

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.

2.2Features

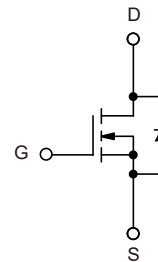
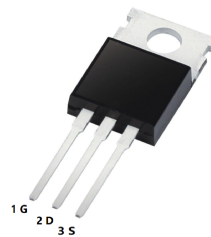
- UIL Capability (Single Pulse and Repetitive Pulse)
- RoHS Compliant

2.1Features

- $V_{DS(V)}=30V$
- $I_D=80A$
- $R_{DS(ON)}<2.5m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<2.9m\Omega(V_{GS}=4.5V)$

3.Pinning information

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



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

Parameter	Symbol	Rating	Units
Drain to Source Voltage	V_{DS}	30	V
Gate to Source Voltage	V_{GS}	± 20	V
Drain Current - Continuous (Package limited) $T_c=25^\circ C$	I_D	80	A
- Continuous(Silicon limited) $T_c=25^\circ C$		219	A
- Pulsed (Note 1)		556	A
Single Pulse Avalanche Energy (Note 2)	E_{AS}	673	mJ
Power Dissipation	P_D	254	W
Operating and Storage Temperature	T_J, T_{STG}	-55 to 175	$^\circ C$



5.Thermal Characteristics

Parameter	Symbol	Rating	Units
Thermal Resistance, Junction to Case TO220	$R_{\theta JC}$	0.59	°C/W
Thermal Resistance, Junction to Ambient TO220	$R_{\theta JA}$	62	°C/W

* Calculate the continuous current (based on the maximum allowable junction temperature). The current limit of the package is 120 A.



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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain to Source Breakdown Voltage	BV _{DSS}	I _D =1mA, V _{GS} =0V	30			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I _D =1mA Referenced to 25°C		22		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =24V			1	μA
		V _{GS} =0V, T _J =150°C			250	μA
Gate to Source Leakage Current	I _{GSS}	V _{GS} =±20V			±100	nA
Gate to Source Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.6	2.5	V
Gate to Source Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I _D =250μA Referenced to 25°C		-9.6		mV/°C
Drain to Source On Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =80A		1.9	2.5	mΩ
		V _{GS} =5V, I _D =80A		2	2.8	mΩ
		V _{GS} =4.5V, I _D =80A		2.1	2.9	mΩ
		V _{GS} =10V, I _D =80A, T _J =150°C		2.9	3.8	mΩ
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =80A		3.4		S
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V f=1MHz		9200	12240	pF
Output Capacitance	C _{oss}			1700	2260	pF
Reverse Transfer Capacitance	C _{rss}			1060	1590	pF
Gate Resistance	R _g	f=1MHz		1.7		Ω
Turn-On Delay Time	t _{D(on)}	V _{DD} =15V, I _D =80A V _{GS} =5V, R _{GEN} =3Ω		35	56	ns
Rise Time	t _r			135	216	ns
Turn-Off Delay Time	t _{D(off)}			64	103	ns
Fall Time	t _f			59	95	ns
Total Gate Charge at 10V	Q _{g(tot)}	V _{GS} =0V to 10V	V _{DD} =15V I _D =80A	158	222	nC
Total Gate Charge at 5V	Q _{g(5)}	V _{GS} =0V to 5V		81	114	nC
Gate to Source Gate Charge	Q _{gs}			27		nC
Gate to Drain "Miller" Charge	Q _{gd}			33		nC



Source to Drain Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =80A		0.88	1.25	V
		V _{GS} =0V, I _S =40A		0.81	1.2	V
Reverse Recovery Time	t _{rr}	I _F =80A, di/dt=100A/μs		60	90	ns
Reverse Recovery Charge	Q _{rr}			74	111	nC

Notes:

- 1: Pulse Test: Pulse Width<80μs, Duty cycle < 0.5%.
- 2: Starting T_J=25°C, L=0.3mH, I_{AS}=67A, V_{DD}=27V, V_{GS}=10V.



7.1 Typical characteristic

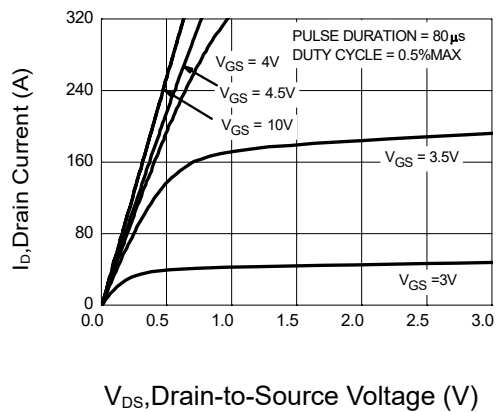


Figure 1: On Region Characteristics

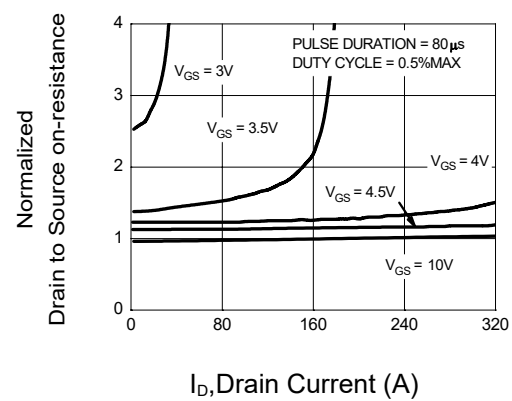


Figure 2: Normalized On-Resistance vs Drain Current and Gate Voltage

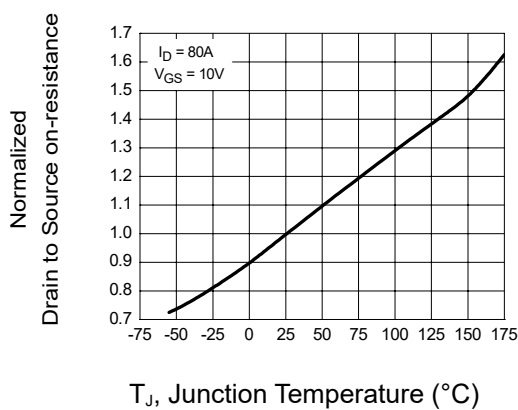


Figure 3: Normalized On Resistance vs Junction Temperature

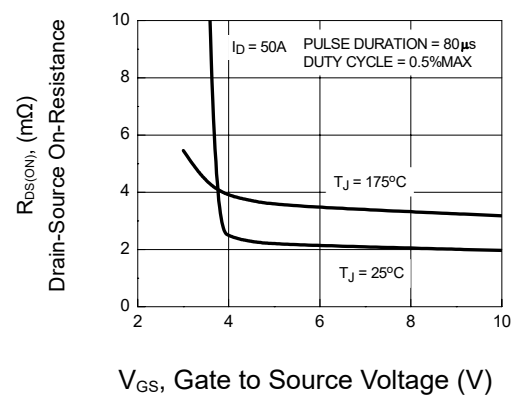


Figure 4: On-Resistance vs Gate to Source Voltage

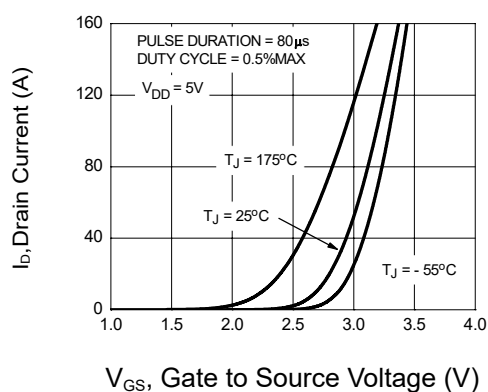


Figure 5: Transfer Characteristics

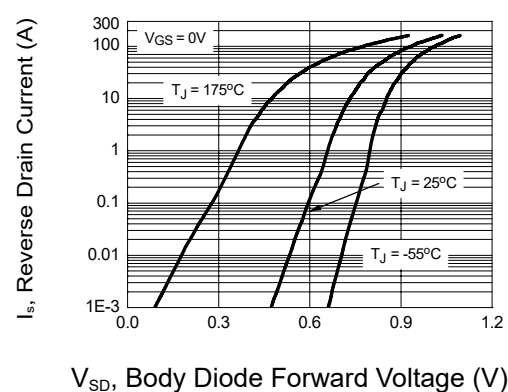


Figure 6: Source to Drain Diode Forward Voltage vs Source Current



7.2 Typical characteristic

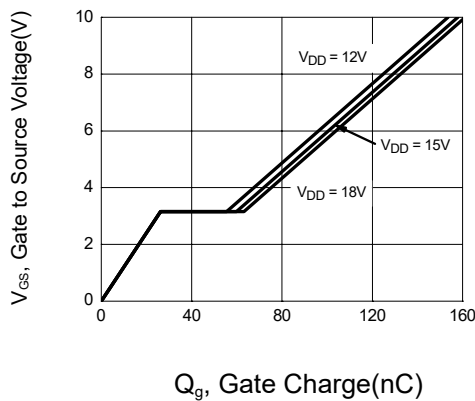


Figure 7: Gate Charge Characteristics

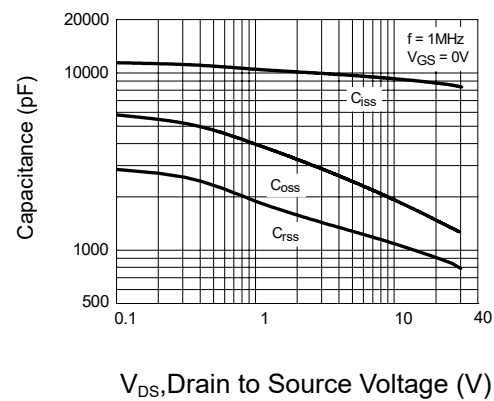


Figure 8: Capacitance vs Drain to Source Voltage

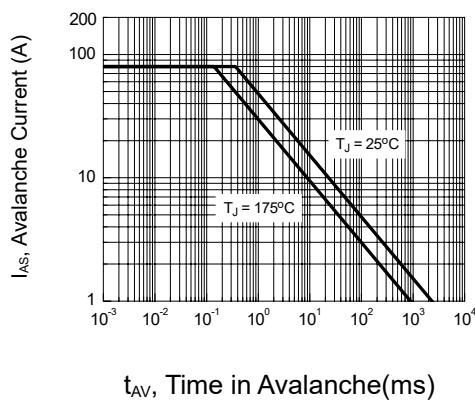


Figure 9: Unclamped Inductive Switching Capability

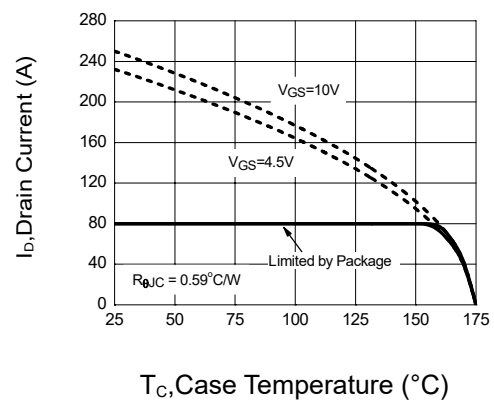


Figure 10: Maximum Continuous Drain Current vs Case Temperature

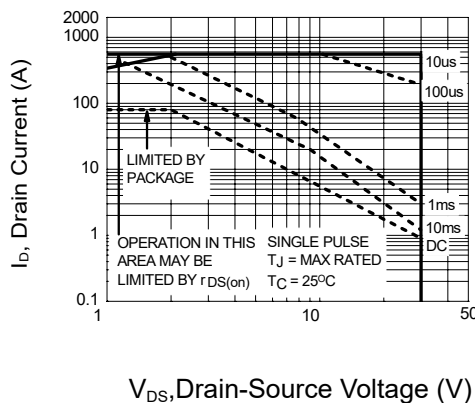


Figure 11: Forward Bias Safe Operating Area

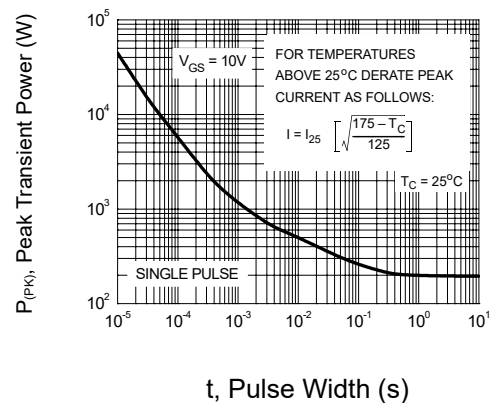
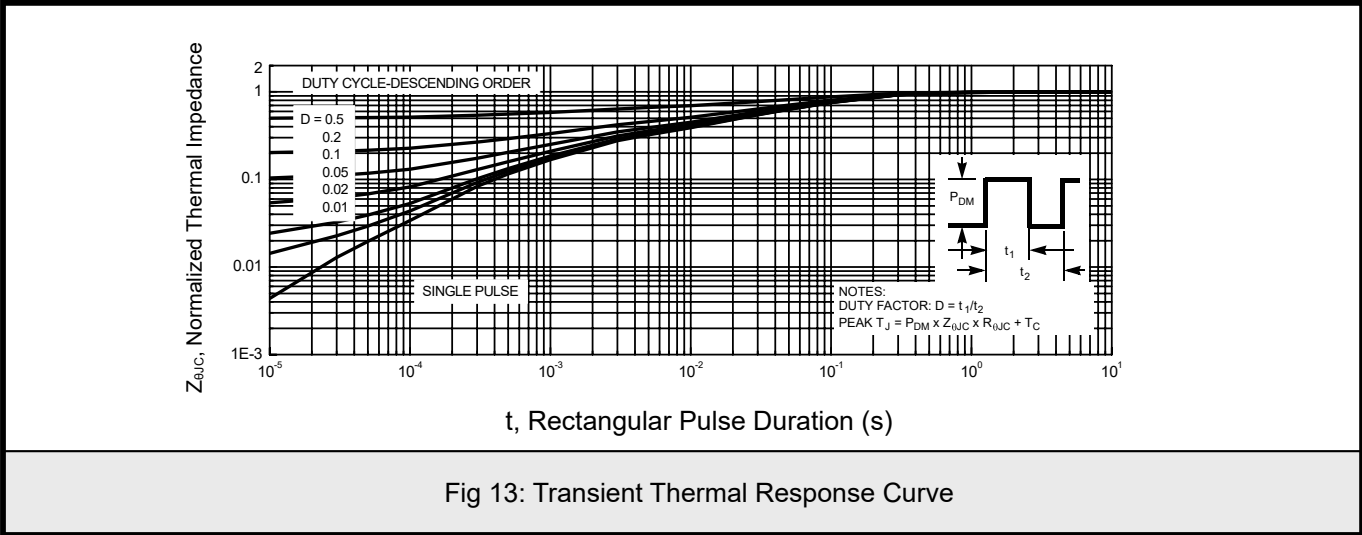


Figure 12: Single Pulse Maximum Power Dissipation

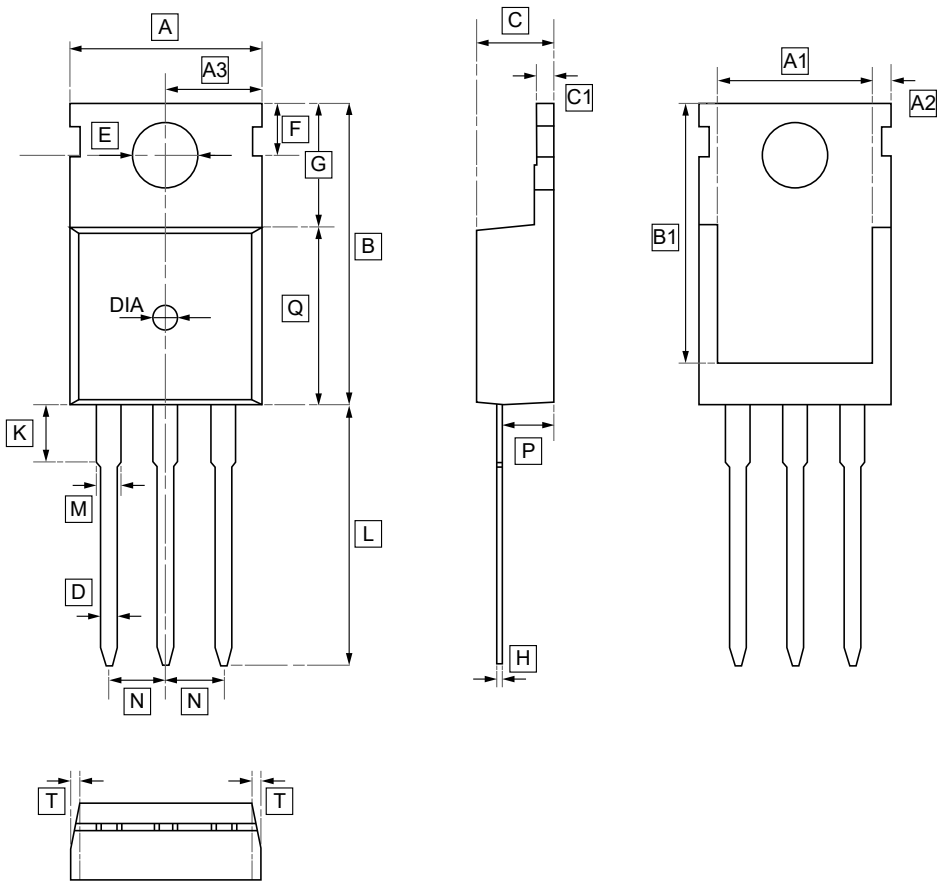


7.3Typical characteristic





8.1 TO-220 Package Outline Dimensions



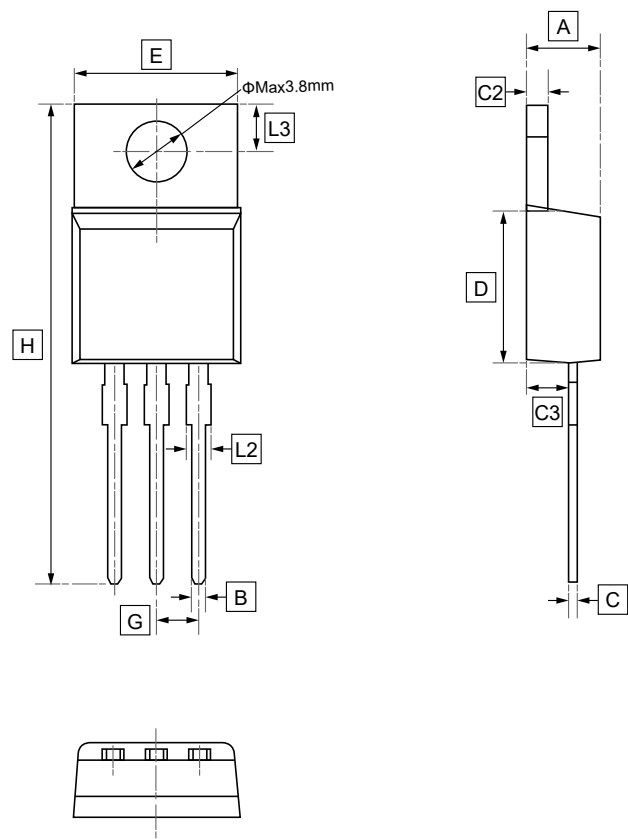
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	B	B1	C	C1	D	E	F	G
Min	9.7	8.44	1.05	4.8	15.4	12.9	4.28	1.1	0.6	3.4	2.65	5.2
Max	10.3	8.84	1.25	5.2	16.2	13.5	4.68	1.5	1.0	3.8	3.25	5.8

Symbol	H	K	L	L1	M	N	P	Q	T	DIA
Min	0.4	2.9	12.8	2.7	1.15	2.49	2.1	8.7	W:0.35	⌀1.5
Max	0.6	3.3	13.6	3.3	1.35	2.59	2.7	9.3		(deep 0.2)



8.2 TO-220 Package Outline Dimensions

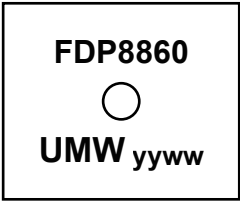


DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	C2	C3	D	E	G	H	L2	L3
Min	4.30	0.60	0.28	1.17	2.30	8.80	9.80	2.44	28.55	1.10	2.59
Max	4.70	1.00	0.48	1.37	2.70	9.20	10.20	2.64	29.15	1.50	2.89



9.Ordering Information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDP8860	TO-220	1000	Tube and box



10.Disclaimer

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