UMW IPD068P03L3G

-30V P-Channel MOSFET

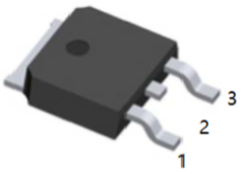
1.Features

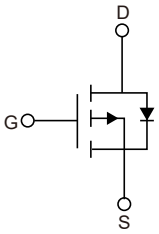
- $V_{DS\ (V)}$=-30V
- I_D=-70A
- $R_{DS(ON)}$<6.8mΩ(V_{GS}=-10V)
- $R_{DS(ON)}$<11mΩ(V_{GS}=-4.5V)
- 175 °C operating temperature
- 100% Avalanche tested
- Pb-free; RoHS compliant, halogen free
- applications: power management

2.Pinning information

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

TO-252(DPAK)
top view





3.Absolute Maximum Ratings T_J= 25°C

Parameter	Symbol	Conditions	Value	Units
Continuous drain current	I_D	T_C=25°C	-70	A
		T_C=100°C	-70	A
Pulsed drain current	$I_{D,pulse}$	T_C=25°C[2)]	-280	A
Avalanche current, single pulse	E_{AS}	I_D=-70A, R_{GS}=25Ω	149	mJ
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25°C	100	W
Storage temperature	T_J,T_{STG}		-55 to 175	°C
ESD class		JESD22-A114 HBM	tbd	
Soldering temperature			260	°C
IEC climatic category; DIN IEC 68-1			55/175/56	

Notes:

[1)] J-STD20 and JESD22

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Thermal resistance, junction -case	R_{thJC}				1.5	K/W
Thermal resistance, junction - ambient	R_{thJA}	6 cm^2 cooling area [2])			50	K/W
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250μA	-30			V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-150μA	-1	-1.5	-2	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=-30V, V_{GS}=0V, T_J=25°C		-0.1	-1	μA
		V_{DS}=-30V, V_{GS}=0V, T_J=150°C		-10	-100	μA
Gate-source leakage current	I_{GSS}	V_{GS}=-20V, V_{DS}=0V		-10	-100	nA
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-45A		7	11	mΩ
		V_{GS}=-10V, I_D=-70A		5	6.8	mΩ
Gate resistance	R_G			5.8		Ω
Transconductance	g_{FS}	$\|V_{DS}\|>2\|I_D\|R_{DS(ON)max}$,$I_D$=-70A	50	100		S
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-15V, f=1MHz		5150	7720	pF
Output capacitance	C_{oss}			2090	3140	pF
Reverse transfer capacitance	C_{rss}			160	240	pF
Turn-on delay time	$t_{D(on)}$	V_{DD}=-15V, V_{GS}=-10V, I_D=-70A, $R_{G,ext}$=6Ω		11	16.5	ns
Rise time	t_r			100	150	ns
Turn-off delay time	$t_{D(off)}$			84	126	ns
Fall time	t_f			31	47	ns
Gate to source charge	Q_{gs}	V_{DD}=-15V, I_D=-70A, V_{GS}=0 to -10V		19	25	nC
Gate charge at threshold	$Q_{g(th)}$			8	11	nC
Gate to drain charge	Q_{gd}			8	13	nC
Switching charge	Q_{SW}			19	27	nC
Gate charge total	Q_g			68	91	nC
Gate plateau voltage	$V_{plateau}$			3.7		V

Output charge	Q_{oss}	V_{DD}=-15V, V_{GS}=0V		48	64	nC
Diode continous forward current	I_S	T_C=25°C			30	A
Diode pulse current	$I_{S,pulse}$				280	A
Diode forward voltage	V_{SD}	V_{GS}=0V, I_F=-70A, T_J=25°C			-1.2	V
Reverse recovery time	t_{rr}	V_R=15V, I_F=-70A, di_F/dt=100A/μs		46	69	ns
Reverse recovery charge	Q_{rr}			44		nC

Notes:

2) Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

5.1Typical characteristic

$P_{tot}=f(T_C)$

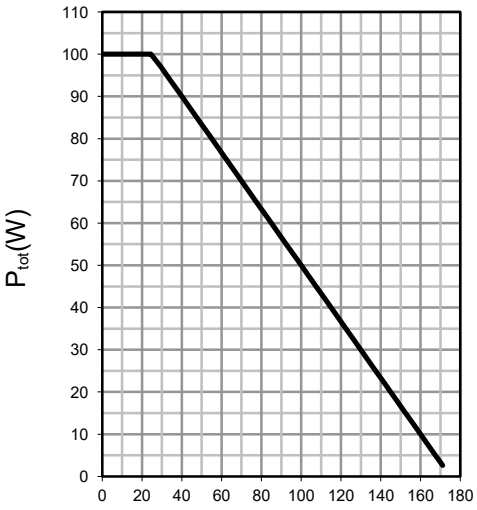


Fig 1. Power dissipation

$I_D=f(T_C)$; $V_{GS}\geq 10V$

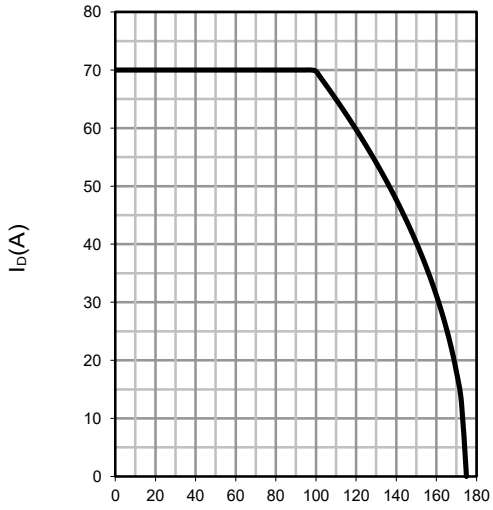


Fig 2. Drain current

ID=f(V_{DS}); T_C=25°C [1)]; D=0; parameter: t_p

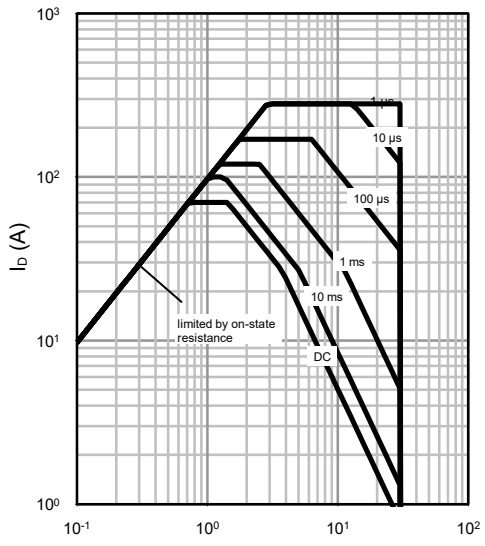


Fig 3. Safe operating area

$Z_{thJC}=f(t_p)$; parameter: $D=t_p/T$

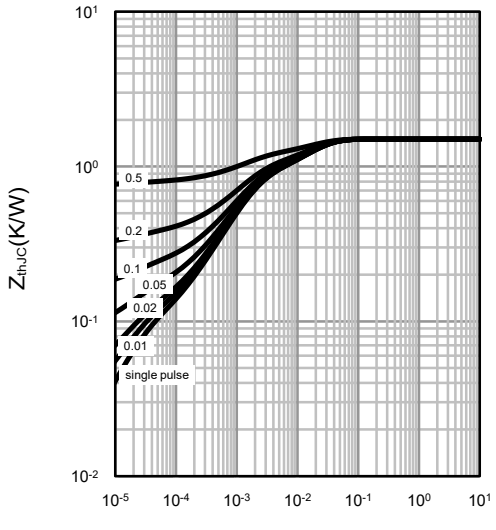


Fig 4. Max transient thermal impedance

5.2Typical characteristic

$I_D=f(V_{DS})$; T_J=25°C; parameter: V_{GS}

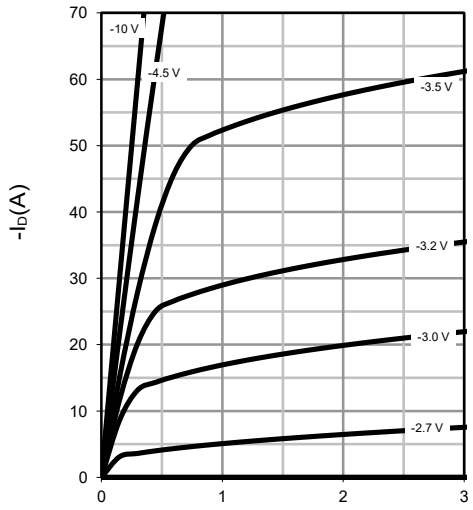


Fig 5. output characteristics

$R_{DS(ON)}=f(I_D)$; T_J=25°C; parameter: V_{GS}

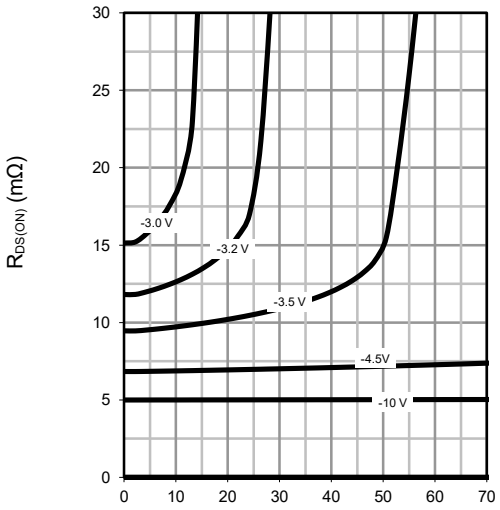


Fig 6. drain-source on resistance

$ID=f(V_{GS})$; $|V_{DS}|>2|$ I_D $|R_{DS(ON)max}$; parameter: T_J

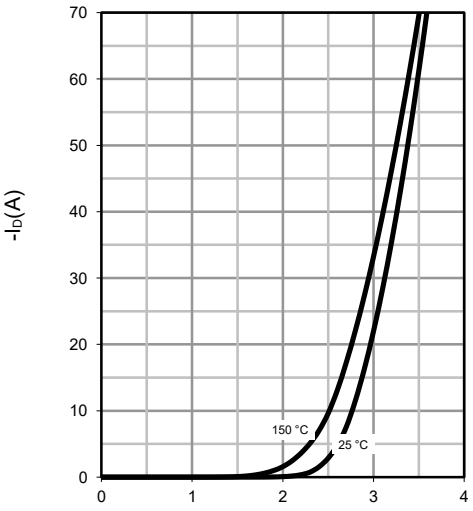


Fig 7. transfer characteristics

$g_{fs}=f(I_D)$; T_J=25°C

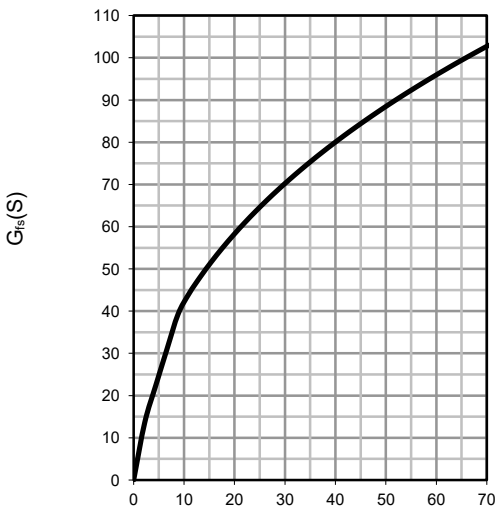


Fig 8. forward transconductance

5.3Typical characteristic

$R_{DS(ON)}=f(T_J)$; I_D=-70A; V_{GS}=-10V

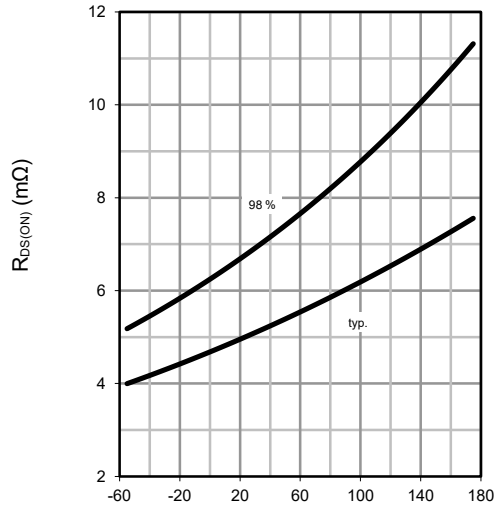


Fig 9. Drain-source on-state resistance

$V_{GS(th)}=f(T_J)$; $V_{GS}=V_{DS}$; I_D=-150μA

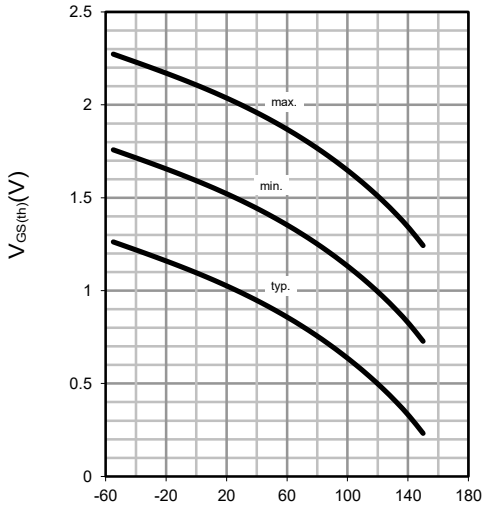


Fig 10. Gate threshold voltage

$C=f(V_{DS})$; V_{GS}=0V; f=1MHZ

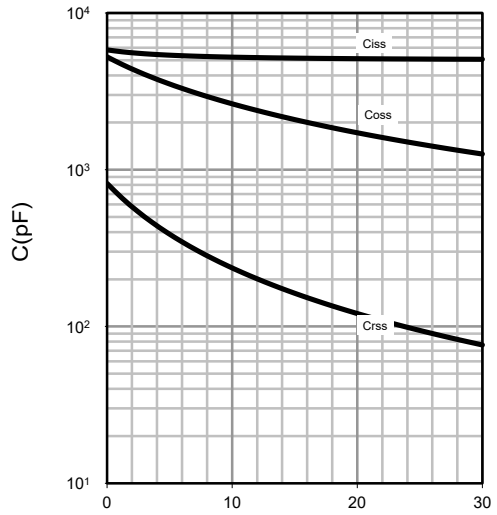


Fig 11. capacitances

$I_F=f(V_{SD})$; parameter: T_J

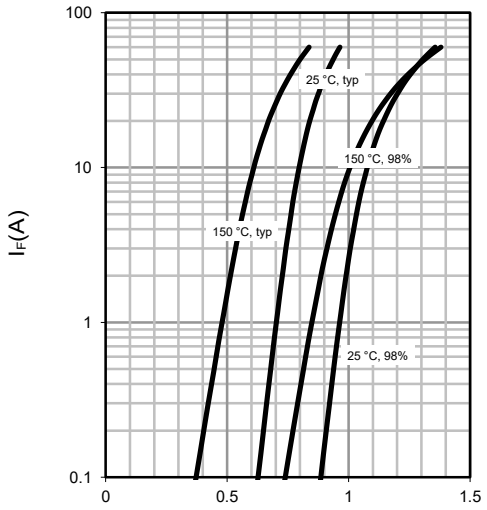


Fig 12. Forward characteristics of reverse diode

5.4Typical characteristic

$I_{AS}=f(t_{AV})$; $R_{GS}=25\Omega$; parameter: $T_{j(start)}$

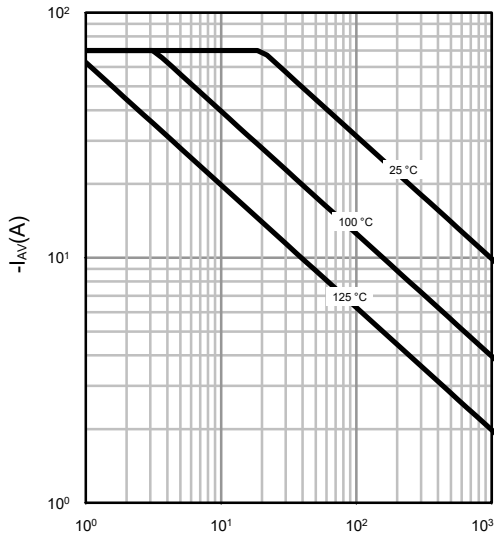


Fig 13. Avalanche characteristics

$V_{GS}=f(Q_{gate})$; I_D=-70Apulsed; parameter: V_{DD}

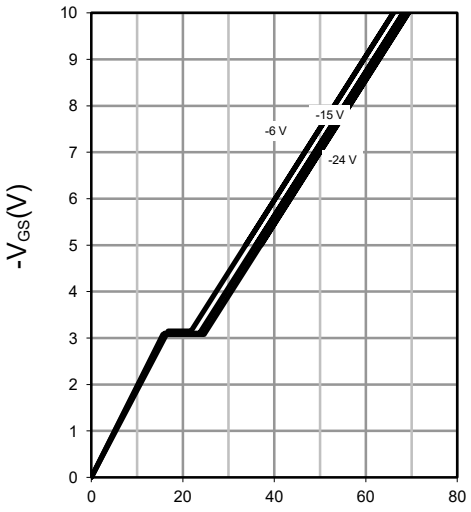


Fig 14. gate charge

$V_{BR(DSS)}=f(T_J)$; I_D=-250µA

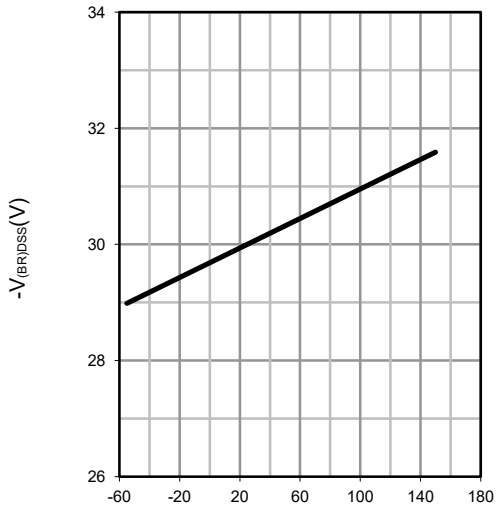


Fig 15. drain source breakdown voltage

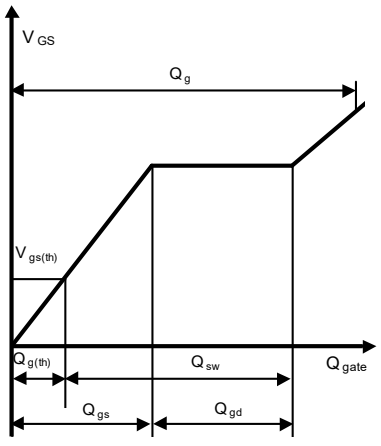
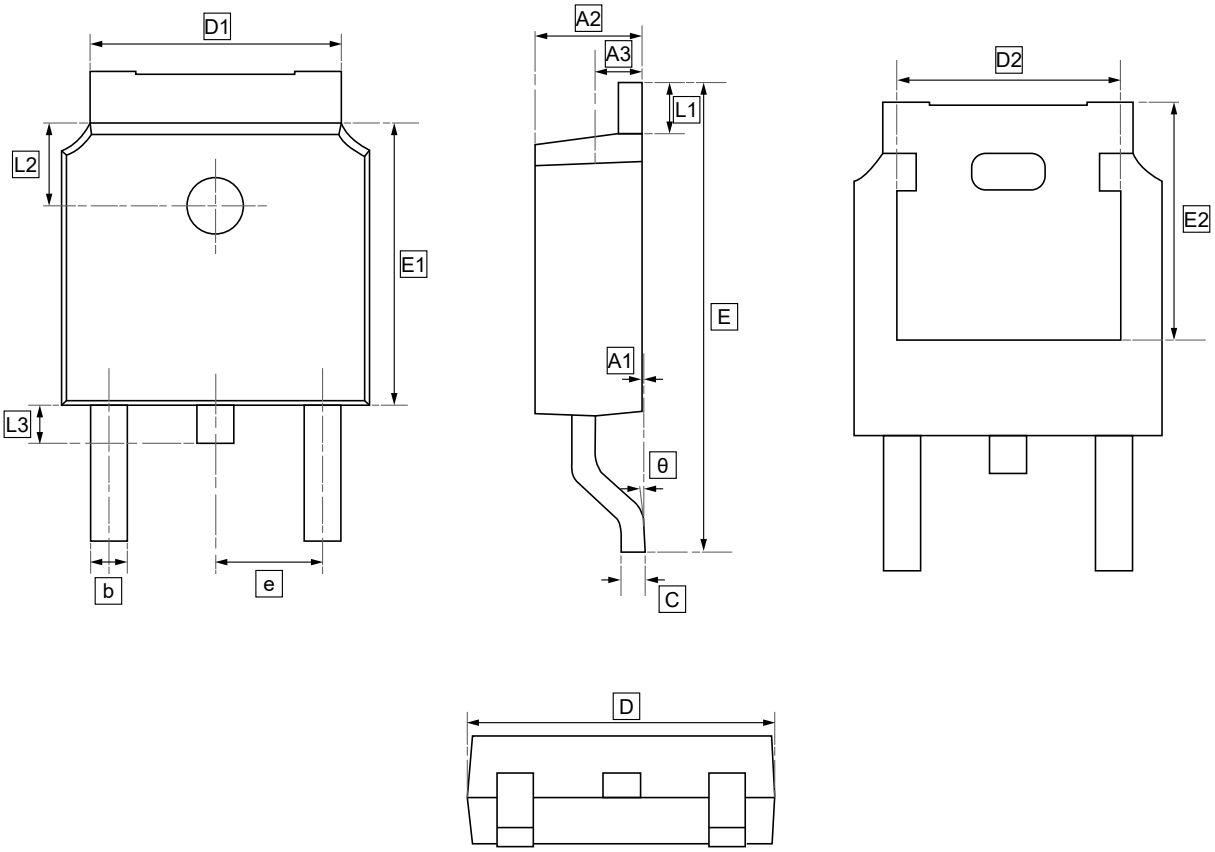


Fig 16. Gate charge waveforms

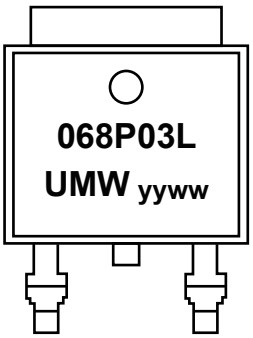
6.TO-252 Package Outline Dimensions



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	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	BSC	1.27	1.90	1.00	8.00

7.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IPD068P03L3G	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.