

NVMFS5A140PLZ

Power MOSFET, Single P-Channel

–40 V, –140 A, 4.2 mΩ

Features

- Small Footprint (5 x 6 mm) for Compact Design
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- NVMFS5A140PLZWF: Wettable Flank Option for Enhanced Optical Inspection
- AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

SPECIFICATION MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted) (Notes 1, 2, 3)

Symbol	Parameter			Value	Unit
V _{DSS}	Drain to Source Voltage			−40	V
V _{GS}	Gate to Source Voltage			±20	V
I _D	Continuous Drain, Current R _{θJC} , (Notes 1, 3)	Steady State	T _C = 25°C	−140	A
P _D	Power Dissipation R _{θJC} (Note 1)		T _C = 25°C	200	W
I _D	Continuous Drain: Current R _{θJA} (Notes 1, 2, 3)	Steady State	T _A = 25°C	−20	A
P _D	Power Dissipation R _{θJA} (Note 1, 2)		T _A = 25°C	3.8	W
I _{DP}	Pulsed Drain Current	PW ≤ 10 μs, duty cycle ≤ 1%		−560	A
T _J , T _{STG}	Operating Junction and Storage Temperature			−55 to +175	°C
I _S	Source Current (Body Diode)			−140	A
E _{AS}	Single Pulse Drain to Source Avalanche Energy (L= 1.0 mH, I _{L(pk)} = −29 A)			420	mJ
T _L	Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			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.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Junction to Case Steady State	0.75	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction to Ambient Steady State (Note 2)	39	

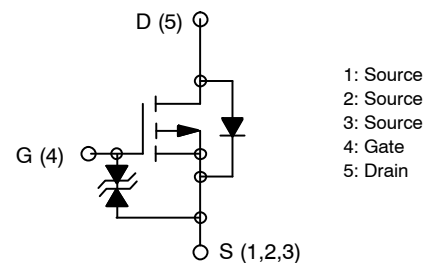
1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. Surface mounted on FR4 board using a 650 mm², 2 oz. Cu pad.
3. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.



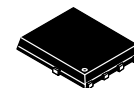
ON Semiconductor®

www.onsemi.com

V_{DS}	$R_{DS(on)}$ MAX	I_D MAX
–40 V	4.2 mΩ @ –10 V	–140 A
	7.2 mΩ @ –4.5 V	

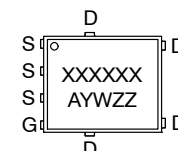


P-CHANNEL MOSFET



DFN5
(SO-8FL)

MARKING DIAGRAM



XXXXXX = Specific Device Code
5A140L(NVMFS5A140PLZ)
140LWF(NVMFS5A140PLZWF)
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

ORDERING INFORMATION

See detailed ordering and shipping information on page 7 of this data sheet.

NVMFS5A140PLZ

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

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

OFF CHARACTERISTICS

$V_{(BR)DSS}$	Drain to Source Breakdown Voltage	$I_D = -1\text{ mA}$, $V_{GS} = 0\text{ V}$	-40			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -40\text{ V}$, $V_{GS} = 0\text{ V}$	$T_J = 25^\circ\text{C}$		-1.0	μA
			$T_J = 100^\circ\text{C}$ (Note 4)		-100	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 16\text{ V}$, $V_{DS} = 0\text{ V}$			± 10	μA

ON CHARACTERISTICS (Note 5)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = -10\text{ V}$, $I_D = -1\text{ mA}$	-1.2		-2.6	V
$R_{DS(on)}$	Drain to Source On Resistance	$V_{GS} = -10\text{ V}$	$I_D = -50\text{ A}$	3.2	4.2	$\text{m}\Omega$
		$V_{GS} = -4.5\text{ V}$	$I_D = -50\text{ A}$	5.0	7.2	
g_{FS}	Forward Transconductance	$V_{DS} = -10\text{ V}$, $I_D = -50\text{ A}$		125		S

CHARGES, CAPACITANCES & GATE RESISTANCE

C_{iss}	Input Capacitance	$V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$ $V_{DS} = -20\text{ V}$,			7400	pF
C_{oss}	Output Capacitance				1030	
C_{rss}	Reverse Transfer Capacitance				720	
$Q_{g(tot)}$	Total Gate Charge	$V_{GS} = -10\text{ V}$, $I_D = -50\text{ A}$ $V_{DS} = -20\text{ V}$,			136	nC
Q_{gs}	Gate to Source Charge				26	
Q_{gd}	Gate to Drain Charge				31	

SWITCHING CHARACTERISTICS (Note 6)

$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = -20\text{ V}$, $I_D = -50\text{ A}$, $V_{GS} = -10\text{ V}$, $R_G = 50\text{ }\Omega$			50	ns
t_r	Rise Time				860	
$t_{d(off)}$	Turn-Off Delay Time				540	
t_f	Fall Time				740	

DRAIN-SOURCE DIODE CHARACTERISTICS

V_{SD}	Forward Diode Voltage	$V_{GS} = 0\text{ V}$, $I_S = -50\text{ A}$			-0.83	-1.5	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{ V}$, $I_S = -50\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$			108		ns
Q_{rr}	Reverse Recovery Charge				236		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.

4. The maximum value is specified by design at $T_J = 100^\circ\text{C}$. Product is not tested to this condition in production.

5. Pulse Test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

6. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

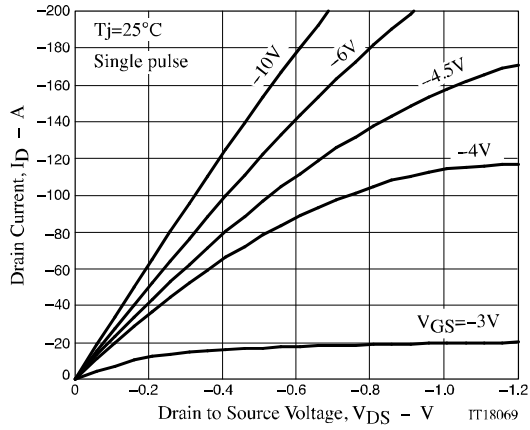


Figure 1. $I_D - V_{DS}$

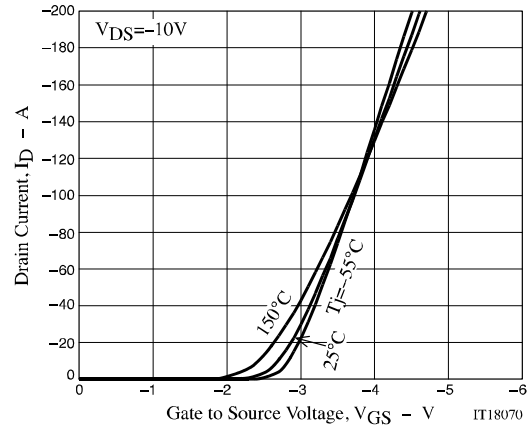


Figure 2. $I_D - V_{GS}$

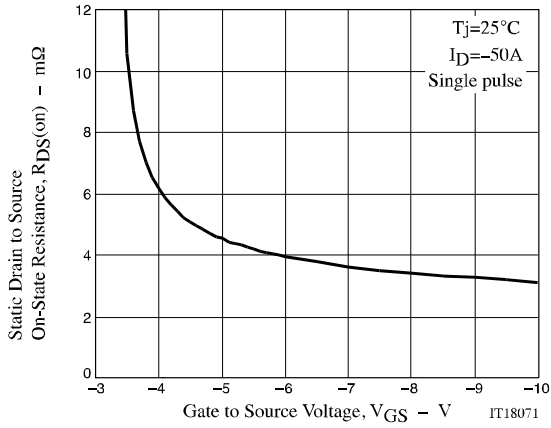


Figure 3. $R_{DS(on)} - V_{GS}$

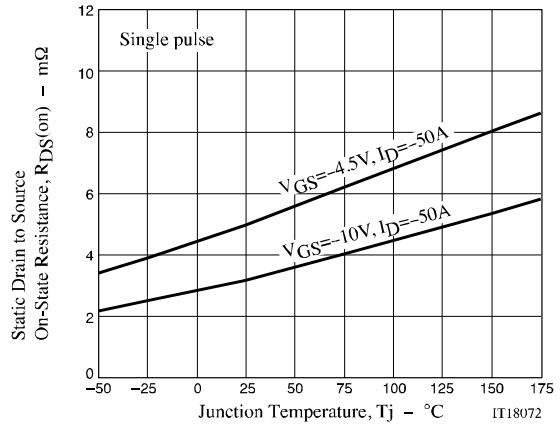


Figure 4. $R_{DS(on)} - T_j$

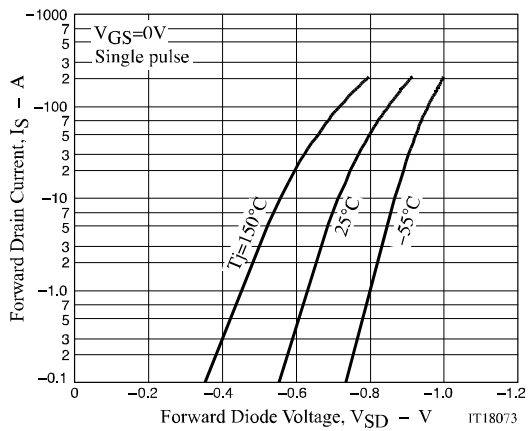


Figure 5. $I_S - V_{SD}$

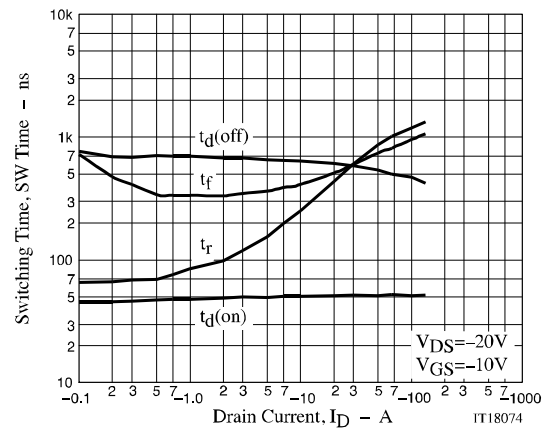


Figure 6. SW Time - I_D

NVMFS5A140PLZ

TYPICAL CHARACTERISTICS

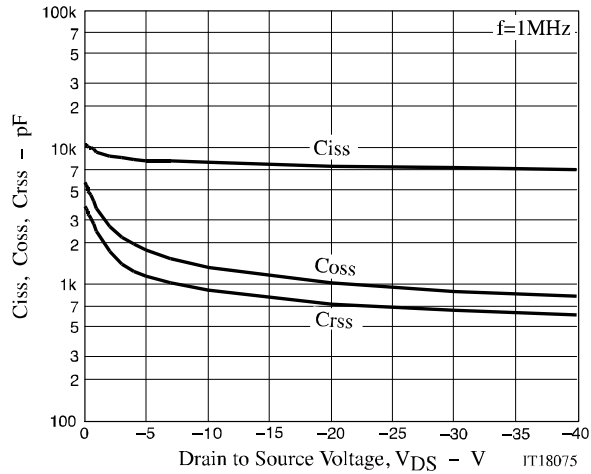


Figure 7. C_{iss} , C_{oss} , C_{rss} - V_{DS}

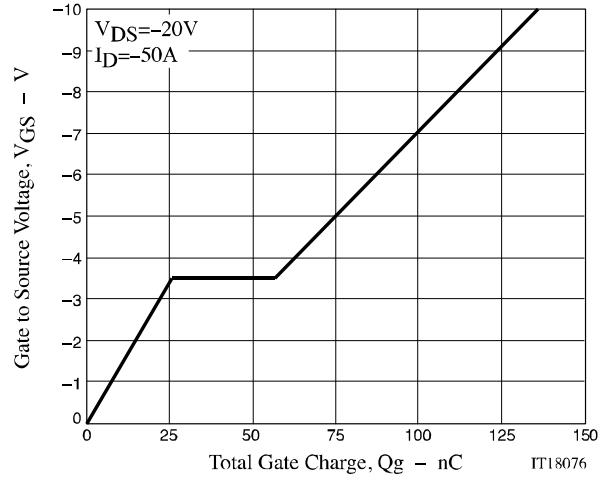


Figure 8. V_{GS} - Q_g

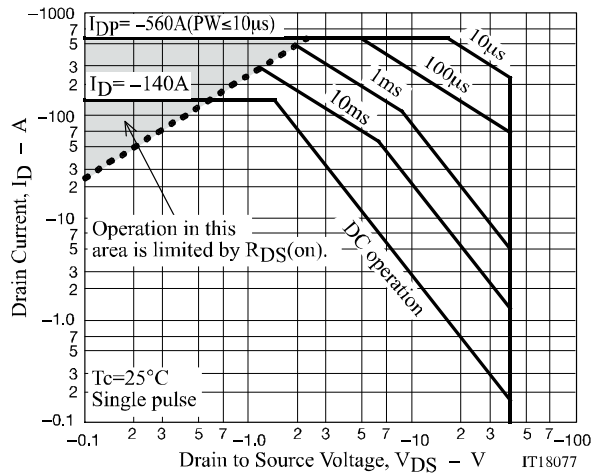


Figure 9. SOA

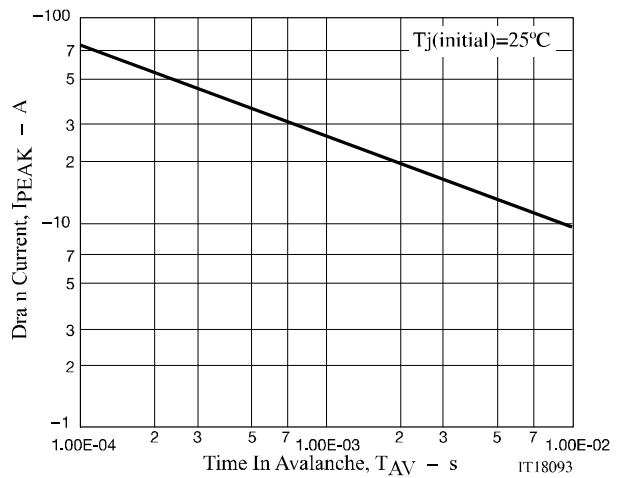


Figure 10. I_{PEAK} - T_{AV}

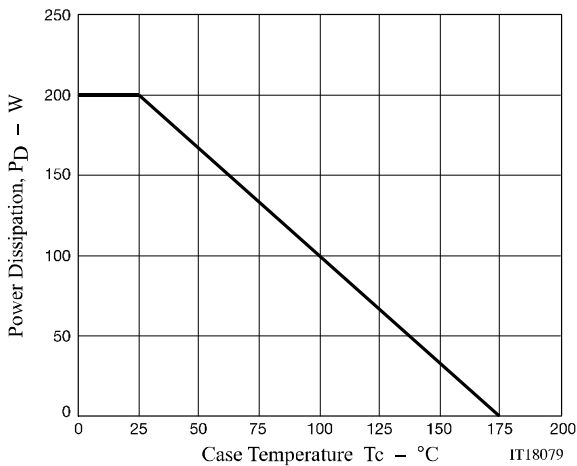


Figure 11. P_D - T_C

NVMFS5A140PLZ

TYPICAL CHARACTERISTICS

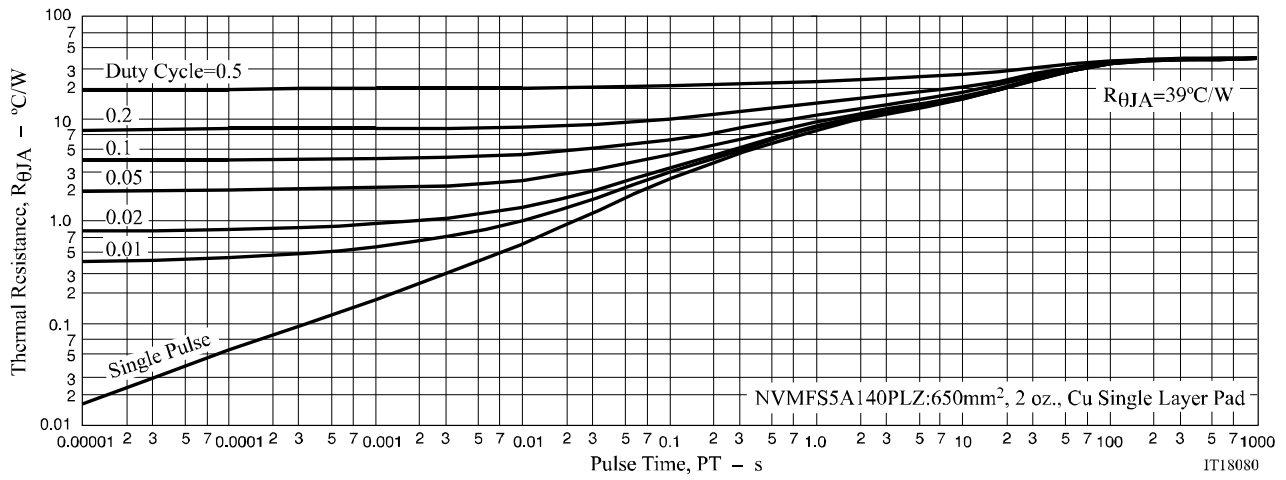
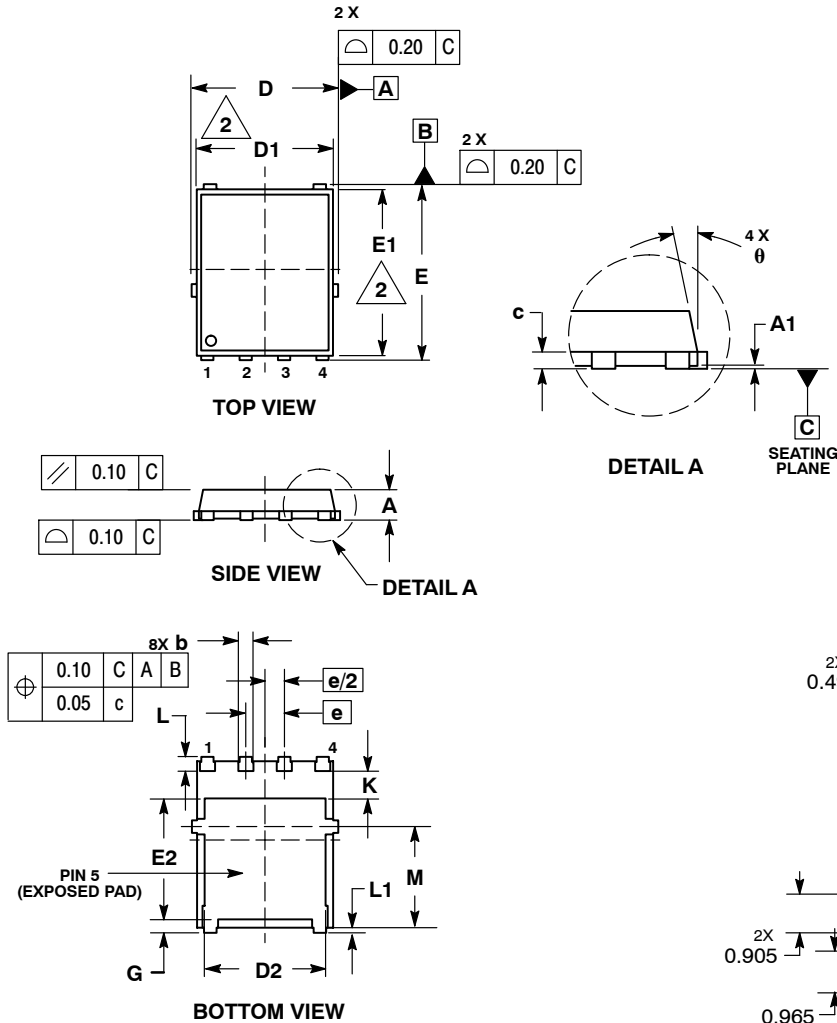


Figure 12. $R_{\theta JA}$ - Pulse Time

NVMFS5A140PLZ

DFN5 5x6, 1.27P
(SO-8FL)
CASE 488AA
ISSUE M

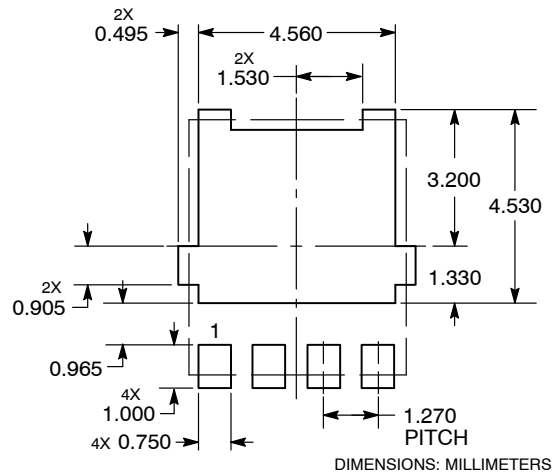


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	---	0.05
b	0.33	0.41	0.51
c	0.23	0.28	0.33
D	5.00	5.15	5.30
D1	4.70	4.90	5.10
D2	3.80	4.00	4.20
E	6.00	6.15	6.30
E1	5.70	5.90	6.10
E2	3.45	3.65	3.85
e	1.27 BSC		
G	0.51	0.575	0.71
K	1.20	1.35	1.50
L	0.51	0.575	0.71
L1	0.125 REF		
M	3.00	3.40	3.80
θ	0 °	---	12 °

RECOMMENDED SOLDERING FOOTPRINT*



NVMFS5A140PLZ

ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing) [†]
NVMFS5A140PLZT1G	5A140L	DFN5 5x6, 1.27P (SO-8FL) (Pb-Free)	1.500 / Tape & Reel
NVMFS5A140PLZWFT1G	140LWF	DFN5 5x6, 1.27P (SO-8FL) (Pb-Free / Wettable Flanks)	1.500 / Tape & Reel
NVMFS5A140PLZT3G	5A140L	DFN5 5x6, 1.27P (SO-8FL) (Pb-Free)	5.000 / Tape & Reel
NVMFS5A140PLZWFT3G	140LWF	DFN5 5x6, 1.27P (SO-8FL) (Pb-Free / Wettable Flanks)	5.000 / 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.

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-Marketing.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

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

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

For additional information, please contact your local Sales Representative



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

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.