

ON Semiconductor

Is Now



To learn more about onsemi™, please visit our website at
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. 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®

FDS8449-F085

N-Channel PowerTrench® MOSFET
40V, 7.6A, 29mΩ

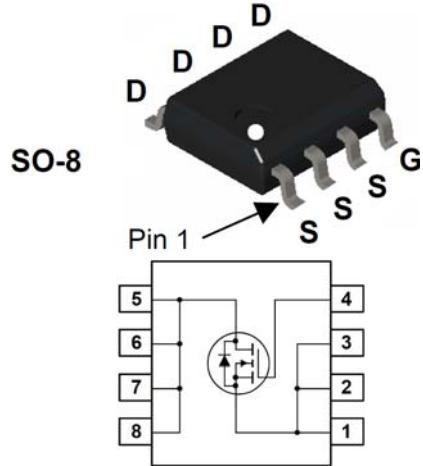
Features

- Typ $R_{DS(on)} = 21\text{m}\Omega$ at $V_{GS} = 10\text{V}$, $I_D = 7.6\text{A}$
- Typ $R_{DS(on)} = 26\text{m}\Omega$ at $V_{GS} = 4.5\text{V}$, $I_D = 6.8\text{A}$
- Typ $Q_{g(5)} = 7.7\text{nC}$ at $V_{GS} = 5\text{V}$, $I_D = 7.6\text{A}$
- RoHS Compliant
- Qualified to AEC Q101



Applications

- Inverter
- Power Supplies



MOSFET Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Ratings | Units |
|-----------------|--|-------------|---------------------|
| V_{DSS} | Drain to Source Voltage | 40 | V |
| V_{GS} | Gate to Source Voltage | ± 20 | V |
| I_D | Drain Current Continuous ($V_{GS} = 10\text{V}$) | 7.6 | A |
| | Pulsed | 50 | |
| E_{AS} | Single Pulse Avalanche Energy (Note 1) | 27 | mJ |
| P_D | Power Dissipation | 5 | W |
| | Derate above 25°C | 0.04 | W/ $^\circ\text{C}$ |
| T_J, T_{STG} | Operating and Storage Temperature | -55 to +150 | $^\circ\text{C}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | 25 | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient, 1in ² copper pad area | 50 | $^\circ\text{C/W}$ |

Package Marking and Ordering Information

| Device Marking | Device | Package | Reel Size | Tape Width | Quantity |
|----------------|--------------|---------|-----------|------------|------------|
| FDS8449 | FDS8449-F085 | SO-8 | 13" | 12mm | 2500 units |

Notes:

- 1: Starting $T_J = 25^\circ\text{C}$, $L = 1\text{mH}$, $I_{AS} = 7.3\text{A}$, $V_{DD} = 40\text{V}$.
- 2: A suffix as "...F085P" has been temporarily introduced in order to manage a double source strategy as ON Semiconductor has officially announced in Aug 2014.

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

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

Off Characteristics

| | | | | | | |
|------------|-----------------------------------|--|----|---|-----|---------------|
| B_{VDSS} | Drain to Source Breakdown Voltage | $I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$ | 40 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 32\text{V}, V_{GS} = 0\text{V}$ | - | - | 1 | μA |
| I_{GSS} | Gate to Source Leakage Current | $V_{GS} = \pm 20\text{V}$ | - | - | 250 | nA |

On Characteristics

| | | | | | | |
|---------------------|----------------------------------|---|---|-----|----|------------------|
| $V_{GS(\text{th})}$ | Gate to Source Threshold Voltage | $V_{GS} = V_{DS}, I_D = 250\mu\text{A}$ | 1 | 1.9 | 3 | V |
| $r_{DS(\text{on})}$ | Drain to Source On Resistance | $I_D = 7.6\text{A}, V_{GS} = 10\text{V}$ | - | 21 | 29 | $\text{m}\Omega$ |
| | | $I_D = 6.8\text{A}, V_{GS} = 4.5\text{V}$ | - | 26 | 36 | |
| | | $I_D = 7.6\text{A}, V_{GS} = 10\text{V}$ $T_J = 125^\circ\text{C}$ | - | 29 | 43 | |
| g_{FS} | Forward Transconductance | $V_{DS} = 10\text{V}, I_D = 7.6\text{A}$ | - | 21 | - | S |

Dynamic Characteristics

| | | | | | | |
|---------------------|-------------------------------|--|---|-----|----|----------|
| C_{iss} | Input Capacitance | $V_{DS} = 20\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$ | - | 760 | - | pF |
| C_{oss} | Output Capacitance | | - | 100 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | - | 60 | - | pF |
| R_G | Gate Resistance | $f = 1\text{MHz}$ | - | 1.2 | - | Ω |
| $Q_{g(\text{TOT})}$ | Total Gate Charge at 10V | $V_{GS} = 0 \text{ to } 5\text{V}$ | - | 7.7 | 11 | nC |
| Q_{gs} | Gate to Source Gate Charge | $V_{DD} = 20\text{V}$ $I_D = 7.6\text{A}$ | - | 2.4 | - | nC |
| Q_{gd} | Gate to Drain "Miller" Charge | | - | 2.8 | - | nC |

Switching Characteristics

| | | | | | | |
|--------------|---------------------|---|---|----|----|----|
| t_{on} | Turn-On Time | $V_{DD} = 20\text{V}, I_D = 1\text{A}$ $V_{GS} = 10\text{V}, R_{\text{GEN}} = 6\Omega$ | - | - | 21 | ns |
| $t_{d(on)}$ | Turn-On Delay Time | | - | 9 | - | ns |
| t_r | Rise Time | | - | 5 | - | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | - | 23 | - | ns |
| t_f | Fall Time | | - | 3 | - | ns |
| t_{off} | Turn-Off Time | | - | - | 39 | ns |

Drain-Source Diode Characteristics

| | | | | | | |
|----------|-------------------------------|--|---|------|-----|----|
| V_{SD} | Source to Drain Diode Voltage | $I_{SD} = 2.1\text{A}$ | - | 0.76 | 1.2 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD} = 7.6\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$ | - | 17 | - | ns |
| Q_{rr} | Reverse Recovery Charge | | - | 7 | - | nC |

Typical Characteristics

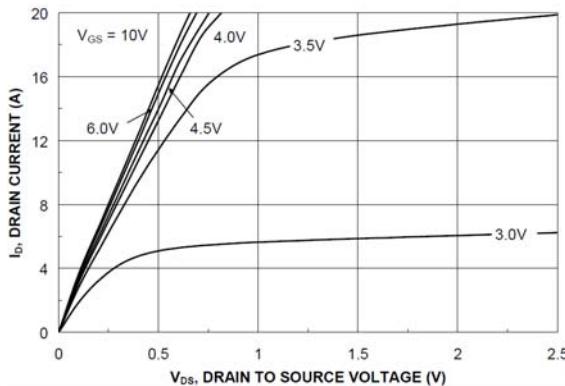


Figure 1. On-Region Characteristics

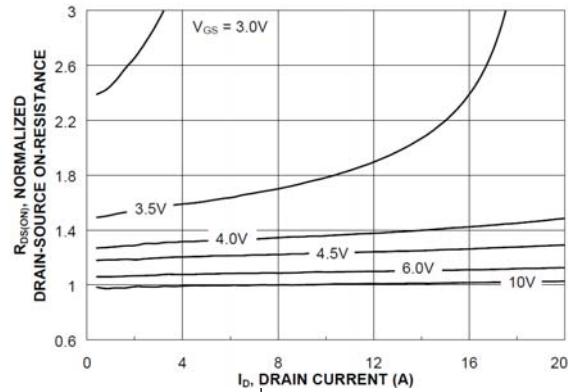


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

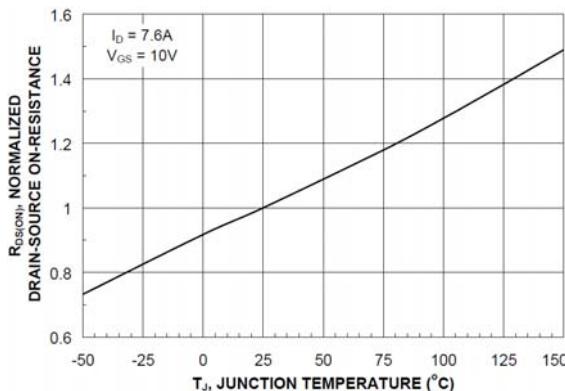


Figure 3. On-Resistance Variation with Temperature

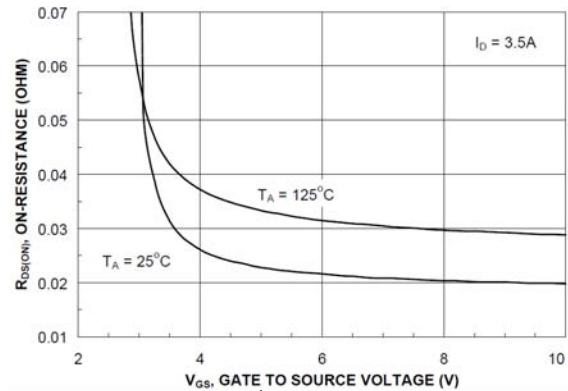


Figure 4. On-Resistance Variation with Gate-to-Source Voltage

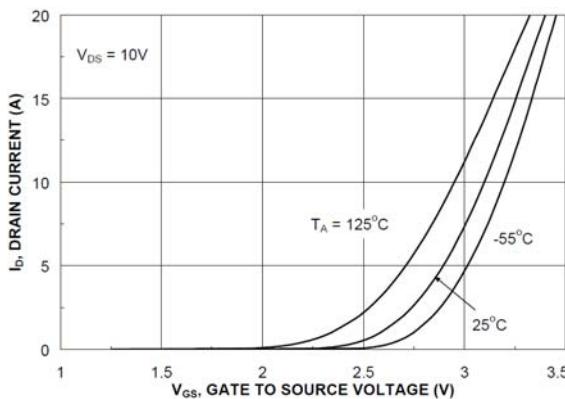


Figure 5. Transfer Characteristics

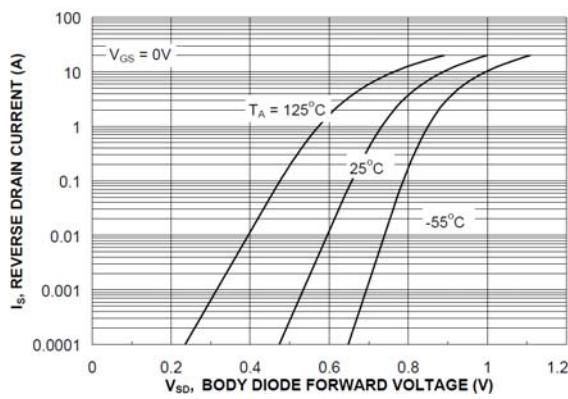


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

Typical Characteristics

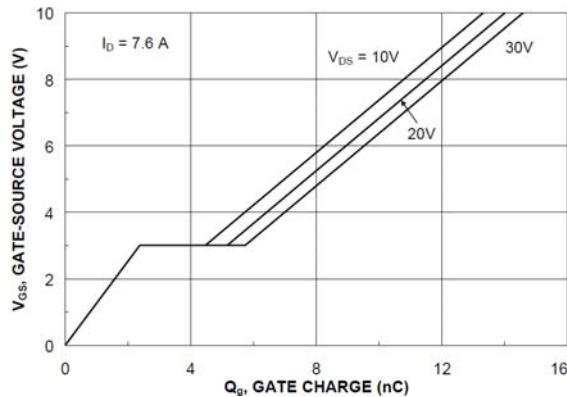


Figure 7. Gate Charge Characteristics

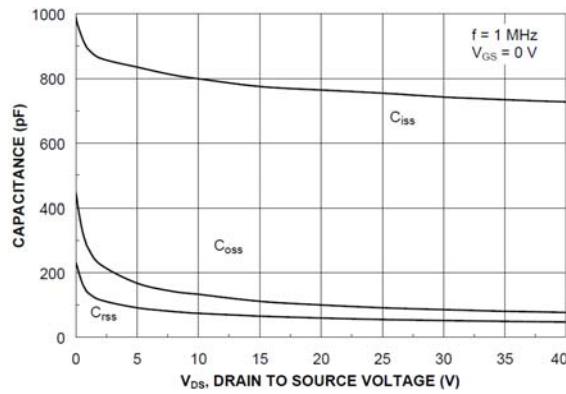


Figure 8. Capacitance Characteristics

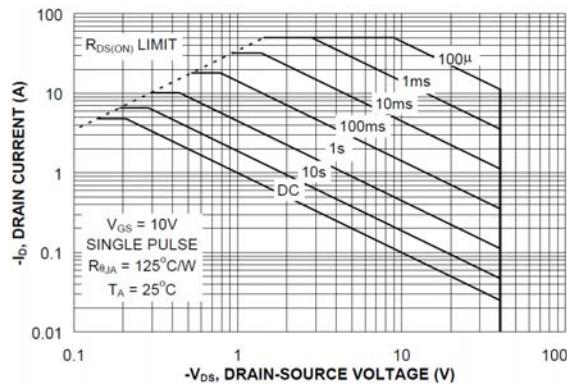


Figure 9. Maximum Safe Operating Area

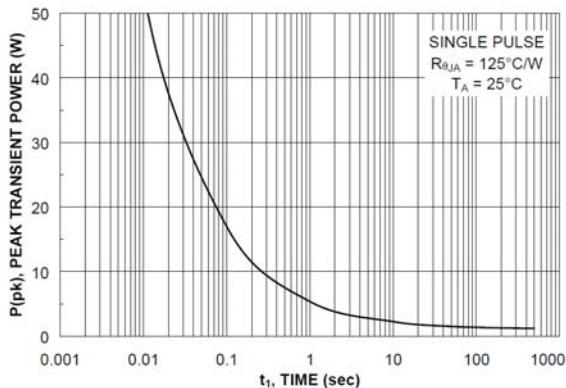


Figure 10. Single Pulse Maximum Power Dissipation

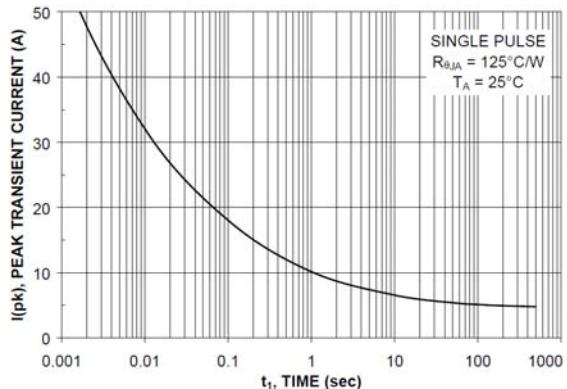


Figure 11. Single Pulse Maximum Peak Current

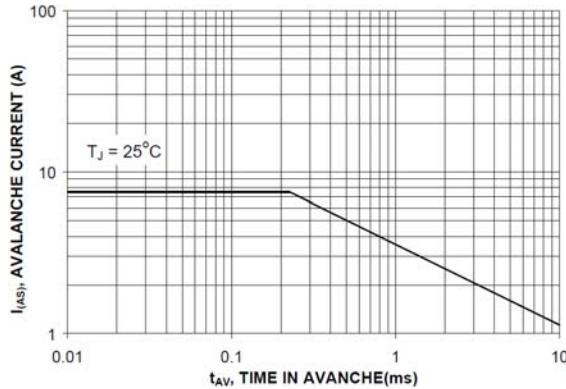


Figure 12. Unclamped Inductive Switching Capability

Typical Characteristics

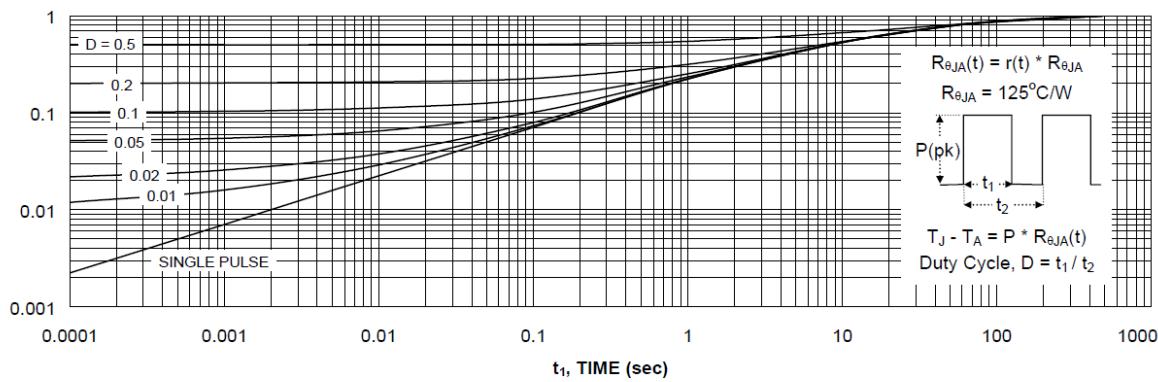


Figure 13. Transient Thermal Response Curve

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. 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
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