

# Capability Approval Certificate

**Certificate Number:** CA/043

**Issue Number:** 18

**Page 1 of 5**

**Issue Date:** 1 October 2014

**Expiry Date:** 30 September 2017

**Approved to Generic/Sectional Specification(s):**

**Number:** BS 9450

**Date:** 1998

**Description of the Technology:**

Thick film passive and active hybrid integrated circuits  
Full assessment

**Manufactured by:**

**Technograph Microcircuits Ltd**

Units 1-4 Block A Railway Triangle  
Walton Road  
Portsmouth  
Hants  
PO6 1TN

**Manufacturer's Approval Number:** 1108/M

**Factory Code:** TTA

**Place(s) of Manufacture:** Units 1-4 Block A Railway Triangle, Portsmouth

**Test Report(s):**

As detailed in Section 5 of the Capability Manual

**Capability Manual:**

TTQ/CA2/82

**Issue:**

11

**Date of acceptance by NSI:**

September 2002

For and on behalf of BSI



UK NSI



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# Capability Approval Abstract

Description of Capability Approval (As recorded in PD 9002)

**Certificate Number:** CA/043  
**Issue Date:** 1 October 2014

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**Page 2 of 5**

**Manufacturer:** Technograph Microcircuits Ltd

<b>Basic Technology:</b>	Thick film passive and discrete hybrid integrated circuits.
<b>Construction -</b>	
<b>Resistors:</b>	Platinum and ruthenium based, screen printed, laser trimmed.
<b>Substrate:</b>	Alumina 96%
<b>Conductors:</b>	Gold and Platinum Gold - up to 5 layers. Gold - up to 3 layers.
<b>Assembly:</b>	
<b>Add on Components:</b>	Bare active devices - diodes, transistors, integrated circuits. Passive devices - capacitors, thick or thin film resistors.
<b>Method of Attachment:</b>	Conductive/insulating epoxy.
<b>Method of Interconnect:</b>	Ultrasonic bonding - Aluminium wedge and Gold ball.  External terminations by soldered pins, or via glass-to-metal seals.
<b>Packages and Sealing:</b>	<ol style="list-style-type: none"><li>1. Dual-in-line integral substrate package with epoxy sealed ceramic lid - up to 40 pins.</li><li>2. Dual-in-line metal package, electroless nickel or gold plated with welded lid - up to 40 leads.</li></ol>



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**Page 3 of 5**

**Manufacturer:** Technograph Microcircuits Ltd

## Boundaries of Capability -

### Resistors:

Range:	5 ohms to 5 Megohms.
Tolerance:	$\pm 1 \Omega$ , $\pm 0.25 \%$ to $\pm 0.5 \%$ depending on value.
Matching:	$\pm 1 \Omega$ , 0.5 %
Rating:	up to 200 mW/mm <sup>2</sup> , 100 V/mm depending on material system.
TCR:	100 ppm/°C.
TCR tracking:	25 ppm/°C, prints from the same screen.
Stability (% per 1000 hrs):	5 $\Omega$ to 100 $\Omega$ $\pm 5\%$ 100 $\Omega$ to 1k $\Omega$ $\pm 1\%$ 1 k $\Omega$ to 1 M $\Omega$ $\pm 0.4\%$ 1 M $\Omega$ to 3.6 M $\Omega$ $\pm 0.4\%$ 3.6 M $\Omega$ to 5 M $\Omega$ $\pm 1\%$
Electrical Performance:	 To customer detail specification.
Customer Participation In Design:	Any level or stage by agreement.



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Page 4 of 5

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## Boundaries of Capability -

### Package ratings:

Operating temperature range:	-55 °C to +125 °C
Storage temperature range:	-65 °C to +150 °C
Voltage:	200 V max
Conductor current density:	Au: 2.5 A/mm PtAu: 0.33 A/mm
Substrate power :	2 W/625 mm <sup>2</sup> max

**Note:** It may not be possible to achieve all the limits of capability in combination. Such combinations are determined by the agreed customer detail specification for the components ordered.



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The logo for BSI (British Standards Institution), consisting of the lowercase letters 'bsi' in a bold, sans-serif font, with a red dot at the end of the 'i'.

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Page 5 of 5

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## Environmental Performance:

TEST BS 9450 Reference	Epoxy Sealed Ceramic Lid	Welded Lid Metal Package
Rapid Change of Temperature 1.2.7.14	-55 °C to +125 °C 5 cycles	-55 °C to +125 °C 5 cycles
Acceleration 1.2.7.10	49,000 m/s <sup>2</sup> Y1	49,000 m/s <sup>2</sup> Y1
Vibration Sinusoidal 1.2.7.9	20-2000 Hz, 98 m/s <sup>2</sup>	20-2000 Hz, 98 m/s <sup>2</sup>
Shock 1.2.7.7	981m/s <sup>2</sup> , 6 ms	981m/s <sup>2</sup> , 6 ms
Damp Heat Steady State 1.2.7.5	56 days	56 days
Solderability 1.2.7.16.2	Pass	Pass
Solder Heat 1.2.7.16.3	350 °C	350°C
Terminal Robustness 1.2.7.17.1, 1.2.7.17.3	0.5 Kg Pass	0.5 Kg Pass
Fine and Gross Leak 1.2.7.15.2, 1.2.7.15.3	5 x 10 <sup>-7</sup> , atm/cc/sec Pass	5 x 10 <sup>-7</sup> , atm/cc/sec Pass



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