

1.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.

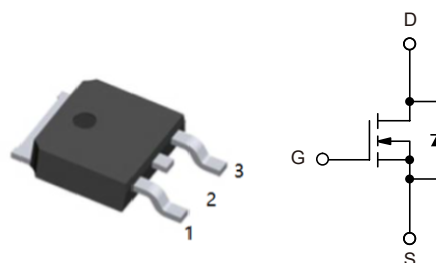
2.Features

- $V_{DS(V)}=25V$
- $I_D=30A$
- $R_{DS(ON)}<7.5m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<17m\Omega(V_{GS}=4.5V)$

3.Pinning information

Pin	Symbol	Description
1	G	GATE
2	D	DRAIN
3	S	SOURCE

TO-252(DPAK)
top view



4.Absolute Maximum Ratings $T_C=25^\circ C$

Parameter	Symbol	Rating	Units
Drain to Source Voltage	V_{DS}	25	V
Gate to Source Voltage	V_{GS}	± 20	
Drain Current -Continuous (Package limited) $T_C=25^\circ C$	I_D	30	A
-Continuous (Silicon limited) $T_C=25^\circ C$		54	
-Continuous $T_A=25^\circ C$ (Note 1a)		17.7	
-Pulsed		100	
Single Pulse Avalanche Energy (Note 3)	E_{AS}	32	mJ
Power Dissipation $T_C=25^\circ C$	P_D	39	W
Power Dissipation $T_A=25^\circ C$ (Note 1a)		3.7	
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ C/W$



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5.Thermal Characteristics

Parameter	Symbol	Rating	Units
Thermal Resistance, Junction to Case	$R_{\theta JC}$	3.8	°C/W
Thermal Resistance, Junction to Ambient (Note 1a)	$R_{\theta JA}$	40	°C/W



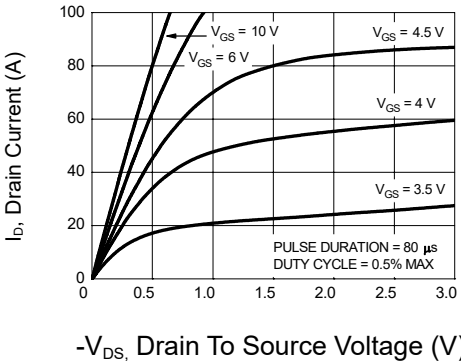
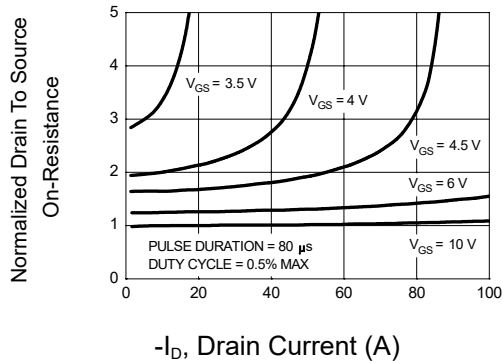
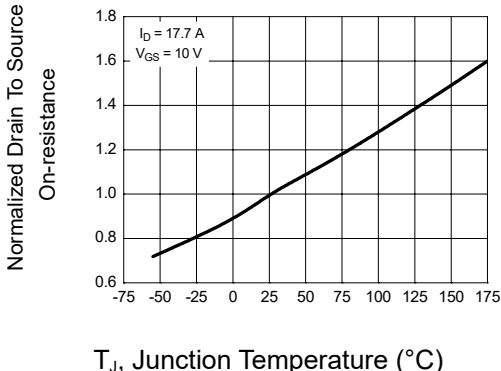
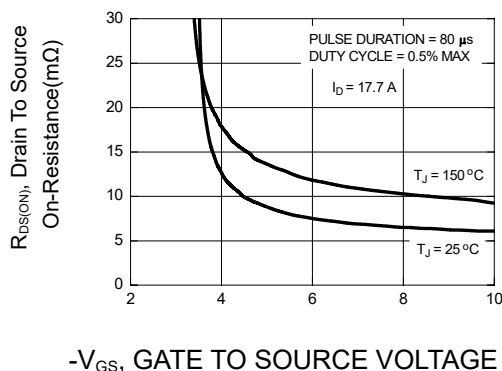
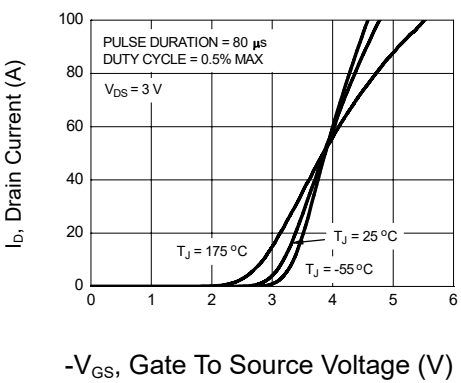
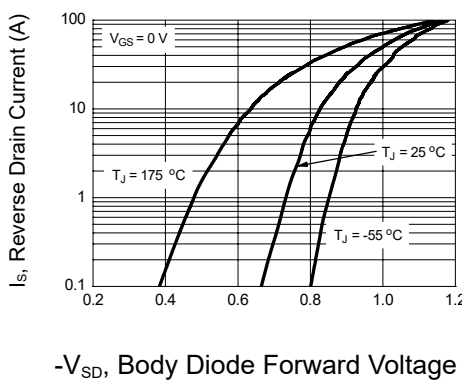
6. Electrical Characteristic (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	25			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I _D =250μA Referenced to 25°C		16		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V			1	μA
Gate to Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
Gate to Source Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.9	3	V
Gate to Source Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I _D =250μA Referenced to 25°C		-6		mV/°C
Static Drain to Source On Resistance	R _{DS(on)}	V _{GS} =10V, I _D =17.7A		5.8	7.5	mΩ
		V _{GS} =4.5V, I _D =13.2A		12.6	17	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =17.7A		84		S
Input Capacitance	C _{iss}	V _{DS} =13V, V _{GS} =0V f=1MHz		1120	1490	pF
Output Capacitance	C _{oss}			238	320	pF
Reverse Transfer Capacitance	C _{rss}			221	335	pF
Gate Resistance	R _g			0.9		Ω
Turn-On DelayTime	t _{D(on)}	V _{DD} =13V, I _D =17.7A V _{GS} =10V, R _{GEN} =6Ω		8	16	ns
Rise Time	t _r			5	10	ns
Turn-Off DelayTime	t _{D(off)}			18	33	ns
Fall Time	t _f			3	10	ns
Total Gate Charge	Q _g	V _{GS} =0V to 10V		20	29	nC
Total Gate Charge	Q _g	V _{GS} =0V to 5V		12	17	nC
Gate to Source Gate Charge	Q _{gs}	V _{DD} =13V		3.5		nC
Gate to Drain "Miller" Charge	Q _{gd}	I _D =17.7A		4.9		nC
Source to Drain Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =3.1A (Note 2)		0.8	1.2	V
		V _{GS} =0V, I _S =17.7A (Note 2)		0.9	1.3	V
Reverse Recovery Time	t _{rr}	I _F =17.7A, di/dt=100A/μs		17	31	ns
Reverse Recovery Charge	Q _{rr}			5	10	nC



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7.1 Typical characteristic

	
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 Variation with Gate-to-Source Voltage
	
Figure 5: Transfer Characteristics	Figure 6: Source to Drain Diode Forward Voltage vs Source Current



7.2 Typical characteristic

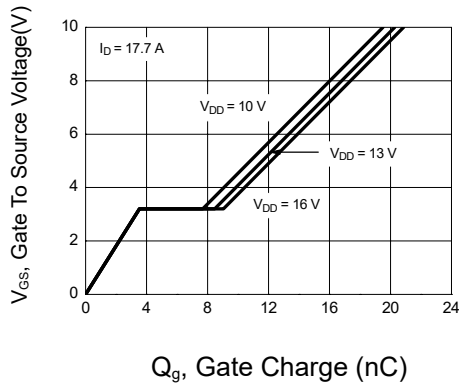


Figure 7: Gate Charge Characteristics

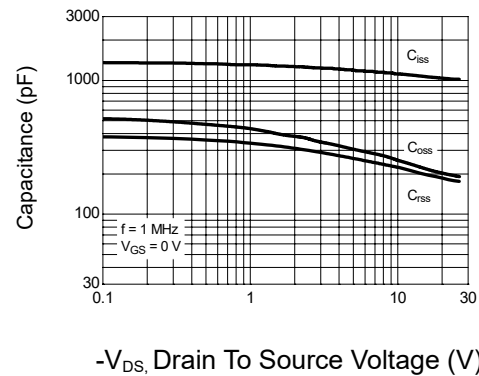


Figure 8: Capacitance vs Drain to Source Voltage

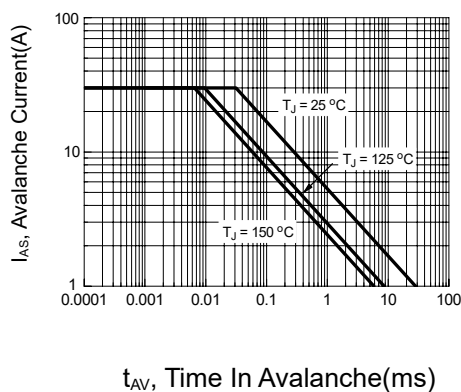


Figure 9: Unclamped Inductive Switching Capability

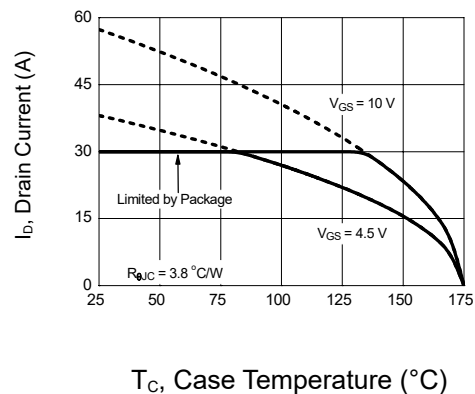


Figure 10: Maximum Continuous Drain Current vs Case Temperature

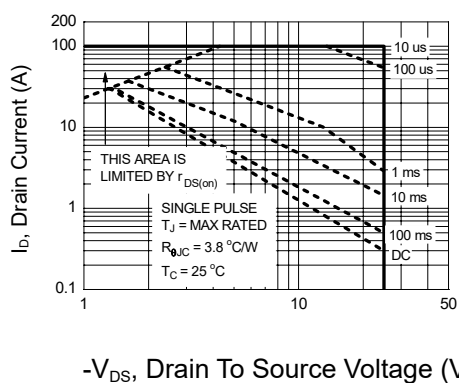


Figure 11: Forward Bias Safe Operating Area

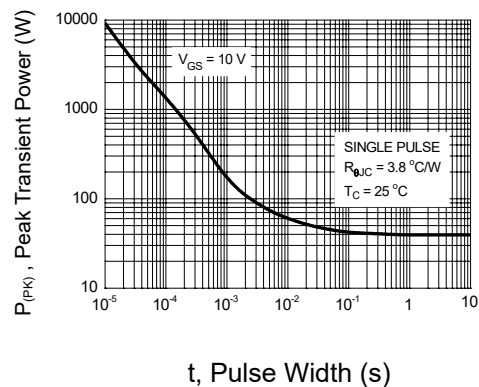


Figure 12: Single Pulse Maximum Power Dissipation



7.3Typical characteristic

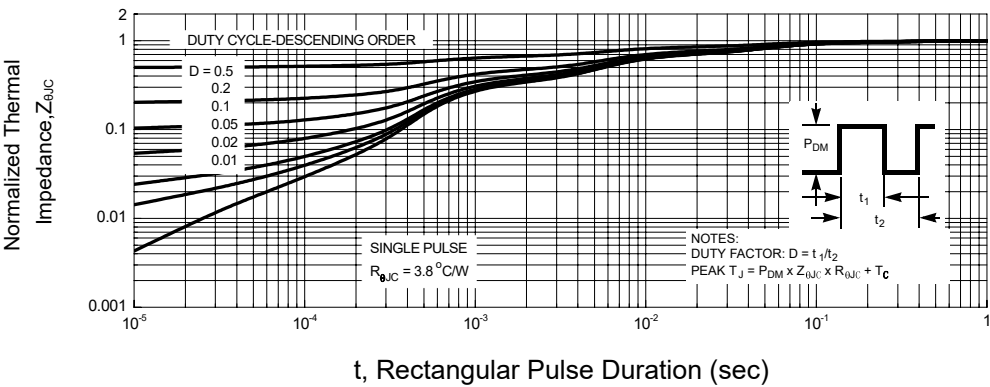


Figure 13: Transient Thermal Response Curve

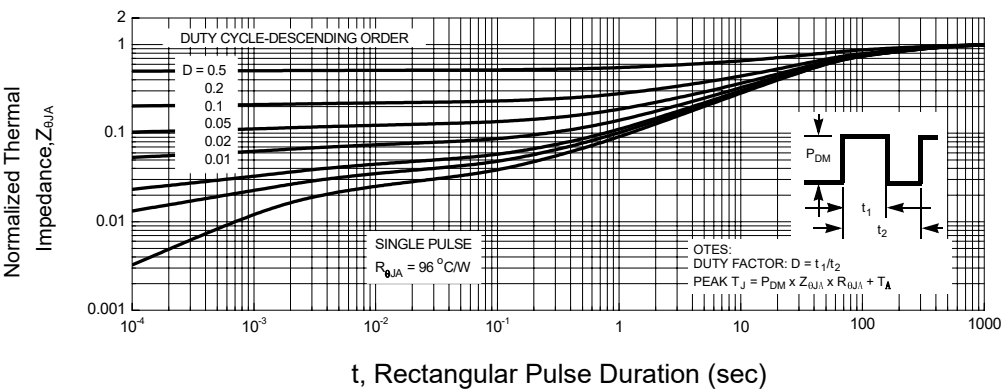
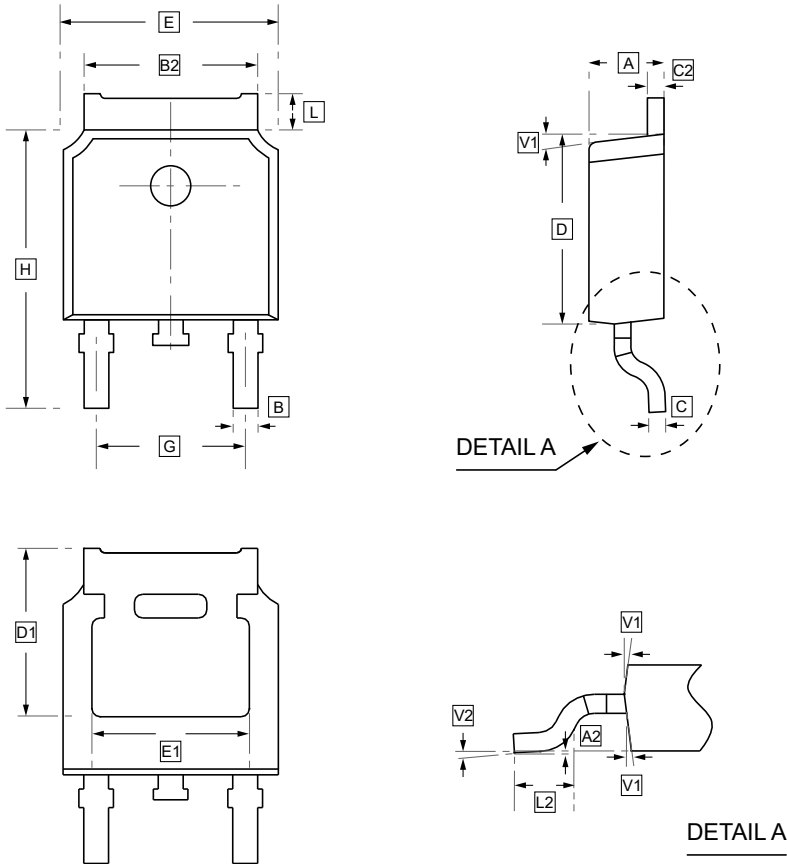


Figure 14: Transient Thermal Response Curve



8.TO-252 Package Outline Dimensions

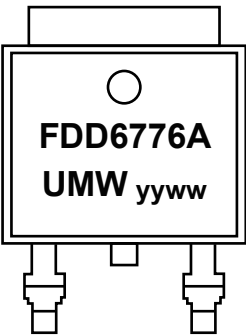


DIMENSIONS (mm are the original dimensions)

Symbol	A	A2	B	B2	C	C2	D	D1	E	E1	G	H	L	L2	V1	V2
Min	2.10	0	0.66	5.18	0.40	0.44	5.90	5.30	6.40	4.63	4.47	9.50	1.09	1.35		0°
Max	2.50	0.10	0.86	5.48	0.60	0.58	6.30	REF	6.80		4.67	10.70	1.21	1.65		6°



9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDD6776A	TO-252	2500	Tape and reel



10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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