1.Description

The 78xx series is a set of three-terminal, low power, high voltage regulators implemented in CMOS technology. The series features extremely low quiescent current which is typically 2μA . They allow input voltages as high as 12V. The device provides large current with a significantly small dropout voltage.

The 78xx consists of a high-precision voltage reference. They are available with several fixed output voltages ranging from 1.8V to 5.0V. CMOS technology ensures low dropout voltage and low current consumption. Although designed primarily as fixed voltage regulators, these devices can be used with external components to generate variable voltages and currents.

2.Features

- Ultra low quiescent current: 2.0μA (typ.)
- High input voltage (up to 12V)
- Output voltage accuracy: tolerance ±3%
- Maximum output current: 250mA
- Low dropout voltage
- Package form:SOT23-3,SOT89-3,TO92

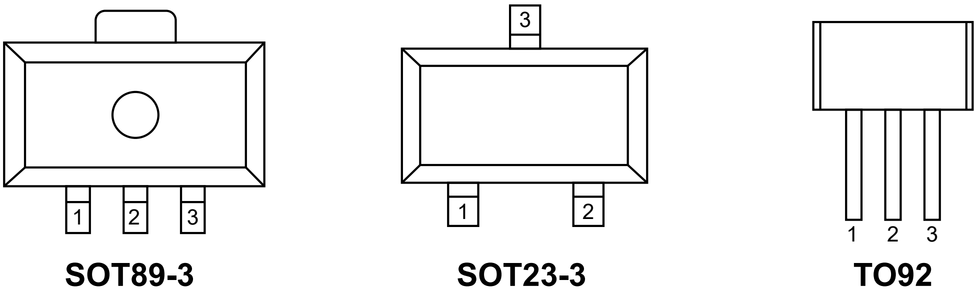
3.Applications

- Battery-powered equipment
- Voltage regulator for microprocessor
- Voltage regulator for LAN cards
- Wireless Communication equipment
- Audio/Video equipment

4.Device Information

Part Number	Input Voltage (MAX) (V)	OUTPUT (V)	Package
7825	12	2.5	SOT23, SOT89, TO92
7827	12	2.7	
7830	12	3	
7833	12	3.3	
7836	12	3.6	
7840	12	4	
7844	12	4.4	
7850	12	5	

5.Pinning Information



Pin Functions

PIN No.			Name	Description
SOT23-3	SOT89-3	TO92		
1	1	1	GND	Ground
3	2	2	VIN	Supply Voltage
2	3	3	VOUT	Output

6.Functional Block Diagram

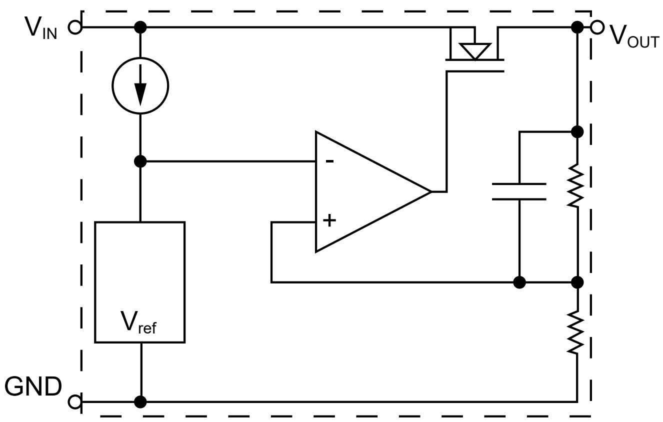


Figure 1. 78xx Functional Block Diagram

7.Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage Range	V_{IN}	-0.5	15	V
Consumption Power	P_D		400	mW
Junction Temperature	T_J	-50	125	°C
Operating Temperature	T_{OP}	-40	85	°C
Welding Temperature	T_h		260	°C,10s

Absolute maximum ratings are those values beyond which the device could be permanently damaged,These are stress ratings only,which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions.

8.1 Electrical Characteristics (7825-A)

(T_A=25°C, voltages are referenced to GND, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	V_{IN}=3.5V, I_{OUT}=40mA	2.425	2.5	2.575	V
Output Current	I_{OUT}	V_{IN}=3.5V, I_{OUT}≥2.25V			450	mA
Load Regulation	ΔV_{OUT}	V_{IN}=3.5V, 1mA≤I_{OUT}≤60mA		45	90	mV
Drop Voltage	V_{DIF}	I_{OUT}=40mA		110		mV
Quiescent Current	I_{SS}	V_{IN}=3.5V, No Load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}*V_{OUT})$	3.5V≤V_{IN}≤12V, I_{OUT}=10mA		0.2	0.3	%/V
Input Voltage	V_{IN}				12	V
Temperature Coefficient	$\Delta V_{OUT}/\Delta T_A$	V_{IN}=3.5V,I_{OUT}=40mA,0°C≤T_A≤85°C		±0.7		mV/°C

8.2 Electrical Characteristics (7827-A)

(T_A=25°C, voltages are referenced to GND, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	V_{IN}=3.7V, I_{OUT}=40mA	2.619	2.7	2.781	V
Output Current	I_{OUT}	V_{IN}=3.7V, I_{OUT}≥2.43V			450	mA
Load Regulation	ΔV_{OUT}	V_{IN}=3.7V, 1mA≤I_{OUT}≤60mA		45	90	mV
Drop Voltage	V_{DIF}	I_{OUT}=40mA		100		mV
Quiescent Current	I_{SS}	V_{IN}=3.7V, No Load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}*V_{OUT})$	3.7V≤V_{IN}≤12V, I_{OUT}=40mA		0.2	0.3	%/V
Input Voltage	V_{IN}				12	V
Temperature Coefficient	$\Delta V_{OUT}/\Delta T_A$	V_{IN}=3.7V,I_{OUT}=40mA,0°C≤T_A≤85°C		±0.7		mV/°C

8.3 Electrical Characteristics (7830-A)

(T_A=25°C, voltages are referenced to GND, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	V_{IN}=4V, I_{OUT}=40mA	2.91	3	3.09	V
Output Current	I_{OUT}	V_{IN}=4V, I_{OUT}≥2.7V			450	mA
Load Regulation	ΔV_{OUT}	V_{IN}=4V, 1mA≤I_{OUT}≤60mA		45	90	mV
Drop Voltage	V_{DIF}	I_{OUT}=40mA		100		mV
Quiescent Current	I_{SS}	V_{IN}=4V, No Load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}*V_{OUT})$	4V≤V_{IN}≤12V, I_{OUT}=40mA		0.2	0.3	%/V
Input Voltage	V_{IN}				12	V
Temperature Coefficient	$\Delta V_{OUT}/\Delta T_A$	V_{IN}=4V, I_{OUT}=40mA, 0°C≤T_A≤85°C		±0.7		mV/°C

8.4 Electrical Characteristics (7833-A)

(T_A=25°C, voltages are referenced to GND, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	V_{IN}=4.3V, I_{OUT}=40mA	3.201	3.3	3.399	V
Output Current	I_{OUT}	V_{IN}=4.3V, I_{OUT}≥2.97V			450	mA
Load Regulation	ΔV_{OUT}	V_{IN}=4.3V, 1mA≤I_{OUT}≤60mA		45	90	mV
Drop Voltage	V_{DIF}	I_{OUT}=40mA		90		mV
Quiescent Current	I_{SS}	V_{IN}=4.3V, No Load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}*V_{OUT})$	4.3V≤V_{IN}≤12V, I_{OUT}=40mA		0.2	0.3	%/V
Input Voltage	V_{IN}				12	V
Temperature Coefficient	$\Delta V_{OUT}/\Delta T_A$	V_{IN}=4.3V,I_{OUT}=40mA,0°C≤T_A≤85°C		±0.7		mV/°C

8.5 Electrical Characteristics (7836-A)

(T_A=25°C, voltages are referenced to GND, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	V_{IN}=4.5V, I_{OUT}=40mA	3.492	3.6	3.708	V
Output Current	I_{OUT}	V_{IN}=4.5V, I_{OUT}≥3.15V			450	mA
Load Regulation	ΔV_{OUT}	V_{IN}=4.5V, 1mA≤I_{OUT}≤60mA		45	90	mV
Drop Voltage	V_{DIF}	I_{OUT}=40mA		80		mV
Quiescent Current	I_{SS}	V_{IN}=4.5V, No Load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}*V_{OUT})$	4.5V≤V_{IN}≤12V, I_{OUT}=40mA		0.2	0.4	%/V
Input Voltage	V_{IN}				12	V
Temperature Coefficient	$\Delta V_{OUT}/\Delta T_A$	V_{IN}=4.5V,I_{OUT}=40mA,0°C≤T_A≤85°C		±0.7		mV/°C

8.6 Electrical Characteristics (7840-A)

(T_A=25°C, voltages are referenced to GND, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	V_{IN}=6.5V, I_{OUT}=1mA	3.88	4	4.12	V
Output Current	I_{OUT}	V_{IN}=5.1V, I_{OUT}≥3.6V			450	mA
Load Regulation	ΔV_{OUT}	V_{IN}=5.1V, 1mA≤I_{OUT}≤80mA		10	90	mV
Drop Voltage	V_{DIF}	I_{OUT}=40mA		100		mV
Quiescent Current	I_{SS}	V_{IN}=12V, No Load		2	5	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}*V_{OUT})$	5.1V≤V_{IN}≤12V, I_{OUT}=10mA		0.5		%/V
Input Voltage	V_{IN}				16	V
Temperature Coefficient	$\Delta V_{OUT}/\Delta T_A$	V_{IN}=6V, I_{OUT}=1mA, -40°C≤T_A≤85°C		±1.3		mV/°C

8.7 Electrical Characteristics (7844-A)

(T_A=25°C, voltages are referenced to GND, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	V_{IN}=6.5V, I_{OUT}=1mA	4.268	4.4	4.576	V
Output Current	I_{OUT}	V_{IN}=5.5V, I_{OUT}≥3.96V			450	mA
Load Regulation	ΔV_{OUT}	V_{IN}=5.5V, 1mA≤I_{OUT}≤80mA		10	90	mV
Drop Voltage	V_{DIF}	I_{OUT}=40mA		100		mV
Quiescent Current	I_{SS}	V_{IN}=12V, No Load		2	5	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}*V_{OUT})$	5.5V≤V_{IN}≤12V, I_{OUT}=10mA		0.5		%/V
Input Voltage	V_{IN}				16	V
Temperature Coefficient	$\Delta V_{OUT}/\Delta T_A$	V_{IN}=6V, I_{OUT}=1mA, -40°C≤T_A≤85°C		±1.3		mV/°C

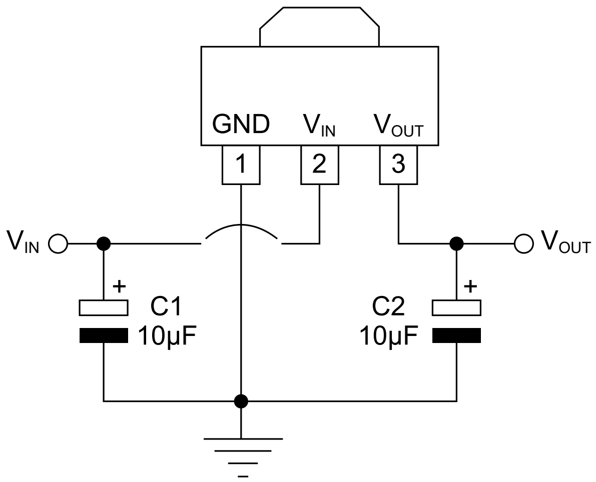
8.8 Electrical Characteristics (7850-A)

(T_A=25°C, voltages are referenced to GND, unless otherwise specified)

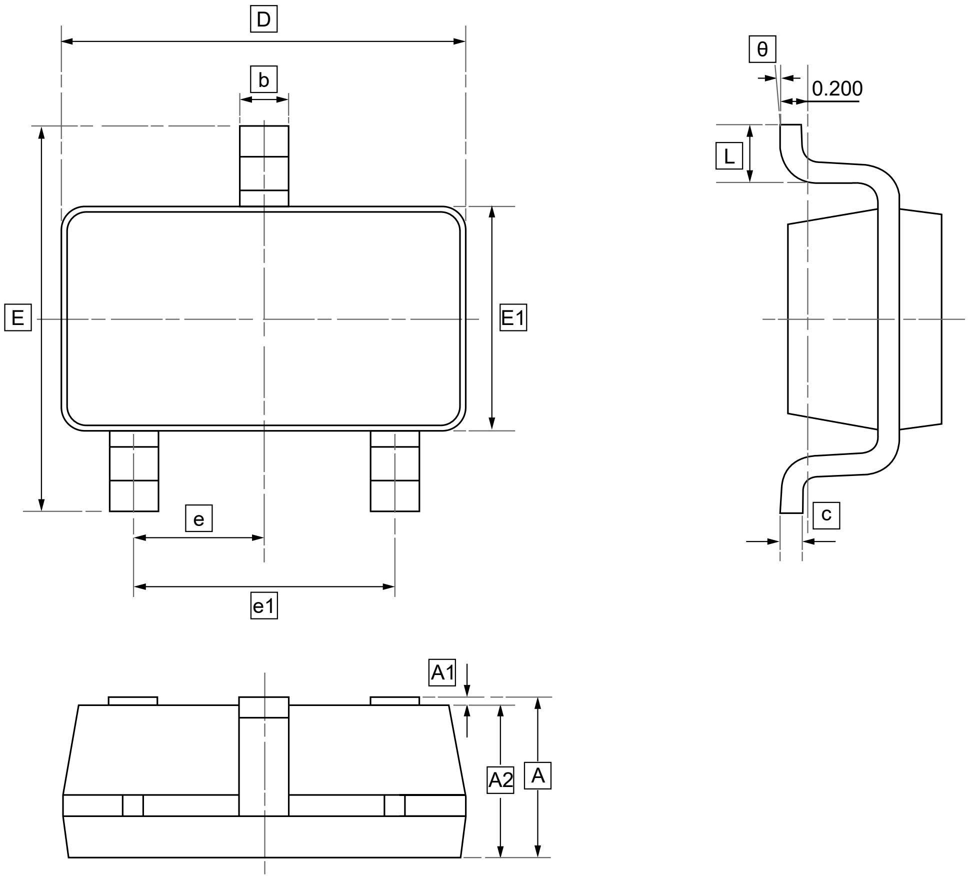
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	V_{IN}=6V, I_{OUT}=40mA	4.85	5	5.15	V
Output Current	I_{OUT}	V_{IN}=6V, I_{OUT}≥4.5V			450	mA
Load Regulation	ΔV_{OUT}	V_{IN}=6V, 1mA≤I_{OUT}≤60mA		45	90	mV
Drop Voltage	V_{DIF}	I_{OUT}=40mA		60		mV
Quiescent Current	I_{SS}	V_{IN}=6V, No Load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}*V_{OUT})$	6V≤V_{IN}≤12V, I_{OUT}=40mA		0.2	0.3	%/V
Input Voltage	V_{IN}				12	V
Temperature Coefficient	$\Delta V_{OUT}/\Delta T_A$	V_{IN}=6V, I_{OUT}=40mA, 0°C≤T_A≤85°C		±0.7		mV/°C

Note: $V_{DIF}=V_{IN2}-V_{OUT2}$, $V_{IN2}=V_{IN}$@($V_{OUT}=V_{OUT2}$), $V_{OUT2}=V_{OUT1}$*98%, $V_{OUT1}=V_{OUT}$@($V_{IN1}=V_{OUT}$+1V,Load=I_{OUT})

9.Typical Application



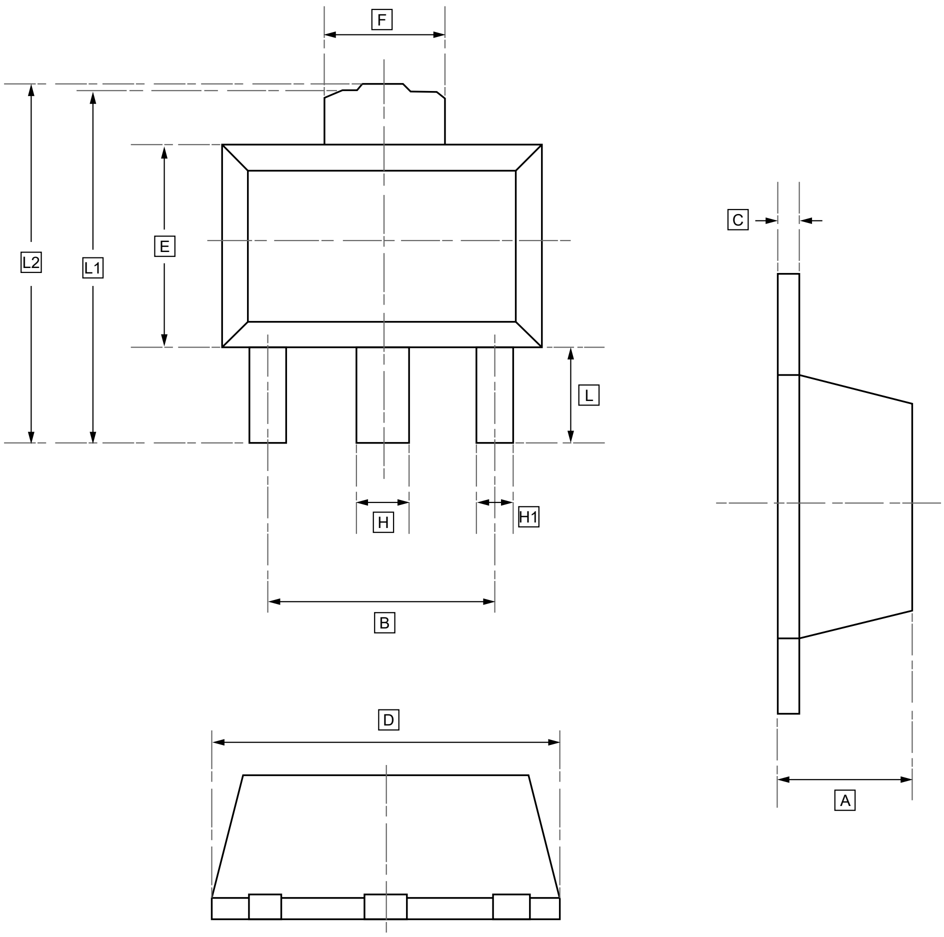
10.1 SOT-23 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E1	E	e	e1	L	K
Min	1.050	0.000	1.050	0.300	0.100	2.820	1.500	2.650	0.950	1.800	0.300	0°
Max	1.250	0.100	1.150	0.500	0.200	3.020	1.700	2.950	BSC	2.000	0.600	8°

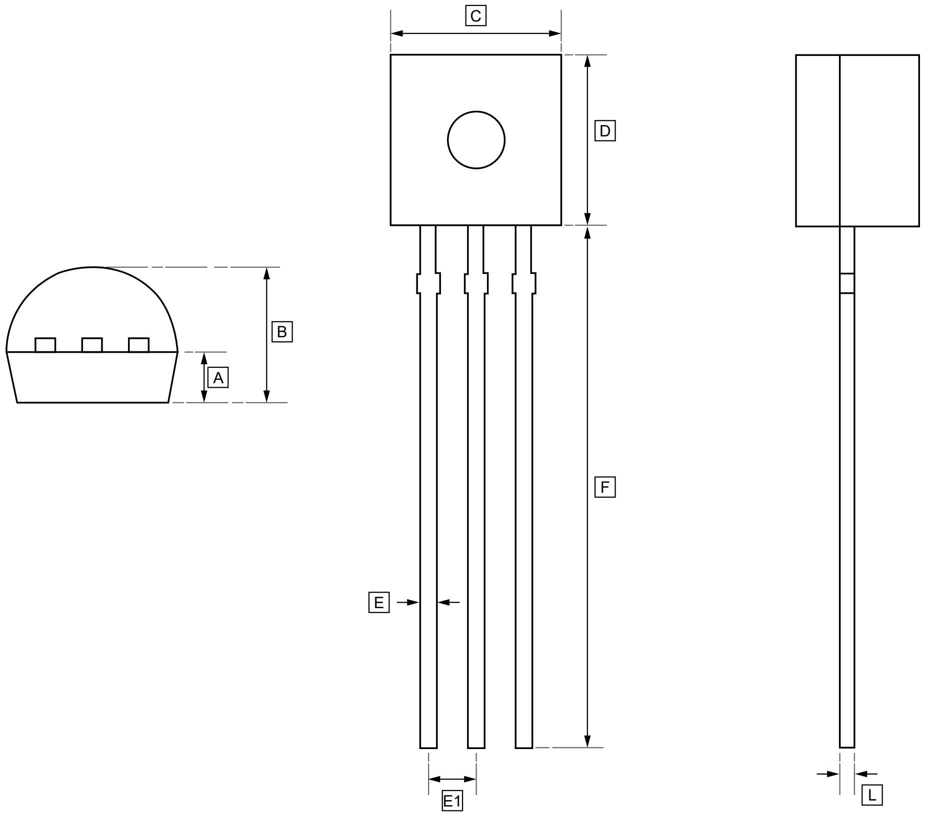
10.2 SOT-89 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	D	E	F	H	H1	L	L1	L2
Min	1.450	2.950	0.330	4.450	2.450	1.650	0.450	0.370	0.900	4.100	4.100
Max	1.550	3.050	0.430	4.550	2.550	1.750	0.580	0.480	1.000	4.300	4.350

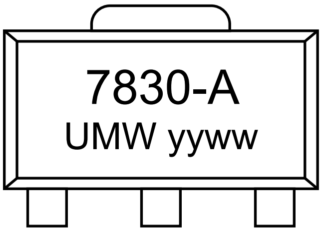
10.3 TO-92 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	D	E	E1	F	L
Min	1.10	3.50	4.50	4.40	0.35	1.27	13.50	0.35
Max	1.30	3.90	4.90	4.90	0.45	TYP	14.50	0.40

11.Ordering Information



yy: Year Code
ww: Week Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW HT7825-A	HT7825-A	SOT-89	1000	Tape and reel
UMW HT7827-A	HT7827-A	SOT-89	1000	Tape and reel
UMW HT7830-A	HT7830-A	SOT-89	1000	Tape and reel
UMW HT7833-A	HT7833-A	SOT-89	1000	Tape and reel
UMW HT7836-A	HT7836-A	SOT-89	1000	Tape and reel
UMW HT7840-A	HT7840-A	SOT-89	1000	Tape and reel
UMW HT7844-A	HT7844-A	SOT-89	1000	Tape and reel
UMW HT7850-A	HT7850-A	SOT-89	1000	Tape and reel

12.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.