Absolute Maximum Ratings

V_{CC} .....-0.3V to +6.0V
$\overline{RESET}$.....-0.3V to +6.0V
All Other Pins.....-0.3V to (V_{CC} + 0.3V)
Input Current (V_{CC}).....20mA
Output Current ($\overline{RESET}$).....20mA
Rate of Rise (V_{CC}) 100V/µs

Continuous Power Dissipation (T_A = +70°C)
SOT143 (derate 4mW/°C above +70°C).....320mW
Operating Temperature Range .....-40°C to +125°C
Storage Temperature Range .....-65°C to +160°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} = +2.5V to +5.5V, T_A = -40°C to +125°C, unless otherwise noted. Typical values are at T_A = +25°C.)

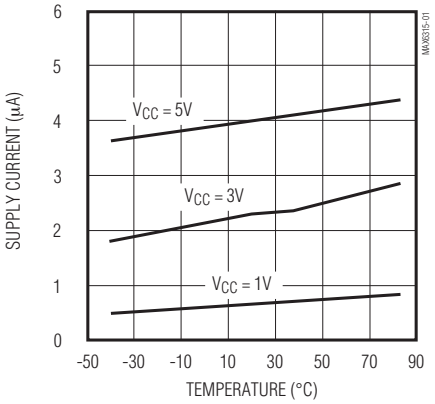
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Operating Voltage Range	V_{CC}	T_A = -40°C to +85°C	1.0		5.5	V
V_{CC} Supply Current	I_{CC}	V_{CC} = 5.5V, no load (-40°C to +85°C)		5	12	µA
		V_{CC} = 5.5V, no load (-40°C to +125°C)			15	
		V_{CC} = 3.6V, no load (-40°C to +85°C)		4	10	
		V_{CC} = 3.6V, no load (-40°C to +125°C)			12	
Reset Threshold (Note 1)	V_{TH}	T_A = +25°C	V_{TH} - 1.8%	V_{TH}	V_{TH} + 1.8%	V
		T_A = -40°C to +85°C	V_{TH} - 2.5%		V_{TH} + 2.5%	
		T_A = -40°C to +125°C	V_{TH} - 3.5%		V_{TH} + 3.5%	
Reset Threshold Tempco	ΔV_{TH}/°C			60		ppm/°C
V_{CC} to Reset Delay		V_{CC} = falling at 1mV/µs		35		µs
Reset Timeout Period	t_{RP}	MAX6315US_ _D1-T (-40°C to +85°C)	1	1.4	2	ms
		MAX6315US_ _D1-T (-40°C to +125°C)	0.8		2.4	
		MAX6315US_ _D2-T (-40°C to +85°C)	20	28	40	
		MAX6315US_ _D2-T (-40°C to +125°C)	16		48	
		MAX6315US_ _D3-T (-40°C to +85°C)	140	200	280	
		MAX6315US_ _D3-T (-40°C to +125°C)	112		336	
		MAX6315US_ _D4-T (-40°C to +85°C)	1120	1570	2240	
		MAX6315US_ _D4-T (-40°C to +125°C)	896		2688	
MANUAL RESET INPUT						
$\overline{MR}$ Input Threshold	V_{IL}	V_{TH} > 4.0V	0.8			V
	V_{IH}				2.4	
	V_{IL}	V_{TH} < 4.0V	0.3 x V_{CC}			
	V_{IH}				0.7 x V_{CC}	
$\overline{MR}$ Minimum Input Pulse			1			µs
$\overline{MR}$ Glitch Rejection				100		ns
$\overline{MR}$ to Reset Delay				500		ns
$\overline{MR}$ Pullup Resistance			32	63	100	kΩ
$\overline{RESET}$ Output Voltage	V_{OL}	V_{CC} > 4.25V, I_{SINK} = 3.2mA			0.4	V
		V_{CC} > 2.5V, I_{SINK} = 1.2mA			0.3	
		V_{CC} > 1.2V, I_{SINK} = 0.5mA			0.3	
		V_{CC} > 1.0V, I_{SINK} = 80µA			0.3	
$\overline{RESET}$ Output Leakage Current		V_{CC} > V_{TH}, $\overline{RESET}$ deasserted			1	µA

Note 1: The MAX6315 monitors V_{CC} through an internal factory-trimmed voltage-divider that programs the nominal reset threshold. Factory-trimmed reset thresholds are available in 100mV increments from 2.5V to 5V (see the *Ordering Information*).

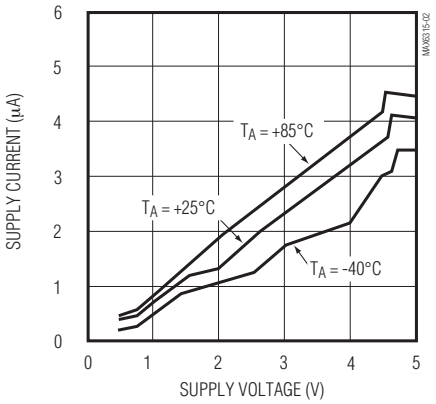
Typical Operating Characteristics

(T_A = +25°C, unless otherwise noted.)

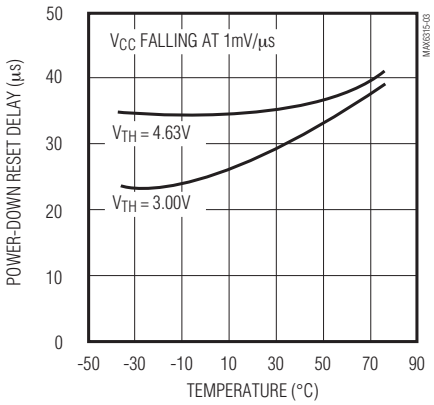
SUPPLY CURRENT vs. TEMPERATURE



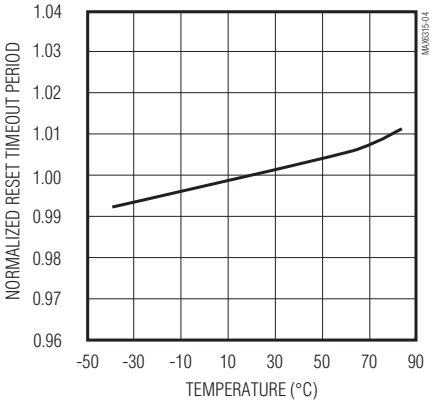
SUPPLY CURRENT vs. SUPPLY VOLTAGE



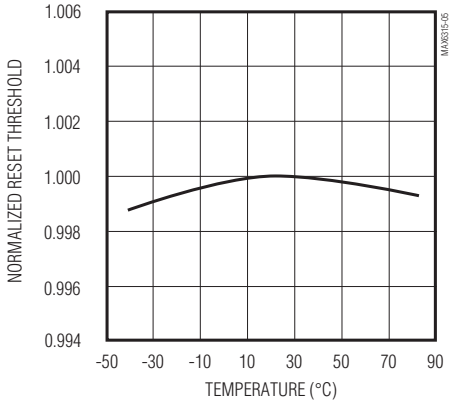
POWER-DOWN RESET DELAY vs. TEMPERATURE



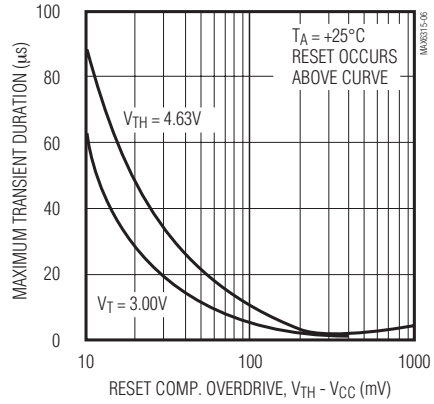
NORMALIZED RESET TIMEOUT PERIOD vs. TEMPERATURE (V_{CC} RISING)



NORMALIZED RESET THRESHOLD vs. TEMPERATURE (V_{CC} FALLING)



MAXIMUM TRANSIENT DURATION vs. RESET COMPARATOR OVERDRIVE



Pin Description

PIN	NAME	FUNCTION
1	GND	Ground
2	$\overline{RESET}$	Active-Low Open-Drain Output. Connect to an external pullup resistor. Can be pulled up to a voltage higher than V_{CC}, but less than 6V.
3	$\overline{MR}$	Manual Reset Input. A logic-low on $\overline{MR}$ asserts reset. Reset remains asserted as long as $\overline{MR}$ is low, and for the reset timeout period (t_{RP}) after the reset conditions are terminated. Connect to V_{CC} if not used.
4	V_{CC}	Supply Voltage and Reset Threshold Monitor Input

Detailed Description

Reset Output

A microprocessor's (µP's) reset input starts the µP in a known state. The MAX6315 asserts reset to prevent code-execution errors during power-up, power-down, or brownout conditions. $\overline{RESET}$ is guaranteed to be a logic-low for V_{CC} > 1V (see the *Electrical Characteristics* table). Once V_{CC} exceeds the reset threshold, the internal timer keeps $\overline{RESET}$ asserted for the reset timeout period (t_{RP}); after this interval $\overline{RESET}$ goes high. If a brownout condition occurs (monitored voltage dips below its programmed reset threshold), $\overline{RESET}$ goes low. Any time V_{CC} dips below the reset threshold, the internal timer resets to zero and $\overline{RESET}$ goes low. The internal timer starts when V_{CC} returns above the reset threshold, and $\overline{RESET}$ remains low for the reset timeout period.

The MAX6315's $\overline{RESET}$ output structure is a simple open-drain n-channel MOSFET switch. Connect a pull-up resistor to any supply in the 0V to +6V range. Select a resistor value large enough to register a logic low when $\overline{RESET}$ is asserted (see the *Electrical Characteristics* table), and small enough to register a logic high while supplying all input current and leakage paths connected to the $\overline{RESET}$ line. A 10kΩ pullup is sufficient in most applications.

Often, the pullup connected to the MAX6315's $\overline{RESET}$ output will connect to the supply voltage monitored at the IC'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 1). This is one useful feature of an open-drain output. Keep in mind that as the MAX6315's V_{CC} decreases below 1V, so does the IC's ability to sink current at $\overline{RESET}$. Finally, with any pullup, $\overline{RESET}$ will be pulled high as V_{CC} decays toward 0V. The voltage where this occurs depends on the pullup resistor value and the voltage to which it connects (see the *Electrical Characteristics* table).

Manual-Reset Input

Many µP-based products require manual-reset capability, allowing the operator, a test technician, or external logic circuitry to initiate a reset. A logic low on $\overline{MR}$ asserts reset. Reset remains asserted while $\overline{MR}$ is low, and for the reset active timeout period after $\overline{MR}$ returns high.

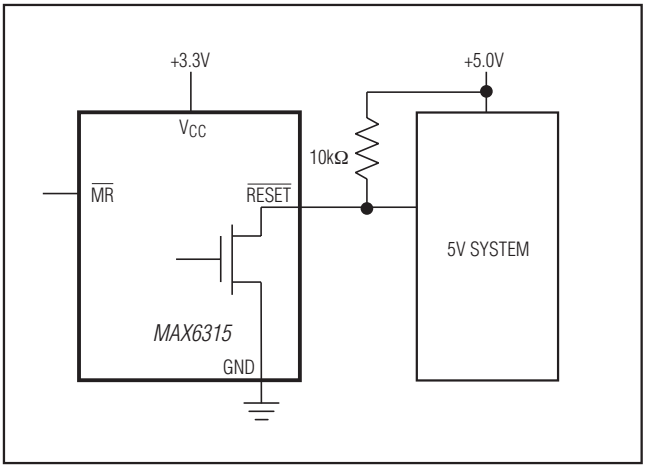


Figure 1. MAX6315 Open-Drain $\overline{RESET}$ Output Allows Use with Multiple Supplies

$\overline{MR}$ has an internal 63kΩ pullup resistor, so it can be left open if not used. Connect a normally open momentary switch from $\overline{MR}$ to GND to create a manual-reset function; external debounce circuitry is not required. If $\overline{MR}$ is driven from long cables or if the device is used in a noisy environment, connecting a 0.1µF capacitor from $\overline{MR}$ to ground provides additional noise immunity.

Applications Information

Negative-Going V_{CC} Transients

In addition to issuing a reset to the µP during power-up, power-down, and brownout conditions, these devices are relatively immune to short-duration negative-going transients (glitches). The *Typical Operating Characteristics* show the Maximum Transient Duration vs. Reset Comparator Overdrive, for which reset pulses are not generated. The graph was produced using negative-going pulses, starting at V_{RST} max and ending below the programmed reset threshold by the magnitude indicated (reset threshold overdrive). The graph shows the maximum pulse width that a negative-going V_{CC} transient may typically have without causing a reset pulse to be issued. As the transient amplitude increases (i.e., goes farther below the reset threshold), the maximum allowable pulse width decreases. A 0.1µF bypass capacitor mounted close to V_{CC} provides additional transient immunity.

Ordering Information (continued)

PART†	NOMINAL V_{TH} (V)	MIN t_{RP} (ms)	TOP MARK††
MAX6315US49D1-T	4.90	1	FY_ _
MAX6315US48D1-T	4.80	1	FZ_ _
MAX6315US47D1-T	4.70	1	GA_ _
MAX6315US46D1-T	4.63	1	GB_ _
MAX6315US45D1-T	4.50	1	GC_ _
MAX6315US44D1-T†††	4.39	1	GD_ _
MAX6315US43D1-T	4.30	1	GE_ _
MAX6315US42D1-T	4.20	1	GF_ _
MAX6315US41D1-T	4.10	1	GG_ _
MAX6315US40D1-T	4.00	1	GH_ _
MAX6315US39D1-T	3.90	1	GI_ _
MAX6315US38D1-T	3.80	1	GJ_ _
MAX6315US37D1-T	3.70	1	GK_ _
MAX6315US36D1-T	3.60	1	GL_ _
MAX6315US35D1-T	3.50	1	GM_ _
MAX6315US34D1-T	3.40	1	GN_ _
MAX6315US33D1-T	3.30	1	GO_ _
MAX6315US32D1-T	3.20	1	GP_ _
MAX6315US31D1-T	3.08	1	GQ_ _
MAX6315US30D1-T	3.00	1	GR_ _
MAX6315US29D1-T	2.93	1	GS_ _
MAX6315US28D1-T	2.80	1	GT_ _
MAX6315US27D1-T	2.70	1	GU_ _
MAX6315US26D1-T†††	2.63	1	GV_ _
MAX6315US25D1-T	2.50	1	GW_ _

PART†	NOMINAL V_{TH} (V)	MIN t_{RP} (ms)	TOP MARK††
MAX6315US50D2-T	5.00	20	GX_ _
MAX6315US49D2-T	4.90	20	GY_ _
MAX6315US48D2-T	4.80	20	GZ_ _
MAX6315US47D2-T	4.70	20	HA_ _
MAX6315US46D2-T	4.63	20	HB_ _
MAX6315US45D2-T	4.50	20	HC_ _
MAX6315US44D2-T†††	4.39	20	HD_ _
MAX6315US43D2-T	4.30	20	HE_ _
MAX6315US42D2-T	4.20	20	HF_ _
MAX6315US41D2-T	4.10	20	HG_ _
MAX6315US40D2-T	4.00	20	HH_ _
MAX6315US39D2-T	3.90	20	HI_ _
MAX6315US38D2-T	3.80	20	HJ_ _
MAX6315US37D2-T	3.70	20	HK_ _
MAX6315US36D2-T	3.60	20	HL_ _
MAX6315US35D2-T	3.50	20	HM_ _
MAX6315US34D2-T	3.40	20	HN_ _
MAX6315US33D2-T	3.30	20	HO_ _
MAX6315US32D2-T	4.20	20	HP_ _
MAX6315US31D2-T	3.08	20	HQ_ _
MAX6315US30D2-T	3.00	20	HR_ _
MAX6315US29D2-T	2.93	20	HS_ _
MAX6315US28D2-T	2.80	20	HT_ _
MAX6315US27D2-T	2.70	20	HU_ _
MAX6315US26D2-T†††	2.63	20	HV_ _
MAX6315US25D2-T	2.50	20	HW_ _

†The MAX6315 is available in a SOT143 package, -40°C to +125°C temperature range.
††The first two letters in the package top mark identify the part, while the remaining two letters are the lot tracking code.
†††Sample stocks generally held on the bolded products; also, the bolded products have 2,500 piece minimum-order quantities. Non-bolded products have 10,000 piece minimum-order quantities. Contact factory for details.
Devices are available in both leaded and lead(Pb)-free packaging. Specify lead-free by replacing "-T" with "+T" when ordering.
***Note:** All devices available in tape-and-reel only. Contact factory for availability.*

Ordering Information (continued)

PART†	NOMINAL V_{TH} (V)	MIN t_{RP} (ms)	TOP MARK††
MAX6315US50D3-T	5.00	140	HX_ _
MAX6315US49D3-T	4.90	140	HY_ _
MAX6315US48D3-T	4.80	140	HZ_ _
MAX6315US47D3-T	4.70	140	IA_ _
MAX6315US46D3-T†††	4.63	140	IB_ _
MAX6315US45D3-T	4.50	140	IC_ _
MAX6315US44D3-T†††	4.39	140	ID_ _
MAX6315US43D3-T	4.30	140	IE_ _
MAX6315US42D3-T	4.20	140	IF_ _
MAX6315US41D3-T	4.10	140	IG_ _
MAX6315US40D3-T	4.00	140	IH_ _
MAX6315US39D3-T	3.90	140	II_ _
MAX6315US38D3-T	3.80	140	IJ_ _
MAX6315US37D3-T	3.70	140	IK_ _
MAX6315US36D3-T	3.60	140	IL_ _
MAX6315US35D3-T	3.50	140	IM_ _
MAX6315US34D3-T	3.40	140	IN_ _
MAX6315US33D3-T	3.30	140	IO_ _
MAX6315US32D3-T	3.20	140	IP_ _
MAX6315US31D3-T†††	3.08	140	IQ_ _
MAX6315US30D3-T	3.00	140	IR_ _
MAX6315US29D3-T†††	2.93	140	IS_ _
MAX6315US28D3-T	2.80	140	IT_ _
MAX6315US27D3-T	2.70	140	IU_ _
MAX6315US26D3-T†††	2.63	140	IV_ _
MAX6315US25D3-T	2.50	140	IW_ _

PART†	NOMINAL V_{TH} (V)	MIN t_{RP} (ms)	TOP MARK††
MAX6315US50D4-T	5.00	1120	IX_ _
MAX6315US49D4-T	4.90	1120	IY_ _
MAX6315US48D4-T	4.80	1120	IZ_ _
MAX6315US47D4-T	4.70	1120	JA_ _
MAX6315US46D4-T	4.63	1120	JB_ _
MAX6315US45D4-T	4.50	1120	JC_ _
MAX6315US44D4-T†††	4.39	1120	JD_ _
MAX6315US43D4-T	4.30	1120	JE_ _
MAX6315US42D4-T	4.20	1120	JF_ _
MAX6315US41D4-T	4.10	1120	JG_ _
MAX6315US40D4-T	4.00	1120	JH_ _
MAX6315US39D4-T	3.90	1120	JI_ _
MAX6315US38D4-T	3.80	1120	JJ_ _
MAX6315US37D4-T	3.70	1120	JK_ _
MAX6315US36D4-T	3.60	1120	JL_ _
MAX6315US35D4-T	3.50	1120	JM_ _
MAX6315US34D4-T	3.40	1120	JN_ _
MAX6315US33D4-T	3.30	1120	JO_ _
MAX6315US32D4-T	3.20	1120	JP_ _
MAX6315US31D4-T	3.08	1120	JQ_ _
MAX6315US30D4-T	3.00	1120	JR_ _
MAX6315US29D4-T	2.93	1120	JS_ _
MAX6315US28D4-T	2.80	1120	JT_ _
MAX6315US27D4-T	2.70	1120	JU_ _
MAX6315US26D4-T†††	2.63	1120	JV_ _
MAX6315US25D4-T	2.50	1120	JW_ _

†The MAX6315 is available in a SOT143 package, -40°C to +125°C temperature range.
††The first two letters in the package top mark identify the part, while the remaining two letters are the lot tracking code.
†††Sample stocks generally held on the bolded products; also, the bolded products have 2,500 piece minimum-order quantities. Non-bolded products have 10,000 piece minimum-order quantities. Contact factory for details.
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Note: *All devices available in tape-and-reel only. Contact factory for availability.*

Chip Information

TRANSISTOR COUNT: 519

Package Information

For the latest package outline information and land patterns (footprints), go to **www.maximintegrated.com/packages**. Note that a "+", "#", or "-" in the package code indicates RoHS status only. Package drawings may show a different suffix character, but the drawing pertains to the package regardless of RoHS status.

PACKAGE TYPE	PACKAGE CODE	OUTLINE NO.	LAND PATTERN NO.
4 SOT35	U4+1	21-0052	90-0183

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
4	4/15	Updated *Benefits and Features* and *Package Information*, added *Revision History*	1, 7

