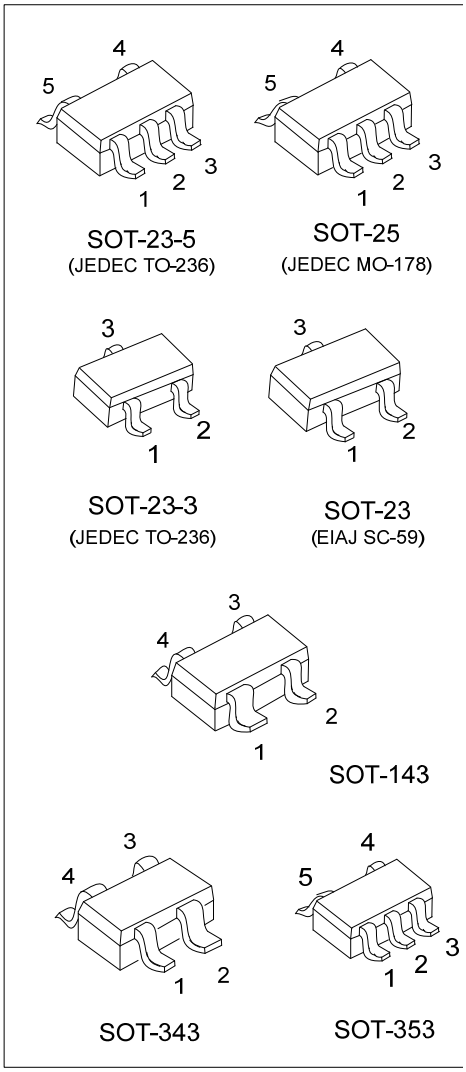
MICROPROCESSOR RESET CIRCUITS



■ DESCRIPTION

The UTC **UIC811** series are resetting circuits which can monitor power supplies especially in microprocessor based systems.

In normal operation, the UTC **UIC811** series can assert a reset under any of the following situation: the power supply drops below a designated reset threshold level (which is available for 3V or 3.3V or 5V system) or $\overline{MR}$ is forced low.

There is an internal active low $\overline{RESET}$ output which has already been guaranteed to remain asserted for at 140ms least while V_{CC} rises above the designed threshold level.

■ FEATURES

* Voltage monitor for 3V or 3.3V or 5V power supplies
* Valid $\overline{RESET}$ remains with V_{CC} as low as 1V
* Typical supply current: 5μA
* Fixed 140ms minimum reset pulse width
* With Manual reset input
* Push-Pull $\overline{RESET}$ Active Low Output

■ ORDERING INFORMATION

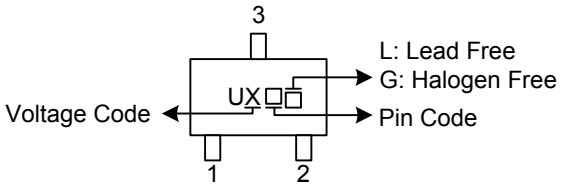
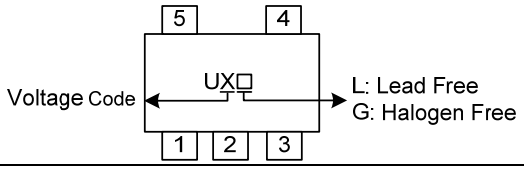
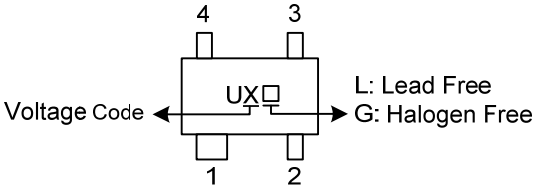
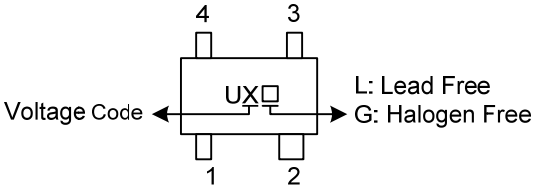
Ordering Number		Package	Pin Assignment					Packing
Lead Free	Halogen Free		1	2	3	4	5	
UIC811L-x-AD4-R	UIC811G-x-AD4-R	SOT-143	GND	$\overline{\text{RESET}}$	$\overline{\text{MR}}$	V_{CC}	-	Tape Reel
UIC811L-x-AE2-2-R	UIC811G-x-AE2-2-R	SOT-23-3	$\overline{\text{RESET}}$	V_{CC}	GND	-	-	Tape Reel
UIC811L-x-AE2-3-R	UIC811G-x-AE2-3-R	SOT-23-3	GND	$\overline{\text{RESET}}$	V_{CC}	-	-	Tape Reel
UIC811L-x-AE2-5-R	UIC811G-x-AE2-5-R	SOT-23-3	$\overline{\text{RESET}}$	GND	V_{CC}	-	-	Tape Reel
UIC811L-x-AE3-2-R	UIC811G-x-AE3-2-R	SOT-23	$\overline{\text{RESET}}$	V_{CC}	GND	-	-	Tape Reel
UIC811L-x-AE3-3-R	UIC811G-x-AE3-3-R	SOT-23	GND	$\overline{\text{RESET}}$	V_{CC}	-	-	Tape Reel
UIC811L-x-AE3-5-R	UIC811G-x-AE3-5-R	SOT-23	$\overline{\text{RESET}}$	GND	V_{CC}	-	-	Tape Reel
UIC811L-x-AE5-R	UIC811G-x-AE5-R	SOT-23-5	GND	NC	$\overline{\text{RESET}}$	$\overline{\text{MR}}$	V_{CC}	Tape Reel
UIC811L-x-AF5-R	UIC811G-x-AF5-R	SOT-25	GND	NC	$\overline{\text{RESET}}$	$\overline{\text{MR}}$	V_{CC}	Tape Reel
UIC811L-x-AL4-R	UIC811G-x-AL4-R	SOT-343	GND	$\overline{\text{RESET}}$	$\overline{\text{MR}}$	V_{CC}	-	Tape Reel
UIC811L-x-AL5-R	UIC811G-x-AL5-R	SOT-353	GND	NC	$\overline{\text{RESET}}$	$\overline{\text{MR}}$	V_{CC}	Tape Reel

Note: Pin Assignment : x: Output Voltage, refer to Marking Information.

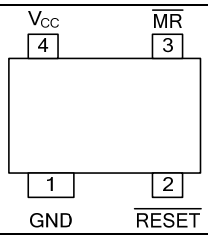
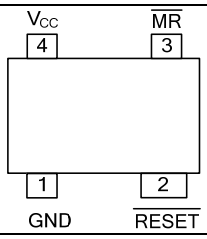
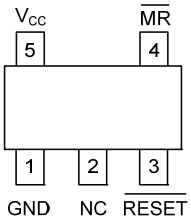
UIC811G-x-AE2-2-R
(1) Packing Type
(2) Pin Assignment
(3) Package Type
(4) Output Voltage Code
(5) Green Package

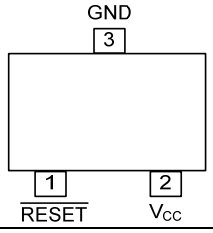
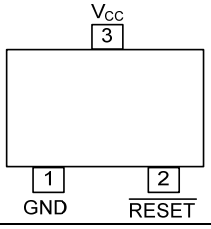
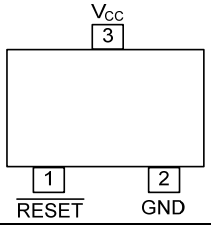
(1) R: Tape Reel
(2) refer to Pin Assignment
(3) AD4: SOT-143, AE2: SOT-23-3, AE3: SOT-23, AE5: SOT-23-5, AF5: SOT-25, AL4: SOT-343 AL5: SOT-353
(4) x: Refer to Marking Information
(5) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-23 SOT-23-3	A : 2.63V B : 2.93V C : 3.08V D: 4.00V E: 4.38V F: 4.63V J: 5.00V	
SOT-23-5 SOT-25 SOT-353		
SOT-143		
SOT-343		

■ PIN CONFIGURATION

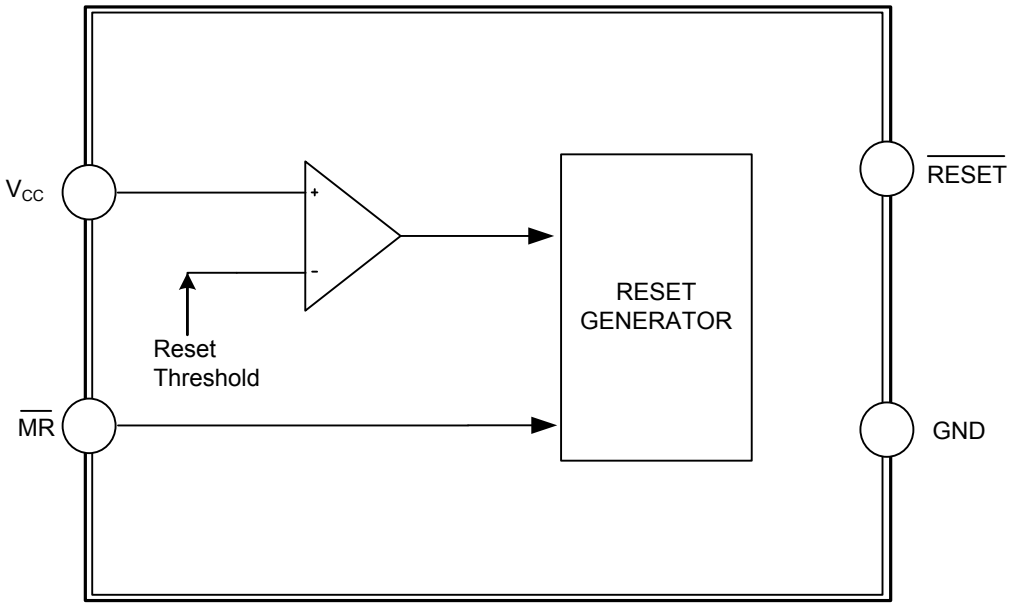
SOT-143	SOT-343	SOT-23-5 / SOT-25 / SOT-353
		

SOT-23-3 / SOT-23		
AE2-2 / AE3-2	AE2-3 / AE3-3	AE2-5 / AE3-5
		

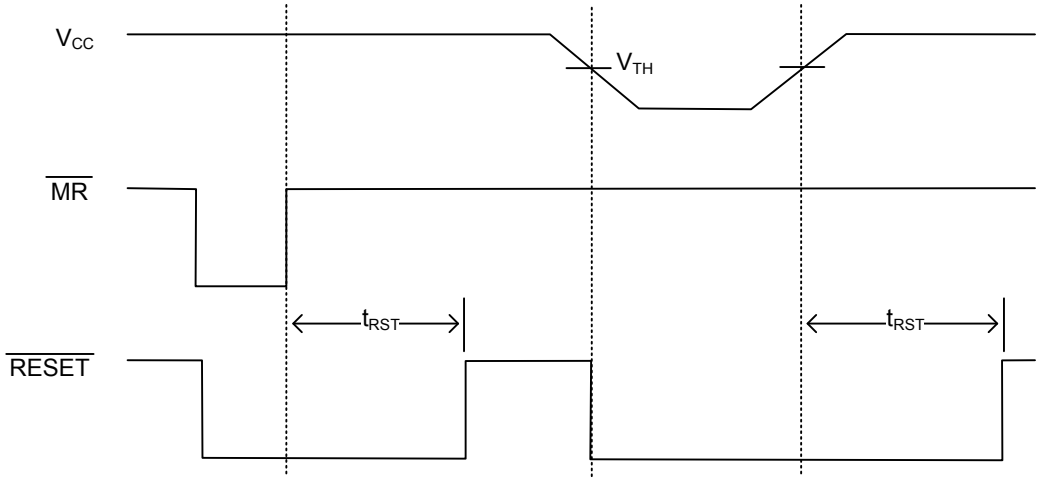
■ PIN DESCRIPTION

PIN NAME	DESCRIPTION
GND	Ground
NC	No Connection.
$\overline{\text{RESET}}$	This pin will fall low after the V_{CC}'s falling below the reset threshold voltage and it also can remain asserted for at least 140ms min after V_{CC}'s rising upon the reset threshold.
$\overline{\text{MR}}$	Input of manual reset. A reset can be forced by a logic low on $\overline{\text{MR}}$. As the $\overline{\text{MR}}$ is held low, the reset will remain asserted, and until the $\overline{\text{MR}}$ rise high, the reset will remain 140ms min at least. When it is float that means it is unused. For 4 Pin, 5 Pin Packing only.
V_{CC}	Input of power supply.

■ BLOCK DIAGRAM



■ FUNCTIONAL DIAGRAM



Reset Timing Diagram

■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Input Voltage		V_{CC}	-0.3 ~ +6.0	V
$\overline{RESET}$		V_{RESET}	-0.3 ~ +6.0	V
Input Current (V_{CC}, $\overline{MR}$)		I_{IN}	20	mA
Output Current ($\overline{RESET}$)		I_{OUT}	20	mA
Rate of Rise		$V_{CC(RR)}$	100	V/μs
Power Dissipation (T_A=70°C)	SOT-23-3/SOT-23	P_D	300	mW
	SOT-23-5/SOT-25		350	mW
	SOT-143		320	mW
	SOT-343		250	mW
	SOT-353		260	mW
Junction Temperature		T_J	+150	°C
Operating Temperature		T_{OPR}	-40 ~ +105	°C
Storage Temperature		T_{STG}	-65 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. The device is not guaranteed to function outside its operating rating.

■ ELECTRICAL CHARACTERISTICS

UIC811-A (2.63V) (V_{CC}=3V, T_A = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage Range	V_{CC}	T_A =-40~+85°C	1		6	V
Supply Current	I_{CC}	V_{CC}=3.0V, no load		5	10	μA
Reset Voltage Threshold	V_{TH}		2.55	2.63	2.70	V
Reset Timeout Period	t_{RST}		140	240	560	ms
$\overline{Reset}$ Output Voltage	V_{OH}	I_{SOURCE} =500μA	2.4			V
	V_{OL}	V_{CC} = V_{TH} min, I_{SINK} =1.2mA			0.3	V
		V_{CC}>1V, I_{SINK} =50μA, T_A=-40~+85°C			0.3	V
$\overline{MR}$ Input Threshold	V_{IH}		2.1			V
	V_{IL}				0.75	V
$\overline{MR}$ Minimum Pulse Width			10			μS
$\overline{MR}$ to Reset Delay				0.5		μS
$\overline{MR}$ Pull-Up Resistance			10	20	40	kΩ
$\overline{MR}$ Glitch Immunity				100		ns

UIC811-B (2.93V) (V_{CC}=3.3V, T_A= 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage Range	V_{CC}	T_A =-40~+85°C	1		6	V
Supply Current	I_{CC}	V_{CC}=3.3V, no load		5	10	μA
Reset Voltage Threshold	V_{TH}		2.85	2.93	3.00	V
Reset Timeout Period	t_{RST}		140	240	560	ms
$\overline{Reset}$ Output Voltage	V_{OH}	I_{SOURCE} =500μA	2.64			V
	V_{OL}	V_{CC} = V_{TH} min, I_{SINK} =1.2mA			0.3	V
		V_{CC}>1V, I_{SINK} =50μA, T_A=-40~+85°C			0.3	V
$\overline{MR}$ Input Threshold	V_{IH}		2.31			V
	V_{IL}				0.825	V
$\overline{MR}$ Minimum Pulse Width			10			μS
$\overline{MR}$ to Reset Delay				0.5		μS
$\overline{MR}$ Pull-Up Resistance			10	20	40	kΩ
$\overline{MR}$ Glitch Immunity				100		ns

■ ELECTRICAL CHARACTERISTICS (Cont.)

UIC811-C (3.08V) (V_{CC}=3.3V, T_A= 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage Range	V_{CC}	T_A =-40~+85°C	1		6	V
Supply Current	I_{CC}	V_{CC}=3.3V, no load		5	10	μA
Reset Voltage Threshold	V_{TH}		3.00	3.08	3.15	V
Reset Timeout Period	t_{RST}		140	240	560	ms
$\overline{Reset}$ Output Voltage	V_{OH}	I_{SOURCE} =500μA	2.64			V
	V_{OL}	V_{CC} = V_{TH} min, I_{SINK} =1.2mA			0.3	V
		V_{CC}>1V, I_{SINK} =50μA, T_A=-40~+85°C			0.3	V
$\overline{MR}$ Input Threshold	V_{IH}		2.31			V
	V_{IL}				0.825	V
$\overline{MR}$ Minimum Pulse Width			10			μS
$\overline{MR}$ to Reset Delay				0.5		μS
$\overline{MR}$ Pull-Up Resistance			10	20	40	kΩ
$\overline{MR}$ Glitch Immunity				100		ns

UIC811-D (4.00V) (V_{CC}=5V, T_A= 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage Range	V_{CC}	T_A =-40~+85°C	1		6	V
Supply Current	I_{CC}	V_{CC}=5.0V, no load		5	15	μA
Reset Voltage Threshold	V_{TH}		3.89	4.00	4.10	V
Reset Timeout Period	t_{RST}		140	240	560	ms
$\overline{Reset}$ Output Voltage	V_{OH}	I_{SOURCE} =800μA	3.5			V
	V_{OL}	V_{CC} = V_{TH} min, I_{SINK} =3.2mA			0.4	V
		V_{CC}>1V, I_{SINK} =50μA, T_A=-40~+85°C			0.3	V
$\overline{MR}$ Input Threshold	V_{IH}		2.3			V
	V_{IL}				0.8	V
$\overline{MR}$ Minimum Pulse Width			10			μS
$\overline{MR}$ to Reset Delay				0.5		μS
$\overline{MR}$ Pull-Up Resistance			10	20	40	kΩ
$\overline{MR}$ Glitch Immunity				100		ns

UIC811-E (4.38V) (V_{CC}=5V, T_A= 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage Range	V_{CC}	T_A =-40~+85°C	1		6	V
Supply Current	I_{CC}	V_{CC}=5.0V, no load		5	15	μA
Reset Voltage Threshold	V_{TH}		4.25	4.38	4.50	V
Reset Timeout Period	t_{RST}		140	240	560	ms
$\overline{Reset}$ Output Voltage	V_{OH}	I_{SOURCE} =800μA	3.5			V
	V_{OL}	V_{CC} = V_{TH} min, I_{SINK} =3.2mA			0.4	V
		V_{CC}>1V, I_{SINK} =50μA, T_A=-40~+85°C			0.3	V
$\overline{MR}$ Input Threshold	V_{IH}		2.3			V
	V_{IL}				0.8	V
$\overline{MR}$ Minimum Pulse Width			10			μS
$\overline{MR}$ to Reset Delay				0.5		μS
$\overline{MR}$ Pull-Up Resistance			10	20	40	kΩ
$\overline{MR}$ Glitch Immunity				100		ns

■ ELECTRICAL CHARACTERISTICS (Cont.)

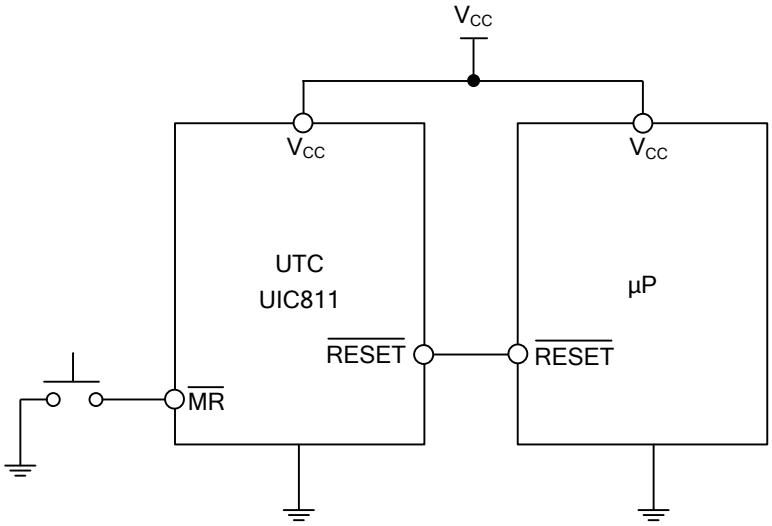
UIC811-F (4.63V) (V_{CC}=5V, T_A= 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage Range	V_{CC}	T_A =-40~+85°C	1		6	V
Supply Current	I_{CC}	V_{CC}=5.0V, no load		5	15	μA
Reset Voltage Threshold	V_{TH}		4.5	4.63	4.75	V
Reset Timeout Period	t_{RST}		140	240	560	ms
$\overline{\text{Reset}}$ Output Voltage	V_{OH}	I_{SOURCE} =800μA	3.5			V
	V_{OL}	V_{CC} = V_{TH} min, I_{SINK} =3.2mA			0.4	V
		V_{CC}>1V, I_{SINK} =50μA, T_A=-40~+85°C			0.3	V
$\overline{\text{MR}}$ Input Threshold	V_{IH}		2.3			V
	V_{IL}				0.8	V
$\overline{\text{MR}}$ Minimum Pulse Width			10			μS
$\overline{\text{MR}}$ to Reset Delay				0.5		μS
$\overline{\text{MR}}$ Pull-Up Resistance			10	20	40	kΩ
$\overline{\text{MR}}$ Glitch Immunity				100		ns

UIC811-J (5.0V) (V_{CC}=5.5V, T_A= 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage Range	V_{CC}	T_A =-40~+85°C	1		6	V
Supply Current	I_{CC}	V_{CC}=5.0V, no load			25	μA
Reset Voltage Threshold	V_{TH}		4.85	5	5.15	V
Reset Timeout Period	t_{RST}		140	240	560	ms
$\overline{\text{Reset}}$ Output Voltage	V_{OH}	I_{SOURCE} =800μA	4.55			V
	V_{OL}	V_{CC} = V_{TH} min, I_{SINK} =3.2mA			0.4	V
		V_{CC}>1V, I_{SINK} =50μA, T_A =-40~+85°C			0.3	V
$\overline{\text{MR}}$ Input Threshold	V_{IH}		2.45			V
	V_{IL}				0.8	V
$\overline{\text{MR}}$ Minimum Pulse Width			10			μS
$\overline{\text{MR}}$ to Reset Delay				0.5		μS
$\overline{\text{MR}}$ Pull-Up Resistance			10	20	40	kΩ
$\overline{\text{MR}}$ Glitch Immunity				100		ns

■ TYPICAL APPLICATION CIRCUIT



■ APPLICATION INFORMATION

Microprocessor Reset

As soon as V_{CC} falls below the reset threshold voltage, the $\overline{\text{RESET}}$ pin is asserted. But the $\overline{\text{RESET}}$ pin can keep asserted for a period of 140ms after V_{CC} rose above the reset threshold voltage. After a power failure the reset operation can keep the processor being reset and powers up properly.

V_{CC} Transients

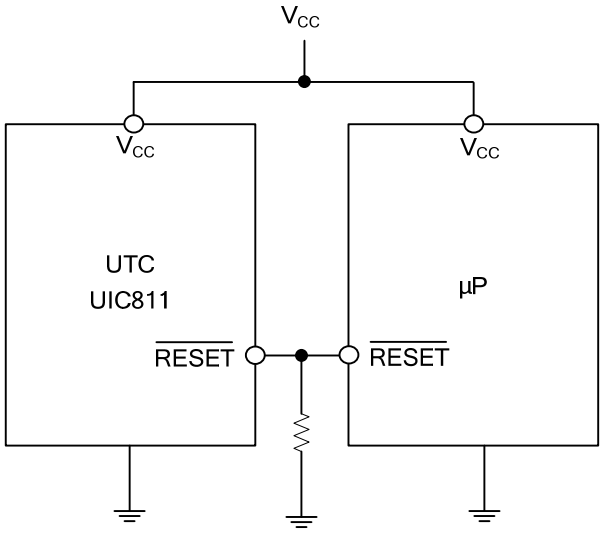
The UTC **UIC811** series won't cause a reset typically as this situation: a negative-going transient 125mV below the reset threshold with a duration of 20µs or less.

Interfacing to Bidirectional Reset Pins

Connecting a 4.7kΩ resistor in series with the UTC **UIC811** series output and the µP reset pin can make the UTC **UIC811** series interface with µPs with bidirectional reset pins.

$\overline{\text{RESET}}$ Valid at Low Voltage

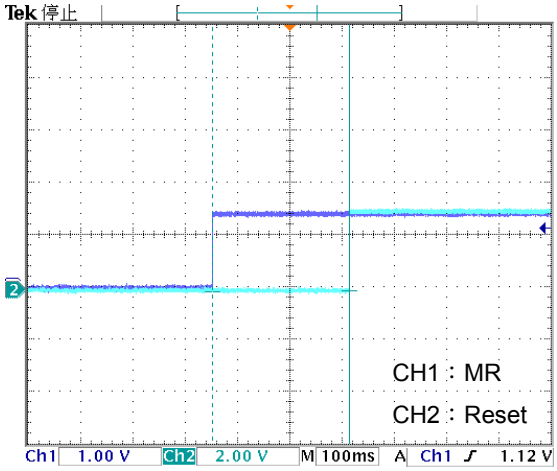
As the figure below, adding a resistor which is recommended 100kΩ can ensure the $\overline{\text{RESET}}$ output remains low with V_{CC} down to 0V. The size of the resistor should be not too large which will load the output excessively and not too small which can pull-down any stray leakage currents.



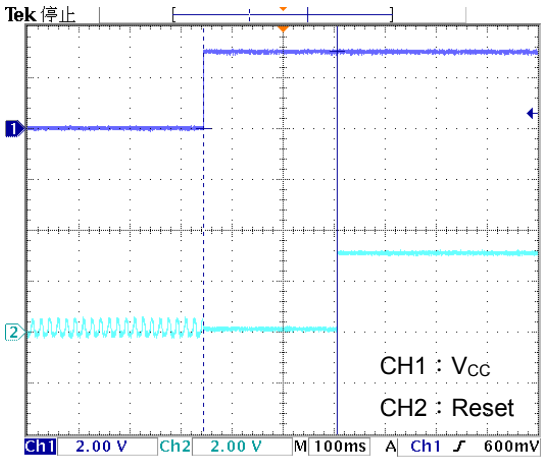
Reset Valid to V_{CC} = 0V

■ TYPICAL CHARACTERISTICS

Reset Timeout out Period



Reset Timeout out Period



MR to Reset Delay