

Company		DUNS#	URL For Additional Information
National Semiconductor		04-147-2986	http://www.national.com/analog/quality/green

Contact	Title	Phone	Email
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Part Number	MSL Rating	Peak Body Temp C	MaxTime(Sec)	Cycles	Unit Type
LM311H NOPB	1	NA	NA	NA	Each

Document Date	European RoHS Compliant. China RoHS Compliant.	Weight (mg)	Does NOT Contain Halogens
01-17-2012		969.92	

Material Composition Declaration for Electronic Products

Item	Weight (mg)	Component	CAS#	Weight (mg)	Item-ppm	Part-ppm
Ext. LeadFinish	7.940	Sn	7440-31-5	7.662	965,000	7,900
		Ag	7440-22-4	0.238	30,000	245
		Cu	7440-50-8	0.040	5,000	41
Stand-off	61.000	Al2O3	1344-28-1	61.000	1,000,000	62,892
Lid	309.500	Ni	7440-02-0	309.500	1,000,000	319,100
Eyelet	266.000	Fe	7439-89-6	143.640	540,000	148,095
		Ni	7440-02-0	77.140	290,000	79,533
		Co	7440-48-4	45.220	170,000	46,623
Leads	178.800	Fe	7439-89-6	96.552	540,000	99,547
		Ni	7440-02-0	51.852	290,000	53,460
		Co	7440-48-4	30.396	170,000	31,339
Glass	132.000	SiO2	60676-86-0	106.392	806,000	109,692
		B2O3	1303-86-2	17.160	130,000	17,692
		Na2O	12401-86-4	5.280	40,000	5,444
		Al2O3	1344-28-1	3.168	24,000	3,266
Plating1	10.400	Ni	7440-02-0	10.400	1,000,000	10,723
Plating2	1.900	Au	7440-57-5	1.900	1,000,000	1,959
Chip	1.350	Si	7440-21-3	1.342	994,000	1,384
		Al	7429-90-5	0.008	6,000	8
Die Attach	1.010	Au	7440-57-5	0.990	980,000	1,021
		Si	7440-21-3	0.020	20,000	21
Wires	0.017	Al	7429-90-5	0.017	1,000,000	18

Note: The device content disclosed herewith is approximate and is based on engineering estimates only. It has not been verified through analytical testing.

Additionally, the following should be noted:

- One or more dopant materials may be present in the silicon die at sub-ppm levels to provide semiconductor properties.
- Epoxy resin components listed are generic and may or may not be the specific compound used, which is considered proprietary.

RoHS Material Composition Declaration

RoHS Directive 2002/95/EC	RoHS Definition: Quantity limit of 0.1% by mass (1000 PPM) in homogeneous material for: Lead (Pb), Mercury, Hexavalent Chromium, Polybrominated Biphenyls (PBB), Polybrominated Diphenyl Ethers (PBDE) and quantity limit of 0.01% by mass (100 PPM) of homogeneous material for Cadmium
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Subject to the limitations below, National Semiconductor Corporation ("National") certifies the following information as of the document date.

- National products designated "ROHS Compliant" comply with the European Unions Directive on the Restriction of the Use of Hazardous Substances 2002/95/EC ("RoHS"). Certain National products contain lead in RoHS exempt applications 7(a) or 7(c)-1.
- National products do not contain and are not manufactured with ozone depleting compounds.
- National products do not contain substances identified by the European Chemical Agency ("ECHA") as substances of very high concern ("SVHC") per REACH Regulation (EC) No 1907/2006. National also complies with use restrictions as stipulated in Annex XVII of REACH.
- National products are manufactured in conformance with National specifications (SC)CSP-9-111C1 Supplier Environmental Requirements for Materials and Products and (SC)CSP-9-111S2 Banned and Reportable Substances.
- National's list of banned and reportable substances and management system is based on the current version of the Joint Industrial Guide, JIG-101.

National has taken commercially reasonable steps to provide representative and accurate information but may not have independently verified information provided or conducted chemical analysis of incoming materials. Equivalent compliant materials may have been substituted for those stated herein. Material concentrations are the maximum expected concentration of the substance in the device and may not represent the actual concentration. National and its suppliers consider certain limited information to be confidential and thus CAS numbers and other limited information may not be available for release. Nationals Standard Terms and Conditions of Sale apply to any issue arising out of or in connection with the information provided herein unless otherwise provided by a written contract signed by both parties.

NATIONAL ACCEPTS NO DUTY TO NOTIFY USERS OF THIS DECLARATION OF UPDATES OR CHANGES TO THIS DECLARATION.

John L. Conn
John L. Conn
Vice President Quality

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Vice President Quality

Banned Substance Monitoring

Part Number		Document Date
LM311H	NOPB	01-17-2012

European RoHS Compliant.

China RoHS Compliant.

Item#	Material	Cd	CrVI	Pb	Hg	PBB	PBDE	Cl	Br	Ref#
1	CHIP	<1	<1	<1	<30	<10	<10	<75	<50	1000
2	EPOXY	<2	<2	<2	<2	<5	<5	<50	<50	32
3	HEADER	<2	<2	<2	<2	<5	<5	N/A	N/A	672
4	WIRE	<2	N/D	<2	<2	<5	<5	N/A	N/A	604

* Cd: Cadmium, CrVI: Hexavalent Chromium, Pb: Lead, Hg: Mercury, NA: Not Applicable

* Unless otherwise noted, units are in PPM (parts-per-million)

Ref#	3rd Party Analysis (available upon request, subject to a non-disclosure agreement)
1000	Analysis on 01/24/2011 by Balazs as per Report# 11-00322-00
32	Analysis on 04/29/2011 by SGS per Report# LPCI/04433(B)/11
672	Analysis on 04/29/2011 by SGS per Report# LPCI/04430(B)/11
604	Analysis on 04/29/2011 by SGS per Report# LPCI/04451(B)/11