

### POWER MANAGEMENT

### PRELIMINARY

#### Description

The SC1534 is designed to maintain a glitch-free 3.3V output when at least one of two inputs, 5V (VIN) and 3.3V (VAUX), is present.

Whenever VIN exceeds a predetermined threshold value, the internal 3.3V linear regulator is enabled, and DR is pulled high.

When VIN falls below a lower threshold value, DR is pulled low and the internal linear regulator is turned off. DR has been designed to drive the gate of an external low threshold P-channel MOSFET, which can be used to connect the 3.3V supply directly to the regulator output. This ensures an uninterrupted 3.3V output even if VIN falls out of specification. A maximum  $R_{DS(ON)}$  of 200mΩ is recommended.

When both supplies are simultaneously available, the drive pin (DR) will be pulled High, turning off the external PMOS switch.

The internal 5V detector has its upper threshold (for VIN rising) set to 4.22V (typical) while the lower threshold (for VIN falling) is at 4.05V (typical) giving a hysteresis of approximately 170mV.

The SC1534 is available in the popular SO-8 and 5-lead TO-263 surface mount packages.

#### Typical Application Circuits

#### Features

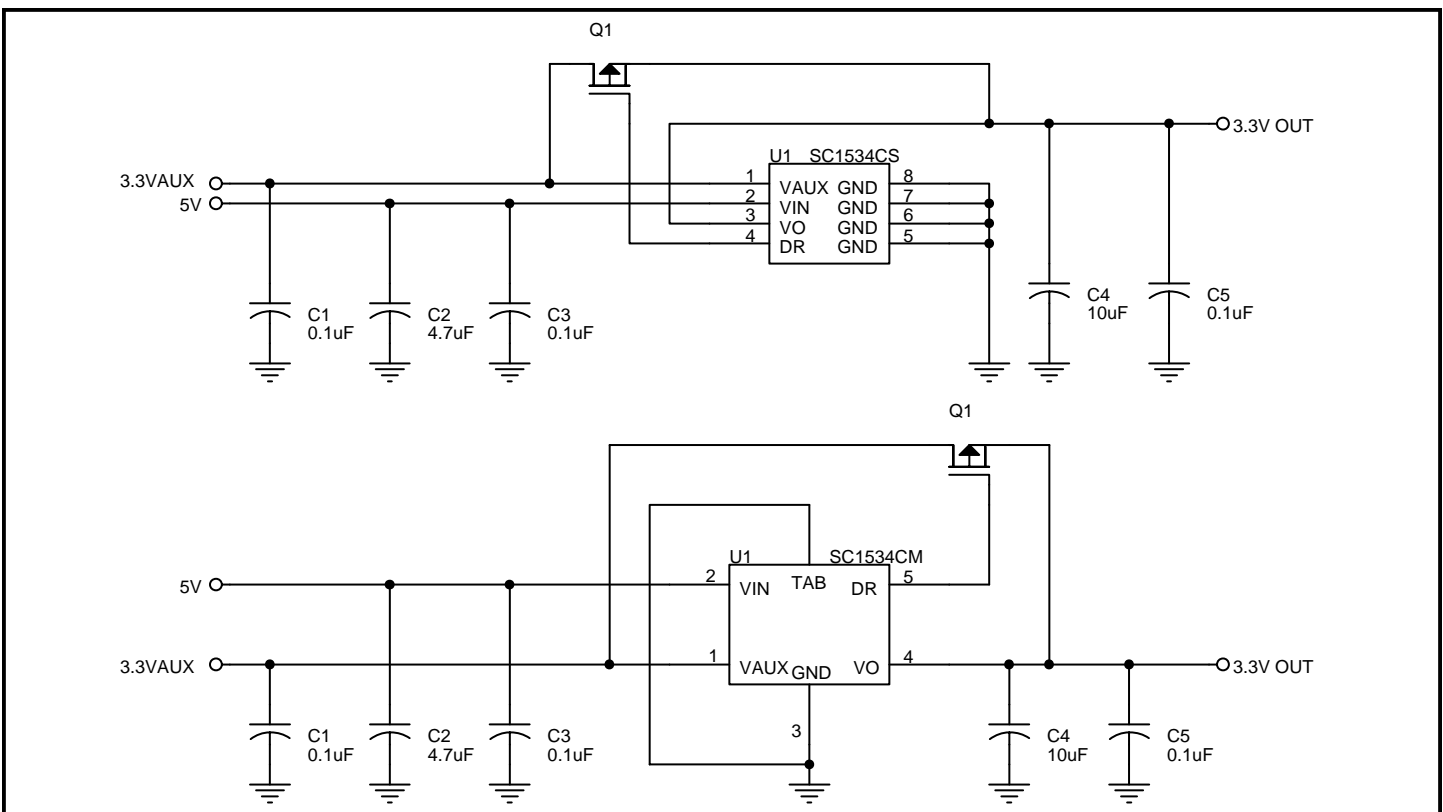
- ◆ Glitch-free transition between input sources
- ◆ Internal logic selects input source
- ◆ Gate drive for external PMOS bypass switch
- ◆ 5V detector with hysteresis
- ◆ 1% regulated output voltage accuracy
- ◆ 400mA load current capability
- ◆ SO-8 and TO-263 packages

#### Applications

- ◆ Desktop Computers
- ◆ Network Interface Cards (NICs)
- ◆ PCMCIA/PCI Interface Cards
- ◆ Cardbus™ Technology
- ◆ Power supplies with multiple input sources

#### Note For Applications Circuits:

(1) External switch (Q1): use a low threshold P-channel MOSFET such as Fairchild FDN338P or International Rectifier IRF7604, or equivalent (PMOS, typical gate threshold voltage ~1V,  $R_{DS(ON)} < 200m\Omega$  at  $V_{GS} = 2.7V$ ).



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**Absolute Maximum Ratings**

Parameter	Symbol	Maximum	Units
Input Supply Voltage	V <sub>IN</sub>	-0.5 to + 7	V
Auxiliary Supply Voltage	V <sub>AUX</sub>	-0.5 to + 7	V
LDO Output Current	I <sub>o</sub>	10 to 400	mA
Thermal Impedance Junction to Ambient SO-8 <sup>(1)</sup> TO-263	θ <sub>JA</sub>	65 60	°C/W
Thermal Impedance Junction to Case SO-8 <sup>(1)</sup> TO-263	θ <sub>JC</sub>	39 3	°C/W
Operating Ambient Temperature Range	T <sub>A</sub>	-5 to + 70	°C
Operating Junction Temperature Range	T <sub>J</sub>	-5 to +125	°C
Storage Temperature Range	T <sub>STG</sub>	-65 to +150	°C
Lead Temperature (Soldering) 10 Sec.	T <sub>LEAD</sub>	300	°C
ESD Rating	V <sub>ESD</sub>	2	kV

**Note:**

(1) 1 inch square of 1/16" FR-4, double sided, 1 oz. minimum copper weight.

**Electrical Characteristics**

Unless specified: T<sub>A</sub> = 25°C, V<sub>IN</sub> = 5V, V<sub>AUX</sub> = 3.3V, I<sub>o</sub> = 400mA, C<sub>o</sub> = 10µF. Values in **bold** apply over full operating temperature range.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
<b>VIN</b>						
Supply Voltage	V <sub>IN</sub>	V <sub>AUX</sub> = 0V	<b>4.3</b>	5.0	<b>5.5</b>	V
Quiescent Current	I <sub>q</sub>	V <sub>IN</sub> = 5V, V <sub>AUX</sub> = 0V, I <sub>o</sub> = 0mA		8.0	11.0	mA
				<b>13.0</b>		
		V <sub>IN</sub> = 5V, V <sub>AUX</sub> = 3.3V, I <sub>o</sub> = 0mA		10	14	mA
					<b>15</b>	
Reverse Leakage From V <sub>AUX</sub>	I <sub>VIN</sub>	V <sub>AUX</sub> = 3.6V, V <sub>IN</sub> = 0V, I <sub>o</sub> = 0mA		1.5	3.0	mA
					<b>4.0</b>	
<b>V<sub>AUX</sub></b>						
Supply Voltage	V <sub>AUX</sub>		<b>3.0</b>	3.3	<b>3.6</b>	V
Quiescent Current	I <sub>Q(AUX)</sub>	V <sub>AUX</sub> = 3.3V, V <sub>IN</sub> = 0V, I <sub>o</sub> = 0mA		8	11	mA
				<b>13</b>		
		V <sub>AUX</sub> = 3.3V, V <sub>IN</sub> = 5V, I <sub>o</sub> = 0mA		1.5	2.5	mA
					<b>3.0</b>	
Reverse Leakage From V <sub>IN</sub>	I <sub>V<sub>AUX</sub></sub>	V <sub>IN</sub> = 5.5V, V <sub>AUX</sub> = 0V, I <sub>o</sub> = 0mA		5	50	µA
					<b>100</b>	

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**Electrical Characteristics (Cont.)**

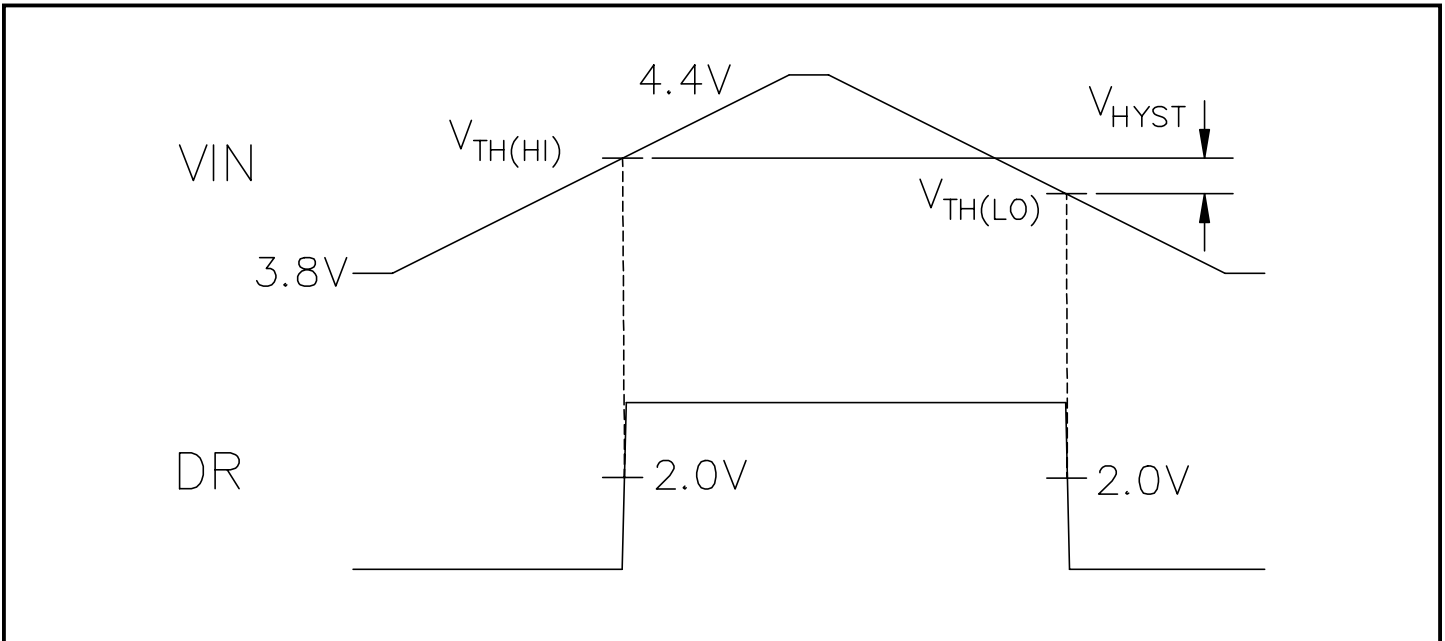
 Unless specified:  $T_A = 25^\circ\text{C}$ ,  $V_{IN} = 5\text{V}$ ,  $V_{AUX} = 3.3\text{V}$ ,  $I_o = 400\text{mA}$ ,  $C_o = 10\mu\text{F}$ . Values in **bold** apply over full operating temperature range.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
<b>5V Detect<sup>(1)(2)(3)</sup></b>						
Low Threshold Voltage	$V_{TH(LO)}$	VIN Falling, $I_o = 20\text{mA}$	3.92	4.05	4.18	V
			<b>3.90</b>		<b>4.20</b>	
Hysteresis	$V_{HYST}$		90	170		mV
			<b>80</b>			
High Threshold Voltage	$V_{TH(HI)}$	VIN Rising, $I_o = 20\text{mA}$			<b>4.35</b>	V
<b>VO</b>						
LDO Output Voltage	VO	$I_o = 20\text{mA}$	3.267	3.300	3.333	V
		$4.35\text{V} \leq V_{IN} \leq 5.5\text{V}$ , $0\text{mA} \leq I_o \leq 400\text{mA}$	<b>3.234</b>		<b>3.366</b>	
Line Regulation	$REG_{(LINE)}$	VIN = 4.35V to 5.5V		0.20	0.40	%
					<b>0.60</b>	
Load Regulation	$REG_{(LOAD)}$	$I_o = 20\text{mA}$ to 400mA		0.20	0.80	%
					<b>1.00</b>	
<b>DR</b>						
Drive Voltage	$V_{DR}$	$4.35\text{V} \leq V_{IN} \leq 5.5\text{V}$ , $I_{DR} = 200\mu\text{A}$	3.4	VIN - 0.8		V
			<b>3.3</b>			
		$V_{IN} < V_{TH(LO)}$ , $I_{DR} = -200\mu\text{A}$		35	150	mV
Peak Drive Current	$I_{DR(PK)}$	Sinking: VIN = 3.9V, $V_{DR} = 1\text{V}$ ;	7			mA
		Sourcing: VIN = 4.35V, $(V_{IN} - V_{DR}) = 2.5\text{V}$	<b>6</b>			
Drive High Delay <sup>(1)(4)</sup>	$t_{DH}$	$C_{DR} = 1.2\text{nF}$ , VIN ramping up, measured from VIN = $V_{TH(HI)}$ to $V_{DR} = 2\text{V}$		0.5	1.0	$\mu\text{s}$
					<b>2.0</b>	
Drive Low Delay <sup>(1)(4)</sup>	$t_{DL}$	$C_{DR} = 1.2\text{nF}$ , VIN ramping down, measured from VIN = $V_{TH(LO)}$ to $V_{DR} = 2\text{V}$		0.5	1.0	$\mu\text{s}$
					<b>2.0</b>	

**Notes:**

- (1) Guaranteed by design.
- (2) See 5V Detect Thresholds on page 4.
- (3) Recommended source impedance for 5V supply:  $\leq 0.125\Omega$ . This will ensure that  $I_o \times R_{SOURCE} < V_{HYST}$ , thus avoiding DR toggling during 5V detect threshold transitions.
- (4) See Timing Diagram on page 4.

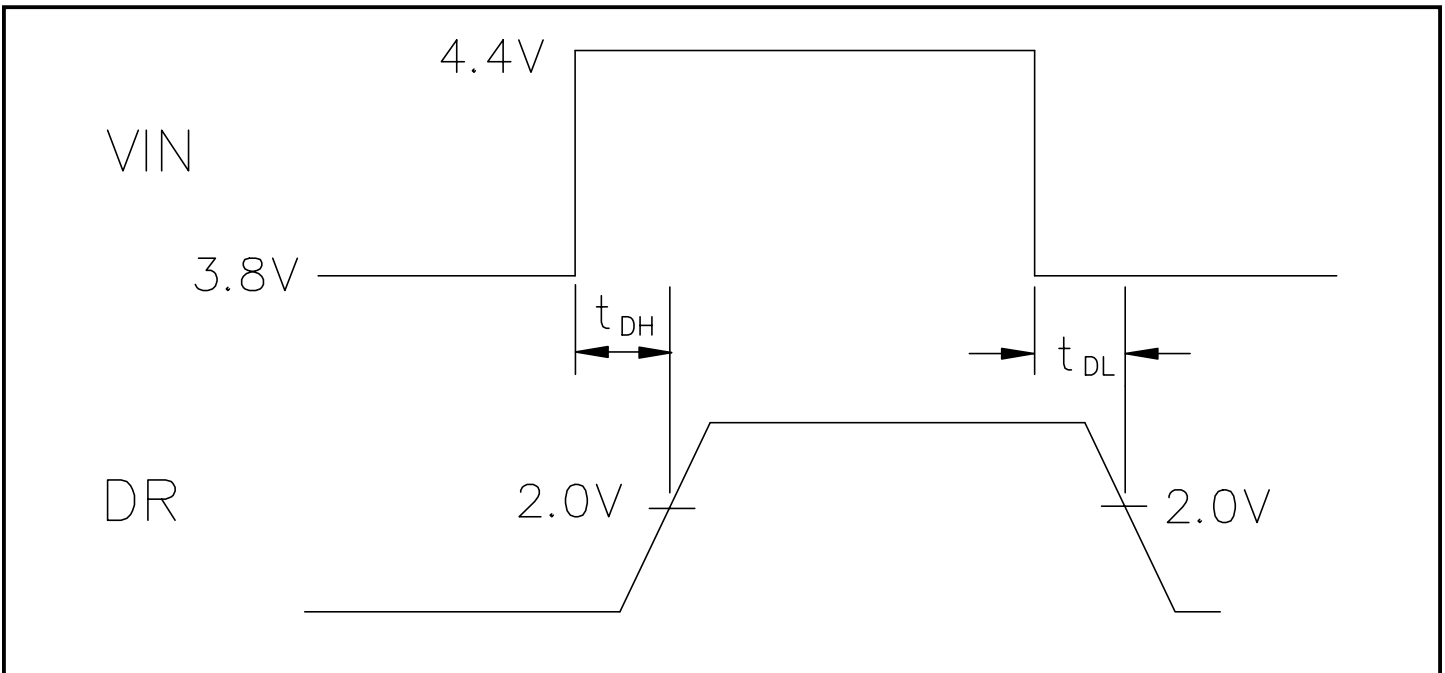
5V Detect Thresholds<sup>(1)</sup>



**Note:**

(1) VIN rise and fall times (10% to 90%) to be  $\geq 100\mu s$ .

Timing Diagram<sup>(1)</sup>



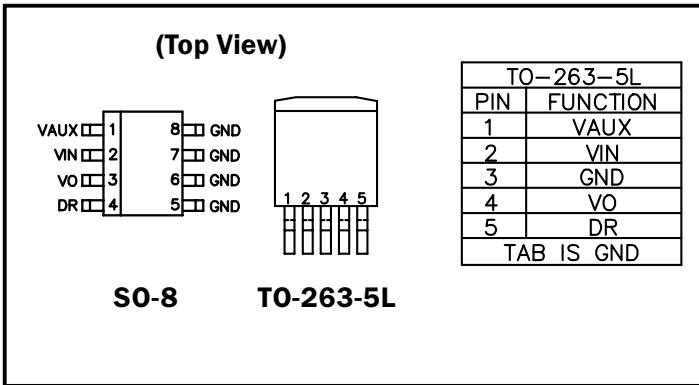
**Note:**

(1) VIN rise and fall times (10% to 90%) to be  $\leq 100ns$ .

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**Pin Configurations**



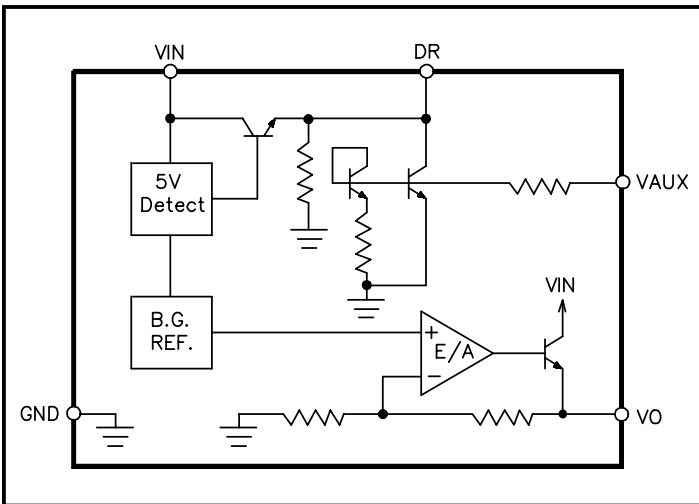
**Ordering Information**

Part Number <sup>(1)</sup>	Package
SC1534CM.TR	TO-263-5L
SC1534CS.TR	SO-8

**Note:**

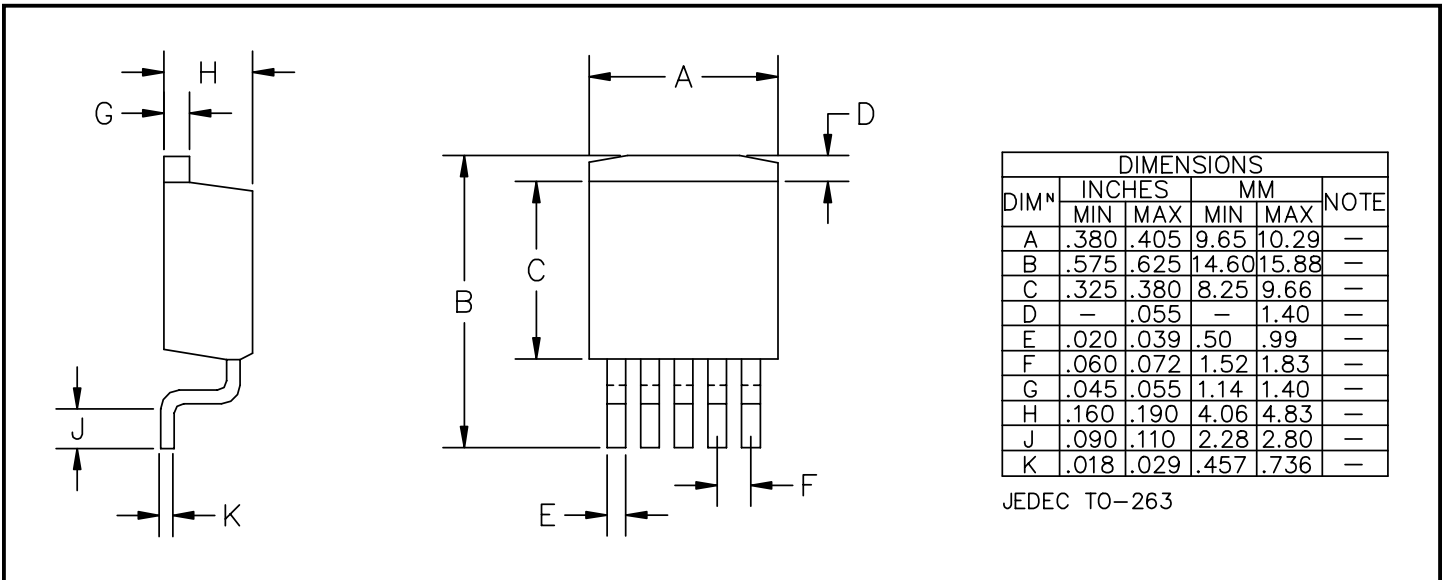
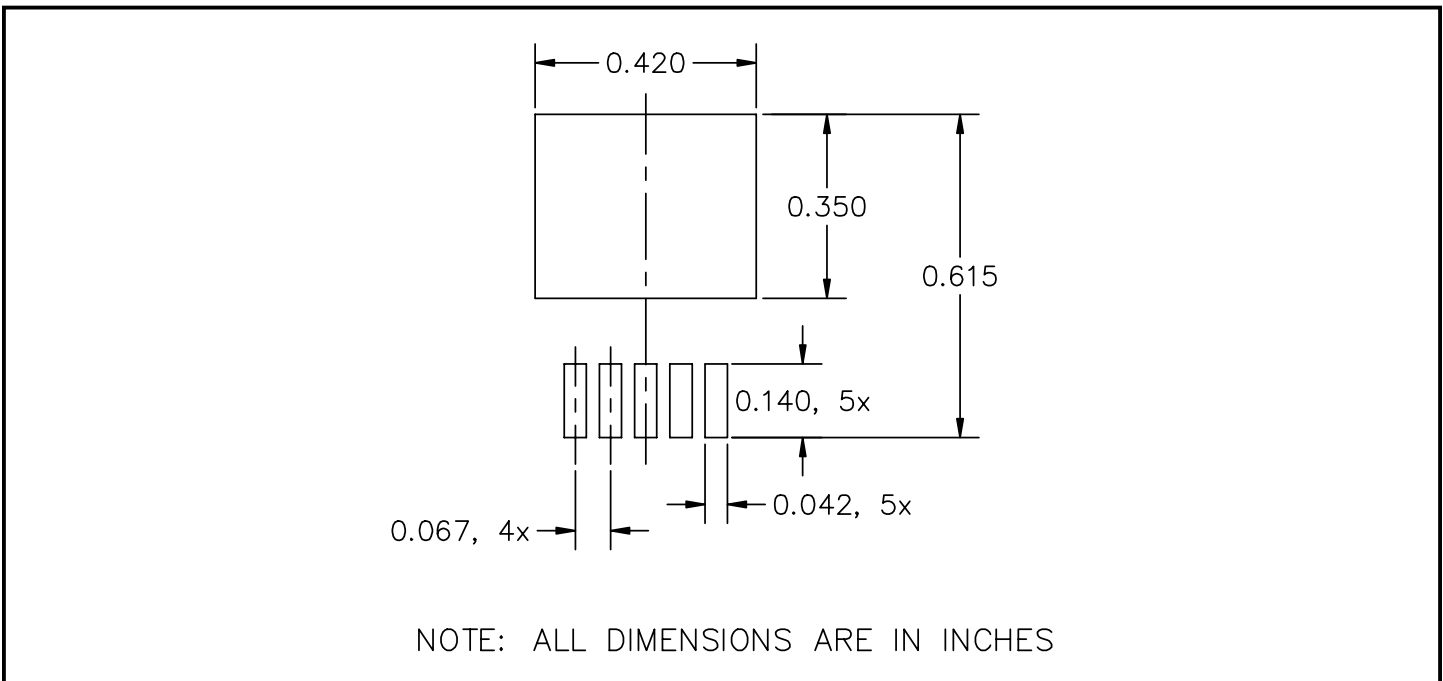
(1) Only available in tape and reel packaging. A reel contains 800 (TO-263-5L) or 2500 (SO-8) devices.

**Block Diagram**



**Pin Descriptions**

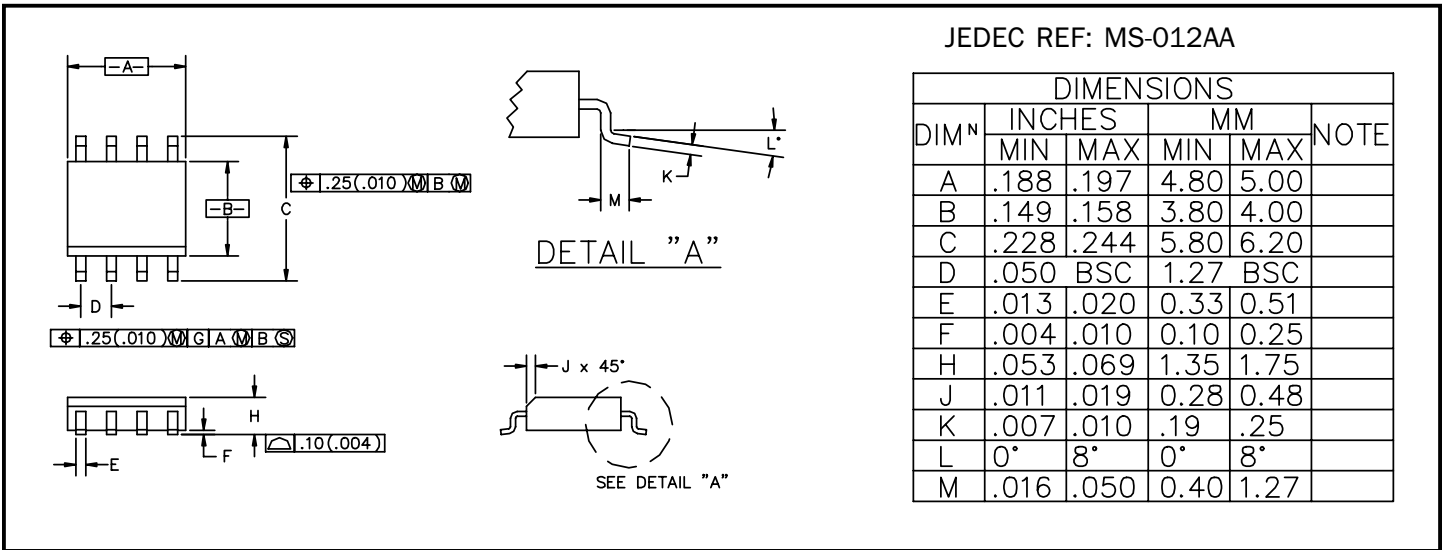
Pin Name	SO-8 Pin #	TO-263-5L Pin #	Pin Function
DR	4	5	Driver output for external P-channel MOSFET pass element.
GND	5,6,7,8	3/TAB	Logic and power ground.
VAUX	1	1	This is the auxiliary input supply, nominally 3.3V.
VIN	2	2	This is the main input supply for the IC, nominally 5V.
VO	3	4	LDO 3.3V output.

**Outline Drawing - TO-263, 5 Pin**

**Land Pattern - TO-263, 5 Pin**


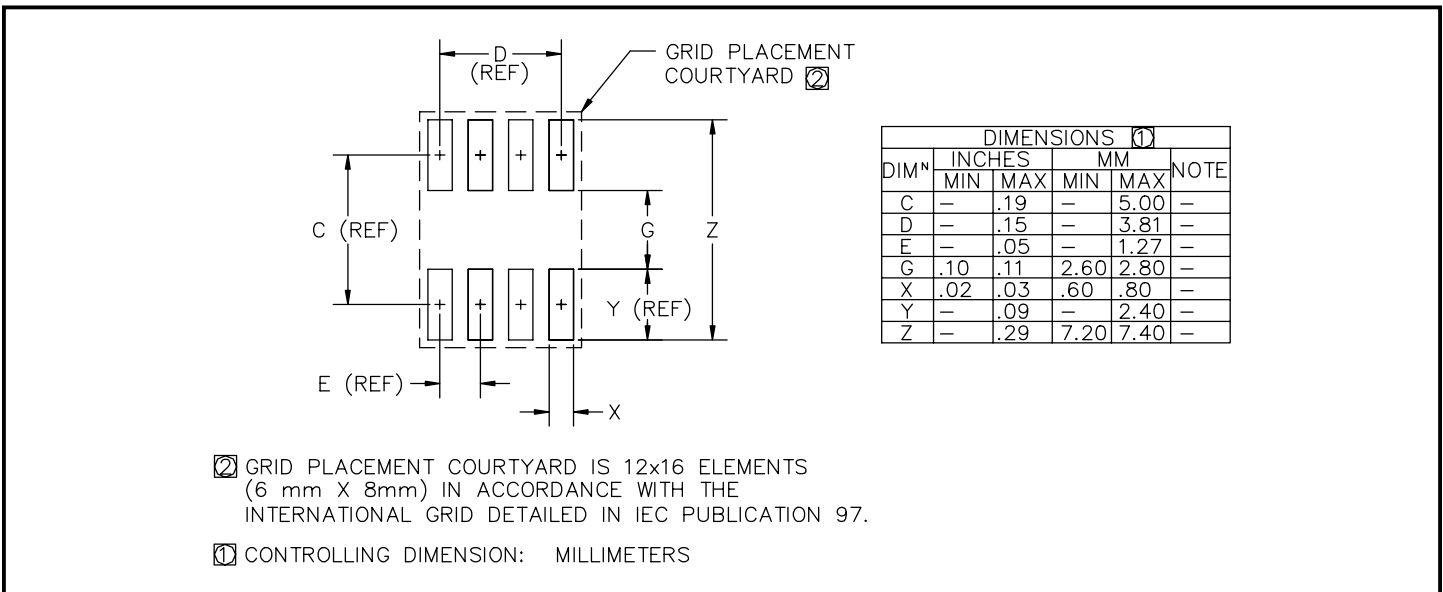
**POWER MANAGEMENT**

**PRELIMINARY**

**Outline Drawing - SO-8**



**Land Pattern - SO-8**



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