

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.

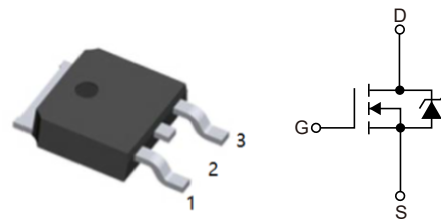
2.Features

- $V_{DS(V)}=30V$
- $I_D=116A$
- $R_{DS(ON)}<5.1m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<6.4m\Omega(V_{GS}=4.5V)$
- Low gate resistance
- RoHS Compliant
- High power and current handling capability
- High performance trench technology for extremely low $R_{DS(ON)}$

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_{DSS}	30	V
Gate to Source Voltage	V_{GS}	± 20	V
Drain Current Continuous ($T_C=25^{\circ}C$, $V_{GS}=10V$) (Note 1)	I_D	116	A
Continuous ($T_C=25^{\circ}C$, $V_{GS}=4.5V$) (Note 1)		103	A
Continuous ($T_{amb}=25^{\circ}C$, $V_{GS}=10V$, with $R_{\theta JA}=52^{\circ}C/W$)		18	A
Pulsed		Figure 4	A
Single Pulse Avalanche Energy (Note 2)	E_{AS}	240	mJ
Power Dissipation	P_D	110	W
Derate above $25^{\circ}C$		0.73	$^{\circ}C/W$
Storage Temperature	T_J, T_{STG}	-55 to 175	$^{\circ}C$



5.Thermal Characteristics

Parameter	Symbol	Rating	Units
Thermal Resistance, Junction-to-Case TO-252,TO-251	$R_{\theta JC}$	1.36	°C/W
Thermal Resistance, Junction-to-Ambient TO-252,TO-251	$R_{\theta JA}$	100	°C/W
Thermal Resistance, Junction-to-Ambient TO-252,1in ² copper pad area	$R_{\theta JA}$	52	°C/W



6. Electrical Characteristic ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Off Characteristics							
Drain to Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V		30			V
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
On Characteristics							
Gate to Source Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA		1.2		2.5	V
Drain to Source On Resistance	R _{DS(ON)}	I _D =35A, V _{GS} =10V			4.2	5.1	mΩ
		I _D =35A, V _{GS} =4.5V			5.2	6.4	mΩ
Dynamic Characteristics							
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, f=1MHz			2990		pF
Output Capacitance	C _{oss}				585		pF
Reverse Transfer Capacitance	C _{rss}				340		pF
Gate Resistance	R _g	V _{GS} =0.5V, f=1MHz			2		Ω
Total Gate Charge at 10V	Q _{g(TOT)}	V _{GS} =0V to 10V	V _{DD} =15V		54	72	nC
Total Gate Charge at 5V	Q _{g(5)}	V _{GS} =0V to 5V	I _D =35A		29	38	nC
Threshold Gate Charge	Q _{g(TH)}	V _{GS} =0V to 1V	I _g =1mA		3	4	nC
Gate to Source Gate Charge	Q _{gs}				8		nC
Gate Charge Threshold to Plateau	Q _{gs2}				5		nC
Gate to Drain “Miller” Charge	Q _{gd}				10		nC
Turn-On Time	t _(on)	V _{DD} =15V, I _D =35A V _{GS} =10V, R _{GS} =4.7Ω				156	ns
Turn-On Delay Time	t _{D(on)}				9		ns
Rise Time	t _r				96		ns
Turn-Off DelayTime	t _{D(off)}				47		ns
Fall Time	t _f				37		ns
Turn-Off Time	t _{off}					126	ns



Drain–Source Diode Characteristics						
Source to Drain Diode Forward Voltage	V _{SD}	I _{SD} =35A			1.25	V
		I _{SD} =15A			1	V
Reverse Recovery Time	t _{rr}	I _F =35A, di/dt=100A/μs			32	ns
Reverse Recovery Charge	Q _{rr}	I _F =35A, di/dt=100A/μs			18	nC

Notes:

- 1: Package current limitation is 35A.
- 2: Starting T_J=25°C, L=0.61mH, I_{AS}=28A, V_{DD}=27V, V_{GS}=10V.



7.1 Typical characteristic

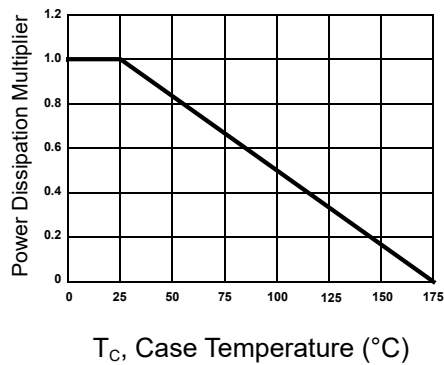


Figure 1: Normalized Power Dissipation vs Case Temperature

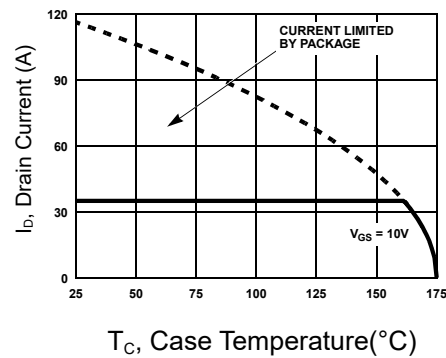


Figure 2: Maximum Continuous Drain Current vs Case Temperature

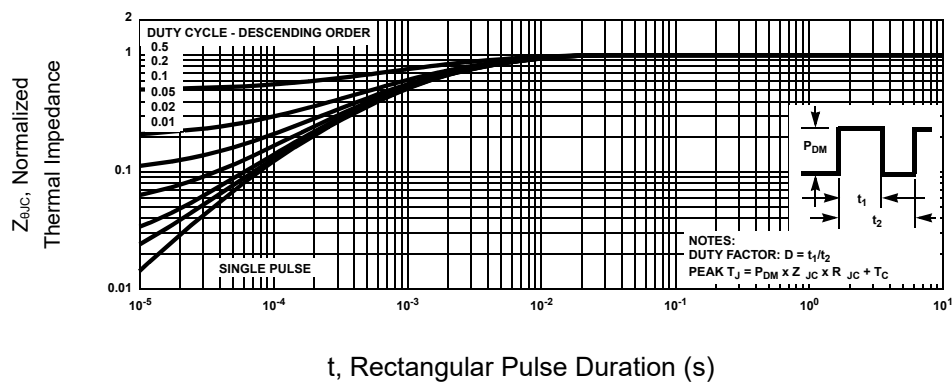


Figure 3: Normalized Maximum Transient Thermal Impedance

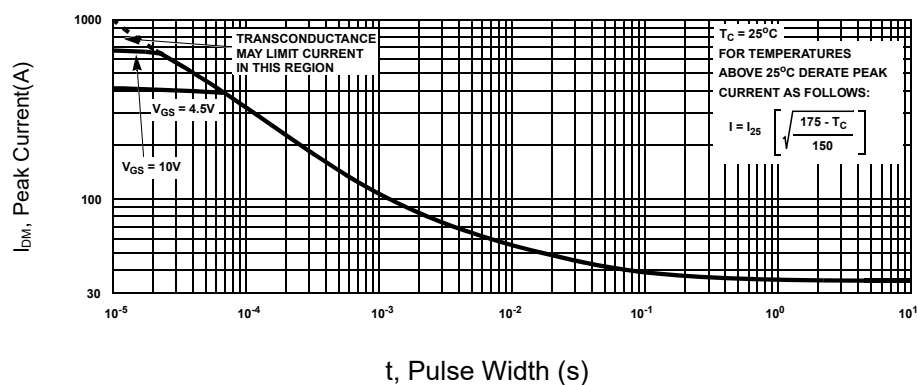


Figure 4: Peak Current Capability



7.2 Typical characteristic

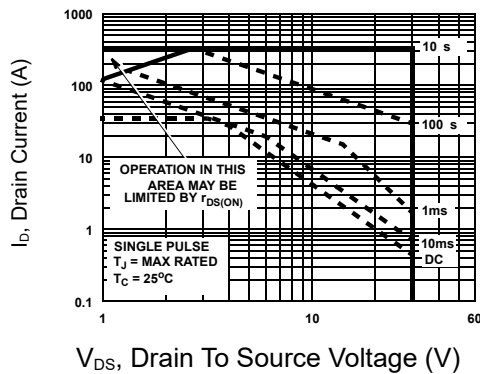


Figure 5: Forward Bias Safe Operating Area

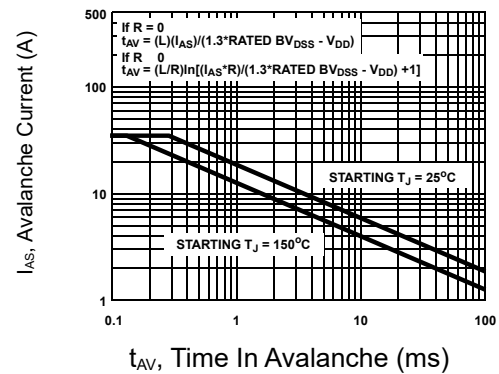


Figure 6: Unclamped Inductive Switching Capability

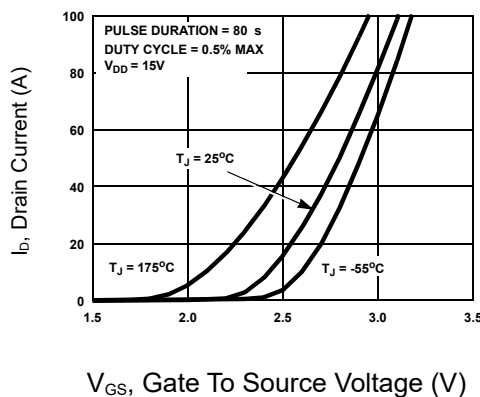


Figure 7: Transfer Characteristics

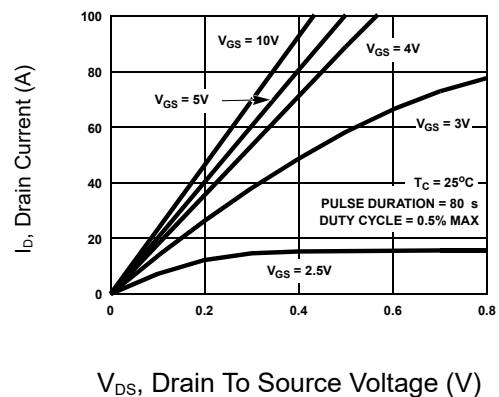


Figure 8: Saturation Characteristics

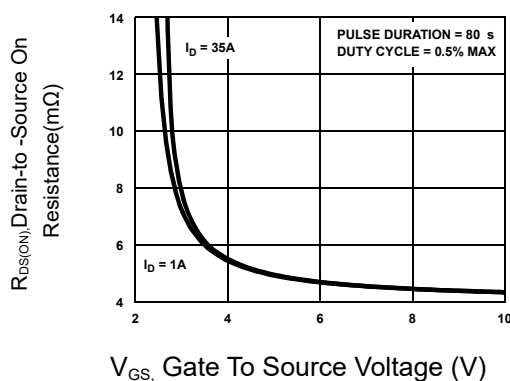


Figure 9: Drain to Source On Resistance vs. Gate Voltage and Drain Current

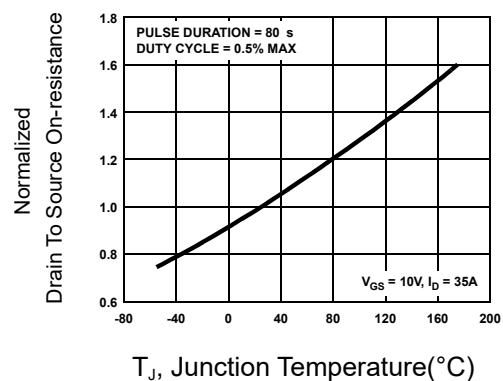
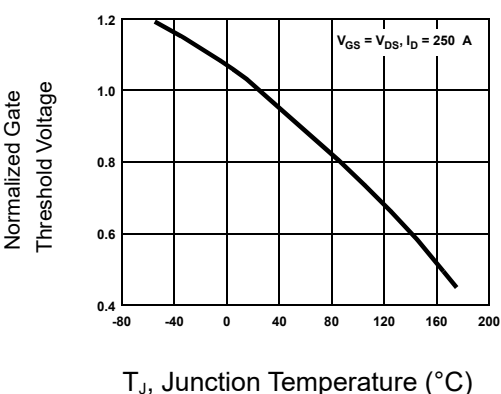
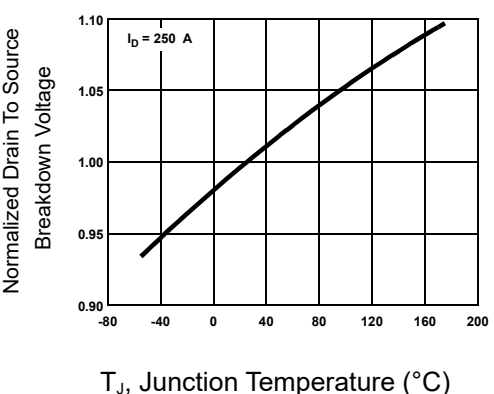
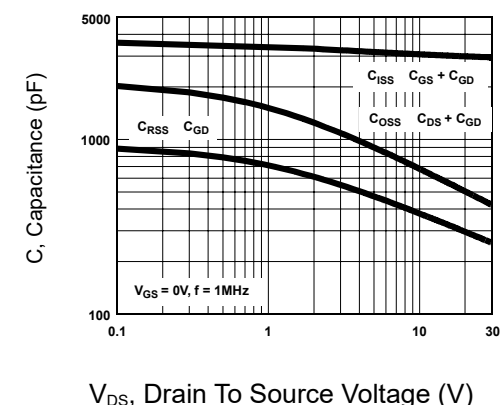
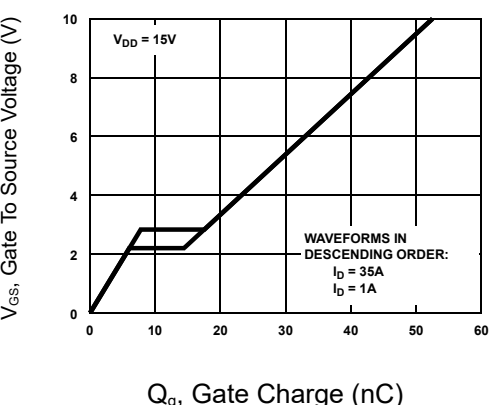


Figure 10: Normalized Drain to Source On Resistance vs. Junction Temperature



7.3Typical characteristic

 Figure 11: Normalized Gate Threshold Voltage vs Junction Temperature	 Figure 12: Normalized Drain to Source Breakdown Voltage vs Junction Temperature
 Figure 13: Capacitance vs Drain to Source Voltage	 Figure 14: Gate Charge Waveforms for Constant Gate Current



7.4 Typical characteristic

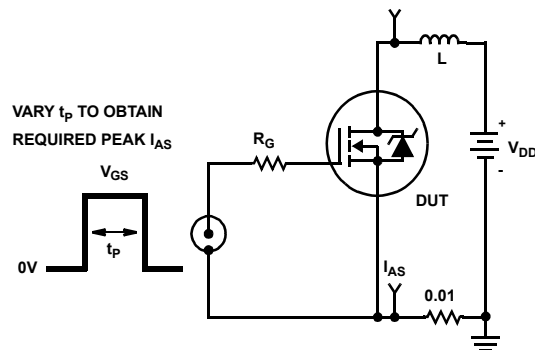


Figure 15. Unclamped Energy Test Circuit

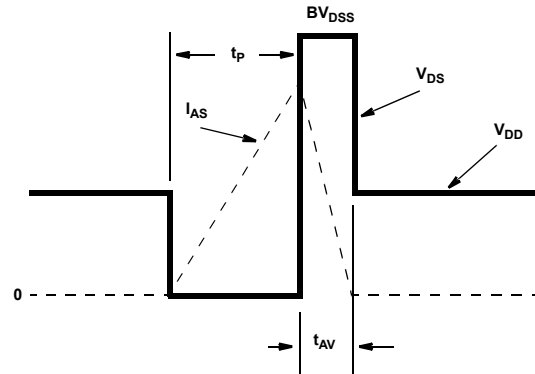


Figure 16. Unclamped Energy Waveforms

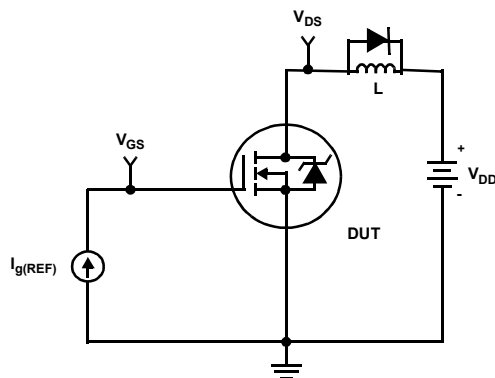


Figure 17. Gate Charge Test Circuit

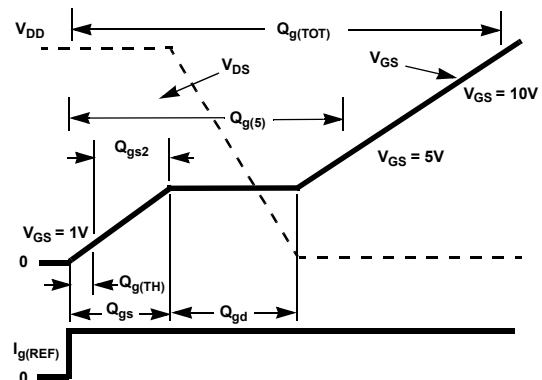


Figure 18. Gate Charge Waveforms

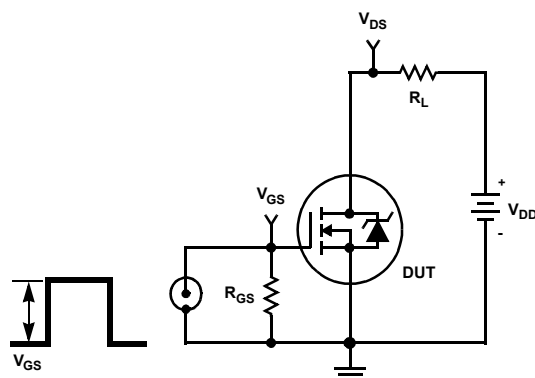


Figure 19. Switching Time Test Circuit

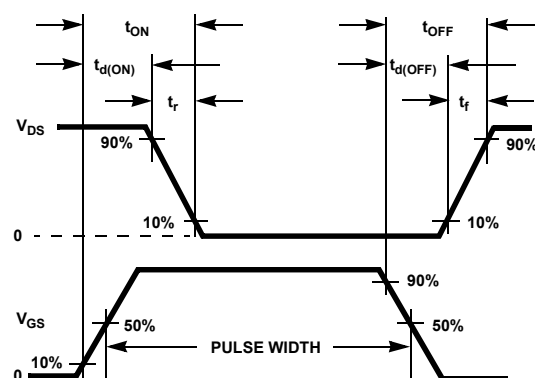
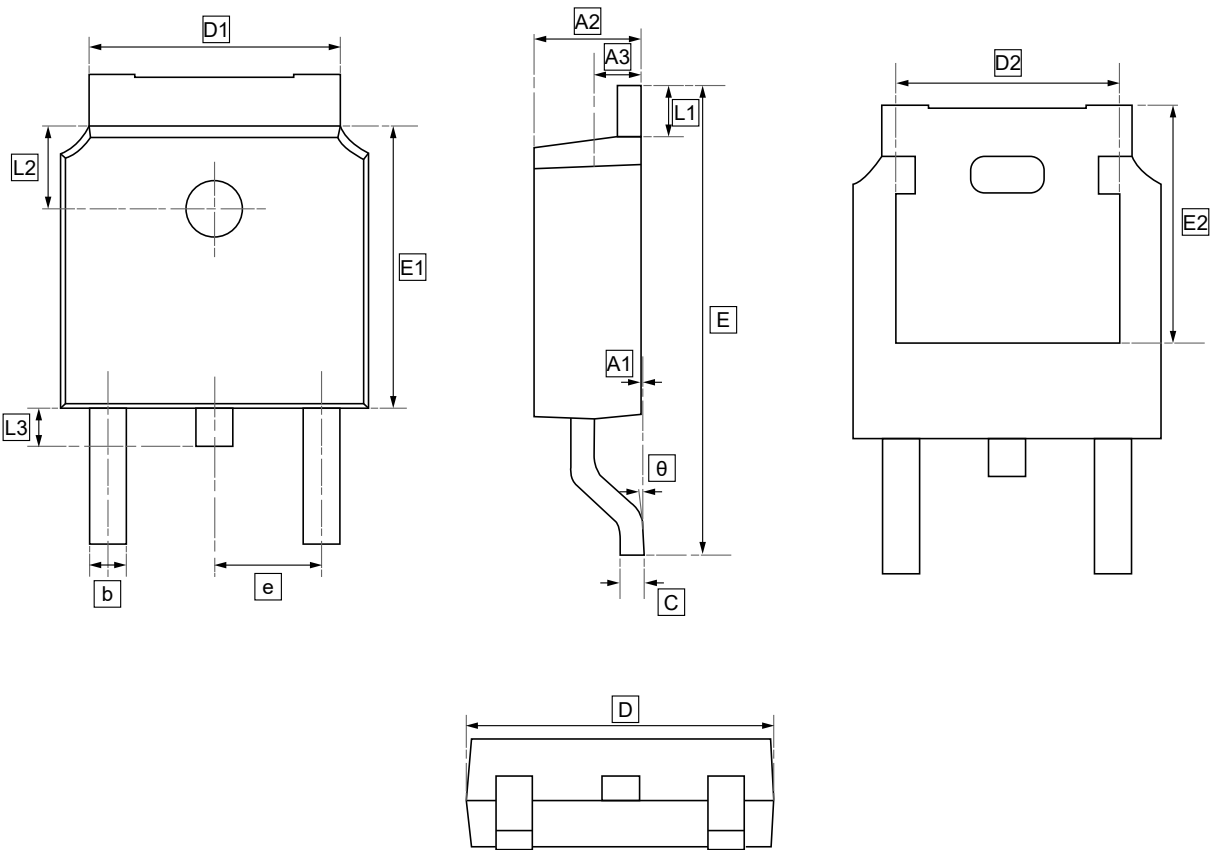


Figure 20. Switching Time Waveforms



8.TO-252 Package Outline Dimensions

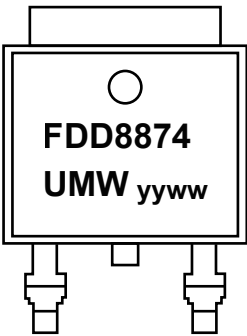


DIMENSIONS (mm are the original dimensions)

Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286 BSC	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38		1.27	1.90	1.00	8.00



9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDD8874	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.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.