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Document Level: (For Engineering & Quality Document/工程暨品质文件专用)

☐ Level 1 - Manual ☑ Level 2 – Procedure/SPEC/Report ☐ Level 3 - Operation Instruction

Security Level:

☐ Security 1 - SMIC Confidential ☑ Security 2 - SMIC Restricted ☐ Security 3 - SMIC Internal

Document Change History

Doc. Rev.	Tech Dev. Rev.	Effective Date	Author	Change Description
0T		2002-12-16	Brian Zhang	Initiate
0.1T	0.1	2003-06-10	JianHua_Ju	Add Technology Develop Revision:0.1

1. Title:
   0.18um Logic 1P6M Salicide 1.8/3.3v Current Density Design Rules

2. Purpose:
   EM Design Guideline for 0.18um Logic Process

3. Scope:
   All SMIC Fabs

4. Nomenclature: NA

5. Reference: NA

6. Responsibility: Technology Development Center

7. Subject Content: Unit: um

SEMICONDUCTOR MANUFACTURING INTERNATIONAL CORPORATION

0.18µm LOGIC 1P6M Salicide 1.8/3.3V

Current Density Design Rules

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CDR: Current Density Rule

RULE NO.	DESCRIPTION	Rule
	Metal Line	
CDR.1	Jmax of M1 line at 110℃	1.0mA/um
CDR.2	Jmax of M2 line at 110℃	1.0mA/um
CDR.3	Jmax of M3 line at 110℃	1.0mA/um
CDR.4	Jmax of M4 line at 110℃	1.0mA/um
CDR.5	Jmax of M5 line at 110℃	1.0mA/um
CDR.6	Jmax of M6 line at 110℃	1.6mA/um
	Contact and Via	
CDR.7	Jmax per Contact at 110℃	0.53mA/cont
CDR.8	Jmax per V1 at 110℃	0.28mA/Via
CDR.9	Jmax per V2 at 110℃	0.28mA/Via
CDR.10	Jmax per V3 at 110℃	0.28mA/Via
CDR.11	Jmax per V4 at 110℃	0.28mA/Via
CDR.12	Jmax per V5 at 110℃	0.706mA/um
	Stack Contact/Vias	
CDR.13	Jmax per stacked V1/V2 at 110℃	0.28mA/Via
CDR.14	Jmax per stacked V2/V3 at 110℃	0.28mA/Via
CDR.15	Jmax per stacked V1/V2/V3 at 110℃	0.28mA/Via

CDR.16	Jmax per stacked V3/V4 at 110℃	0.28mA/Via
CDR.17	Jmax per stacked V2/V3//V4 at 110℃	0.28mA/Via
CDR.18	Jmax per stacked V1/V2/V3/V4 at 110℃	0.28mA/Via
CDR.19	Jmax per stacked V4/V5 at 110℃	0.28mA/Via
CDR.20	Jmax per stacked V3/V4/V5 at 110℃	0.28mA/Via
CDR.21	Jmax per stacked V2/V3/V4/V5 at 110℃	0.28mA/Via
CDR.22	Jmax per stacked V1/V2/V3/V4/V5 at 110℃	0.28mA/Via
CDR.23	Jmax per stacked CT/V1 at 110℃	0.28mA/Via
CDR.24	Jmax per stacked CT/V1/V2 at 110℃	0.28mA/Via
CDR.25	Jmax per stacked CT/V1/V2/V3 at 110℃	0.28mA/Via
CDR.26	Jmax per stacked CT/V1/V2/V3/V4 at 110℃	0.28mA/Via
CDR.27	Jmax per stacked CT/V1/V2/V3/V4/V5 at 110℃	0.28mA/Via

Notice:

Jmax is maximum DC current allowed per um of metal line width or per via or per contact. The number is based on 0.1% point of measurement data at 20% resistance increase after 10 years continuous operation.

Use the following table to convert Jmax from 110℃ to another temperature.

Jmax transformation rate

Temp.	70 ℃	85 ℃	100 ℃	110 ℃	125 ℃	150 ℃	175 ℃
Jmax transformation rate from 110 ℃	3.443	2.097	1.329	1	0.6707	0.3670	0.2148

Example: Jmax at 85℃ = 2.097 * Jmax at 110℃ = 2.097* 1mA/um = 2.097 mA/um for M1 to M6.

8. Attachment: NA