UMW HUF76609D3

100V N-Channel MOSFET

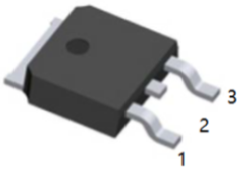
1.Features

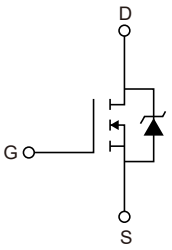
- $V_{DS\ (V)}$=100V
- I_D=10A
- $R_{DS(ON)}$<150mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<160mΩ(V_{GS}=5V)
- Ultra Low On-Resistance
- Simulation Models
- UIS Rating Curve
- Switching Time vs R_{GS} Curves
- Peak Current vs Pulse Width Curve
- Spice and SABER Thermal Impedance Models
- Electrical Models

2.Pinning information

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

TO-252(DPAK)
top view





3.Absolute Maximum Ratings T_C= 25°C

Parameter	Symbol	Rating	Units
Drain to Source Voltage (Note 1)	V_{DSS}	100	V
Drain to Gate Voltage (R_{GS}=20kΩ) (Note 1)	V_{DGR}	100	V
Gate to Source Voltage	V_{GS}	±16	V
Drain Current Continuous (T_C=25°C, V_{GS}=5V)	I_D	10	A
Continuous (T_C=25°C,V_{GS}=10V)(Figure 2)		10	A
Continuous (T_C=100°C, V_{GS}=5V)		7	A
Continuous (T_C=100°C, V_{GS}=4.5V)(Figure 2)		7	A
Pulsed Drain Current	I_{DM}	Figure 4	
Pulsed Avalanche Rating	UIS	Figures 6, 17, 18 Power	
Dissipation	P_D	49	W
Derate Above 25°C		0.327	W/°C

Operating and StorageTemperature	T_J,T_{STG}	-55 to 175	°C
Maximum Temperature for Soldering			
Leads at 0.063in (1.6mm) from Case for 10s	T_L	300	°C
Package Body for 10s, See Techbrief TB334	T_{pkg}	260	°C

Note:

1. T_J=25°C to 150°C.

4.Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=250μA,V_{GS}=0V(Figure 12)	100			V
		I_D=250μA,V_{GS}=0V, T_C=-40°C	90			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=95V, V_{GS}=0V			1	μA
		V_{DS}=90V, V_{GS}=0V, T_C=150°C			250	μA
Gate−Body Leakage Current	I_{GSS}	V_{GS}=±16V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage(Note 3)	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA (Figure 11)	1		3	V
Drain to Source On Resistance	$R_{DS(ON)}$	I_D=10A, V_{GS}=10V (Figure 9,10)		130	150	mΩ
		I_D=7A, V_{GS}=5V (Figure 9)		135	160	mΩ
		I_D=7A, V_{GS}=4.5V (Figure 9)		140	161	mΩ
THERMAL SPECIFICATIONS						
Thermal Resistance Junction to Case	$R_{\theta JC}$	TO-252			3.06	°C/W
Thermal Resistance Junction toAmbient	$R_{\theta JA}$				100	°C/W
SWITCHING SPECIFICATIONS (V_{GS} = 4.5V)						
Turn-On Time	t_{on}	V_{DD}=50V, I_D=7A V_{GS}=4.5V, R_{GS}=20Ω (Figures 15, 21, 22)			77	ns
Turn-On Delay Time	$t_{D(on)}$			10		ns
Rise Time	t_r			41		ns
Turn-Off Delay Time	$t_{D(off)}$			30		ns
Fall Time	t_f			28		ns
Turn-Off Time	t_{off}				87	ns

SWITCHING SPECIFICATIONS (V_{GS} = 10V)					
Turn-On Time	t_{on}	V_{DD}=50V, I_D=10A V_{GS}=10V, R_{GS}=24Ω (Figures 16, 21, 22)		36	ns
Turn-On Delay Time	$t_{D(on)}$		6		ns
Rise Time	t_r		18		ns
Turn-Off Delay Time	$t_{D(off)}$		55		ns
Fall Time	t_f		39		ns
Turn-Off Time	t_{off}			141	ns
GATE CHARGE SPECIFICATIONS					
Total Gate Charge	$Q_{g(tot)}$	V_{GS}=0 to 10V; V_{DD}=50V	13	16	nC
Gate Charge at 5V	$Q_{g(5)}$	V_{GS}=0 to 5V; I_D=7A	7.3	8.8	nC
Threshold Gate Charge	$Q_{g(th)}$	V_{GS}=0 to 1V; (Figures 14, 19, 20)	0.5	0.6	nC
Gate to Source Gate Charge	Q_{gs}		1.4		nC
Gate to Drain “Miller” Charge	Q_{gd}		3.4		nC
CAPACITANCE SPECIFICATIONS					
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V (Figure 13)	425		pF
Output Capacitance	C_{oss}		75		pF
Reverse Transfer Capacitance	C_{rss}		22		pF
Source to Drain Diode Specifications					
Source to Drain Diode Voltage	V_{SD}	I_{SD}=7A		1.25	V
		I_{SD}=4A		1	V
Reverse Recovery Time	t_{rr}	I_{SD}=7A, dI_{SD}/dt = 100A/μs		92	ns
Reverse Recovered Charge	Q_{rr}	I_{SD}=7A, dI_{SD}/dt = 100A/μs		273	nC

5.1Typical Characterisitics

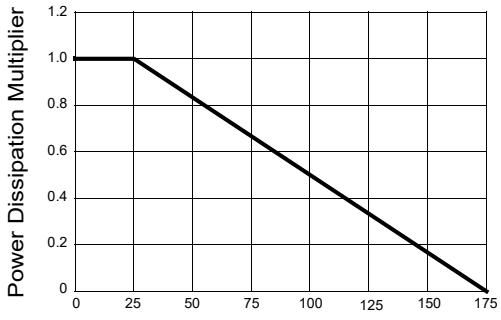


Figure 1: Normalized Power Dissipation Vs Case Temperature

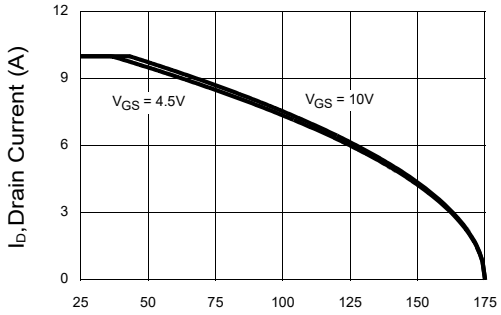


Figure 2: Maximum Continuous Drain Current Vs Case Temperature

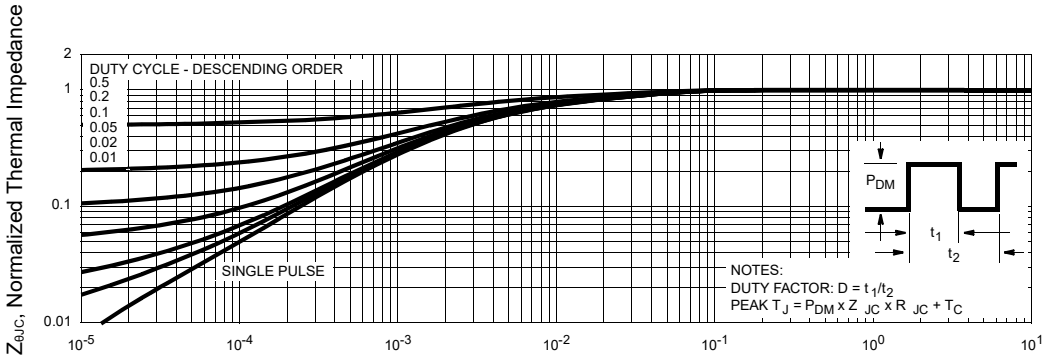


Figure 3: Normalized Maximum Transient Thermal Impedance

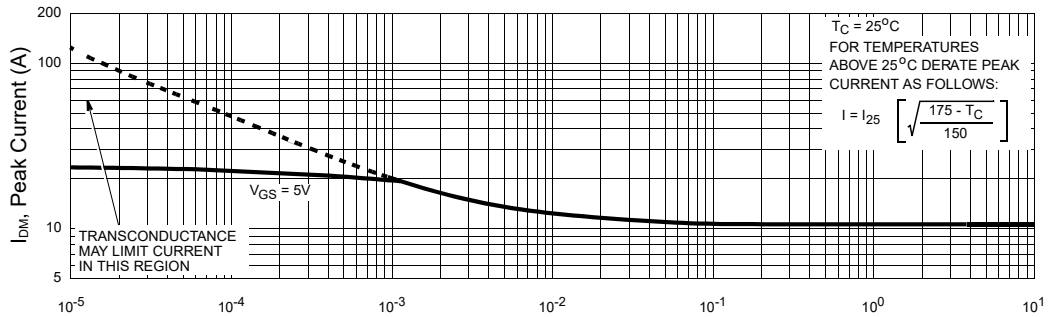
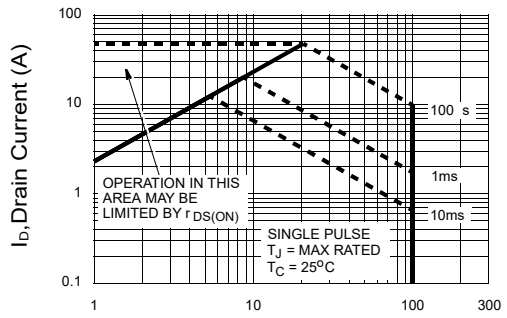


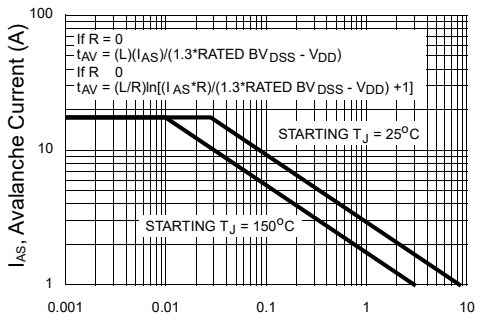
Figure 4: Peak Current Capability

5.2Typical Characterisitics



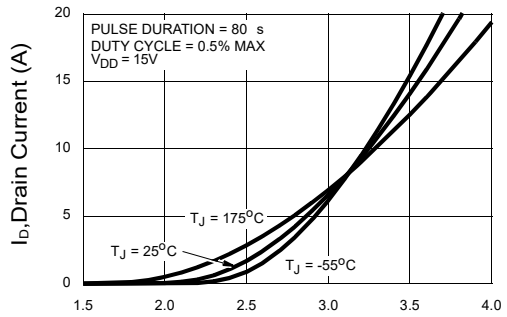
V_{DS},Drain to Source Voltage (V)

Figure 5: Forward Bias Safe Operating Area



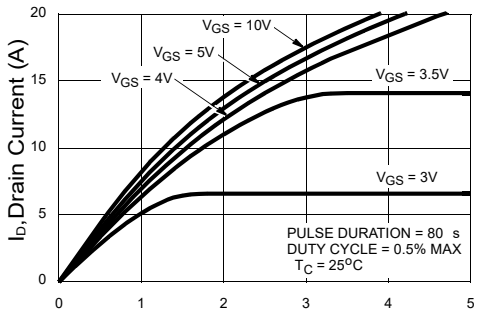
t_{AV}, Time In Avalanche(ms)

Figure 6: Unclamped Inductive Switching Capability



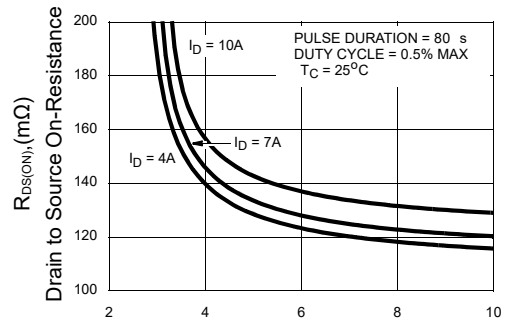
V_{GS},Gate to Source Voltage (V)

Figure 7: Transfer Characteristics



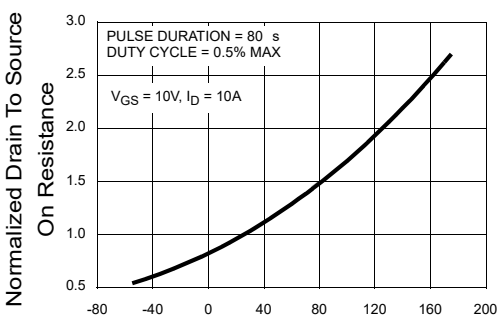
V_{DS},Drain Source Voltage (V)

Figure 8: Saturation Characteristics



V_{GS},Gate to Source Voltage (V)

Figure 9: Drain To Source On Resistance Vs Gate Voltage And Drain Current



T_J,Junction Temperature (°C)

Figure 10: Normalized Drain To Source On Resistance Vs Junction Temperature

5.3Typical Characterisitics

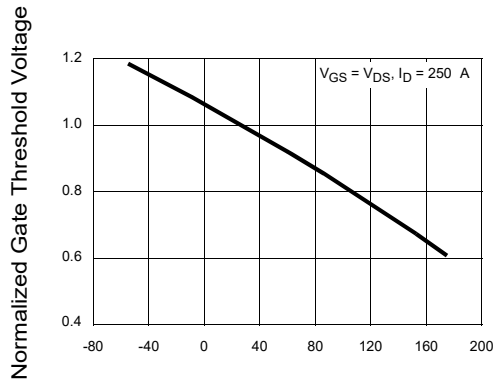


Figure 11: Normalized Gate Threshold Voltage Vs Junction Temperature

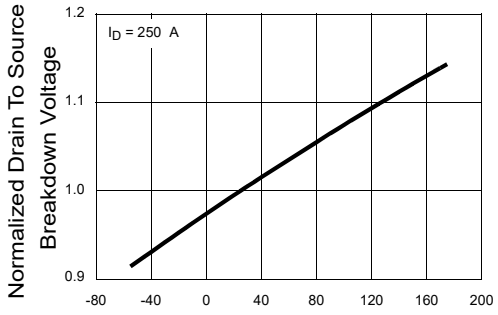


Figure 12: Normalized Drain To Source Breakdown Voltage Vs Junction Temperature

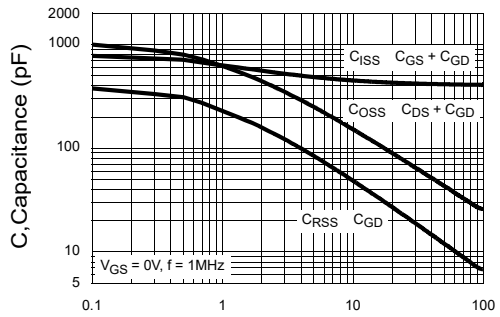


Figure 13: Capacitance Vs Drain To Source Voltage

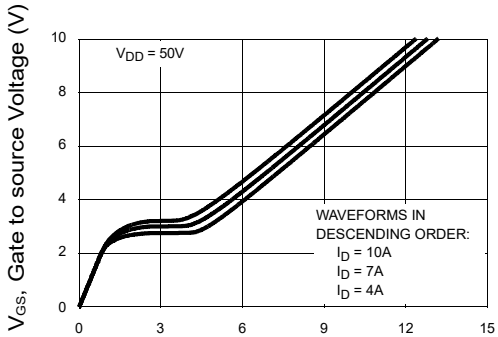


Figure 14: Gate Charge Waveforms For Constant Gate Current

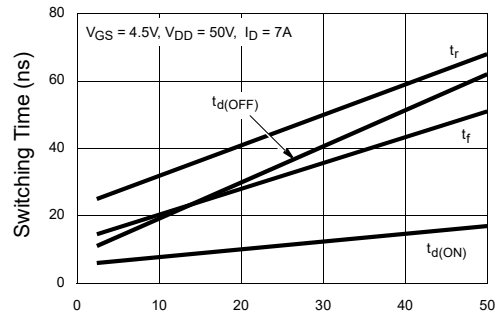


Figure 15: Switching Time Vs Gate Resistance

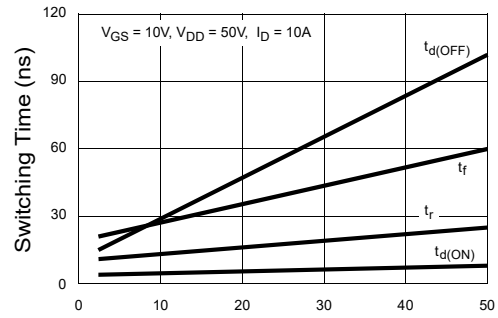


Figure 16: Switching Time Vs Gate Resistance

5.4Typical Characterisitics

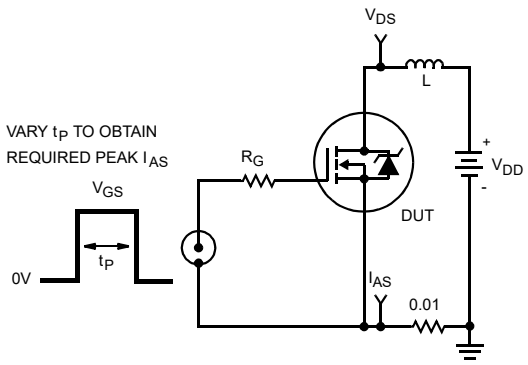


Figure 17. unclamped Energy Test Circuit

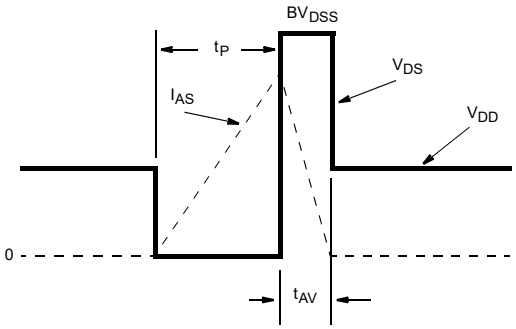


Figure 18. unclamped Energy Waveforms

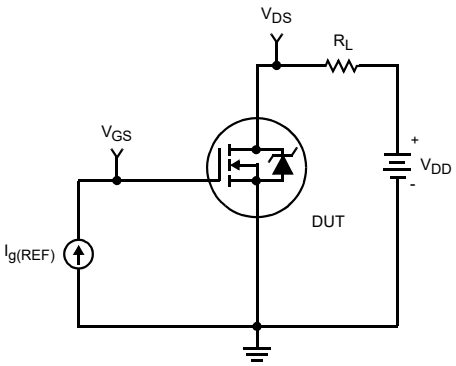


Figure 19. gate Charge Test Circuit

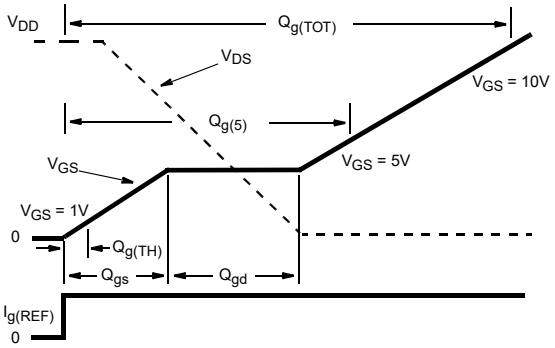


Figure 20. gate Charge Waveforms

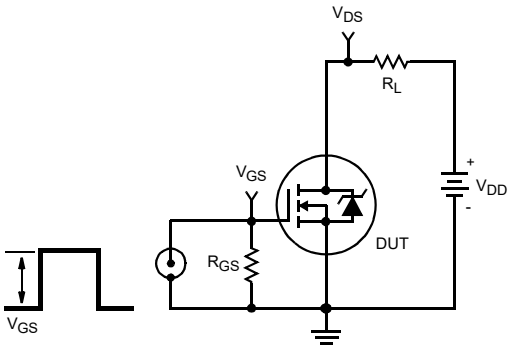


Figure 21. Switching Time Test Circuit

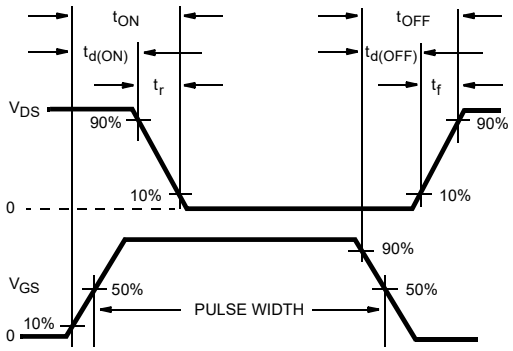
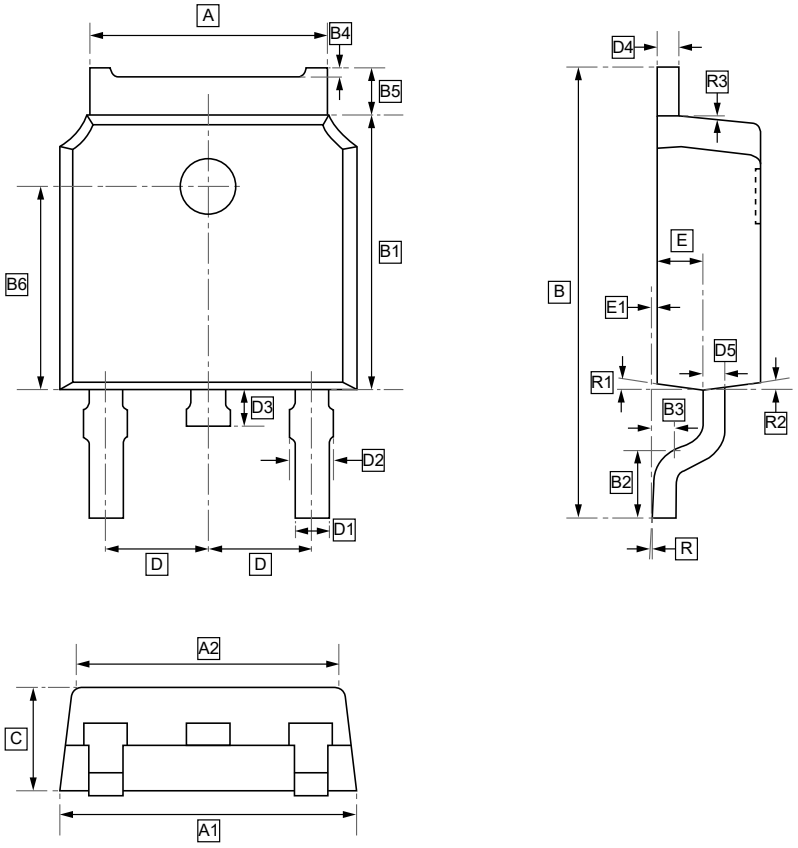


Figure 22. switching Time Waveform

6.TO-252 Package Outline Dimensions

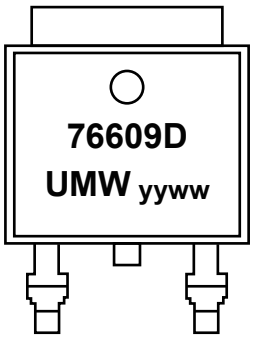


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	B	B1	B2	B3	B4	B5	B6	C	D
Min	5.1	6.4	5.6	9.5	5.9	1.35	0.4	0.1	0.85	4.35	2.15	2.286
Max	5.5	6.8	6.0	10.3	6.3	1.65	0.6	(typ.)	1.05	4.65	2.45	(typ.)

Symbol	D1	D2	D3	D4	D5	E	E1	R	R1	R2	R3
Min	0.66	0.81	0.65	0.42	0.42	0.86	0.05	0°	7°	7°	7°
Max	0.86	1.01	0.95	0.58	0.58	1.16	0.05	6°	(typ.)	(typ.)	(typ.)

7.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW HUF76609D3	TO-252	2500	Tape and reel

8.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.