



# Environment Friendly Status for Logic Products

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# Dark Green introduction



- ▶ Environmental safety aspects are getting more important in the manufacturing processes as well as having a value of it's own in the eyes of the customer.
- ▶ NXP introduced green products in 2003, these products are fully compliant with RoHS (European Union directive 2002/95/EC).
- ▶ **The next step** for NXP towards more environmentally friendly products is the introduction of **Dark Green** products. This will further reduce the use of halogens and antimony in the materials.
- ▶ There will be no changes to any product parameter and the products will be qualified to demanding automotive standard AEC-Q101.

# Definitions

**Green = RoHS(\*) compliant**

## Substances

Pb (\*\*)

Hg, Cr6+, PBB, PBDE

Cd

## Limit

< 1000 ppm

< 1000 ppm

< 100 ppm

**Dark Green = RoHS compliant and Halogen + Antimony free**

## Substances

Antimony Oxides (Sb<sub>2</sub>O<sub>3</sub>, Sb<sub>2</sub>O<sub>5</sub>)

Chlorinated + Brominated Flame Retardents

## Limit

< 900 ppm

Σ < 900 ppm

(\*) ref. EU Directive 2002/95/EC

(\*\*) allowable exemptions are also called Green, but dedicated symbols are used

Substances above are not intentionally added, but might be present as an impurity with an upper limit according to the listed values. The plastic materials are classified according to UL94V-0.

What does the following mean...?

- Pb-free
- RoHS
- Dark green
- Halogen free

What does the following mean...?

- Pb-free – No Lead
- RoHS – Restriction on Hazardous Substances
- Dark green – RoHS + Halogen + Antimony
- Halogen free includes Antimony (heavy metals)

# RoHS

The RoHS directive currently lists 6 materials as being restricted.

Note, not banned, just restricted to max. concentration levels

## RoHS Restricted Materials

Material & Toxicological Profile (pdf)	Maximum Concentration
<a href="#">Lead (Pb)</a>	0.1% by weight
<a href="#">Mercury (Hg)</a>	0.1% by weight
<a href="#">Cadmium (Cd)</a>	0.01% by weight
<a href="#">Hexavalent Chromium (Cr-VI)</a>	0.1% by weight
<a href="#">Polybrominated Biphenyls (PBB)</a>	0.1% by weight
<a href="#">Polybrominated Diphenyl Ethers (PBDE)</a>	0.1% by weight

RoHS language provides for future expansion of the restricted list should scientific evidence suggest the necessity

## Dark-Green = RoHS compliant and Halogen + Antimony Free

<b><u>Substances</u></b>	<b><u>Limit</u></b>
Antimony Oxides ( $\text{Sb}_2\text{O}_3$ , $\text{Sb}_2\text{O}_5$ )	< 900 ppm
Chlorinated + Brominated Flame Retardants	$\Sigma$ < 900 ppm

Substances above are not intentionally added, but might be present as an impurity with an upper limit according to the listed values. Limits refer to the individual homogeneous materials ( such as mold compound, total substrate etc.)

## Lead free + Halogen free (dark green)

- ▶ New RHF **R**oHS **H**alogen **F**ree indicator introduced per Q3 2006

RoHS Compliancy status	Halogen /Antimony free (Y/N)	RHF- Code
Leaded (non compliant)		<b>N</b> (Not-green)
Lead Inside (RoHS exemption)	N	<b>E</b> (Exemption)
Lead Inside (RoHS exemption)	Y	<b>H</b> (Halogen free)
Lead free (100 % compliant)	N	<b>G</b> (Green)
Lead free (100 % compliant)	Y	<b>D</b> (Dark-green)

- ▶ On Labels:

- RHF Code in last digit PMC (Product Manufacturing code)
- Seal on reel and box labels



## SMD Logic packages dark GREEN status
























- ▶ Packages with green border are produced dark green per today

	Width (mil)	Pitch mm (mil)	JEDEC code	EIAJ type	5	6	8	14	16	20	24	28	48	52	56	96/114	Suffix	Low-voltage products
SOIC	150	1.27 (50)	ms-012	I													D	LV LVT (A)LVC
	300		ms-013	III														
SSOP	212	0.65 (25)	mo-150	II													DB	LV, LVC LVT
	299	0.635 (25)	mo-118	III													DL	(A)LVC16 (A)LVT16
TSSOP	177	0.65 (25.6)	mo-153	I													PW	LV, LVC LVT, (A)LVC
	244	0.5 (19.7)	mo-153	II													DGG	(A)LVC16 (A)LVT16
DOFN	2.5	0.5 (19.7)	mo-241														BQ	LVC LVT
	3.5																	
PQFP	394 x 394	0.65 (25.6)	mo-108														BB	
TVSOP	173	0.40 (15.7)	mo-194														DG-V	ALVC
LFBGA	217	0.8 (31.5)	mo-205														EC	(A)LVC32 (A)LVT32
VFBGA	177	0.65 (25.6)	mo-225														EV	(A)LVC16 (A)LVT16

- ▶ Other packages, Dark Green is available on special request. Example, /DG (special part-number), expected introduction time <3 months, depending qual. status

## Dark green status Picogate packages

- ▶ Packages with green border are produced Dark Green today

Package suffix	GW	GW	DC	GV	GV	DP	GM	GT	GM	GF
	5-pin	6-pin	8-pin	5-pin	6-pin	8-pin	6-pin	8-pin	8-pin	6-pin
Single-gate	 SOT353	 SOT363	 SOT765	 SOT753	 SOT457	 SOT505-2	 SOT886	 SOT883	 SOT902	 SOT891
Dual-gate		 SOT363	 SOT765		 SOT457	 SOT505-2	 SOT886	 SOT883	 SOT902	 SOT891
Triple-gate	 3 mm		 SOT765			 SOT505-2		 SOT883	 SOT902	
	5-pin	6-pin	8-pin	5-pin	6-pin	8-pin	6-pin	8-pin	8-pin	6-pin
Width (mm)	2.1	2.1	3.1	2.8	2.8	4	1.00	1.00	1.60	1.00
Length (mm)	2.0	2.0	2.0	2.9	2.9	3.0	1.45	1.95	1.60	1.00
Pitch (mm)	0.65	0.65	0.5	0.95	0.95	0.65	0.50	0.50	0.50	0.35

- ▶ SOT765 package is not available as Dark Green package

# Logic Products

## Environment Friendly Status

- ▶ All Logic packages are Pb-free
- ▶ All logic Packages are RoHS compliant
- ▶ Dark Green status:

Package	Pins	Suffix	Dark Green
SO	14, 16, 20, 24	D	Q1, 08 *
SSOP	14, 16, 20, 24	DB	Inquire
TSSOP	14, 16, 20, 24	PW	Q1, 08 *
DQFN	14, 16, 20, 24	BQ	Dark Green
BGA	56	EV	Dark Green
BGA	96/114	EC	Dark Green
PicoGate	5, 6	GW, GV	Dark Green
PicoGate	8	DC	Inquire
PicoGate	8	DP	Dark Green
MicroPak	6,8	GM, GT, GF	Always
* SO and TSSOP pkgs are available on request only.			Full production
by Q4 2009			