

# FDMC3300NZA

## Monolithic Common Drain N-Channel 2.5V Specified PowerTrench® MOSFET

**8A, 20V, 26mΩ**

### General Description

This Dual N-Channel MOSFET has been designed using Fairchild Semiconductor's advanced Power Trench process to optimize the  $R_{DS(on)}$  @  $V_{GS}=2.5V$  on special MicroFET leadframe with all the drains on one side of the package.

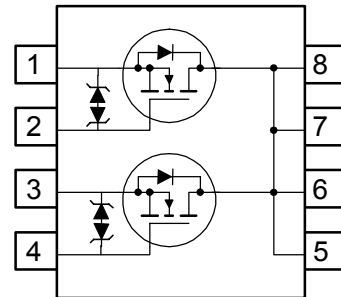
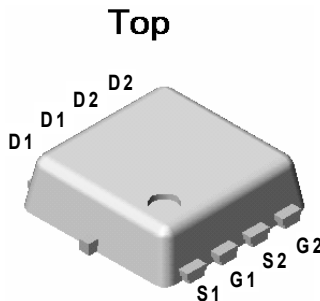
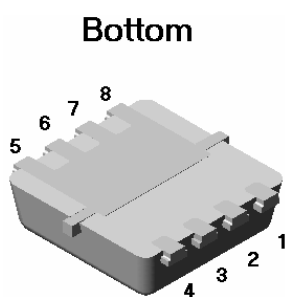
### Applications

- Li-Ion Battery Pack



### Features

- $R_{DS(on)} = 26m\Omega$  @  $V_{GS} = 4.5V$ ,  $I_D = 8A$
- $R_{DS(on)} = 34m\Omega$  @  $V_{GS} = 2.5V$ ,  $I_D = 7A$
- >2000V ESD protection
- Low Profile-1mm maximum in the new package MicroFET 3.3x3.3 mm
- Pb-free and RoHS Compliant



### Absolute Maximum Ratings $T_A = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Rated	Units
$V_{DSS}$	Drain-Source Voltage	20	V
$V_{GSS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current -Continuous (Note 1a)	8	A
		40	
$P_D$	Power dissipation (Steady State) (Note 1a)	2.4	W
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

### Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1a)	52	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1b)	108	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Note 1)	5	

### Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape Width	Quantity
3300A	FDMC3300NZA	7"	12mm	3000 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-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	20	-	-	V
$\frac{\Delta B_{VDSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu A$ , Referenced to $25^\circ\text{C}$	-	12.0	-	mV/ $^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 16V, V_{GS} = 0V$ ,	-	-	1	$\mu A$
$I_{GSS}$	Gate-Body Leakage,	$V_{GS} = \pm 12V, V_{DS} = 0V$	-	-	$\pm 10$	$\mu A$

**On Characteristics** (Note 2)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.6	-	1.5	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = 250\mu A$ , Referenced to $25^\circ\text{C}$	-	-3.1	-	mV/ $^\circ\text{C}$
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 4.5V, I_D = 8A$	-	20	26	m $\Omega$
		$V_{GS} = 2.5V, I_D = 7A$	-	25	34	
		$V_{GS} = 4.5V, I_D = 8A, T_J = 150^\circ\text{C}$	-	29	38	
$g_{FS}$	Forward Transconductance	$V_{DS} = 5V, I_D = 8A$	-	29	-	S

**Dynamic Characteristics**

$C_{iss}$	Input Capacitance	$V_{DS} = 10V, V_{GS} = 0V, f = 1.0\text{MHz}$	-	610	-	pF
$C_{oss}$	Output Capacitance		-	165	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	115	-	pF
$R_G$	Gate Resistance	$f = 1.0\text{MHz}$	-	1.7	-	$\Omega$

**Switching Characteristics** (Note 2)

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 10V, I_D = 1A, V_{GS} = 4.5V, R_{GEN} = 6\Omega$	-	8	16	ns
$t_r$	Turn-On Rise Time		-	8	16	ns
$t_{d(off)}$	Turn-Off Delay Time		-	19	34	ns
$t_f$	Turn-Off Fall Time		-	9	18	ns
$Q_g$	Total Gate Charge	$V_{DS} = 10V, I_D = 8A, V_{GS} = 4.5V$	-	8	-	nC
$Q_{gs}$	Gate-Source Charge		-	1	-	nC
$Q_{gd}$	Gate-Drain Charge		-	2	-	nC

**Drain-Source Diode Characteristics and Maximum Ratings**

$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 2A$ (Note 2)	-	0.7	1.2	V
$t_{rr}$	Diode Reverse Recovery Time	$I_F = 8A$ ,	-	-	21	ns
$Q_{rr}$	Diode Reverse Recovery Charge	$di_F/dt = 100A/\mu s$	-	-	6	nC

**Notes:**

- $R_{\theta JA}$  is determined with the device mounted on a  $1\text{in}^2$  oz. copper pad on a  $1.5 \times 1.5\text{in}$  board of FR-4 material.  $R_{\theta JC}$  are guaranteed by design while  $R_{\theta JA}$  is determined by the user's board design.



a.  $52^\circ\text{C/W}$  when mounted on a  $1\text{in}^2$  pad of 2 oz



b.  $108^\circ\text{C/W}$  when mounted on a minimum pad of 2 oz copper

- Pulse Test: Pulse Width <  $300\mu s$ , Duty Cycle < 2.0%

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

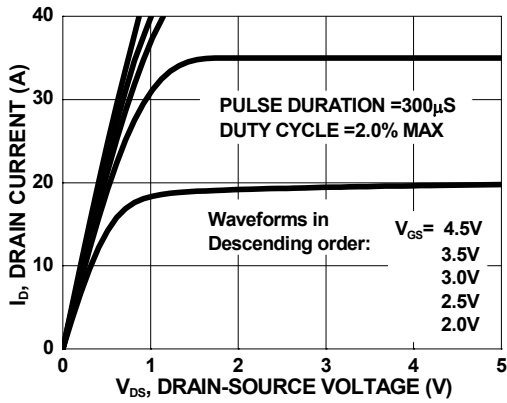


Figure 1. On Region Characteristics

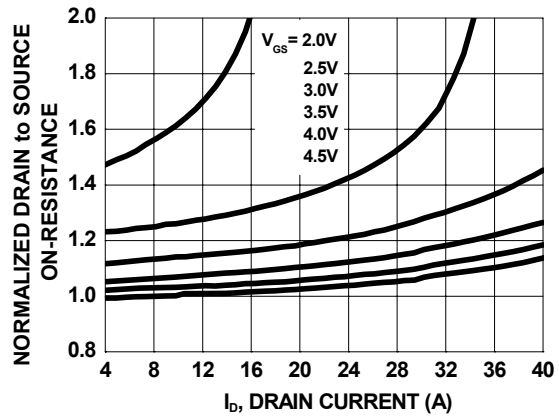


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

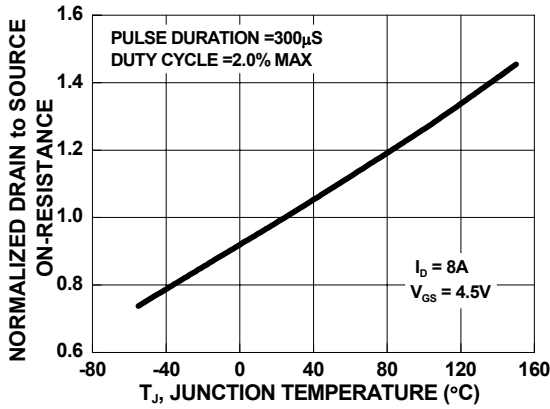


Figure 3. On Resistance Variation with Temperature

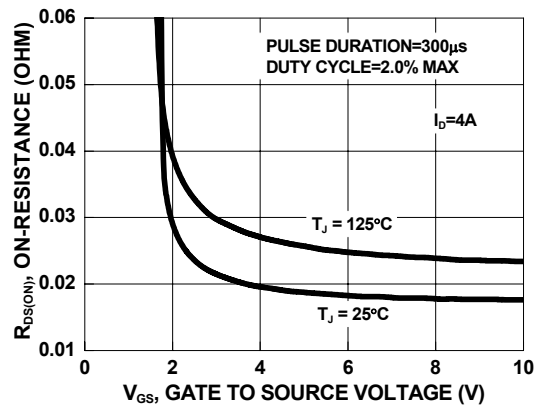


Figure 4. On-Resistance Variation with Gate-to-Source Voltage

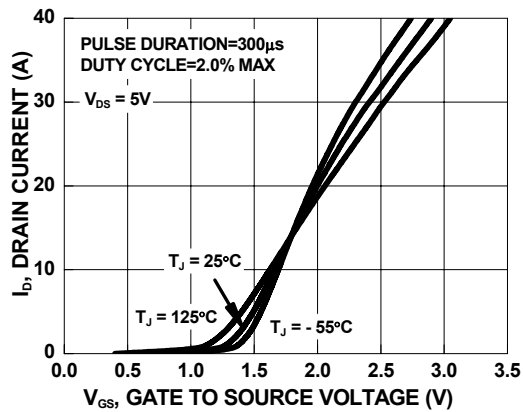


Figure 5. Transfer Characteristics

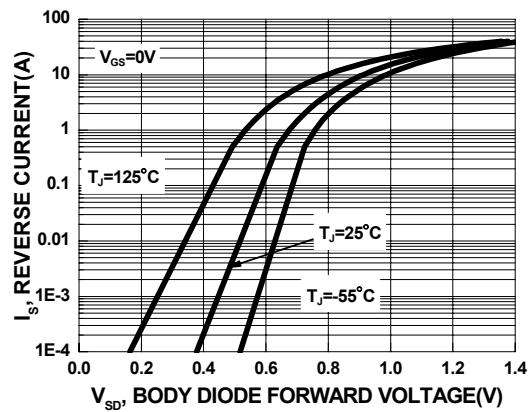


Figure 6. Body Diode Forward Voltage Variation With Source Current and Temperature

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

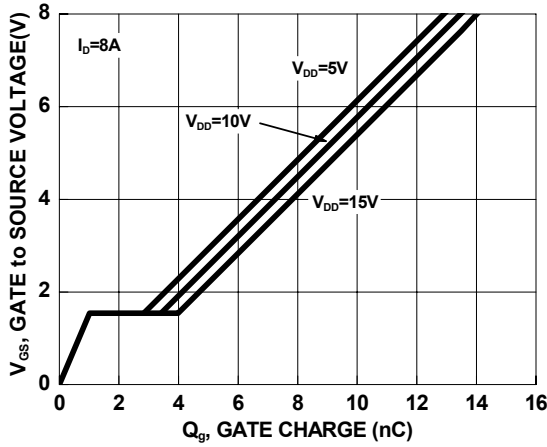


Figure 7. Gate Charge Characteristics

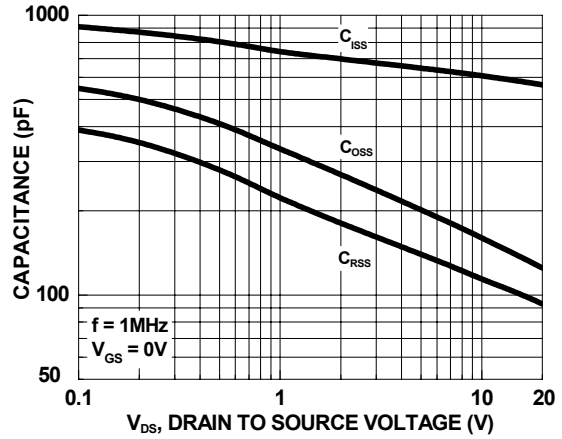


Figure 8. Capacitance Characteristics

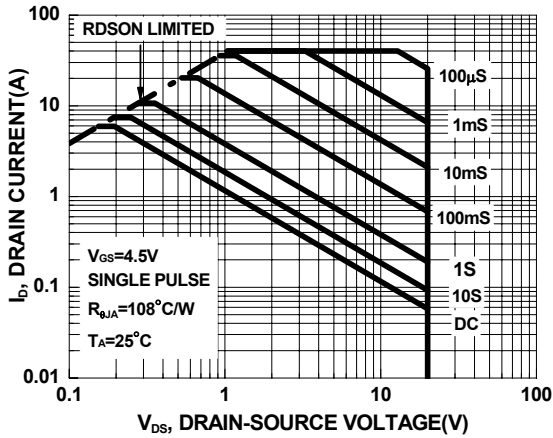


Figure 9. Safe Operating Area

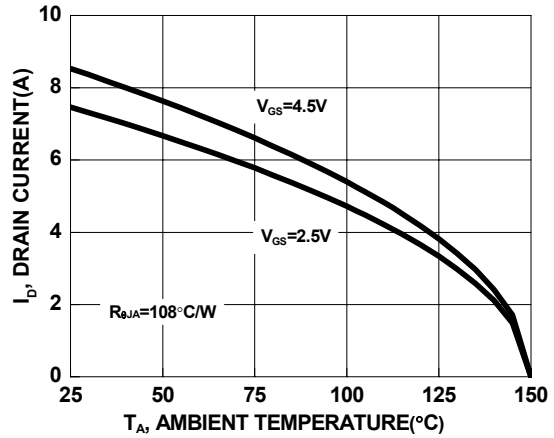


Figure 10. Maximum Continuous Drain Current vs Ambient Temperature

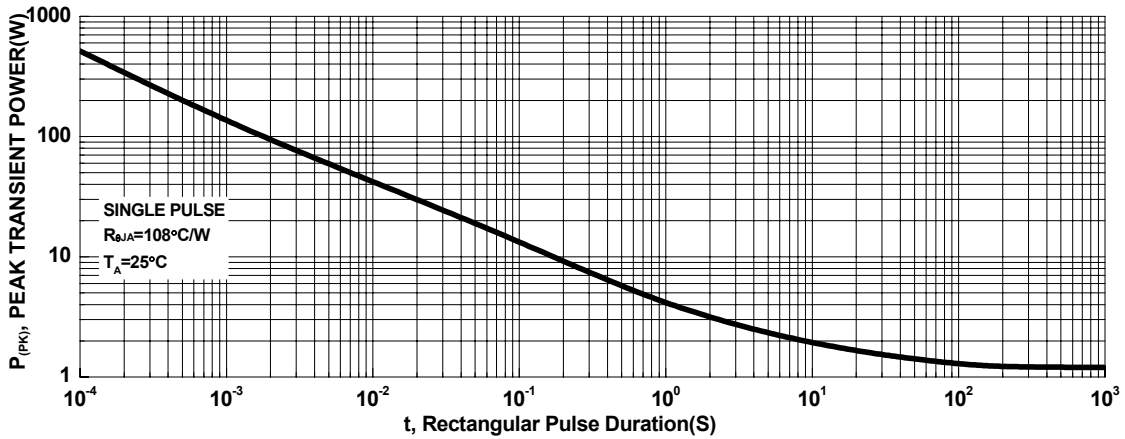


Figure 11. Single Maximum Power Dissipation

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

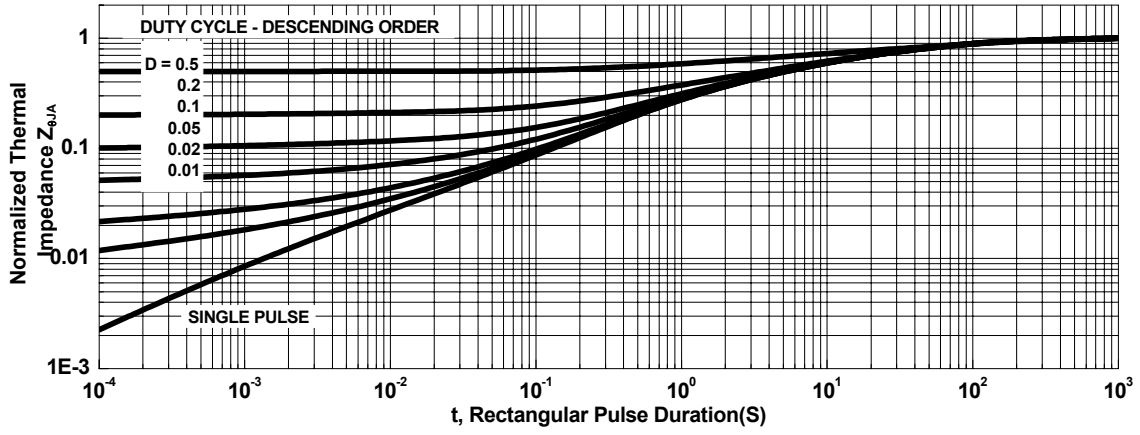


Figure 12. Transient Thermal Response Curve



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CROSSVOLT™	GTO™	MICROWIRE™	Quiet Series™	TruTranslation™
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