



## DOCUMENT CHANGE REQUEST

DCR number 538

Changes required for: General

Originator: S Jeffery - ESCC

Date: 2009/08/18

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Organisation: ESA/ESTEC

Status: IMPLEMENTED

Title: Fuses, 0.14 to 3.5 Amps, Based on Type MGA-S

Number: 4008/001

Issue: 1

Other documents affected:

Page:

Specification 4008/001 Issue 1 is updated to accompany the updated Generic 4008. Changes are summarised herein (see attached Issue 2 - Draft A).

Paragraph:

Specification 4008/001 Issue 1 is updated to accompany the updated Generic 4008. Changes are summarised herein (see attached Issue 2 - Draft A).

Original wording:

Proposed wording:

To introduce a number of editorial changes (see the attached mark-up) which are required to make this detail spec clear, complete and consistent.

Justification:

Improve the appearance, content and clarity of the spec.

Attachments:

4008001\_Issue\_2\_Draft\_B.pdf, null

Modifications:

N/A

Approval signature:

Date signed:

2009-08-18



Pages 1 to 14

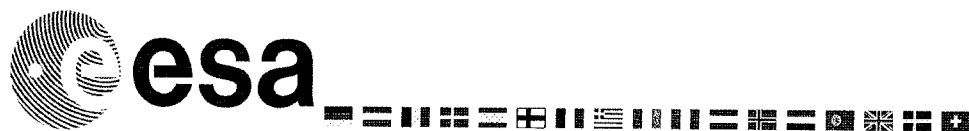
**FUSES, 0.14 TO 3.5 AMPS**

**BASED ON TYPE MGA-S**

**ESCC Detail Specification No. 4008/001**

as applicable

|                     |           |
|---------------------|-----------|
| Issue 1.2 - Draft B | June 2008 |
|---------------------|-----------|



Document Custodian: European Space Agency - see <https://escies.org>



as applicable

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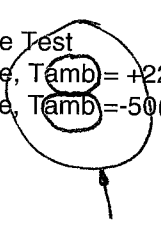
**DOCUMENTATION CHANGE NOTICE**

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

| DCR No. | CHANGE DESCRIPTION  |
|---------|---|
| tbd     | Specification up issued to incorporate editorial changes per DCR. |

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A handwritten circle is drawn around the subscript "b" in the temperature notation  $T_{amb}$  in the table.

subscript

| Symbols | Dimensions mm |      |
|---------|---------------|------|
|         | Min           | Max  |
| L       | 3             | 3.4  |
| B       | 1.35          | 1.75 |
| H       | 1.35          | 1.75 |
| D       | 0.3           | 0.7  |

## 1.8 MATERIALS AND FINISHES

Materials and finishes shall be as follows:

- (a) Body : Ceramic
- (b) Terminal material : Copper
- (c) Terminal plating : Electrolytic Nickel of thickness 1µm minimum and 5µm maximum over electrolytic Copper of thickness 0.3µm minimum and 2µm maximum, with an electrolytic Tin-lead final finish of thickness 5µm minimum and 15µm maximum. The composition of the Tin-lead shall be 65 to 95% tin, remainder lead.

lower case

lower case

lower case

lower case

## 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 Deviations from Chart F4 - Qualification and Periodic Tests

- (a) Rapid Change of Temperature: the number of cycles shall be 200.
- (b) Vibration: shall not be performed.

### 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:

- (a) The ESCC qualified components symbol (for ESCC qualified components only).
- (b) The ESCC Component Number.

(c) Traceability information.

### 2.3 CURRENT CARRYING CAPACITY TEST

Ref. Current Carrying Capacity in the ESCC Generic Specification.

Test Current : Nominal Current, DC, as specified in Component Type Variants and Range of Components.

Duration : 4 hours minimum.

Test temperature :  $+22 \pm 3^{\circ}\text{C}$ .

### 2.4 OVERLOAD OPERATION TEST

Ref. Overload Operation in the ESCC Generic Specification.

| Overload Current | Pre-arcing Time (ms) |      |
|------------------|----------------------|------|
|                  | Min                  | Max  |
| 357% $I_R$       | 2                    | 5000 |
| 571% $I_R$       | 0.5                  | 10   |
| 857% $I_R$       | 0.05                 | 2    |

### 2.5 VERIFICATION OF OVERLOAD OPERATION AT DC RATED VOLTAGE TEST

Ref. Verification of Overload Operation at DC Rated Voltage in the ESCC Generic Specification.

#### 2.5.1 Verification of Overload Operation at DC Rated Voltage, $T_{amb} = +22 \pm 3^{\circ}\text{C}$

| Overload Current | Pre-arcing Time (ms) |      |
|------------------|----------------------|------|
|                  | Min                  | Max  |
| 357% $I_R$       | 2                    | 5000 |
| 571% $I_R$       | 0.5                  | 10   |
| 50A              | N/A (Note 2)         |      |
| 300A (Note 1)    | N/A (Note 2)         |      |

#### **NOTES:**

- Not applicable for Variants 11 and 12.
- The fuse shall open the test circuit. The following criteria shall apply:  
The circuit shall remain energized for 30 seconds minimum without any indication of closing.  
The insulation shall not puncture. The terminals shall not separate from the body.  
The terminals and the body shall not rupture and the terminals shall not be shunted.

## 2.5.2 Verification of Overload Operation at DC Rated Voltage, $T_{amb} = -50(+5, -0)^{\circ}\text{C}$

| Overload Current | Pre-arcing Time (ms) |      |
|------------------|----------------------|------|
|                  | Min                  | Max  |
| 382% $I_R$       | 2                    | 5000 |
| 611% $I_R$       | 0.5                  | 10   |
| 50A              | N/A (Note 2)         |      |
| 300A (Note 1)    | N/A (Note 2)         |      |

### NOTES:

- Not applicable for Variants 11 and 12.
- The fuse shall open the test circuit. The following criteria shall apply:  
The circuit shall remain energized for 30 seconds minimum without any indication of closing.  
The insulation shall not puncture. The terminals shall not separate from the body.  
The terminals and the body shall not rupture and the terminals shall not be shunted.

## 2.6 INSULATION RESISTANCE TEST

Ref. Insulation Resistance in the ESCC Generic Specification.

Test Condition : A.

Test Temperature:  $T_{amb} = +22 \pm 3^{\circ}\text{C}$

Test Limit: 20k $\Omega$  minimum.

## 2.7 CURRENT CLEARING TEST

Ref. Thermal Vacuum in the ESCC Generic Specification.

The maximum current clearing  $I^2t$  value for each component type variant is given below.

| Variant Number | Maximum Current Clearing $I^2t$ at 571% $I_R$ (DC)<br>( $\text{A}^2 \text{ s}$ ) |
|----------------|--|
| 01             | 0.0064   |
| 02             | 0.01   |
| 03             | 0.0225   |
| 04             | 0.04   |
| 05             | 0.09   |
| 06             | 0.16   |
| 07             | 0.36   |
| 08             | 0.64   |
| 09             | 1  |
| 10             | 1.44   |
| 11             | 2.56   |
| 12             | 4  |



| Test Reference per<br>ESCC No. 4008                   | Characteristics                                       | Symbols               | Limits  |     | Units |
|---|---|-----------------------|---|-----|-------|
|   |   |                       | Min   | Max |       |
|   | Voltage Drop Drift<br>(from initial measure-<br>ment) | $\frac{\Delta V}{VD}$ | -   | ±20 | %     |
| Rapid Change of<br>Temperature<br>Final Measurements  | Cold Resistance                                       | R                     | See Component Type<br>Variants and Range<br>of Components |     | mΩ    |
|   | Voltage Drop<br>Note 1                                | VD                    | See Component Type<br>Variants and Range<br>of Components |     | mV    |
| Vibration<br>Final Measurements                       | Cold Resistance                                       | R                     | See Component Type<br>Variants and Range<br>of Components |     | mΩ    |
|   | Voltage Drop<br>Note 1                                | VD                    | See Component Type<br>Variants and Range<br>of Components |     | mV    |
| Shock<br>Final Measurements                           | Cold Resistance                                       | R                     | See Component Type<br>Variants and Range<br>of Components |     | mΩ    |
|   | Voltage Drop<br>Note 1                                | VD                    | See Component Type<br>Variants and Range<br>of Components |     | mV    |
| Damp Heat, Steady<br>State<br>Final Measurements      | Cold Resistance                                       | R                     | See Component Type<br>Variants and Range<br>of Components |     | mΩ    |
|   | Voltage Drop<br>Note 1                                | VD                    | See Component Type<br>Variants and Range<br>of Components |     | mV    |
| Resistance to Soldering<br>Heat<br>Final Measurements | Cold Resistance                                       | R                     | See Component Type<br>Variants and Range<br>of Components |     | mΩ    |
|   | Voltage Drop<br>Note 1                                | VD                    | See Component Type<br>Variants and Range<br>of Components |     | mV    |
| Robustness of<br>Terminations                         |   |                       |   |     |       |