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:

High speed Driver with bootstrapping for dual Power MOSFETs

P-DSOP-14

Features :

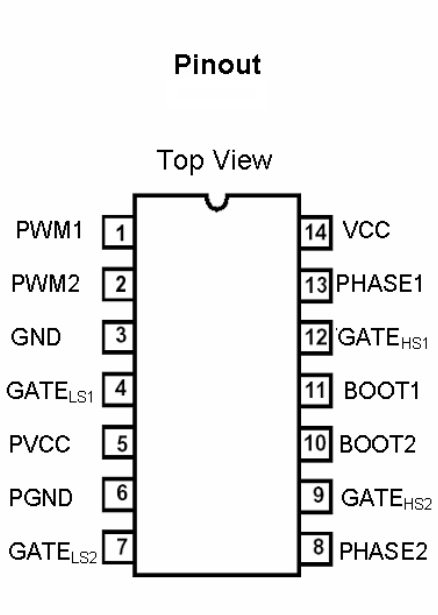
- Fast rise and fall times for frequencies up to 1 MHz
- Changes the High Side and Low Side MOSFET´s gate to 6..12 V according to PVCC setting.
- Adjustable High Side and Low Side MOSFET gate drive voltage via PVCC pin for optimizing ON losses and gate drive losses
- Integrates the bootstrap diode for 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

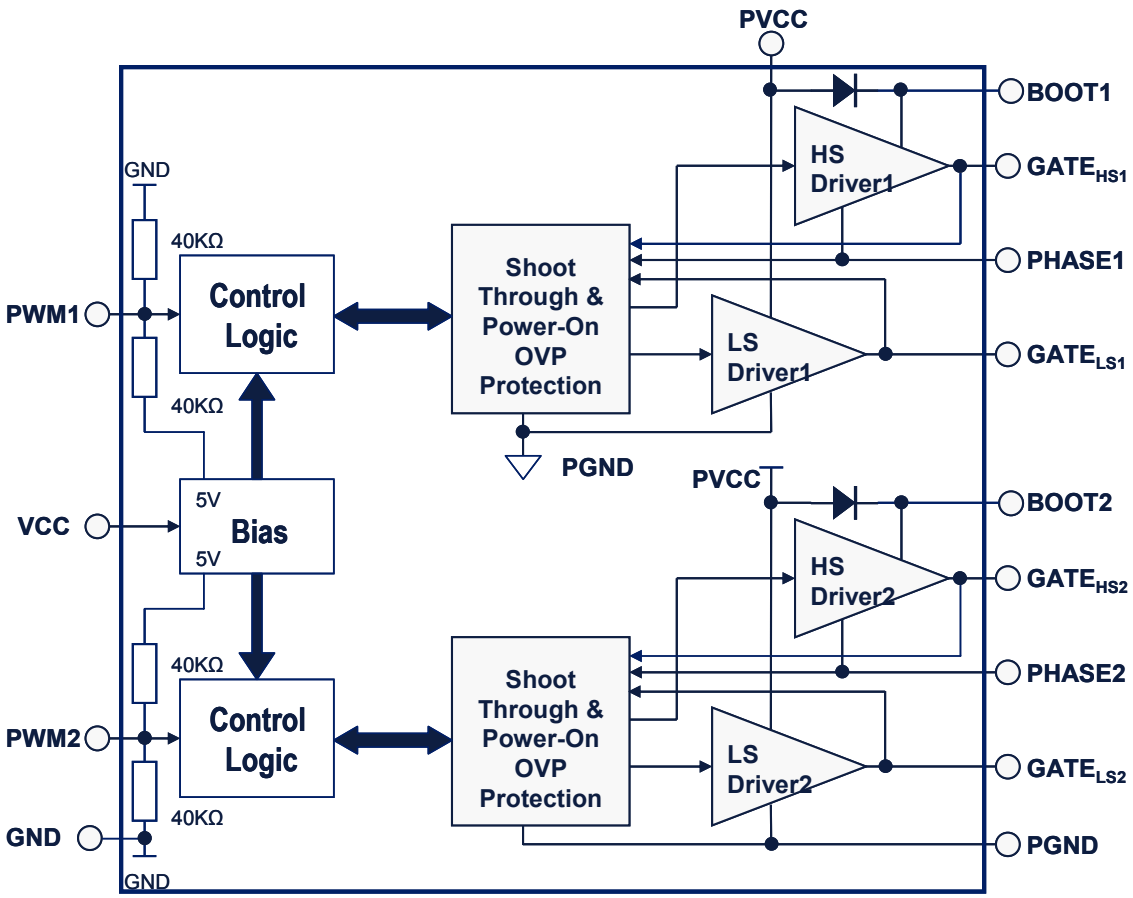
General Description

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.

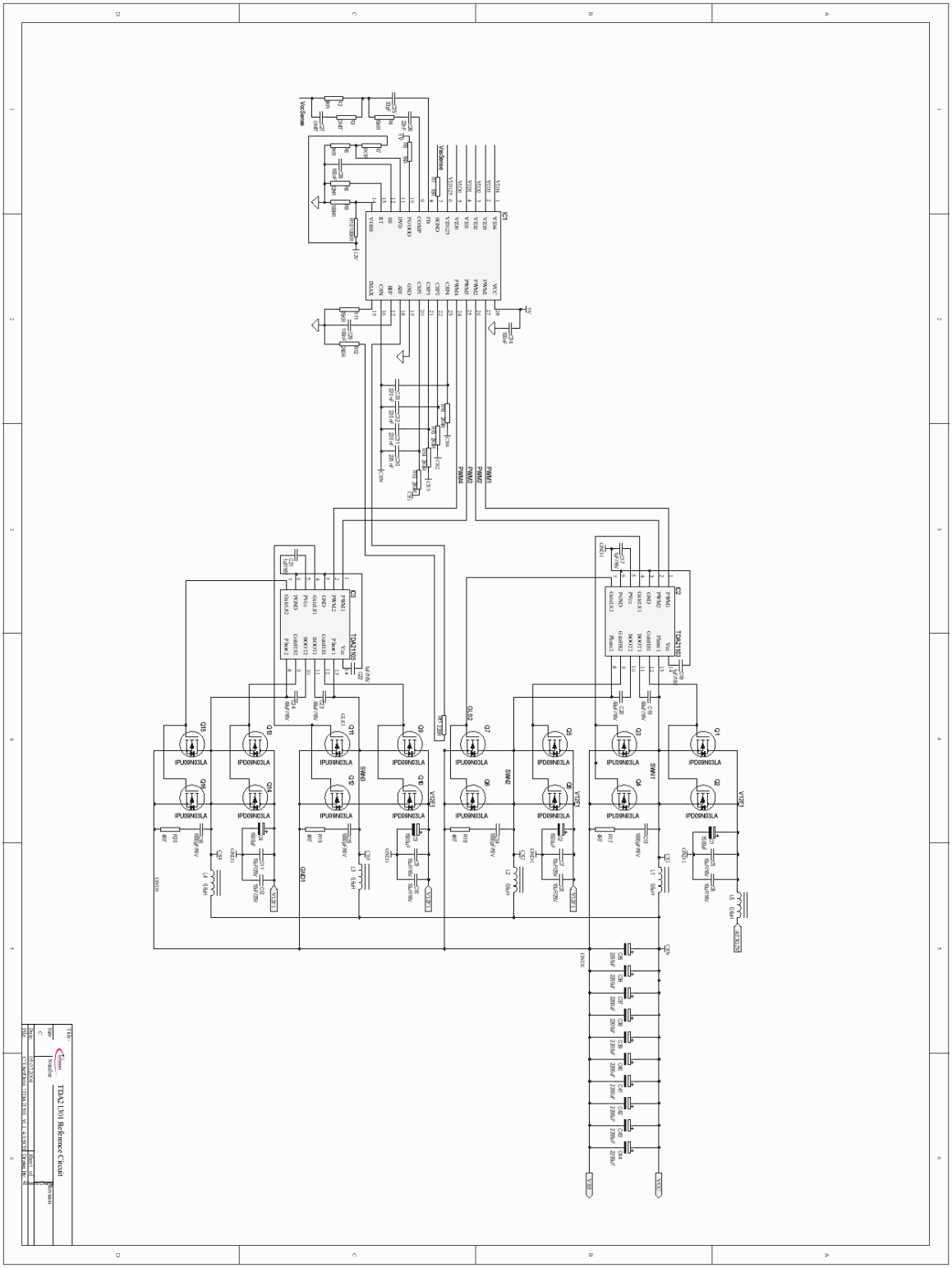
Target application

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



Absolute Maximum Ratings

At Tj = 25 °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 Machine Mode			2 200	KV 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 Tj = 25 °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 °C, T_J = 125 °C		0,75		W
Junction temperature	T_J		0		125	°C
Ambient temperature	T_A		0		70	°C

Electrical Characteristic

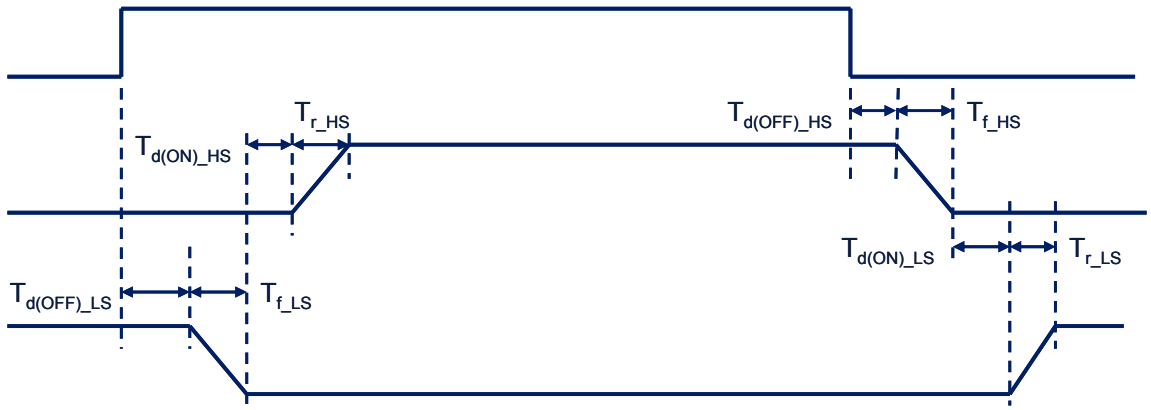
At Tj = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Supply Characteristic						
VCC supply current Bias Current Power Supply Current	 I_{VCC} I_{PVCC}	f =250 KHz, V_{PVCC} = V_{VCC} = 12 V C_{BOOT}=0.1uF, R_{PHASE} = 20 Ω		 5,5 5,5	 8 10	mA
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 Tj = 25 °C, unless otherwise specified

Dynamic Characteristic						
Turn-on propagation Delay High Side	$t_{d(ON)\_HS}$	P_{PVCC} = V_{VCC}= 12 V C_{ISS} = 3000 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		

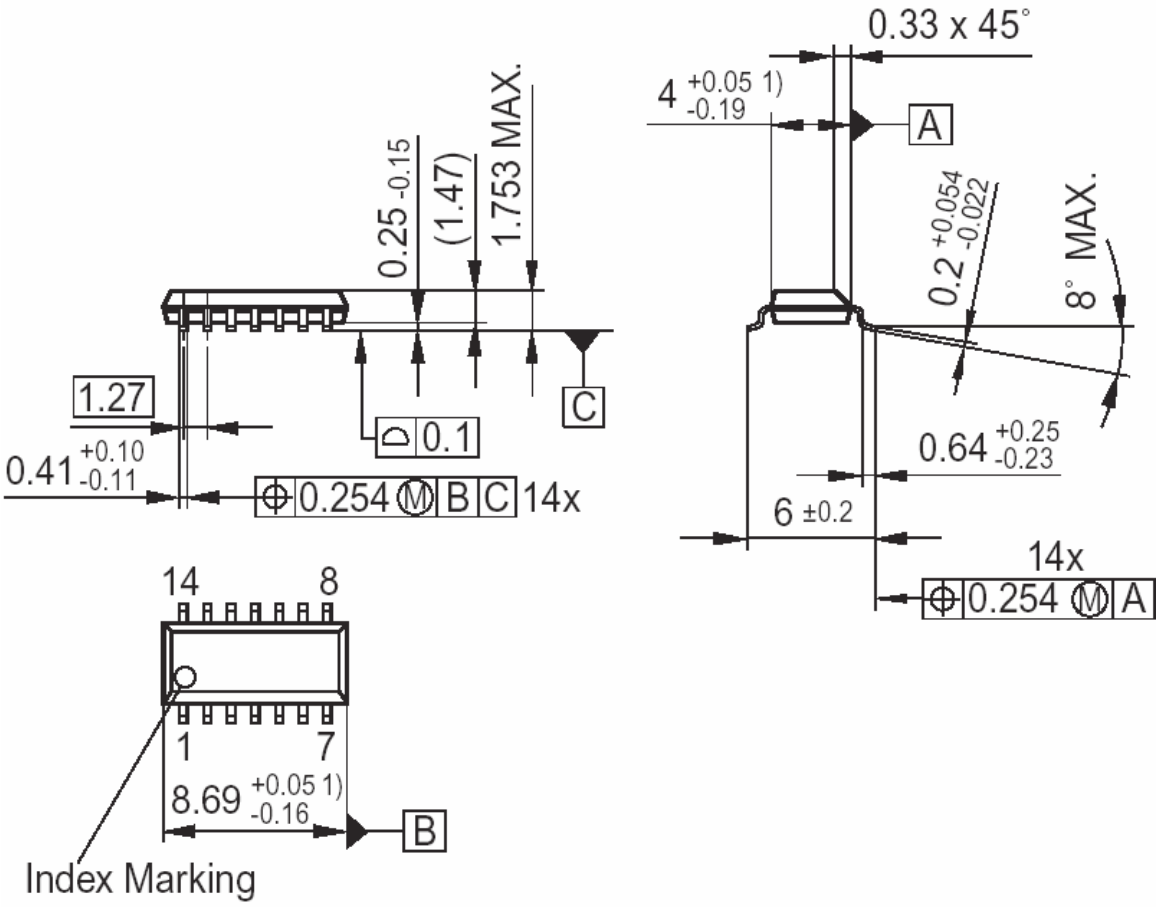
Timing diagram



At Tj = 25 °C, unless otherwise specified

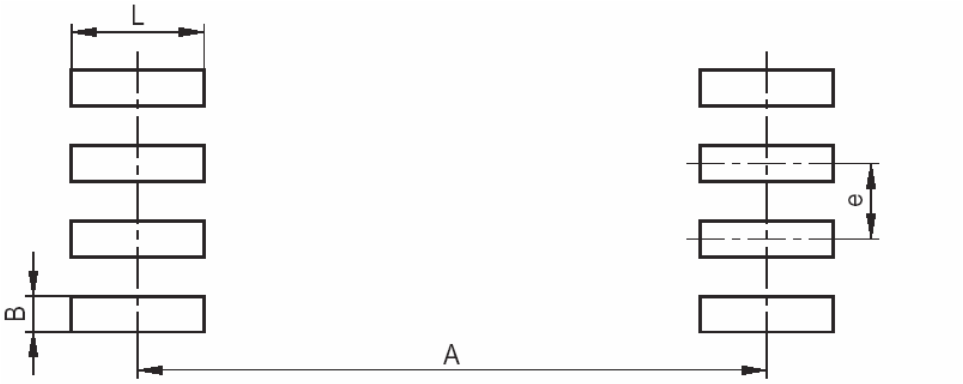
Parameter		Conditions	Values			Unit
			Min.	Typ.	Max.	
Output Characteristic High Side (HS) and Low Side (LS), ensured by design						
Output Resistance	HS; Source	V_{PVCC} = V_{VCC}= 12 V		1,75	3,0	Ω
	HS; Sink	V_{PVCC} = V_{VCC}= 12 V		2,8	5,0	Ω
	LS; Source	V_{PVCC} = V_{VCC}= 12 V		1,9	3,0	Ω
	LS; Sink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

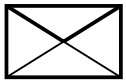
We listen to Your Comments

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

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

A
Siemens AG Österreich
Erdberger Lände 26
A-1031 Wien
T (+43)1-17 07-3 56 11
Fax (+43)1-17 07-5 59 73
AUS
Siemens Ltd.
885 Mountain Highway
Bayswater,***Victoria 3153***
T (+61)3-97 21 21 11
Fax (+61)3-97 21 72 75
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
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
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
CH
Siemens Schweiz AG
Bauelemente
Freilagerstrasse 40
CH-8047 Zürich
T (+41)1-4 953065
Fax (+41)1-4 955050
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
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
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
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
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
DK
Siemens A/S
Borupvang 3
DK-2750 Ballerup
T (+45)44 77-44 77
Fax (+45)44 77-40 17
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

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
FIN
Siemens Components Scandinavia
P.O .Bo x 6 0
FIN-02601 Espoo (Helsinki)
T (+3 58)10-5 11 51 51
Fax (+3 58)10-5 11 24 95
Email:
scs@components.siemens.se
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
H
Simacomp Kft.
Lajos u.103
H-1036 Budapest
T (+36)1-4 57 16 90
Fax (+36)1-4 57 16 92
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
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
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
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
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
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
IL
Nisko Ltd.
2A,Habarzel St.
P.O.Box 58151
61580 Tel Aviv –Isreal
T (+9 72)3 -7 65 73 00
Fax (+9 72)3 -7 65 73 33

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
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
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
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
NZ
Siemens Auckland
300 Great South Road
Greenland, Auckland
T (+64)9-5 20 30 33
Fax (+64)9-5 20 15 56
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
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
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
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
RUS
INTECH electronics
ul.Smolnaya,24/1203
RUS-125 445 Moskva
T (+7)0 95 -4 51 97 37
Fax (+7)0 95 -4 51 86 08
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

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
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
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
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
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
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
Infineon Technologies
Hong Kong Ltd.
Chengdu Office
Room14J1,Jinyang Mansion
58 Tidu Street,
Chengdu,
Sichuan Province 610 016
T (+86)28-6 61 54 46 /79 51
Fax (+86)28 -6 61 01 59
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
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
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