MIC2981/82

High-Voltage, High-Current Source Driver Array

Features

- Output Voltage to 50V
- Output Current to 500 mA
- Transient-Protected Outputs
- Integral Clamp Diodes
- TTL, CMOS, or PMOS Compatible Inputs

Applications

- Relay and Solenoid Switching
- Stepping Motor
- LED and Incandescent Displays

Package Type

MIC2981/82
18-Lead SOIC (WM)
18-Lead PDIP (N)
(Top View)

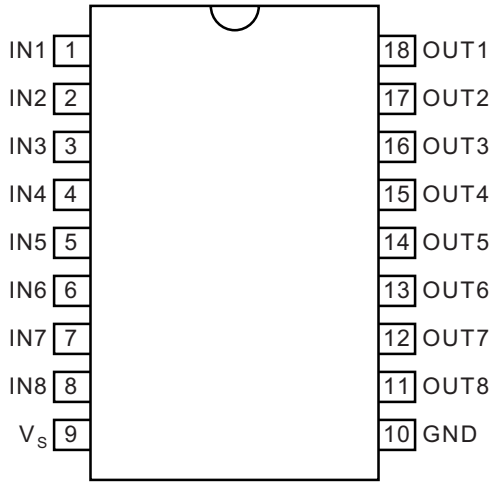


TABLE 1: PIN DESCRIPTION

Pin No.	Pin Name	Pin Function
1-8	IN1-IN8	Input 1 through Input 8: Base drive to driver input transistor.
9	V_S	Supply input.
10	GND	Ground.
11-18	OUT8-OUT1	Output 8 through Output 1: Emitter of Darlington driver output.

General Description

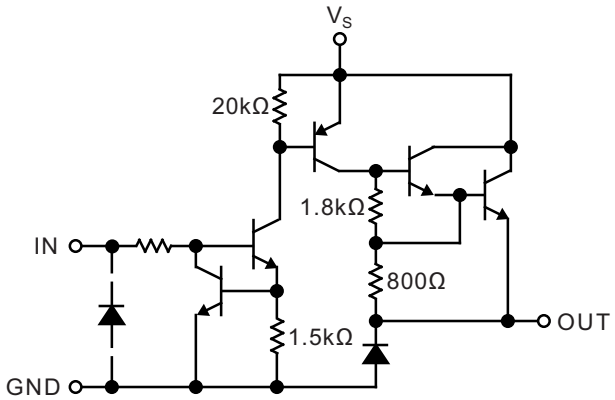
The MIC2981/82 is an 8-channel, high-voltage, high-current source driver array ideal for switching high-power loads from logic-level TTL, CMOS, or PMOS control signals.

These drivers can manage multiple loads of up to 50V and 500 mA, limited only by package power dissipation. The MIC2981/82 features inputs compatible with 5V TTL and 5V to 15V CMOS or PMOS logic outputs. Microchip's dual-marked device replaces either UDN2981 or UDN2982 devices.

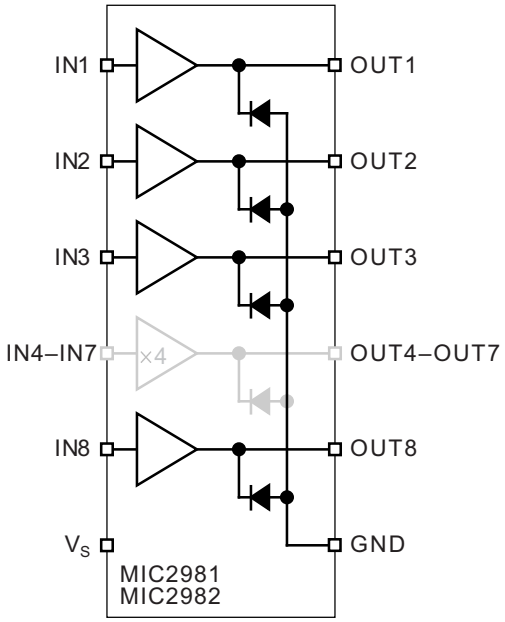
The MIC2981/82 is available in the 18-lead plastic DIP and 18-lead wide SOIC packages. Both devices operate in the industrial temperature range.

Typical Application Circuit

Typical Source Driver



Block Diagram



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Supply Voltage (V_S) ..... +50V
Output Voltage (V_{CE}) ..... +50V
Continuous Output Current (I_C) ..... 500 mA
Input Voltage (V_{IN}) ..... +30V
Ground Current 3A

Operating Ratings ‡

Supply Voltage (V_S) ..... +5V to +50V

† Notice: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

‡ Notice: The device is not guaranteed to function outside its operating ratings.

General Note: Devices are ESD protected; however, handling precautions are recommended.

ELECTRICAL CHARACTERISTICS

Electrical Characteristics: V_S = 50V; T_A = +25°C, unless noted. Note 1

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Output Leakage Current	I_{CEX}	—	—	200	µA	V_{IN} = 0.4V, T_A = +70°C, Note 2
Output Sustaining Voltage	$V_{CE(SUS)}$	35	—	—	V	I_{OUT} = 45 mA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	1.7	2.0	V	V_{IN} = 2.4V, I_{OUT} = 100 mA
		—	1.8	2.1		V_{IN} = 2.4V, I_{OUT} = 225 mA
		—	1.9	2.2		V_{IN} = 2.4V, I_{OUT} = 350 mA
Input Current	$I_{IN(ON)}$	—	140	200	µA	MIC2981, V_{IN} = 2.4V
		—	310	450		MIC2981, V_{IN} = 3.85V
		—	140	200	µA	MIC2982, V_{IN} = 2.4V
		—	1.25	1.93	mA	MIC2982, V_{IN} = 12V
Output Source Current	I_{OUT}	350	—	—	mA	V_{IN} = 2.4V, V_{CE} = 2.2V
Supply Current	I_S	—	—	10	mA	V_{IN} = 2.4V, OUT1–8 = Open, Note 2
Turn-On Delay	t_{ON}	—	1.0	2.0	µs	0.5E_{IN} to 0.5E_{OUT}, R_L = 100Ω, V_S = 35V
Turn-Off Delay	t_{OFF}	—	5.0	10	µs	0.5E_{IN} to 0.5E_{OUT}, R_L = 100Ω, V_S = 35V, Note 3
Clamp Diode Leakage Current	I_R	—	—	50	µA	V_R = 50V, V_{IN} = 0.4V, Note 2
Clamp Diode Forward Voltage	V_F	—	1.5	2.0	V	I_F = 350 mA

Note 1: Specification for packaged product only.
2: Applied to all 8 inputs simultaneously.
3: Load conditions affect turn-off delay.

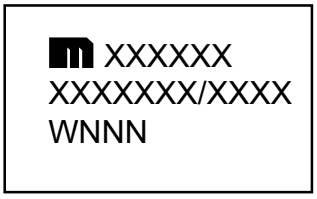
TEMPERATURE SPECIFICATIONS

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Ambient Temperature Range	T_A	–40	—	+85	°C	—
Maximum Junction Temperature	$T_{J(MAX)}$	—	—	+150	°C	—
Storage Temperature	T_S	–65	—	+150	°C	—
Package Thermal Resistances						
Thermal Resistance, PDIP 18-Ld	θ_{JA}	—	56	—	°C/W	—
Thermal Resistance, SOIC 18-Ld	θ_{JA}	—	84	—	°C/W	—

2.0 PACKAGING INFORMATION

2.1 Package Marking Information

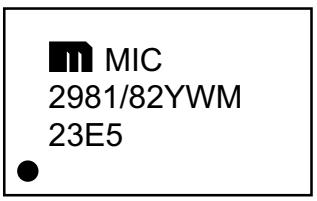
18-Lead PDIP*



Example

18-Lead SOIC*

Example



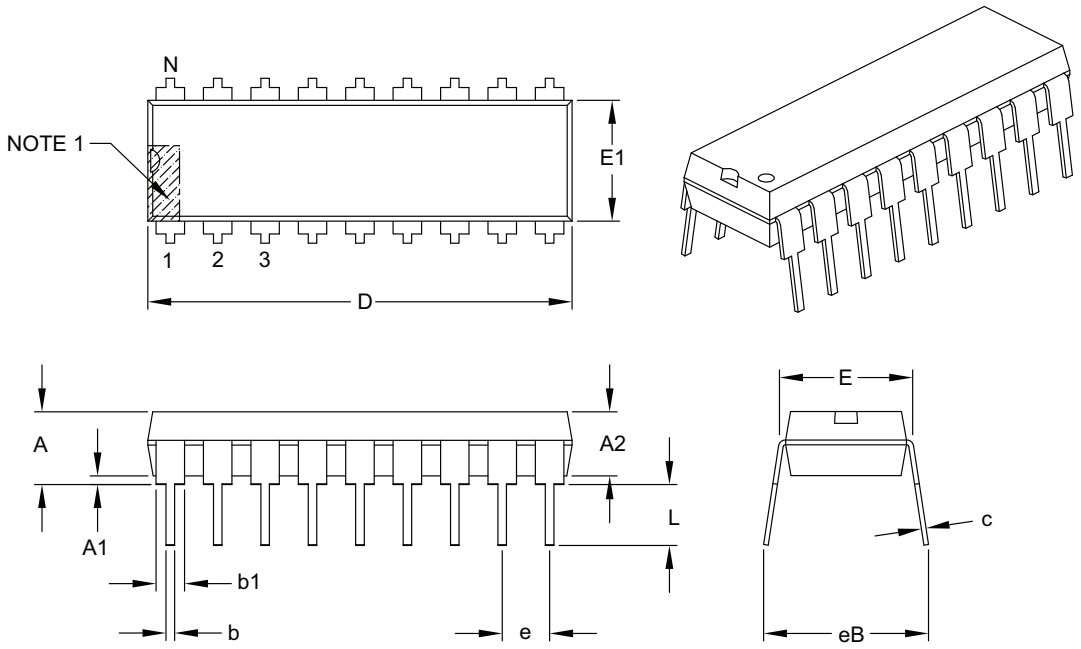
Note: Orders for MIC2981YWM or MIC2982YWM will be filled with the dual-marked MIC2981/82YWM. Orders for MIC2981YN or MIC2982YN will be filled with the dual-marked MIC2981/82YN.

Legend:	XX...X	Product code or customer-specific information
	Y	Year code (last digit of calendar year)
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week ‘01’)
	NNN	Alphanumeric traceability code
	(e3)	Pb-free JEDEC® designator for Matte Tin (Sn)
	*	This package is Pb-free. The Pb-free JEDEC designator ((e3)) can be found on the outer packaging for this package.
	●, ▲, ▼	Pin one index is identified by a dot, delta up, or delta down (triangle mark).
Note:	In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.	
	Underbar (_) symbol may not be to scale.	

Note: If the full seven-character YYWWNNN code cannot fit on the package, the following truncated codes are used based on the available marking space:
6 Characters = YWWNNN; 5 Characters = WWNNN; 4 Characters = WNNN; 3 Characters = NNN;
2 Characters = NN; 1 Character = N

18-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		18	
Pitch	e		.100 BSC	
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.300	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.880	.900	.920
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.014
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

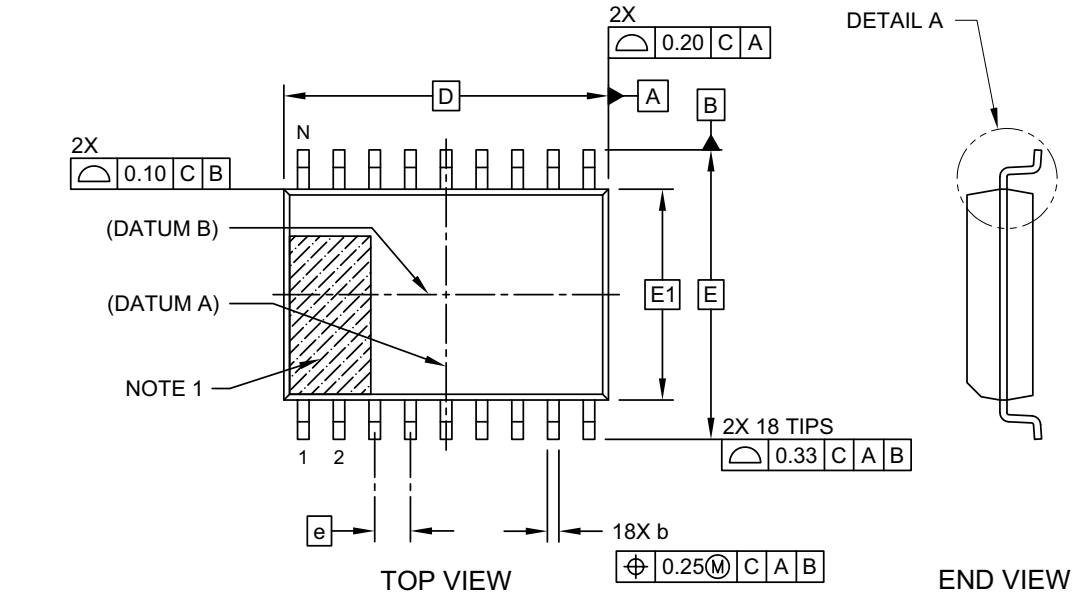
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

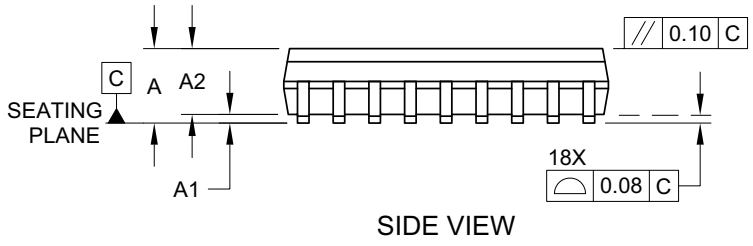
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-007B

18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm (.300 In.) Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

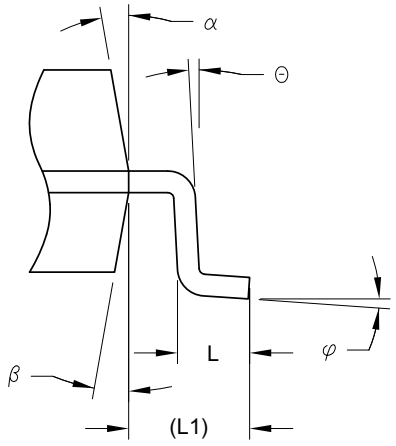




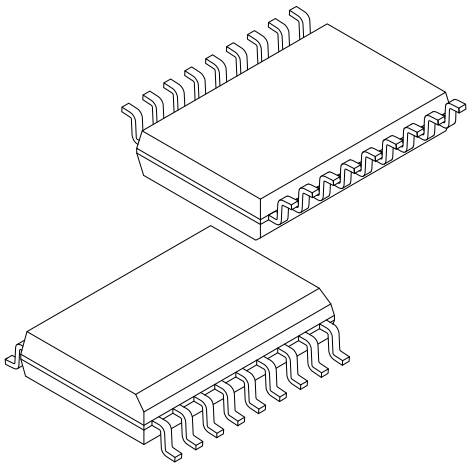
Microchip Technology Drawing C04-051D Sheet 1 of 2

18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm (.300 In.) Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



DETAIL A



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		18	
Pitch	e		1.27 BSC	
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E		10.30 BSC	
Molded Package Width	E1		7.50 BSC	
Overall Length	D		11.55 BSC	
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1		1.40 REF	
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

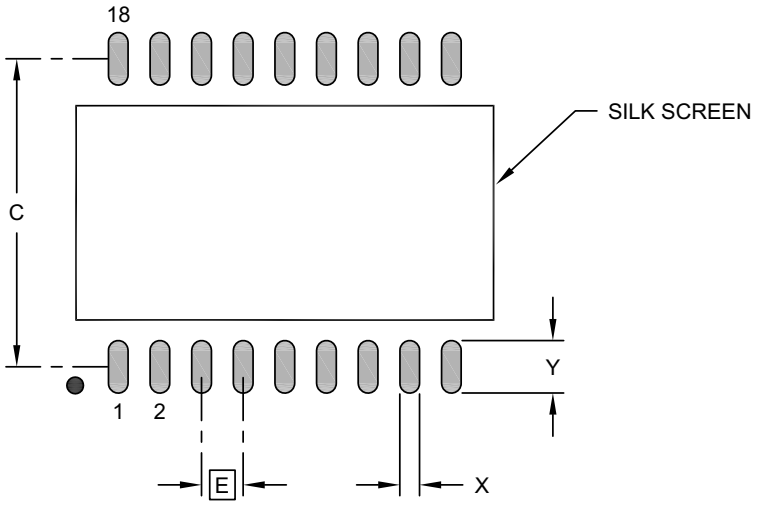
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-051D Sheet 2 of 2

18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm (.300 In.) Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Contact Pad Spacing	C		9.40	
Contact Pad Spacing				
Contact Pad Width (X18)	X			0.60
Contact Pad Length (X18)	Y			1.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2051A

NOTES:

APPENDIX A: REVISION HISTORY

Revision A (September 2022)

- Converted Micrel document MIC2981/82 to Microchip data sheet DS20006727A.
- Minor text changes throughout.

NOTES:

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

Part Number	X	XX	-XX
Device	Temperature Range	Package	Media Type

Device:	MIC2981/82:		High-Voltage, High-Current Source Driver Array
Temperature Range:	Y	=	–40°C to +85°C
Package:	WM	=	18-Lead SOIC
	N	=	18-Lead PDIP
Media Type:	<blank>	=	21/Tube (PDIP Only)
	<blank>	=	41/Tube (SOIC Only)
	TR	=	1,000/Reel (SOIC Only)

Examples:

a) MIC2981/82YN: MIC2981/82, –40°C to +85°C Temp. Range, 18-Lead PDIP, 21/Tube

b) MIC2981/82YWM: MIC2981/82, –40°C to +85°C Temp. Range, 18-Lead SOIC, 41/Tube

c) MIC2981/82YWM-TR: MIC2981/82, –40°C to +85°C Temp. Range, 18-Lead SOIC, 1,000/Reel

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.

NOTES:

Note the following details of the code protection feature on Microchip products:

- Microchip products meet the specifications contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is secure when used in the intended manner, within operating specifications, and under normal conditions.
- Microchip values and aggressively protects its intellectual property rights. Attempts to breach the code protection features of Microchip product is strictly prohibited and may violate the Digital Millennium Copyright Act.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of its code. Code protection does not mean that we are guaranteeing the product is "unbreakable" Code protection is constantly evolving. Microchip is committed to continuously improving the code protection features of our products.

Trademarks

ISBN: 978-1-6683-1274-2

For information regarding Microchip's Quality Management Systems, please visit www.microchip.com/quality.

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
http://www.microchip.com/support
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Austin, TX
Tel: 512-257-3370

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453
Tel: 317-536-2380

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608
Tel: 951-273-7800

Raleigh, NC
Tel: 919-844-7510

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110
Tel: 408-436-4270

Canada - Toronto
Tel: 905-695-1980
Fax: 905-695-2078

ASIA/PACIFIC

Australia - Sydney
Tel: 61-2-9868-6733

China - Beijing
Tel: 86-10-8569-7000

China - Chengdu
Tel: 86-28-8665-5511

China - Chongqing
Tel: 86-23-8980-9588

China - Dongguan
Tel: 86-769-8702-9880

China - Guangzhou
Tel: 86-20-8755-8029

China - Hangzhou
Tel: 86-571-8792-8115

China - Hong Kong SAR
Tel: 852-2943-5100

China - Nanjing
Tel: 86-25-8473-2460

China - Qingdao
Tel: 86-532-8502-7355

China - Shanghai
Tel: 86-21-3326-8000

China - Shenyang
Tel: 86-24-2334-2829

China - Shenzhen
Tel: 86-755-8864-2200

China - Suzhou
Tel: 86-186-6233-1526

China - Wuhan
Tel: 86-27-5980-5300

China - Xian
Tel: 86-29-8833-7252

China - Xiamen
Tel: 86-592-2388138

China - Zhuhai
Tel: 86-756-3210040

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444

India - New Delhi
Tel: 91-11-4160-8631

India - Pune
Tel: 91-20-4121-0141

Japan - Osaka
Tel: 81-6-6152-7160

Japan - Tokyo
Tel: 81-3-6880- 3770

Korea - Daegu
Tel: 82-53-744-4301

Korea - Seoul
Tel: 82-2-554-7200

Malaysia - Kuala Lumpur
Tel: 60-3-7651-7906

Malaysia - Penang
Tel: 60-4-227-8870

Philippines - Manila
Tel: 63-2-634-9065

Singapore
Tel: 65-6334-8870

Taiwan - Hsin Chu
Tel: 886-3-577-8366

Taiwan - Kaohsiung
Tel: 886-7-213-7830

Taiwan - Taipei
Tel: 886-2-2508-8600

Thailand - Bangkok
Tel: 66-2-694-1351

Vietnam - Ho Chi Minh
Tel: 84-28-5448-2100

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4485-5910
Fax: 45-4485-2829

Finland - Espoo
Tel: 358-9-4520-820

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Garching
Tel: 49-8931-9700

Germany - Haan
Tel: 49-2129-3766400

Germany - Heilbronn
Tel: 49-7131-72400

Germany - Karlsruhe
Tel: 49-721-625370

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Germany - Rosenheim
Tel: 49-8031-354-560

Israel - Ra'anana
Tel: 972-9-744-7705

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Italy - Padova
Tel: 39-049-7625286

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Norway - Trondheim
Tel: 47-7288-4388

Poland - Warsaw
Tel: 48-22-3325737

Romania - Bucharest
Tel: 40-21-407-87-50

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

Sweden - Gothenberg
Tel: 46-31-704-60-40

Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820