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19-2440; Rev 2; 10/02

MAXIM

Low-Power, SC70/SOT µP Reset Circuits with Capacitor-Adjustable Reset Timeout Delay

General Description

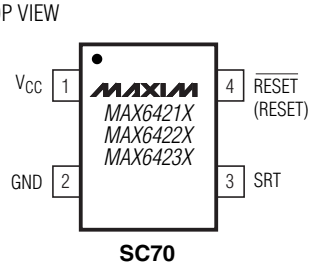
The MAX6340/MAX6421–MAX6426 low-power microprocessor supervisor circuits monitor system voltages from 1.6V to 5V. These devices perform a single function: they assert a reset signal whenever the V_{CC} supply voltage falls below its reset threshold. The reset output remains asserted for the reset timeout period after V_{CC} rises above the reset threshold. The reset timeout is externally set by a capacitor to provide more flexibility.

The MAX6421/MAX6424 have an active-low, push-pull reset output. The MAX6422 has an active-high, push-pull reset output and the MAX6340/MAX6423/MAX6425/MAX6426 have an active-low, open-drain reset output. The MAX6421/MAX6422/MAX6423 are offered in 4-pin SC70 or SOT143 packages. The MAX6340/MAX6424/MAX6425/MAX6426 are available in 5-pin SOT23-5 packages.

Applications

Portable Equipment
Battery-Powered Computers/Controllers
Automotive
Medical Equipment
Intelligent Instruments
Embedded Controllers
Critical µP Monitoring
Set-Top Boxes
Computers

Pin Configurations



SC70

( ) ARE FOR THE MAX6422

Pin Configurations continued at end of data sheet.

Features

- **Monitor System Voltages from 1.6V to 5V**
- **Capacitor-Adjustable Reset Timeout Period**
- **Low Quiescent Current (1.6µA typ)**
- **Three RESET Output Options**
  - **Push-Pull $\overline{\text{RESET}}$**
  - **Push-Pull RESET**
  - **Open-Drain $\overline{\text{RESET}}$**
- **Guaranteed Reset Valid to V_{CC} = 1V**
- **Immune to Short V_{CC} Transients**
- **Small 4-Pin SC70, 4-Pin SOT143, and 5-Pin SOT23 Packages**
- **MAX6340 Pin Compatible with LP3470**
- **MAX6424/MAX6425 Pin Compatible with NCP300–NCP303, MC33464/MC33465, S807/S808/S809, and RN5VD**
- **MAX6426 Pin Compatible with PST92XX**

Ordering Information

PART	TEMP RANGE	PIN-PACKAGE
MAX6340UK_ _-T	-40°C to +125°C	5 SOT23-5
MAX6421XS_ _-T	-40°C to +125°C	4 SC70-4
MAX6421US_ _-T	-40°C to +125°C	4 SOT143-4
MAX6422XS_ _-T	-40°C to +125°C	4 SC70-4
MAX6422US_ _-T	-40°C to +125°C	4 SOT143-4
MAX6423XS_ _-T	-40°C to +125°C	4 SC70-4
MAX6423US_ _-T	-40°C to +125°C	4 SOT143-4
MAX6424UK_ _-T	-40°C to +125°C	5 SOT23-5
MAX6425UK_ _-T	-40°C to +125°C	5 SOT23-5
MAX6426UK_ _-T	-40°C to +125°C	5 SOT23-5

Note: *The MAX6340/MAX6421–MAX6426 are available with factory-trimmed reset thresholds from 1.575V to 5.0V in approximately 0.1V increments. Insert the desired nominal reset threshold suffix (from Table 1) into the blanks. There are 50 standard versions with a required order increment of 2500 pieces. Sample stock is generally held on standard versions only (see Standard Versions Table). Required order increment is 10,000 pieces for nonstandard versions. Contact factory for availability. All devices are available in tape-and-reel only.*

Typical Operating Circuit appears at end of data sheet.

Selector Guide appears at end of data sheet.

For pricing, delivery, and ordering information, please contact Maxim/Dallas Direct! at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

Low-Power, SC70/SOT µP Reset Circuits with Capacitor-Adjustable Reset Timeout Delay

ABSOLUTE MAXIMUM RATINGS

All Voltages Referenced to GND
V_{CC} .....-0.3V to +6.0V
SRT, $\overline{RESET}$, RESET (push-pull).....-0.3V to (V_{CC} + 0.3V)
$\overline{RESET}$ (open drain).....-0.3V to +6.0V
Input Current (all pins).....±20mA
Output Current ($\overline{RESET}$, RESET) .....±20mA

Continuous Power Dissipation (T_A = +70°C)
4-Pin SC70 (derate 3.1mW/°C above +70°C).....245mW
4-Pin SOT143 (derate 4mW/°C above +70°C).....320mW
5-Pin SOT23 (derate 7.1mW/°C above +70°C).....571mW
Operating Temperature Range .....-40°C to +125°C
Storage Temperature Range .....-65°C to +150°C
Junction Temperature .....+150°C
Lead Temperature (soldering, 10s) .....+300°C

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 in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(V_{CC} = 1V to 5.5V, T_A = T_{MIN} to T_{MAX}, unless otherwise specified. Typical values are at V_{CC} = 5V and T_A = +25°C.) (Note 1)

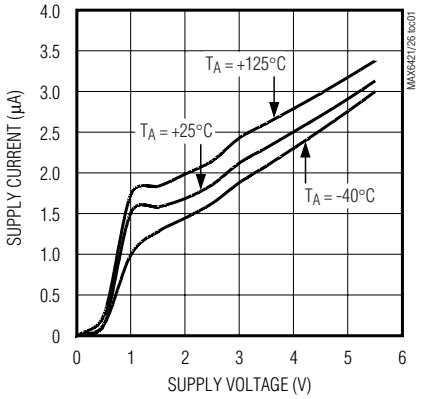
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Supply Voltage Range	V_{CC}		1.0		5.5	V
Supply Current	I_{CC}	V_{CC} ≤ 5.0V		2.5	4.2	µA
		V_{CC} ≤ 3.3V		1.9	3.4	
		V_{CC} ≤ 2.0V		1.6	2.5	
V_{CC} Reset Threshold Accuracy	V_{TH}	T_A = +25°C	V_{TH} - 1.5%		V_{TH} + 1.5%	V
		T_A = -40°C to +125°C	V_{TH} - 2.5%		V_{TH} + 2.5%	
Hysteresis	V_{HYST}			4 x V_{TH}		mV
V_{CC} to Reset Delay	t_{RD}	V_{CC} falling at 1mV/µs		80		µs
Reset Timeout Period	t_{RP}	C_{SRT} = 1500pF	3.00	4.375	5.75	ms
		C_{SRT} = 0		0.275		
V_{SRT} Ramp Current	I_{RAMP}	V_{SRT} = 0 to 0.65V; V_{CC} = 1.6V to 5V		240		nA
V_{SRT} Ramp Threshold	$V_{TH-RAMP}$	V_{CC} = 1.6V to 5V (V_{RAMP} rising)		0.65		V
RAMP Threshold Hysteresis		V_{RAMP} falling threshold		33		mV
$\overline{RESET}$ Output Voltage Low	V_{OL}	V_{CC} ≥ 1.0V, I_{SINK} = 50µA			0.3	V
		V_{CC} ≥ 2.7V, I_{SINK} = 1.2mA			0.3	
		V_{CC} ≥ 4.5V, I_{SINK} = 3.2mA			0.4	
$\overline{RESET}$ Output Voltage High, Push-Pull	V_{OH}	V_{CC} ≥ 1.8V, I_{SOURCE} = 200µA	0.8 x V_{CC}			V
		V_{CC} ≥ 2.25V, I_{SOURCE} = 500µA	0.8 x V_{CC}			
		V_{CC} ≥ 4.5V, I_{SOURCE} = 800µA	0.8 x V_{CC}			
$\overline{RESET}$ Output Leakage Current, Open-Drain	I_{LKG}	V_{CC} > V_{TH}, reset not asserted			1.0	µA
RESET Output Voltage High	V_{OH}	V_{CC} ≥ 1.0V, I_{SOURCE} = 1µA	0.8 x V_{CC}			V
		V_{CC} ≥ 1.8V, I_{SOURCE} = 150µA	0.8 x V_{CC}			
		V_{CC} ≥ 2.7V, I_{SOURCE} = 500µA	0.8 x V_{CC}			
		V_{CC} ≥ 4.5V, I_{SOURCE} = 800µA	0.8 x V_{CC}			
RESET Output Voltage Low	V_{OL}	V_{CC} ≥ 1.8V, I_{SINK} = 500µA			0.3	V
		V_{CC} ≥ 2.7V, I_{SINK} = 1.2mA			0.3	
		V_{CC} ≥ 4.5V, I_{SINK} = 3.2mA			0.4	

Note 1: Devices production tested at +25°C. Overtemperature limits are guaranteed by design.

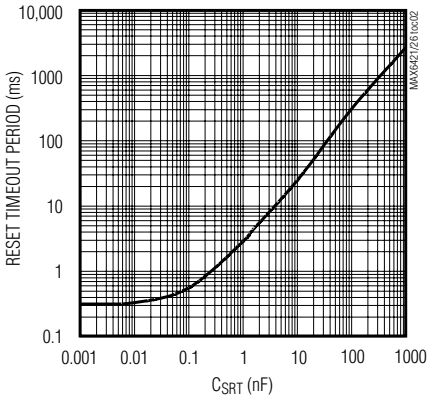
Typical Operating Characteristics

(V_{CC} = 5V, C_{SRT} = 1500pF, T_A = +25°C, unless otherwise noted.)

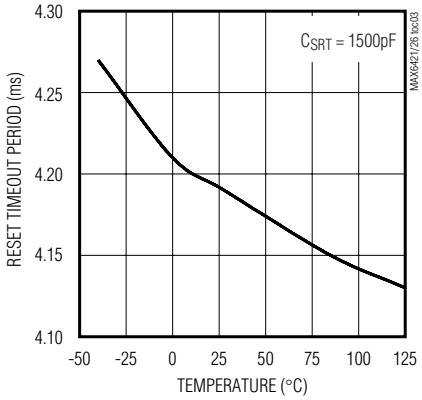
SUPPLY CURRENT vs. SUPPLY VOLTAGE



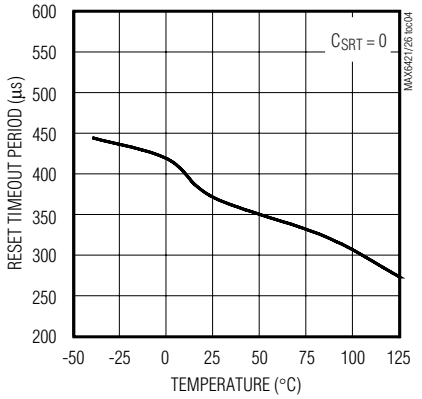
RESET TIMEOUT PERIOD vs. C_{SRT}



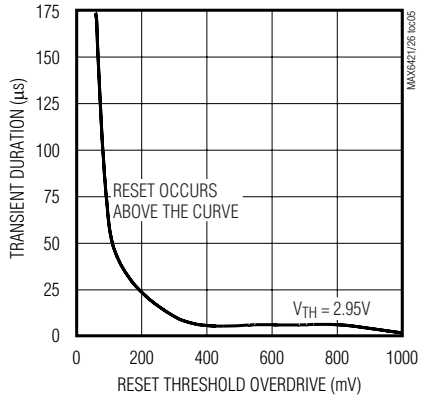
RESET TIMEOUT PERIOD vs. TEMPERATURE



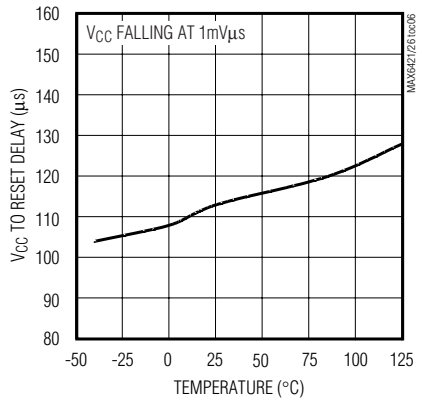
RESET TIMEOUT PERIOD vs. TEMPERATURE



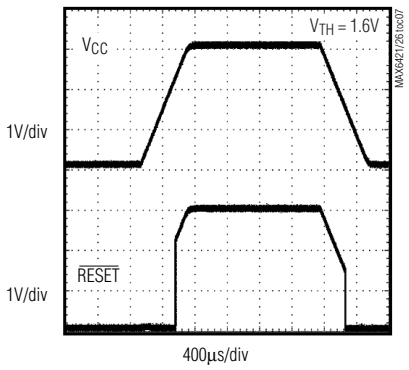
MAXIMUM TRANSIENT DURATION vs. RESET THRESHOLD OVERDRIVE



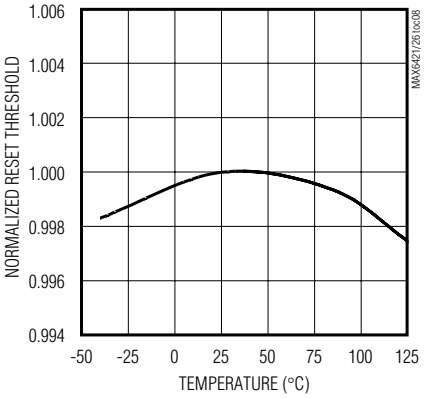
V_{CC} TO RESET DELAY vs. TEMPERATURE (V_{CC} FALLING)



POWER-UP/POWER-DOWN CHARACTERISTIC



NORMALIZED RESET THRESHOLD vs. TEMPERATURE



Low-Power, SC70/SOT µP Reset Circuits with Capacitor-Adjustable Reset Timeout Delay

Pin Description

PIN					NAME	FUNCTION
MAX6340	MAX6421 MAX6422 MAX6423		MAX6424 MAX6425	MAX6426		
SOT23	SOT143	SC70	SOT23	SOT23		
1	3	3	5	1	SRT	Set Reset Timeout Input. Connect a capacitor between SRT and ground to set the timeout period. Determine the period as follows: $t_{RP} = 2.73 \times 10^6 \times C_{SRT} + 275\mu s$ with t_{RP} in seconds and C_{SRT} in farads.
2	1	2	3	2, 3	GND	Ground
3	—	—	4	—	N.C.	Not Internally Connected. Can be connected to GND.
4	2	1	2	5	V_{CC}	Supply Voltage and Reset Threshold Monitor Input
5	4	4	1	4	$\overline{RESET}$	$\overline{RESET}$ changes from high to low whenever V_{CC} drops below the selected reset threshold voltage. $\overline{RESET}$ remains low for the reset timeout period after V_{CC} exceeds the reset threshold.
—			—	—	RESET	RESET changes from low to high whenever V_{CC} drops below the selected reset threshold voltage. RESET remains high for the reset timeout period after V_{CC} exceeds the reset threshold.

Detailed Description

Reset Output

The reset output is typically connected to the reset input of a µP. A µP's reset input starts or restarts the µP in a known state. The MAX6340/MAX6421–MAX6426 µP supervisory circuits provide the reset logic to prevent code-execution errors during power-up, power-down, and brownout conditions (see *Typical Operating Characteristics*).

$\overline{RESET}$ changes from high to low whenever V_{CC} drops below the threshold voltage. Once V_{CC} exceeds the threshold voltage, $\overline{RESET}$ remains low for the capacitor-adjustable reset timeout period.

The MAX6422 active-high RESET output is the inverse logic of the active-low $\overline{RESET}$ output. All device outputs are guaranteed valid for V_{CC} > 1V.

The MAX6340/MAX6423/MAX6425/MAX6426 are open-drain $\overline{RESET}$ outputs. Connect an external pullup resistor to any supply from 0 to 5.5V. Select a resistor value large enough to register a logic low when $\overline{RESET}$ is asserted and small enough to register a logic high while supplying all input current and leakage paths connected to the $\overline{RESET}$ line. A 10kΩ to 100kΩ pullup is sufficient in most applications.

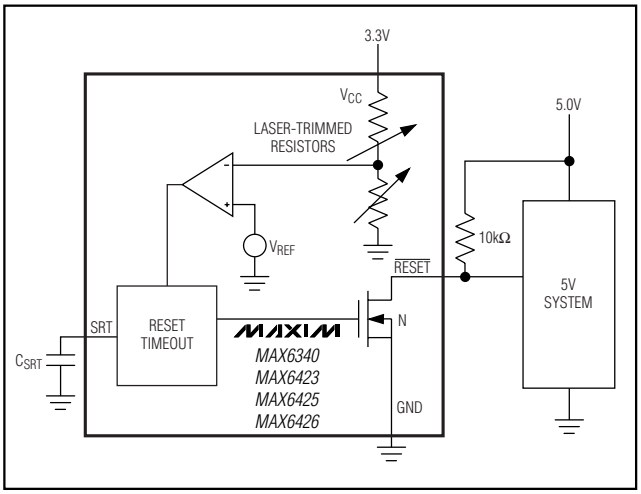


Figure 1. MAX6340/MAX6423/MAX6425/MAX6426 Open-Drain $\overline{RESET}$ Output Allows Use with Multiple Supplies

Selecting a Reset Capacitor

The reset timeout period is adjustable to accommodate a variety of µP applications. Adjust the reset timeout period (t_{RP}) by connecting a capacitor (C_{SRT}) between SRT and ground. Calculate the reset timeout capacitor as follows:

$$C_{SRT} = (t_{RP} - 275\mu s) / (2.73 \times 10^6)$$

where t_{RP} is in seconds and C_{SRT} is in farads.

The reset delay time is set by a current/capacitor-controlled ramp compared to an internal 0.65V reference. An internal 240nA ramp current source charges the external capacitor. The charge to the capacitor is cleared when a reset condition is detected. Once the reset condition is removed, the voltage on the capacitor ramps according to the formula: dV/dt = I/C. The C_{SRT} capacitor must ramp to 0.65V to deassert the reset. C_{SRT} must be a low-leakage (<10nA) type capacitor; ceramic is recommended.

Operating as a Voltage Detector

The MAX6340/MAX6421–MAX6426 can be operated in a voltage detector mode by floating the SRT pin. The reset delay times for V_{CC} rising above or falling below the threshold are not significantly different. The reset output is deasserted smoothly without false pulses.

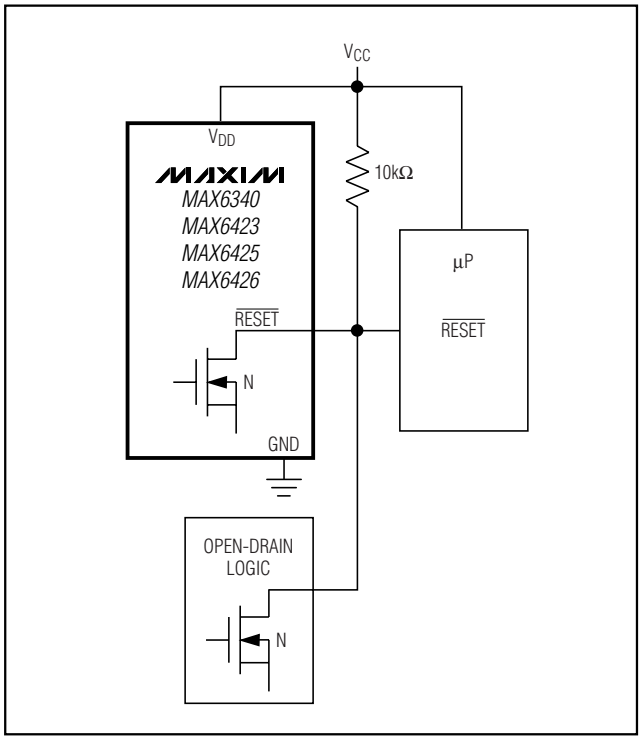


Figure 2. Wired-OR Reset Circuit

Applications Information

Interfacing to Other Voltages for Logic Compatibility

The open-drain outputs of the MAX6340/MAX6423/MAX6425/MAX6426 can be used to interface to µPs with other logic levels. As shown in Figure 1, the open-drain output can be connected to voltages from 0 to 5.5V. This allows for easy logic compatibility to various µPs.

Wired-OR Reset

To allow auxiliary circuitry to hold the system in reset, an external open-drain logic signal can be connected to the open-drain $\overline{RESET}$ of the MAX6340/MAX6423/MAX6425/MAX6426, as shown in Figure 2. This configuration can reset the µP, but does not provide the reset timeout when the external logic signal is released.

Negative-Going V_{CC} Transients

In addition to issuing a reset to the µP during power-up, power-down, and brownout conditions, these supervisors are relatively immune to short-duration negative-going transients (glitches). The graph Maximum Transient Duration vs. Reset Threshold Overdrive in the *Typical Operating Characteristics* shows this relationship.

The area below the curve of the graph is the region in which these devices typically do not generate a reset pulse. This graph was generated using a negative-going pulse applied to V_{CC}, starting above the actual reset threshold (V_{TH}) and ending below it by the magnitude indicated (reset-threshold overdrive). As the magnitude of the transient decreases (farther below the reset threshold), the maximum allowable pulse width decreases. Typically, a V_{CC} transient that goes 100mV below the reset threshold and lasts 50µs or less does not cause a reset pulse to be issued.

Ensuring a Valid $\overline{RESET}$ or $\overline{RESET}$ Down to V_{CC} = 0

When V_{CC} falls below 1V, $\overline{RESET}$/$\overline{RESET}$ current-sinking (sourcing) capabilities decline drastically. In the case of the MAX6421/MAX6424, high-impedance CMOS-logic inputs connected to $\overline{RESET}$ can drift to undetermined voltages. This presents no problems in most applications, since most µPs and other circuitry do not operate with V_{CC} below 1V.

In those applications where $\overline{RESET}$ must be valid down to zero, adding a pulldown resistor between $\overline{RESET}$ and ground sinks any stray leakage currents, holding $\overline{RESET}$ low (Figure 3). The value of the pulldown resistor is not critical; 100kΩ is large enough not to load $\overline{RESET}$ and small enough to pull $\overline{RESET}$ to ground. For applications using the MAX6422, a 100kΩ pullup resis-

Low-Power, SC70/SOT µP Reset Circuits with Capacitor-Adjustable Reset Timeout Delay

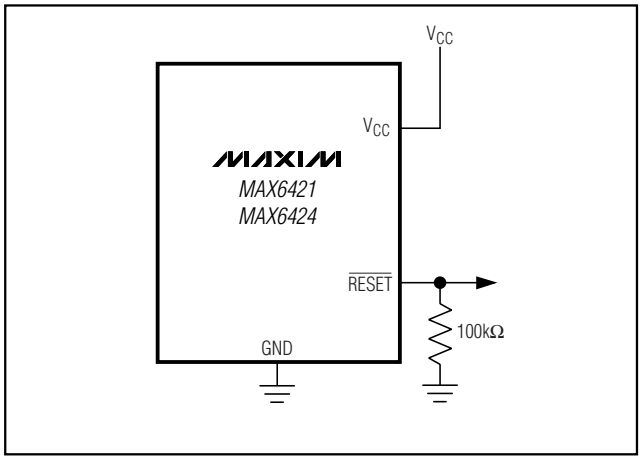


Figure 3. Ensuring $\overline{RESET}$ Valid to V_{CC} = 0

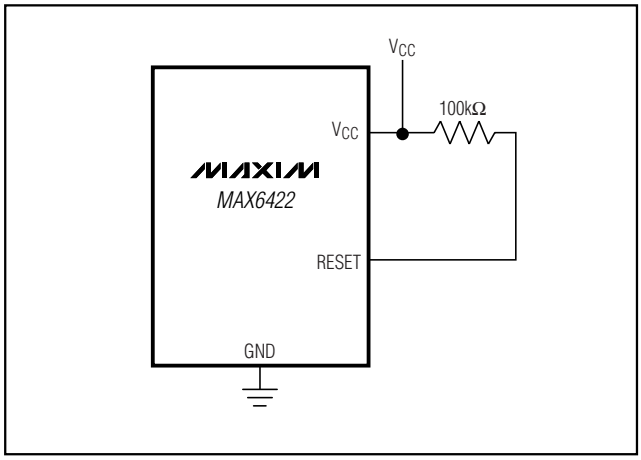


Figure 4. Ensuring RESET Valid to V_{CC} = 0

tor between RESET and V_{CC} holds RESET high when V_{CC} falls below 1V (Figure 4). Open-drain $\overline{RESET}$ versions are not recommended for applications requiring valid logic for V_{CC} down to zero.

Layout Consideration

SRT is a precise current source. When developing the layout for the application, be careful to minimize board capacitance and leakage currents around this pin. Traces connected to SRT should be kept as short as possible. Traces carrying high-speed digital signals and traces with large voltage potentials should be routed as far from SRT as possible. Leakage current and stray capacitance (e.g., a scope probe) at this pin could cause errors in the reset timeout period. When evaluating these parts, use clean prototype boards to ensure accurate reset periods.

Table 1. Reset Threshold Voltage Suffix

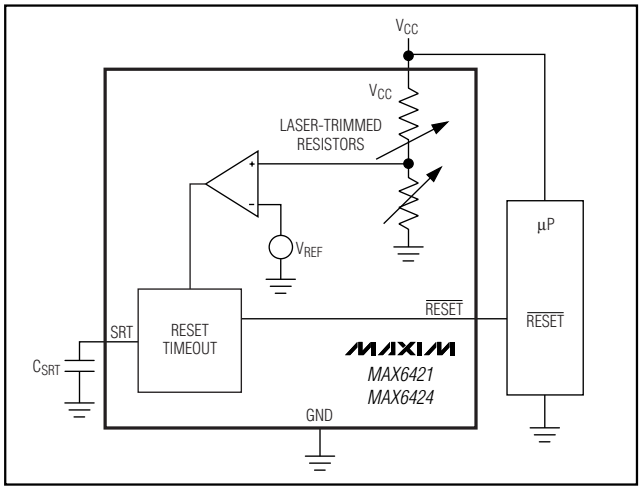
SUFFIX	MIN	TYP	MAX
16	1.536	1.575	1.614
17	1.623	1.665	1.707
18	1.755	1.800	1.845
19	1.853	1.900	1.948
20	1.950	2.000	2.050
21	2.048	2.100	2.153
22	2.133	2.188	2.243
23	2.313	2.313	2.371
24	2.340	2.400	2.460
25	2.438	2.500	2.563
26	2.559	2.625	2.691
27	2.633	2.700	2.768
28	2.730	2.800	2.870
29	2.852	2.925	2.998
30	2.925	3.000	3.075
31	2.998	3.075	3.152
32	3.120	3.200	3.280
33	3.218	3.300	3.383
34	3.315	3.400	3.485
35	3.413	3.500	3.558
36	3.510	3.600	3.690
37	3.608	3.700	3.793
38	3.705	3.800	3.895
39	3.803	3.900	3.998
40	3.900	4.000	4.100
41	3.998	4.100	4.203
42	4.095	4.200	4.305
43	4.193	4.300	4.408
44	4.266	4.375	4.484
45	4.388	4.500	4.613
46	4.509	4.625	4.741
47	4.583	4.700	4.818
48	4.680	4.800	4.920
49	4.778	4.900	5.023
50	4.875	5.000	5.125

Standard Versions Table

PART*	OUTPUT STAGE	TOP MARK
MAX6340UK16-T	Open-Drain $\overline{\text{RESET}}$	AEBE
MAX6340UK22-T	Open-Drain $\overline{\text{RESET}}$	AEBG
MAX6340UK26-T	Open-Drain $\overline{\text{RESET}}$	AEBI
MAX6340UK29-T	Open-Drain $\overline{\text{RESET}}$	AEBJ
MAX6340UK46-T	Open-Drain $\overline{\text{RESET}}$	AEBM
MAX6421US16-T	Push-Pull $\overline{\text{RESET}}$	KADA
MAX6421XS16-T	Push-Pull $\overline{\text{RESET}}$	ACU
MAX6421US22-T	Push-Pull $\overline{\text{RESET}}$	KADE
MAX6421XS22-T	Push-Pull $\overline{\text{RESET}}$	ACY
MAX6421US26-T	Push-Pull $\overline{\text{RESET}}$	KADG
MAX6421XS26-T	Push-Pull $\overline{\text{RESET}}$	ADA
MAX6421US29-T	Push-Pull $\overline{\text{RESET}}$	KADH
MAX6421XS29-T	Push-Pull $\overline{\text{RESET}}$	ADB
MAX6421US46-T	Push-Pull $\overline{\text{RESET}}$	KADK
MAX6421XS46-T	Push-Pull $\overline{\text{RESET}}$	ADE
MAX6422US16-T	Push-Pull RESET	KABD
MAX6422XS16-T	Push-Pull RESET	ACV
MAX6422US22-T	Push-Pull RESET	KADM
MAX6422XS22-T	Push-Pull RESET	ADG
MAX6422US26-T	Push-Pull RESET	KADO
MAX6422XS26-T	Push-Pull RESET	ADI
MAX6422US29-T	Push-Pull RESET	KADP
MAX6422XS29-T	Push-Pull RESET	ADJ
MAX6422US46-T	Push-Pull RESET	KADS
MAX6422XS46-T	Push-Pull RESET	ADM
MAX6423US16-T	Open-Drain $\overline{\text{RESET}}$	KADC
MAX6423XS16-T	Open-Drain $\overline{\text{RESET}}$	ADUF
MAX6423US22-T	Open-Drain $\overline{\text{RESET}}$	KADU
MAX6423XS22-T	Open-Drain $\overline{\text{RESET}}$	ADUK
MAX6423US26-T	Open-Drain $\overline{\text{RESET}}$	KADW
MAX6423XS26-T	Open-Drain $\overline{\text{RESET}}$	ADUM
MAX6423US29-T	Open-Drain $\overline{\text{RESET}}$	KADX
MAX6423XS29-T	Open-Drain $\overline{\text{RESET}}$	ADUN
MAX6423US46-T	Open-Drain $\overline{\text{RESET}}$	KAEA
MAX6423XS46-T	Open-Drain $\overline{\text{RESET}}$	ADUQ
MAX6424UK16-T	Push-Pull $\overline{\text{RESET}}$	ADUF
MAX6424UK22-T	Push-Pull $\overline{\text{RESET}}$	ADUK
MAX6424UK26-T	Push-Pull $\overline{\text{RESET}}$	ADUM
MAX6424UK29-T	Push-Pull $\overline{\text{RESET}}$	ADUN
MAX6424UK46-T	Push-Pull $\overline{\text{RESET}}$	ADUQ
MAX6425UK16-T	Open-Drain $\overline{\text{RESET}}$	ADUG
MAX6425UK22-T	Open-Drain $\overline{\text{RESET}}$	ADUS
MAX6425UK26-T	Open-Drain $\overline{\text{RESET}}$	ADUU
MAX6425UK29-T	Open-Drain $\overline{\text{RESET}}$	ADUV
MAX6425UK46-T	Open-Drain $\overline{\text{RESET}}$	ADUY
MAX6426UK16-T	Open-Drain $\overline{\text{RESET}}$	ADUH
MAX6426UK22-T	Open-Drain $\overline{\text{RESET}}$	ADVA
MAX6426UK26-T	Open-Drain $\overline{\text{RESET}}$	ADVC
MAX6426UK29-T	Open-Drain $\overline{\text{RESET}}$	ADVD
MAX6426UK46-T	Open-Drain $\overline{\text{RESET}}$	ADVG

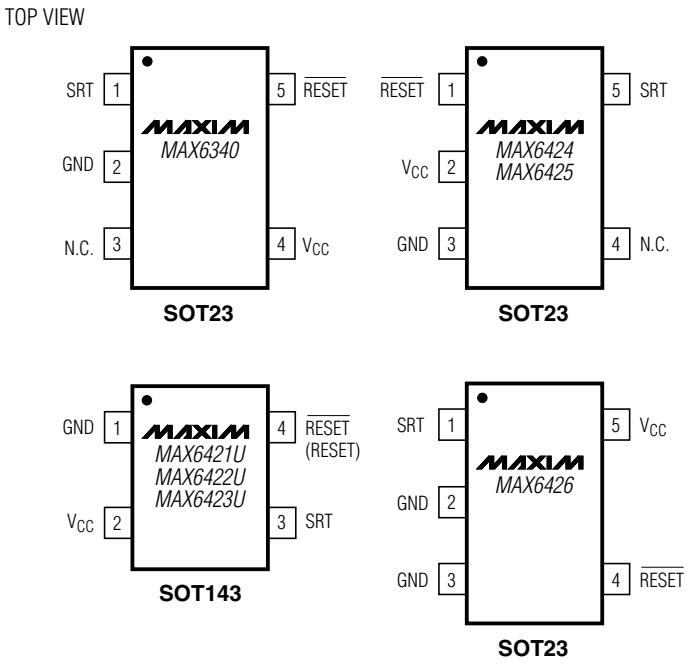
**Sample stock is generally held on all standard versions. Contact factory for availability of nonstandard versions.*

Typical Operating Circuit



Low-Power, SC70/SOT µP Reset Circuits with Capacitor-Adjustable Reset Timeout Delay

Pin Configurations (continued)



Selector Guide

PART	PUSH-PULL $\overline{\text{RESET}}$	PUSH-PULL RESET	OPEN-DRAIN $\overline{\text{RESET}}$	PIN-PACKAGE
MAX6340	—	—	✔	5 SOT23
MAX6421	✔	—	—	4 SOT143/SC70
MAX6422	—	✔	—	4 SOT143/SC70
MAX6423	—	—	✔	4 SOT143/SC70
MAX6424	✔	—	—	5 SOT23
MAX6425	—	—	✔	5 SOT23

Chip Information

TRANSISTOR COUNT: 295

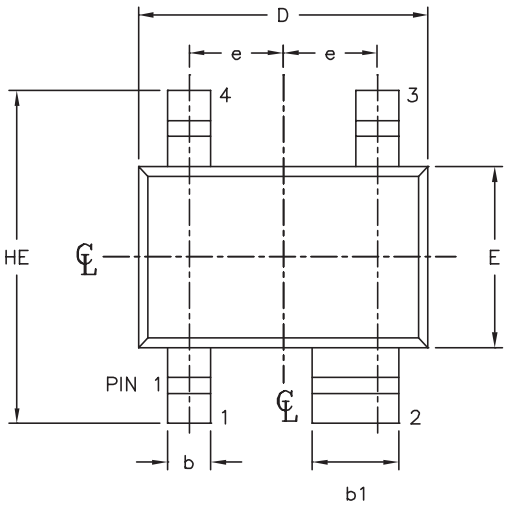
PROCESS: BiCMOS

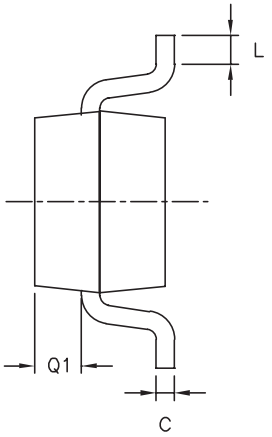
Low-Power, SC70/SOT µP Reset Circuits with Capacitor-Adjustable Reset Timeout Delay

Package Information

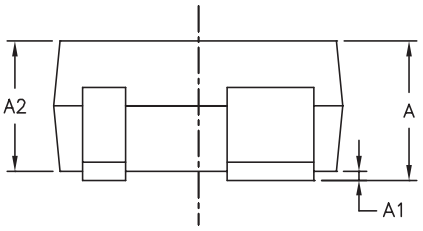
(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information, go to **www.maxim-ic.com/packages**.)

SC70, 4L.EPS





SYMBOL	MIN	MAX
e	0.65 BSC	
D	1.80	2.25
b	0.15	0.40
b1	0.55	0.70
E	1.15	1.35
HE	1.80	2.40
Q1	0.10	0.40
A2	0.80	1.00
A1	0.00	0.10
A	0.80	1.10
c	0.10	0.18
L	0.10	0.30



NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. DIMENSIONS ARE EXCLUSIVE OF MOLD FLASH & METAL BURR.
4. ALL SPECIFICATIONS COMPLY TO EIAJ SC70.
5. DIE IS FACING UP FOR MOLD AND FACING DOWN FOR TRIM/FORM. ie: REVERSE TRIM/FORM.
6. PACKAGE SURFACE TO BE MIRROR FINISH.

MAXIM

PROPRIETARY INFORMATION

TITLE:

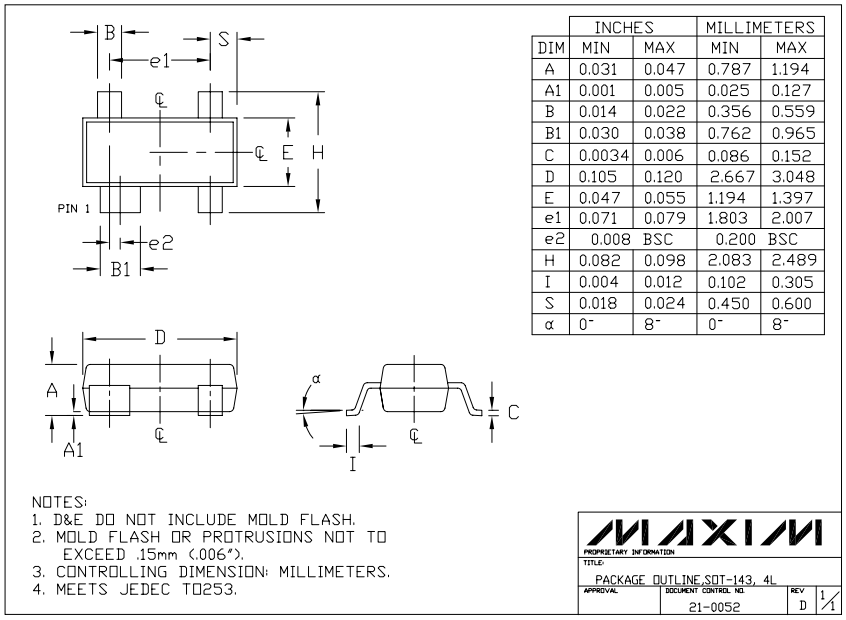
PACKAGE OUTLINE, SC70, 4L

APPROVAL	DOCUMENT CONTROL NO.	REV	
	21-0098	A	1/1

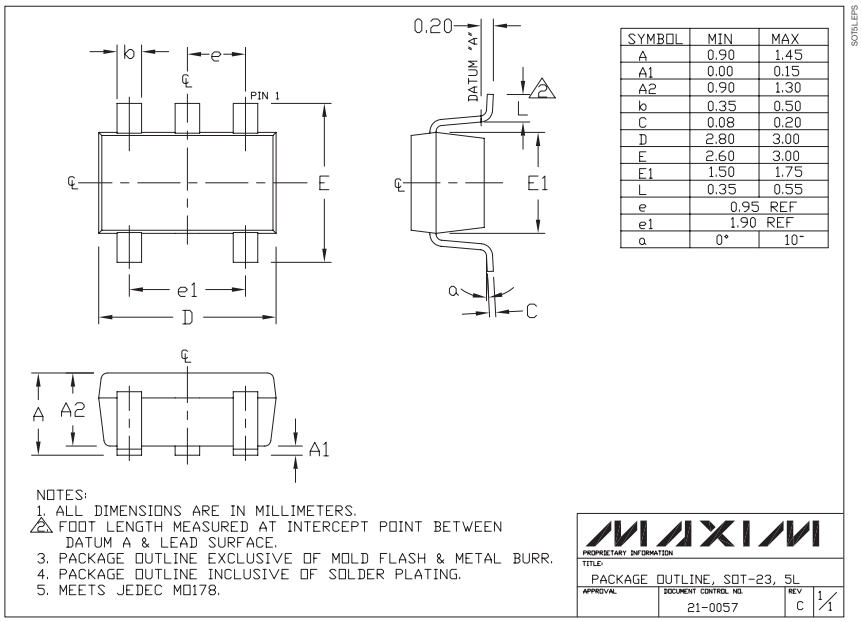
Low-Power, SC70/SOT µP Reset Circuits with Capacitor-Adjustable Reset Timeout Delay

Package Information (continued)

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information, go to **www.maxim-ic.com/packages**.)



DIM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	0.031	0.047	0.787	1.194
A1	0.001	0.005	0.025	0.127
B	0.014	0.022	0.356	0.559
B1	0.030	0.038	0.762	0.965
C	0.0034	0.006	0.086	0.152
D	0.105	0.120	2.667	3.048
E	0.047	0.055	1.194	1.397
e1	0.071	0.079	1.803	2.007
e2	0.008 BSC		0.200 BSC	
H	0.082	0.098	2.083	2.489
I	0.004	0.012	0.102	0.305
S	0.018	0.024	0.450	0.600
α	0°	8°	0°	8°



SYMBOL	MIN	MAX
A	0.90	1.45
A1	0.00	0.15
A2	0.90	1.30
b	0.35	0.50
C	0.08	0.20
D	2.80	3.00
E	2.60	3.00
E1	1.50	1.75
L	0.35	0.55
e	0.95 REF	
e1	1.90 REF	
α	0°	10°

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