PJ20301 Datasheet

5.5V, 3A, Ultra Low Dropout And Low Iq LDO In DFN3x3-10 and PSOP-8 Package

Version：Rev.1.0

Release Date：2025-10-23

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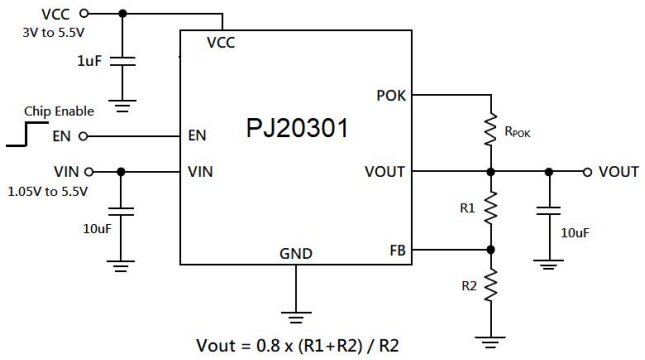
General Description

The PJ20301 is a 3 A low dropout linear regulator designed for low dropout and high current applications. This device works with dual supplies, a control input for the control circuitry and a power input as low as 1.0 V for providing current to output. It features 3 A output current and ultra-low-drop output voltage as well as full protection functions. V_{OUT} can be as low as 0.8V. The other features include soft start, under voltage protection, current limit protection, Power-On-Reset function, and over temperature protection. The PJ20301 is available in DFN3x3-10 and PSOP-8 packages.

Features

- Operating input voltage range : 1.0 V to 6.0 V
- Output voltage is Adjustable from 0.8 V (Min.)
- Maximum Output current : 3 A
- Dropout voltage : 250 mV at I_{OUT} = 3 A (Typ.)
- Output voltage tolerance : ±1.5 %
- Excellent Line Regulation (0.01 %/V typ.)
- Excellent Load Regulation (0.1 %/A typ.)
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limit
- V_{OUT} Under Voltage Protection
- Ceramic Capacitor Stable
- Available in DFN3x3-10, PSOP-8 packages
- These devices are Pb−Free, halogen Free/BFR free, and are RoHS compliant

Simplified Schematic



Applications

- Notebook, Netbook, Graphic Cards
- Low Voltage Logic Supplies
- Chipset Supplies
- Server System
- SMPS Post Regulators

Ordering Information

Ordering Information

Order number	Marking ID	Package	Description
PJ20301QW	A1 YM DNN	DFN3x3-10	Halogen free RoHS compliant in T/R, 3,000 pcs/Reel
PJ20301PP	PJ20301 PPYMDNN	PSOP-8	Halogen free RoHS compliant in T/R, 4,000 pcs/Reel

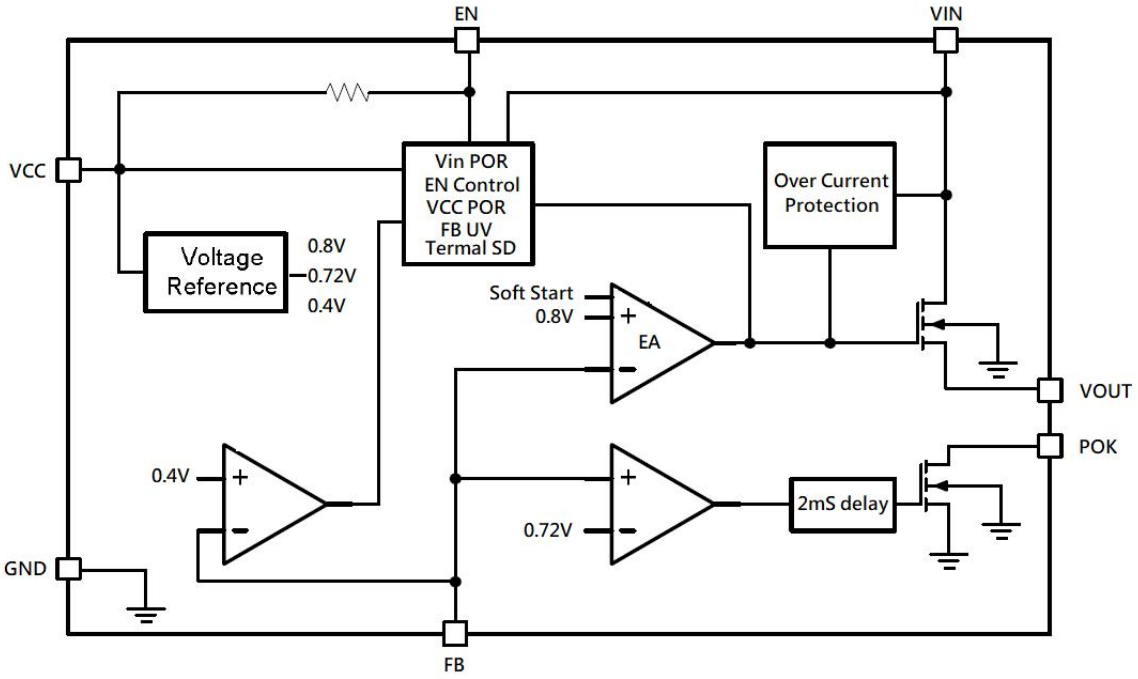
Note:

(1) Panjit can meet RoHS 2.0/REACH requirement. So most package types Panjit offers only states halogen free, instead of lead free.

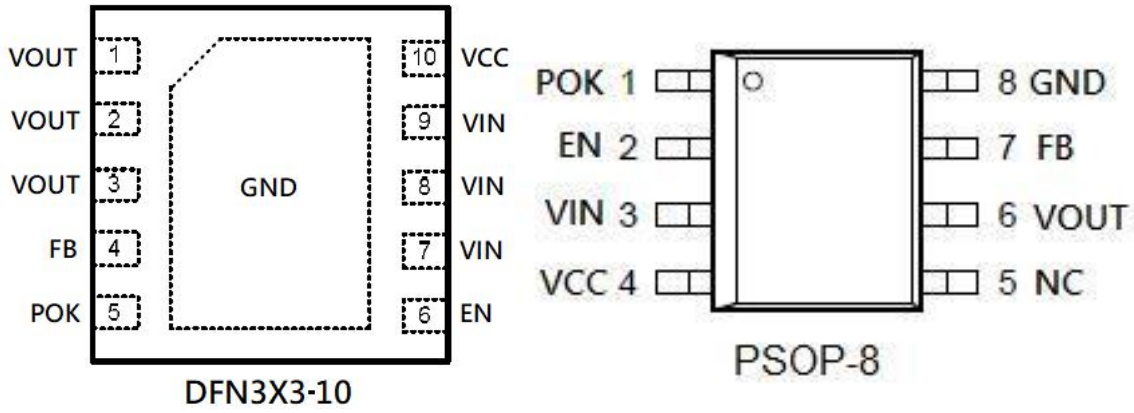
Marking Information

Marking	Package	Definition
A1 YM DNN	DFN3x3-10	A1: Product code Y: Year code M: Month code D: Day code NN: Serial No.
PJ20301 PPYMDNN	PSOP-8	PJ20301: Product code PP: Package code Y: Year code M: Month code D: Day code NN: Serial No.

Function Block Diagram



Pin Configuration



Pin Assignment (Top View)

Pin Description

Terminal			I/O(1)	Description
Name	PIN No. DFN3X3-10	PIN No. PSOP-8		
POK	5	1	O	Power OK indication, open drain output
FB	4	7	I	Feedback
VOUT	1, 2, 3	6	O	Output Voltage pin, the Source of power device
VIN	7, 8, 9	3	P	Input Voltage pin, the Drain of power device
EN	6	2	I	Enable pin. Internal pull high to VCC
VCC	10	4	I	Supply input of control circuit
GND	11 (Exposed PAD)	8 & (Exposed PAD)	G	Ground
NC	-	5	-	No Connect

(1) I – Input; O – Output; P – Power; G – Ground

Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted) (1)

Parameter		Min	Max	Units
Voltage range at terminals(2)	VIN, VCC	-0.3	6.5	V
	Other Pins	-0.3	V_{CC}+0.3	V
I_{OUT}	Output Current	3		A
P_D	Power Dissipation, T_A = 25°C, PSOP-8	1.9		W
P_D	Power Dissipation, T_A = 25°C, DFN3x3-10	1.85		W
$I_{OUT(PK)}$	VOUT Peak Current (< 30 µs)	6.2		A
T_L	Lead temperature range	300		°C
T_J(2)	Operating junction temperature range	-40	125	°C
T_{STG}	Storage temperature range	-65	150	°C

(1) 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 under recommended operating conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) Operating at junction temperatures greater than 125°C, although possible, degrades the lifetime of the device.

Handling Ratings

Parameter	Definition	Min	Max	Units
ESD(1)	Human Body Model (HBM) ESD stress voltage(2)	-2	2	kV
	Charged Device Model (CDM) ESD stress voltage(3), all pins	-500	500	V

(1) Electrostatic discharge (ESD) to measure device sensitivity and immunity to damage caused by assembly line electrostatic discharges into the device.

(2) Level listed above is the passing level per ANSI, ESDA, and JEDEC JS-001. JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(3) Level listed above is the passing level per EIA-JEDEC JESD22-C101. JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

Recommended Operating Conditions

Symbol	Parameter	Min	Typ	Max	Units
V_{IN}	Input voltage range	1.05		V_{CC}	V
V_{CC}	Control Voltage	3.0		5.5	V
T_J	Operating junction temperature	-40		125	°C

Electrical Characteristics

V_{CC} = 5 V, C_{IN} = C_{OUT} = 10 µF, C_{VCC} = 1 uF. Typical value is tested at T_A = +25°C, unless otherwise noted.

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_{CC}	Control input voltage	V_{OUT} = V_{REF}	3.0		6.0	V
V_{CC_POR}	POR threshold voltage		2.2		2.9	V
$V_{CC\_POR\_HY}$	POR hysteresis voltage			0.4		V
V_{IN}	Input voltage	V_{OUT} = V_{REF}	1.05		V_{CC}	V
V_{IN_POR}	POR threshold voltage		0.8		1.0	V
$V_{IN\_POR\_HY}$	POR hysteresis voltage			0.35		V
T_{DEG}	POR deglitch time			100		uS
I_{VCCSD}	Control input current in shutdown	V_{IN} = V_{CC} = 5 V, V_{EN} = 0 V		10	30	uA
I_Q	Quiescent current	V_{IN} = V_{CC} = V_{EN} = 5 V, I_{OUT} = 0 A		0.9	1.5	mA
V_{REF}	Reference voltage	V_{IN} = V_{CC} = V_{EN} = 5 V, I_{OUT} = 0 A, V_{OUT} = V_{REF}	0.785	0.8	0.815	V
$V_{REFLINE}$	Line regulation	1.05 V < V_{IN} < 5 V, V_{CC} = V_{EN} = 5 V		0.01	0.1	%/V
$V_{REFLOAD}$	Load regulation	0 A < I_{OUT} < 3 A, V_{CC} = V_{EN} = 5 V		0.1	0.5	%/A
V_{DROP}	Dropout voltage	I_{OUT} = 3 A, V_{CC} = 5 V, V_{OUT} = 1.2 V		250	360	mV
R_{PULL}	V_{OUT} pull low resistance	V_{CC} = 5 V, V_{EN} = 0 V, Sink = 5 mA			150	Ohm
V_{IH}	EN pin threshold voltage	EN logic high voltage	1.1			V
V_{IL}		EN logic low voltage			0.3	V
I_{EN}	Enable source current	V_{CC} = 5 V, V_{EN} = 0 V		5	10	uA
R_{EN}	EN pull-high resistor		500			kΩ
T_{SS}	Output voltage ramp-up time		0.6	1	2	mS
V_{POK_H}	POK Threshold	V_{FB} rising		92		%
V_{POK_L}	POK Threshold	V_{FB} falling		82		%
V_{POK_SINK}	POK sink voltage	Sinking current = 5 mA			0.4	V
t_{POK_DELAY}	POL delay time	From V_{OUT} > 92% to POK rising	1	2	4	mS
I_{OCP}	OCP threshold level		3.2	4.5		A
V_{UVP}	Under voltage threshold	V_{FB} Falling		0.15		V
T_{SD}	Thermal shutdown threshold			165		°C
T_{SD_HYS}	Thermal shutdown hysteresis			30		°C

Note:

(1) It is not recommended to use at 125°C without load.

Typical Performance Characteristic

V_{IN} = 5 V, V_{CC} = 5 V, V_{OUT} = 0.8 V, C_{IN} = 10 uF, C_{OUT} = 10 uF, T_A = 25°C, unless otherwise specified.

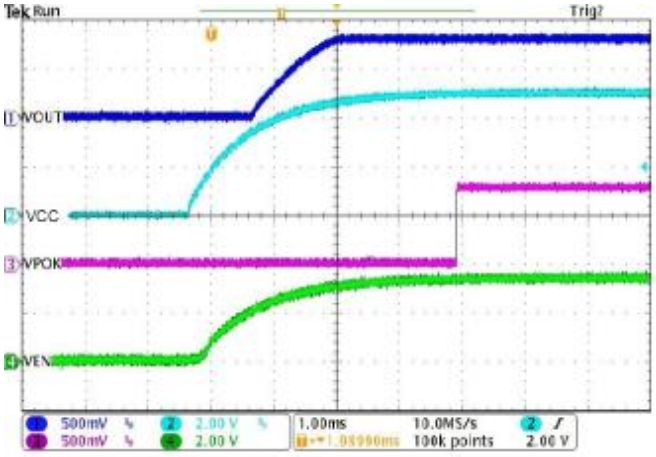


Figure-1. V_{CC} Power ON, I_{OUT} = 200 mA

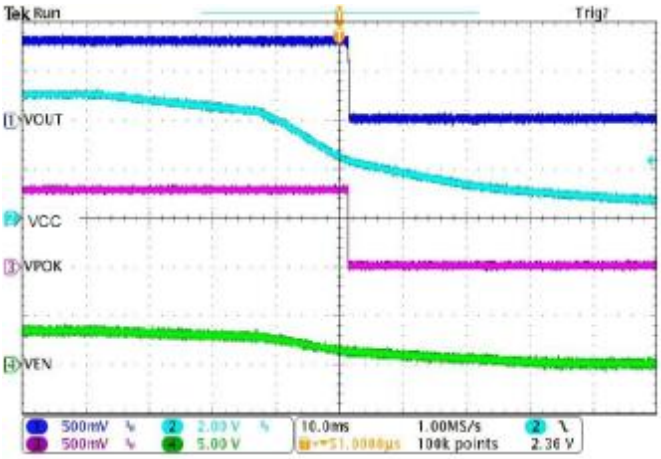


Figure-2. V_{CC} Power OFF, I_{OUT} = 200 mA

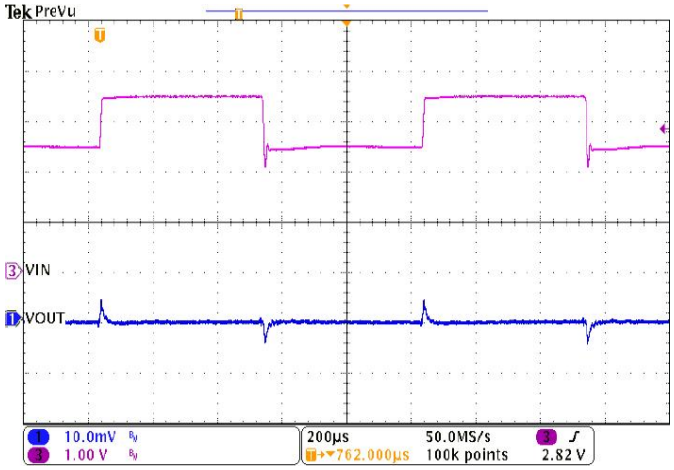


Figure-3. Line Transient, V_{IN} = 2.5 V to 3.5 V

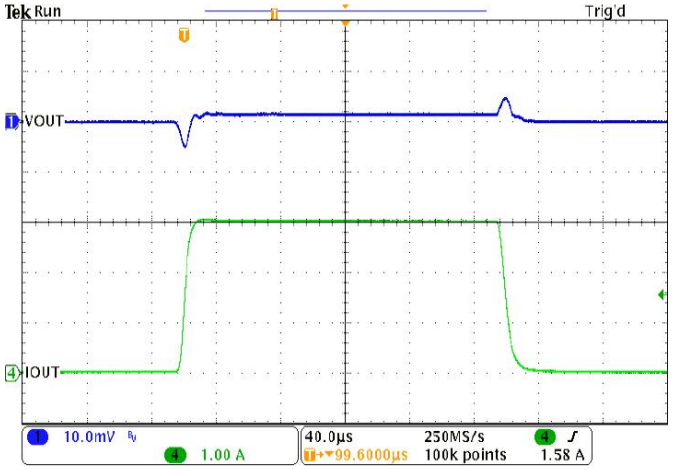


Figure-4. Load Transient, I_{OUT} = 0 A to 3 A

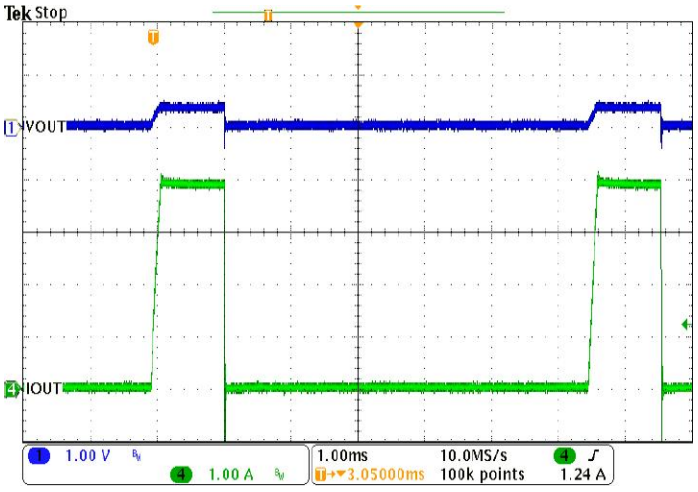


Figure-5. V_{OUT} Short circuit

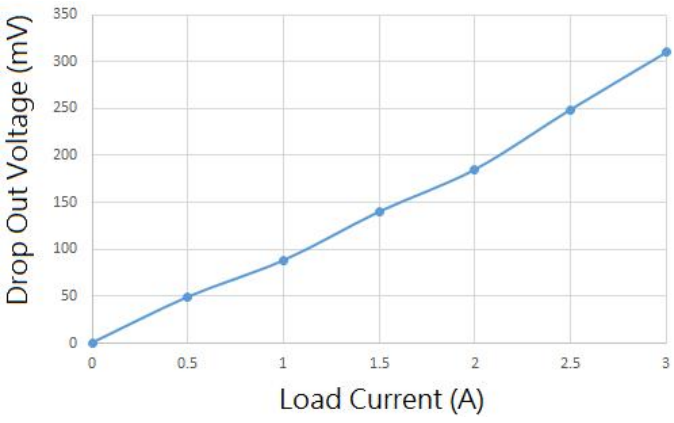


Figure-6. V_{DROP} vs Output Current

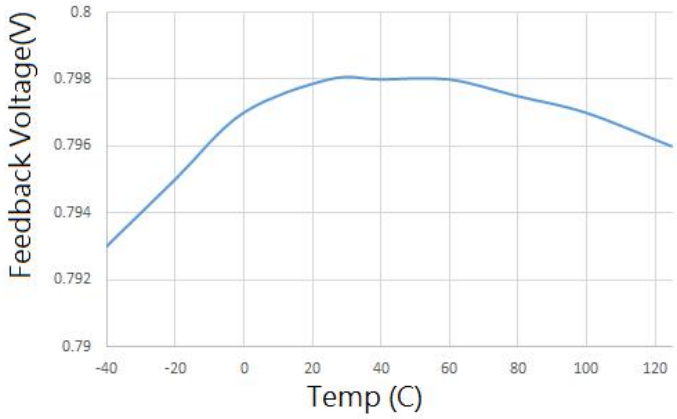


Figure-7. V_{FB} Voltage vs Temperature

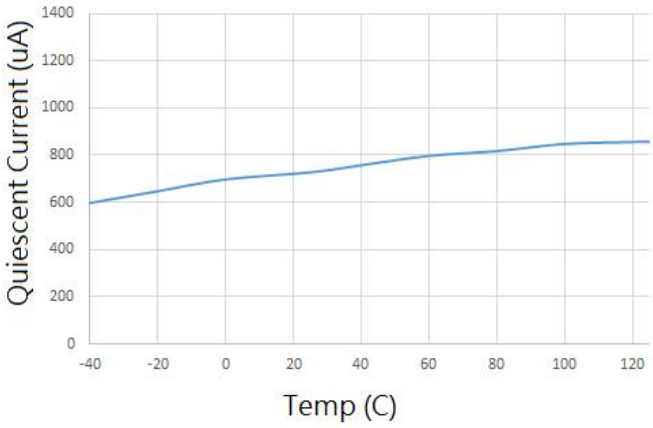
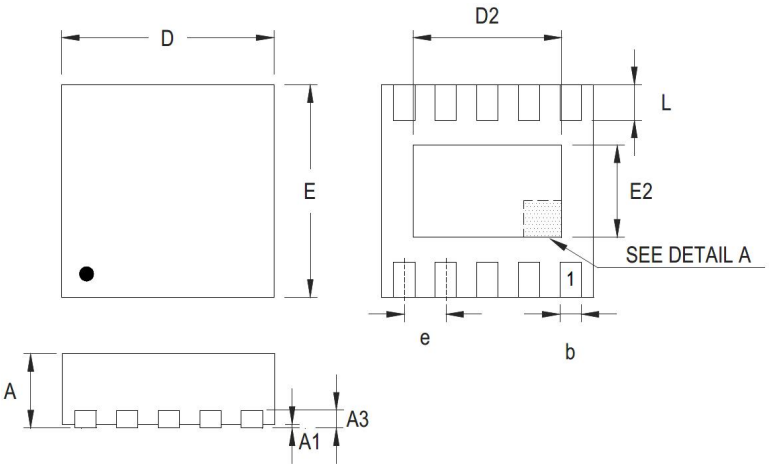
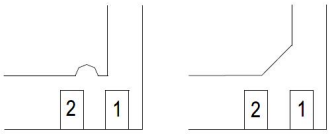


Figure-8. Quiescent Current vs Temperature

Package Dimension – DFN3X3-10





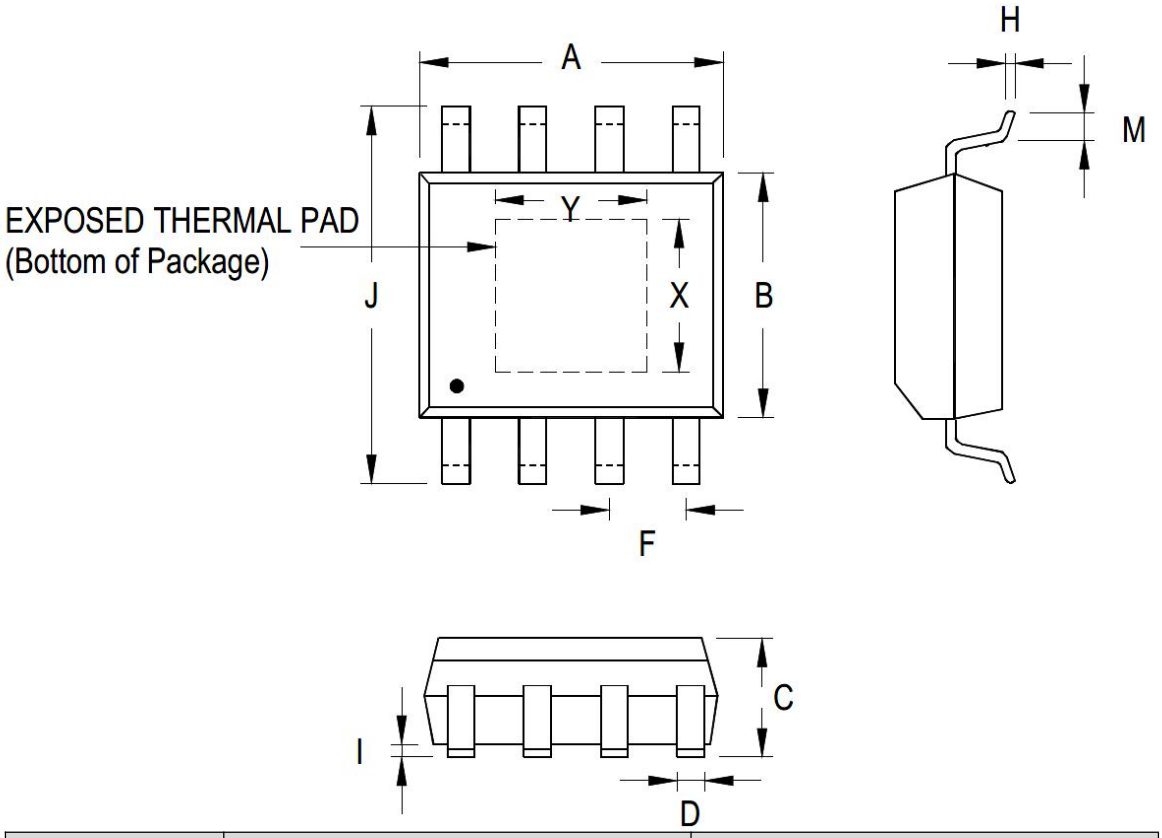
DETAIL A

Pin #1 ID and Tie Bar Mark Options

Note : The configuration of the Pin #1 identifier is optional, but must be located within the zone indicated.

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.175	0.250	0.007	0.010
b	0.180	0.300	0.007	0.012
D	2.950	3.050	0.116	0.120
D2	2.300	2.650	0.091	0.104
E	2.950	3.050	0.116	0.120
E2	1.500	1.750	0.059	0.069
e	0.500		0.020	
L	0.350	0.450	0.014	0.018

Package Dimension – PSOP-8



Symbol		Dimensions In Millimeters		Dimensions In Inches	
		Min	Max	Min	Max
A		4.801	5.004	0.189	0.197
B		3.810	4.000	0.150	0.157
C		1.346	1.753	0.053	0.069
D		0.330	0.510	0.013	0.020
F		1.194	1.346	0.047	0.053
H		0.170	0.254	0.007	0.010
1		0.000	0.152	0.000	0.006
J		5.791	6.200	0.228	0.244
M		0.406	1.270	0.016	0.050
Option 1	X	2.000	2.300	0.079	0.091
	Y	2.000	2.300	0.079	0.091
Option 2	X	2.100	2.500	0.083	0.098
	Y	3.000	3.500	0.118	0.138

Version History

Version	Date	Changes
Rev.1.0	2025-10-23	Initial release

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