

NTGS5120P, NVGS5120P

Power MOSFET

–60 V, –2.9 A, Single P–Channel, TSOP–6

Features

- 60 V BV_{DS}, Low R_{DS(on)} in TSOP–6 Package
- 4.5 V Gate Rating
- NV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC–Q101 Qualified and PPAP Capable
- This is a Pb–Free Device

Applications

- High Side Load Switch
- Power Switch for Printers, Communication Equipment

MAXIMUM RATINGS (T_J = 25°C unless otherwise stated)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V _{DSS}	−60	V
Gate-to-Source Voltage			V _{GS}	± 20	V
Continuous Drain Current (Note 1)	Steady State	T _A = 25°C	I _D	−2.5	A
		T _A = 85°C		−2.0	
	t ≤ 5 s	T _A = 25°C		−2.9	
Power Dissipation (Note 1)	Steady State	T _A = 25°C	P _D	1.1	W
	t ≤ 5 s			1.4	
Continuous Drain Current (Note 2)	Steady State	T _A = 25°C	I _D	−1.8	A
		T _A = 85°C		−1.3	
Power Dissipation (Note 2)	Steady State	T _A = 25°C	P _D	0.6	W
Pulsed Drain Current	t _p = 10 μs		I _{DM}	−20	A
Operating Junction and Storage Temperature			T _J , T _{STG}	−55 to 150	°C
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T _L	260	°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. Surface–mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces)
2. Surface–mounted on FR4 board using the minimum recommended pad size.

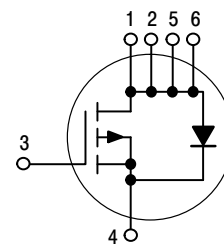


ON Semiconductor®

<http://onsemi.com>

V _{(BR)DSS}	R _{DS(ON)} MAX	I _D MAX
–60 V	111 mΩ @ –10 V	–2.9 A
	142 mΩ @ –4.5 V	

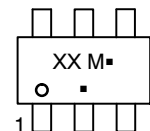
P–Channel



MARKING DIAGRAM

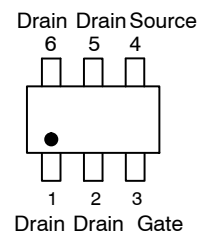


TSOP–6
CASE 318G
STYLE 1



XX = Device Code
M = Date Code
▪ = Pb–Free Package
(Note: Microdot may be in either location)

PIN ASSIGNMENT



ORDERING INFORMATION

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

NTGS5120P, NVGS5120P

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	102	°C/W
Junction-to-Ambient – $t = 5$ s (Note 3)	$R_{\theta JA}$	77.6	
Junction-to-Ambient – Steady State (Note 4)	$R_{\theta JA}$	200	

3. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces)
4. Surface-mounted on FR4 board using the minimum recommended pad size.

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
-----------	--------	----------------	-----	-----	-----	------

OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0$ V, $I_D = -250$ μ A	-60			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0$ V, $V_{DS} = -48$ V			-1.0	μ A
		$T_J = 125^\circ\text{C}$			-5.0	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 12$ V			± 100	nA
		$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V			± 200	

ON CHARACTERISTICS (Note 5)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}$, $I_D = -250$ μ A	-1.0		-3.0	V
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = -10$ V, $I_D = -2.9$ A		72	111	m Ω
		$V_{GS} = -4.5$ V, $I_D = -2.5$ A		88	142	
Forward Transconductance	g_{FS}	$V_{DS} = -5.0$ V, $I_D = -6.0$ A		10.1		S

CHARGES, CAPACITANCES AND GATE RESISTANCE

Input Capacitance	C_{ISS}	$V_{GS} = 0$ V, $f = 1$ MHz, $V_{DS} = -30$ V		942		pF
Output Capacitance	C_{OSS}			72		
Reverse Transfer Capacitance	C_{RSS}			48		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -10$ V, $V_{DS} = -30$ V; $I_D = -2.9$ A		18.1		nC
Threshold Gate Charge	$Q_{G(TH)}$			1.2		
Gate-to-Source Charge	Q_{GS}			2.7		
Gate-to-Drain Charge	Q_{GD}			3.6		

SWITCHING CHARACTERISTICS (Note 6)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = -10$ V, $V_{DS} = -30$ V, $I_D = -1.0$ A, $R_G = 6.0$ Ω		8.7		ns
Rise Time	t_r			4.9		
Turn-Off Delay Time	$t_{d(OFF)}$			38		
Fall Time	t_f			12.8		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0$ V, $I_S = -0.9$ A	$T_J = 25^\circ\text{C}$		-0.75	-1.0	V
Reverse Recovery Time	t_{RR}	$V_{GS} = 0$ V, $dI_S/dt = 100$ A/ μ s, $I_S = -0.9$ A		18.3			ns
Charge Time	t_a			15.5			ns
Reverse Recovery Charge	Q_{RR}			15.1			nC

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.

5. Pulse Test: pulse width ≤ 300 μ s, duty cycle $\leq 2\%$
6. Switching characteristics are independent of operating junction temperatures

NTGS5120P, NVGS5120P

TYPICAL CHARACTERISTICS

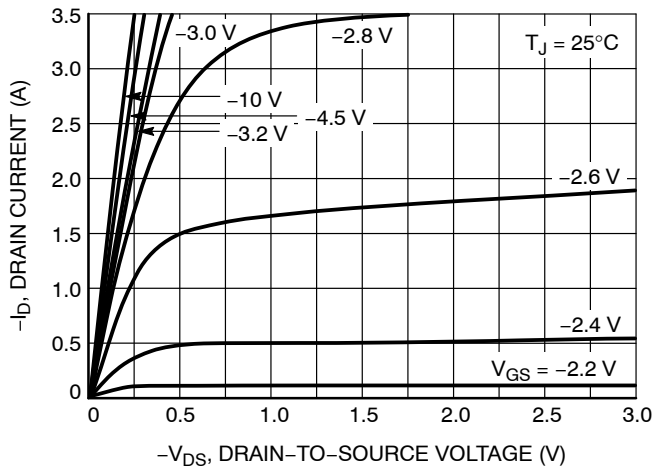


Figure 1. On-Region Characteristics

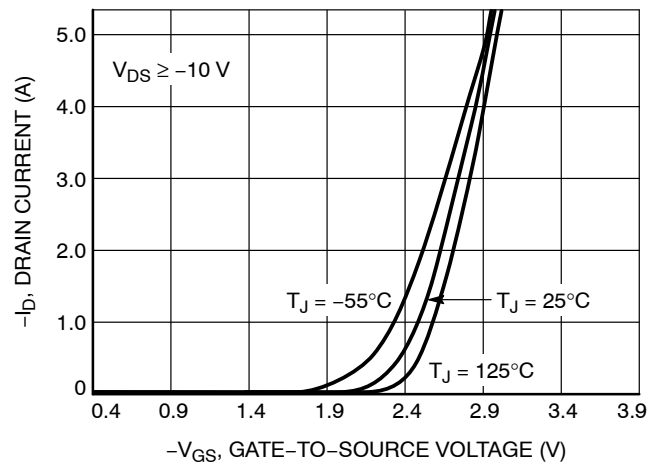


Figure 2. Transfer Characteristics

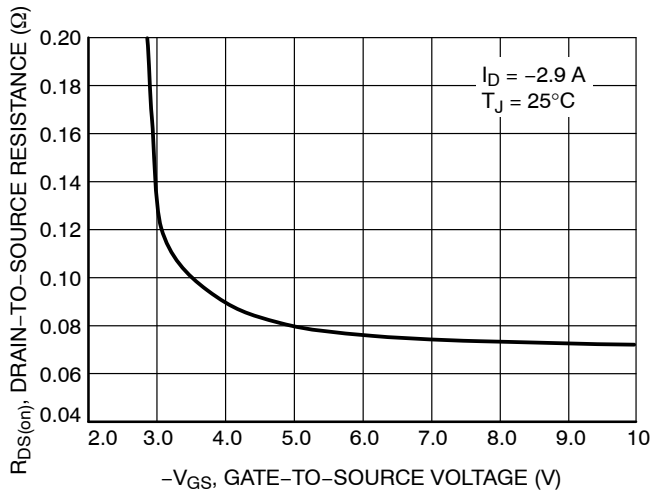


Figure 3. On-Resistance vs. Gate Voltage

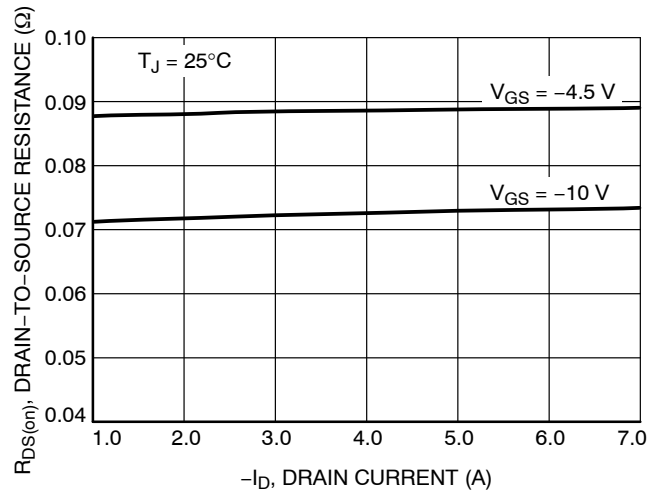


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

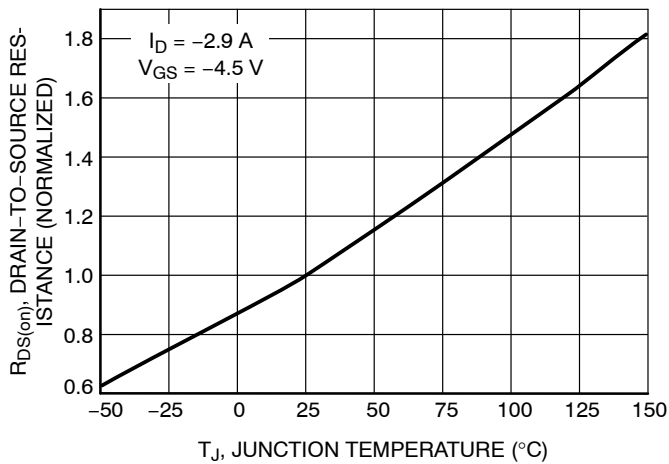


Figure 5. On-Resistance Variation with Temperature

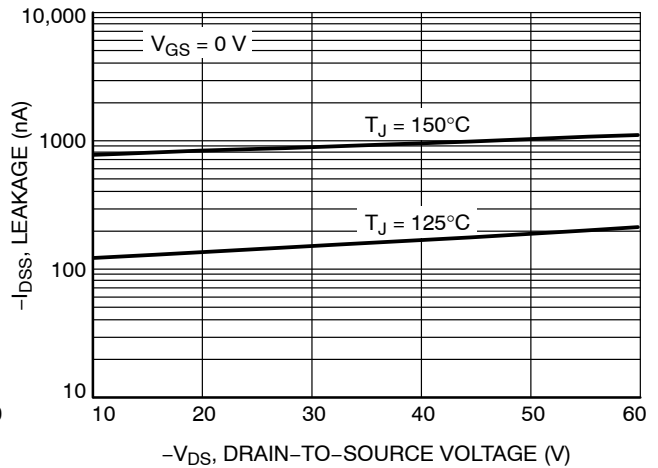


Figure 6. Drain-to-Source Leakage Current vs. Voltage

NTGS5120P, NVGS5120P

TYPICAL CHARACTERISTICS

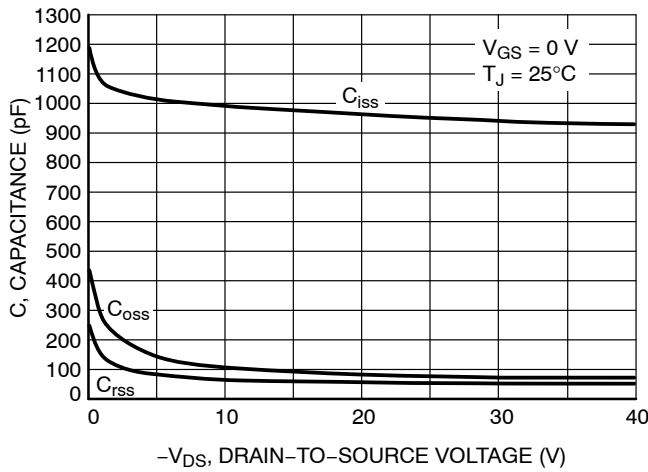


Figure 7. Capacitance Variation

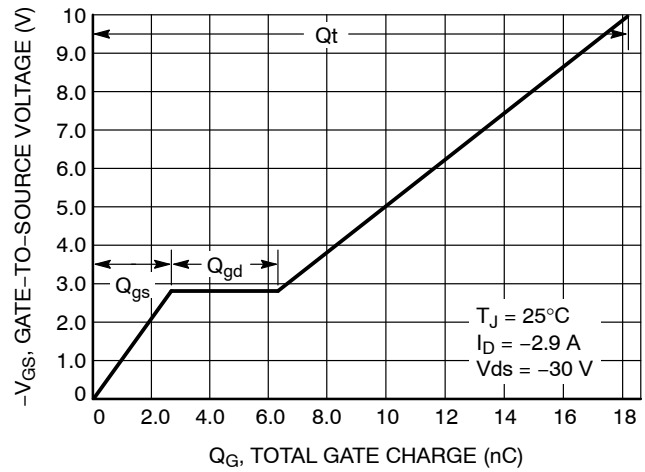


Figure 8. Gate-to-Source Voltage vs. Total Charge

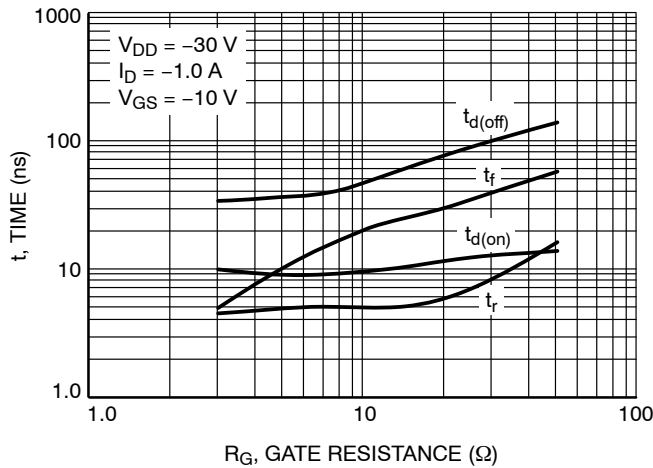


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

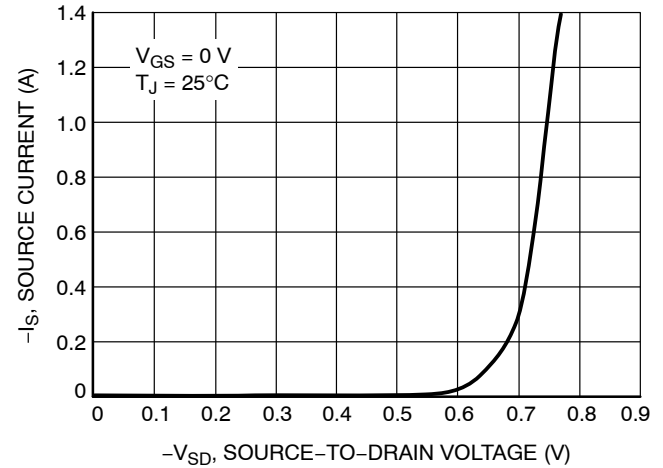


Figure 10. Diode Forward Voltage vs. Current

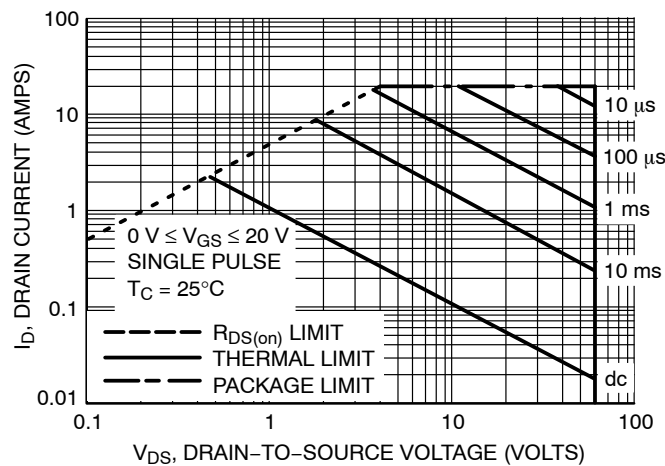


Figure 11. Maximum Rated Forward Biased Safe Operating Area

NTGS5120P, NVGS5120P

TYPICAL CHARACTERISTICS

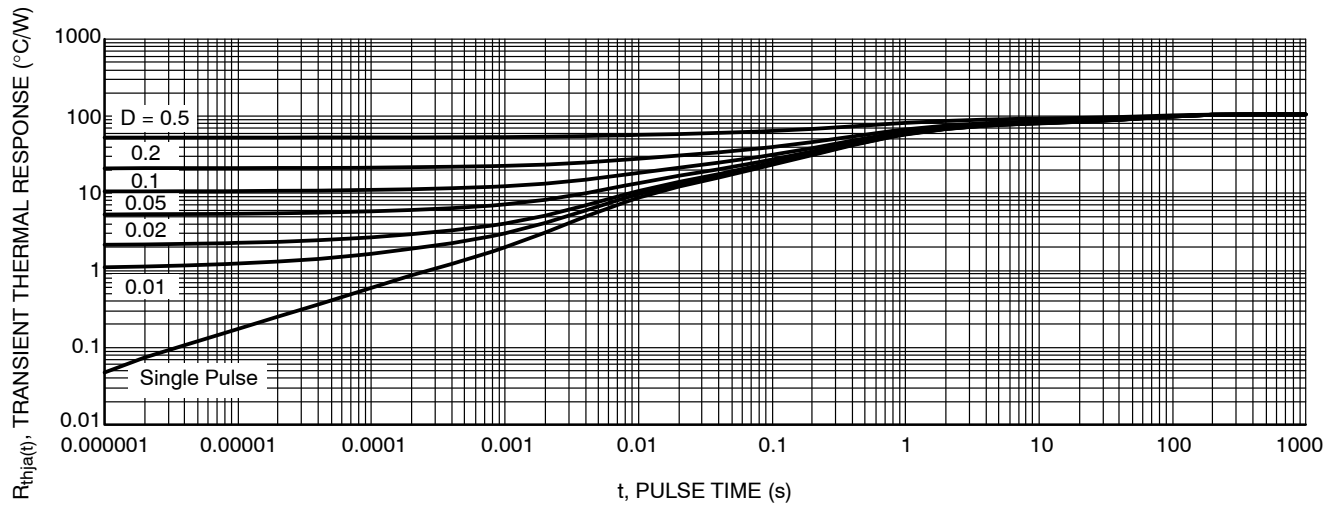


Figure 12. Thermal Response

Table 1. ORDERING INFORMATION

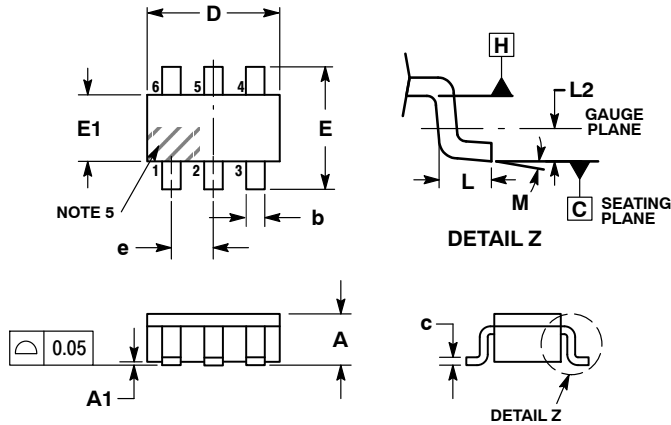
Part Number	Marking (XX)	Package	Shipping [†]
NTGS5120PT1G	P6	TSOP-6 (Pb-Free)	3000 / Tape & Reel
NVGS5120PT1G	VP6	TSOP-6 (Pb-Free)	3000 / Tape & Reel

[†]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.

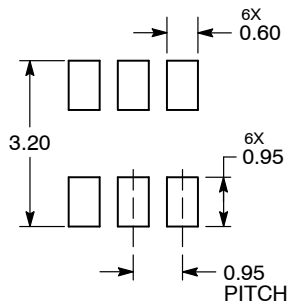
NTGS5120P, NVGS5120P

PACKAGE DIMENSIONS

TSOP-6 CASE 318G-02 ISSUE V



RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE. DIMENSIONS D AND E1 ARE DETERMINED AT DATUM H.
5. PIN ONE INDICATOR MUST BE LOCATED IN THE INDICATED ZONE.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.01	0.06	0.10
b	0.25	0.38	0.50
c	0.10	0.18	0.26
D	2.90	3.00	3.10
E	2.50	2.75	3.00
E1	1.30	1.50	1.70
e	0.85	0.95	1.05
L	0.20	0.40	0.60
L2	0.25 BSC		
M	0°	-	10°

STYLE 1:

1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

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

ON Semiconductor and the  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC) or its subsidiaries in the United States and/or other countries. SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marketing.pdf. 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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 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

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com

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

For additional information, please contact your local Sales Representative

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А