

# LA6585MC

## BTL Driver Single-phase Full-wave for Motor Driver

### Monolithic Digital IC

#### Overview

The LA6585MC is single-phase bipolar fan motor is driven, through BTL output linear drive, at high efficiency, low power, and low sound by suppressing the reactive power. Lock protection, rotary signal circuits are incorporated, which is optimum for the notebook PC, consumer equipment power supply, car audio system, CPU cooler, etc. that require high reliability and low noise.

#### Functions and Features

- Pre-driver for Single-phase Full-wave Drive
- Single-phase Full-wave Linear Drive by BTL Output (Gain Resistance 1 k $\Omega$ –360 k $\Omega$ , 51 dB):  
No Switching Noise, which is Optimum for Equipment Requiring Silence, such as Consumer Equipment Power Supply, Car Audio System, etc.
- Low-voltage Operation Possible, with Wide Operating Voltage Range (2.2 to 14.0 V)
- Low Saturation Output (Upper + Lower Saturation Voltage:  $V_{Osat}$  (Total) = 1.2 V Typ,  $I_O$  = 250 mA): High Coil Efficiency with Low Current Drain. Additionally, IC itself Generates only Small Heat
- Built-in Lock Protection and Automatic Reset Circuits
- Built-in FG & RD Outputs
- Built-in Hall bias ( $V_{HB}$  = 1.5 V)
- Thermal Protection Circuit: When the Large Current Flows due to Output Short-circuit and the IC Chip Temperature Exceeds 180°C, this Protective Circuit Suppresses the Drive Current to Prevent Burn and Damage to IC.
- Extra-small & High Heat Capacity Package



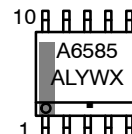
ON Semiconductor®

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



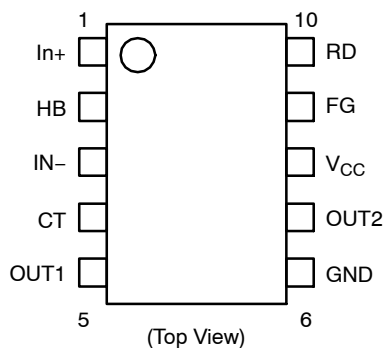
SOIC-10 NB  
CASE 751BQ

#### MARKING DIAGRAM



A6585 = Specific Device Code  
A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week  
▪ = Pb-Free Package

#### PIN ASSIGNMENT



#### ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

# LA6585MC

## SPECIFICATIONS

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
V <sub>CC</sub> max	Supply Voltage		15	V
P <sub>d</sub> max	Allowable Power Dissipation	Mounted on a specified board (Note 1)	750	mW
I <sub>OUT</sub> max	Output Current		0.7	A
V <sub>OUT</sub> max	Output Withstand Voltage		15	V
V <sub>RD/FG</sub> max	RD/FG Output Pin Output Withstand Voltage		15	V
I <sub>RD/FG</sub> max	RD/FG Output Current		10	mA
I <sub>B</sub> max	HB Output Current		10	mA
T <sub>opr</sub>	Operating Temperature		–30 to +90	°C
T <sub>stg</sub>	Storage Temperature		–55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Mounted on a specified board: 114.3 mm × 76.1 mm × 1.6 mm glass epoxy.

### OPERATING CONDITIONS (T<sub>A</sub> = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
V <sub>CC</sub>	Supply Voltage		2.2 to 14.0	V
V <sub>ICM</sub>	Common-phase Input Voltage Range of Hall Input		0 to V <sub>CC</sub> –1.5	V

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C, V<sub>CC</sub> = 12 V, unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I <sub>CC1</sub>	Circuit Current	During drive (CT = L)	3	6	9	mA
I <sub>CC2</sub>		During lock protection (CT = H)	2.5	5	7.5	mA
I <sub>CT1</sub>	Lock Detection Capacitor Charge Current		0.9	1.2	1.5	μA
I <sub>CT2</sub>	Capacitor Discharge Current		0.10	0.18	0.25	μA
R <sub>CT</sub>	Capacitor Charge and Discharge Current Ratio	RCD = I <sub>CT1</sub> /I <sub>CT2</sub>	5	6.5	8	–
V <sub>CT1</sub>	CT Charge Voltage		1.3	1.5	1.7	V
V <sub>CT2</sub>	CT Discharge Voltage		0.3	0.5	0.7	V
V <sub>OL</sub>	OUT Output L Saturation Voltage	I <sub>O</sub> = 200 mA	–	0.25	0.45	V
V <sub>OH</sub>	OUT Output H Saturation Voltage	I <sub>O</sub> = 200 mA	–	0.95	1.2	V
V <sub>HN</sub>	Hall Input Sensitivity	Zero peak value (including offset and hysteresis)	–	7	15	mV
V <sub>HB</sub>	Hall Bias Voltage	I <sub>HB</sub> = 5 mA	1.3	1.5	1.7	V
V <sub>FG/RD</sub>	FG/RD Output Pin L Voltage	I <sub>RD/FG</sub> = 5 mA	–	0.15	0.3	V
I <sub>FG/RDL</sub>	FG/RD Output Pin Leak Current	V <sub>RD/FG</sub> = 15 V	–	1	30	μA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

# LA6585MC

TRUTH TABLE

IN-	IN+	CT	OUT1	OUT2	FG	RD	Mode
H	L	L	H	L	L	L	During rotation
L	H		L	H	H		
-	-	H	Off	Off	-	H	During overheat protection

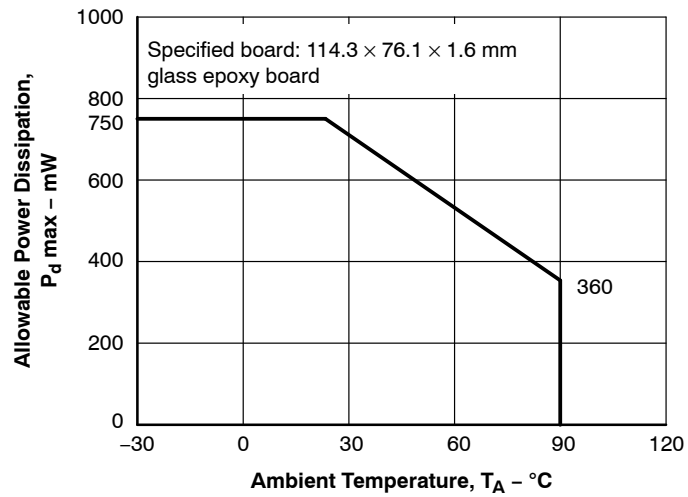


Figure 1.  $P_d \text{ max} - T_A$

# LA6585MC

## BLOCK DIAGRAM

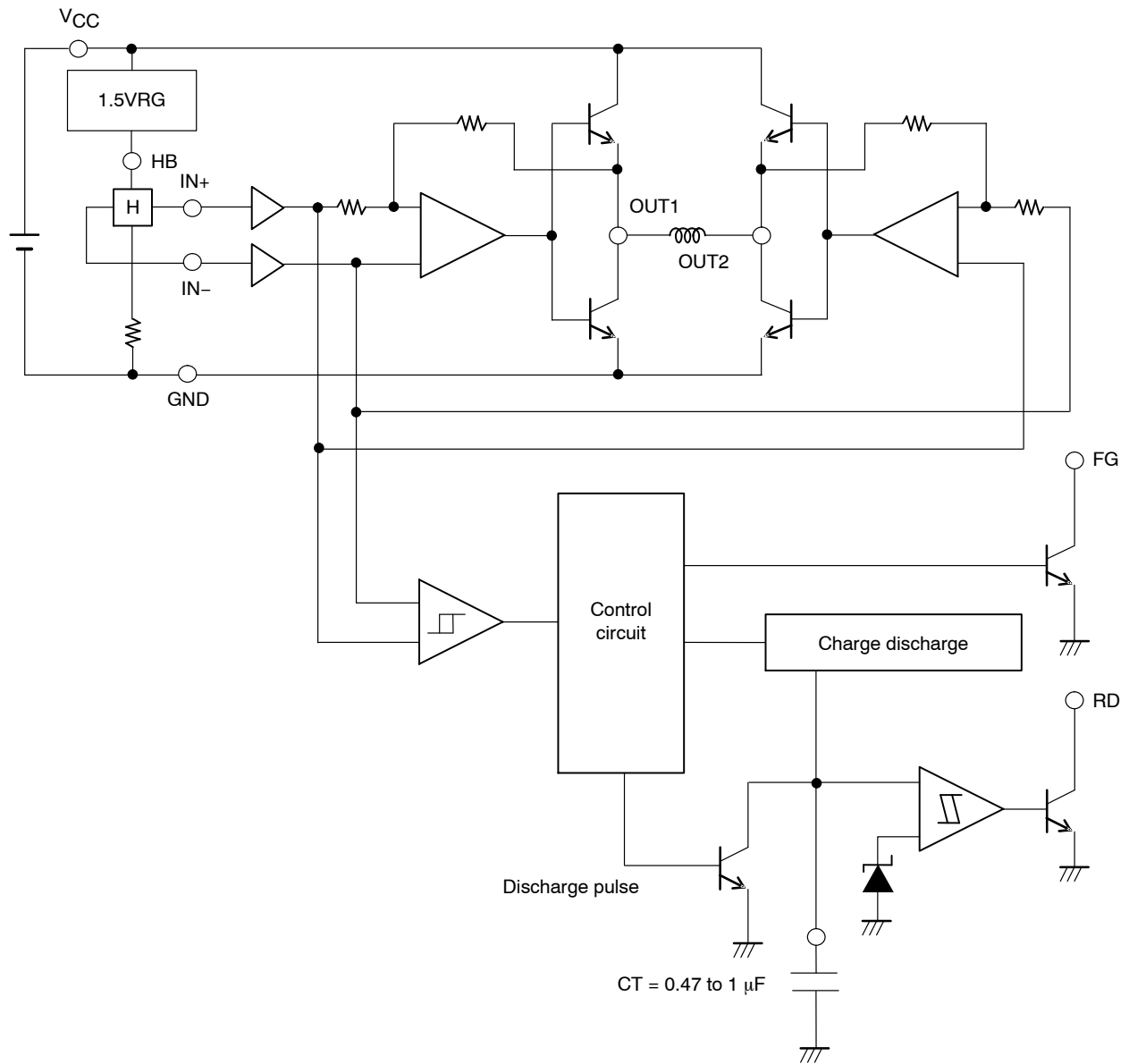


Figure 2. Block Diagram

## APPLICATION CIRCUIT

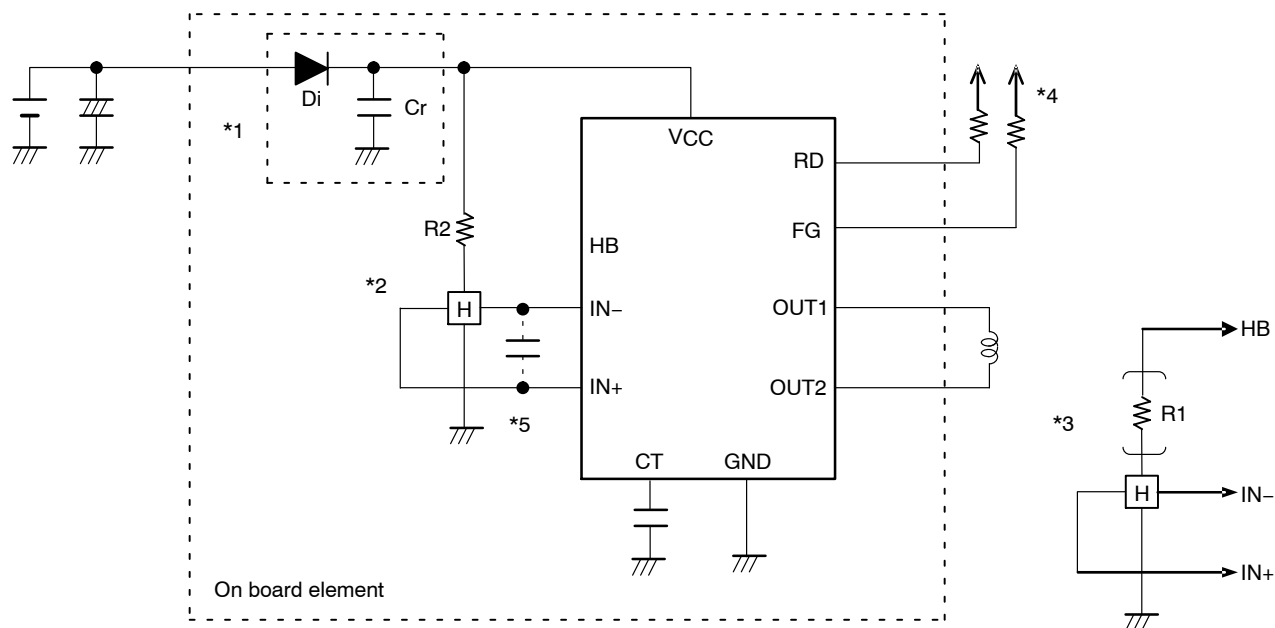


Figure 3. Sample Application Circuit

\*1: When the breakdown protective DI at reverse connection is to be used, it is necessary to insert the capacitor Cr to secure the regenerative current route. Similarly, Cr must be provided to enhance the reliability when there is no capacitor near the fan power line.

\*2: To obtain Hall bias from  $V_{CC}$ , carry out bias to  $V_{CC}$  with resistor R2 as shown in the figure. Linear driving is made through voltage control of the coil by amplifying the Hall output. When the Hall element output is large, the startup performance and efficiency are improved. Adjustment of the Hall element can reduce the noise further.

\*3: To obtain Hall bias from the HB pin, carry out constant-voltage bias at about 1.5 V, which enables the Hall element to generate the stable Hall output satisfactory in temperature characteristics. Adjustment of the Hall output amplitude is made with R1. (When  $V_{CC} = 12$  V, the step \*2 above proves advantageous for IC heat generation.)

\*4: Keep this open when not using.

\*5: When the wiring from the Hall output to IC Hall input is long, noise may be carried through the wiring. In this case, insert the capacitor as shown in the figure.

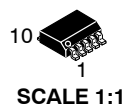
## ORDERING INFORMATION

Device	Package	Wire Bond	Shipping <sup>†</sup> (Qty / Packing)
LA6585MC-AH	SOIC-10 NB (Pb-Free / Halogen Free)	Au wire	2,000 / Tape & Reel
LA6585MC-AH-M	SOIC-10 NB (Pb-Free / Halogen Free)	Au wire	2,000 / Tape & Reel

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

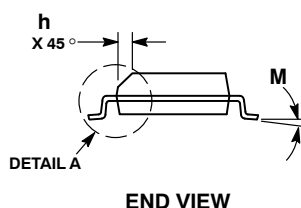
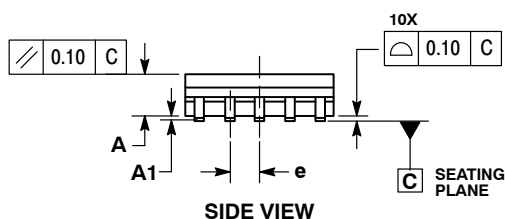
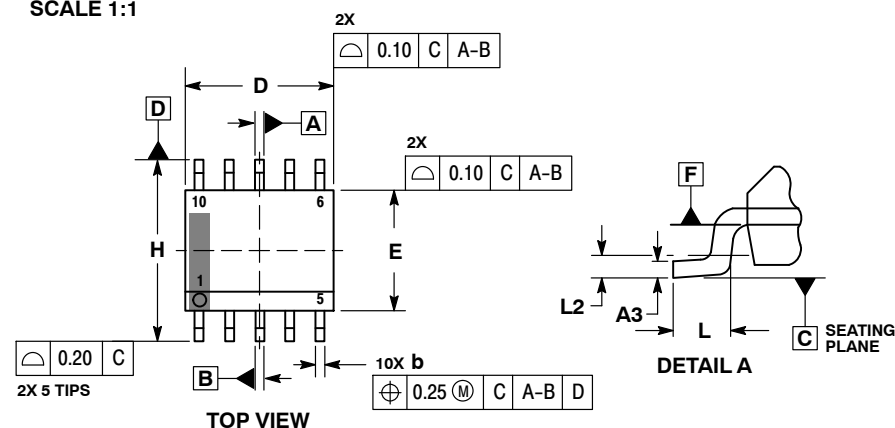
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

ON Semiconductor®

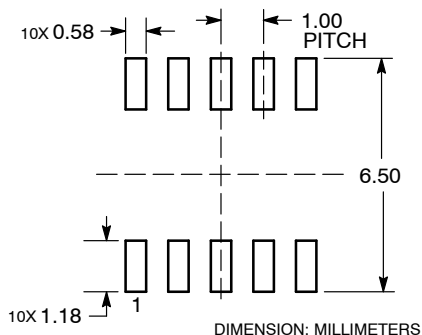


## SOIC-10 NB CASE 751BQ ISSUE B

DATE 26 NOV 2013



### RECOMMENDED SOLDERING FOOTPRINT\*



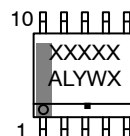
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.10mm TOTAL IN EXCESS OF 'b' AT MAXIMUM MATERIAL CONDITION.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15mm PER SIDE. DIMENSIONS D AND E ARE DETERMINED AT DATUM F.
5. DIMENSIONS A AND B ARE TO BE DETERMINED AT DATUM F.
6. A1 IS DEFINED AS THE VERTICAL DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.

MILLIMETERS		
DIM	MIN	MAX
A	1.25	1.75
A1	0.10	0.25
A3	0.17	0.25
b	0.31	0.51
D	4.80	5.00
E	3.80	4.00
e	1.00 BSC	
H	5.80	6.20
h	0.37 REF	
L	0.40	0.80
L2	0.25 BSC	
M	0°	8°

### GENERIC MARKING DIAGRAM\*




XXXXXX = Specific Device Code  
A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week  
■ = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G", may or not be present.

DOCUMENT NUMBER:	98AON52341E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
STATUS:	ON SEMICONDUCTOR STANDARD	
NEW STANDARD:		
DESCRIPTION:	SOIC-10 NB	PAGE 1 OF 2

[illegible]

**ON Semiconductor** and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)

**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative





**Стандарт  
Электрон  
Связь**

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

**Наши контакты:**

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331