Excellent Integrated System Limited

Stocking Distributor

Click to view price, real time Inventory, Delivery & Lifecycle Information:

STMicroelectronics
VN808SR

For any questions, you can email us directly:
sales@integrated-circuit.com

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

VN808SR

Octal channel high side driver

Features

Type	$R_{DS(on)}$	I_{out}	V_{CC}
VN808SR	150 mΩ	0.7 A	45 V

- V_{CC}/2 compatible input
- Junction overtemperature protection
- Case overtemperature protection for thermal independence of the channels
- Current limitation
- Shorted load protection
- Undervoltage shut-down
- Protection against loss of ground
- Very low stand-by current
- Compliance to 61000-4-4 IEC test up to 4 kV

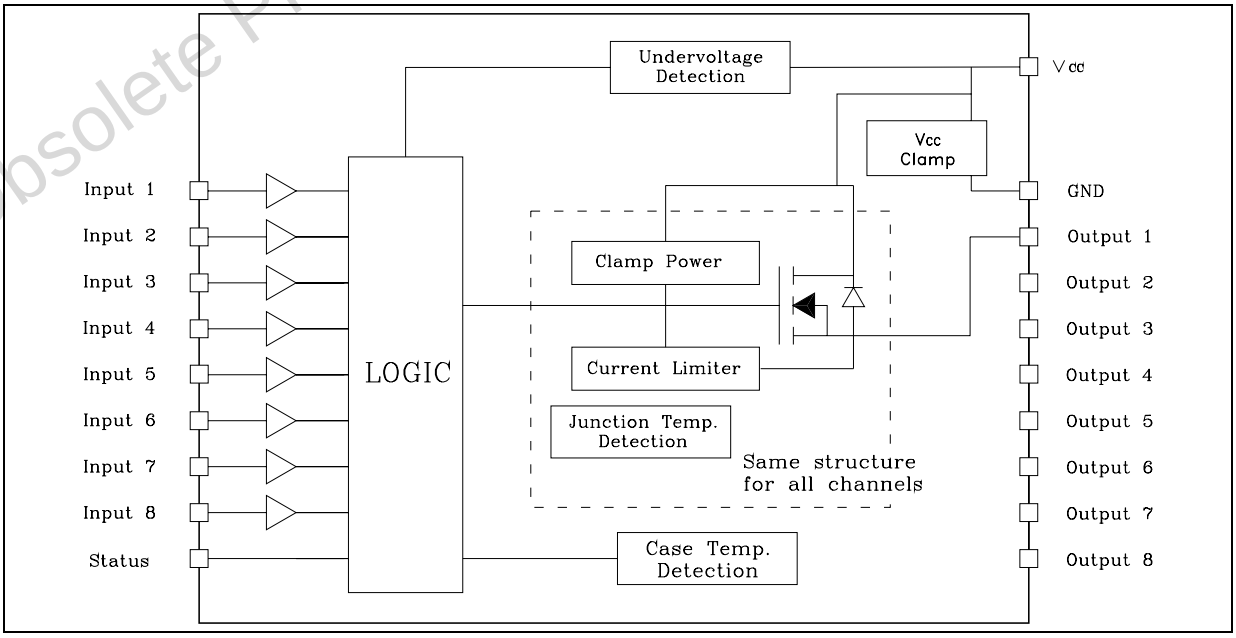
PowerSO-36

Description

The VN808SR is a monolithic device designed in STMicroelectronics VIPower M0-3 technology, intended for driving any kind of load with one side connected to ground.

Active current limitation combined with thermal shutdown and automatic restart, protect the device against overload. In overload condition, the channel turns OFF and back ON automatically so as to maintain the junction temperature between T_{TSD} and T_R. If this condition makes the case temperature reach T_{CSD}, the overloaded channel is turned OFF and restarts only when the case temperature has decreased to T_{CR} (see waveform 3 *Figure 7 on page 10*). Non overloaded channels continue to operate normally. The device automatically turns OFF in the case of a ground pin disconnection. This device is especially suitable for industrial applications and conforms to IEC 61131.

Obsolete Product(s) - Obsolete Product(s)



Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

Contents

1 Maximum ratings 3
2 Electrical characteristics 4
3 Pin connections 6
4 Current, voltage conventions and internal diagram 8
5 Switching time waveforms 9
6 Reverse polarity protection 12
7 Package mechanical data 13
8 Order codes 15
9 Revision history 16

Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

1 Maximum ratings

Table 1. Absolute maximum rating

Symbol	Parameter	Value	Unit
V_{CC}	DC supply voltage	45	V
$-I_{GND}$	DC ground pin reverse current TRAN ground pin reverse current (pulse duration < 1 ms)	-250 -6	mA A
I_{OUT}	DC output current	Internally limited	A
$-I_{OUT}$	Reverse DC output current	-2	A
I_{IN}	DC Input current	± 10	mA
V_{IN}	Input voltage range	$-3/+V_{CC}$	V
V_{ESD}	Electrostatic discharge (R = 1.5 kΩ; C = 100 pF)	2000	V
P_{TOT}	Power dissipation at T_c = 25 °C	96	W
L_{MAX}	Max inductive load (V_{CC} = 24 V, R_{LOAD} = 48 Ω, T_A = 100 °C)	2	H
T_J	Junction operating temperature	Internally limited	°C
T_C	Case operating temperature	Internally limited	°C
T_{STG}	Storage temperature	-40 to 150	°C

Table 2. Thermal data

Symbol	Parameter		Value	Unit
R_{thJC}	Thermal resistance junction-case	Max	1.3	°C/W
R_{thJA}	Thermal resistance junction-ambient (1)	Max	50	°C/W

1. When mounted on FR4 printed circuit board with 0.5 cm^2 of copper area (at least 35 µm think) connected to all TAB pins.

Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

2 Electrical characteristics

(10.5 V < V_{CC} < 32 V; -40 °C < T_J < 125 °C; unless otherwise specified)

Table 3. Power section

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
V_{CC}	Operating supply voltage		10.5		45	V
V_{USD}	Undervoltage shutdown		7		10.5	V
R_{ON}	On state resistance	I_{OUT} = 0.5 A; T_J = 25 °C I_{OUT} = 0.5 A;		150	185 280	mΩ mΩ
I_S	Supply current	OFF state; V_{CC} = 24 V; T_{CASE} = 25 °C ON state (all channels ON); V_{CC} = 24 V, T_{CASE} = 100 °C			150 12	µA mA
I_{LGND}	Output current at turn-off	V_{CC} = V_{STAT} = V_{IN} = V_{GND} = 24 V V_{OUT} = 0 V			1	mA
$I_{L(off)}$	OFF state output current	V_{IN} = V_{OUT} = 0 V;	0		5	µA
$t_{d(Vccon)}$	Power-on delay time from V_{CC} rising edge	*Table 7.*		1		ms

Table 4. Switching (V_{CC} = 24 V)

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
t_{ON}	Turn-on time	R_L = 48 Ω from 80% V_{OUT} *Figure 5.*		50	100	µs
t_{OFF}	Turn-off time	R_L = 48 Ω to 10% V_{OUT} *Figure 5.*		75	150	µs
$dV_{OUT}/dt_{(on)}$	Turn-on voltage slope	R_L = 48 Ω from V_{OUT} = 2.4 V to V_{OUT} = 19.2 V *Figure 5.*		0.7		V/ µs
$dV_{OUT}/dt_{(off)}$	Turn-off voltage slope	R_L = 48 Ω from V_{OUT} = 21.6 V to V_{OUT} = 2.4 V *Figure 5.*		1.5		V/ µs

Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

Table 5. Input pin

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
V_{INL}	Input low level				V_{CC} /2-1	V
I_{INL}	Low level input current	$V_{IN} = V_{CC}$ / 2 - 1 V	80			µA
V_{INH}	Input high level		V_{CC} /2+1			V
I_{INH}	High level input current	$V_{IN} = V_{CC}$ / 2 + 1 V		150	260	µA
$V_{I(HYST)}$	Input hysteresis voltage			0.6		V
I_{IN}	Input current	$V_{IN} = V_{CC}$ = 32 V			300	µA

Table 6. Protections

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
T_{CSD}	Case shut-down temperature		125	130	135	°C
T_{CR}	Case reset temperature		110			°C
T_{CHYST}	Case thermal hysteresis		7	15		°C
T_{TSD}	Junction shutdown temperature		150	175	200	°C
T_R	Junction reset temperature		135			°C
T_{HYST}	Junction thermal hysteresis		7	15		°C
I_{lim}	DC Short circuit current	V_{CC} = 24 V; R_{LOAD} = 10 mΩ	0.7		1.7	A
V_{demag}	Turn-off output clamp voltage	I_{OUT} = 0.5 A; L = 6mH	V_{CC}-57	V_{CC}-52	V_{CC}-47	V

Obsolete Product(s) - Obsolete Product(s)

Table 7. Status pin

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
I_{HSTAT}	High level output current	V_{CC} = 18...32 V; R_{STAT} = 1 kΩ (Fault condition)	2	3	4	mA
I_{LSTAT}	Leakage current	Normal operation; V_{CC} = 32 V			0.1	µA
V_{CLSTAT}	Clamp voltage	I_{STAT} = 1 mA I_{STAT} = -1 mA	6.0	6.8 -0.7	8.0	V V

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

3 Pin connections

Figure 2. Connection diagram (top view)

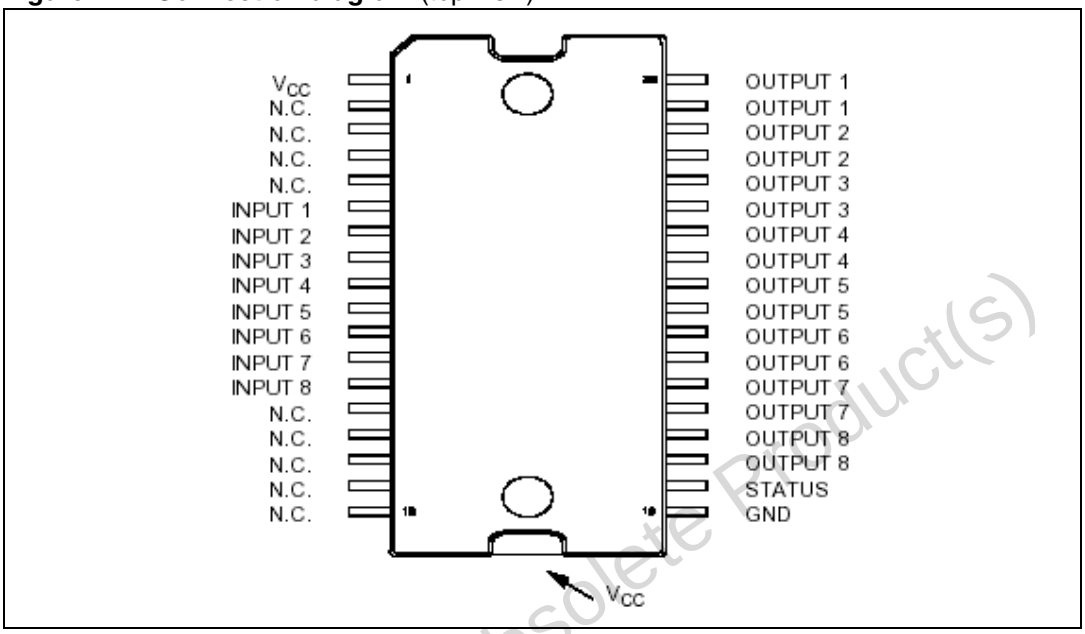


Table 8. Pin functions

Pin N°	Symbol	Function
TAB	V_{CC}	Positive power supply voltage
1	V_{CC}	Positive power supply voltage
2,3,4,5	NC	Not connected
6	Input 1	Input of channel 1
7	Input 2	Input of channel 2
8	Input 3	Input of channel 3
9	Input 4	Input of channel 4
10	Input 5	Input of channel 5
11	Input 6	Input of channel 6
12	Input 7	Input of channel 7
13	Input 8	Input of channel 8
14,15,16,17,18	NC	Not connected
19	GND	Logic ground
20	STATUS	Common open source diagnostic for over-temperature
21,22	Output 8	High-side output of channel 8
23,24	Output 7	High-side output of channel 7
25,26	Output 6	High-side output of channel 6

Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

Table 8. Pin functions (continued)

Pin N°	Symbol	Function
27.28	Output 5	High-side output of channel 5
29,30	Output 4	High-side output of channel 4
31,32	Output 3	High-side output of channel 3
33,34	Output 2	High-side output of channel 2
35,36	Output 1	High-side output of channel 1

Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

4 Current, voltage conventions and internal diagram

Figure 3. Current and voltage conventions

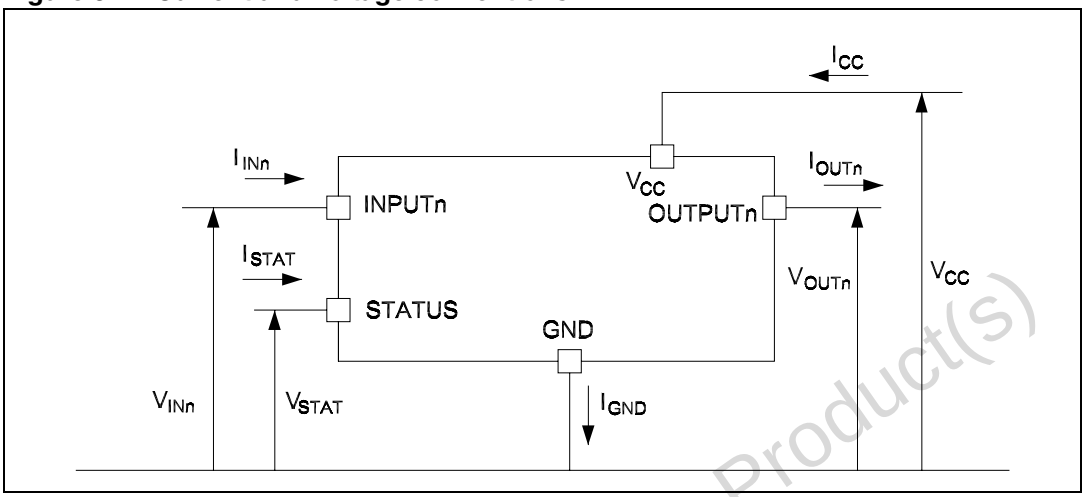
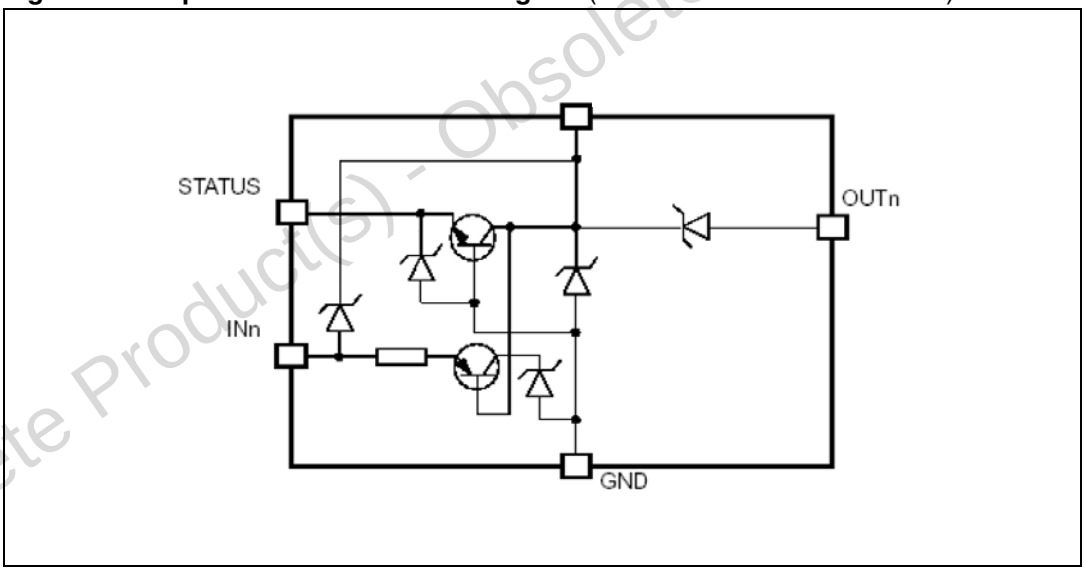


Figure 4. Equivalent internal block diagram (same structure for all channel)



Obsolete Product(s) - Obsolete Product(s)

Table 9. Truth table

Conditions	INPUTn	OUTPUTn	STATUS
Normal operation	L H	L H	L L
Current limitation	L H	L X	L L
Overtemperature (see waveforms 3, 4 *Figure 7*) -> $T_J > T_{TSD}$	L H	L L	L H
Undervoltage	L H	L L	X X

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

5 Switching time waveforms

Figure 5. Turn-ON and turn-OFF

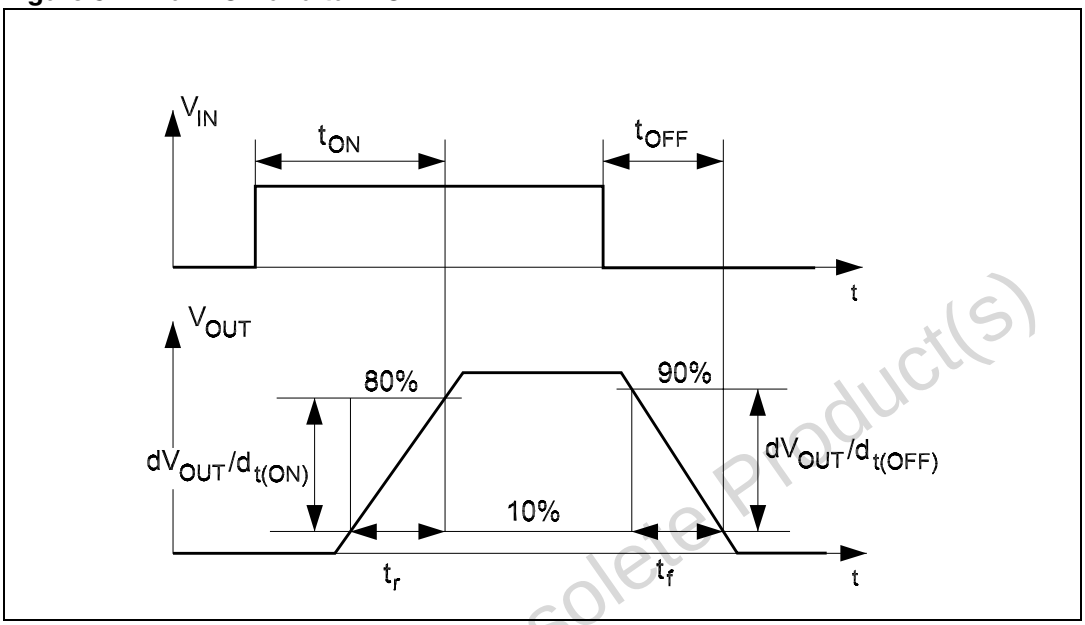
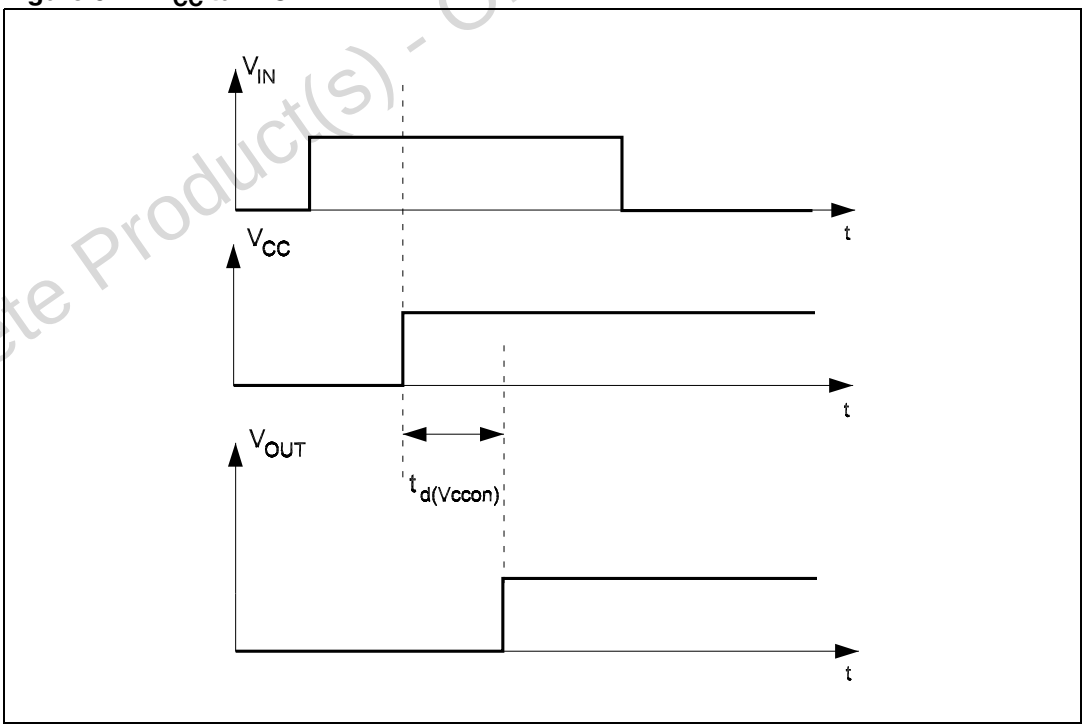


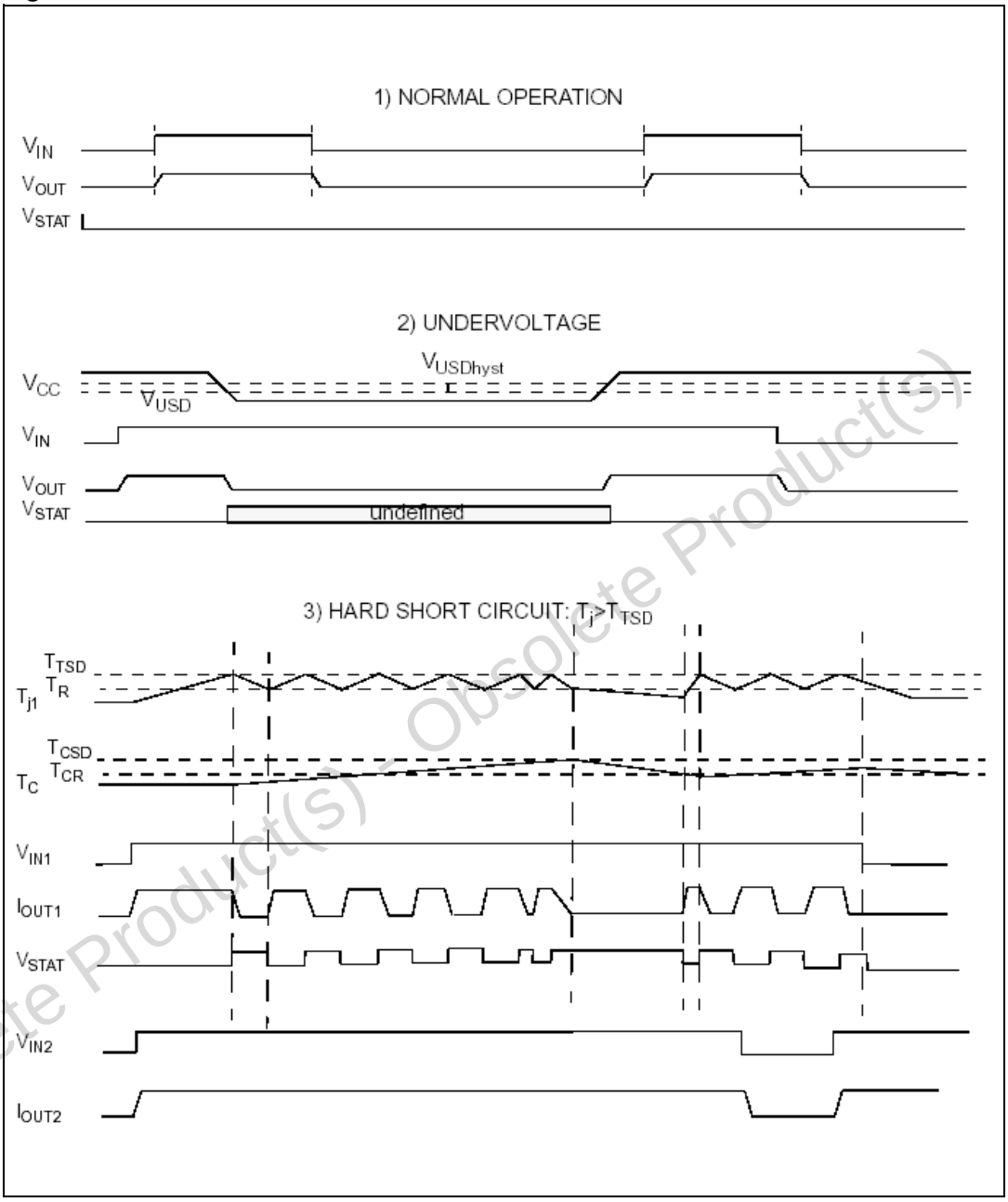
Figure 6. V_{CC} turn-ON



Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

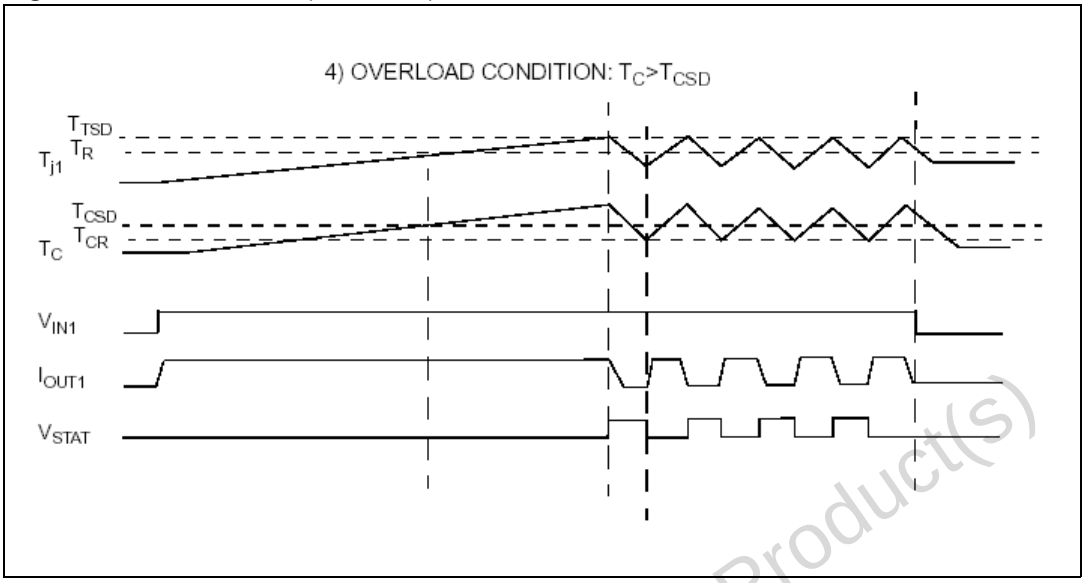
Figure 7. Waveforms



Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

Figure 7. Waveforms (continued)



Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

6 Reverse polarity protection

This schematic can be used with any type of load.

The following is an indication on how to dimension the R_{GND} resistor.

$R_{GND} = (-V_{CC}) / (-I_{GND})$

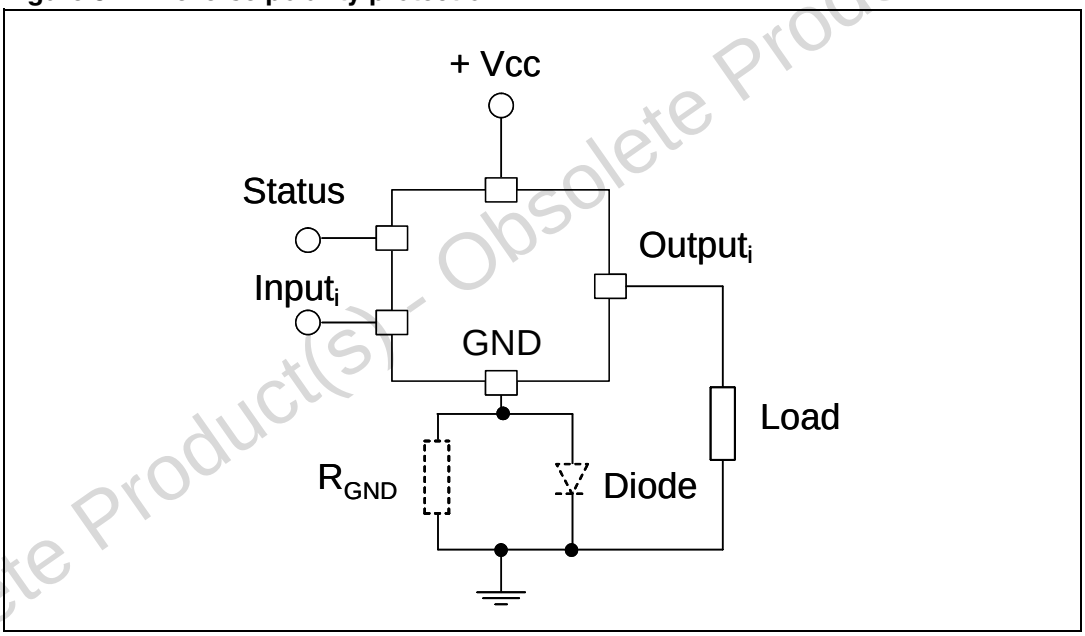
where $-I_{GND}$ is the DC reverse ground pin current and can be found in the absolute maximum rating section of the device datasheet.

Power dissipation in R_{GND} (when V_{CC}< 0: during reverse polarity situations) is:

$PD = (-V_{CC})^2/R_{GND}$

Note: In normal condition (no reverse polarity) due to the diode there will be a voltage drop between GND of the device and GND of the system.

Figure 8. Reverse polarity protection



Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

7 Package mechanical data

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

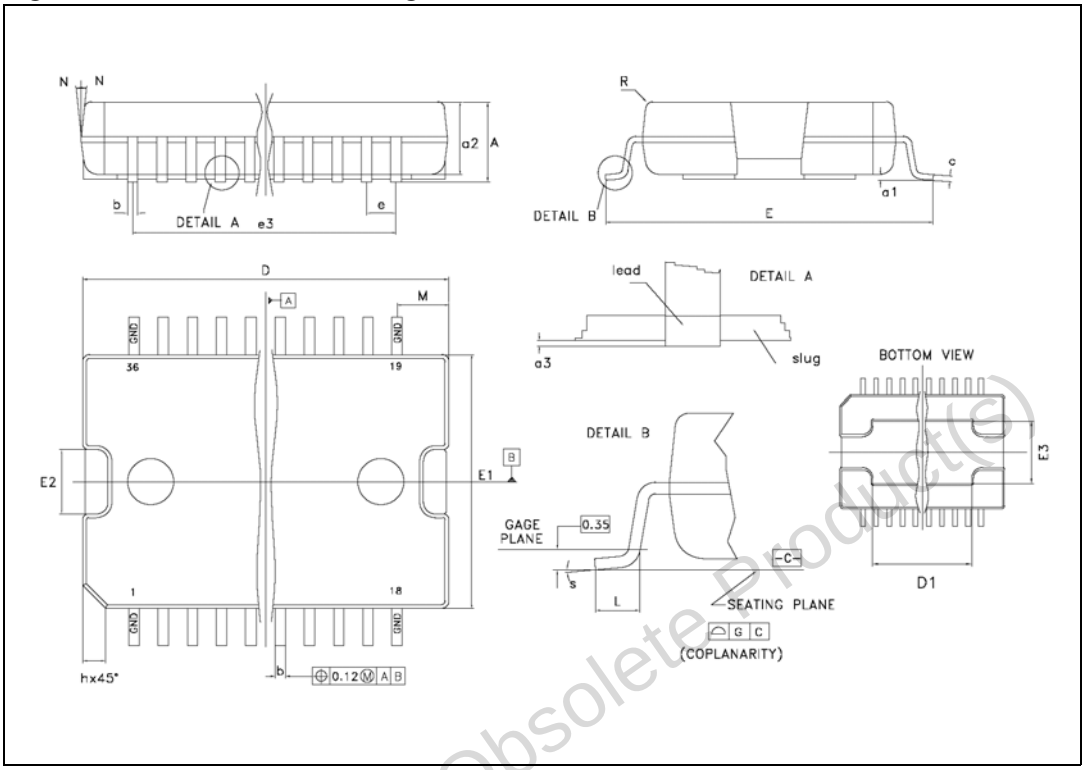
Table 10. PowerSO-36 mechanical data

Dim.	mm			inch		
	Min	Typ	Max	Min	Typ	Max
A			3.60			0.1417
a1	0.10		0.30	0.003		0.0118
a2			3.30			0.1299
a3	0		0.10	0		0.0039
b	0.22		0.38	0.008		0.0150
c	0.23		0.32	0.009		0.0126
D (1)	15.80		16.00	0.622		0.6299
D1	9.40		9.80	0.370		0.3858
E	13.90		14.50	0.547		0.5709
E1 (1)	10.90		11.10	0.429		0.4370
E2			2.90			0.1142
E3	5.8		6.2	0.228		0.2441
e		0.65			0.025	
e3		11.05			0.435	
G	0		0.10	0.000		0.0039
H	15.50		15.90	0.610		0.6260
h			1.10			0.0433
L	0.80		1.10	0.031		0.0433
N			10°			10°
S	0°		8°	0°		8°

Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

Figure 9. PowerSO-36 drawings



Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

8 Order codes

Table 11. Order codes

Order codes	Package	Packaging
VN808SR	PowerSO-36	Tube
VN808SR13TR	PowerSO-36	Tape and reel

Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

9 Revision history

Table 12. Document revision history

Date	Revision	Changes
13-Sep-2005	1	Initial release
01-Mar-2007	2	Document reformatted
26-Mar-2007	3	Typo in *Figure 3.*
07-Jul-2008	4	Added *Section 4 on page 8*
25-Aug-2009	5	Updated *Section 6: Reverse polarity protection*

Obsolete Product(s) - Obsolete Product(s)

Distributor of STMicroelectronics: Excellent Integrated System Limited
Datasheet of VN808SR - IC DVR OCT HISIDE 0.7A POWERS36
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

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.

Obsolete Product(s) - Obsolete Product(s)

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.

© 2009 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