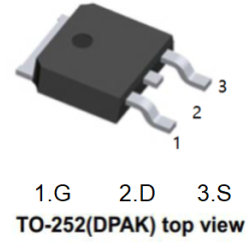


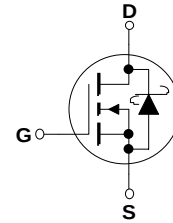
Applications

- DC/DC converter
- Low side notebook



Features

- $V_{DS}(V) = 30V$
- $I_D = 90A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 5.7m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 7.1m\Omega$ ($V_{GS} = 4.5V$)
- Low gate charge (46nC typical)
- High power and current handling capability



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

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain-Source Voltage	30	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous (Note 3)	90	A
	– Pulsed (Note 1a)	100	
P_D	Power Dissipation for Single Operation (Note 1)	70	W
		3.1	
		1.3	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to $+150$	$^\circ C$

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Note 1)	1.8	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1a)	40	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1b)	96	$^\circ C/W$

Electrical Characteristics

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
W_{DSS}	Drain-Source Avalanche Energy	Single Pulse, $V_{DD} = 15\text{ V}$, $I_D = 16\text{ A}$		108	250	mJ
I_{AR}	Drain-Source Avalanche Current				16	A
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = 1\text{ mA}$	30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 10\text{ mA}$, Referenced to 25°C		31		mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 24\text{ V}$, $V_{GS} = 0\text{ V}$			500	μA
I_{GSS}	Gate-Body Leakage	$V_{GS} = \pm 20\text{ V}$, $V_{DS} = 0\text{ V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 1\text{ mA}$	1	1.5	3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = 10\text{ mA}$, Referenced to 25°C		-3.6		mV/ $^\circ\text{C}$
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}$, $I_D = 16\text{ A}$ $V_{GS} = 4.5\text{ V}$, $I_D = 15\text{ A}$		4.7 5.8	5.7 7.1	m Ω
g_{FS}	Forward Transconductance	$V_{DS} = 5\text{ V}$, $I_D = 16\text{ A}$		61		S
C_{iss}	Input Capacitance	$V_{DS} = 15\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$		2500		pF
C_{oss}	Output Capacitance			710		pF
C_{rss}	Reverse Transfer Capacitance			270		pF
R_G	Gate Resistance	$V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$		1.6		Ω
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 15\text{ V}$, $I_D = 1\text{ A}$, $V_{GS} = 10\text{ V}$, $R_{GEN} = 6\text{ }\Omega$		12	21	ns
t_r	Turn-On Rise Time			12	22	ns
$t_{d(off)}$	Turn-Off Delay Time			46	74	ns
t_f	Turn-Off Fall Time			28	44	ns
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 15\text{ V}$, $I_D = 1\text{ A}$, $V_{GS} = 4.5\text{ V}$, $R_{GEN} = 6\text{ }\Omega$		20	32	ns
t_r	Turn-On Rise Time			24	38	ns
$t_{d(off)}$	Turn-Off Delay Time			35	56	ns
t_f	Turn-Off Fall Time			27	43	ns
$Q_{g(TOT)}$	Total Gate Charge, $V_{GS} = 10\text{ V}$	$V_{DS} = 15\text{ V}$, $I_D = 16\text{ A}$		46	64	nC
Q_g	Total Gate Charge, $V_{GS} = 5\text{ V}$			25	35	nC
Q_{gs}	Gate-Source Charge			7		nC
Q_{gd}	Gate-Drain Charge			9		nC

Electrical Characteristics (continued)

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
I_S	Maximum Continuous Drain–Source Diode Forward Current				3.5	A
V_{SD}	Drain–Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 3.5\text{ A}$ (Note 2)		0.4	0.7	V
t_{RR}	Diode Reverse Recovery Time	$dI_F/dt = 300\text{ A/us}, I_F = 16\text{ A}$		25		ns
I_{RM}	Maximum Recovery Current			1.9		A
Q_{RR}	Diode Reverse Recovery Charge			24		nC

Notes:

- $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) $R_{\theta JA} = 40^\circ\text{C/W}$ when mounted on a 1in² pad of 2 oz copper



b) $R_{\theta JA} = 96^\circ\text{C/W}$ when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

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

- Maximum current is calculated as:
$$\sqrt{\frac{P_D}{R_{DS(on)}}}$$

where P_D is maximum power dissipation at $T_C = 25^\circ\text{C}$ and $R_{DS(on)}$ is at $T_{J(max)}$ and $V_{GS} = 10\text{ V}$. Package current limitation is 21A

Typical Characteristics

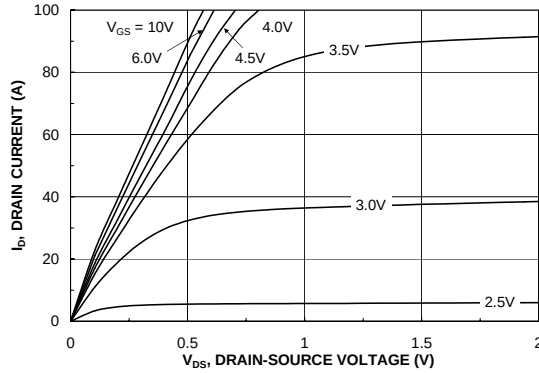


Figure 1. On-Region Characteristics

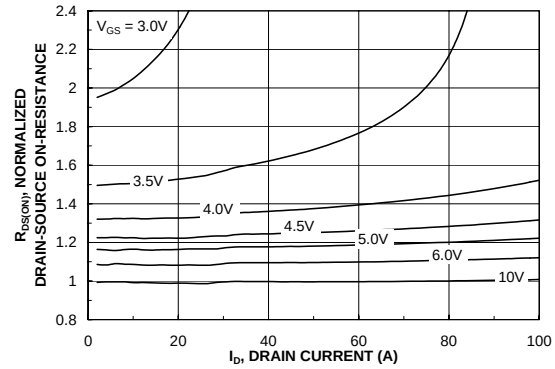


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

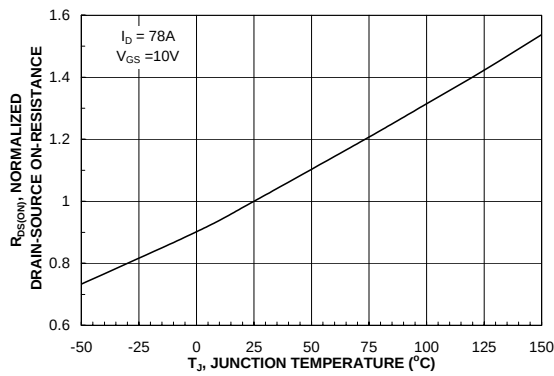


Figure 3. On-Resistance Variation with Temperature

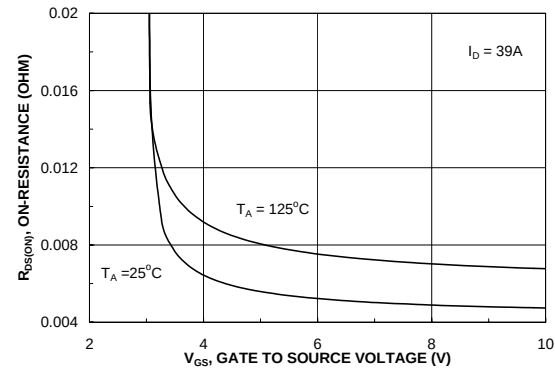


Figure 4. On-Resistance Variation with Gate-to-Source Voltage

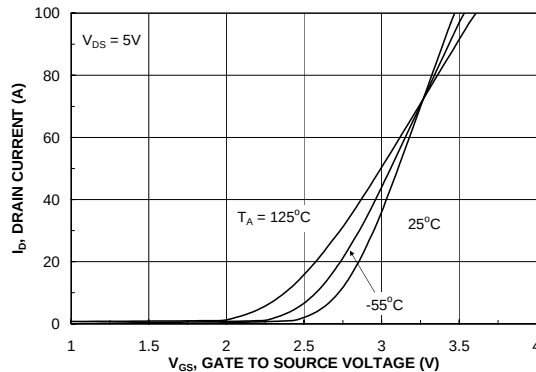


Figure 5. Transfer Characteristics

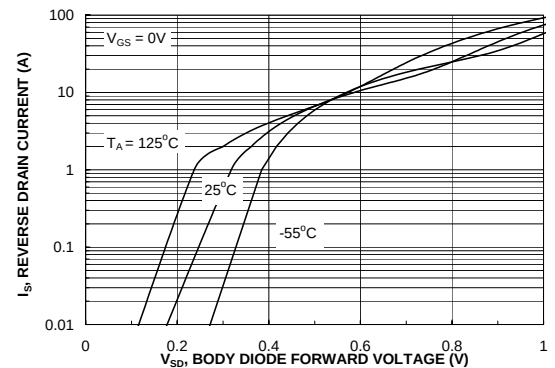


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

Typical Characteristics

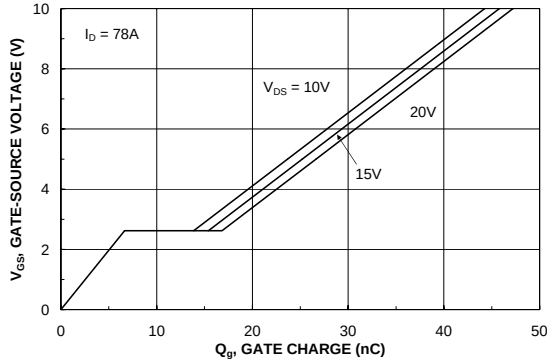


Figure 7. Gate Charge Characteristics

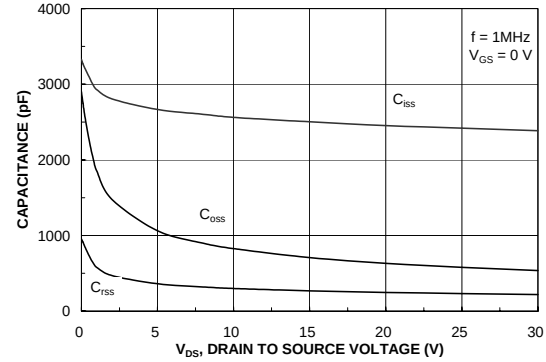


Figure 8. Capacitance Characteristics

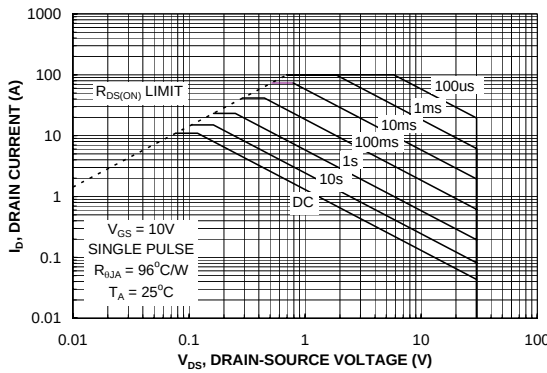


Figure 9. Maximum Safe Operating Area

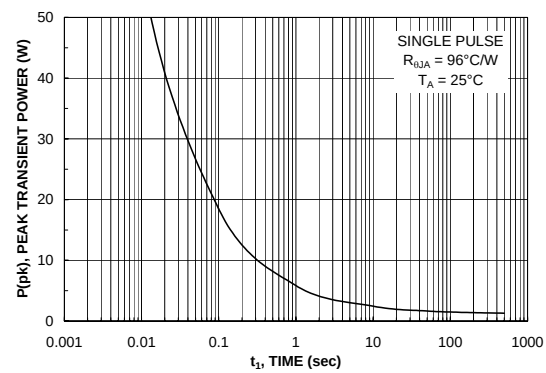


Figure 10. Single Pulse Maximum Power Dissipation

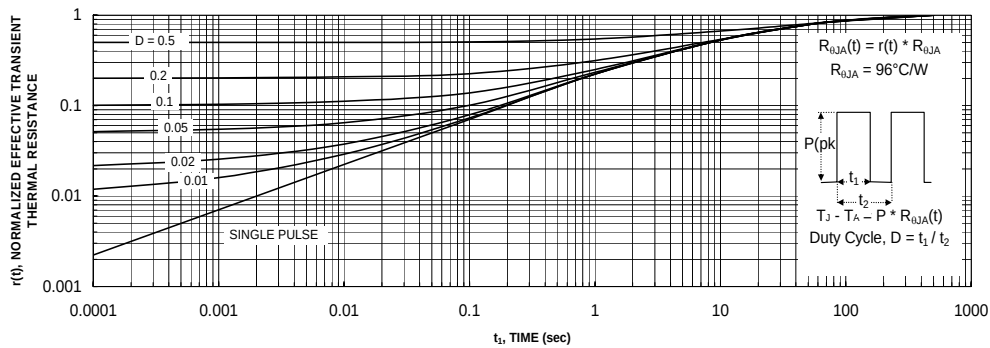
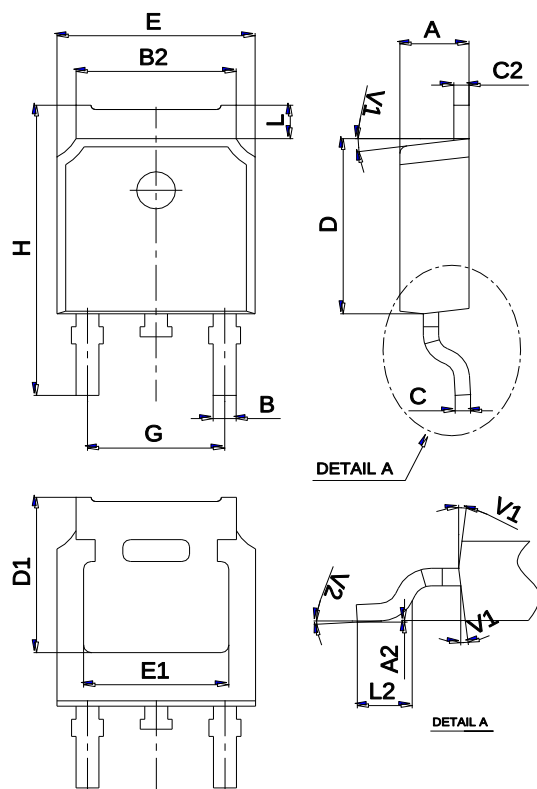


Figure 11. Transient Thermal Response Curve

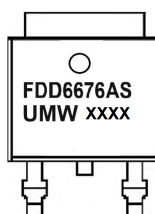
Thermal characterization performed using the conditions described in Note 1b.
Transient thermal response will change depending on the circuit board design.

Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW FDD6676AS	TO-252	2500	Tape and reel