differential Change	$\lvert\Delta(V_{BE1}-V_{BE2})\Delta T_{amb}\rvert 1$	3066	T_{amb}=-55(+5-0)°C to +25±3°C V_{CE}=-5V I_C=-100µA Test condition B	-	800	µV
	$\lvert\Delta(V_{BE1}-V_{BE2})\Delta T_{amb}\rvert 2$	3066	T_{amb}=+25±3°C to +125(+0 -5)°C V_{CE}=-5V I_C=-100µA Test condition B	-	1000	µV

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NOTES:
1. 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 ±3°C.

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

The drift values (Δ) 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 Δ	Absolute		
			Min	Max	
Collector-Base Cut-off Current	I_{CBO}	±2 or (1) ±100%	-	-10	nA
Collector-Emitter Saturation Voltage 2	$V_{CE(sat)2}$	±15 or (1) ±10%	-	-250	mV
Forward-Current Transfer Ratio 2	h_{FE2}	±15%	150	450	-

NOTES:
1. 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 ±3°C.

The test methods and test conditions shall be as per the corresponding test defined in either Room Temperature Electrical Measurements or High and Low Temperatures Electrical Measurements, as applicable.

The limit values for each characteristic shall not be exceeded.

Characteristics	Symbols	Limits		Units
		Min	Max	
Collector-Base Cut-off Current	I_{CBO}	-	-20	nA
Collector-Emitter Saturation Voltage 2	$V_{CE(sat)2}$	-	-250	mV
Forward-Current Transfer Ratio 2	h_{FE2}	150	450	-
Forward-Current Transfer Ratio Comparison	h_{FE2-1}/ h_{FE2-2}	0.85	1.18	-
Base-Emitter Voltage Differential 2	$\|V_{BE1}-V_{BE2}\|2$	-	6	mV
Base-Emitter Voltage Differential Change (Note 1)	$\|\Delta(V_{BE1}-V_{BE2})\Delta T_{amb}\|1$	-	1	mV
	$\|\Delta(V_{BE1}-V_{BE2})\Delta T_{amb}\|2$	-	1.2	mV

NOTES:

1. Measured after Operating Life test only.

2.7 HIGH TEMPERATURE REVERSE BIAS BURN-IN CONDITIONS

Characteristics	Symbols	Test Conditions	Units
Ambient Temperature	T_{amb}	+150(+0 -5)	°C
Collector-Base Voltage (Note 1)	V_{CB}	-45	V
Duration	t	72 Minimum	hrs

NOTES:

1. On completion of High Temperature Reverse Bias Burn-in, the collector-base voltage shall continue to be applied until T_{case} < +30°C.

2.8 POWER BURN-IN CONDITIONS

Characteristics	Symbols	Test Conditions	Units
Ambient Temperature	T_{amb}	+25 ~~to~~ to +50	°C
Power Dissipation (Both Sections)	P_{totB}	As per Maximum Ratings P_{totB1} ~~derated~~ at the specified T_{amb}	W
Collector-Base Voltage	V_{CB}	-45	V

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

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APPENDIX 'A'

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 3) 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)