THE DATASHEET OF

AP2318AMP-ADJTRG1

Description

The AP2318A is a series of ultra low dropout regulators optimized for low voltage applications where transient response and minimum input voltage are critical.

The AP2318A provides current limit and thermal shutdown function. Its circuit includes a trimmed bandgap reference to assure output voltage accuracy to be within ±1.5%. On-chip thermal shutdown provides protection against any combination of overload and ambient temperatures that would cause excessive junction temperatures.

The AP2318A has adjustable version, which can set the output voltage through two external resistors.

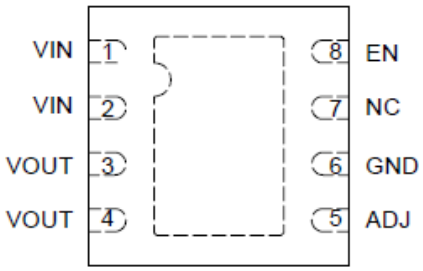
The AP2318A is available in the standard DFN-3x3-8 and PSOP-8 packages.

Features

- Wide Operating Voltage Ranges: 2.5V to 12V
- Output Voltage Accuracy: ±1.5%
- On-chip Thermal Shutdown
- ESD Rating
  - 3000V (Human Body Model)
  - 600V (Machine Model)
- Operating Junction Temperature: -40°C to +125°C

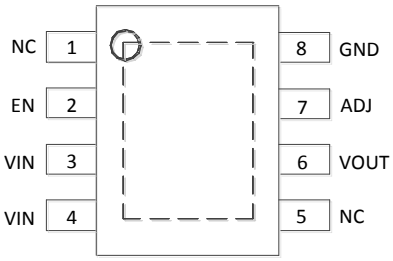
Pin Assignments

(Top View)



DFN-3x3-8

(Top View)

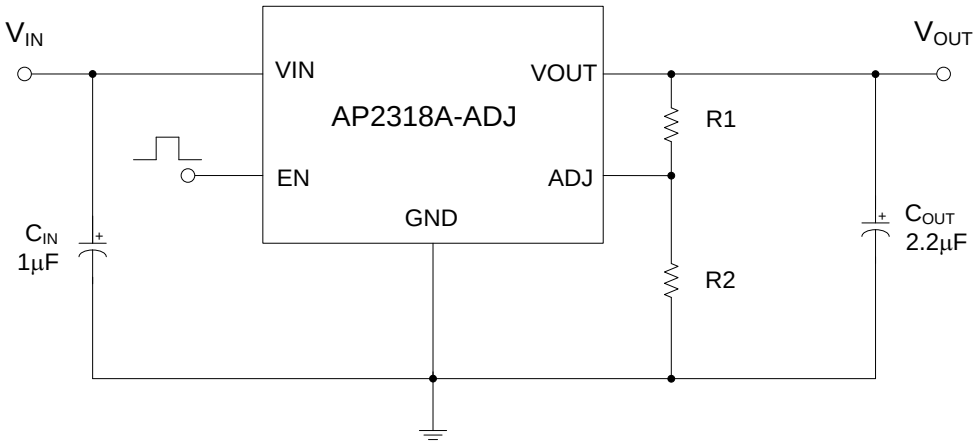


PSOP-8

Applications

- Notebook
- USB Device
- Add-on Card
- DVD Player
- PC Motherboard

Typical Applications Circuit

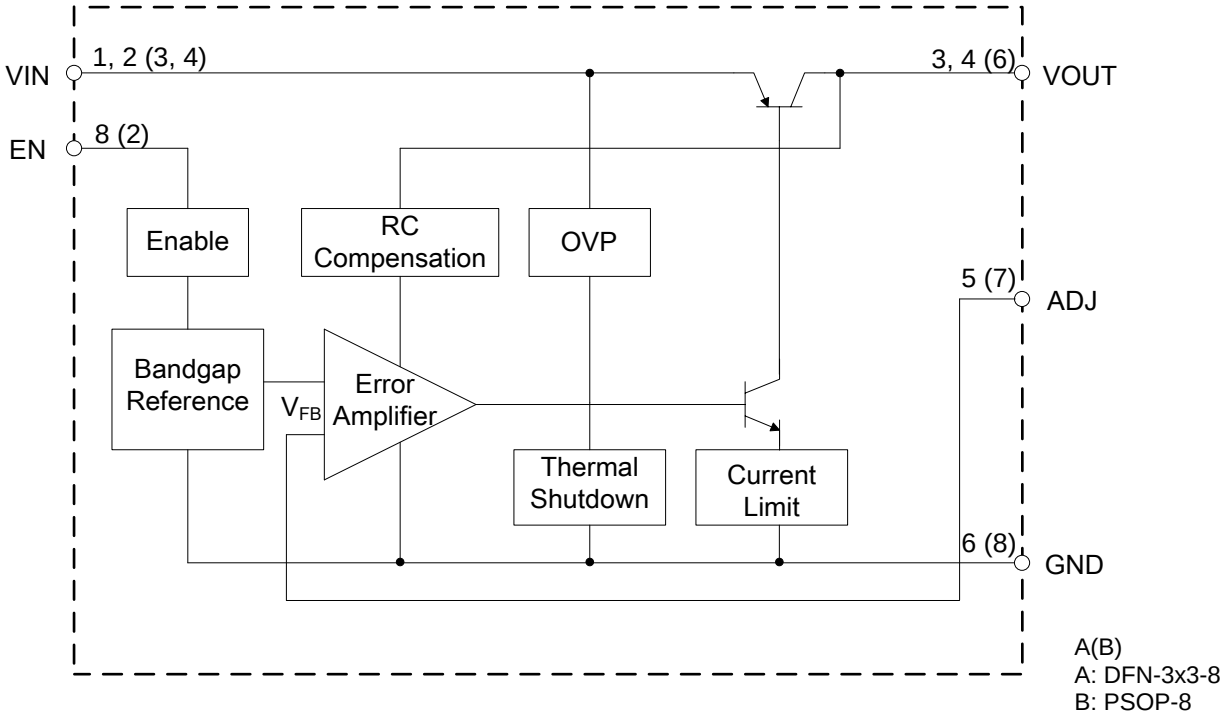


ADJ Version, V_{OUT} = 1.25*(R1+R2)/R2

Pin Description

Pin Number		Pin Name	Function
DFN-3x3-8	PSOP-8		
1, 2	3, 4	VIN	Input Voltage
3, 4	6	VOUT	Output Voltage
5	7	ADJ	Adjustable Voltage
6	8	GND	Ground
7	1, 5	NC	No Connection
8	2	EN	On/Off Control

Functional Block Diagram



Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Rating		Unit
V_{IN}	Input Voltage	15		V
T_J	Operating Junction Temperature	+150		°C
T_{STG}	Storage Temperature Range	-65 to +150		°C
T_{LEAD}	Lead Temperature (Soldering, 10sec)	+260		°C
θ_{JA}	Thermal Resistance (Junction to Ambient) (Note 2)	DFN-3x3-8	120	°C/W
		PSOP-8	108	
ESD	ESD (Human Body Model)	3000		V
ESD	ESD (Machine Model)	600		V

Notes:
1. 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.
2. Absolute maximum ratings indicate limits beyond which damage to the component may occur. Electrical specifications do not apply when operating the device outside of its operating ratings. The maximum allowable power dissipation is a function of the maximum junction temperature, $T_J(Max)$, the junction-to-ambient thermal resistance, θ_{JA}, and the ambient temperature, T_A. The maximum allowable power dissipation at any ambient temperature is calculated using: $P_D(Max) = (T_J(Max)-T_A)/\theta_{JA}$. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{IN}	Input Voltage	2.5	12	V
V_{EN}	Enable Voltage	—	12	V
T_J	Operating Junction Temperature Range	-40	+125	℃

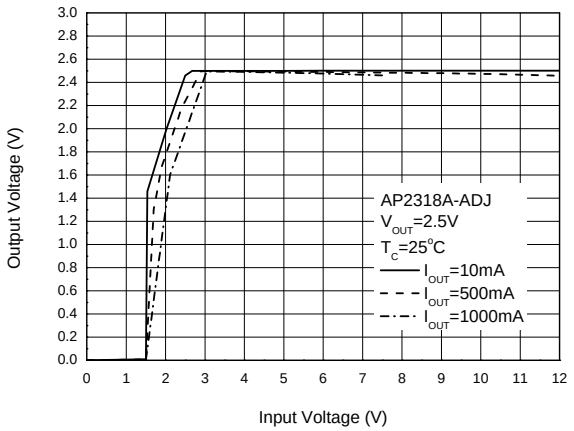
Electrical Characteristics

(Operating Conditions: 2.5V ≤ V_{IN} ≤ 12V, C_{IN} = 1μF, C_{OUT} = 2.2μF, T_J = +25°C, unless otherwise specified. (P ≤ Maximum Power Dissipation). Limits appearing in **Boldface** type apply over the entire junction temperature range for operation of -40°C to +125°C.)

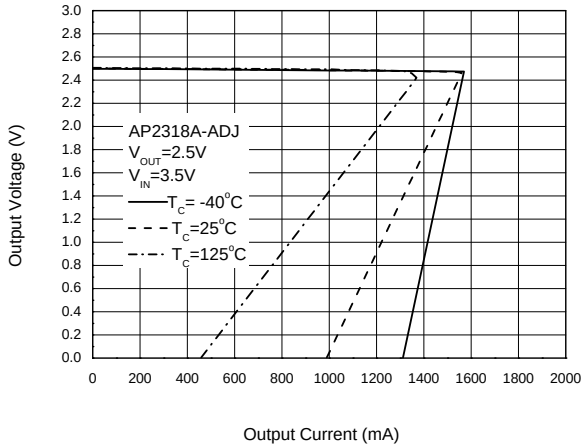
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{REF}	Reference Voltage	AP2318A-ADJ, I_{OUT} = 10mA, V_{IN}-V_{OUT} = 2V, T_J = +25°C, 10mA ≤ I_{OUT} ≤ 1A, V_{OUT}+2V ≤ V_{IN} ≤ 12V	1.231 **1.225**	1.250 **1.250**	1.269 **1.275**	V
I_{OUT}(Max)	Maximum Output Current	V_{IN}-V_{OUT} = 2V	1.2	1.5	—	A
V_{RLINE}	Line Regulation	AP2318A-ADJ I_{OUT} = 10mA, V_{OUT}+2V ≤ V_{IN} ≤ 12V	—	1	**6**	mV
		I_{OUT} = 10mA, 2.5V ≤ V_{IN} ≤ 12V	—	1	**6**	mV
V_{RLOAD}	Load Regulation	AP2318A-ADJ V_{IN} = V_{OUT}+2V, 10mA ≤ I_{OUT} ≤ 1A	—	1	**15**	mV
		V_{IN} = 2.5V, 10mA ≤ I_{OUT} ≤ 1A	—	1	**15**	mV
V_{DROP}	Dropout Voltage	ΔV_{OUT} (ΔV_{REF}) = 1%, V_{OUT} > 2V, I_{OUT} = 1A	—	0.5	—	V
I_{ADJ}	Adjust Pin Current	—	—	0.05	**1**	μA
I_{LOAD}(Min)	Minimum Load Current	V_{OUT}+2V ≤ V_{IN} ≤ 12V (ADJ only)	—	**1.7**	**5**	mA
I_Q	Quiescent Current	V_{IN} = V_{OUT}+2V, I_{OUT} = 0mA	—	250	—	μA
V_{NOI}	RMS Output Noise (% of V_{OUT})	T_A = +25°C, 10Hz ≤ f ≤ 20kHz	—	0.003	—	%
—	Thermal Shutdown Temperature	—	—	+150	—	°C
—	Thermal Shutdown Hysteresis	—	—	+25	—	°C
V_{EN}	Enable Input Voltage	Enable Logic Low	—	—	**0.8**	V
		Enable Logic High	2.25	—	—	
I_{EN}	Enable Input Current	V_{EN} = 2.25V	—	5	—	μA
		V_{EN} = 0.8V	—	—	4	μA
θ_{JC}	Thermal Resistance (Junction to Case)	DFN-3x3-8	—	15	—	°C/W
		PSOP-8	—	12	—	

Performance Characteristics

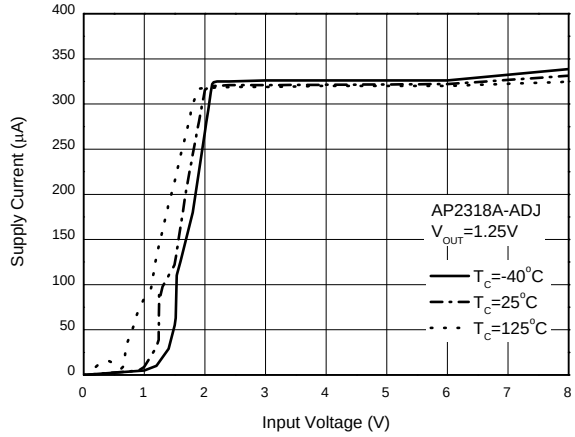
Output Voltage vs. Input Voltage



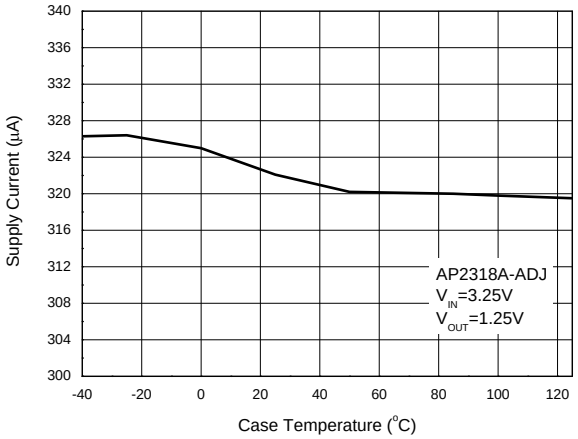
Output Voltage vs. Output Current



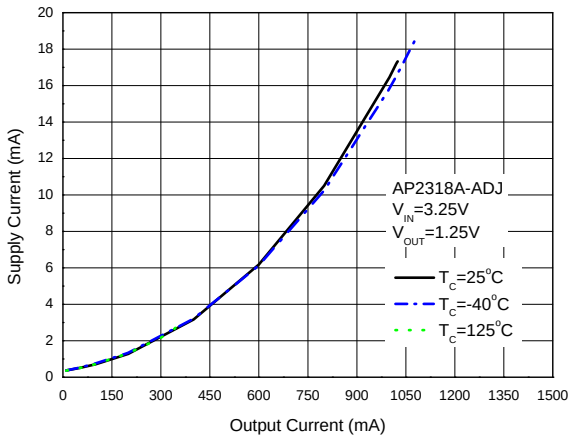
Supply Current vs. Input Voltage



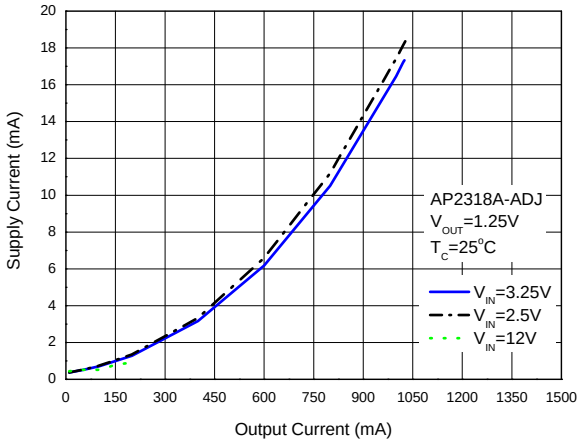
Supply Current vs. Case Temperature



Supply Current vs. Output Current

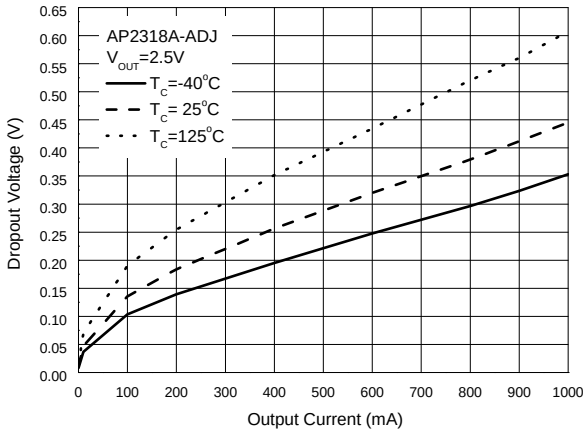


Supply Current vs. Output Current

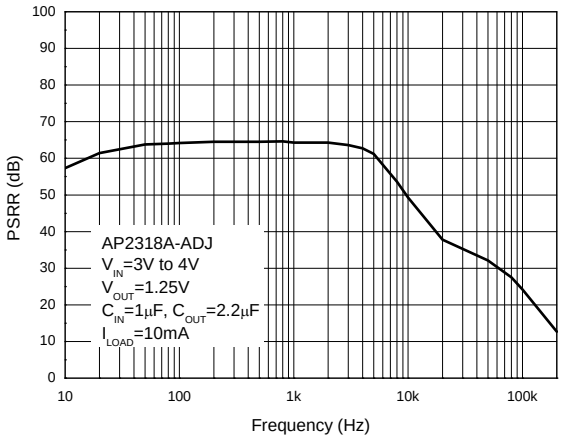


Performance Characteristics (Cont.)

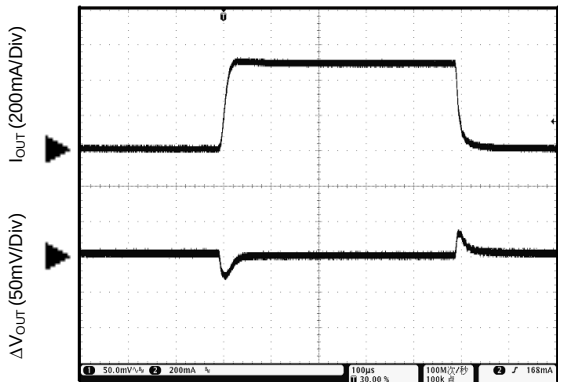
Dropout Voltage vs. Output Current



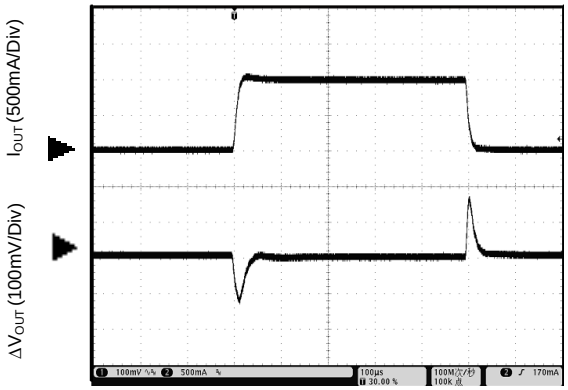
PSRR vs. Frequency



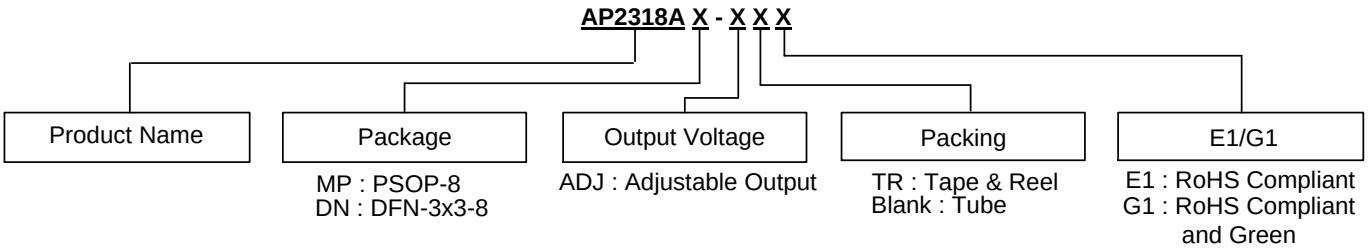
Load Transient Response
(Conditions: V_{IN} = 2.5V, V_{OUT} = 1.25V, I_{OUT} =1 to 500mA)
C_{IN} = 1μF, C_{OUT} = 2.2μF)



Load Transient Response
(Conditions: V_{IN} = 2.5V, V_{OUT} = 1.8V, I_{OUT} =1mA to 1A)
C_{IN} = 1μF, C_{OUT} = 2.2μF)



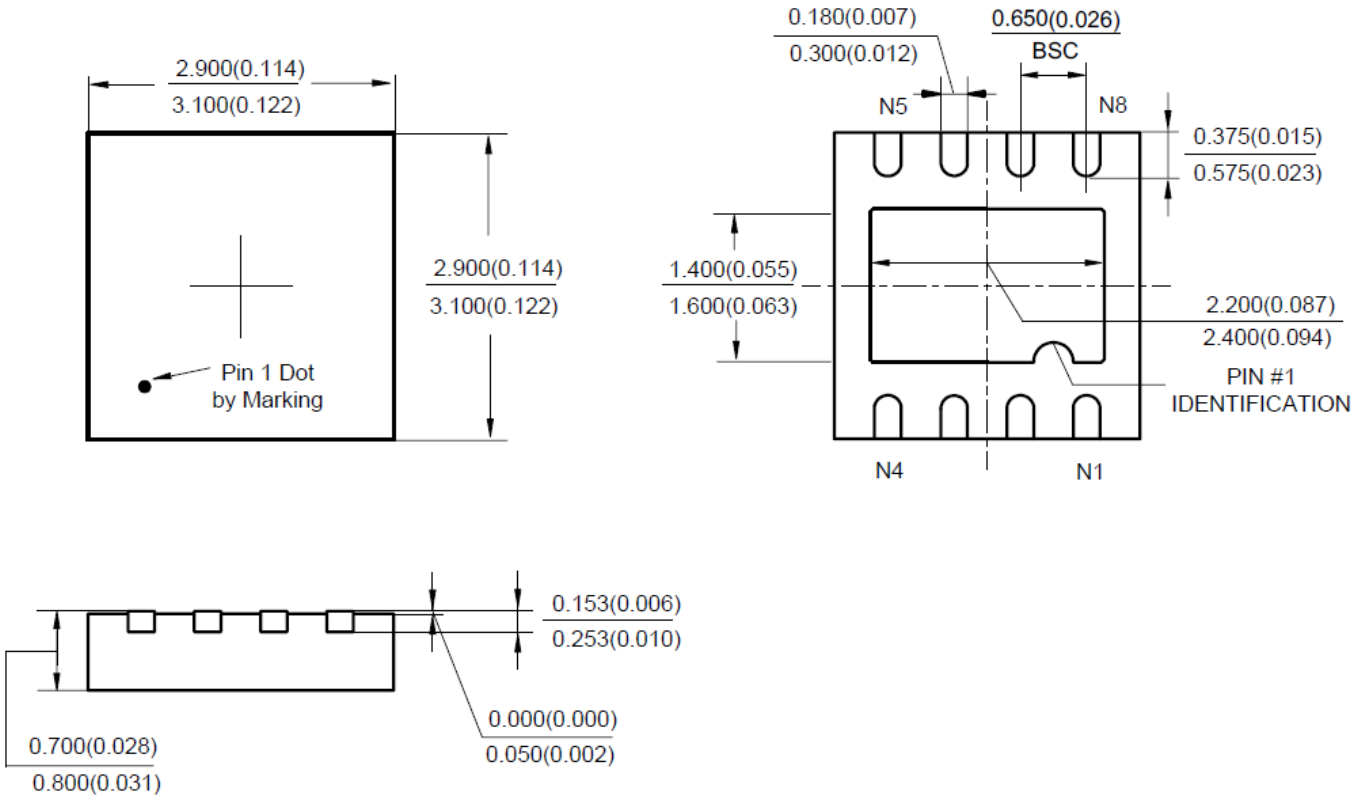
Ordering Information



Package	Temperature Range	Part Number	Marking ID	Packing
DFN-3x3-8	-40 to +125°C	AP2318ADN-ADJTRG1	B7B	Tube
PSOP-8	-40 to +125°C	AP2318AMP-ADJE1	2318A-ADJE1	Tube
		AP2318AMP-ADJG1	2318A-ADJG1	Tube
		AP2318AMP-ADJTRE1	2318A-ADJE1	Tape & Reel
		AP2318AMP-ADJTRG1	2318A-ADJG1	Tape & Reel

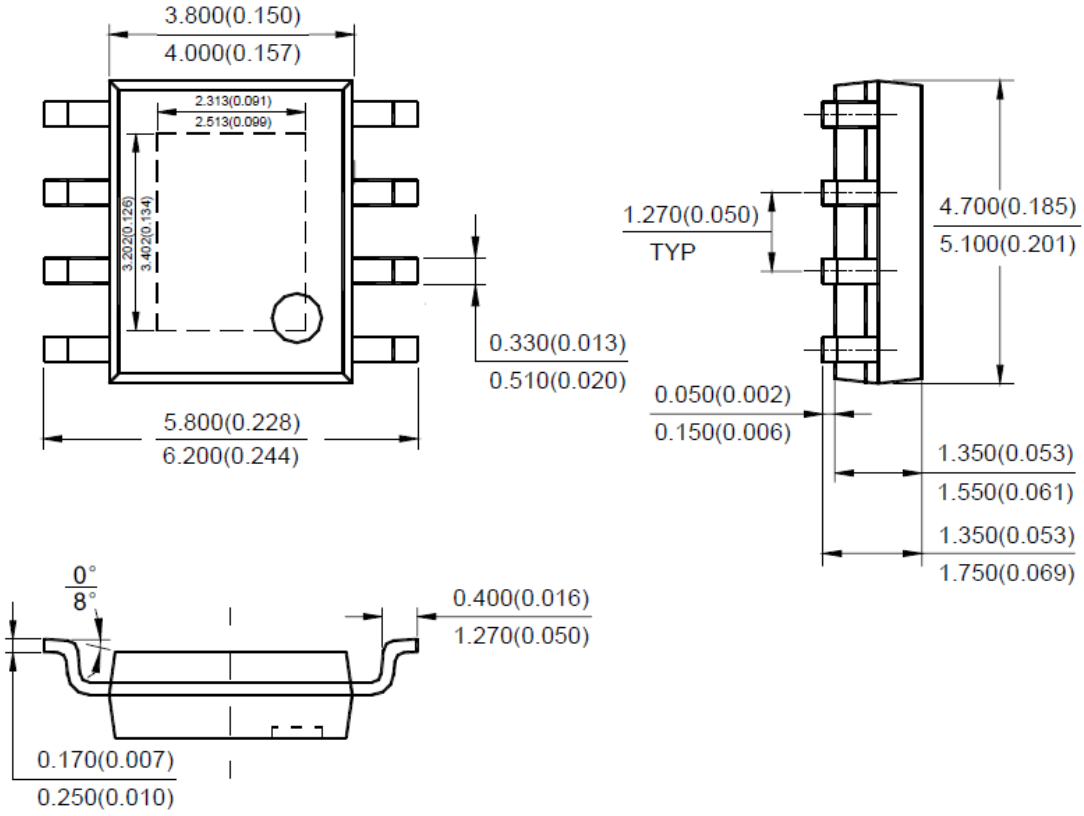
Package Outline Dimensions (All dimensions in mm(inch).)

(1) Package Type: DFN-3x3-8



Package Outline Dimensions (Cont. All dimensions in mm(inch).)

(2) Package Type: PSOP-8



Note: Eject hole, oriented hole and mold mark is optional.

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