

# ON Semiconductor

## Is Now

# onsemi™

To learn more about onsemi™, please visit our website at  
[www.onsemi.com](http://www.onsemi.com)

---

**onsemi** and **onsemi** and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi** product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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 **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** 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 **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner. Other names and brands may be claimed as the property of others.



ON Semiconductor®

# FDPC4044

## Common Drain N-Channel PowerTrench® MOSFET

30 V, 27 A, 4.3 mΩ

### Features

- Max  $r_{S1S2(on)}$  = 4.3 mΩ at  $V_{GS} = 10\text{ V}$ ,  $I_{S1S2} = 27\text{ A}$
- Max  $r_{S1S2(on)}$  = 6.4 mΩ at  $V_{GS} = 4.5\text{ V}$ ,  $I_{S1S2} = 23\text{ A}$
- Package size/height: 3.3 x 3.3 x 0.8 mm
- Low inductance packaging shortens rise/fall times, resulting in lower switching losses
- MOSFET integration enables optimum layout for lower circuit inductance and reduced switch node ringing
- RoHS Compliant

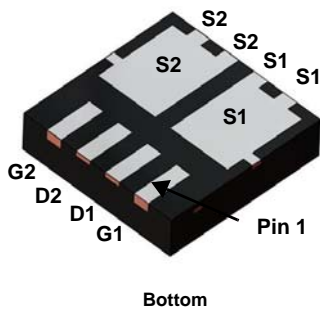


### General Description

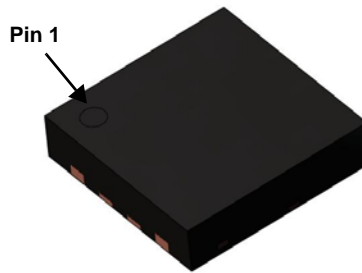
This device is designed specifically as a single package solution for Li-Ion battery pack protection circuit and other ultra-portable applications. It features two common drain N-channel MOSFETs, which enables bidirectional current flow. FDPC4044 combines ON Semiconductor's advanced PowerTrench® process with state of the art packaging process to minimize the on-state resistance.

### Applications

- Battery management
- Load switch
- Battery protection

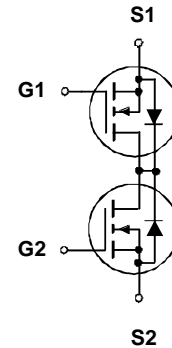


Bottom



Top

Power Clip 33



### MOSFET Maximum Ratings $T_A = 25\text{ °C}$ unless otherwise noted

Symbol	Parameter	Conditions	Rated Value	Units
$V_{S1S2}$	Source1 to Source2 Voltage		30	V
$V_{GS}$	Gate to Source Voltage	(Note 3)	±20	V
$I_{S1S2}$	Source1 to Source2 Current	-Continuous $T_A = 25\text{ °C}$	27	A
		-Pulsed	120	
$P_D$	Power Dissipation	$T_A = 25\text{ °C}$	2.7	W
		$T_A = 25\text{ °C}$	1	
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range		-55 to +150	°C

### Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	47	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1b)	127	

### Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
40CF	FDPC4044	Power Clip 33	13 "	12 mm	3000 units

## Electrical Characteristics $T_J = 25\text{ }^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
--------	-----------	-----------------	-----	-----	-----	-------

### Off Characteristics

$I_{S1S2}$	Zero Gate Voltage Source1 to Source2 Current	$V_{S1S2} = 24\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
$I_{GSS}$	Gate to Source Leakage Current	$V_{GS} = 20\text{ V}, V_{S1S2} = 0\text{ V}$			100	nA

### On Characteristics

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{S1S2}, I_{S1S2} = 250\text{ }\mu\text{A}$	1.2	1.5	3	V
$r_{S1S2(on)}$	Static Source1 to Source2 On Resistance	$V_{GS} = 10\text{ V}, I_{S1S2} = 27\text{ A}$		3.2	4.3	m $\Omega$
		$V_{GS} = 4.5\text{ V}, I_{S1S2} = 23\text{ A}$		4.6	6.4	
		$V_{GS} = 10\text{ V}, I_{S1S2} = 27\text{ A}, T_J = 125\text{ }^\circ\text{C}$		4.5	7	
$g_{FS}$	Forward Transconductance	$V_{S1S2} = 10\text{ V}, I_{S1S2} = 27\text{ A}$		150		S

### Dynamic Characteristics

$C_{iss}$	Input Capacitance	$V_{S1S2} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		2295	3215	pF
$C_{oss}$	Output Capacitance			627	880	pF
$C_{riss}$	Reverse Transfer Capacitance			66	95	pF

### Switching Characteristics

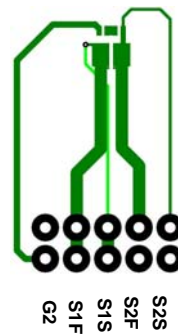
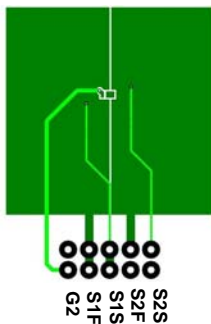
$t_{d(on)}$	Turn-On Delay Time	$V_{S1S2} = 15\text{ V}, I_{S1S2} = 27\text{ A}, V_{GS} = 10\text{ V}, R_{GEN} = 6\text{ }\Omega$		8.5	17	ns
$t_r$	Rise Time			4.8	10	ns
$t_{d(off)}$	Turn-Off Delay Time			32	52	ns
$t_f$	Fall Time			5.2	10	ns
$Q_g$	Total Gate Charge	$V_{S1S2} = 15\text{ V}, I_{S1S2} = 27\text{ A}, V_{G1S1} = 10\text{ V}, V_{G2S2} = 0\text{ V}$		35	49	nC
$Q_{gs}$	Gate to Source1 Gate Charge			5.7		nC
$Q_{gd}$	Gate to Source2 "Miller" Charge			4.7		nC

### Source1 to Source2 Diode Characteristics

$I_{fss}$	Maximum Continuous Source1 to Source2 Diode Forward Current			1	A
$V_{fss}$	Source1 to Source2 Diode Forward Voltage	$V_{G1S1} = 0\text{ V}, V_{G2S2} = 4.5\text{ V}, I_{fss} = 27\text{ A}$ (Note 2)	0.8	1.2	V

#### Notes:

- $R_{\theta JA}$  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.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.



- Pulse Test: Pulse Width < 300  $\mu\text{s}$ , Duty cycle < 2.0%.

- As an N-ch device, the negative  $V_{gs}$  rating is for low duty cycle pulse occurrence only. No continuous rating is implied.

**Typical Characteristics**  $T_J = 25\text{ }^\circ\text{C}$  unless otherwise noted

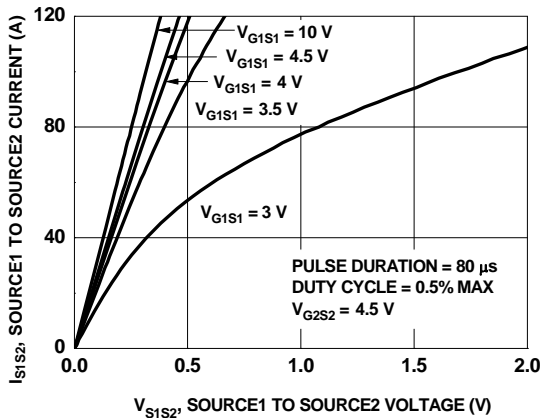


Figure 1. On-Region Characteristics

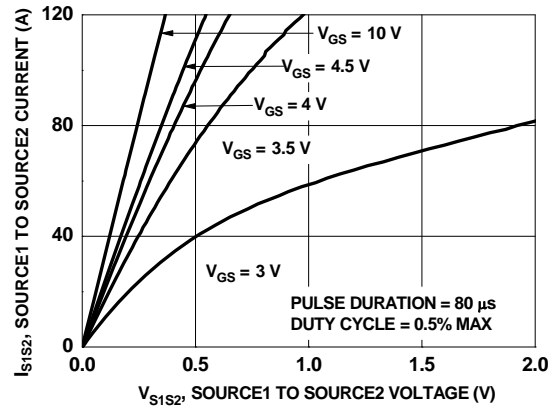


Figure 2. On-Region Characteristics

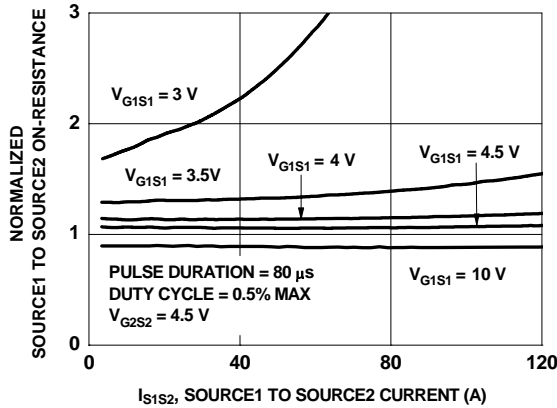


Figure 3. Normalized On-Resistance vs Source1 to Source2 Current and Gate Voltage

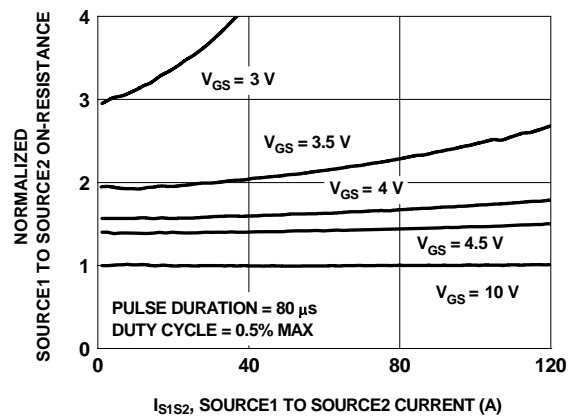


Figure 4. Normalized On-Resistance vs Source1 to Source2 Current and Gate Voltage

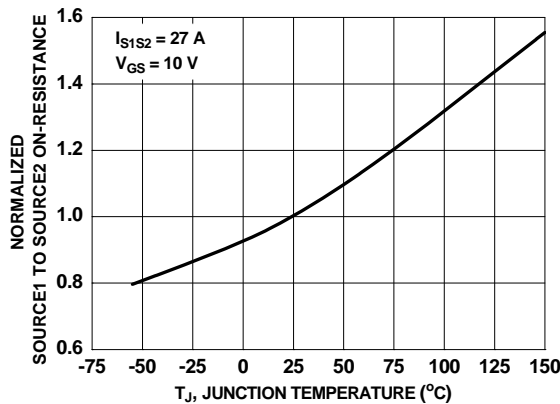


Figure 5. Normalized On-Resistance vs Junction Temperature

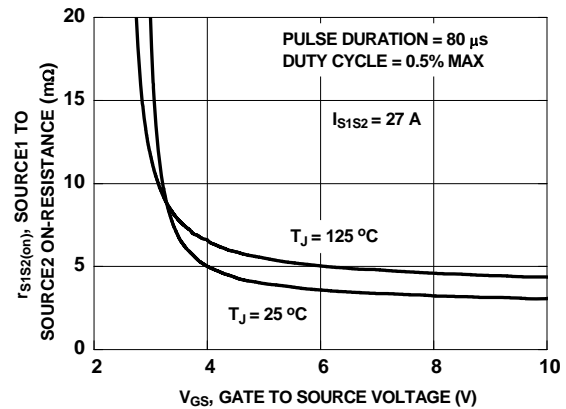


Figure 6. On-Resistance vs Gate to Source Voltage

**Typical Characteristics**  $T_J = 25\text{ }^\circ\text{C}$  unless otherwise noted

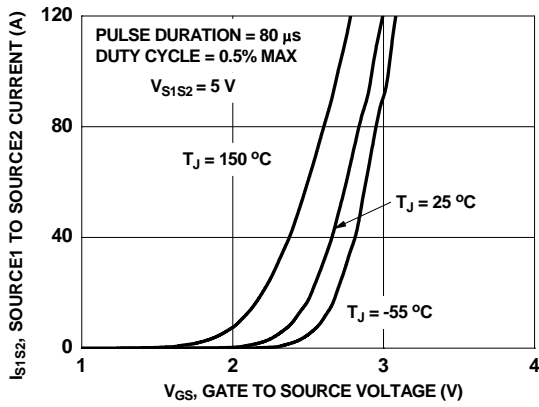


Figure 7. Transfer Characteristics

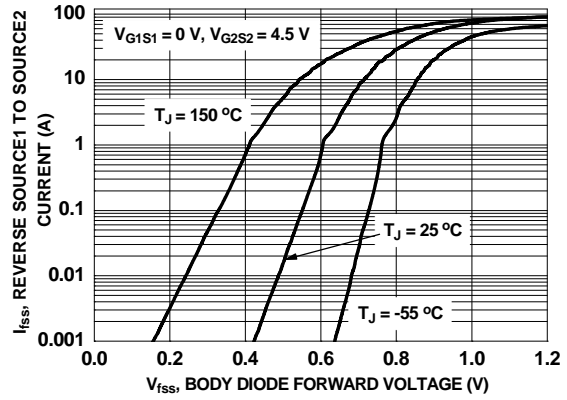


Figure 8. Source1 to Source2 Diode Forward Voltage vs Source Current

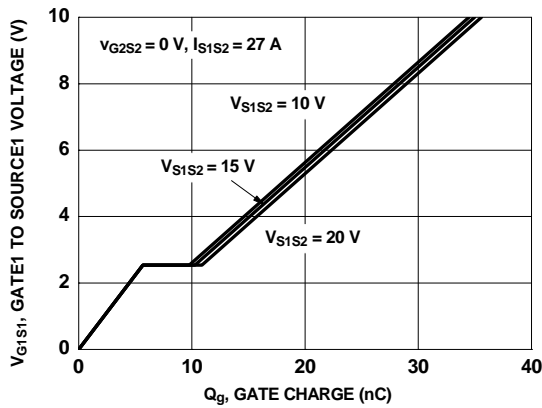


Figure 9. Gate Charge Characteristics

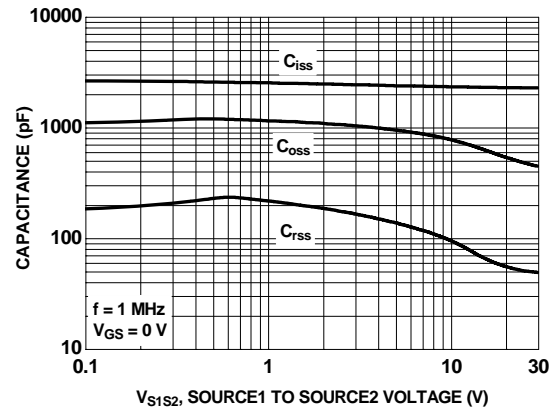


Figure 10. Capacitance vs Source1 to Source2 Voltage

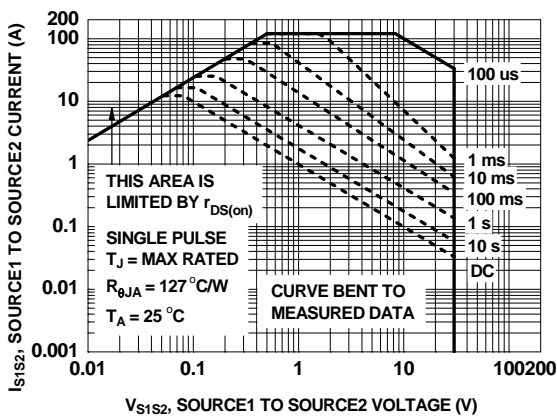


Figure 11. Forward Bias Safe Operating Area

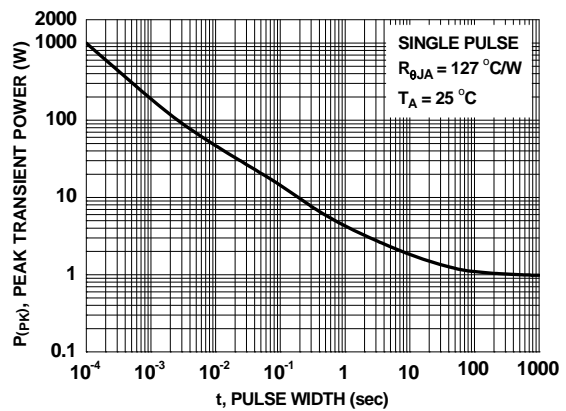
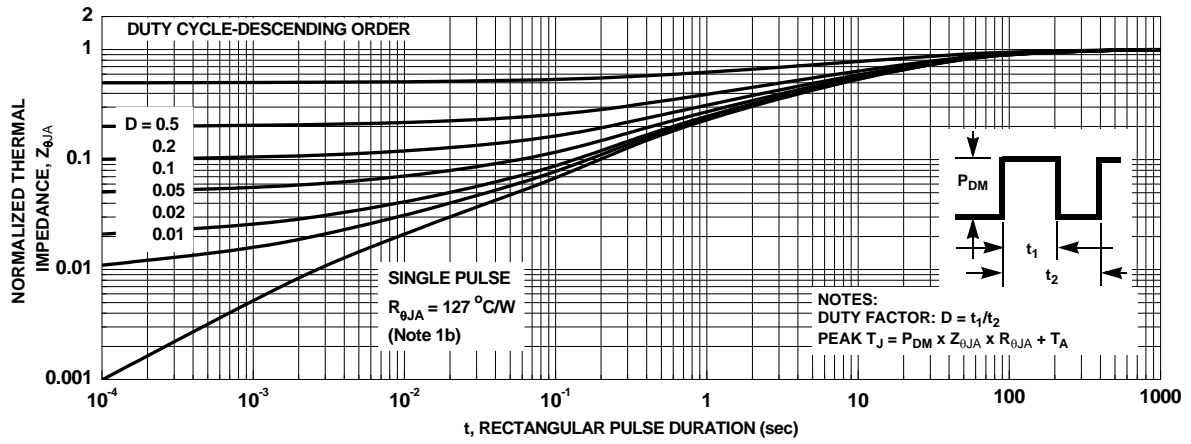


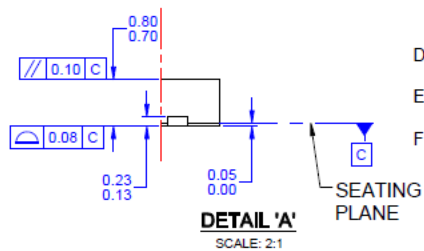
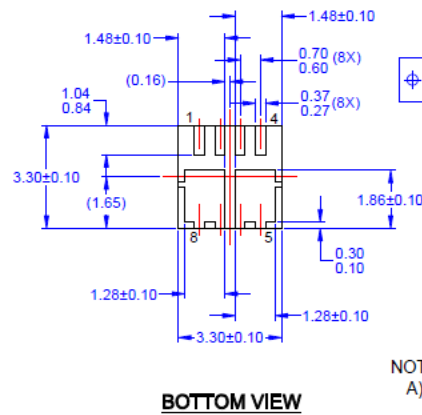
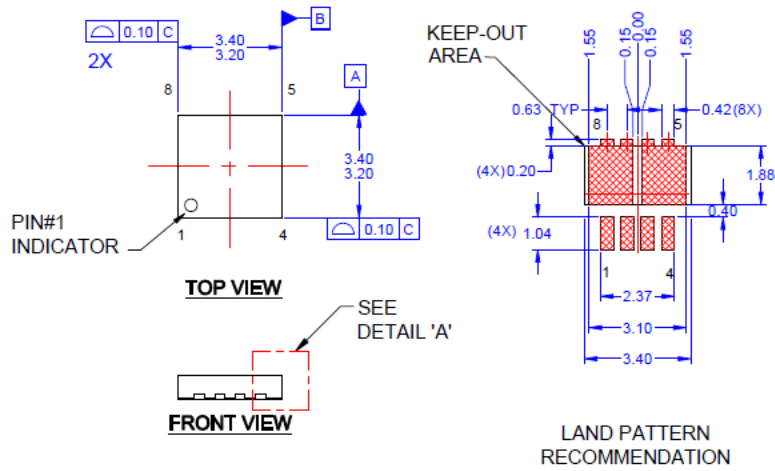
Figure 12. Single Pulse Maximum Power Dissipation

**Typical Characteristics**  $T_J = 25\text{ }^\circ\text{C}$  unless otherwise noted




**Figure 13. Junction-to-Ambient Transient Thermal Response Curve**

## Dimensional Outline and Pad Layout



- NOTES: UNLESS OTHERWISE SPECIFIED
- DOES NOT FULLY CONFORM TO JEDEC REGISTRATION MO-229, DATED 08/2012
  - ALL DIMENSIONS ARE IN MILLIMETERS.
  - DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH. MOLD FLASH OR BURRS DOES NOT EXCEED 0.10MM.
  - DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
  - IT IS RECOMMENDED TO HAVE NO TRACES OR VIAS WITHIN THE KEEP OUT AREA.
  - DRAWING FILE NAME: MKT-PQFN08LREV2

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  
**Japan Customer Focus Center**  
 Phone: 81-3-5817-1050

**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



## 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](#) [DMP22D4UFO-7B](#)