



24V 500mA Ultralow-Quiescent-Current LDO

General Description

The VD8202 ultra-low quiescent current regulator features low dropout voltage and low current in the standby mode. With less than 1.5 μ A quiescent current at no load, the VD8202 is ideally suited for standby micro-control-unit systems, especially for always-on applications like E-meters, fire alarms, smoke detectors and other battery operated systems. The VD8202 retains all of the features that are common to low dropout regulators including a low dropout PMOS pass device, short circuit protection, and thermal shutdown.

The VD8202 has a 24-V maximum operating voltage limit, a -40°C to 125°C operating temperature range, and $\pm 2\%$ output voltage tolerance over the entire output current, input voltage, and temperature range. The VD8202 is available in a SOT233 and SOT893, ESOP8 surface mount packages.

Ordering Information

Part Number	Voltage
VD8202_15	Vout=1.5V
VD8202_18	Vout=1.8V
VD8202_25	Vout=2.5V
VD8202_33	Vout=3.3V
VD8202_50	Vout=5.0V
VD8202_XX	Vout can trim from 1.5V to 5.5V, 0.1V/step

Features

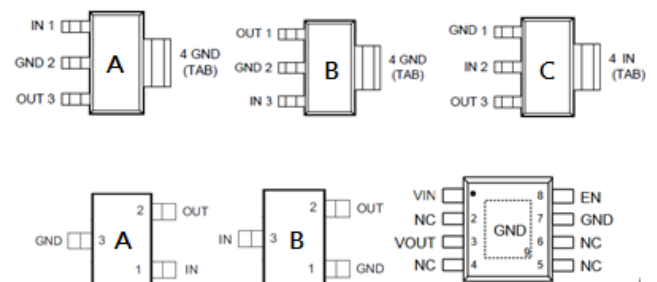
- VIN Range up to 24V
- Output Voltage Tolerances of $\pm 2\%$ Over the Temperature Range
- Output Current of 500 mA

- Ultra Low Quiescent Current ($I_Q = 1.5 \mu A$)
- Dropout Voltage Typically 2400 mV at $I_{OUT} = 500 \text{ mA}$
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limit
- Ceramic Capacitor Stable

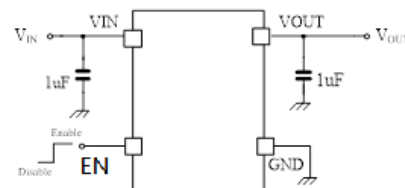
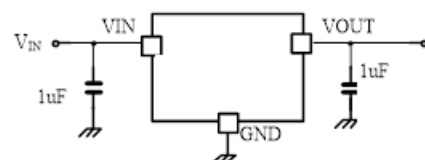
Applications

- E-meters, Water Meters and Gas Meters
- Fire Alarm, Smoke Detector
- Appliances and White Goods

Pin Configuration



Typical Application Circuit

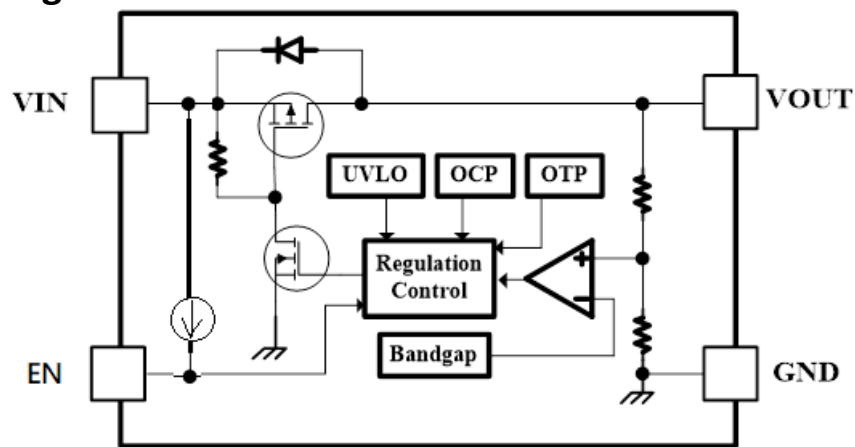




Pin Assignment

Pin Name	Pin No. TO92	Pin No. SOT235	Pin No. SOT223 SOT893	Pin No. SOT223 SOT893	Pin No. SOT233	Pin No. SOT233	Pin No. PSOP8	Pin Function
VOUT	1	5	3	3	2	2	3	Output Voltage Pin
GND	2	2	2,4	1	3	1	7,9	Ground
VIN	3	1	1	2,4	1	3	1	Input Voltage pin.
EN	--	3	--	--	--	--	8	Enable

Function Block Diagram



**Absolute Maximum Ratings** (Note1)

- V_{IN} ----- -0.3V to +28V
- Junction Temperature----- 125°C
- Lead Temperature (Soldering, 10 sec.)----- 300°C
- Storage Temperature ----- -65°C to 150°C

Recommended Operating Conditions

- Input Voltage, V_{IN} ----- +2.7V to +24V
- Junction Temperature ----- -40°C to 125°C

Electrical Characteristics $V_{IN}=12V$, $I_{OUT}=1mA$, $C_{IN}=C_{OUT}=1\mu F$, $T_J=25^\circ C$, unless otherwise specified

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}		-2%		2%	V
Line Regulation	ΔV_{LINE}	$V_{IN}=V_{OUT} + 1V$ to 40V,		2	12	mV
Load Regulation	ΔV_{LOAD}	$I_{OUT}= 1mA$ to 100mA		20	30	mV
		$I_{OUT}= 1mA$ to 500mA		60	100	
Dropout Voltage	V_{DROP}	$I_{OUT}=100mA$		400		mV
		$I_{OUT}=500mA$		2400		mV
Quiescent Current	I_Q	$T_J= 25^\circ C$		1.5	4.0	uA
Current Limit	I_{CL}		520	620		mA
Enable high level	V_{ENHI}		1.0			V
Enable low level	V_{ENLO}				0.3	V
Enable pin pull high current	I_{EN}			0.1		uA
Thermal Shutdown	T_{SD}			140		°C
Thermal Shutdown Hysteresis	T_{HY}			20		°C
Power supply rejection ratio	PSRR	f=1kHz		80		dB
		f=10kHz		60		dB



Typical Characteristics

$V_{IN}=12V$, $I_{OUT}=1mA$, $V_{OUT}=3.3V$, $C_{IN}=C_{OUT}=1\mu F$, $T_J=25^{\circ}C$, unless otherwise specified

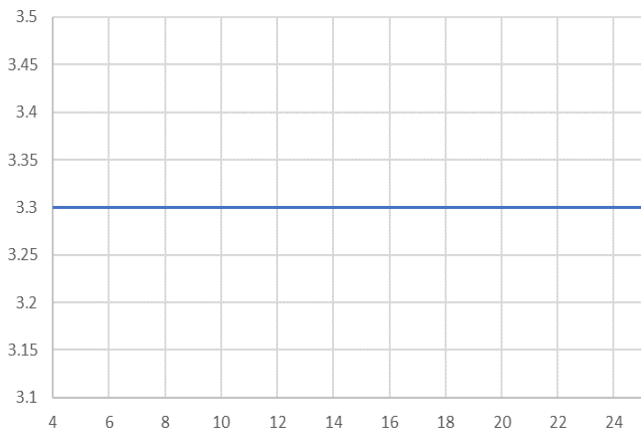


Fig 1 Vout vs Vin

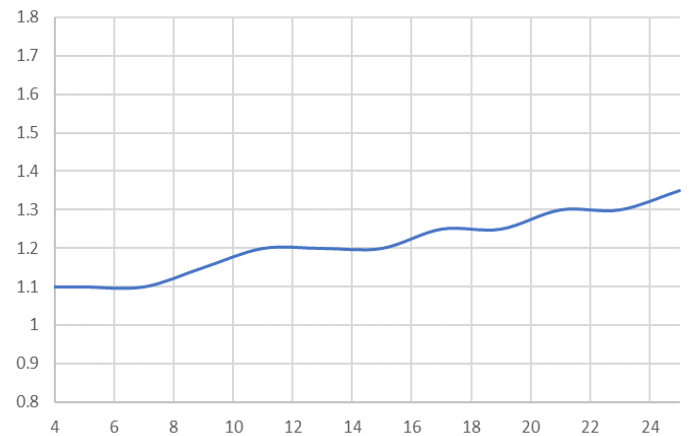


Fig 2 Iq vs Vin

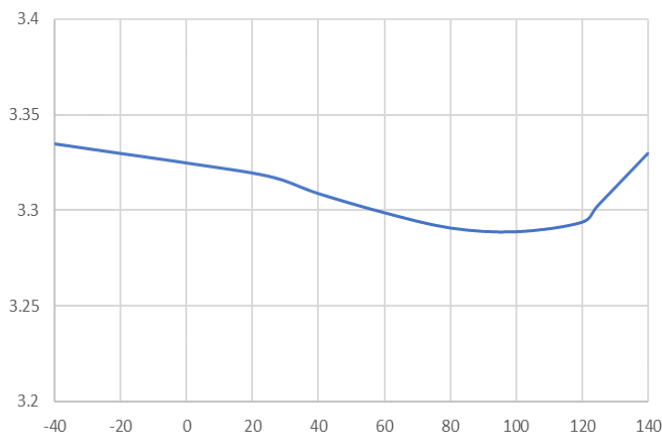


Fig 3 Vout (3.3V) vs Temperature

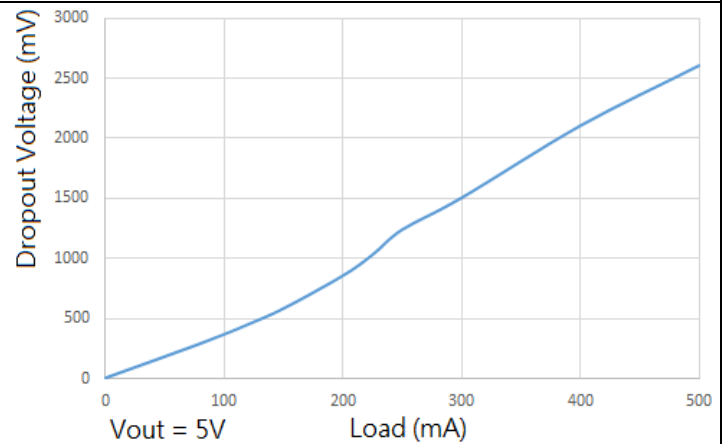


Fig 4 Dropout vs Load

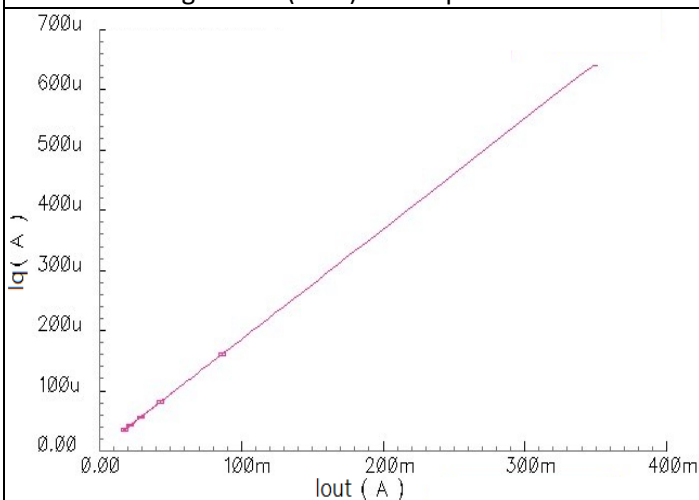


Fig 5 Iq vs Load

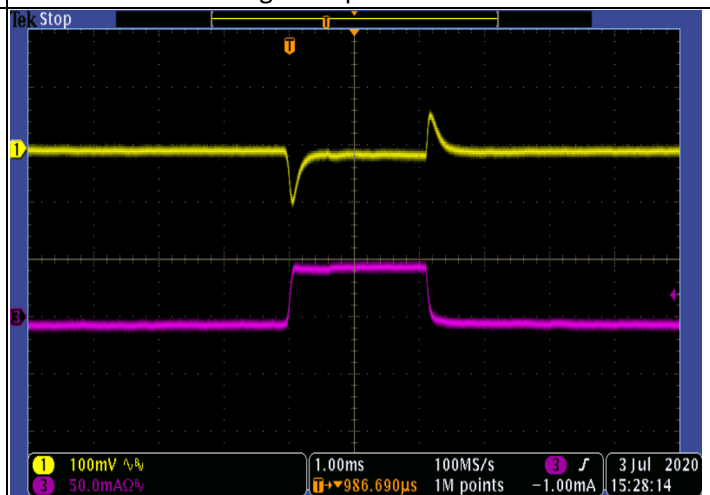


Fig 6 Vout Load Transient (0 to 50mA)

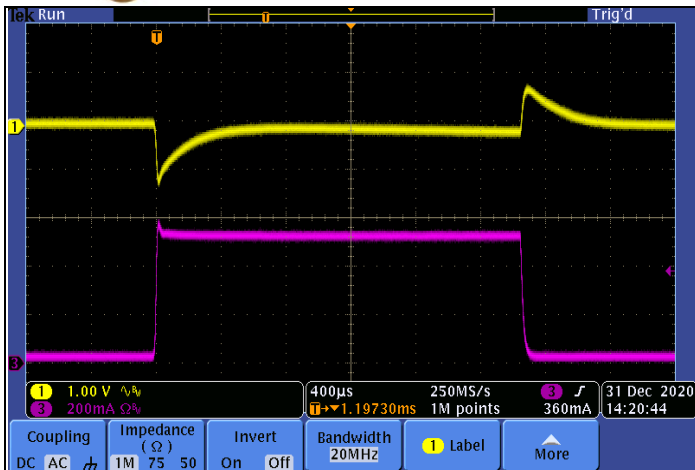


Fig 7 Vout Load Transient (10 to 500mA)

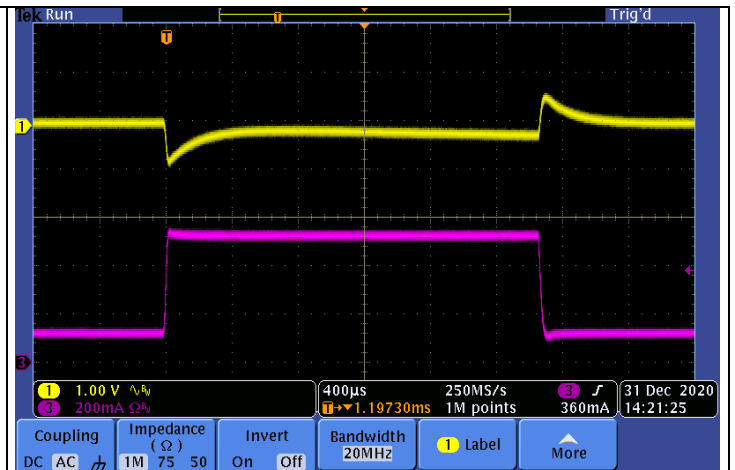


Fig 8 Vout Load Transient (100 to 500mA)

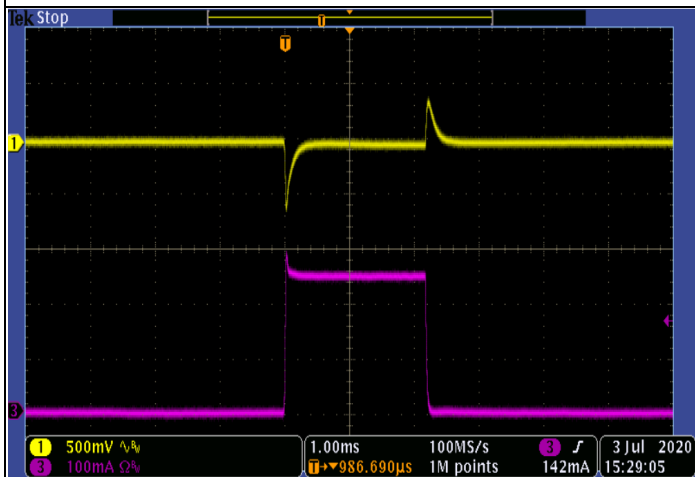


Fig 9 Vout Load Transient (1 to 250mA)

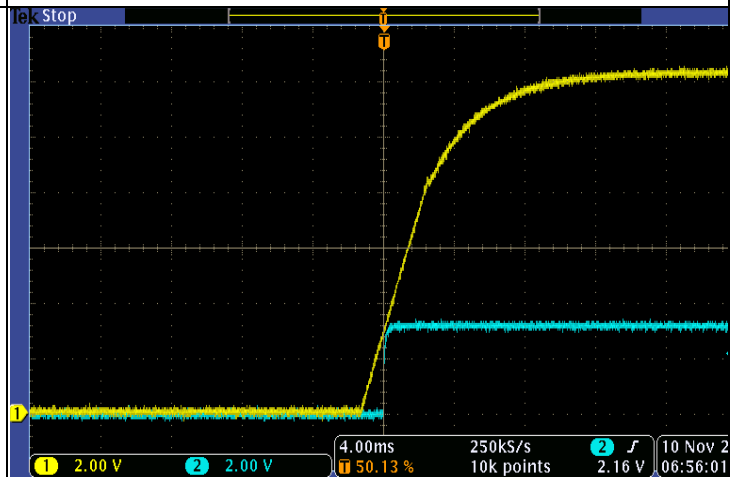


Fig 10 Vin Start up

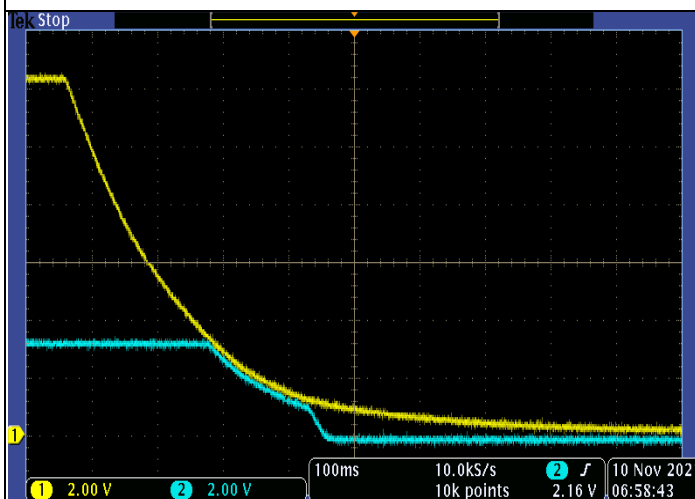


Fig 11 Vin power off

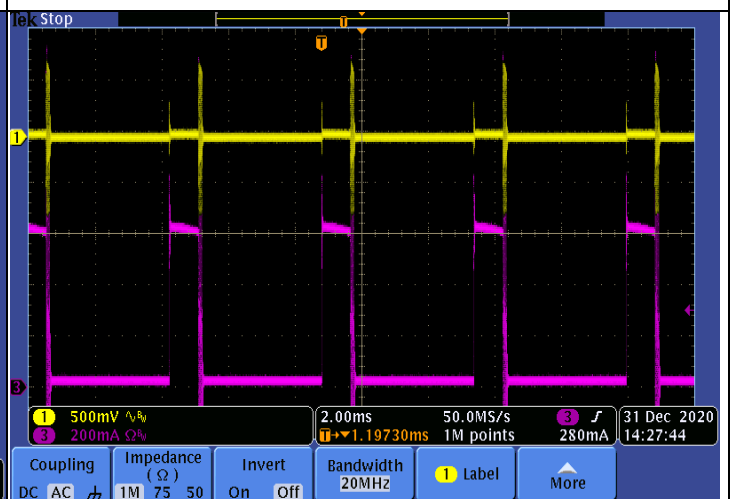
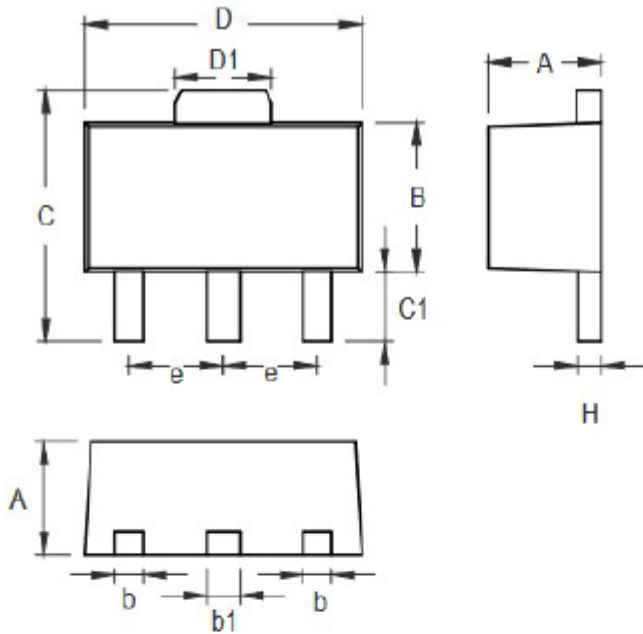


Fig 12 Vout Short to GND



Package Information

SOT89-3



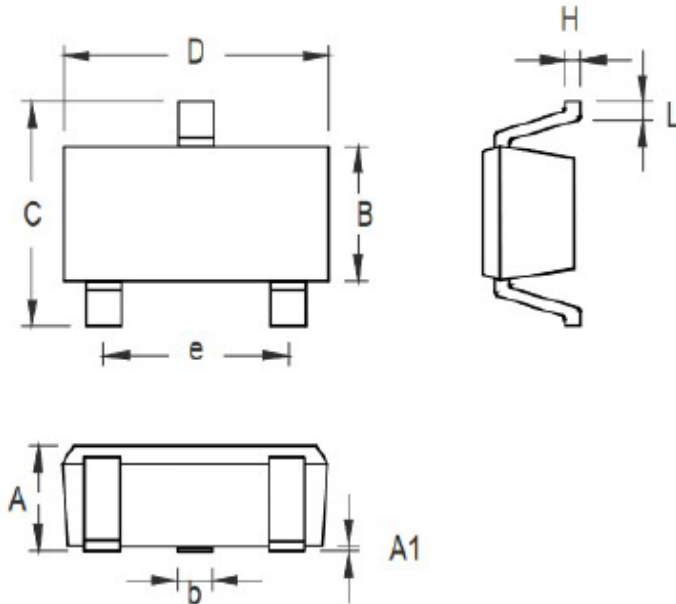
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.397	1.600	0.055	0.063
b	0.356	0.483	0.014	0.019
B	2.388	2.591	0.094	0.102
b1	0.406	0.533	0.016	0.021
C	3.937	4.242	0.155	0.167
C1	0.787	1.194	0.031	0.047
D	4.394	4.597	0.173	0.181
D1	1.397	1.753	0.055	0.069
e	1.448	1.549	0.057	0.061
H	0.356	0.432	0.014	0.017

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SOT23-3

Outline Dimension

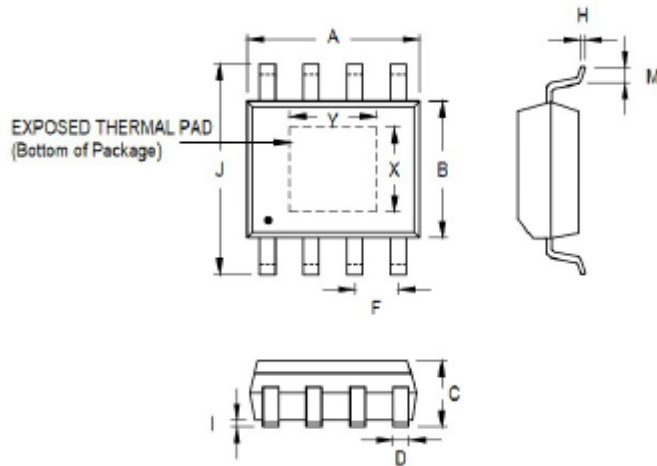


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	0.000	0.152	0.000	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.508	0.014	0.020
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	1.803	2.007	0.071	0.079
H	0.080	0.254	0.003	0.010
L	0.300	0.610	0.012	0.024



SOP8-EP

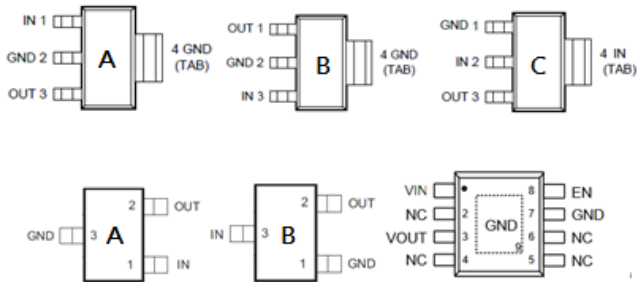
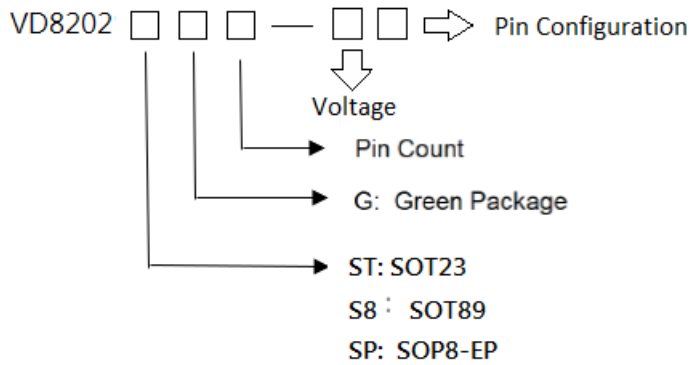
Outline Dimension



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
I		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



Ordering Information



Part No.	Voltage	Q`ty/Reel	Pin Configuration
VD8202STG3	Vout=1.5V Vout=1.8V Vout=2.5V Vout=3.3V Vout=5.0V	4000	A.B.
VD8202S8G3		4000	A.B.C
VD8202SPG8		4001	

ex: VD8202S8G3-25B , VD8202STG3-33A

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