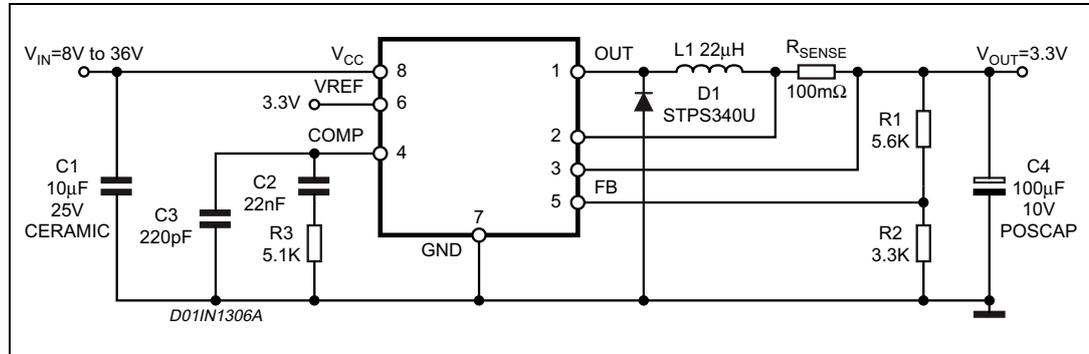


# Content

1	Test and application circuit .....	3
2	Pin connection .....	3
3	Maximum ratings .....	4
4	Internal block diagram .....	5
5	Electrical characteristics .....	6
6	Package mechanical data .....	8
7	Revision history .....	10

# 1 Test and application circuit

Figure 1. Test and application circuit



# 2 Pin connection

Figure 2. Pin connection

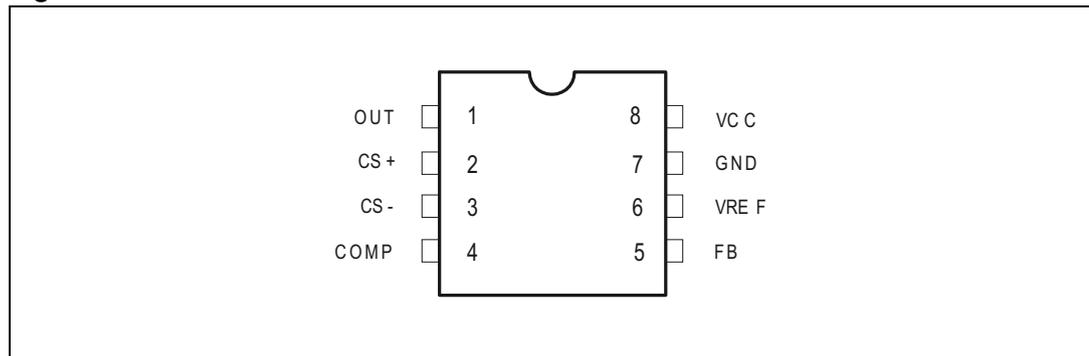


Table 2. Pin description

N°	Pin	Function
1	OUT	Regular output
2	CS+	Current error amplifier input (current sense at higher voltage)
3	CS-	Current error amplifier input (current sense at lower voltage)
4	COMP	E/A output to be used for frequency compensation
5	FB	Stepdown feedback input. Connecting directly to this pin results in an output voltage of 1.235 V. An external resistive divider is required for higher output voltages. In this case: $V_{out} = V_{FB} \cdot \left(1 + \frac{R1}{R2}\right) = 1.235V \left(1 + \frac{R1}{R2}\right)$
6	VREF	3.3 V VREF. No cap is need for stability.
7	GND	Ground
8	VCC	Unregulated DC input voltage.

### 3 Maximum ratings

**Table 3. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_8$	Input voltage	40	V
$V_1$	Output DC voltage output peak voltage at $t = 0.1 \mu\text{s}$	-1 to 40 -5 to 40	V V
$I_1$	Maximum output current	Internally limited	
$V_4, V_5$	Analog pins	4	V
$V_2, V_3$	Analog pins	-0.3V to VCC	V
$P_{\text{tot}}$	Power dissipation at $T_{\text{amb}} \leq 70 \text{ }^\circ\text{C}$	0.7	W
$T_j$	Operating junction temperature range	-40 to 150	$^\circ\text{C}$
$T_{\text{stg}}$	Storage temperature range	-55 to 150	$^\circ\text{C}$

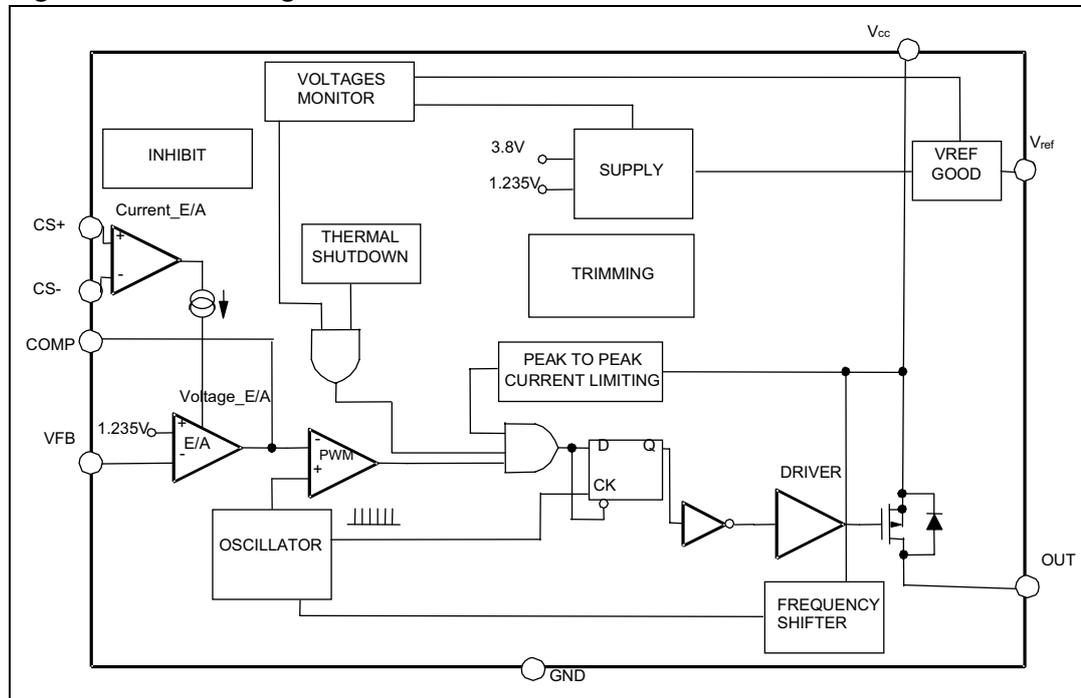
**Table 4. Thermal data**

Symbol	Parameter	Value	Unit
$R_{\text{th j-amb}}$	Thermal Resistance Junction to Ambient Max.	110 <sup>(1)</sup>	$^\circ\text{C/W}$

1. Package mounted on board.

# 4 Internal block diagram

Figure 3. Block diagram



## 5 Electrical characteristics

$T_j = 25^\circ\text{C}$ ,  $V_{CC} = 12\text{V}$ , unless otherwise specified.

**Table 5. Electrical characteristics**

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit	
$V_{CC}$	Operating input voltage range	$V_O = 1.235\text{V}$ ; $I_O = 1\text{A}$	8		36	V	
$V_d$	Dropout voltage	$V_{CC} = 8\text{V}$ ; $I_O = 1\text{A}$		0.25	0.5	V	
$I_O$	Operating charging current	$R_{\text{sense}} = 0.1\Omega$		0.95	1	1.05	A
			(1)	0.92		1.08	A
$I_l$	Maximum limiting current	$V_{CC} = 8\text{V to } 36\text{V}$	2	2.5	3.2	A	
$f_s$	Switching frequency		(1)	212	250	287	kHz
				225	250	275	kHz
d	Duty cycle		0		100	%	
<b>Dynamic characteristics</b>							
$V_5$	Voltage feedback (FB)	$8\text{V} < V_{CC} < 36\text{V}$ , $20\text{mA} < I_O < 1\text{A}$		1.21	1.235	1.259	V
			(1)	1.198	1.235	1.272	V
$\eta$	Efficiency	$V_O = 5\text{V}$ , $V_{CC} = 12\text{V}$		90		%	
<b>DC characteristics</b>							
$I_{\text{qop}}$	Total operating quiescent current		(1)		3	5	mA
$I_q$	Quiescent current	Duty cycle = 0; VFB = 1.5V			3		mA
<b>Voltage error amplifier</b>							
$V_{OH}$	High level output voltage	$V_{FB} = 1\text{V}$		3.6			V
$V_{OL}$	Low level output voltage	$V_{FB} = 1.5$			0.4		V
$I_{O \text{ source}}$	Source output current	$V_{\text{comp}} = 1.9\text{V}$ ; $V_{FB} = 1\text{V}$		200	300		$\mu\text{A}$
$I_{O \text{ sink}}$	Sink output current	$V_{\text{comp}} = 1.9\text{V}$ ; $V_{FB} = 1.5\text{V}$		1	1.5		mA
$I_b$	Source bias current			2.5	4		$\mu\text{A}$
	DC open loop gain	$R_L = 0$		50	58		dB
$g_m$	Transconductance	$I_{\text{comp}} = -0.1 \text{ to } 0.1\text{mA}$ , $V_{\text{comp}} = 1.9\text{V}$			2.3		mS
<b>Current error amplifier</b>							
$V_{\text{offs}}$	Input offset voltage	$V_{CS-} = 1.8\text{V}$ ; $V_{CS+} = V_{\text{comp}}$		95	100	105	mV
$I_{CS+}$	CS+ output current	$I_O = 1\text{A}$ , $R_{\text{sense}} = 100\text{m}\Omega$ , $V_{\text{out}} < V_{CC} - 2\text{V}$			1.5	3	$\mu\text{A}$
$I_{CS-}$	CS- output current	$I_O = 1\text{A}$ , $R_{\text{sense}} = 100\text{m}\Omega$ , $V_{\text{out}} < V_{CC} - 2\text{V}$			1.5	3	$\mu\text{A}$

Table 5. Electrical characteristics (continued)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
<b>Reference section</b>						
	Reference voltage		3.234	3.3	3.366	V
		$I_{REF} = 0 \text{ to } 5\text{mA}$ $V_{CC} = 8\text{V to } 36\text{V}$	<sup>(1)</sup> 3.2	3.3	3.399	V
	Line regulation	$I_{REF} = 0\text{mA}$ , $V_{CC} = 8\text{V to } 36\text{V}$		5	10	mV
	Load regulation	$I_{REF} = 0 \text{ to } 5 \text{ mA}$		8	15	mV
	Short circuit current		10			mA

1. Specification Referred to T<sub>J</sub> from -40 to 125°C. Specification over the -40 to +125 T<sub>J</sub> Temperature range are assured by design, characterization and statistical correlation

## 6 Package mechanical data

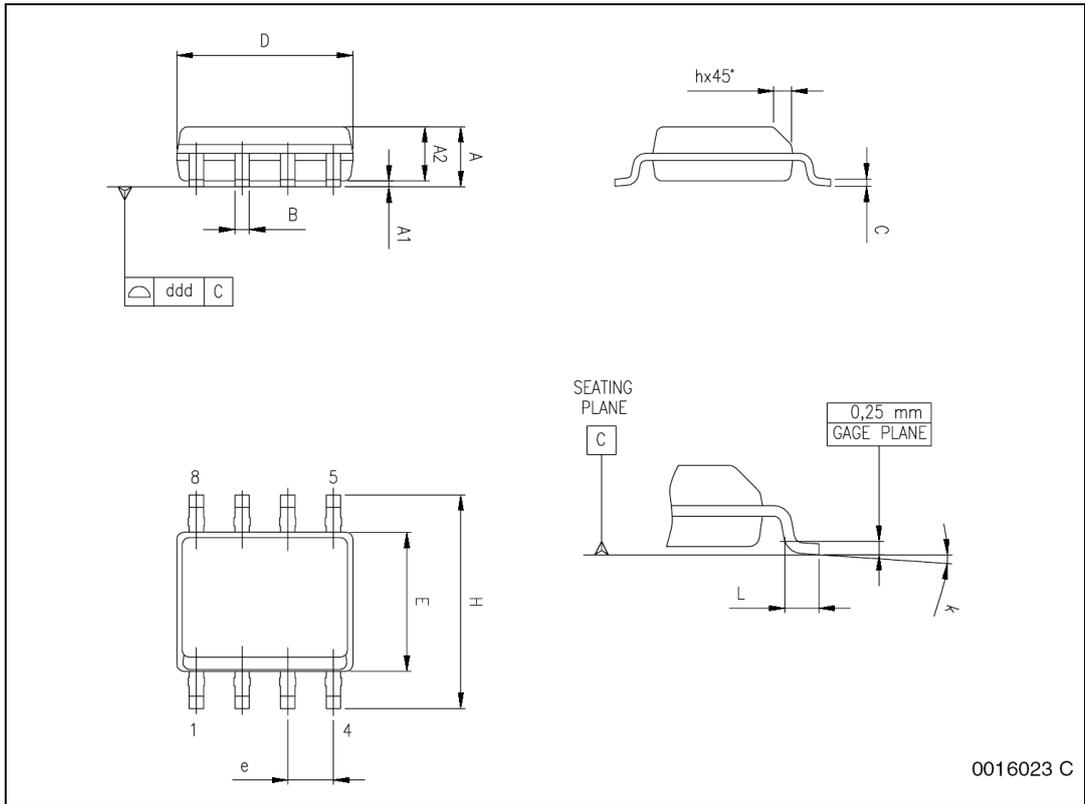
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK is an ST trademark.

**Table 1. SO-8 mechanical data**

Dim.	mm.			inch		
	Min	Typ	Max	Min	Typ	Max
A	1.35		1.75	0.053		0.069
A1	0.10		0.25	0.004		0.010
A2	1.10		1.65	0.043		0.065
B	0.33		0.51	0.013		0.020
C	0.19		0.25	0.007		0.010
D <sup>(1)</sup>	4.80		5.00	0.189		0.197
E	3.80		4.00	0.15		0.157
e		1.27			0.050	
H	5.80		6.20	0.228		0.244
h	0.25		0.50	0.010		0.020
L	0.40		1.27	0.016		0.050
k	0° (min.), 8° (max.)					
ddd			0.10			0.004

1. Dimensions D does not include mold flash, protrusions or gate burrs. Mold flash, protrusions or gate burrs shall not exceed 0.15mm (.006inch) in total (both side).

Figure 4. Package dimensions



## 7 Revision history

**Table 6. Document revision history**

Date	Revision	Changes
January 2004	7	Technical migration from ST-PRESS to EDOCS.
October 2004	8	Changed style look and feel.
26-Nov-2010	9	Updated <a href="#">Note 1 on page 7</a>

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2010 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)

