Supply Voltage Supervisor with Open-Drain Reset

1 Features

- **Operating Voltage Range:1.2V to 5.5V**
- **Low Power Consumption:50μA (Max)**
- **Precision Supply-Voltage Monitor: 2.63V, 2.93V, 3.08V, 4.00V, 4.65V**
- **Guaranteed $\overline{\text{RESET}}$ Valid at V_{CC}=1.2V**
- **200ms Reset Pulse Width**
- **Voltage Monitor for Power-Fail or Low-Battery Warning**
- **Operating Temperature Range: -40°C to +125°C**
- **Open-Drain,$\overline{\text{RESET}}$ Output**
- **Available in Green Package: SOT23**

2 Applications

- **Computers**
- **SOC 、DSP or Micro controllers**
- **Embedded Systems**
- **Industrial Equipment**
- **Intelligent Instruments**
- **Critical μP Power Monitoring**
- **Wireless Communications Systems**

3 Descriptions

The ZMB803 microprocessor (μP) supervisory circuits reduce the complexity and number of components required to monitor power-supply and battery function in μP systems. This device significantly improves system reliability and accuracy compared to separate ICs or discrete components.

These circuits perform a single function: they assert a reset signal whenever the V_{CC} supply voltage declines below a preset threshold, keeping it asserted for at least 200ms after V_{CC} has risen above the reset threshold. Reset thresholds suitable for operation with a variety of supply voltages are available.

The ZMB803 has an open-drain output stage.The ZMB803's open-drain $\overline{\text{RESET}}$ output requires a pull-up resistor that can be connected to a voltage higher than V_{CC}. The ZMB803 have an active-low $\overline{\text{RESET}}$ output.The reset comparator is designed to ignore fast transients on V_{CC}, and the outputs are guaranteed to be in the correct logic state for V_{CC} down to 1.2V.

Low supply current makes the ZMB803 ideal for use in portable equipment.The ZMB803 is available in Green SOT23 package. It operates over an ambient temperature range of -40°C to +125°C.

Device Information (1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
ZMB803	SOT23(3)	1.30mm×2.92mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

4 Typical Application

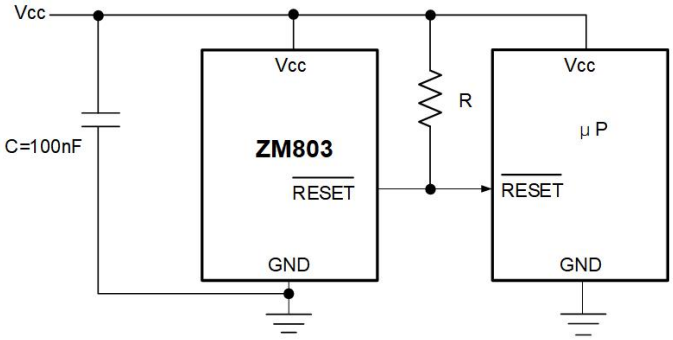


Table of Contents

5 Revision History

Note: Page numbers for previous revisions may different from page numbers in the current version.

Version	Change Date	Change Item
A.1	2021/08/09	Initial version completed

6 Package/Ordering Information (1)

PRODUCT	ORDERING NUMBER	PACKAGE TYPE	TEMPERATURE RANGE	PACKAGE MARKING (2/3)	MSL(3)	PACKAGE OPTION
ZMB803	ZMB803-2.63YSF3	SOT23	-40℃~125℃	803B	MSL3	Tape and Reel,3000
	ZMB803-2.93YSF3	SOT23	-40℃~125℃	803C	MSL3	Tape and Reel,3000
	ZMB803-3.08YSF3	SOT23	-40℃~125℃	803D	MSL3	Tape and Reel,3000
	ZMB803-4.00YSF3	SOT23	-40℃~125℃	803E	MSL3	Tape and Reel,3000
	ZMB803-4.65YSF3	SOT23	-40℃~125℃	803G	MSL3	Tape and Reel,3000

NOTE:

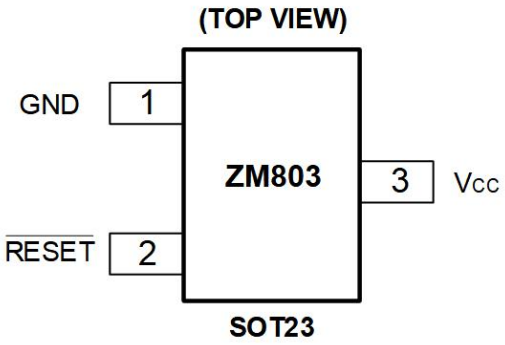
(1) This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the right-hand navigation.

(2) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.

(3) B,C,D,E,G represents different Reset Thresholds.

(4) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.

7 Pin Configuration



Pin Description

PIN	NAME	FUNCTION
SOT23		
1	GND	Ground, reference for all signals.
2	$\overline{\text{RESET}}$	Active-Low Reset Output remains low while V_{CC} is below the reset threshold, and for at least 200ms after V_{CC} rises above the reset threshold.
3	V_{CC}	Power Supply Voltage that is monitored.

8 Specifications

8.1 Absolute Maximum Ratings (1)

over operating free-air temperature range (unless otherwise noted) (1)(2)

			MIN	MAX	UNIT
V_{CC}	Supply voltage range		-0.5	6.0	V
V_I	Input voltage range (2)		-0.5	6.0	V
Vo	Voltage range applied to any output in the high-impedance or power-off state (2)		-0.5	6.0	V
Vo	Voltage range applied to any output in the high or low state (2)(3)		-0.5	V_{CC}+0.5	V
I_{IK}	Input clamp current	V_I<0		-20	mA
I_{OK}	Output clamp current	V_O<0		-20	mA
I_O	Continuous output current			±20	mA
	Continuous current through V_{CC} or GND			±20	mA
θ_{JA}	Package thermal impedance (4)	SOT23		295	°C/W
T_J	Junction temperature (5)		-65	150	°C
T_{stg}	Storage temperature		-65	150	°C
T_A	Operating temperature		-40	125	°C

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

(3) The value of V_{CC} is provided in the *Recommended Operating Conditions table*.

(4) The package thermal impedance is calculated in accordance with JESD-51.

(5) The maximum power dissipation is a function of $T_{J(MAX)}$, $R_{\theta JA}$, and T_A. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(MAX)} - T_A) / R_{\theta JA}$. All numbers apply for packages soldered directly onto a PCB.

8.2 ESD Ratings

The following ESD information is provided for handling of ESD-sensitive devices in an ESD protected area only.

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-body model (HBM), MIL-STD-883K METHOD 3015.9	±4000	V
		Machine model (MM), JESD22-A115C (2010)	±200	V

ESD SENSITIVITY CAUTION

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

8.3 Electrical Characteristics

(V_{CC} = 2.74V to 5.5V for ZMB803-2.63; V_{CC} = 3.05V to 5.5V for ZMB803-2.93; V_{CC} = 3.21V to 5.5V for ZMB803-3.08; V_{CC} = 4.17V to 5.5V for ZMB803-4.00; V_{CC} = 4.84V to 5.5V for ZMB803-4.65;T_A = -40°C to +125°C, unless otherwise noted, typical at 25°C.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage Range	V_{CC}		1.2		5.5	V
Supply Current	I_{SUPPLY}			20	50	μA
Reset Threshold	V_{RT}	ZMB803-2.63	2.50	2.63	2.74	V
		ZMB803-2.93	2.80	2.93	3.05	
		ZMB803-3.08	2.94	3.08	3.21	
		ZMB803-4.00	3.82	4.00	4.17	
		ZMB803-4.65	4.44	4.65	4.84	
Reset Threshold Hysteresis		ZMB803-2.63		12		mV
		ZMB803-2.93		14		
		ZMB803-3.08		15		
		ZMB803-4.00		20		
		ZMB803-4.65		23		
Reset Pulse Width	t_{RS}		100	200	460	ms
Reset Threshold Temperature Coefficient (1)				30		ppm/°C
V_{CC} to $\overline{RESET}$ delay	t_{RD}	V_{CC}=3.3V, ZMB803-2.93		33		μs
$\overline{RESET}$ Output voltage	Low	I_{OL} = 1.2mA			0.4	V
$\overline{RESET}$ Open-Drain output Leakage Current	$I_{lkg(OD)}$	V_{CC} > V_{RT}, RESET deasserted			1	μA

(1) This parameter is ensured by design and/or characterization and is not tested in production.

8.4 Typical Operating Characteristics

NOTE: The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only.

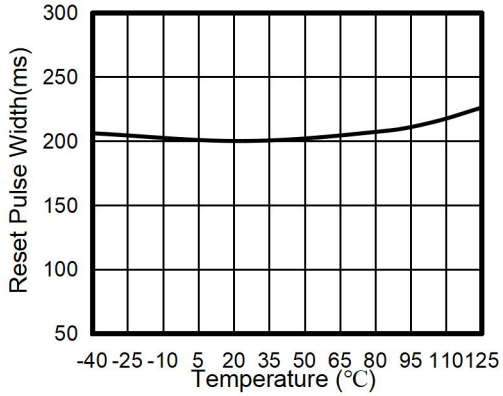


Figure 1. Reset Pulse Width vs Temperature

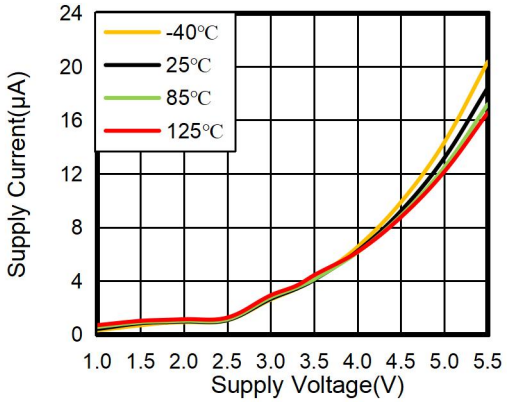


Figure 2. Supply Voltage vs Supply Current

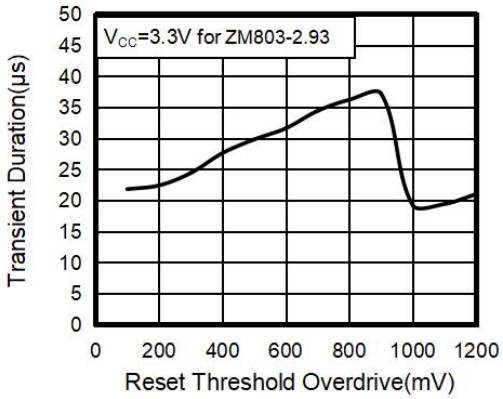


Figure 3. Transient Duration vs Reset Threshold Overdrive

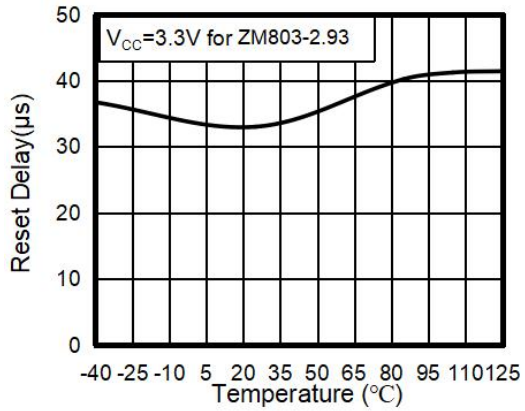


Figure 4. Reset Delay vs Temperature

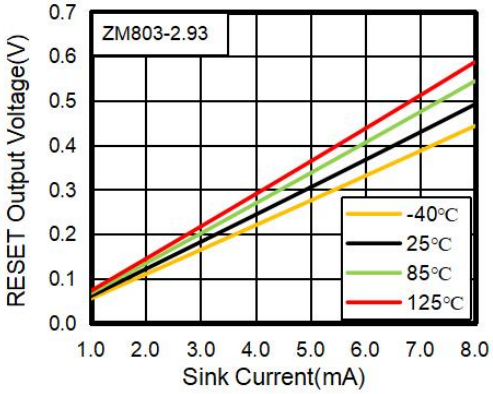


Figure 5. RESET Output Voltage vs Sink Current

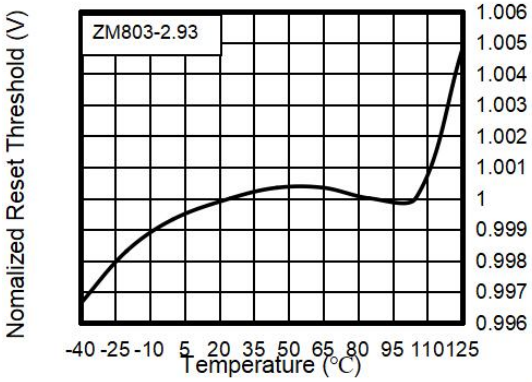
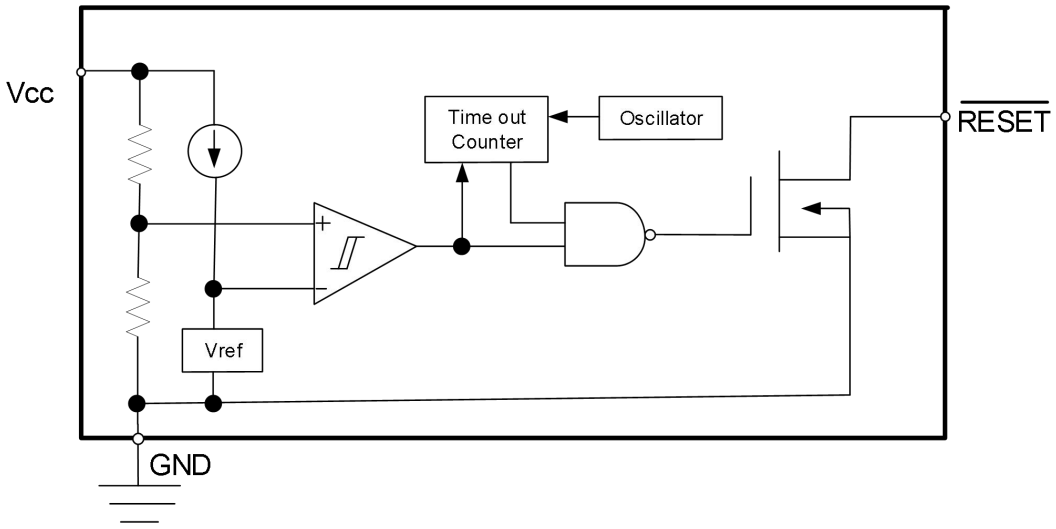


Figure 6. Normalized Reset Threshold vs Temperature

9 Function Block Diagram



10 Detailed Description

A microprocessor's (μP's) reset input starts the μP in a known state. The ZMB803 assert reset to prevent code-execution errors during power-up, power-down or brownout conditions. They assert a reset signal whenever the V_{CC} supply voltage declines below a preset threshold, keeping it asserted for at least 200ms after V_{CC} has risen above the reset threshold. The ZMB803 uses an open-drain output. Connect a pull-up resistor on the ZMB803's $\overline{RESET}$ output pin to any supply voltage between 0V to 6V.

11 Applications Information

11.1 Interfacing to µPs with Bidirectional Reset Pins

Since the $\overline{\text{RESET}}$ output on the ZMB803 is open drain, this device interfaces easily with µPs with bidirectional reset pins, Connecting the µP supervisor's $\overline{\text{RESET}}$ output directly to the µP's $\overline{\text{RESET}}$ pin with a single pull-up resistor allows either device to assert reset (Figure 7).

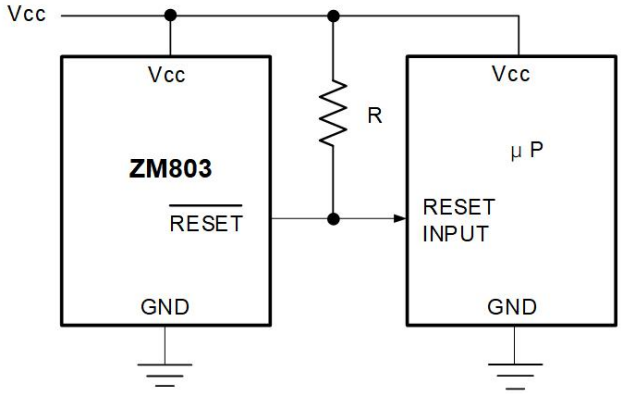


Figure 7. Interfacing to µP's with Bidirectional Reset I/O

11.2 ZMB803 Open-Drain $\overline{\text{RESET}}$ Output Allows Use with Multiple Supplies

The pull-up connected to the ZMB803 will connect to the supply voltage that is being monitored at the µP's V_{CC} pin. However, some systems may use the open-drain output to level-shift from the monitored supply to reset circuitry powered by some other supply (Figure 8). Note that as the ZMB803's V_{CC} decreases below 1.2V, so does the µP's ability to sink current at $\overline{\text{RESET}}$. Also, with any pull-up, $\overline{\text{RESET}}$ will be pulled high as V_{CC} decays toward 0V. The voltage where this occurs depends on the pull-up resistor value and the voltage to which it is connected.

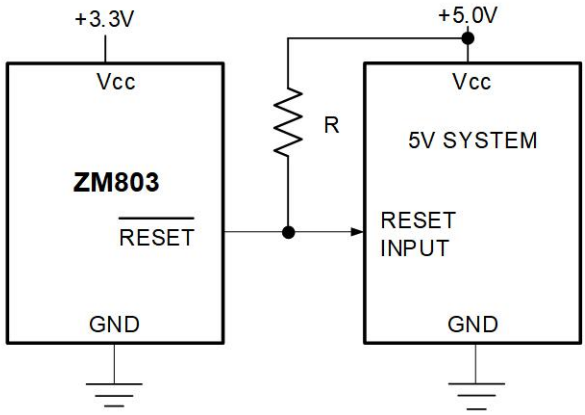
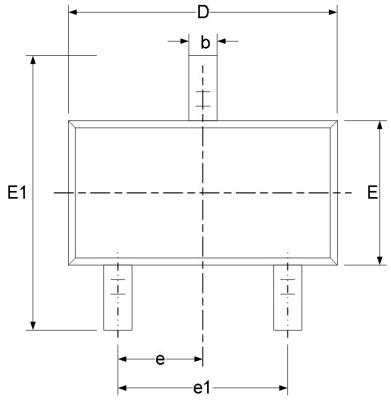
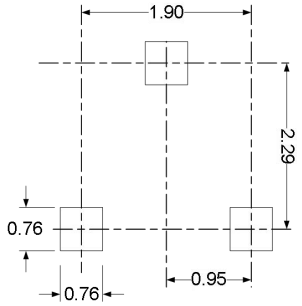


Figure 8. ZMB803 Open-Drain $\overline{\text{RESET}}$ output Allows Use with Multiple Supplies

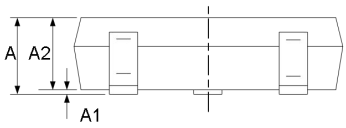
12 Package Outline Dimensions

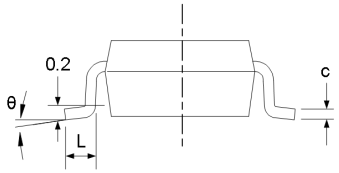
SOT23 (3)





RECOMMENDED LAND PATTERN (Unit: mm)





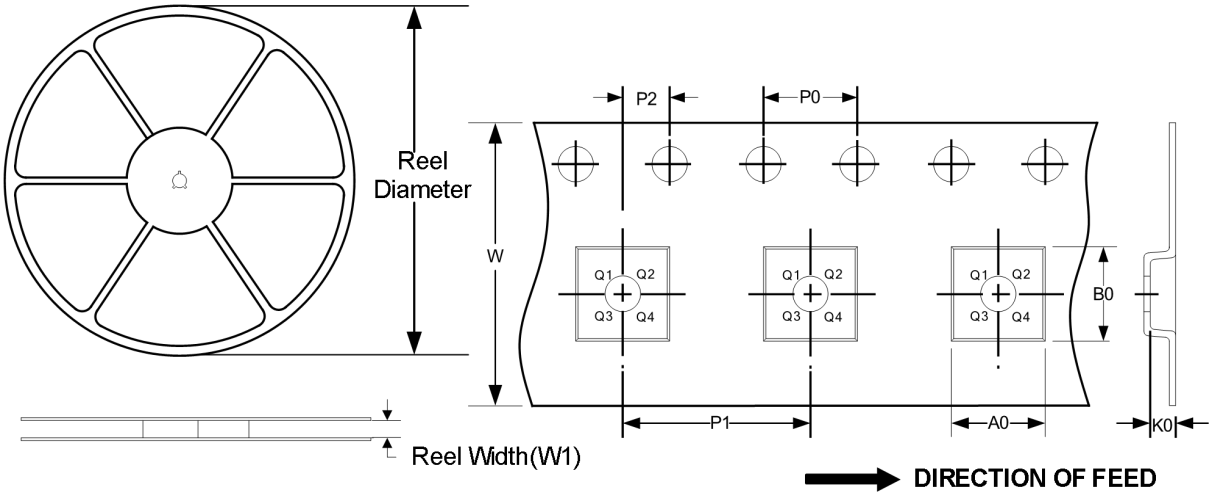
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A (1)	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D (1)	2.800	3.000	0.110	0.118
E (1)	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 (BSC) (2)		0.037 (BSC) (2)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.

13 Tape and Reel Information

REEL DIMENSIONS **TAPE DIMENSION**



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOT23	7''	9.5	3.15	2.77	1.22	4.0	4.0	2.0	8.0	Q3

NOTE:
1. All dimensions are nominal.
2. Plastic or metal protrusions of 0.15mm maximum per side are not included.

IMPORTANT NOTICE AND DISCLAIMER

Z-Micro will accurately and reliably provide technical and reliability data (including data sheets), design resources (including reference designs), application or other design advice, WEB tools, safety information and other resources, without warranty of any defect, and will not make any express or implied warranty, including but not limited to the warranty of merchantability Implied warranty that it is suitable for a specific purpose or does not infringe the intellectual property rights of any third party.

These resources are intended for skilled developers designing with Z-Micro products You will be solely responsible for: (1) Selecting the appropriate products for your application; (2) Designing, validating and testing your application; (3) Ensuring your application meets applicable standards and any other safety, security or other requirements; (4) Z-Micro and the Z-Micro logo are registered trademarks of Z-Micro. All trademarks are the property of their respective owners; (5) For change details, review the revision history included in any revised document. The resources are subject to change without notice. Our company will not be liable for the use of this product and the infringement of patents or third-party intellectual property rights due to its use.