

R5402N149KD

■Electrical Characteristics

•R5402N149KD Unless otherwise provided, Topt=25°C Item Symbol Conditions Min. Typ. Max. Unit Operating Input Voltage Vpp1 VDD - Vss 1.5 5.0 V Minimum Operating Vst Voltage Defined as 1.8 V Voltage for 0V Charging VDD-V-, VDD-Vss=0V Over-charge Threshold VDET1 $R1=330\Omega$ 4.255 4.280 4.305 $\overline{\mathsf{V}}$ Voltage R1=330Ω, Topt=-5°C to 55°C*Note 4.250 4.280 4.310 V Released voltage from VREL1 $R1 = 330\Omega$ 4.030 4.080 4.130 $\overline{\mathsf{v}}$ Over-charge Output Delay of tVDET1 VDD=3.6V→4.4V 0.7 1.0 1.3 s Over-charge Release Delay for VD1 tVREL1 VDD=4.5V→3.6V 11 21 16 ms Over-discharge Threshold VDET2 Detect falling edge of 2.827 2.900 2.973 V supply voltage Released Voltage VREL2 from Detect rising edge of supply 3.022 3,100 3.178 $\overline{\mathsf{v}}$ Over-discharge voltage Output Delay tVDET2 VDD=3.6V→2.2V 14 20 26 ms Over-discharge Release Delay for VD2 tVREL2 VDD=3V, V-=3V→0V 0.7 1.2 1.7 ms VDET3 Excess discharge-current Detect rising edge of 0.110 0.125 0.140 ٧ threshold 'V-' pin voltage Output delay of tVDET3 excess VDD=3.0V, V-=0V to 1V 8 16 12 ms discharge-current Output delay of release tVREL3 VDD=3.0V, V-=3V to 0V 0.7 1.7 1.2 ms from excess discharge-current **Short Protection Voltage** Vshort VDD=3.0V 0.55 0.80 1.00 V Delay Time for tshort Short VDD=3.0V, V-=0V to 3V 230 300 500 μs Protection Reset Resistance for Rshort VDD=3.6V,V-=1.0V 25 50 75 kΩ **Excess Current Protection** Detect falling edge of Excess charge-current VDET4 -0.130 -0.100 -0.070 ٧ threshold 'V-' pin voltage Output delay of excess tVDET4 VDD=3.0V, V-=0V to -1V 8 11 ms charge-current Output delay of release tVREL4 VDD=3.0V, V-=-1V to 0V 0.7 1.2 1.7 ms from excess charge-current Delay Time Shortening Vos VDD=4.4V -1.4 -2.0 -2.6 ٧ Mode Voltage Nch ON-Voltage of Cout Vol1 Iol=50μA, VDD=4.5V 0.4 0.5 V Pch ON-Voltage of Cout V_oH1 Ioh=-50μA, VDD=3.9V 3.7 $\overline{\mathsf{v}}$ 3.4 Nch ON-Voltage of Dout Vol2 Iol=50μA, VDD=2.0V 0.2 0.5 V Pch ON-Voltage of DOUT V₀н2 Ioh=-50μA, VDD=3.9V 3.4 3.7 V Supply Current IDD VDD=3.9V, V- =0V 4.0 8.0 μΑ Standby Current Istandby VDD=2.0V 1.2 2.0 μΑ

^{•:} Note: Considering of variation in process parameters, we compensate for this characteristic related to temperature by laser-trim, however, this specification is guaranteed by design, not mass production tested.





No. 2146818/TY

Date: May 10 2007

Page 1 of 3

RICOH COMPANY LTD 13-1 HIMEMURO -CHO IKEDA-CITY OSAKA 563-8501 **JAPAN**

The following sample was submitted and identified by the client as POWER MANAGEMENT ICS.

SGS Job No.

2358942

Style / Item No.

- 1. R1151NXXXX-TR-FX
- 2. R1218NXXXX-TR-FX
- 3. R5105NXXXX-TR-FX
- 4. R5106NXX1X-TR-FX
- 5. R5323NXXXX-TR-FX
- 6. R5325NXXXX-TR-FX
- 7. R5326NXXXX-TR-FX
- 8. R5402NXXXXX-TR-FX
- 9. R5405NXXXXX-TR-FX
- 10. R5420NXXXXX-TR-FX
- 11. R5421NXXXXX-TR-FX
- 12. R5426NXXXXX-TR-FX
- 13. R5429NXXXXXX-TR-FX 14. R5460NXXXXX-TR-FX
- RICOH COMPANY LTD

JAPAN

MAY 03 2007

MAY 03 - 09 2007

Country of Origin

Sample Receiving Date

Manufacturer

Testing Period

Test Requested

With reference to RoHS Directive 2002/95/EC, and its amendment directives

Test Method

With reference to IEC 62321 (Ed. 1) 111/54/CDV

Procedures for the Determination of Levels of Regulated Substances in

Electrotechnical Products by Chemical Method

- Determination of Lead & Cadmium by ICP/ AAS
- Determination of Mercury by ICP/ CV-AAS
- Determination of Hexavalent Chromium by Colorimetric Method
- Determination of PBB and PBDE by GC/MS

Test Results

Please refer to next page.

Conclusion

Based on the performed tests on submitted samples, the results comply with the RoHS Directive 2002/95/EC and its subsequent amendments.

Signed for and on behalf of SGS Hopg Kong Ltd.

Wong/Tak/Ming, William Operations Manager

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SGS Hong Kong Ltd. 5/F - 8/F, 12/F, 26/F & 28/F - 29/F., Metropole Square, 2 On You Street, Siu Lek Yuen, Shatin, N.T., Hong Kong. 1 (852) 2334 4481 1 (852) 2764 3126 www.hk.sgs.com



No. 2146818/TY

Date: May 10 2007

Page 2 of 3

Test results (Unit: mg/kg):

Cadmium(Cd)	1	MDL	RoHS Lim
Lead (Pb)	ND	5	100
Mercury (Hg)	ND ND	5	1000
Hexavalent Chromium (CrVI)	ND ND	5	1000
by alkaline extraction	ND	5	
Polybrominated Biphenyl (PBBs)			1000
Monobromobiphenyl	< 50	50	1000
Dibromobiphenyl	ND	5	-
Tribromobiphenyl	ND ND	5	_
Tetrabromobiphenyl	ND	5	-
Hexabromobiphenyl	ND ND	5	-
Pentabromobiphenyl	ND	5	-
Heptabromobiphenyl	ND	5	_
Octabromobiphenyl	ND ND	5	-
Nonabromobiphenyl	ND ND	5	-
Decabromobiphenyl	ND	5	_
Polybrominated Diphenylethers (PBDEs)*	ND	5	4-
Monobromodiphenyl ether	< 45	45	1000
Dibromodiphenyl ether	ND ND	5	-
ribromodiphenyl ether	ND	5	
etrabromodiphenyl ether	ND ND	5	-
entabromodiphenyl ether	ND ND	5	_
exabromodiphenyl ether	ND ND	5	
eptabromodiphenyl ether	ND	5	-
ctabromodiphenyl ether	ND	5	-
onabromodiphenyl ether	ND	5	
ecabromodiphenyl ether*	ND	5	-
Im of PBDEs (Mono to Deca)	ND	5	
(mono to Deca)	< 50	50	

Sample Description:

Black Ceramic w/ Silvery Metal (Foot)

Note:

- (1) mg/kg = ppm
- (2) ND = Not Detected
- (3) MDL = Method Detection Limit
- (4) < = Less Than
- (5) *= sum of Mono to NonaBDE & according to 2005/717/EC DecaBDE is exempt.
- (7) The maximum permissible limit is quoted from the document 2005/618/EC amending RoHS

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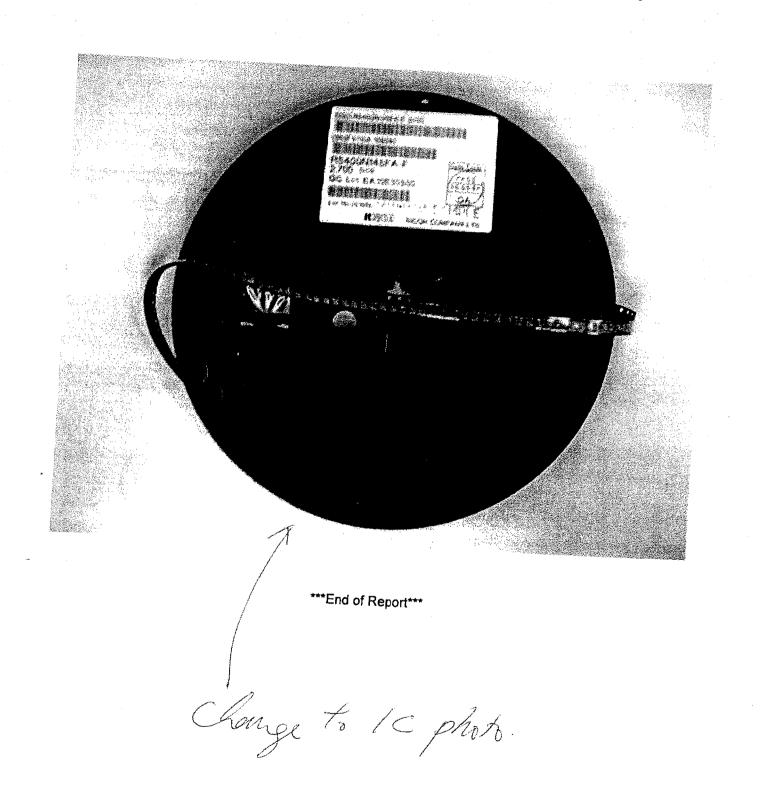




No. 2146818/TY

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Page 3 of 3



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RICOH COMPANY LTD

JAPAN

MAY 03 2007

MAY 03 - 09 2007

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Manufacturer

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With reference to RoHS Directive 2002/95/EC, and its amendment directives

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Dibromobiphenyl	ND ND	5	_
Tribromobiphenyl	ND ND	5	_
Tetrabromobiphenyl	ND	5	-
lexabromobiphenyl	ND ND	5	-
Pentabromobiphenyl	ND ND	5	-
leptabromobiphenyl	ND	5	_
Octabromobiphenyl	ND	5	_
lonabromobiphenyl	ND	5	-
ecabromobiphenyl	ND	5	-
Olyhromineted District	ND	5	-
olybrominated Diphenylethers (PBDEs)*	< 45	45	1000
onobromodiphenyl ether	ND	5	
bromodiphenyl ether	ND	5	
ibromodiphenyl ether	ND	5	
etrabromodiphenyl ether	ND	5	
entabromodiphenyl ether	ND	5	
exabromodiphenyl ether	ND	5	_
eptabromodiphenyl ether	ND	5	-
tabromodiphenyl ether	ND	5	<u>-</u>
nabromodiphenyl ether	ND ND	5	
cabromodiphenyl ether*	ND	5	-
m of PBDEs (Mono to Deca)	< 50	50	-

Sample Description:

Black Ceramic w/ Silvery Metal (Foot)

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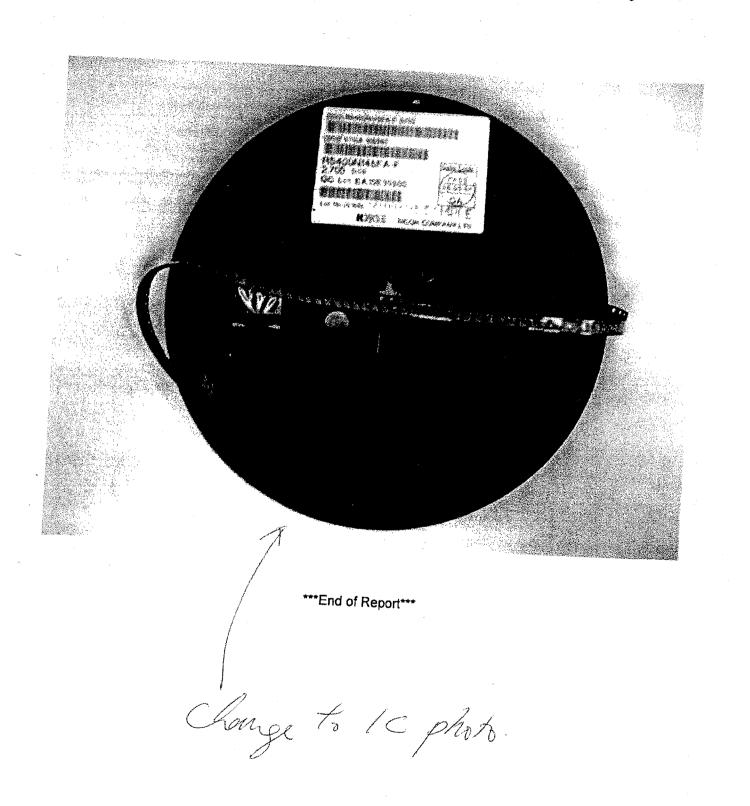
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Page 3 of 3



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