

Version 1.0 , Aug 2004

Datasheet

DS-CoreControl-TDA21103

TDA21103

Authors: Edward Chang

Published by Infineon Technologies AG

<http://www.infineon.com/DCDC>

Power Management & Supply



Never stop thinking.

Contents:

Features.....	3
Application.....	3
Pinout Drawing and Description.....	3
General Description.....	4
Block Diagram.....	4
Application Circuit.....	5
Absolute Maximum Rating.....	6
Thermal Characteristic.....	7
Operation Condition.....	7
Electrical Characteristic.....	8
Timing Diagram.....	9
Outline Dimension.....	11
Revision History.....	12
Sales Office Worldwide.....	13

High speed Driver with bootstrapping for dual Power MOSFETs



P-DSOP-14

Features :

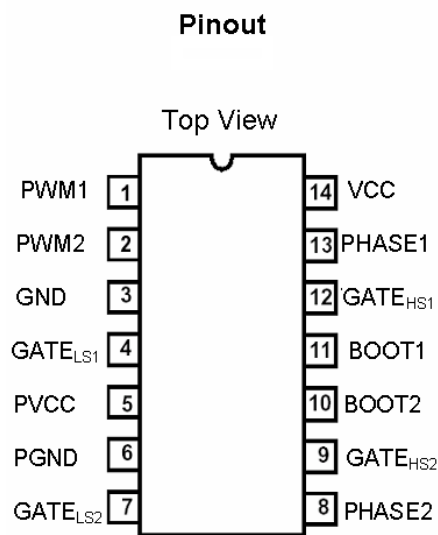
- Fast rise and fall times for frequencies up to 1 MHz
- Changes the High Side and Low Side MOSFET's gate to 6..12 V according to PVCC setting.
- Adjustable High Side and Low Side MOSFET gate drive voltage via PVCC pin for optimizing ON losses and gate drive losses
- Integrates the bootstrap diode for reducing the part count
- Prevents from cross-conducting by adaptive gate drive control
- Supports shut-down mode for low quiescent current through three-state input
- Compatible to standard PWM controller ICs (Intersil, Analog Devices)
- Floating High Side MOSFET drive
- Power-On Overvoltage Protection
- Ideal for multi-phase Desktop CPU supplies on motherboards and VRM's

Application :

- Voltage Regulator Modules
- Low Output Voltage High Output Current DC-DC Converters

Type	Package	Marking	Ordering Code
TDA21103	P-DSOP-14	21103	Q67042-S4252

Pinout Drawing and Description :



Number	Name	Description
1	PWM1	Input for the PWM1 controller signal
2	PWM2	Input for the PWM2 controller signal
3	GND	Ground
4	GATE _{LS1}	Gate drive output for the N-Channel Low Side MOSFET 1.
5	PVCC	Input to adjust the High Side gate drive
6	PGND	Power ground return for the Low Side Drivers
7	GATE _{LS2}	Gate drive output for the N-Channel Low Side MOSFET 2.
8	PHASE2	To be connected to the junction of the High Side and the Low Side MOSFET 2
9	GATE _{HS2}	Gate drive output for the N-Channel High Side MOSFET 2.
10	BOOT2	Floating bootstrap pin. To be connected to the external bootstrap capacitor to generate the gate drive voltage for the High Side N-Channel MOSFET 2.
11	BOOT1	Floating bootstrap pin. To be connected to the external bootstrap capacitor to generate the gate drive voltage for the High Side N-Channel MOSFET 1.
12	GATE _{HS1}	Gate drive output for the N-Channel High Side MOSFET 1.
13	PHASE1	To be connected to the junction of the High Side and the Low Side MOSFET 1
14	VCC	Supply Voltage

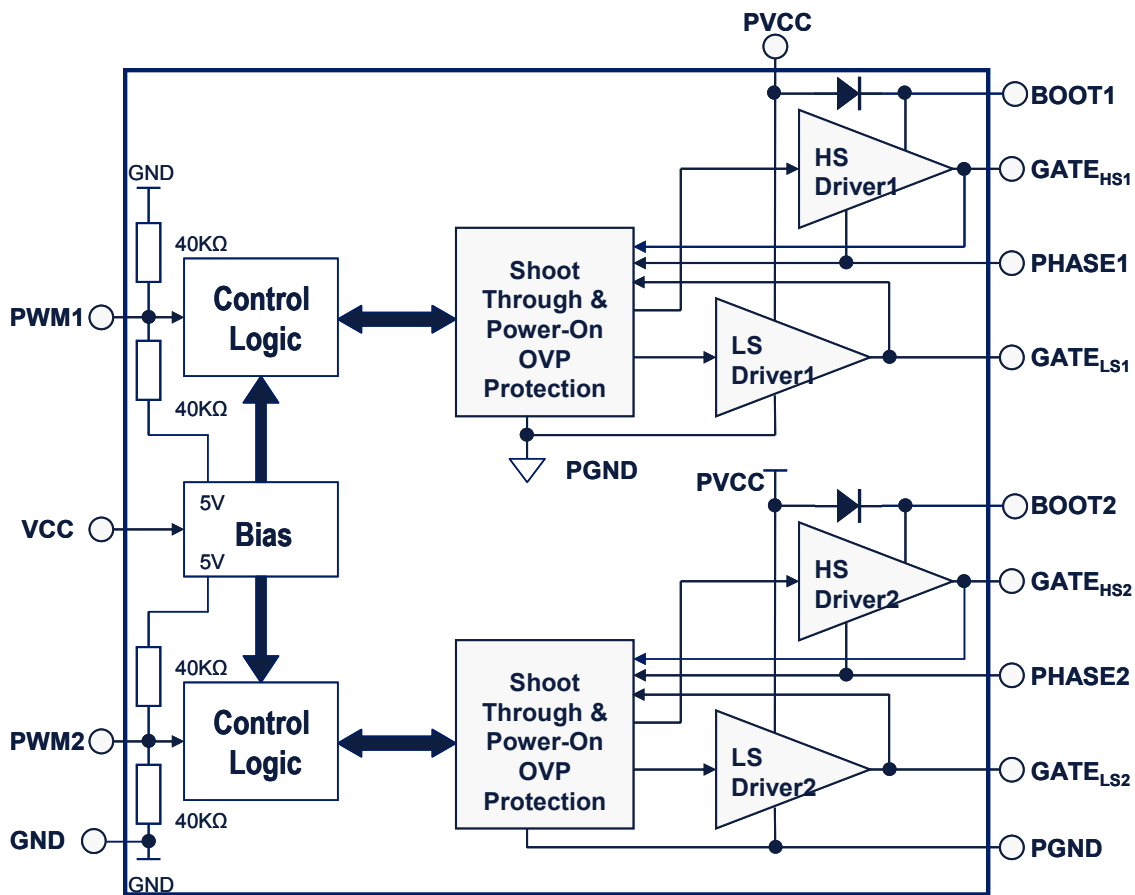
General Description

The dual high speed driver is designed to drive a wide range of N-Channel low side and N-Channel high side MOSFETs with varying gate charges. It has a small propagation delay from input to output, short rise and fall times and the same pin configuration as the HIP6602B. In addition it provides several protection features as well as a shut down mode for efficiency reasons.

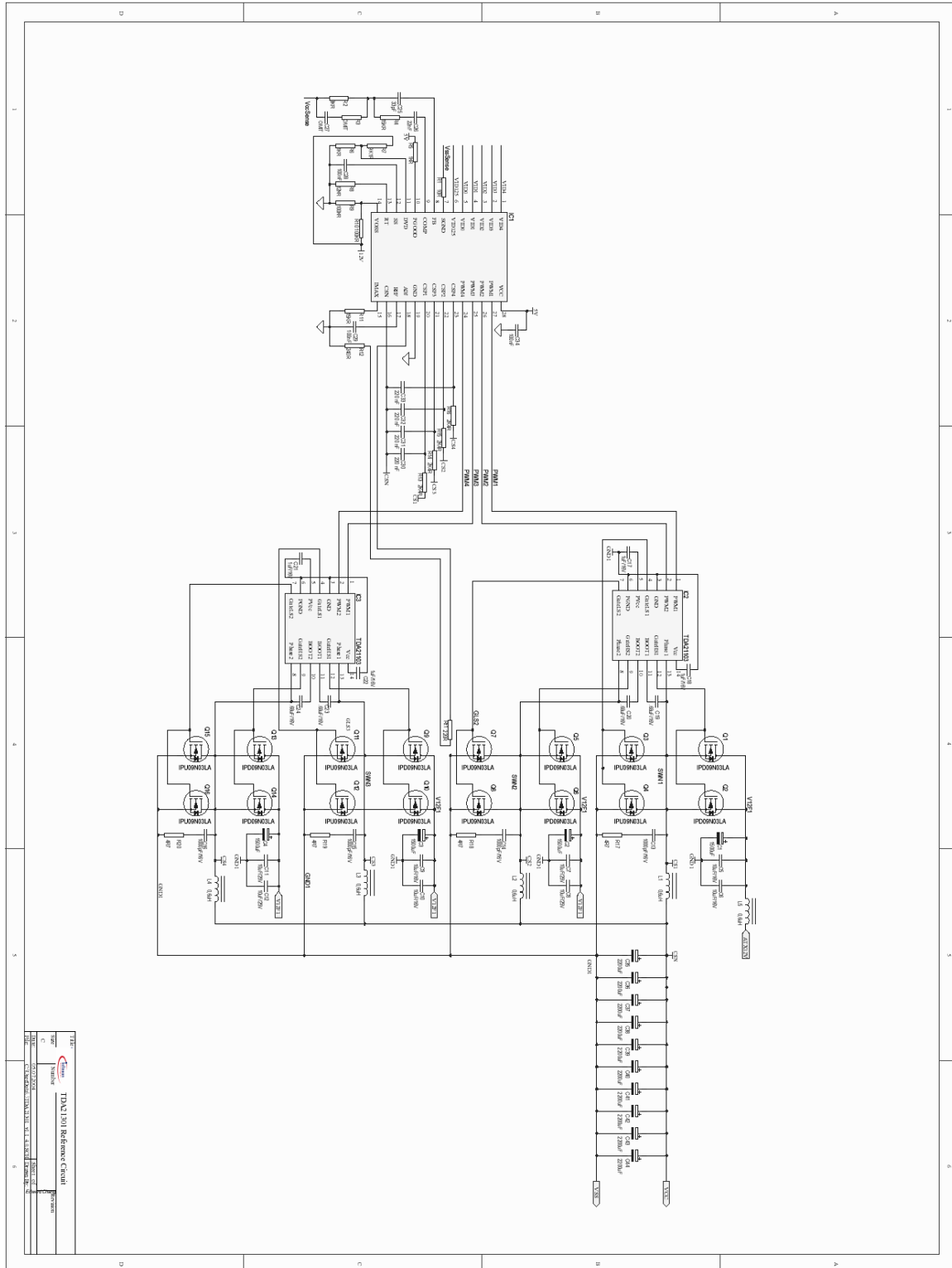
Target application

The dual high speed driver is designed to work well in half-bridge type circuits where dual N-Channel MOSFETs are utilized. A circuit designer can fully take advantage of the driver's capabilities in high-efficiency, high-density synchronous DC/DC converters that operate at high switching frequencies, e.g. in multi-phase converters for CPU supplies on motherboards and VRM's but also in motor drive and half bridge class-D amplifier type applications.

Block Diagram



Application Circuit



TDA21103 Reference Circuit
 Version 1.0
 Copyright © 2008 Infineon Technologies AG
 All rights reserved.

Absolute Maximum Ratings

At $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Value		Unit
		Min.	Max.	
Voltage supplied to 'VCC' pin; DC	V_{VCC}	-0,3	15	V
Voltage supplied to 'PVCC' pin; DC	V_{PVCC}	-0,3	$V_{CC}+0,3$	
Voltage supplied to 'PWM' pin	V_{PWM}	-0,3	7	
Voltage supplied to 'BOOT' pin referenced to 'PHASE'	$V_{BOOT} - V_{PHASE}$	-0,3	15	
Voltage supplied to 'BOOT' pin referenced to 'GND'	V_{BOOT}	-0,3	30	
Voltage rating at 'PHASE' pin, DC	V_{PHASE}	-4	15	
Junction temperature	T_J	0	125	°C
Storage temperature	T_S	-40	150	
Lead temperature (Soldering, 10 seconds)			260	
ESD Rating; Human Body Model			2	KV
Machine Mode			200	V
IEC climatic category; DIN EN 60068-1		55/ 150/ 56	-	

Thermal Characteristic

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction-soldering point					K/W
Thermal resistance, junction-ambient			127		

Operating Conditions

At $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Voltage supplied to 'VCC' pins	V_{VCC}		10,8		13,2	V
Voltage supplied to 'PVCC' pins	V_{PVCC}		6		13,2	V
Input signal transition frequency	f		0,1		1	MHz
Power dissipation	P_{TOT}	$T_A = 25\text{ °C}, T_J = 125\text{ °C}$		0,75		W
Junction temperature	T_J		0		125	°C
Ambient temperature	T_A		0		70	°C

Electrical Characteristic

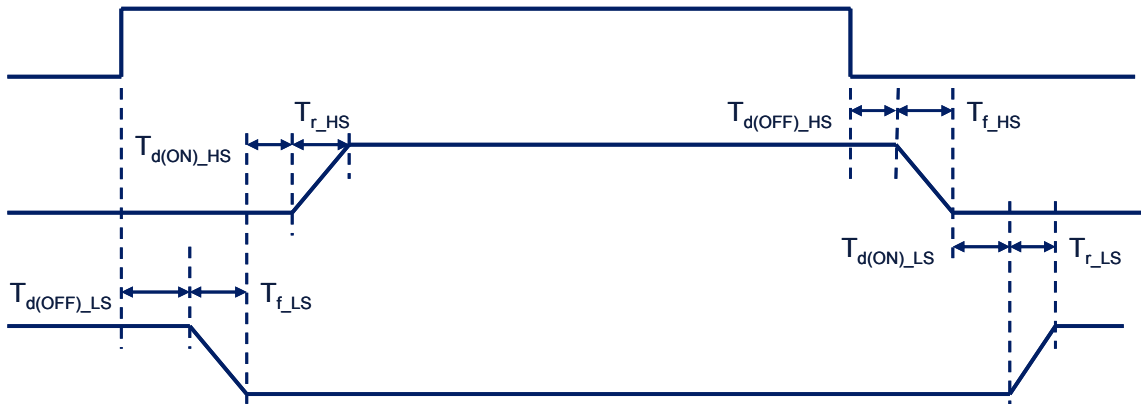
At T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Supply Characteristic						
VCC supply current		f =250 KHz,				
Bias Current	I _{VCC}	V _{PVCC} = V _{VCC} = 12 V		5,5	8	mA
Power Supply Current	I _{PVCC}	C _{BOOT} =0.1uF, R _{PHASE} = 20 Ω		5,5	10	
Under-voltage lockout		V _{VCC} rising threshold				
			8,6	9,9	10,7	V
Hysteresis			0,6	1,35		
Input Characteristic						
Current in 'PWM' pin	I _{PWM_L}	V _{PWM} = 0 V	-80	-127	-150	μA
Current in 'PWM' pin	I _{PWM_H}	V _{PWM} = 5 V	80	127	150	
PWM pin open	V _{PWM_O}		1,1	2,1	3,7	
PWM Low level	V _{PWM_L}		1,0	1,26	1,5	V
PWM High level	V _{PWM_H}		3,3	3,7	4,3	

At $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified

Dynamic Characteristic						
Turn-on propagation Delay High Side	$t_{d(ON_HS)}$	$P_{PVCC} = V_{VCC} = 12\text{ V}$ $C_{ISS} = 3000\text{ pF}$				ns
Turn-off propagation delay High Side	$t_{d(OFF_HS)}$			60		
Rise time High Side	t_{r_HS}			30		
Fall time High Side	t_{f_HS}			40		
Turn-on propagation Delay Low Side	$t_{d(ON_LS)}$					
Turn-off propagation delay Low Side	$t_{d(OFF_LS)}$			45		
Rise time Low Side	t_{r_LS}			30		
Fall time Low Side	t_{f_LS}			30		

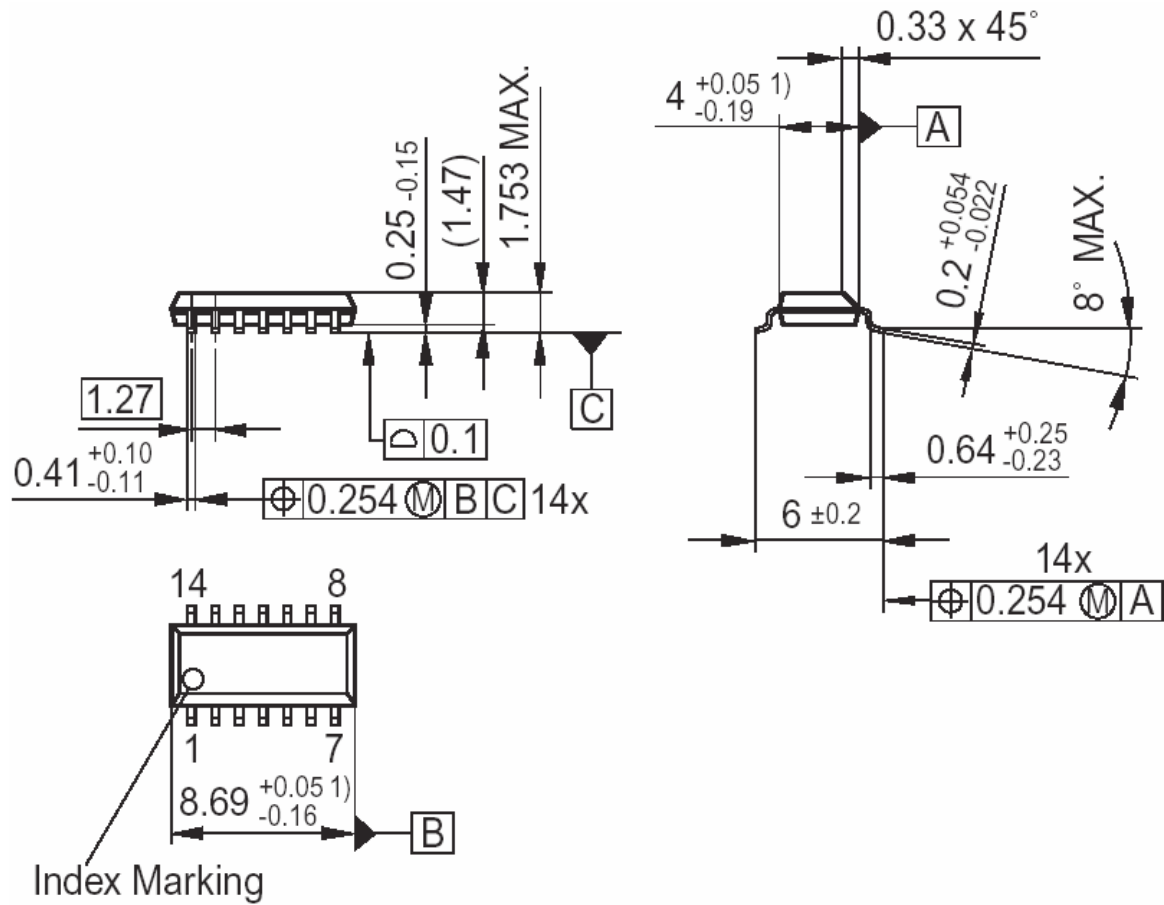
Timing diagram



At $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified

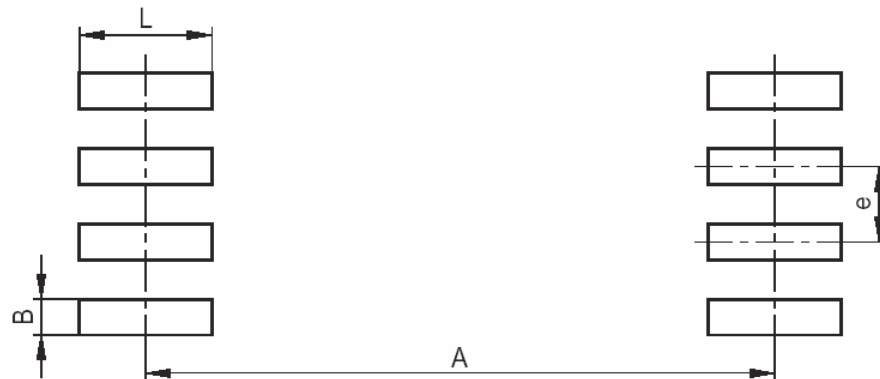
Parameter		Conditions	Values			Unit
			Min.	Typ.	Max.	
Output Characteristic High Side (HS) and Low Side (LS), ensured by design						
Output Resistance	HS; Source	$V_{PVCC} = V_{VCC} = 12\text{ V}$		1,75	3,0	Ω
	HS; Sink	$V_{PVCC} = V_{VCC} = 12\text{ V}$		2,8	5,0	Ω
	LS; Source	$V_{PVCC} = V_{VCC} = 12\text{ V}$		1,9	3,0	Ω
	LS; Sink	$V_{PVCC} = V_{VCC} = 12\text{ V}$		1,6	3,0	Ω

Package Drawing P-DSO-14



1) Does not include plastic or metal protrusion of 0.25 max. per side

Layout Footprints



e	A	L	B
1,27 mm	5,69 mm	1,31 mm	0,65 mm

Revision History		
Datasheet DS-CoreControl-TDA21103		
Actual Release: V1.0 Date: 10.08.2004		Previous Release: Date:
Page of actual Rel.	Page of prev. Rel.	Subjects changed since last release

For questions on technology, delivery and prices please contact the Infineon Technologies Offices in Germany or the Infineon Technologies Companies and Representatives worldwide: see the address list on the last page or our webpage at

<http://www.infineon.com/DCDC>

CoreControl™, **OptiMOS™** and **OptiMOS II™** are trademarks of Infineon Technologies AG.

We listen to Your Comments

Any information within this dokument that you feel is wrong, unclear or missing at all?

Your feedback will help us to continously improve the quality of this dokument.

Please send your proposal (including a reference to this dokument) to:

mcdoku.comment@infineon.com



Edition 2004-08-10

Published by Infineon Technologies AG,
St.-Martin-Strasse 53,
D-81541 München

© Infineon Technologies AG 2004.
All Rights Reserved.

Attention please!

The information herein is given to describe certain components and shall not be considered as warranted characteristics.

Terms of delivery and rights to technical change reserved.

We hereby disclaim any and all warranties, including but not limited to warranties of non-infringement, regarding circuits, descriptions and charts stated herein.

Infineon Technologies is an approved CECC manufacturer.

Information

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office in Germany or our Infineon Technologies Representatives worldwide (see address list).

Warnings

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

Infineon Technologies AG sales offices worldwide – partly represented by Siemens AG

<p>A Siemens AG Österreich Erdburger Lände 26 A-1031 Wien T (+43)1-17 07-3 56 11 Fax (+43)1-17 07-5 59 73</p> <p>AUS Siemens Ltd. 885 Mountain Highway Bayswater, Victoria 3153 T (+61)3-97 21 21 11 Fax (+61)3-97 21 72 75</p> <p>B Siemens Electronic Components Benelux Charleroisesteenweg 116/ Chaussée de Charleroi 116 B-1060 Brussel/Bruxelles T (+32)2-5 36 69 05 Fax (+32)2-5 36 28 57 Email: components@siemens.nl</p> <p>BR Siemens Ltda. Semiconductores Avenida Mutinga, 3800-Pirituba 05110-901 São Paulo-SP T (+55)11-39 08 25 64 Fax (+55)11-39 08 27 28</p> <p>CDN Infineon Technologies Corporation 320 March Road, Suite 604 Canada, Ontario K2K 2E2 T (+1)6 13-5 91 63 86 Fax (+1)6 13-5 91 63 89</p> <p>CH Siemens Schweiz AG Bauelemente Freilagerstrasse 40 CH-8047 Zürich T (+41)1-4 953065 Fax (+41)1-4 955050</p> <p>D Infineon Technologies AG Völklinger Str.2 D-40219 Düsseldorf T (+49)2 11-3 99 29 30 Fax (+49)2 11-3 99 14 81</p> <p>Infineon Technologies AG Werner-von-Siemens-Platz 1 D-30880 Laatzen (Hannover) T (+49)5 11-8 77 22 22 Fax (+49)5 11-8 77 15 20</p> <p>Infineon Technologies AG Von-der-Tann-Straße 30 D-90439 Nürnberg T (+49)9 11-6 54 76 99 Fax (+49)9 11-6 54 76 24</p> <p>Infineon Technologies AG Weissacher Straße 11 D-70499 Stuttgart T (+49)7 11-1 37 33 14 Fax (+49)7 11-1 37 24 48</p> <p>D Infineon Technologies AG Halbleiter Distribution Richard-Strauss-Straße 76 D-81679 München T (+49)89-92 21 40 86 Fax (+49)89-92 21 20 71</p> <p>DK Siemens A/S Borupvang 3 DK-2750 Ballerup T (+45)44 77-44 77 Fax (+45)44 77-40 17</p> <p>E Siemens S.A. Dpto. Componentes Ronda de Europa, 5 E-28760 Tres Cantos-Madrid T (+34)91-5 14 71 51 Fax (+34)91-5 14 70 13</p>	<p>F Infineon Technologies France, 39/47, Bd.Ornano F-93527 Saint-Denis CEDEX2 T (+33)1-49 22 31 00 Fax (+33)1-49 22 28 01</p> <p>FIN Siemens Components Scandinavia P.O. Box 6 0 FIN-02601 Espoo (Helsinki) T (+358)10-5 11 51 51 Fax (+358)10-5 11 24 95 Email: scs@components.siemens.se</p> <p>GB Infineon Technologies Siemens House Oldbury GB-Bracknell, Berkshire RG12 8FZ T (+44)13 44-39 66 18 Fax (+44)13 44-39 66 32</p> <p>H Simacomp Kft. Lajos u.103 H-1036 Budapest T (+36)1-4 57 16 90 Fax (+36)1-4 57 16 92</p> <p>HK Infineon Technologies Hong Kong Ltd. Suite 302, Level 3, Festival Walk, 80 Tat Chee Avenue, Yam Yat Tsuen, Kowloon Tong Hong Kong T (+8 52)28 32 05 00 Fax (+8 52)28 27 97 62</p> <p>I Siemens S.A. Semiconductor Sales Via Piero e Alberto Pirelli, 10 I-20126 Milano T (+39)02-66 76 -1 Fax (+39)02-66 76 43 95</p> <p>IND Siemens Ltd. Components Division No.84 Keonics Electronic City Hosur Road Bangalore 561 229 T (+91)80-8 52 11 22 Fax (+91)80-8 52 11 80</p> <p>Siemens Ltd. CMP Div, 5th Floor 4A Ring Road, IP Estate New Delhi 110 002 T (+91)11-3 31 99 12 Fax (+91)11-3 31 96 04</p> <p>Siemens Ltd. CMP Div, 4th Floor 130, Pandurang Budhkar Marg, Worli Mumbai 400 018 T (+91)22-4 96 21 99 Fax (+91)22-4 96 22 01</p> <p>IRL Siemens Ltd. Electronic Components Division 8, Raglan Road IRL-Dublin 4 T (+3 53)1-2 16 23 42 Fax (+3 53)1-2 16 23 49</p> <p>IL Nisko Ltd. 2A, Habarzel St. P.O.Box 58151 61580 Tel Aviv –Israel T (+9 72)3 -7 65 73 00 Fax (+9 72)3 -7 65 73 33</p>	<p>J Siemens Components K.K. Talanawa Park Tower 12F & 17F 3-20-14, Higashi-Gotanda, Shinagawa-ku, Tokyo T (+81)3-54 49 64 11 Fax (+81)3 -54 49 64 01</p> <p>MAL Infineon Technologies AG Sdn Bhd Bayan Lepas Free Industrial Zone1 11900 Penang T (+60)4 -6 44 99 75 Fax (+60)4 -6 41 48 72</p> <p>N Siemens Components Scandinavia Østre Aker vei 24 Postboks 10, Veitvet N-0518 Oslo T (+47)22-63 30 00 Fax (+47)22-68 49 13 Email: scs@components.siemens.se</p> <p>NL Siemens Electronic Components Benelux Postbus 16068 NL-2500 BB Den Haag T (+31)70-3 33 20 65 Fax (+31)70-3 33 28 15 Email: components@siemens.nl</p> <p>NZ Siemens Auckland 300 Great South Road Greenland, Auckland T (+64)9-5 20 30 33 Fax (+64)9-5 20 15 56</p> <p>P Siemens S.A. an Componentes Electronicos R.Irmaos Siemens,1 Alfragide P-2720-093 Amadora T (+351)1-4 17 85 90 Fax (+351)1-4 17 80 83</p> <p>PK Siemens Pakistan Engineering Co.Ltd. PO Box 1129, Islamabad 44000 23 West Jinnah Ave Islamabad T (+92)51-21 22 00 Fax (+92)51-21 16 10</p> <p>PL Siemens SP.z.o.o. ul.Zupnicza 11 PL-03-821 Warszawa T (+48)22-8 70 91 50 Fax (+48)22-8 70 91 59</p> <p>ROK Siemens Ltd. Asia Tower, 10th Floor 726 Yeoksam-dong, Kang-nam Ku CPO Box 3001 Seoul 135-080 T (+82)2-5 27 77 00 Fax (+82)2-5 27 77 79</p> <p>RUS INTECH electronics ul.Smolnaya, 24/1203 RUS-125 445 Moskva T (+70)95 -4 51 97 37 Fax (+70)95 -4 51 86 08</p> <p>S Siemens Components Scandinavia Österögatan 1, Box 46 S-164 93 Kista T (+46)8-7 03 35 00 Fax (+46)8-7 03 35 01 Email: scs@components.siemens.se</p>	<p>ROC Infineon Technologies Taiwan.Ltd. 12F-1, No.3-2 Yuan Qu. St., Nan Kang Software Park, Taipei, 115 T (+8 86)2-2655 7500 Fax (+8 86)2-2655 7501</p> <p>SGP Infineon Technologies Asia Pacific,Pte.Ltd. 168 Kallang Way Singapore 349 253 T (+65)8 40 06 10 Fax (+65)7 42 62 39</p> <p>USA Infineon Technologies Corporation 1730 North First Street San Jose, CA 95112 T (+1)4 08-5 01 60 00 Fax (+1)4 08-5 01 24 24</p> <p>Siemens Components, Inc. Optoelectronics Division 19000 Homestead Road Cupertino, CA 95014 T (+1)4 08-2 57 79 10 Fax (+1)4 08-7 25 34 39</p> <p>Siemens Components, Inc. Special Products Division 186 Wood Avenue South Iselin, NJ 08830-2770 T (+1)7 32-9 06 43 00 Fax (+1)7 32-6 32 28 30</p> <p>VRC Infineon Technologies Hong Kong Ltd. Beijing Office Room 2106, Building A Vantone New World Plaza No.2 Fu Cheng Men Wai Da Jie Jie 100037 Beijing T (+86)10 -68 57 90 -06,-07 Fax (+86)10 -68 57 90 08</p> <p>Infineon Technologies Hong Kong Ltd. Chengdu Office Room14J1, Jinyang Mansion 58 Tudu Street, Chengdu, Sichuan Province 610 016 T (+86)28-6 61 54 46 /79 51 Fax (+86)28 -6 61 01 59</p> <p>Infineon Technologies Hong Kong Ltd. Shanghai Office Room1101, Lucky Target Square No.500 Chengdu Road North Shanghai 200003 T (+86)21-63 6126 18 /19 Fax (+86)21-63 61 11 67</p> <p>Infineon Technologies Hong Kong Ltd. Shenzhen Office Room 1502, Block A Tian An International Building Renim South Road Shenzhen 518 005 T (+86)7 55 -2 28 91 04 Fax (+86)7 55-2 28 02 17</p> <p>ZA Siemens Ltd. Components Division P.O.B.3438 Halfway House 1685 T (+27)11-6 52 -27 02 Fax (+27)11-6 52 20 42</p>
---	---	--	--