

FDMC6675BZ

P-Channel **POWERTRENCH**® MOSFET

-30 V, -20 A, 14.4 mΩ

Description

The FDMC6675BZ has been designed to minimize losses in load switch applications. Advancements in both silicon and package technologies have been combined to offer the lowest $R_{DS(on)}$ and ESD protection.

Features

- Max $R_{DS(on)}$ = 14.4 mΩ at $V_{GS} = -10$ V, $I_D = -9.5$ A
- Max $R_{DS(on)}$ = 27.0 mΩ at $V_{GS} = -4.5$ V, $I_D = -6.9$ A
- HBM ESD Protection Level of 8 kV Typical (Note 3)
- Extended V_{GSS} Range (-25 V) for Battery Applications
- High Performance Trench Technology for Extremely Low $R_{DS(on)}$
- High Power and Current Handling Capability
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

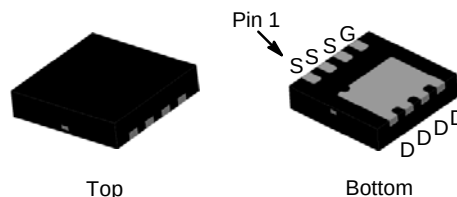
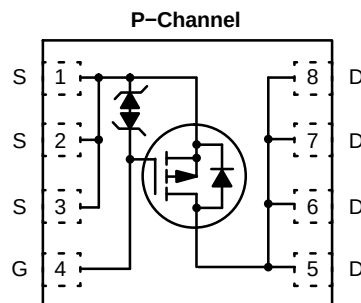
- Load Switch in Notebook and Server
- Notebook Battery Pack Power Management



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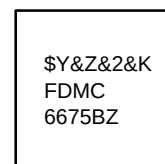
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V_{DS}	$R_{DS(on)}$ MAX	I_D MAX
-30 V	14.4 mΩ @ 10 V	-20 A



**WDFN8 3.3x3.3, 0.65P
CASE 511DR**

MARKING DIAGRAM



\$Y	= ON Semiconductor Logo
&Z	= Assembly Plant Code
&2	= Numeric Date Code
&K	= Lot Code
FDMC6675BZ	= Specific Device Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

FDMC6675BZ

MOSFET MAXIMUM RATINGS (T_A = 25°C, Unless otherwise specified)

Symbol	Parameter	Ratings	Unit
V _{DS}	Drain to Source Voltage	-30	V
V _{GS}	Gate to Source Voltage	±25	V
I _D	Drain Current – Continuous T _C = 25°C	-20	A
	– Continuous T _A = 25°C (Note 1a)	-9.5	
	– Pulsed	-32	
P _D	Power Dissipation T _C = 25°C	36	W
	Power Dissipation T _A = 25°C (Note 1a)	2.3	
T _J , T _{STG}	Operating and Storage Junction Temperature Range	-55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Symbol	Parameter	Ratings	Unit
R _{θJC}	Thermal Resistance, Junction to Case	3.4	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient (Note 1a)	53	

PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Package	Reel Size	Tape Width	Shipping (Qty / Packing) [†]
FDMC6675BZ	FDMC6675BZ	WDFN8 3.3x3.3, 0.65P (MLP) (Pb-Free/Halogen Free)	13"	12 mm	3000 / Tape & Reel

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

BV _{DSS}	Drain to Source Breakdown Voltage	I _D = -250 μA, V _{GS} = 0 V	-30	-	-	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I _D = -250 μA, referenced to 25°C	-	-20	-	mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -24 V, V _{GS} = 0 V V _{DS} = -24 V, V _{GS} = 0 V, T _J = 125°C	-	-	-1 -100	μA
I _{GSS}	Gate to Source Leakage Current	V _{GS} = ±25 V, V _{DS} = 0 V	-	-	±10	μA

ON CHARACTERISTICS

V _{GS(th)}	Gate to Source Threshold Voltage	V _{GS} = V _{DS} , I _D = -250 μA	-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 μA, referenced to 25°C	-	-6.0	-	mV/°C
R _{DS(on)}	Static Drain to Source On Resistance	V _{GS} = -10 V, I _D = -9.5 A	-	10.7	14.4	mΩ
		V _{GS} = -4.5 V, I _D = -6.9 A	-	17.4	27.0	
		V _{GS} = -10 V, I _D = -9.5 A, T _J = 125°C	-	15.2	20.5	
g _{FS}	Forward Transconductance	V _{DD} = -5 V, I _D = -9.5 A	-	28	-	S

FDMC6675BZ

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

DYNAMIC CHARACTERISTICS

C_{iss}	Input Capacitance	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	–	2154	2865	pF
C_{oss}	Output Capacitance		–	392	525	pF
C_{rss}	Reverse Transfer Capacitance		–	349	525	pF

SWITCHING CHARACTERISTICS

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = -15\text{ V}, I_D = -9.5\text{ A}, V_{GS} = -10\text{ V}, R_{GEN} = 6\ \Omega$	–	11	20	ns
t_r	Rise Time		–	10	20	
$t_{d(off)}$	Turn-off Delay Time		–	44	71	
t_f	Fall Time		–	26	42	
Q_g	Total Gate Charge	$V_{GS} = 0\text{ V to } -10\text{ V}, V_{DD} = -15\text{ V}, I_D = -9.5\text{ A}$	–	46	65	nC
Q_g	Total Gate Charge	$V_{GS} = 0\text{ V to } -5\text{ V}, V_{DD} = -15\text{ V}, I_D = -9.5\text{ A}$	–	26	37	nC
Q_{gs}	Gate to Source Charge	$V_{DD} = -15\text{ V}, I_D = -9.5\text{ A}$	–	6.4	–	nC
Q_{gd}	Gate to Drain "Miller" Charge	$V_{DD} = -15\text{ V}, I_D = -9.5\text{ A}$	–	13	–	nC

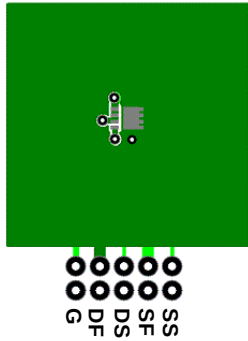
DRAIN-SOURCE DIODE CHARACTERISTICS

V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = -9.5\text{ A (Note 2)}$	–	–0.89	–1.3	V
		$V_{GS} = 0\text{ V}, I_S = -1.6\text{ A (Note 2)}$	–	–0.73	–1.2	V
t_{rr}	Reverse Recovery Time	$I_F = -9.5\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$	–	24	38	ns
Q_{rr}	Reverse Recovery Charge		–	15	27	nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

NOTES:

- $R_{\theta JA}$ is determined with the device mounted on a 1 in² pad 2 oz copper pad on a 1.5 × 1.5 in. board of FR-4 material. $R_{\theta CA}$ is determined by the user's board design.



a) 53°C/W when mounted on a 1 in² pad of 2 oz copper



b) 125°C/W when mounted on a minimum pad

- Pulse Test: Pulse Width < 300 μs , Duty cycle < 2.0%.
- The diode connected between the gate and source serves only as protection against ESD. No gate overvoltage rating is implied.

TYPICAL CHARACTERISTICS

($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

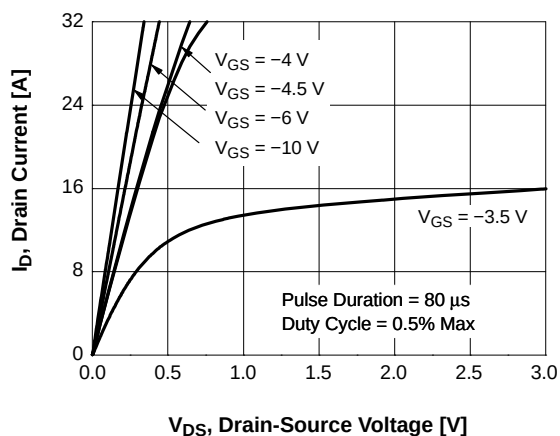


Figure 1. On-Region Characteristics

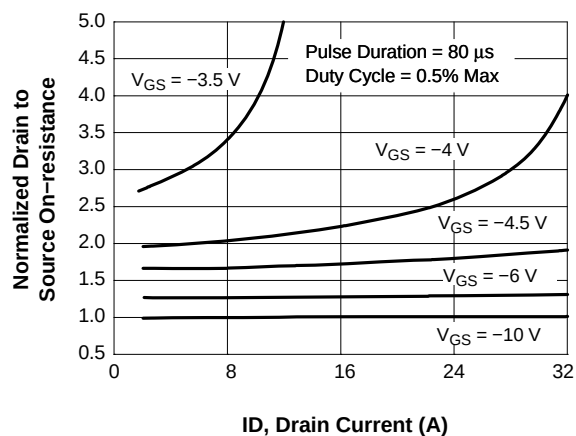


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

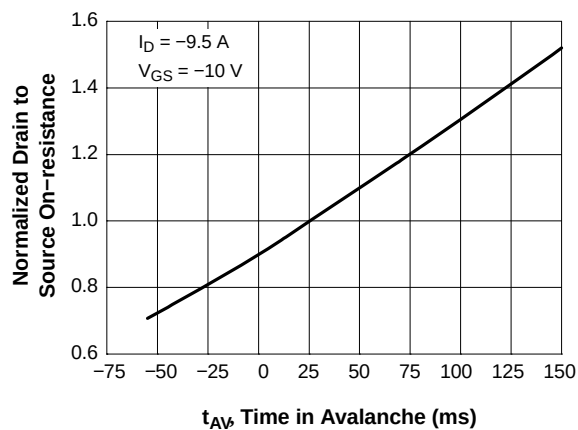


Figure 3. Normalized On Resistance vs Junction Temperature

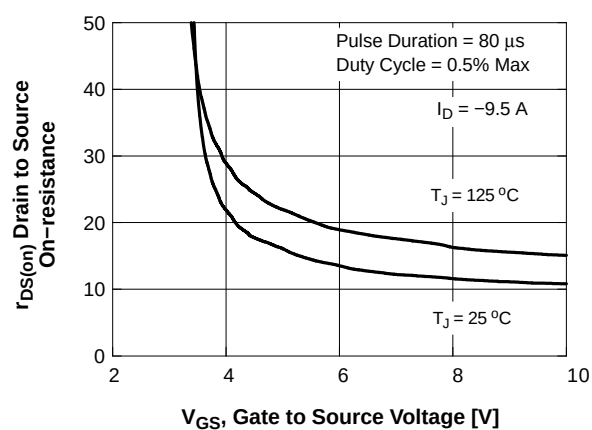


Figure 4. On-Resistance vs Gate to Source Voltage

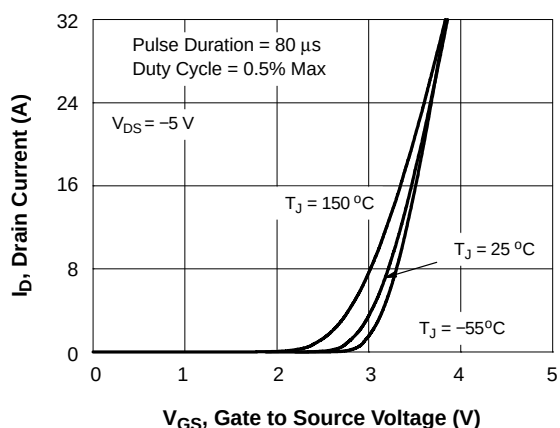


Figure 5. Transfer Characteristics

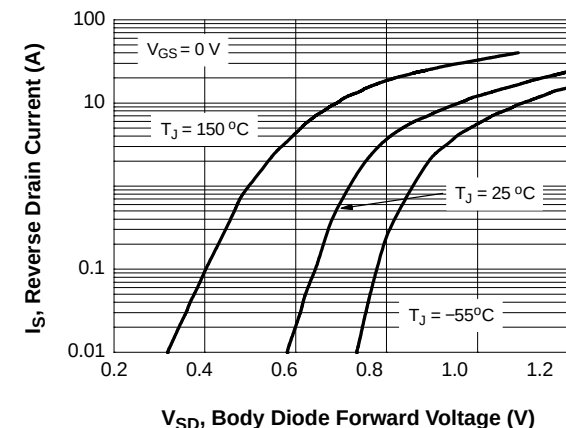


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

($T_J = 25^\circ\text{C}$ unless otherwise noted)

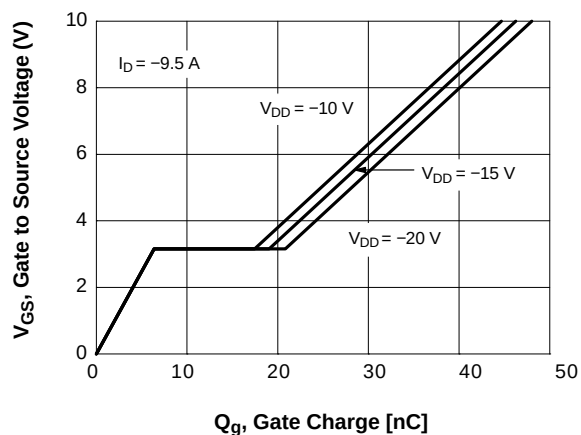


Figure 7. Gate Charge Characteristics

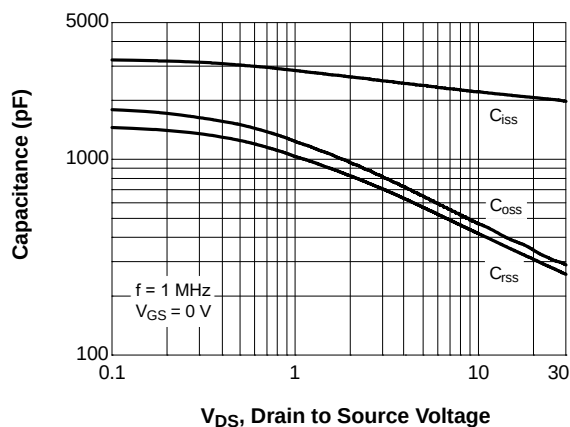


Figure 8. Capacitance vs Drain to Source Voltage

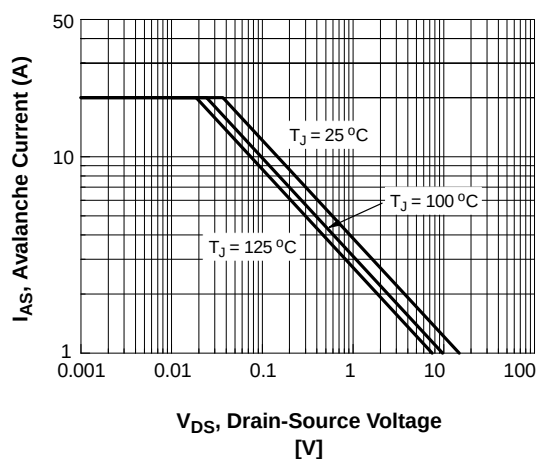


Figure 9. Unclamped Inductive Switching Capability

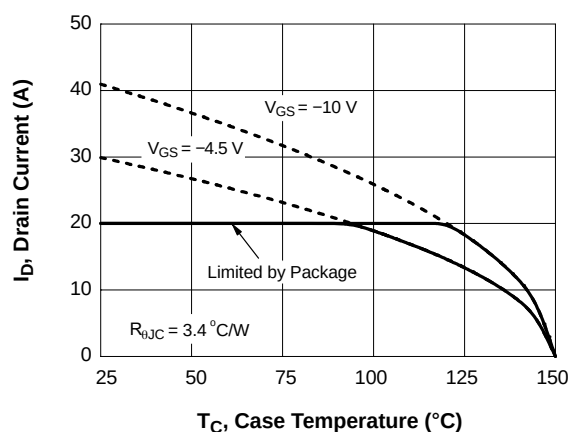


Figure 10. Maximum Continuous Drain Current vs Case Temperature

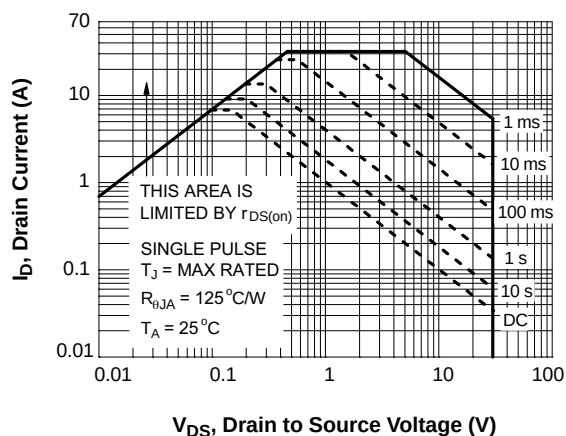


Figure 11. Forward Bias Safe Operating Area

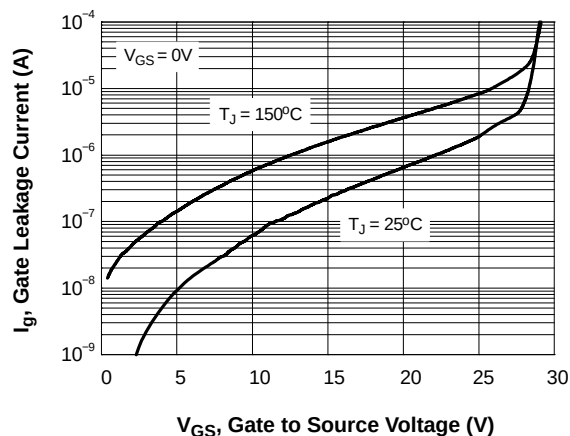


Figure 12. I_{gss} vs V_{gss}

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

($T_J = 25^\circ\text{C}$ unless otherwise noted)

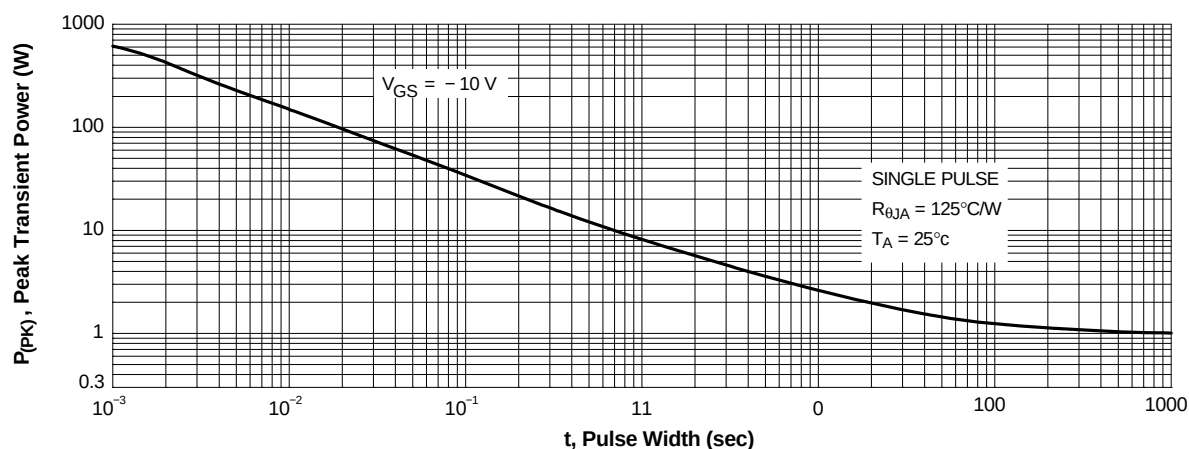


Figure 13. Single Pulse Maximum Power Dissipation

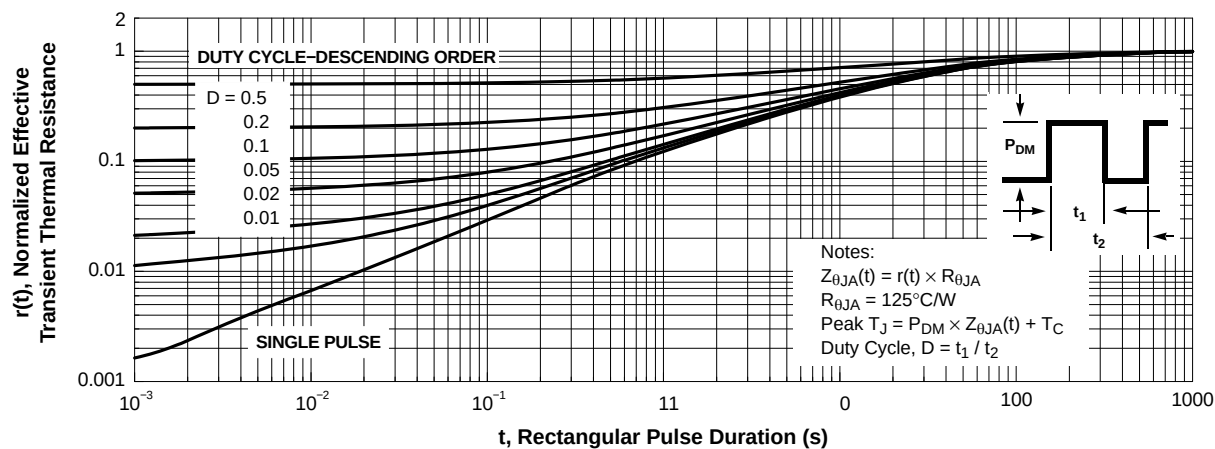


Figure 14. Junction-to-Ambient Transient Thermal Response Curve

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