Typical Applications Circuit
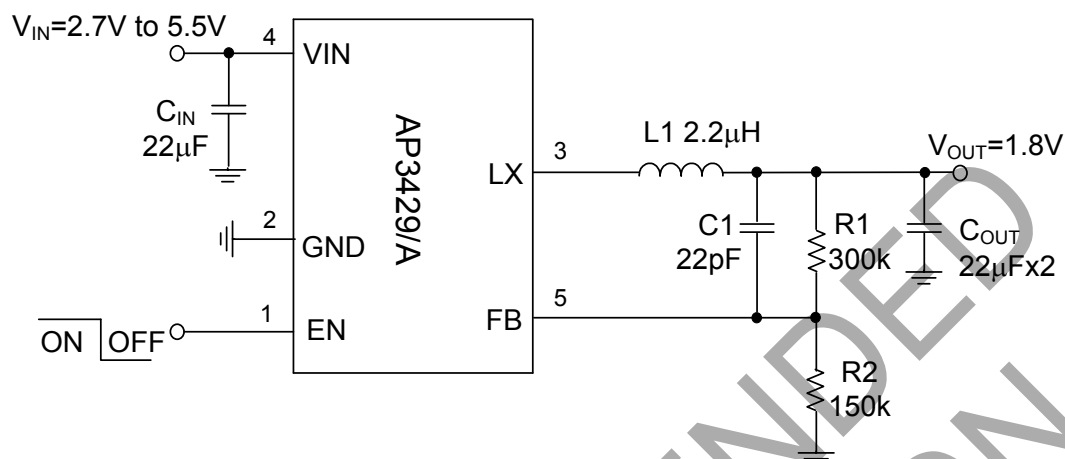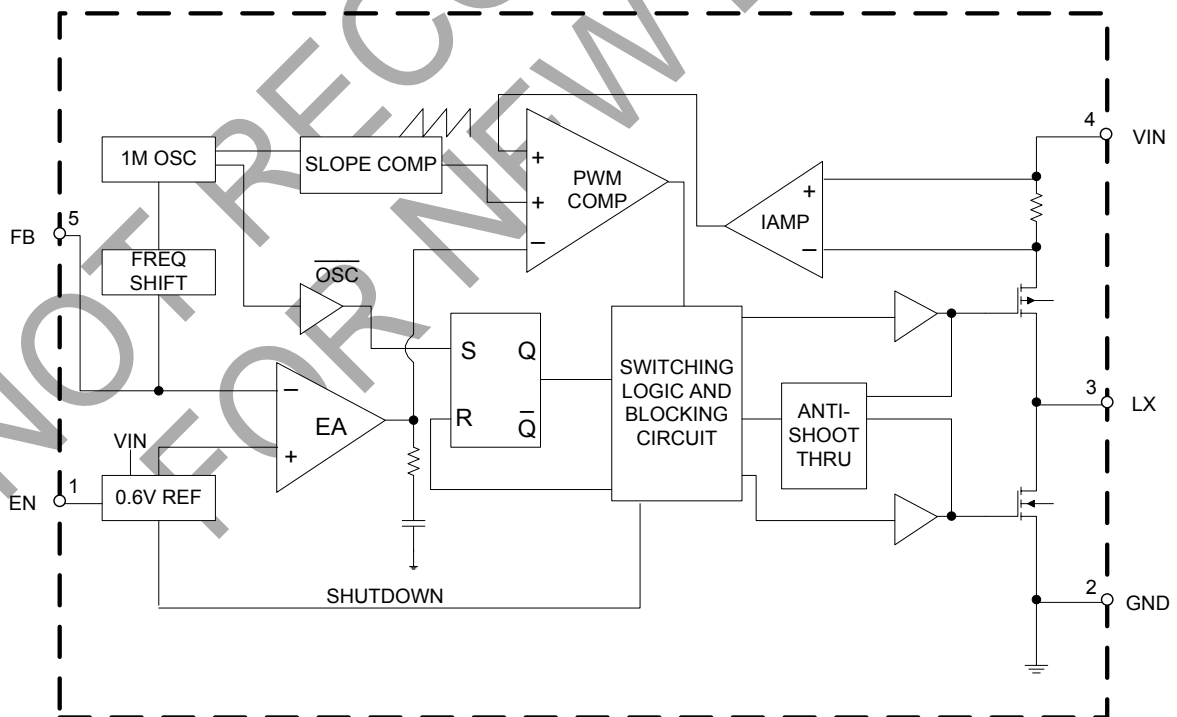

Pin Descriptions

Pin Number	Pin Name	Function
1	EN	Enable control input. Force this pin voltage above 1.5V enables the chip, and below 0.4V shuts down the device.
2	GND	Ground pin.
3	LX	The drains of the internal main and synchronous power MOSFETs.
4	VIN	Bias supply. Chip main power supply pin.
5	FB	Feedback voltage to internal error amplifier. The threshold voltage is 0.6V.

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Functional Block Diagram
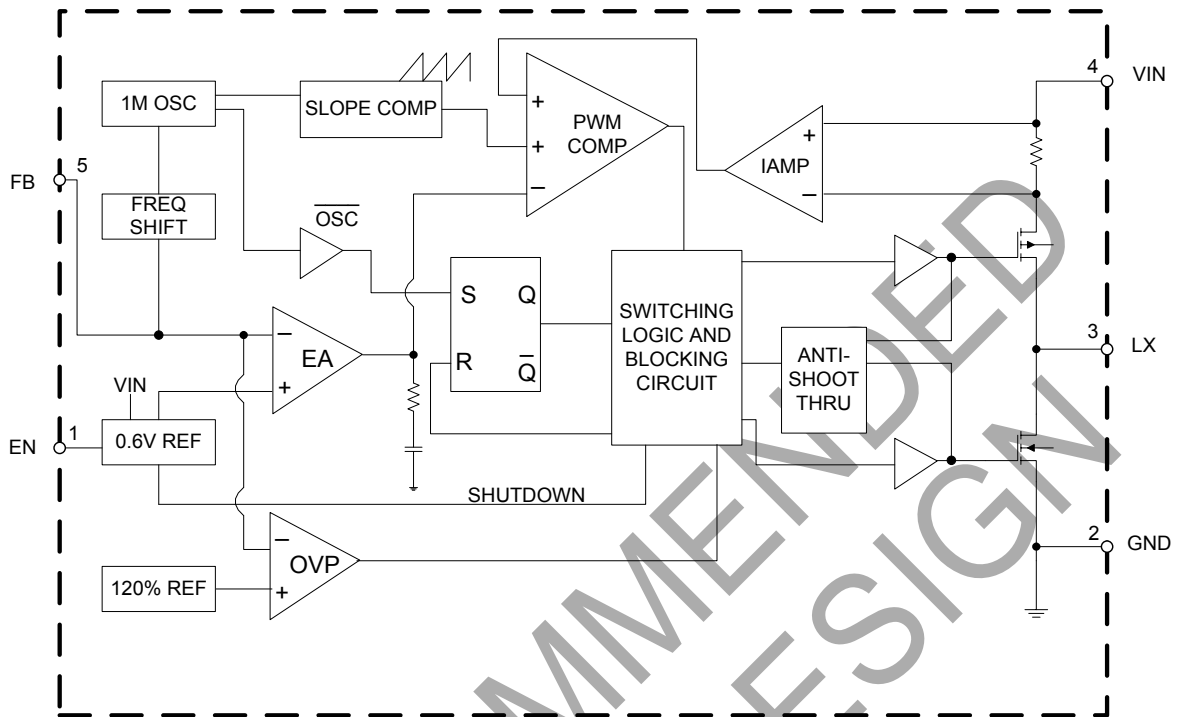
Function Block Diagram of AP3429

Function Block Diagram of AP3429A

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Absolute Maximum Ratings (Note 4)

Symbol	Parameter	Rating	Unit
V_{IN}	Input Voltage	-0.3 to 6	V
V_{EN}	EN Pin Voltage	-0.3 to V_{IN}+0.3	V
V_{LX}	LX Pin Voltage	-0.3 to V_{IN}+0.3	V
V_{FB}	Feedback Pin Voltage	-0.3 to V_{IN}+0.3	V
P_D	Power Dissipation (on PCB, T_A = +25°C)	0.4	W
θ_{JA}	Thermal Resistance (Junction to Ambient)	220	°C/W
θ_{JC}	Thermal Resistance (Junction to Case, Simulation)	130	ºC/W
T_J	Operating Junction Temperature	+150	°C
T_{STG}	Storage Temperature	-55 to +150	°C
V_{MM}	ESD (Machine Model)	200	V
V_{HBM}	ESD (Human Body Model)	2000	V

Note 4:   Stresses greater than 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 under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

## Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{IN}	Input Voltage Range	2.7	5.5	V
T_A	Operating Ambient Temperature	-40	+85	°C
T_J	Junction Temperature Range	-40	+125	°C

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Electrical Characteristics (@V_{IN} = 5V, V_{OUT} = 1.8V, L = 2.2µH, C_{IN} = 22µF, C_{OUT} = 22µF×2, T_A = +25°C, unless otherwise specified.)

Symbol	Parameters	Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range	–	2.7	–	5.5	V
V_{FB}	Regulated Feedback Voltage	–	0.588	0.6	0.612	V
I_{FB}	FB Leakage Current	V_{FB} = 1V	–	–	0.2	µA
I_Q	Quiescent Current	V_{FB} = 0.65V	–	90	–	µA
I_{SD}	Shutdown Current	V_{EN} = 0V	–	0.1	1	µA
I_{LIM}	Peak Inductor Current	–	3	–	–	A
V_{SCP}	Short Circuit Protection Latch Off Threshold	–	–	0.3	–	V
f_{OSC}	Oscillator Frequency	–	–	1	–	MHz
$R_{DS(ON)}$	Drain to Source On-state Resistance	I_{LX} = 100mA, high side	–	110	–	mΩ
		I_{LX} = 100mA, low side	–	80	–	
V_{ENH}	EN High Threshold	–	1.5	–	–	V
V_{ENL}	EN Low Threshold	–	–	–	0.4	V
I_{EN}	EN Leakage Current	V_{IN} = V_{EN} = 5V	-1.0	–	1.0	µA
V_{UVLO}	Input UVLO Threshold	–	–	2.4	2.7	V
V_{HYS}	UVLO Hysteresis	–	–	0.2	–	V
–	Maximum Duty Cycle	–	100	–	–	%
R_{DSCH}	Output Discharge Switch On Resistance	–	–	50	–	Ω
T_{OTP}	Over Temperature Protection	–	–	+160	–	°C
T_{OTH}	OTP Hysteresis	–	–	+30	–	°C
V_{IOVP}	V_{IN} Over Voltage Protection	–	–	6.25	–	V
V_{IHSY}	IOVP Hysteresis	–	–	0.25	–	V
t_{SS}	Soft-start Time	–	–	1.8	–	ms

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Performance Characteristics (@T_A = +25°C, V_IN = 5V, V_OUT = 1.8V, unless otherwise specified.)

Efficiency vs. Load Current
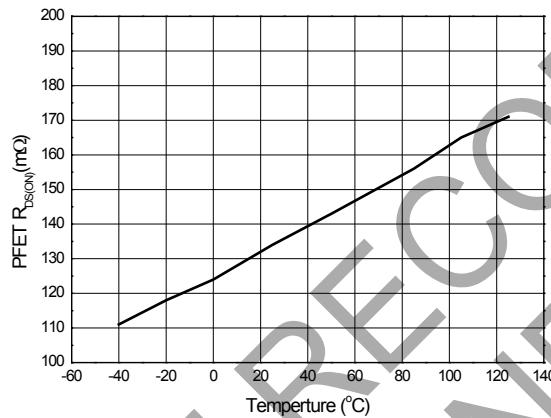

V_IN=5V, V_OUT=1.0V
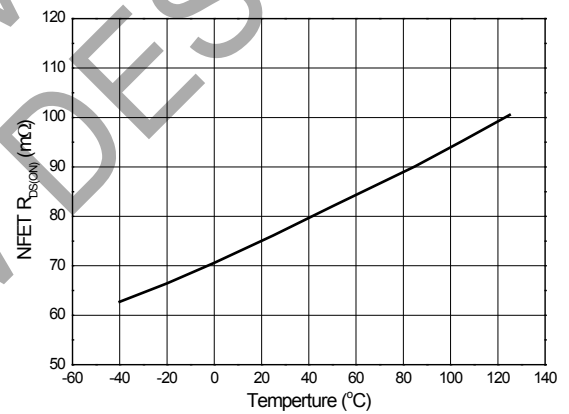V_IN=5V, V_OUT=1.8V
V_IN=5V, V_OUT=3.3V
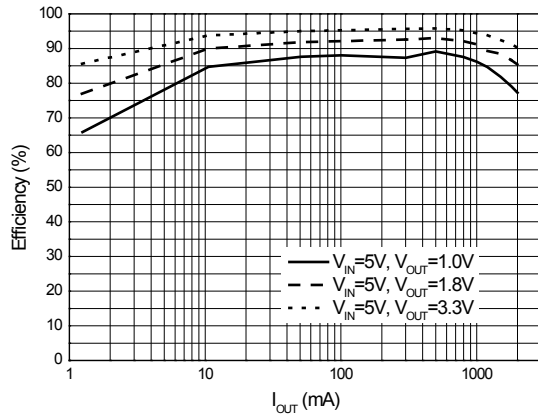
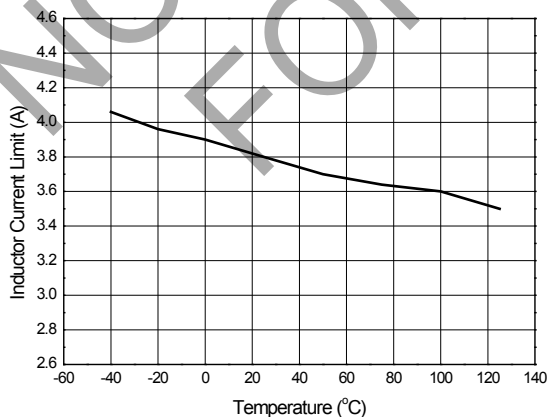**Feedback Reference Voltage vs. Temperature**
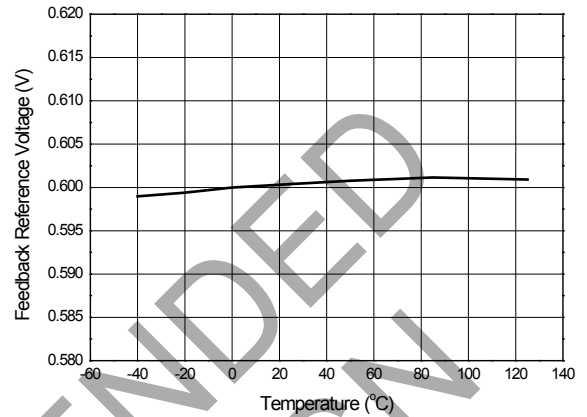
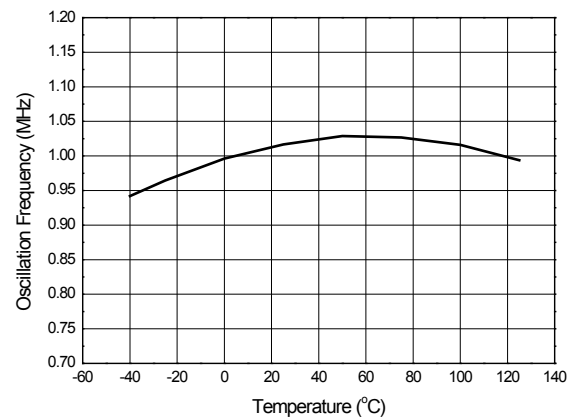**PFET Drain-Source On-State Resistance vs. Temperature**

NFET Drain-Source On-State Resistance vs. Temperature
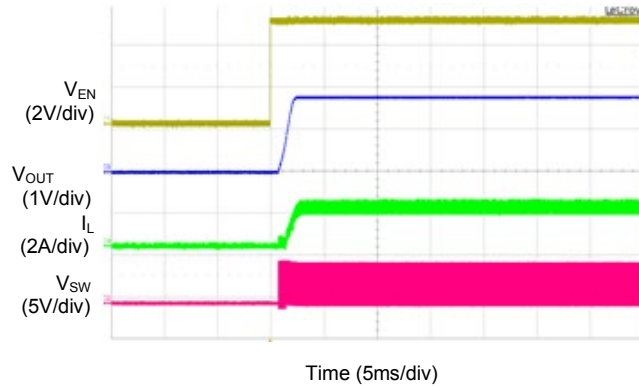

Inductor Current Limit vs. Temperature
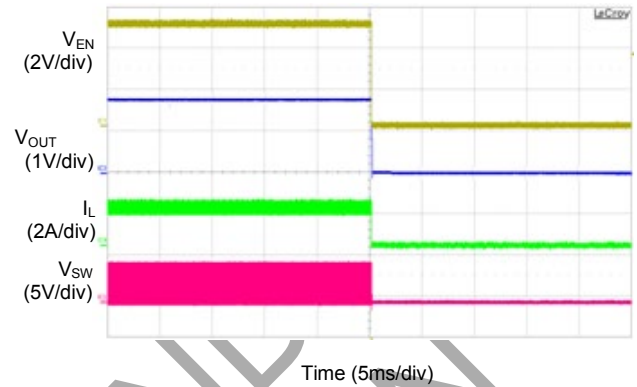

Oscillation Frequency vs. Temperature

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Performance Characteristics (Cont. @T_A = +25°C, V_{IN} = 5V, V_{OUT} = 1.8V, unless otherwise specified.)

Enable Turn on Characteristic (I_{OUT}=2A)

V_{EN} (2V/div)
V_{OUT} (1V/div)
I_L (2A/div)
V_{SW} (5V/div)

Time (5ms/div)

Enable Turn off Characteristic (I_{OUT}=2A)

V_{EN} (2V/div)
V_{OUT} (1V/div)
I_L (2A/div)
V_{SW} (5V/div)

Time (5ms/div)

Short Current Protection (I_{OUT}=2A)

V_{OUT} (1V/div)
I_L (2A/div)
V_{SW} (5V/div)

Time (50ms/div)

SCP Recovery (I_{OUT}=2A)

V_{OUT} (1V/div)
I_L (2A/div)
V_{SW} (5V/div)

Time (50ms/div)
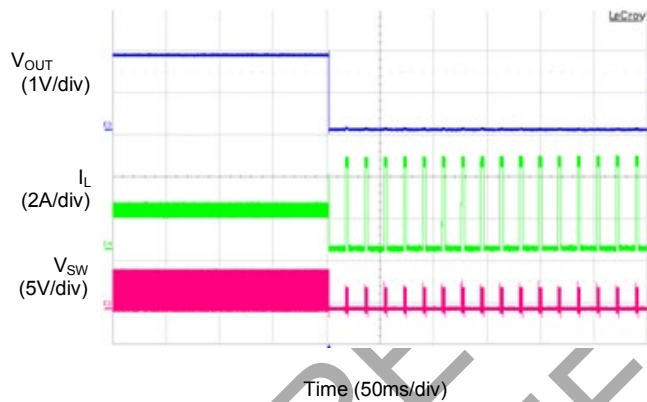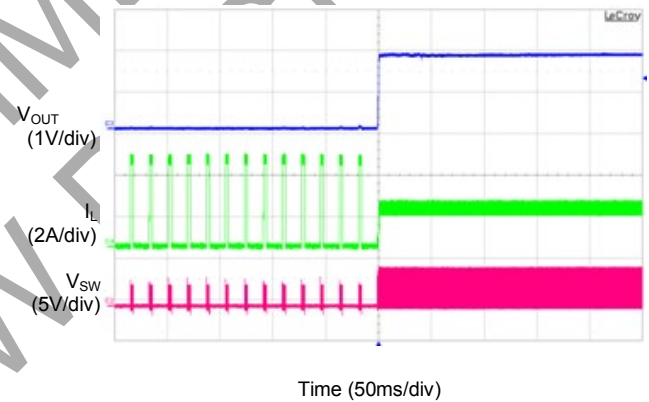
Load Transient (I_{OUT}=0.1A to 2A)

V_{OUT_AC} (100mV/div)
I_{OUT} (1A/div)

Time (100µs/div)
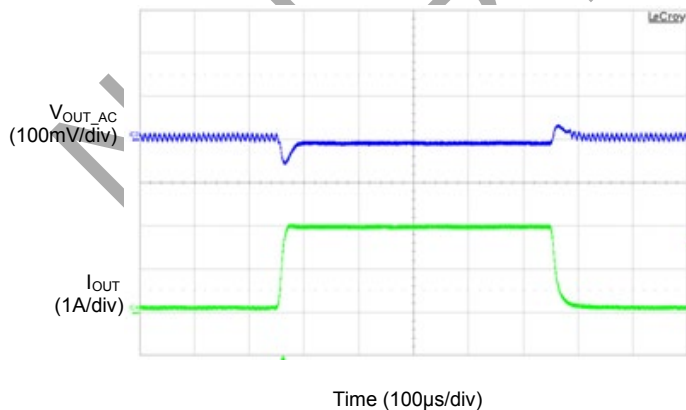
Load Transient (I_{OUT}=1A to 2A)

V_{OUT_AC} (100mV/div)
I_{OUT} (1A/div)

Time (100µs/div)

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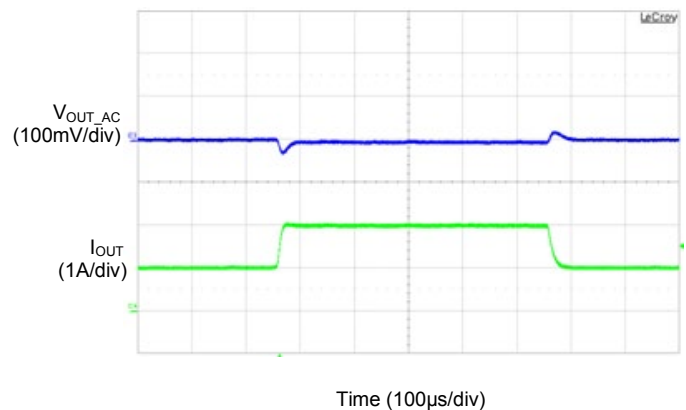
Application Information

Typical application circuit is shown in the application circuit and for the circuit parameters setting please refers to the following descriptions.

Under Voltage Lockout (UVLO) Circuit

The AP3429/A provides an under voltage lockout circuit to prevent it from undefined status. When the V_{IN} drops lower than the UVLO detector threshold, the UVLO circuit starts to operate, V_{REF} stops, and high-side and low-side built-in switch transistors turn "OFF". As a result, V_{OUT} drops according to the COUT capacitance value and the load. When the V_{IN} is rising higher than UVLO released voltage, the IC will restart the operation.

Over Current Protection

The AP3429/A has internal over current protection function to protect from catastrophic failures. The IC can monitor the PMOS current, if the peak current is higher than the current limit threshold, OCP function will be triggered and enter cycle by cycle current limit mode. If V_{FB} drops under 0.3V for example, output node shorted to GND, AP3429 will enter latch off mode. IC will turn off both power switches. It will remain latch off state until the V_{IN} or Enable recycled to release it. AP3429A will enter hiccup mode to protect itself, if short circuit is removed, and V_{FB} rises over 0.3V, the AP3429A recovers to normal operation again.

Over Voltage Protection

The AP3429 has internal output OVP circuits. When V_{OUT} is exceeds 120% of the regulation level for more than 40µs, the power switching will be turned off. IC enter latch off mode and will restart until V_{IN} or Enable voltage recycled.
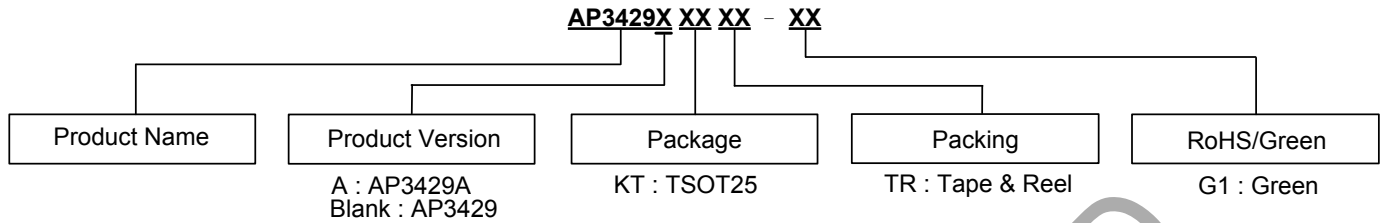
Over Temperature Protection

The internal thermal temperature protection circuitry of AP3429/A is provided to protect the integrated circuit in the event that the maximum junction temperature is exceeded. When the junction temperature exceeds +160°C, it shuts down the internal control circuit and switching power MOSFET. The AP3429/A will restart automatically under the control of soft start circuit when the junction temperature decreases to +130°C.

Input Over Voltage Protection

When input voltage of AP3429/A is near 6.25V, the IC will enter Input-Over-Voltage-Protection. It would be shut down and there will be no output voltage in this state. As the input voltage goes down below 6V, it will leave input OVP and recover the output voltage.

AP3429/A
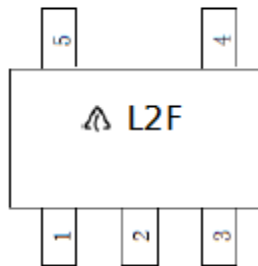Document number: DS36561 Rev. 4 - 3

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Ordering Information

AP3429X XX XX – XX

Product Name	Product Version	Package	Packing	RoHS/Green
	A : AP3429A Blank : AP3429	KT : TSOT25	TR : Tape & Reel	G1 : Green

Package	Temperature Range	Part Number	Marking ID	Packing	Status
TSOT25	-40 to +85°C	AP3429AKTTR-G1	L2E	3000/Tape & Reel	NRND
		AP3429KTTR-G1	L2F	3000/Tape & Reel	NRND

Marking Information

AP3429

(Top View)

First Line: Logo and Marking ID

AP3429A

(Top View)

First Line: Logo and Marking ID

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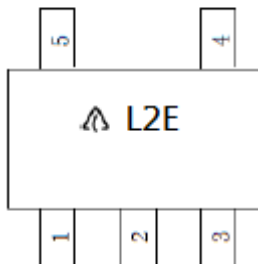
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Package Outline Dimensions

Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.

(1)   Package Type: TSOT25
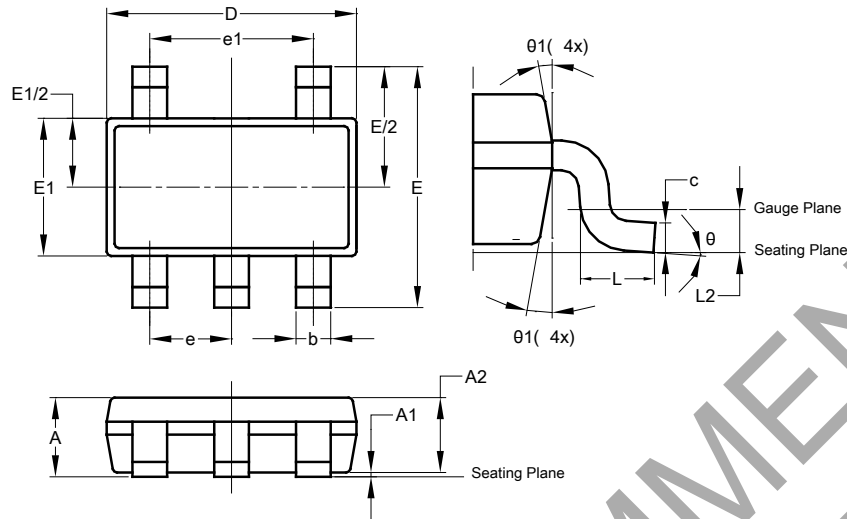
TSOT25			
Dim	**Min**	**Max**	**Typ**
A	-	1.00	-
A1	0.01	0.10	-
A2	0.84	0.90	-
b	0.30	0.45	-
c	0.12	0.20	-
D	-	-	2.90
E	-	-	2.80
E1	-	-	1.60
e	0.95 BSC		
e1	1.90 BSC		
L	0.30	0.50	
L2	0.25 BSC		
θ	0°	8°	4°
θ1	4°	12°	-
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

(1)   Package Type: TSOT25
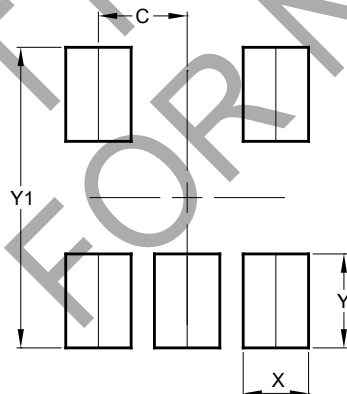
Dimensions	Value (in mm)
C	0.950
X	0.700
Y	1.000
Y1	3.199

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