

Is Now Part of



# **ON Semiconductor**®

# To learn more about ON Semiconductor, please visit our website at <u>www.onsemi.com</u>

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (\_), the underscore (\_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (\_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at <a href="mailto:www.onsemi.com">www.onsemi.com</a>. Please email any questions regarding the system integration to <a href="mailto:Fairchild\_questions@onsemi.com">Fairchild\_questions@onsemi.com</a>.

ON Semiconductor and the ON Semiconductor logo 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. 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 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 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 unavteries, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out or i, 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 and is officers, employees, uniotificated use, even if such claim any manner.



# N-Channel PowerTrench<sup>®</sup> MOSFET 30 V, 18.8 A, 4.2 m $\Omega$

### Features

- Max  $r_{DS(on)}$  = 4.2 m $\Omega$  at V<sub>GS</sub> = 10 V, I<sub>D</sub> = 18.8 A
- Max  $r_{DS(on)}$  = 5.5 m $\Omega$  at V<sub>GS</sub> = 4.5 V, I<sub>D</sub> = 16.1 A
- High performance technology for extremely low r<sub>DS(on)</sub>
- Termination is Lead-free and RoHS Compliant

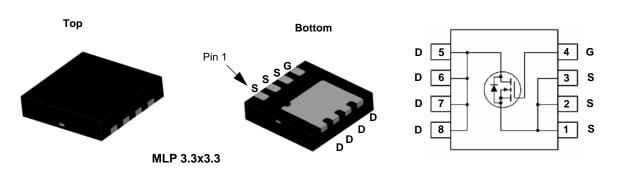


## **General Description**

This N-Channel MOSFET is produced using Fairchild Semiconductor's advanced Power Trench<sup>®</sup> process that has been especially tailored to minimize the on-state resistance. This device is well suited for Power Management and load switching applications common in Notebook Computers and Portable Battery Packs.

## Applications

- DC DC Buck Converters
- Notebook battery power management
- Load switch in Notebook



## MOSFET Maximum Ratings T<sub>A</sub> = 25 °C unless otherwise noted

Symbol	Parameter			Ratings	Units	
V <sub>DS</sub>	Drain to Source Voltage			30	V	
V <sub>GS</sub>	Gate to Source Voltage			±20	V	
ID	Drain Current -Continuous	T <sub>C</sub> = 25 °C		24		
	-Continuous	T <sub>A</sub> = 25 °C	(Note 1a)	18.8	Α	
	-Pulsed			60		
E <sub>AS</sub>	Single Pulse Avalanche Energy		(Note 3)	188	mJ	
P <sub>D</sub>	Power Dissipation	T <sub>C</sub> = 25 °C		45	w	
	Power Dissipation	T <sub>A</sub> = 25 °C	(Note 1a)	2.3	VV	
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Junction Temperature Range			-55 to +150	°C	

#### Thermal Characteristics

$R_{ ext{ heta}JC}$	Thermal Resistance, Junction to Case	2.8	°C/W
$R_{ extsf{ heta}JA}$	Thermal Resistance, Junction to Ambient (Note 1	a) 53	C/VV

### Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDMC7664	FDMC7664	MLP 3.3x3.3	13 "	12 mm	3000 units

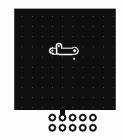
June 2014

FDMC7664
N-Channel
PowerTrench <sup>®</sup>
MOSFET

Symbol	Parameter	Test Conditions	Min	Тур	Max	Units
Off Chara	cteristics					
BV <sub>DSS</sub>	Drain to Source Breakdown Voltage	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0 V	30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250 \ \mu\text{A}$ , referenced to 25 °C		12		mV/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	$V_{DS} = 24 V, V_{GS} = 0 V$			1	μA
		T <sub>J</sub> = 125 °C			250	μΛ
I <sub>GSS</sub>	Gate to Source Leakage Current, Forward	$V_{GS} = 20 \text{ V}, \text{ V}_{DS} = 0 \text{ V}$			100	nA
On Chara	cteristics					
V <sub>GS(th)</sub>	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250 \ \mu A$	1.0	1.9	3.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250 \ \mu$ A, referenced to 25 °C		-7		mV/°C
	Static Drain to Source On Resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 18.8 A		3.6	4.2	
r <sub>DS(on)</sub> Static D		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 16.1 A		4.5	5.5	mΩ
	State Drain to Source On Resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 18.8 A T <sub>J</sub> = 125 °C		4.4	5.4	- 11152
9 <sub>FS</sub>	Forward Transconductance	V <sub>DD</sub> = 5 V, I <sub>D</sub> = 18.8 A		115		S
C <sub>iss</sub> C <sub>oss</sub>	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V f = 1 MHz		3655 1100 115	4865 1465 170	pF pF pF
C <sub>oss</sub> C <sub>rss</sub>						
R <sub>g</sub>	Gate Resistance			0.8	2.2	Ω
Switching	g Characteristics					T
t <sub>d(on)</sub>	Turn-On Delay Time			15	27	ns
t <sub>r</sub>	Rise Time	V <sub>DD</sub> = 15 V, I <sub>D</sub> = 18.8 A		7	14	ns
t <sub>d(off)</sub>	Turn-Off Delay Time	$V_{GS}$ = 10 V, $R_{GEN}$ = 6 $\Omega$		37	59	ns
t <sub>f</sub>	Fall Time			6	12	ns
Q <sub>g(TOT)</sub>	Total Gate Charge	$V_{GS} = 0 V$ to 10 V		55	76	nC
Qg	Total Gate Charge	$V_{GS} = 0 \text{ V to } 4.5 \text{ V}$ $V_{DD} = 15 \text{ V}$		25	34	nC
Q <sub>gs</sub>	Gate to Source Charge	I <sub>D</sub> = 18.8 A		12		nC
Q <sub>gd</sub>	Gate to Drain "Miller" Charge			6		nC
Drain-Sou	urce Diode Characteristics					
\ <i>\</i>		V <sub>GS</sub> = 0 V, I <sub>S</sub> = 18.8 A (Note 2)		0.83	1.2	
V <sub>SD</sub>	Source to Drain Diode Forward Voltage	$V_{GS} = 0 V, I_S = 1.9 A$ (Note 2)		0.71	1.2	V
t <sub>rr</sub>	Reverse Recovery Time			41	65	ns
	Reverse Recovery Charge	I <sub>F</sub> = 18.8 A, di/dt = 100 A/μs		20	35	nC

NOTES:

1. R<sub>BJA</sub> is determined with the device mounted on a 1 in<sup>2</sup> pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR-4 material. R<sub>BJC</sub> is guaranteed by design while R<sub>BCA</sub> is determined by the user's board design.



a. 53 °C/W when mounted on a 1 in<sup>2</sup> pad of 2 oz copper

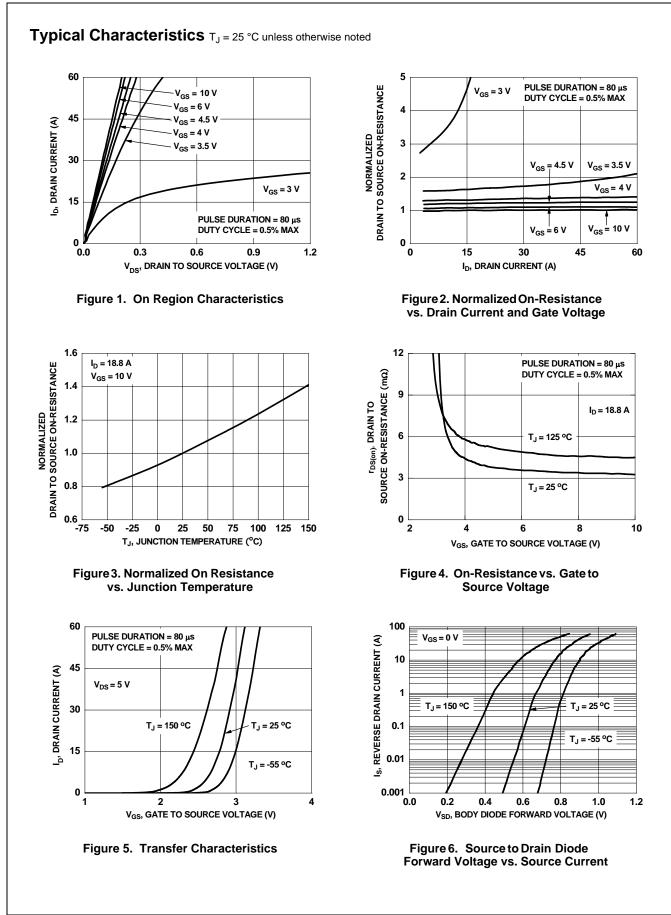
b.125 °C/W when mounted on a minimum pad of 2 oz copper



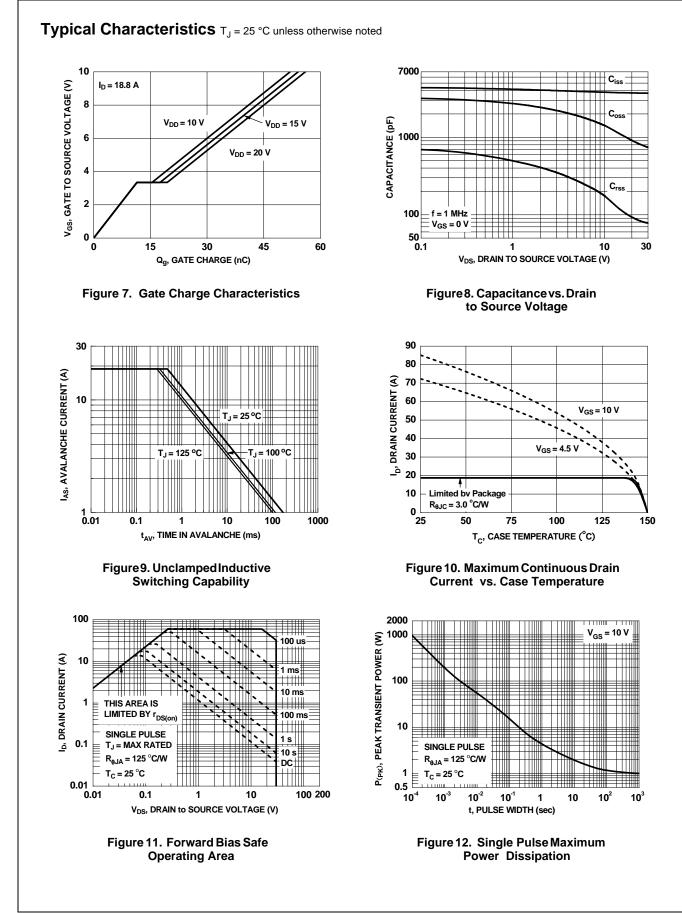
2. Pulse Test: Pulse Width < 300  $\mu s,$  Duty cycle < 2.0 %.

3.  $E_{AS}\,$  of 188 mJ is based on starting  $T_J$  = 25  $^oC,\,L$  = 1 mH,  $I_{AS}$  = 19.4 A,  $V_{DD}$  = 27 V,  $V_{GS}$  = 10 V.

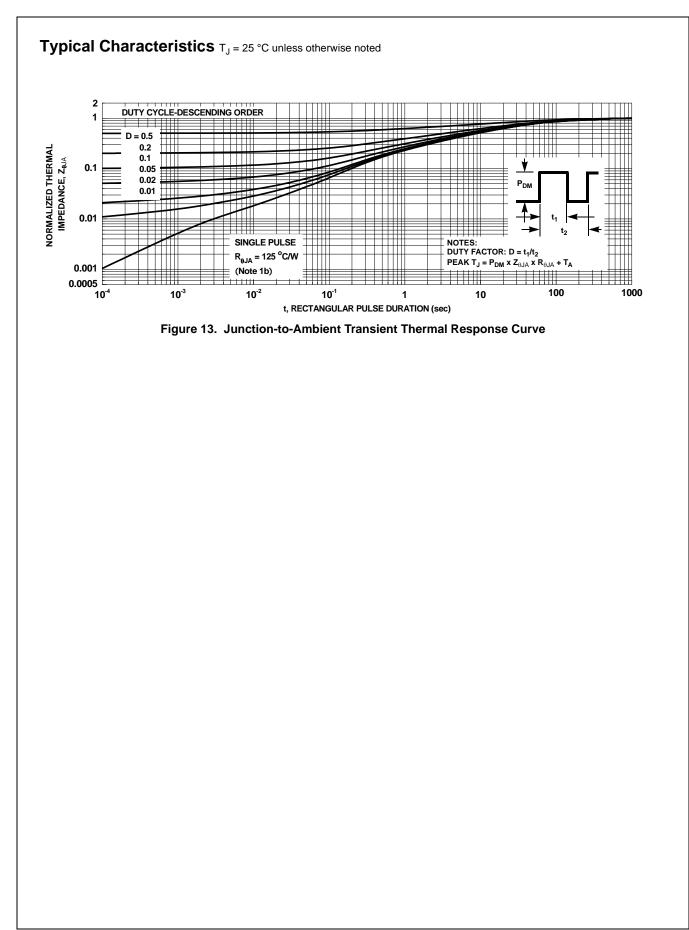
FDMC7664 N-Channel PowerTrench<sup>®</sup> MOSFET

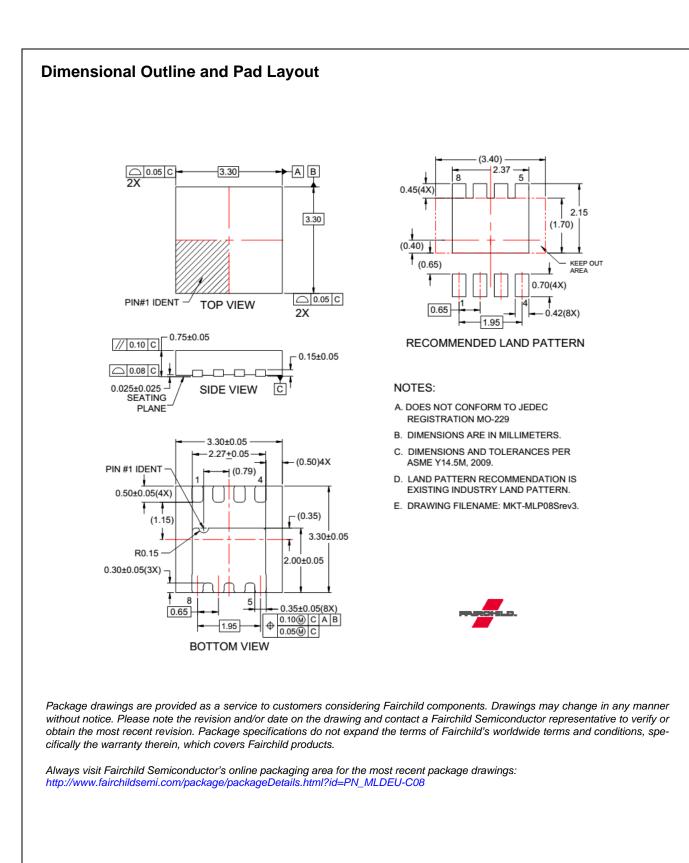






#### ©2009 Fairchild Semiconductor Corporation FDMC7664 Rev.C4









TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

intended to be an exhaus
AccuPower™
AX-CAP <sup>®</sup> *
BitSiC™
Build it Now™
CorePLUS™
CorePOWER™
CROSSVOLT™
CTL™
Current Transfer Logic™
DEUXPEED®
Dual Cool™
EcoSPARK <sup>®</sup>
EfficentMax™
ESBC™

# F®

Fairchild<sup>®</sup> Fairchild Semiconductor<sup>®</sup> FACT Quiet Series<sup>™</sup> FACT<sup>®</sup> FAST<sup>®</sup> FastvCore<sup>™</sup> FETBench<sup>™</sup> FPS<sup>™</sup> FRFET® Global Power Resource<sup>SM</sup> GreenBridge™ Green FPS™ Green FPS™ e-Series™ Gmax™ GTO™ IntelliMAX™ ISOPLANAR™ Marking Small Speakers Sound Louder and Better™ MegaBuck™ MICROCOUPLER™ MicroFET™ MicroPak™ MicroPak2™ MillerDrive™ MotionMax™ mWSaver® OptoHiT™ **OPTOLOGIC<sup>®</sup> OPTOPLANAR<sup>®</sup>** 

F-PESTM

PowerTrench® PowerXS™ Programmable Active Droop™ QFET QS™ Quiet Series™ RapidConfigure™ тм Saving our world, 1mW/W/kW at a time™ SignalWise™ SmartMax™ SMART START™ Solutions for Your Success™ SPM® STEALTH™ SuperFET<sup>®</sup> SuperSOT™-3 SuperSOT™-6 SuperSOT™-8 SupreMOS<sup>®</sup> SyncFET™ Svnc-Lock™

$$\label{eq:system} \begin{split} & \begin{split} & \begin{split} & \begin{split} & & \\ &$$

SerDes" UHC<sup>®</sup> Ultra FRFET™ UniFET™ VCX™ VisualMax™ VoltagePlus™ XS™ 仙童™

\*Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

#### DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

#### LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used here in:

- Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
- A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

#### ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.Fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufactures of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed application, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handing and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address and warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts buy form Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

#### PRODUCT STATUS DEFINITIONS Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.
		Rev. I6

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 <u>www.onsemi.com/site/pdf/Patent-Marking.pdf</u>. 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 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 has against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death ass

#### 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

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

© Semiconductor Components Industries, LLC

# **X-ON Electronics**

Largest Supplier of Electrical and Electronic Components

Click to view similar products for MOSFET category:

Click to view products by ON Semiconductor manufacturer:

Other Similar products are found below :

614233C 648584F IRFD120 JANTX2N5237 FCA20N60\_F109 FDZ595PZ 2SK2545(Q,T) 405094E 423220D TPCC8103,L1Q(CM MIC4420CM-TR VN1206L SBVS138LT1G 614234A 715780A NTNS3166NZT5G SSM6J414TU,LF(T 751625C BUK954R8-60E NTE6400 SQJ402EP-T1-GE3 2SK2614(TE16L1,Q) 2N7002KW-FAI DMN1017UCP3-7 EFC2J004NUZTDG ECH8691-TL-W FCAB21350L1 P85W28HP2F-7071 DMN1053UCP4-7 NTE221 NTE222 NTE2384 NTE2903 NTE2941 NTE2945 NTE2946 NTE2960 NTE2967 NTE2969 NTE2976 NTE455 NTE6400A NTE2910 NTE2916 NTE2956 NTE2911 DMN2080UCB4-7 TK10A80W,S4X(S SSM6P69NU,LF DMP22D4UF0-7B