

# FDD6672A

## 30V N-Channel PowerTrench® MOSFET

### General Description

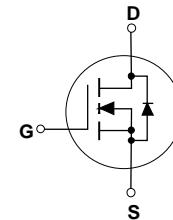
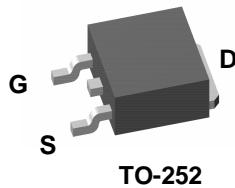
This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low  $R_{DS(ON)}$  and fast switching speed.

### Applications

- DC/DC converter

### Features

- 65 A, 30 V.  $R_{DS(ON)} = 9.5 \text{ m}\Omega$  @  $V_{GS} = 4.5 \text{ V}$   
 $R_{DS(ON)} = 8 \text{ m}\Omega$  @  $V_{GS} = 10 \text{ V}$
- High performance trench technology for extremely low  $R_{DS(ON)}$
- Low gate charge (33 nC typical)
- High power and current handling capability



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

Symbol	Parameter	Ratings	Units
$V_{DSS}$	Drain-Source Voltage	30	V
$V_{GSS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current – Continuous (Note 1a)	65	A
	– Pulsed	100	
$P_D$	Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$ (Note 1)	70	W
	@ $T_A = 25^\circ\text{C}$ (Note 1a)	3.2	
	@ $T_A = 25^\circ\text{C}$ (Note 1b)	1.3	
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	°C

### Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Note 1)	1.8	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1b)	96	°C/W

### Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
FDD6672A	FDD6672A	13"	16mm	2500 units

## Electrical Characteristics

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$\text{BV}_{\text{DSS}}$	Drain-Source Breakdown Voltage	$V_{\text{GS}} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	30			V
$\frac{\Delta \text{BV}_{\text{DSS}}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250 \mu\text{A}$ , Referenced to $25^\circ\text{C}$		20		$\text{mV/}^\circ\text{C}$
$I_{\text{DSS}}$	Zero Gate Voltage Drain Current	$V_{\text{DS}} = 24 \text{ V}$ , $V_{\text{GS}} = 0 \text{ V}$		1		$\mu\text{A}$
$I_{\text{GSSF}}$	Gate-Body Leakage, Forward	$V_{\text{GS}} = 12 \text{ V}$ , $V_{\text{DS}} = 0 \text{ V}$		100		nA
$I_{\text{GSSR}}$	Gate-Body Leakage, Reverse	$V_{\text{GS}} = -12 \text{ V}$ $V_{\text{DS}} = 0 \text{ V}$		-100		nA
<b>On Characteristics</b> (Note 2)						
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{\text{DS}} = V_{\text{GS}}$ , $I_D = 250 \mu\text{A}$	0.8	1.2	2.0	V
$\frac{\Delta V_{\text{GS(th)}}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = 250 \mu\text{A}$ , Referenced to $25^\circ\text{C}$		-4		$\text{mV/}^\circ\text{C}$
$R_{\text{DS(on)}}$	Static Drain-Source On-Resistance	$V_{\text{GS}} = 4.5 \text{ V}$ , $I_D = 13 \text{ A}$ $V_{\text{GS}} = 4.5 \text{ V}$ , $I_D = 13 \text{ A}$ , $T_J = 125^\circ\text{C}$ $V_{\text{GS}} = 10 \text{ V}$ , $I_D = 14 \text{ A}$	8.2 11.5 6.8	9.5 16 8		$\text{m}\Omega$
$I_{\text{D(on)}}$	On-State Drain Current	$V_{\text{GS}} = 10 \text{ V}$ , $V_{\text{DS}} = 5 \text{ V}$	50			A
$g_{\text{FS}}$	Forward Transconductance	$V_{\text{DS}} = 10 \text{ V}$ , $I_D = 15 \text{ A}$		75		S
<b>Dynamic Characteristics</b>						
$C_{\text{iss}}$	Input Capacitance	$V_{\text{DS}} = 15 \text{ V}$ , $V_{\text{GS}} = 0 \text{ V}$ , $f = 1.0 \text{ MHz}$		5070		pF
$C_{\text{oss}}$	Output Capacitance			550		pF
$C_{\text{rss}}$	Reverse Transfer Capacitance			230		pF
<b>Switching Characteristics</b> (Note 2)						
$t_{\text{d(on)}}$	Turn-On Delay Time	$V_{\text{DD}} = 10 \text{ V}$ , $I_D = 1 \text{ A}$ , $V_{\text{GS}} = 4.5 \text{ V}$ , $R_{\text{GEN}} = 6 \Omega$		17	25	ns
$t_r$	Turn-On Rise Time			18	25	ns
$t_{\text{d(off)}}$	Turn-Off Delay Time			69	100	ns
$t_f$	Turn-Off Fall Time			29	42	ns
$Q_g$	Total Gate Charge	$V_{\text{DS}} = 15 \text{ V}$ , $I_D = 15 \text{ A}$ , $V_{\text{GS}} = 4.5 \text{ V}$		33	46	nC
$Q_{\text{gs}}$	Gate-Source Charge			7.5		nC
$Q_{\text{gd}}$	Gate-Drain Charge			6.8		nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain-Source Diode Forward Current			2.7		A
$V_{\text{SD}}$	Drain-Source Diode Forward Voltage	$V_{\text{GS}} = 0 \text{ V}$ , $I_S = 2.7 \text{ A}$ (Note 2)		0.7	1.2	V

**Notes:**

- $R_{\text{thJA}}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the drain tab.  $R_{\text{thJC}}$  is guaranteed by design while  $R_{\text{thCA}}$  is determined by the user's board design.



- a)  $R_{\text{thJA}} = 40^\circ\text{C/W}$  when mounted on a 1 in 2 pad of 2 oz copper.

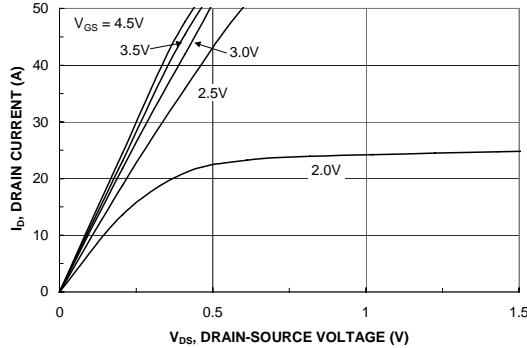


- b)  $R_{\text{thJA}} = 96^\circ\text{C/W}$  on a minimum mounting pad.

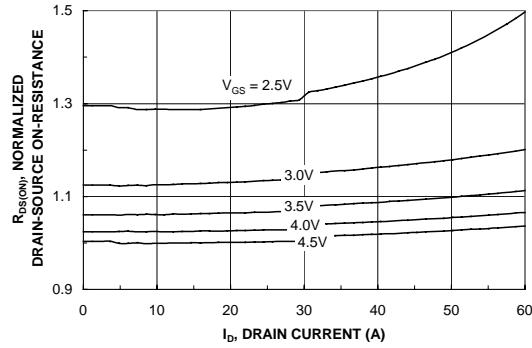
Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width < 300μs, Duty Cycle < 2.0%

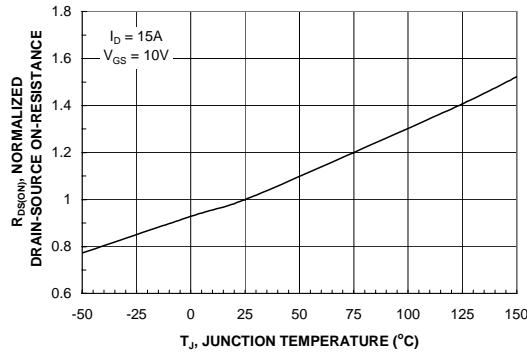
## Typical Characteristics



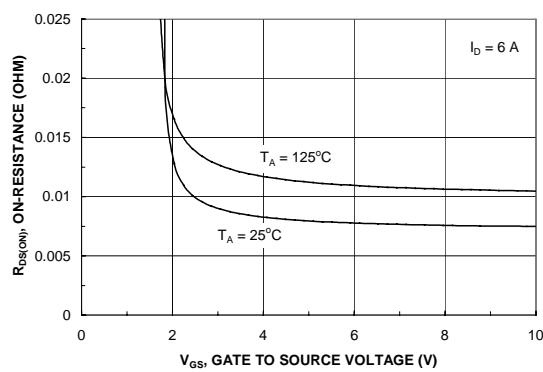
**Figure 1. On-Region Characteristics.**



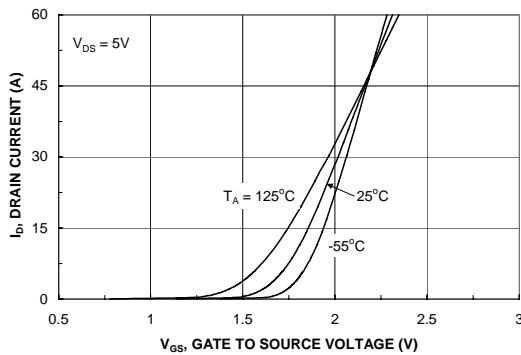
**Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.**



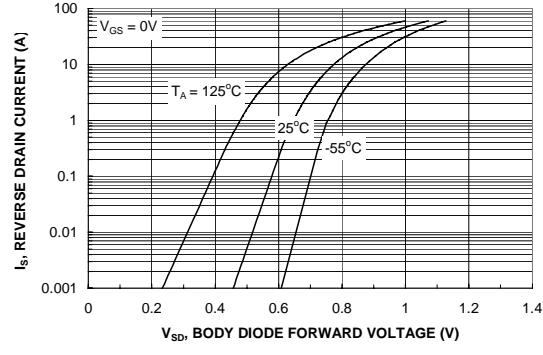
**Figure 3. On-Resistance Variation with Temperature.**



**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

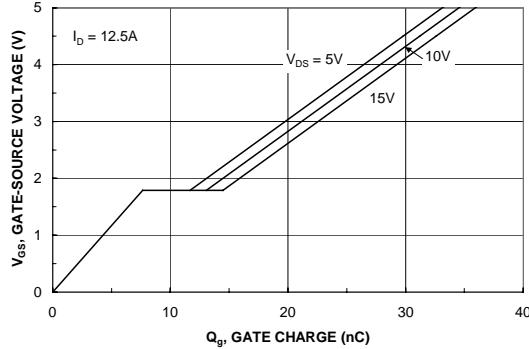


Figure 7. Gate Charge Characteristics.

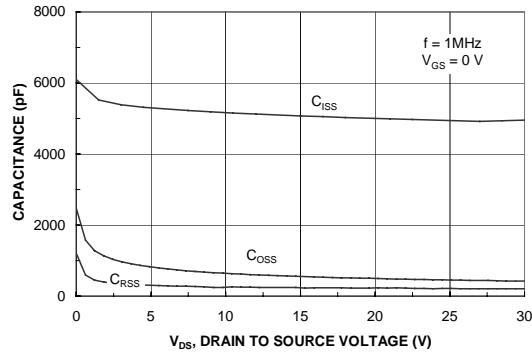


Figure 8. Capacitance Characteristics.

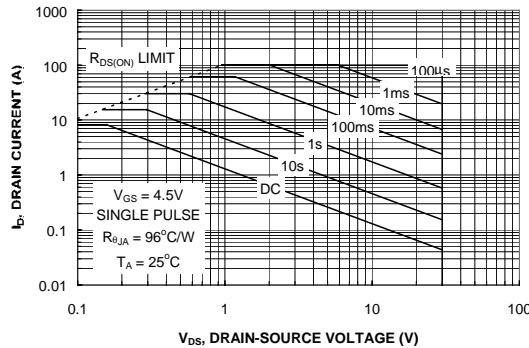


Figure 9. Maximum Safe Operating Area.

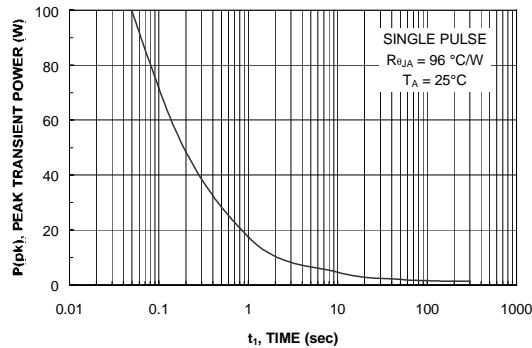


Figure 10. Single Pulse Maximum Power Dissipation.

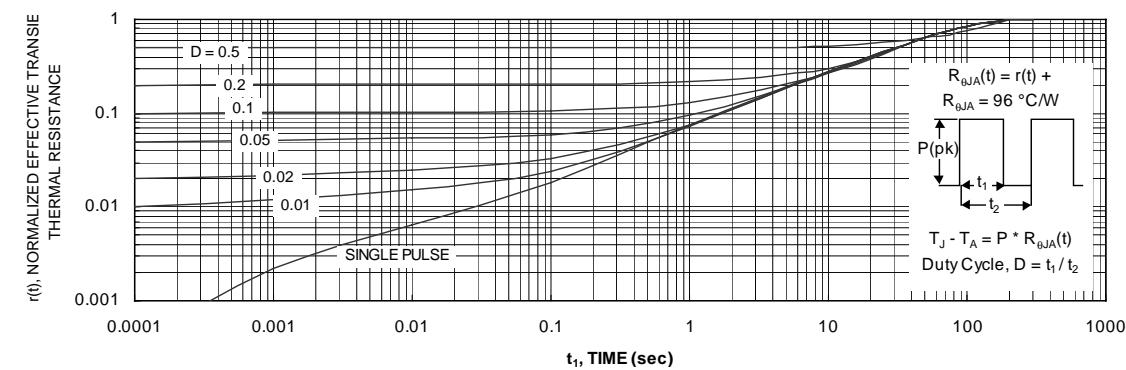


Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1b.  
Transient thermal response will change depending on the circuit board design.

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