

ET528XXYB - High PSRR Low Noise 300mA LDO

General Description

The ET528XXYB family are the 300mA LDO with auto discharge function. It uses an advanced CMOS process and a PMOSFET pass device to achieve high power supply rejection ratio (PSRR), low noise, low dropout, low ground current, fast start-up and excellent output accuracy.

The ET528XXYB family are stable with a 1.0 μ F ceramic output capacitor, uses a precision voltage reference and feedback loop to achieve excellent Regulation and transient response.

The ET528XXYB family offered in a small DFN4 package, which are ideal for small form factor portable equipment.

Features

- Wide Input Voltage Range from 1.7V to 5.5V
- Up to 300mA Load Current
- Standard Fixed Output Voltage: 1.2V, 1.8V, 2.5V, 2.8V, 3.0V and 3.3V etc.
- Very Low I_Q is 45 μ A Typical
- Low Dropout is Typical 270mV@1.8V at 300mA Load
- Very High PSRR: 70dB at 1KHz
- Very Low Noise is 45 μ Vrms
- Excellent Load / Line Transient Response
- With Auto Discharging Function
- Package Information:

Part No.	Package	MSL
ET528XXYB	DFN4 (1 $\times$ 1)	Level 1

Applications

- Smart Phones and Cellular Phones
- Digital Still Cameras
- Portable Instrument

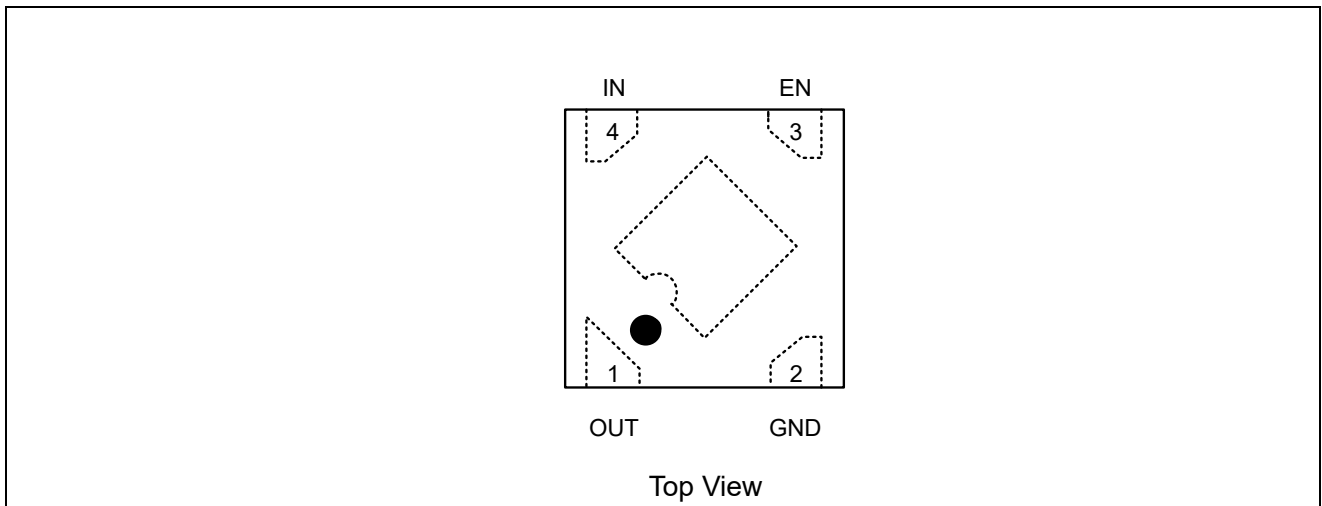
ET528XXYB

Device Information

ET 528 XX X B

<u>XX</u> Output Voltage		<u>X</u> Package		<u>B</u> Auto-Discharging Function
XX	Output Voltage For example, 18 is 1.8V output	Y	DFN4(1×1)	B: With Auto-discharging Function

Pin Configuration

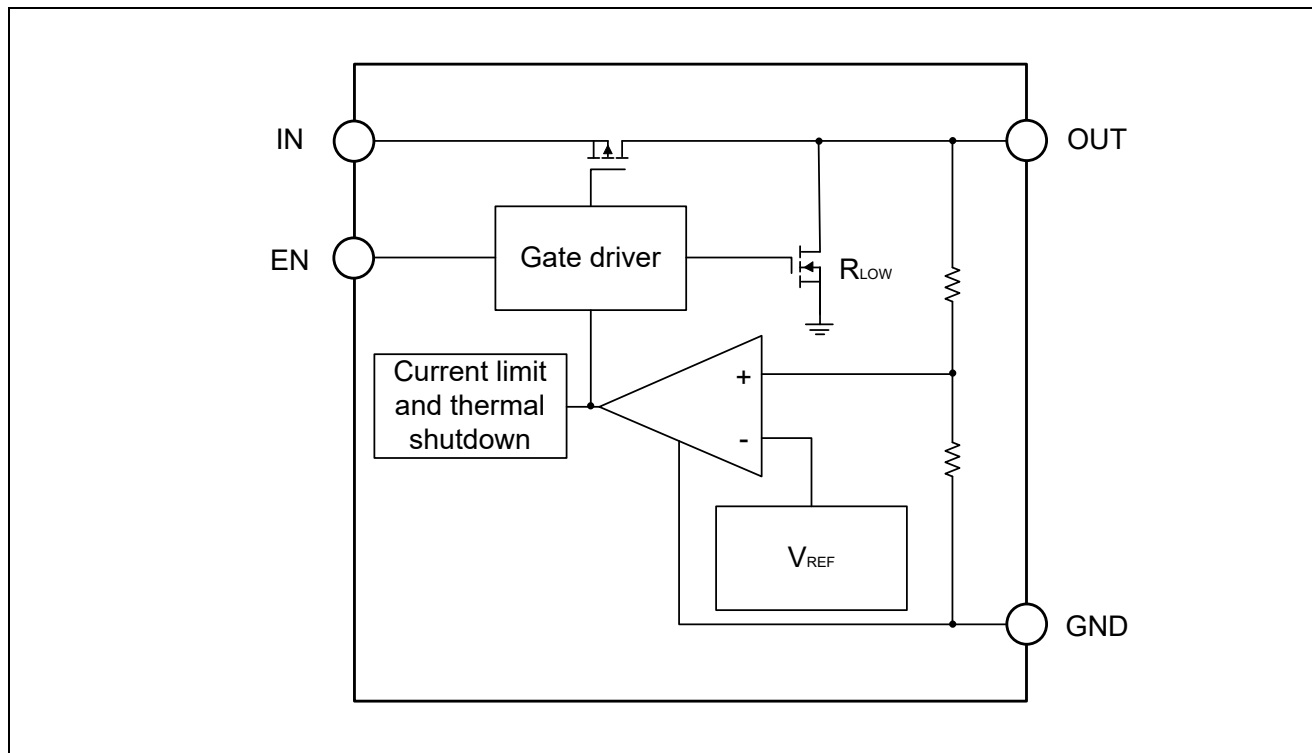


Pin Function

Pin No.	Pin Name	Pin Function
1	OUT	Output pin. A low-ESR capacitor should be connected to this pin to GND.
2	GND	Ground pin.
3	EN	Enable control input pin, active high. Do not leave EN floating
4	IN	Supply input pin. Must be closely decoupled to GND with a ceramic capacitor
-	Thermal Pad	Thermal pad for DFN4(1×1) package, connect to GND or leave floating. Do not connect to any potential other than GND

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Block Diagram



Functional Description

Input Capacitor

A 1 μ F ceramic capacitor is recommended to connect between VIN and GND pins to decouple input power supply glitch and noise. The amount of the capacitance may be increased without limit. This input capacitor must be located as close as possible to the device to assure input stability and less noise. For PCB layout, a wide copper trace is required for both VIN and GND.

Output Capacitor

An output capacitor is required for the stability of the LDO. The recommended output capacitance is from 0.68 μ F to 4.7 μ F, Equivalent Series Resistance (ESR) is from 5m Ω to 100m Ω , and temperature characteristics is X7R or X5R. Higher capacitance values help to improve load/line transient response. The output capacitance may be increased to keep low undershoot/overshoot. Place output capacitor as close as possible to OUT and GND pins.

ON/OFF Input Operation

The ET528XXYB is turned on by setting the EN pin high, and is turned off by pulling it low. If this feature is not used, the EN pin should be tied to IN pin to keep the regulator output on at all time.

Ultra Fast Start-up

After enabled, the ET528XXYB is able to provide full power in as little as tens of microseconds, typically 80 μ s. This feature will help load circuitry move in and out of standby mode in real time, eventually extend battery life for mobile phones and other portable devices.

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Current Limit Protection

When output current at the OUT pin is higher than current limit threshold or the OUT pin, the current limit protection will be triggered and clamp the output current to approximately 500mA to prevent over-current and to protect the regulator from damage due to overheating.

Thermal shutdown Protection

Thermal protection disables the output when the junction temperature rises to approximately +155°C, allowing the device to cool down. When the junction temperature reduces to approximately +130°C the output circuitry is enabled again. Depending on power dissipation, thermal resistance, and ambient temperature, the thermal protection circuit may cycle on and off. This cycling limits the heat dissipation of the regulator, protecting it from damage due to overheating.

Absolute Maximum Ratings

Symbol	Parameters (Items)	Value	Unit
V _{IN}	IN Voltage	-0.3 to 6.0	V
V _{EN}	Input Voltage (EN Pin)	-0.3 to V _{IN} +0.3	V
V _{OUT}	Output Voltage	-0.3 to V _{IN} +0.3	V
I _{MAX}	Maximum Load Current	300	mA
P _D	Maximum Power Consumption	400	mW
V _{ESD}	Human Body Model (JESD22-A114)	±4000	V
	Charged Device Model (JESD22-C101)	±1500	
R _{θJA}	Junction-to-ambient Thermal Resistance	250	°C/W
R _{ψjc} ⁽¹⁾	Junction-to-case(bottom) Thermal Resistance	139	°C/W
T _J	Operating Junction Temperature	-40 to 150	°C
T _{STG}	Storage Temperature	-65 to 150	°C
T _{SL}	Lead Temperature (Soldering, 10 sec)	300	°C

Note1: Test at T_A=25°C with the component mounted on 5*5mm, FR4, 2layer, Top and Bottom layer 1oz.

Recommended Operating Conditions

Symbol	Parameters	Rating	Unit
V _{IN}	Input Voltage	1.7 to 5.5	V
I _{OUT}	Output Current	0 to 300	mA
T _A	Operating Ambient Temperature	-40 to 85	°C
C _{IN}	Effective Input Ceramic Capacitor Value	0.47 to 4.7	μF
C _{OUT}	Effective Output Ceramic Capacitor Value	0.68 to 4.7	μF
ESR	Input and Output Capacitor Equivalent Series Resistance (ESR)	5 to 100	mΩ

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Electrical Characteristics

($V_{IN}=V_{OUT}+1V$, $V_{EN}=1.2V$, $I_{OUT}=1mA$, $C_{IN}=1\mu F$, $C_{OUT}=1\mu F$, $T_A=25^{\circ}C$, unless otherwise stated)

Symbol	Parameters	Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range ⁽²⁾		1.7		5.5	V
V_{DROP}	Dropout Voltage ⁽³⁾	$V_{OUT}=1.2V$, $I_{OUT}=300mA$			850	mV
		$V_{OUT}=1.8V$, $I_{OUT}=300mA$		360	600	mV
		$V_{OUT}=2.8V$, $I_{OUT}=300mA$		350	510	mV
		$V_{OUT}=3.0V$, $I_{OUT}=300mA$		350	510	mV
		$V_{OUT}=3.3V$, $I_{OUT}=300mA$		340	510	mV
I_{Q_ON}	Input Quiescent Current	Active mode: $V_{EN}=V_{IN}$		45	80	μA
I_{Q_OFF}	Input Shutdown Current	$V_{EN}=0V$		0.01	1	μA
V_{OUT}	Regulated Output Voltage	$I_{OUT}=1mA$, $-40^{\circ}C \leq T_A \leq 85^{\circ}C$	-2		2	%
Reg_{LINE}	Output Line Regulation	$V_{IN}=V_{OUT}+1V$ to $5.5V$, $I_{OUT}=10mA$		0.03	0.2	%/V
Reg_{LOAD}	Output Load Regulation	I_{OUT} from $0mA$ to $300mA$		20	40	mV
t_s	Soft-start Time	From enable to power on, $V_{OUT}=1.8V$		50		μs
I_{LIMIT}	Current Limit		300	600		mA
I_{SHORT}	Short Current Limit	$V_{OUT}=0V$		75		mA
PSRR	Power Supply Rejection Ratio ⁽⁴⁾	$f=1kHz$, $C_{OUT}=1\mu F$, $I_{OUT}=20mA$		70		dB
		$f=10kHz$, $C_{OUT}=1\mu F$, $I_{OUT}=20mA$		65		
e_n	Output Noise ⁽⁴⁾	$10Hz$ to $100kHz$, $C_{OUT}=1\mu F$		45		μV_{RMS}
V_{IL}	EN Low Threshold	V_{EN} Falling			0.4	V
V_{IH}	EN High Threshold	V_{EN} Rising	0.9			V
I_{EN}	EN Pin Input Current	$V_{EN}=0V$		0	0.1	μA
R_{PD}	EN pull-down Resistance		0.7	1	1.3	$M\Omega$
T_{TSD}	Over-temperature Shutdown Threshold ⁽⁴⁾	T_J rising		155		$^{\circ}C$
T_{HYS}	Over-temperature Shutdown Hysteresis ⁽⁴⁾	T_J falling from shutdown		20		$^{\circ}C$

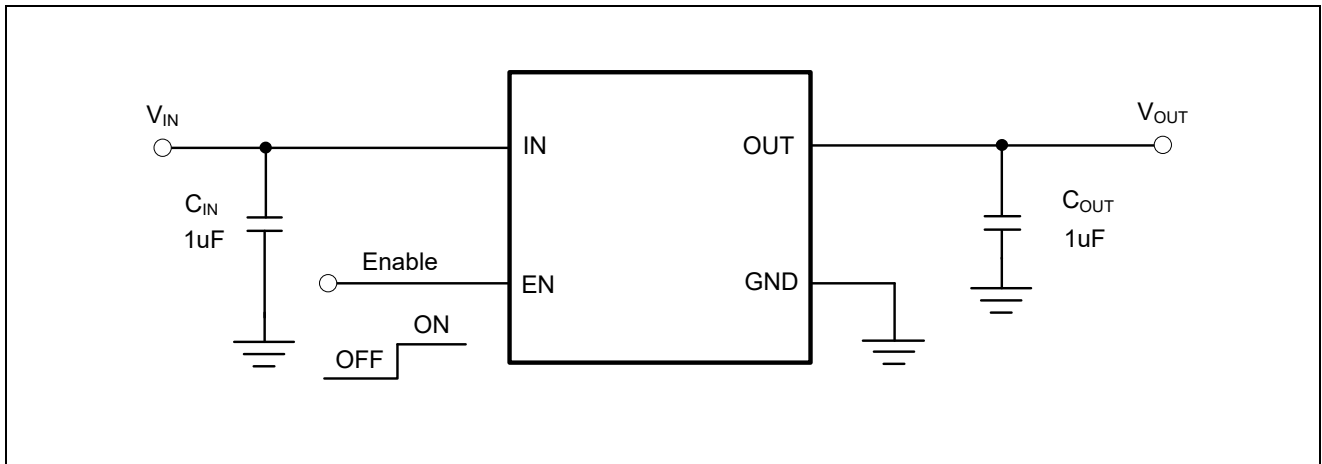
Note2: Here V_{IN} means internal circuit can work normal. If $V_{IN} < V_{OUT}$, Output voltage follow $V_{IN}(I_{OUT}=1mA)$, circuit is safety. The maximum input voltage should take into account the maximum power consumption ($P_D(max)$). The minimum operating voltage is $V_{IN}(min) = V_{OUT} + V_{DROP}(max)$.

Note3. V_{DROP} FT test method: test the V_{OUT} voltage at $V_{SET} + V_{DROPMAX}$ with 300mA output current.

Note4. Guaranteed by design and characterization. not a FT item.

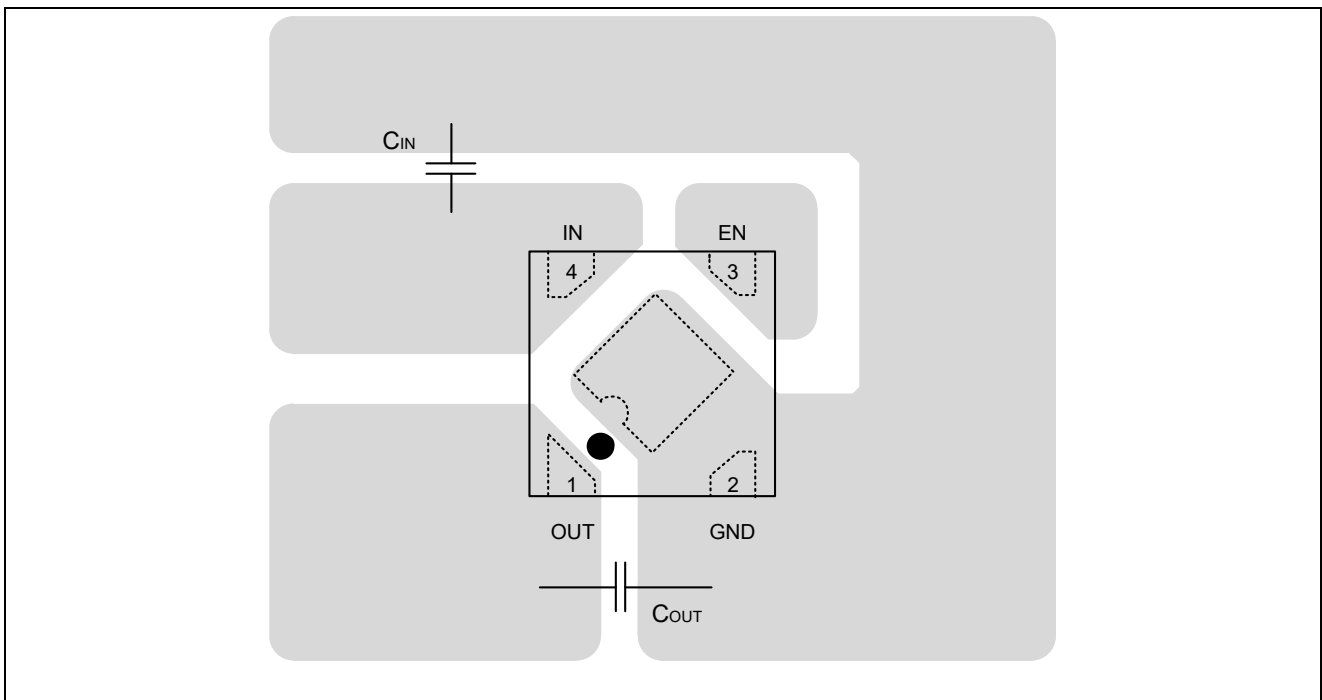
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Application Circuits



PCB Layout Guide

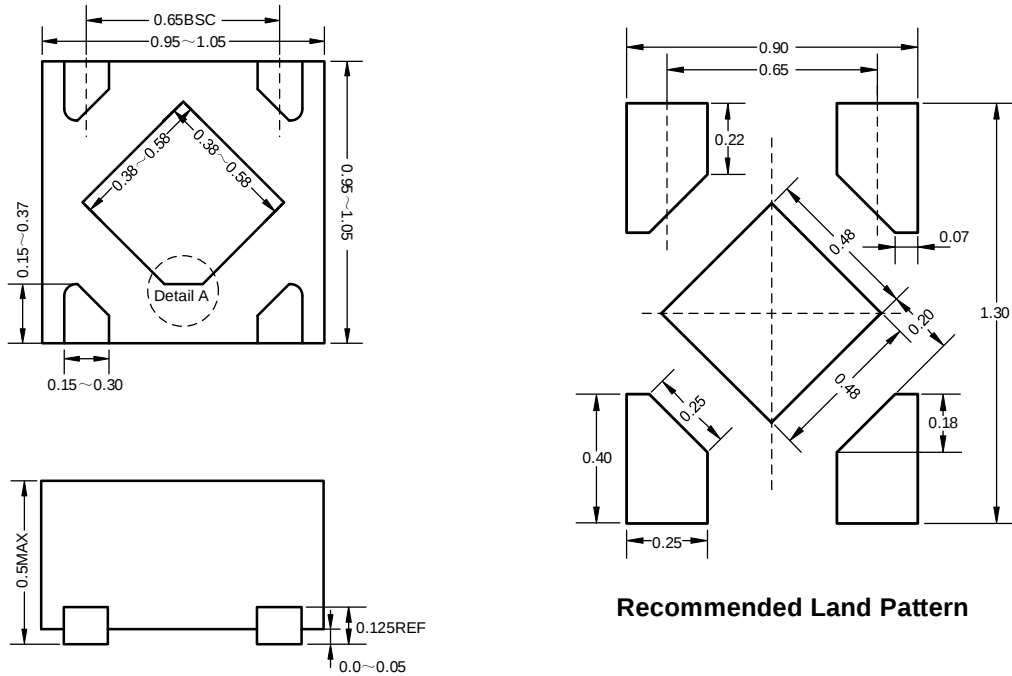
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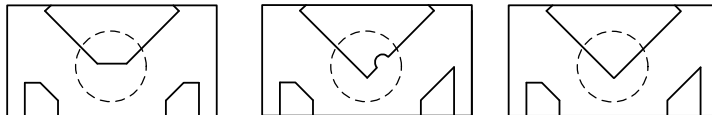
Package Dimension

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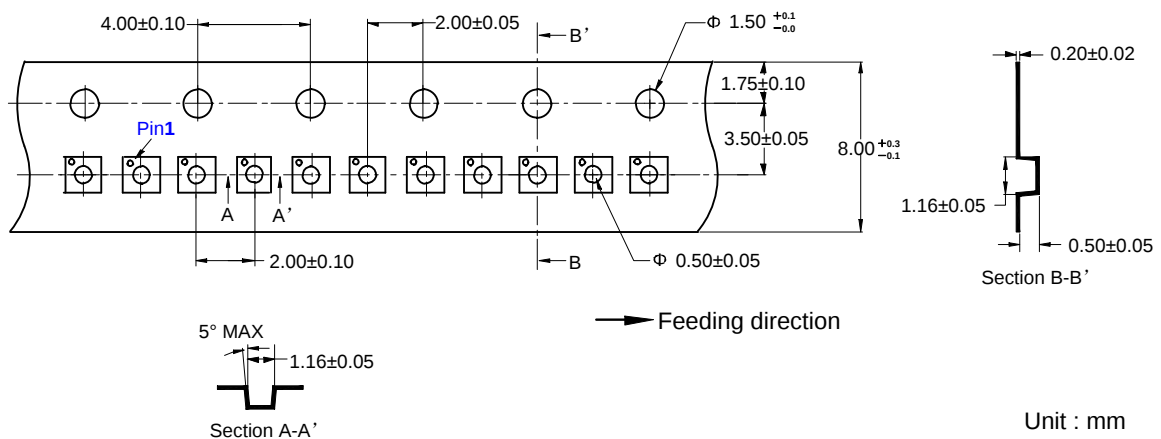
Recommended Land Pattern

Detail A: (PIN1 shape)



Unit: mm

Tape Information



Unit : mm

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Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
0.0	2023-08-08	Original Version	Tugz	Liuxm	Liujiy
1.0	2024-05-10	Official Version	Tugz	Liuxm	Liujiy