UMW SPD30P06PG

-60V P-Channel MOSFET

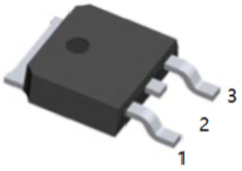
1.Features

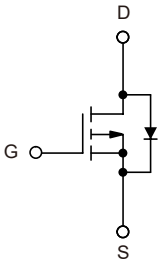
- $V_{DS\ (V)}$=-60V
- I_D=-30A
- $R_{DS(ON)}$=75mΩ(V_{GS}=-10V)
- P-Channel
- Enhancement mode
- Avalanche rated
- dv/dt rated
- 175°C operating temperature

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 [1]	-30	A
		T_C=100°C	-21.5	A
Pulsed drain current	$I_{D,puls}$	T_C=25°C	-120	A
Avalanche energy, single pulse	E_{AS}	I_D=-30A,V_{DD}=-25V,R_{GS}=25Ω	250	mJ
Avalanche energy, periodic limited by T_{jmax}	E_{AR}		12.5	mJ
Reverse diode dv/dt	dv/dt	I_S=-30 A, V_{DS}=-48V, di/dt=200 A/μs,T_{jmax}=175°C	6	kV/μs
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25°C	125	W
storage temperature	T_J,T_{STG}		-55 to 175	°C
IEC climatic category; DIN IEC 68-1			55/175/56	

4.Thermal resistance rating

Parameter	Symbol	Max	Units
Thermal resistance, junction -case	R_{thJC}	1.2	K/W
Thermal resistance, junction - ambient, leade	R_{thJA}	100	K/W
SMD version, device on PCB:@ min.	R_{thJA}	75	K/W
footprint @ 6 cm^2 cooling area [1)]		50	K/W

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250μA	-60			V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	-2.1	-3	-4	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=-60V, V_{GS}=0V, T_J=25°C		-0.1	-1	μA
		V_{DS}=-60V, 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}=-10V, I_D=-21.5A		69	75	mΩ
Transconductance	g_{fs}	V_{DS}≥2*I_D*$R_{DS(ON)max}$,I_D=-21.5 A	5.2	10.4		S
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-25V, f=1MHz		1228	1535	pF
Output capacitance	C_{oss}			387	383	pF
Reverse transfer capacitance	C_{rss}			142	177	pF
Turn-on delay time	$t_{D(on)}$	V_{DD}=-30V, V_{GS}=-10V, I_D=-21.5A, R_G=1.6Ω		13	19.5	ns
Rise time	t_r			11	16.5	ns
Turn-off delay time	$t_{D(off)}$			30	45	ns
Fall time	t_f			20	30	ns
Gate to source charge	Q_{gs}	V_{DD}=-48V, I_D=-30A, V_{GS}=0 to -10V		3.7	5.6	nC
Gate to drain charge	Q_{gd}			13.8	20.7	nC
Gate charge total	Q_g			32	48	nC
Gate plateau voltage	$V_{plateau}$			-5.2		V
Inverse diode continuous forward current	I_S	T_C=25°C			-30	A
Inverse diode direct current,pulsed	I_{SM}	T_C=25°C			-120	A
Inverse diode forward voltage	V_{SD}	V_{GS}=0V, I_F=-30A		-1.3	-1.7	V
Reverse recovery time	t_{rr}	V_R=-30V, I_F=I_S, di_F/dt=100A/μs		64.6	97	ns
Reverse recovery charge	Q_{rr}	V_R=-30V, I_F=I_S, di_F/dt=100A/μs		153	230	nC

6.1Typical characteristic

$P_{tot}=f(T_C)$

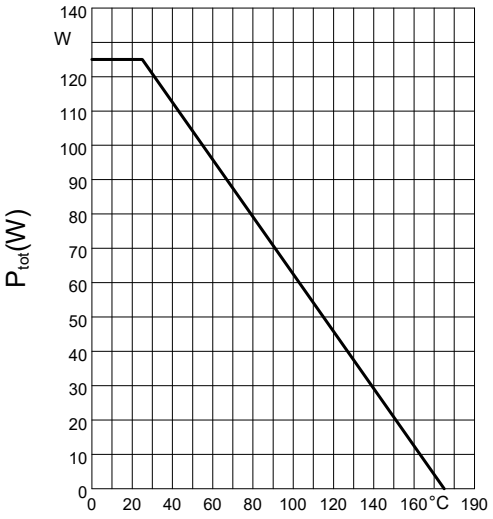


Fig 1. Power dissipation

$I_D=f(T_C)$; $V_{GS}\geq10V$

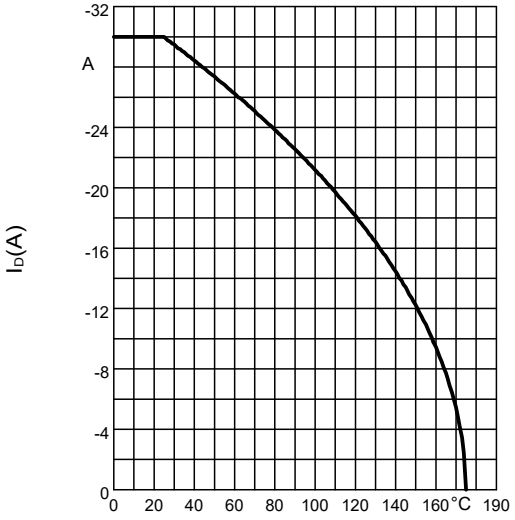


Fig 2. Drain current

$I_D=f(V_{DS})$; parameter: T_C=25°C; D=0

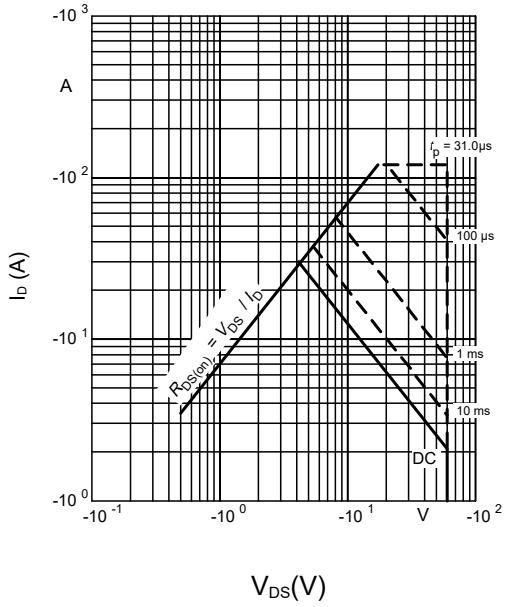


Fig 3. Safe operating area

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

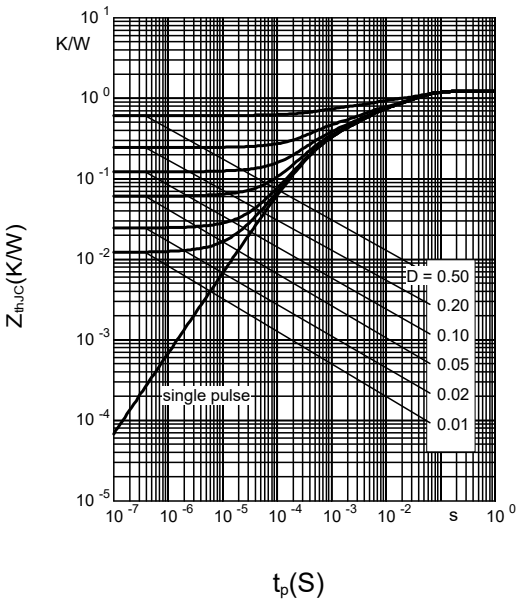


Fig 4. Max transient thermal impedance

6.2Typical characteristic

$I_D=f(V_{DS})$; $T_J=25°C$; parameter: $t_p=80\mu s$

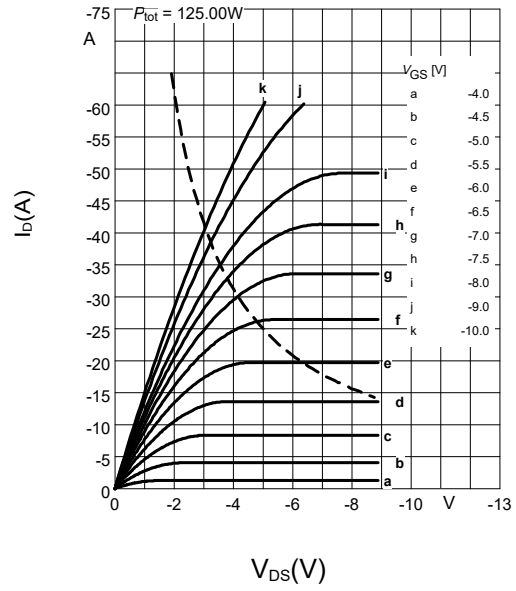


Fig 5. output characteristics

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

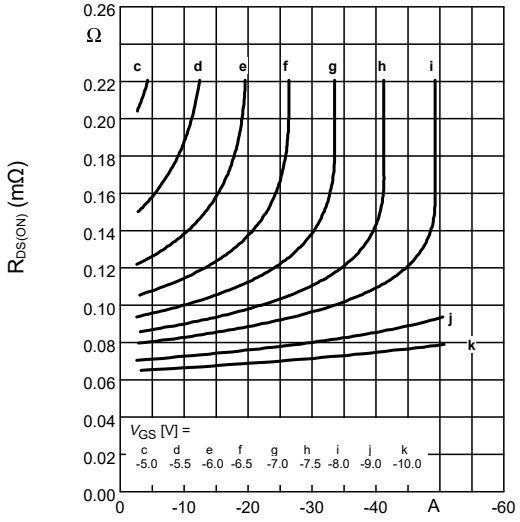


Fig 6. drain-source on resistance

$|V_{DS}|>2|\ I_D\ |R_{DS(ON)max}$; parameter: $t_p=80\mu s$

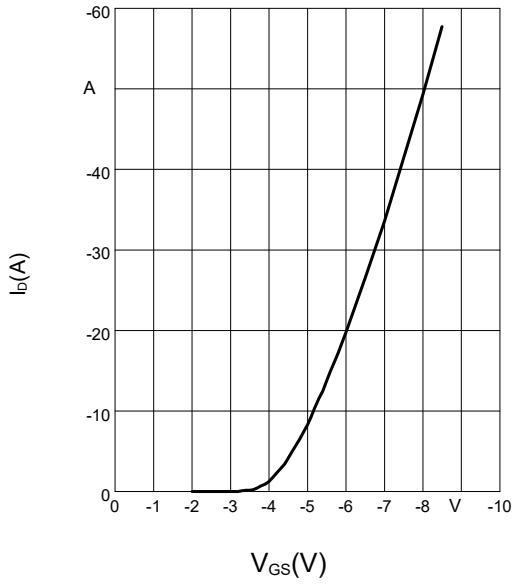


Fig 7. transfer characteristics

$g_{fs}=f(I_D)$; $T_J=25°C$; parameter: g_{fs}

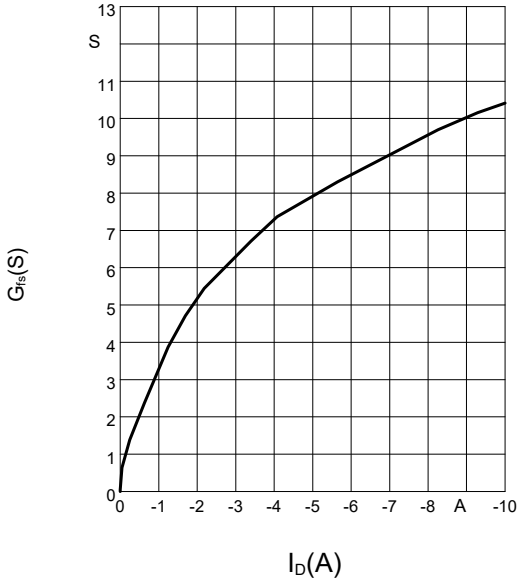


Fig 8. forward transconductance

6.3Typical characteristic

$R_{DS(ON)}$=f(T_J); parameter:I_D=-21.5A; V_{GS}=-10V

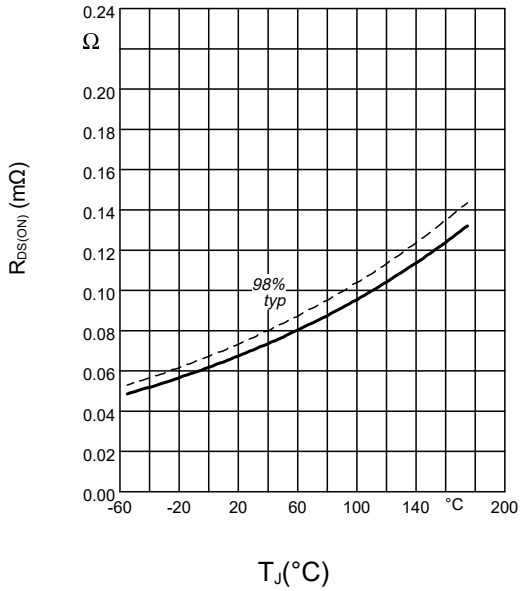


Fig 9. Drain-source on-state resistance

$V_{GS(th)}$=f(T_J);V_{GS}=V_{DS}; parameter: I_D=-1.7mA

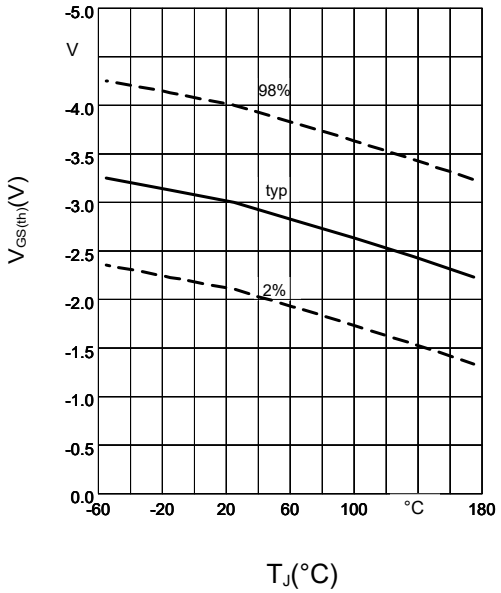


Fig 10. Tgate threshold voltage

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

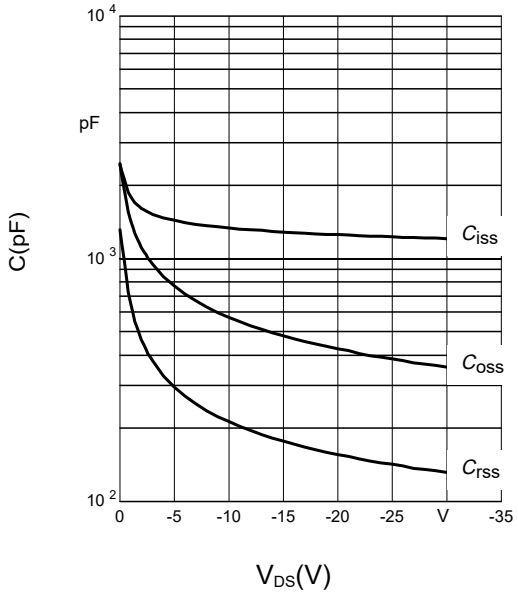


Fig 11. capacitances

I_F=f(V_{SD}); parameter: T_J, t_p=80μs

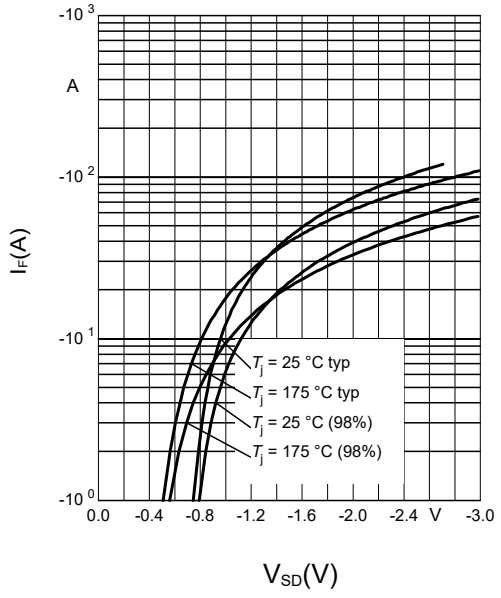


Fig 12. Forward characteristics of reverse diode

6.4Typical characteristic

$E_{AS}=f(T_J)$; parameter: I_D=-30A, V_{DD}=-25V, R_{GS}=25Ω

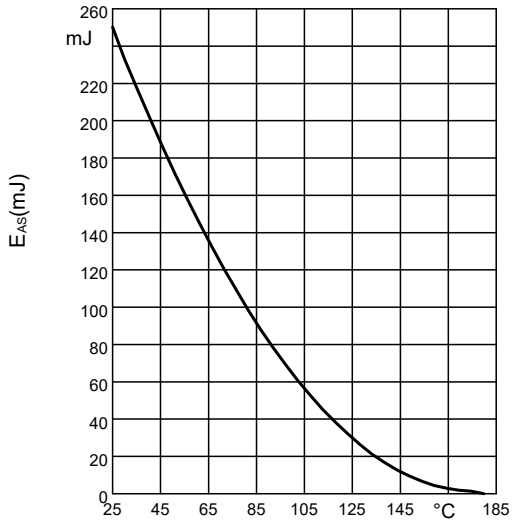


Fig 13. Avalanche characteristics

$V_{GS}=f(Q_{gate})$; parameter: I_D=-300A pulsed

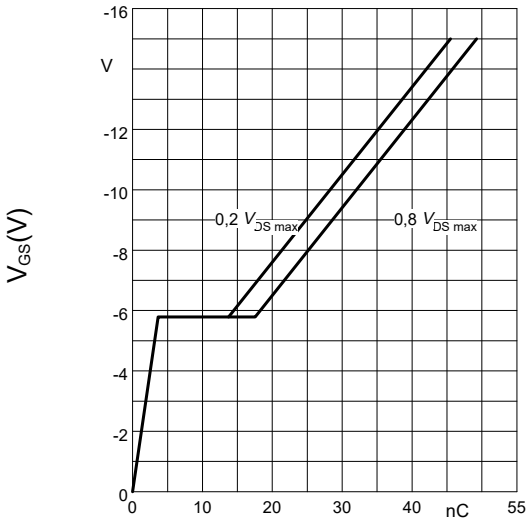


Fig 14. gate charge

$V_{BR(DSS)}=f(T_J)$

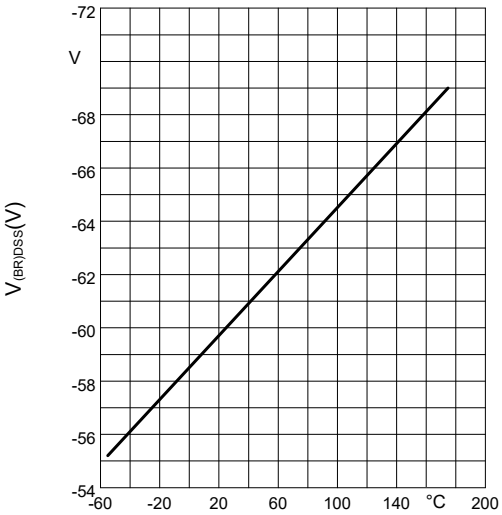
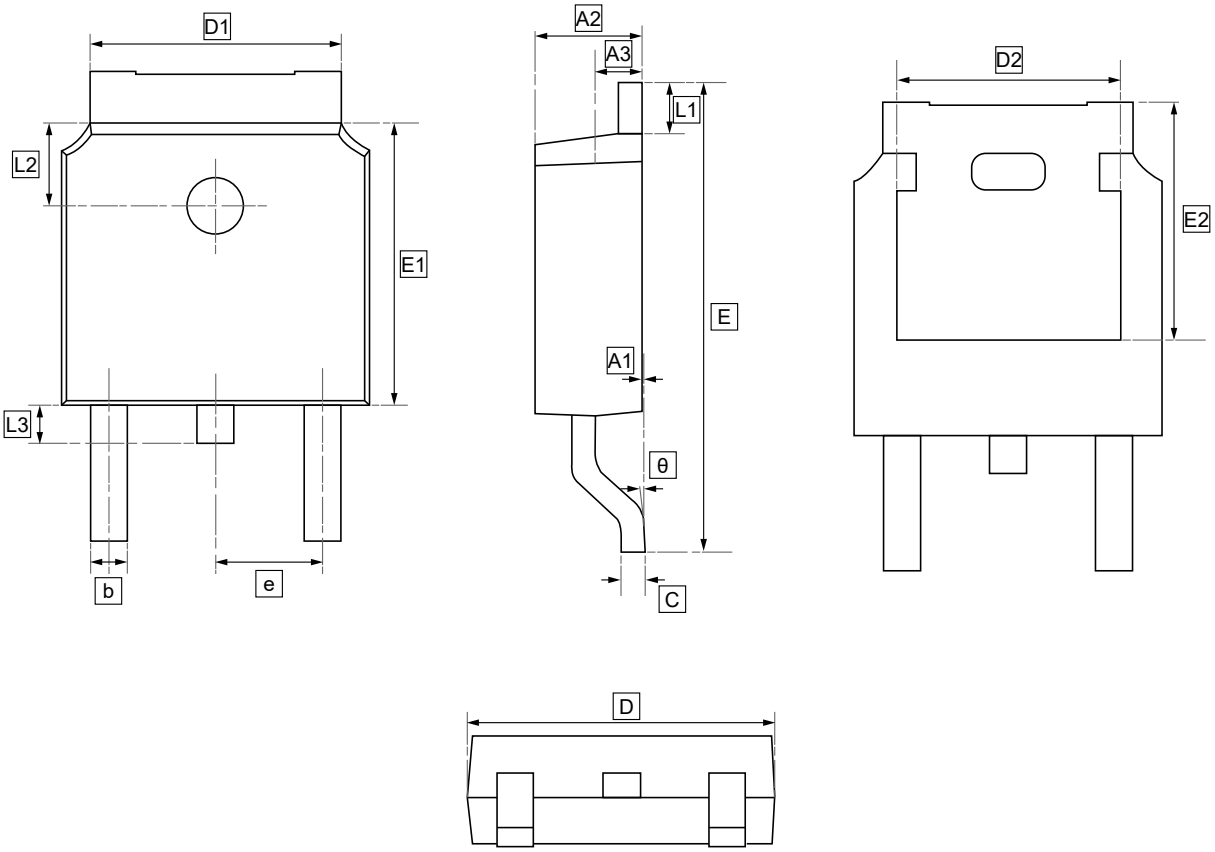


Fig 15. Drain-source breakdown voltage

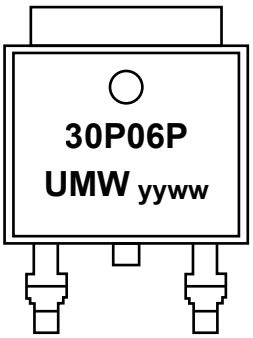
7.TO-252 Package Outline Dimensions



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

8.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW SPD30P06PG	TO-252	2500	Tape and reel

9.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.