

POWER MANAGEMENT

PRELIMINARY

Description

The SC1537 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 100m Ω 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 SC1537 is available in the popular SO-8 and 5-lead TO-263 surface mount packages.

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
- ◆ 700mA load current capability
- ◆ SO-8 and TO-263 packages

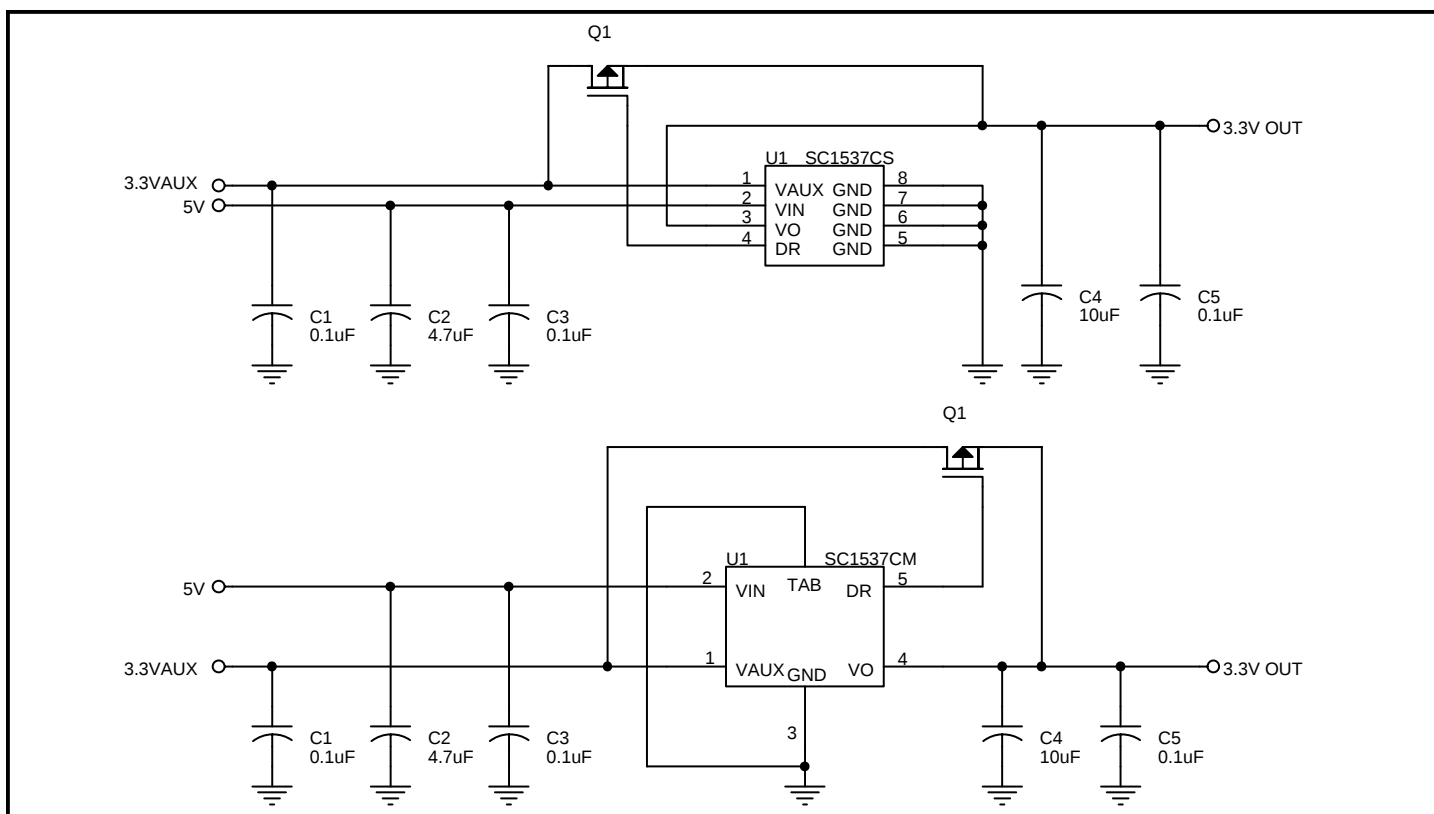
Applications

- ◆ 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 Vishay Si2305DS ($R_{DS(ON)} < 71\text{m}\Omega$ at $V_{GS} = 2.5\text{V}$) or International Rectifier IRLML6401 ($R_{DS(ON)} < 85\text{m}\Omega$ at $V_{GS} = 2.5\text{V}$), or equivalent.

Typical Application Circuits



POWER MANAGEMENT

PRELIMINARY

Absolute Maximum Ratings

Parameter	Symbol	Maximum	Units
Input Supply Voltage	V _{IN}	-0.5 to + 7	V
Auxiliary Supply Voltage	VAUX	-0.5 to + 7	V
LDO Output Current	I _O	10 to 700	mA
Thermal Impedance Junction to Ambient SO-8 ⁽¹⁾ TO-263	θ_{JA}	65 60	°C/W
Thermal Impedance Junction to Case SO-8 ⁽¹⁾ TO-263	θ_{JC}	39 3	°C/W
Operating Ambient Temperature Range	T _A	0 to + 70	°C
Operating Junction Temperature Range	T _J	0 to +125	°C
Storage Temperature Range	T _{STG}	-65 to +150	°C
Lead Temperature (Soldering) 10 Sec.	T _{LEAD}	300	°C
ESD Rating	V _{ESD}	2	kV

Note:

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

Electrical Characteristics

Unless specified: T_A = 25°C, V_{IN} = 5V, VAUX = 3.3V, I_O = 700mA, C_O = 10μF. Values in **bold** apply over full operating temperature range.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
VIN						
Supply Voltage	VIN	VAUX = 0V	4.75	5.00	5.25	V
Quiescent Current	IQ	VIN = 5V, 0V ≤ VAUX ≤ 3.6V, IO = 0mA		10	14	mA
					16	
Reverse Leakage From VAUX	IVIN	VAUX = 3.6V, VIN = 0V, IO = 0mA		1.5	3.0	mA
					4.0	
VAUX						
Supply Voltage	VAUX		3.0	3.3	3.6	V
Quiescent Current	IQ(AUX)	VAUX = 3.3V, VIN = 0V, IO = 0mA		8	11	mA
					13	
		VAUX = 3.3V, VIN = 5V, IO = 0mA		0.5	2.5	mA
					3.0	
Reverse Leakage From VIN	IVAUX	VIN = 5.25V, VAUX = 0V, IO = 0mA		5	50	μA
					100	

POWER MANAGEMENT

PRELIMINARY

Electrical Characteristics (Cont.)

Unless specified: $T_A = 25^\circ\text{C}$, $V_{IN} = 5\text{V}$, $V_{AUX} = 3.3\text{V}$, $I_O = 700\text{mA}$, $C_O = 10\mu\text{F}$. Values in **bold** apply over full operating temperature range.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
5V Detect ⁽¹⁾⁽²⁾⁽³⁾						
Low Threshold Voltage	V _{TH(LO)}	VIN Falling, I _O = 20mA	3.92	4.05	4.18	V
			3.90		4.20	
Hysteresis	V _{HYST}		90	170		mV
			80			
High Threshold Voltage	V _{TH(HI)}	VIN Rising, I _O = 20mA			4.35	V
VO						
LDO Output Voltage	VO	I _O = 20mA	3.234	3.300	3.366	V
		4.75V ≤ VIN ≤ 5.25V, 10mA ≤ I _O ≤ 700mA	3.201		3.399	
Line Regulation	REG _(LINE)	VIN = 4.75V to 5.25V		0.10	0.60	%
					0.80	
Load Regulation	REG _(LOAD)	I _O = 10mA to 700mA		0.6	1.0	%
					1.2	
DR						
Drive Voltage	V _{DR}	4.75V ≤ VIN ≤ 5.25V, I _{DR} = 200μA	3.4	VIN - 0.8		V
			3.3			
		VIN < V _{TH(LO)} , I _{DR} = -200μA		35	150	mV
					200	
Peak Drive Current	I _{DR(PK)}	Sinking: VIN = 3.9V, V _{DR} = 1V;	7			mA
		Sourcing: VIN = 4.35V, (VIN - V _{DR}) = 2.5V	5			
Drive High Delay ⁽¹⁾⁽⁴⁾	t _{DH}	C _{DR} = 1.2nF, VIN ramping up, measured		0.5	1.0	μs
		from VIN = V _{TH(HI)} to V _{DR} = 2V			2.0	
Drive Low Delay ⁽¹⁾⁽⁴⁾	t _{DL}	C _{DR} = 1.2nF, VIN ramping down, measured		0.5	1.0	μs
		from VIN = V _{TH(LO)} to V _{DR} = 2V			2.0	

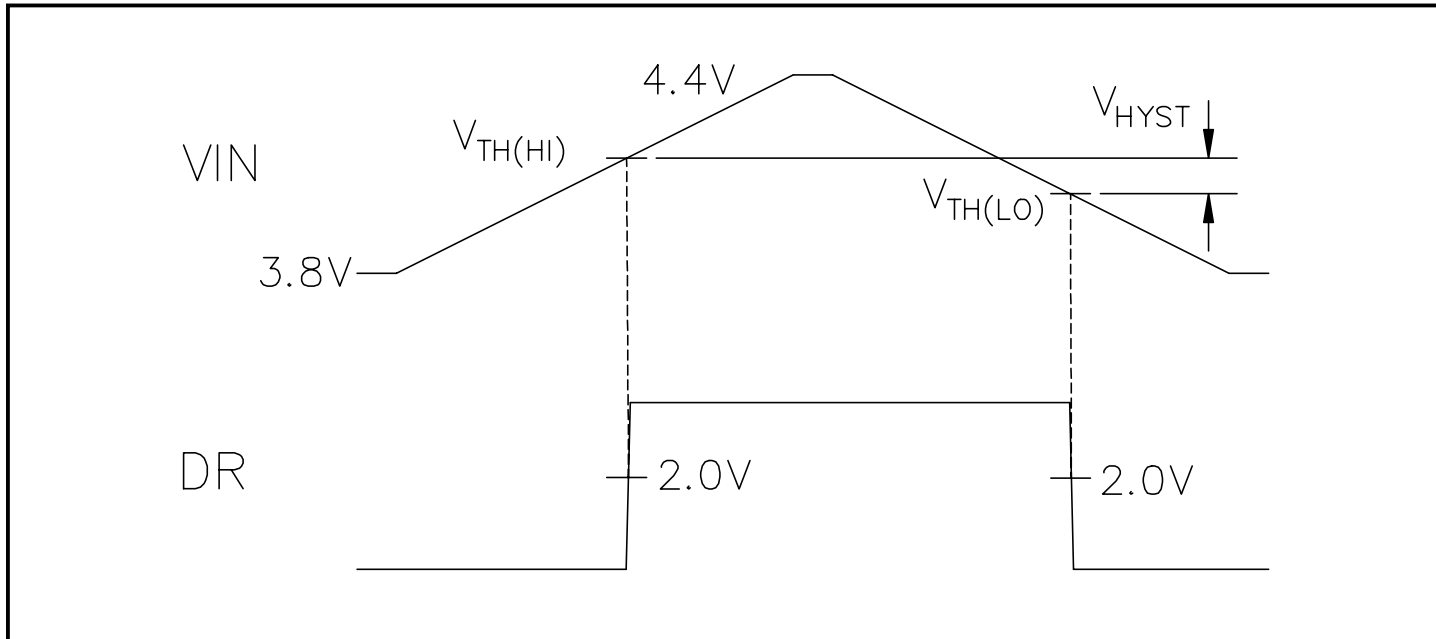
Notes:

(1) Guaranteed by design.

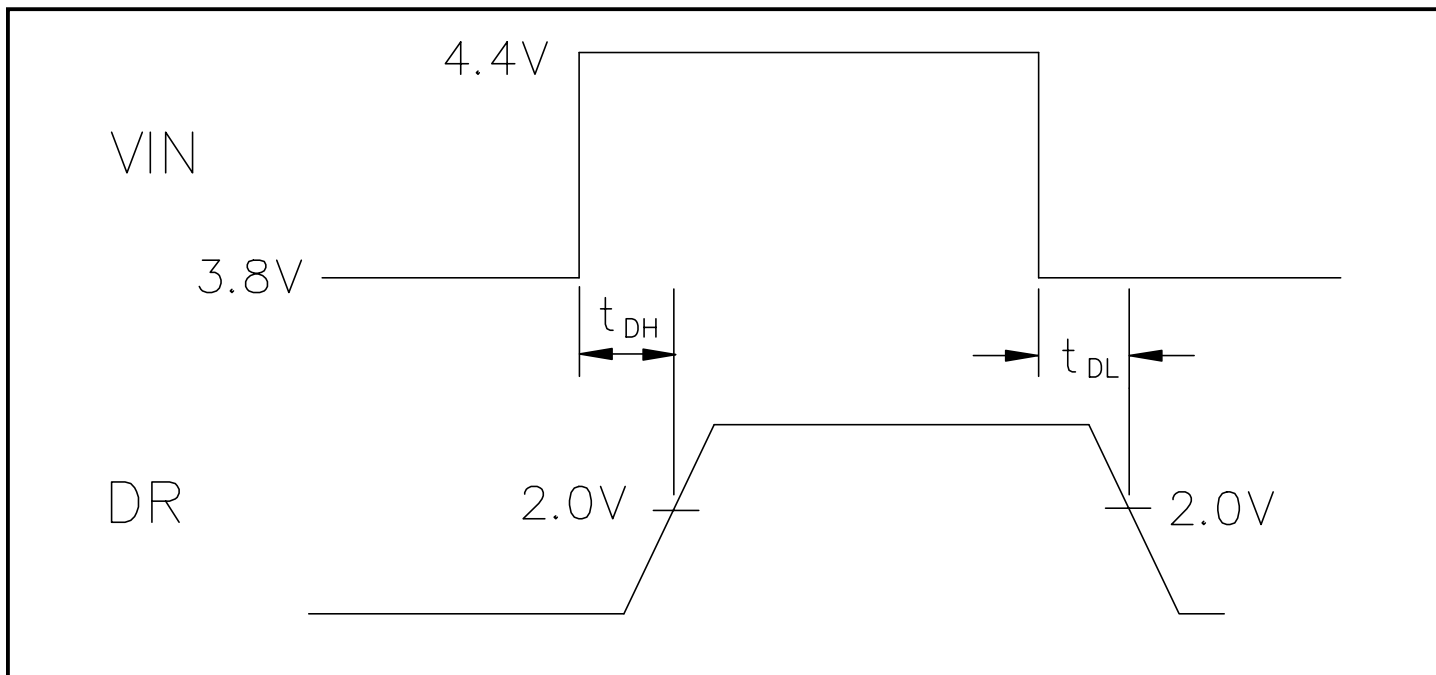
(2) See 5V Detect Thresholds on page 4.

(3) Recommended source impedance for 5V supply: $\leq 0.07\Omega$. 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⁽¹⁾

Note:

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

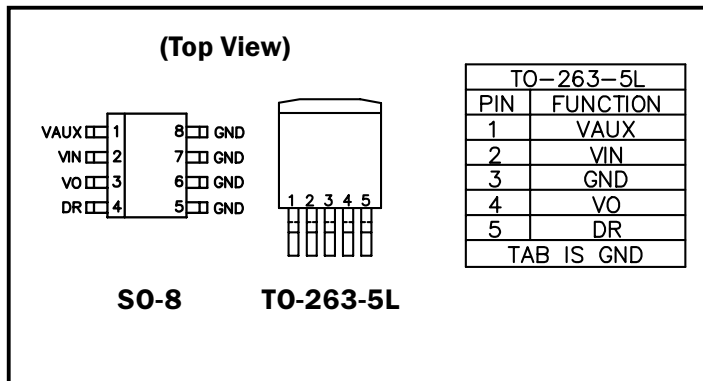
Timing Diagram⁽¹⁾

Note:

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

POWER MANAGEMENT

PRELIMINARY

Pin Configurations



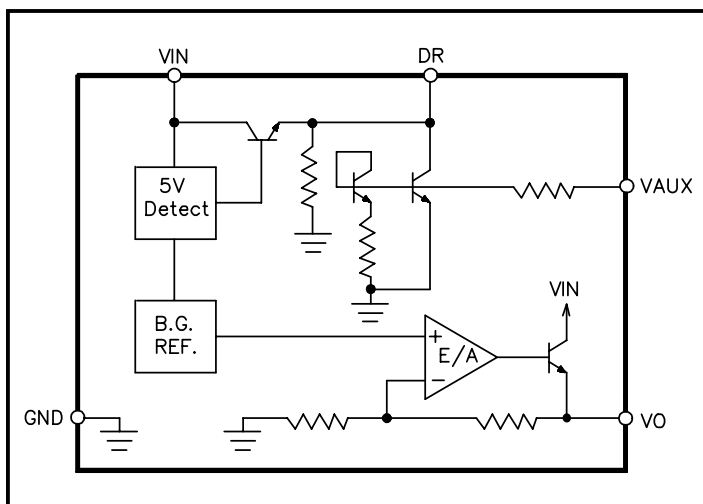
Ordering Information

Part Number ⁽¹⁾	Package
SC1537CMTR	TO-263-5L
SC1537CSTR	SO-8

Note:

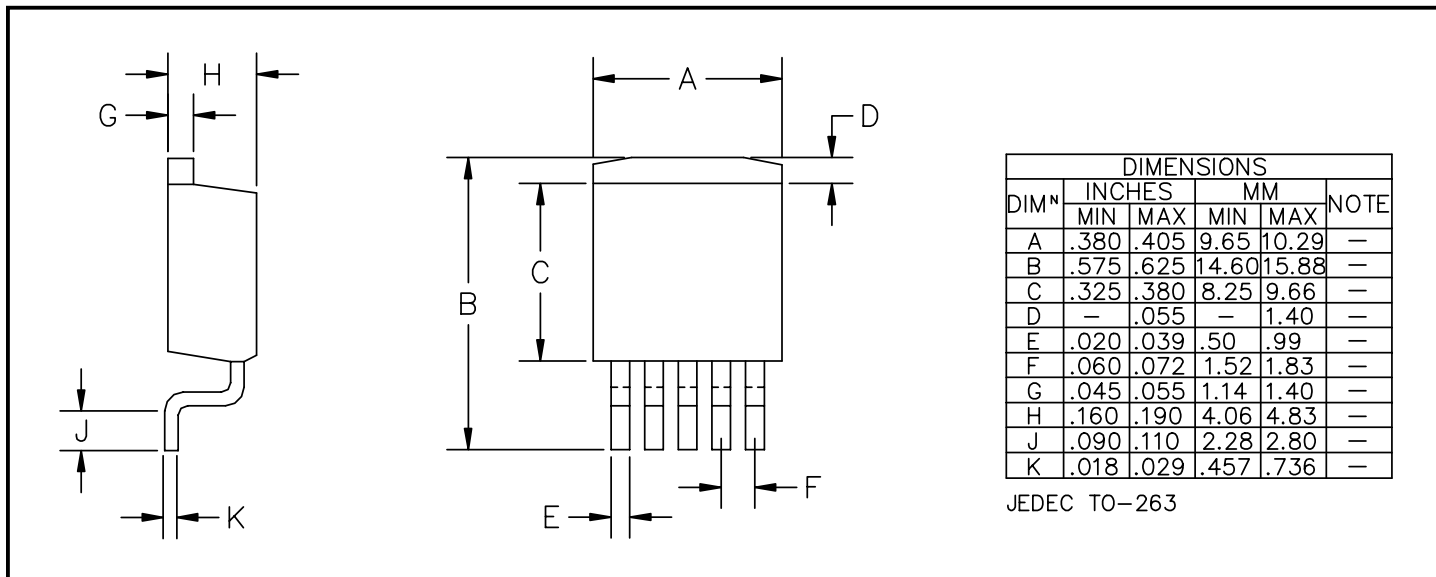
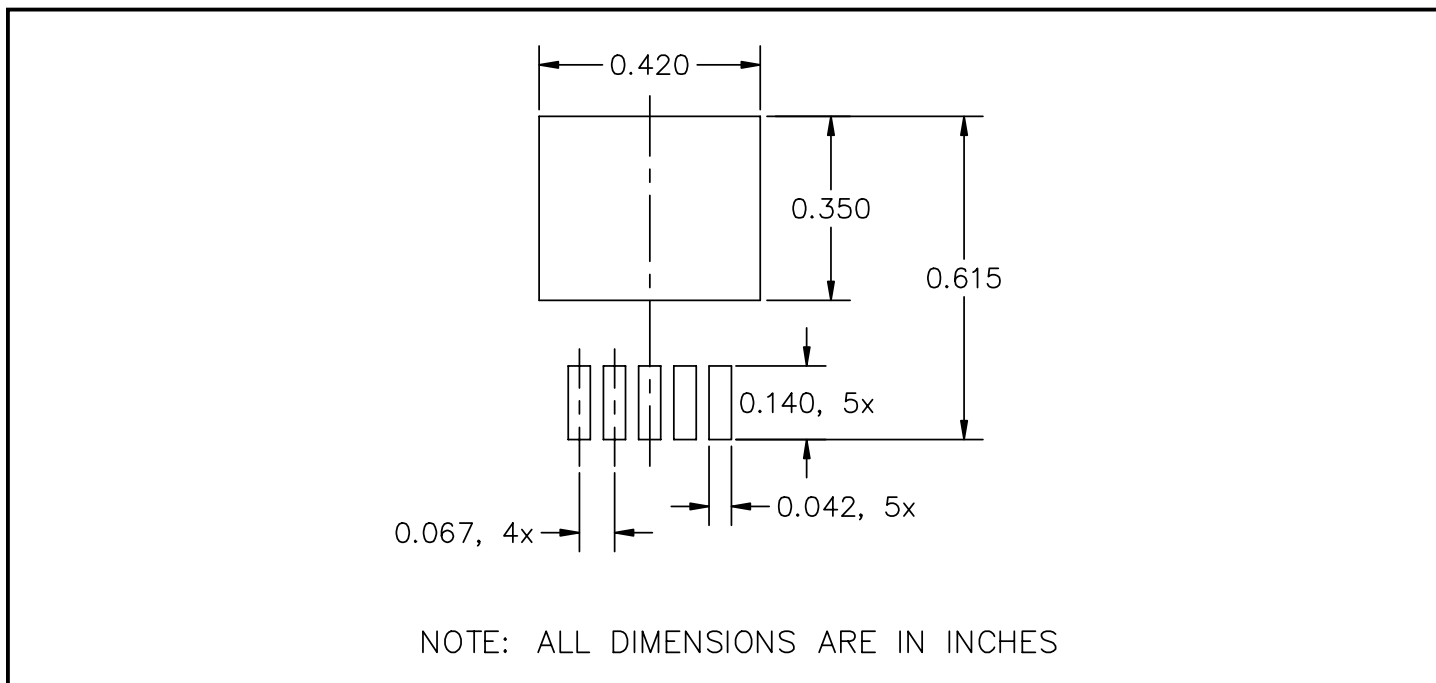
(1) Only available in tape and reel packaging. A reel contains 800 (TO-263-5L) or 2500 (SO-8) devices.

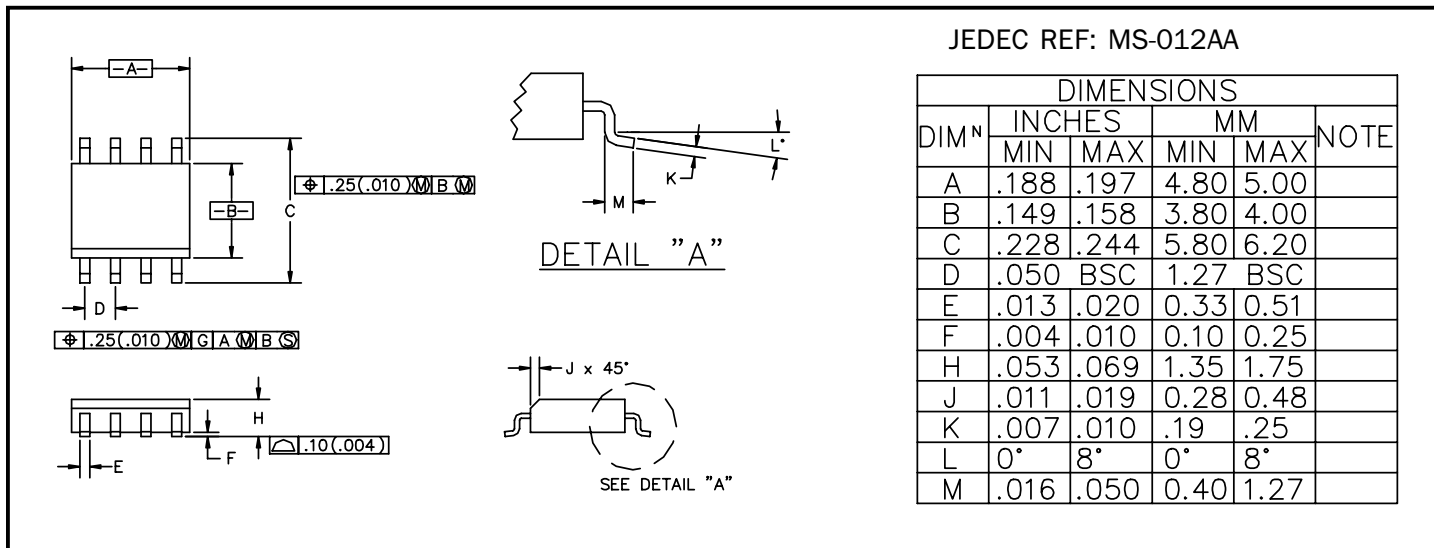
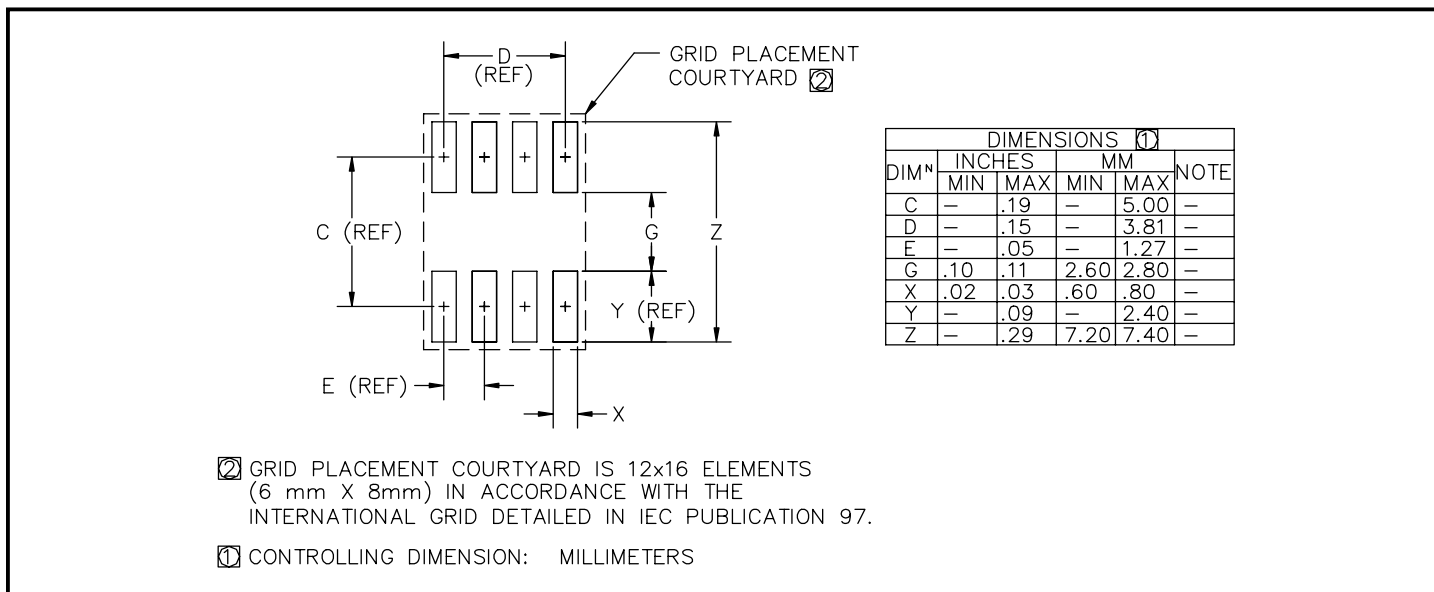
Block Diagram



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.

POWER MANAGEMENT
PRELIMINARY
Outline Drawing - TO-263, 5 Pin

Land Pattern - TO-263, 5 Pin


POWER MANAGEMENT
PRELIMINARY
Outline Drawing - SO-8

Land Pattern - SO-8

Contact Information

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