



ON Semiconductor®

## FDD3672-F085

### N-Channel UltraFET Trench MOSFET

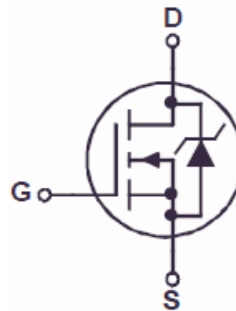
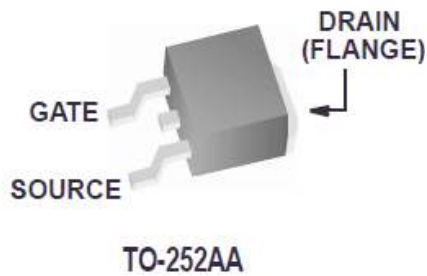
100V, 44A, 28mΩ

#### Features

- Typ  $r_{DS(on)}$  = 24mΩ at  $V_{GS} = 10V$ ,  $I_D = 44A$
- Typ  $Q_{g(10)}$  = 24nC at  $V_{GS} = 10V$
- Low Miller Charge
- Low  $Q_{rr}$  Body Diode
- Optimized efficiency at high frequencies
- UIS Capability (Single Pulse and Repetitive Pulse)
- Qualified to AEC Q101
- RoHS Compliant

#### Applications

- DC/DC converters and Off-Line UPS
- Distributed Power Architectures and VRMs
- Primary Switch for 24V and 48V Systems
- High Voltage Synchronous Rectifier



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

Symbol	Parameter	Ratings	Units
$V_{DSS}$	Drain to Source Voltage	100	V
$V_{GS}$	Gate to Source Voltage	$\pm 20$	V
$I_D$	Drain Current Continuous ( $T_C < 30^\circ\text{C}$ , $V_{GS} = 10\text{V}$ )	44	A
	Pulsed	See Figure 4	
$E_{AS}$	Single Pulse Avalanche Energy (Note 1)	73	mJ
$P_D$	Power Dissipation	144	W
	Derate above $25^\circ\text{C}$	0.96	W/ $^\circ\text{C}$
$T_J, T_{STG}$	Operating and Storage Temperature	-55 to +175	$^\circ\text{C}$

## Thermal Characteristics

$R_{\theta JC}$	Maximum Thermal Resistance Junction to Case	1.04	$^\circ\text{C/W}$
$R_{\theta JA}$	Maximum Thermal Resistance Junction to Ambient TO-263, 1in <sup>2</sup> copper pad area	52	$^\circ\text{C/W}$

## Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDD3672	FDD3672-F085	TO-252AA	330mm	16mm	2500 units

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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### Off Characteristics

$B_{VDSS}$	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}$ , $V_{GS} = 0\text{V}$	100	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 80\text{V}$ , $V_{GS} = 0\text{V}$	-	-	1	$\mu\text{A}$
		$T_J = 150^\circ\text{C}$	-	-	250	
$I_{GSS}$	Gate to Source Leakage Current	$V_{GS} = \pm 20\text{V}$	-	-	$\pm 100$	nA

### On Characteristics

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$ , $I_D = 250\mu\text{A}$	2	3	4	V
$r_{DS(on)}$	Drain to Source On Resistance	$I_D = 44\text{A}$ , $V_{GS} = 10\text{V}$	-	0.024	0.028	$\Omega$
		$I_D = 21\text{A}$ , $V_{GS} = 6\text{V}$ ,	-	0.028	0.047	$\Omega$
		$I_D = 44\text{A}$ , $V_{GS} = 10\text{V}$ , $T_J = 175^\circ\text{C}$	-	0.063	0.074	$\Omega$

### Dynamic Characteristics

$C_{iss}$	Input Capacitance	$V_{DS} = 25\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{MHz}$	-	1635	-	pF	
$C_{oss}$	Output Capacitance		-	240	-	pF	
$C_{rss}$	Reverse Transfer Capacitance		-	60	-	pF	
$Q_{g(TOT)}$	Total Gate Charge at 10V	$V_{DD} = 50\text{V}$ $I_D = 44\text{A}$ $I_g = 1.0\text{mA}$	-	24	36	nC	
$Q_{g(TH)}$	Threshold Gate Charge		$V_{GS} = 0$ to 2V	-	3	4.5	nC
$Q_{gs}$	Gate to Source Gate Charge			-	8.3	-	nC
$Q_{gs2}$	Gate Charge Threshold to Plateau			-	5.3	-	nC
$Q_{gd}$	Gate to Drain "Miller" Charge			-	5.8	-	nC

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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**Switching Characteristics**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$t_{on}$	Turn-On Time	$V_{DD} = 50\text{V}, I_D = 44\text{A},$ $V_{GS} = 10\text{V}, R_{GS} = 11\Omega$	-	-	78	ns
$t_{d(on)}$	Turn-On Delay Time		-	12	-	ns
$t_r$	Turn-On Rise Time		-	37	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	24	-	ns
$t_f$	Turn-Off Fall Time		-	44	-	ns
$t_{off}$	Turn-Off Time		-	-	70	ns

**Drain-Source Diode Characteristics**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$V_{SD}$	Source to Drain Diode Voltage	$I_{SD} = 44\text{A}$	-	0.9	1.25	V
		$I_{SD} = 21\text{A}$	-	0.8	1.0	V
$t_{rr}$	Reverse Recovery Time	$I_F = 44\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	44	57	ns
$Q_{rr}$	Reverse Recovery Charge		-	58	76	nC

**Notes:**

1: Starting  $T_J = 25^\circ\text{C}$ ,  $L = 0.2\text{mH}$ ,  $I_{AS} = 27\text{A}$

### Typical Characteristics

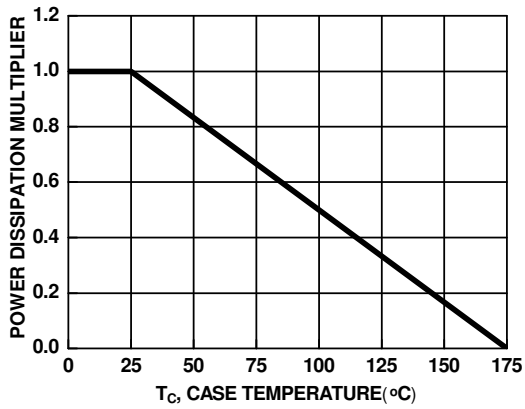


Figure 1. Normalized Power Dissipation vs Case Temperature

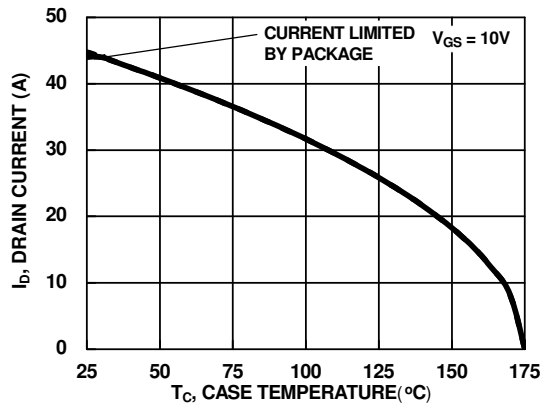


Figure 2. Maximum Continuous Drain Current vs Case Temperature

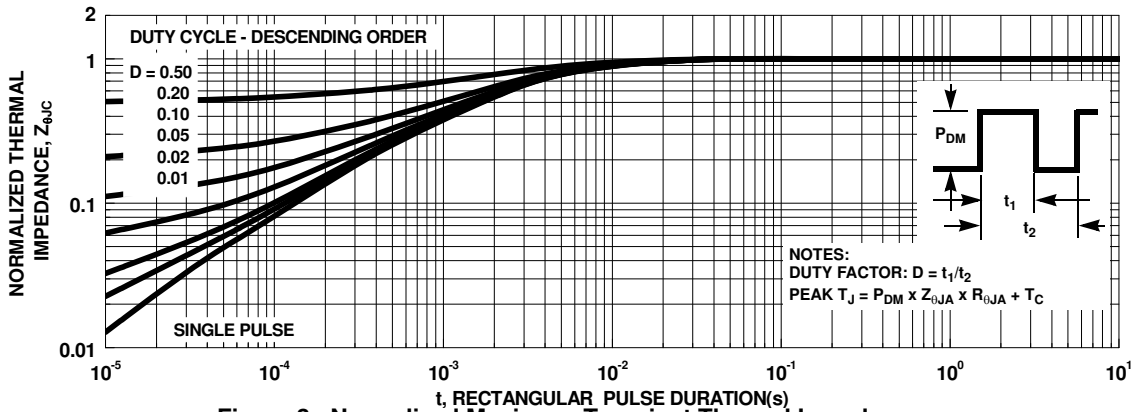


Figure 3. Normalized Maximum Transient Thermal Impedance

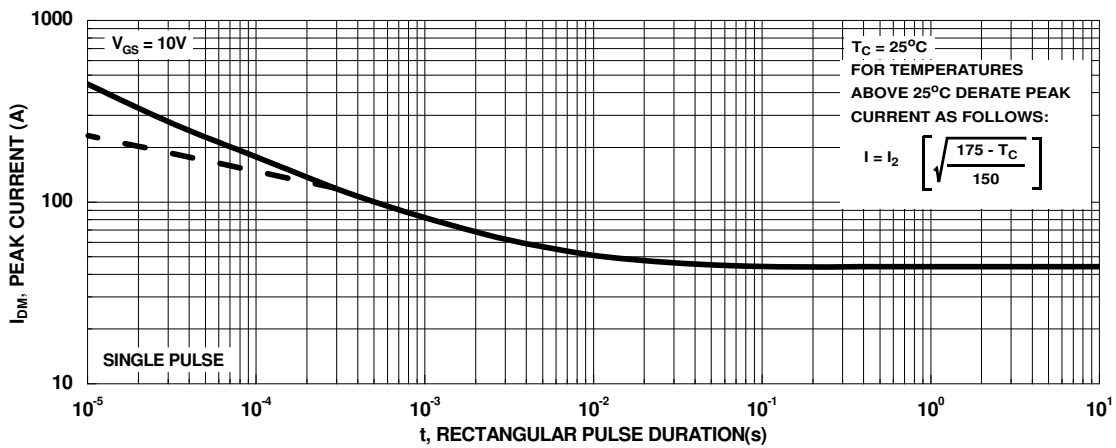
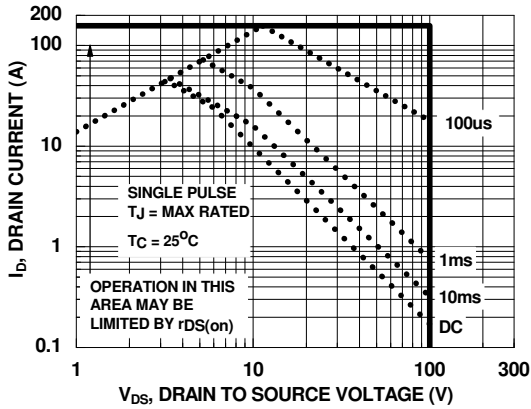
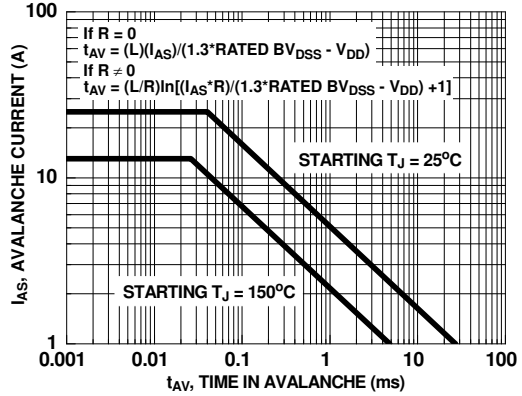


Figure 4. Peak Current Capability

**Typical Characteristics**

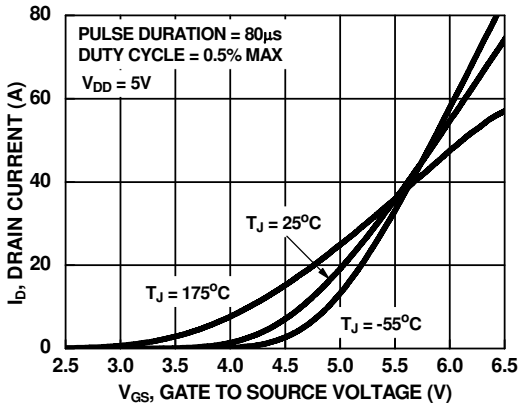


**Figure 5. Forward Bias Safe Operating Area**

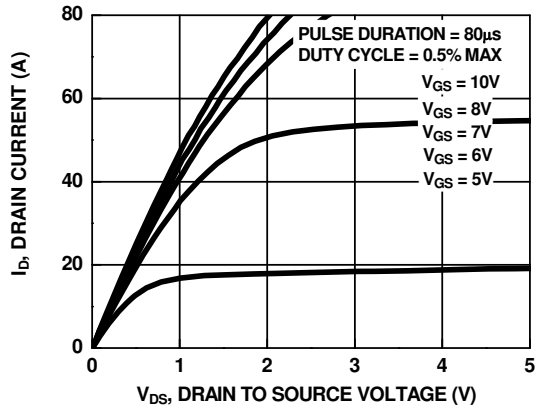


NOTE: Refer to ON Semiconductor Application Notes AN7514 and AN7515

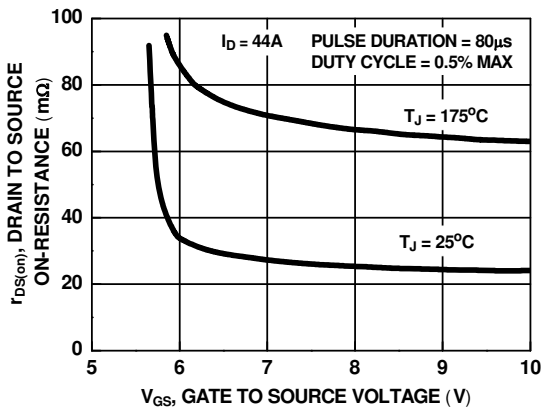
**Figure 6. Unclamped Inductive Switching Capability**



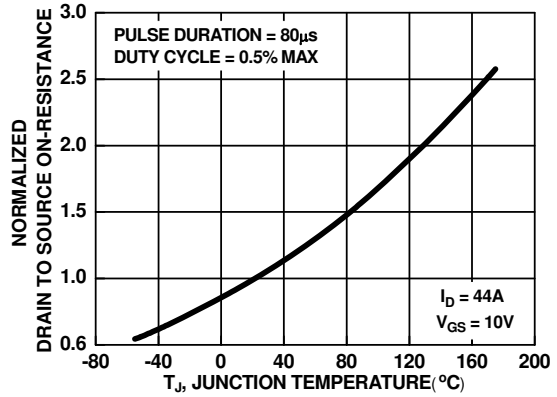
**Figure 7. Transfer Characteristics**



**Figure 8. Saturation Characteristics**

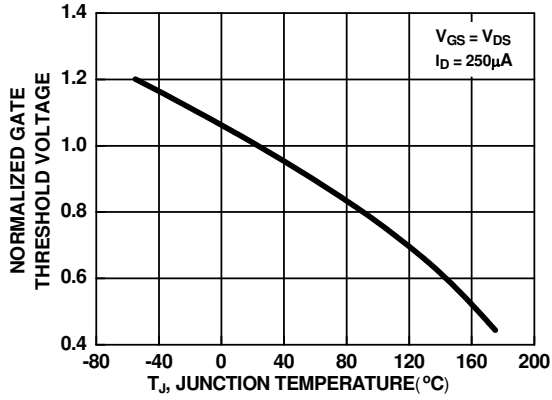


**Figure 9. Drain to Source On-Resistance Variation vs Gate to Source Voltage**

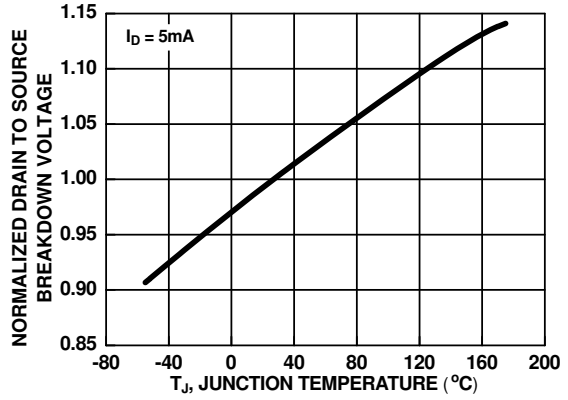


**Figure 10. Normalized Drain to Source On-Resistance vs Junction Temperature**

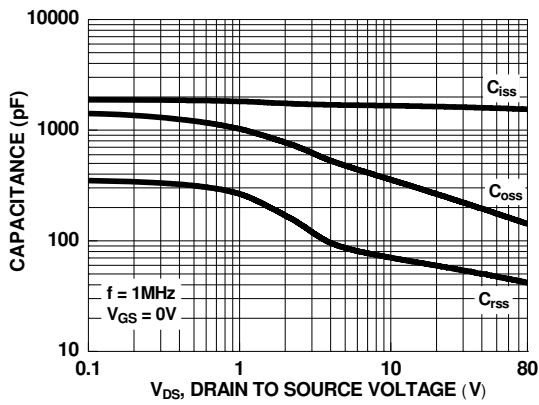
**Typical Characteristics**



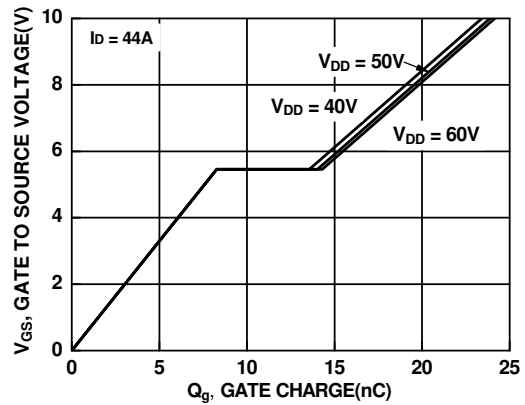
**Figure 11. Normalized Gate Threshold Voltage vs Junction Temperature**



**Figure 12. Normalized Drain to Source Breakdown Voltage vs Junction Temperature**



**Figure 13. Capacitance vs Drain to Source Voltage**



**Figure 14. Gate Charge vs Gate to Source Voltage**

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