ET7H2XX - 16V Input 30uA 200mA LDO

General Description

ET7H2XX series are 30μA LDO with 200mA output ability, it uses an advanced CMOS process and a PMOSFET pass device to achieve low noise, fast start-up and excellent output accuracy. The dynamic transient boost feature improves device transient response for wireless communication applications.

ET7H2XX series are offered SOT89-3, SOT23-5, SOT23-3, DNF4(1×1) packages

Features

- Wide Input Voltage Range From 2.5V to 16V
- Up to 200mA Load Current
- I_Q is 30μA Typical
- Dropout is 1000mV at 200mA Load @V_{OUT}=1.2V
- Dropout is 680mV at 200mA Load @V_{OUT}=1.8V
- Short Current Protection is 100mA
- Excellent Load/Line Transient Response
- Line Regulation is 0.01%/V Typical
- Packages are SOT89-3, SOT23-5, SOT23-3, DFN4 (1×1)

Device information

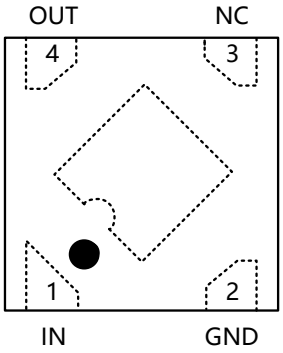
ET 7H2 XX X

XX Output Voltage		X Package	
XX	Output X.X-V For example, 18 is 1.8V output	F	SOT89-3
		Y	DFN4(1X1)
		S	SOT23-3
		T	SOT23-5

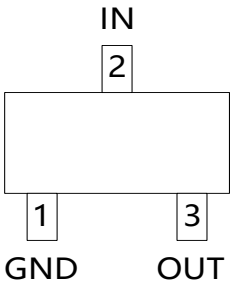
Mark Specification Label

Part No.	Marking				V_{OUT}
	SOT89-3	SOT23-3	DFN4	SOT23-5	
	XXF	XXS	XXY	XXT	
ET7H212	12F	12S	AX	12T	1.2V
ET7H218	18F	18S	CX	18T	1.8V
ET7H230	30F	30S	GX	30T	3.0V
ET7H233	33F	33S	EX	33T	3.3V
ET7H236	36F	36S	RX	36T	3.6V
ET7H250	50F	50S	5X	50T	5.0V

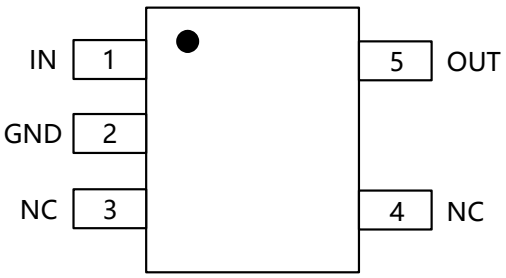
Pin Configuration



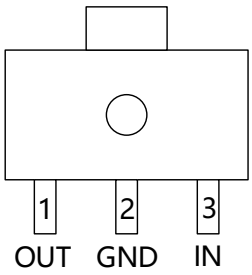
ET7H2XXY(DFN4)



ET7H2XXS(SOT23-3)



ET7H2XXT(SOT23-5)



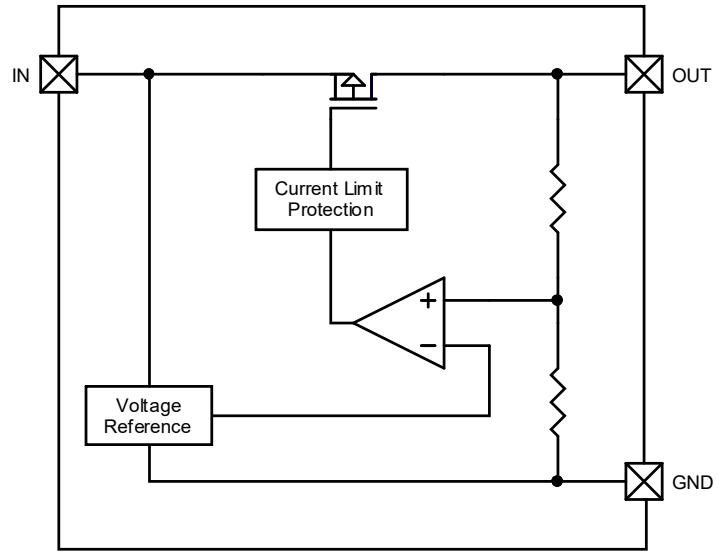
ET7H2XXF(SOT89-3)

Top View

Pin Function

Pin No.				Pin Name	Pin Function
SOT89-3 (F)	SOT23-5 (T)	SOT23-3 (S)	DFN4 (Y)		
2	2	1	2	GND	Ground.
3	1	2	1	IN	Supply input pin. Need a 1μF or greater capacitor closely decoupled to GND
1	5	3	4	OUT	Output pin. Bypass a 1μF or greater capacitor from this pin to ground.
-	3	-	3	NC	No connection.
-	4	-	-	NC	No connection.

Block Diagram



Functional Description

Input Capacitor

A 1μF~10uF ceramic capacitor is recommended to connect between V_{IN} 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 V_{IN} and GND.

Output Capacitor

An output capacitor is required for the stability of the LDO. The recommended output capacitance is from 1μF to 10μF, Equivalent Series Resistance (ESR) is from 5mΩ to 100mΩ, and temperature characteristics are 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.

Low Quiescent Current

The ET7H2XX consuming only around 30μA for all input range and output loading, provides great power saving in portable and low power applications.

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.

Absolute Maximum Ratings

Parameter	Rating		Unit
IN pin to GND pin	-0.3 to 24.0		V
OUT pin to GND pin	-0.3 to 6.0		V
Thermal Resistance (Junction to Ambient)	SOT89-3	135	°C/W
	SOT23-5	250	
	SOT23-3	360	
	DFN4	250	
Power Dissipation @25°C	SOT89-3	750	mW
	SOT23-5	400	
	SOT23-3	280	
	DFN4	400	
Operating Junction Temperature	-40 to 150		°C
Storage Temperature	-65 to 150		°C
Lead Temperature (Soldering, 10 sec)	300		°C
HBM ESD (ESDA/JEDEC JS-001-2017)	±2000		V

Recommended Operating Conditions

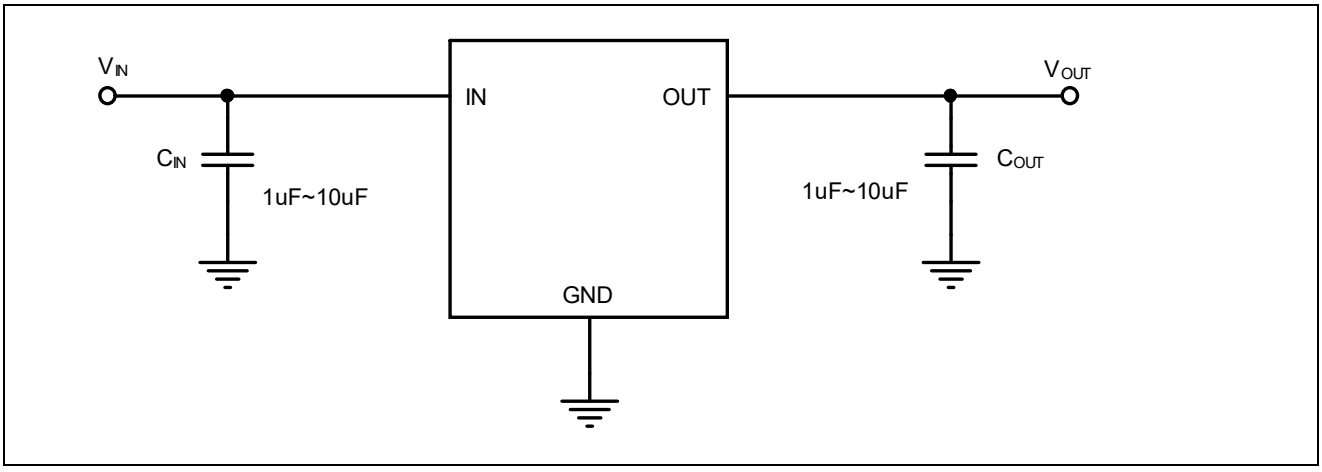
Symbol	Item	Rating	Unit
V_{IN}	Input Voltage	2.5 to 16	V
I_{OUT}	Output Current	0 to 200	mA
T_A	Operating Ambient Temperature	-40 to 85	°C
T_J	Operating Junction Temperature	-40 to 125	°C
C_{IN}	Effective Input Ceramic Capacitor Value	0.47 to 10	μF
C_{OUT}	Effective Output Ceramic Capacitor Value	0.47 to 10	μF
ESR	Input and Output Capacitor Equivalent Series Resistance (ESR)	5 to 100	mΩ

Electrical Characteristics

(V_{IN}= V_{OUT}+2V, T_A= 25°C, C_{IN}=C_{OUT}=1uF, unless otherwise noted)

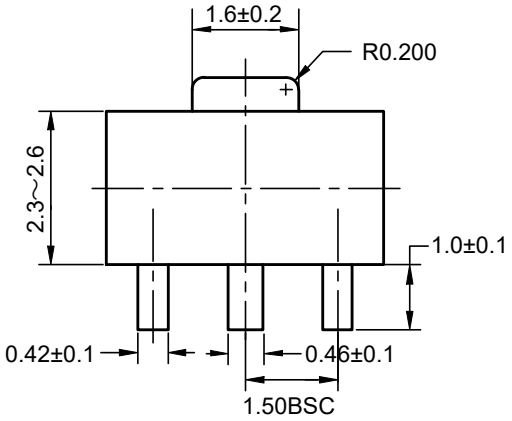
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Operation Range	V_{IN}		2.5		16	V
Dropout Voltage	V_{DROP}	V_{OUT}= 1.2V, I_{OUT} = 200mA		1000	1300	mV
		V_{OUT}= 1.8V, I_{OUT} = 200mA		680	1000	
DC Supply Quiescent Current	I_Q	I_{OUT}=0mA		30	60	μA
Regulated Output Voltage	V_{OUT}	I_{OUT}=1mA	-2%		+2%	V
Output Voltage Line Regulation	Reg_{LINE}	V_{IN} = V_{OUT} +1V to 16V, I_{OUT} = 10mA ($\Delta V_{OUT}/\Delta V_{IN}/V_{OUT}$)		0.01	0.1	%/V
Output Voltage Load Regulation	Reg_{LOAD}	I_{OUT} from 1mA to 200mA V_{IN}=V_{OUT}+2V		30	60	mv
Over Current Protection	I_{LIMT}	R_{OUT}=1Ω		500		mA
Power Supply Rejection Ratio	PSRR	f=1kHz, C_{OUT}=1μF, I_{OUT}=20mA		53		dB
Output Noise	e_N	10Hz to 100kHz, I_{OUT} = 20mA, V_{OUT} =1.2V		90* V_{OUT}		μV_{RMS}

Application Circuits

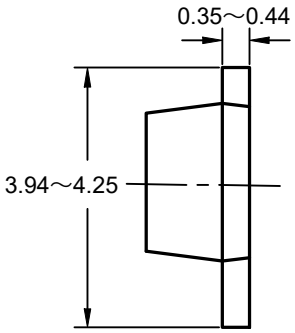


Package Dimension

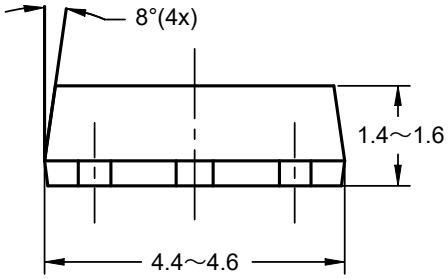
SOT89-3



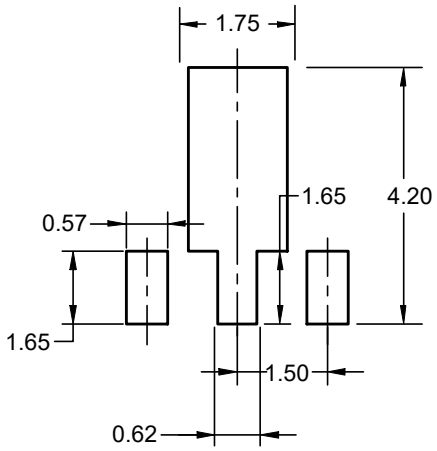
Top View



Side View



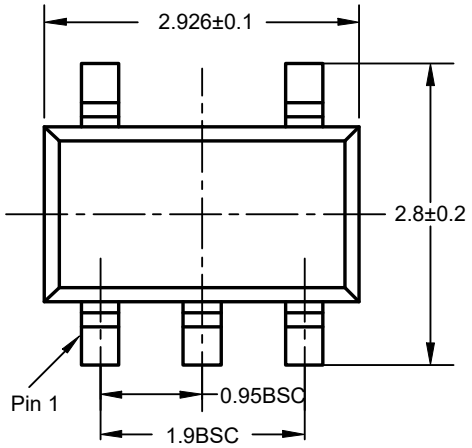
Side View

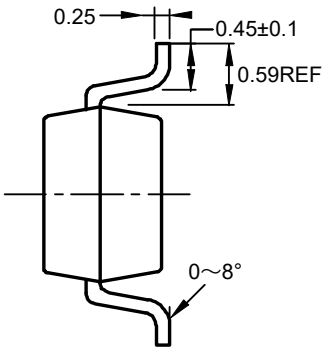


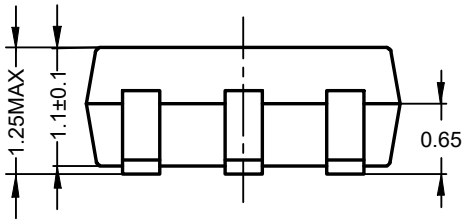
Recommended Land Pattern

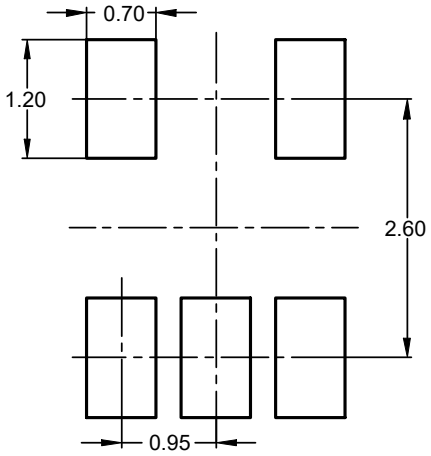
Unit: mm

SOT23-5





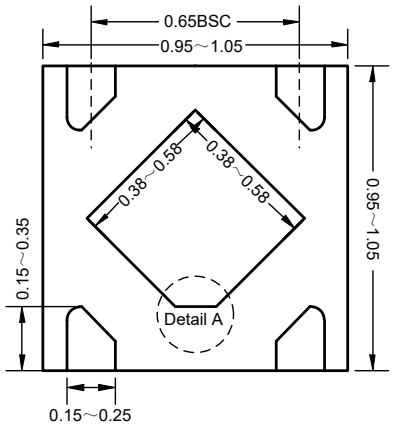


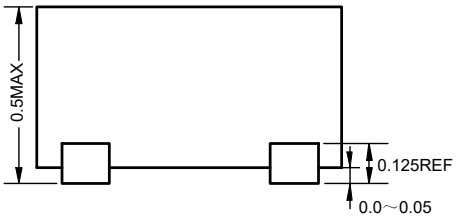


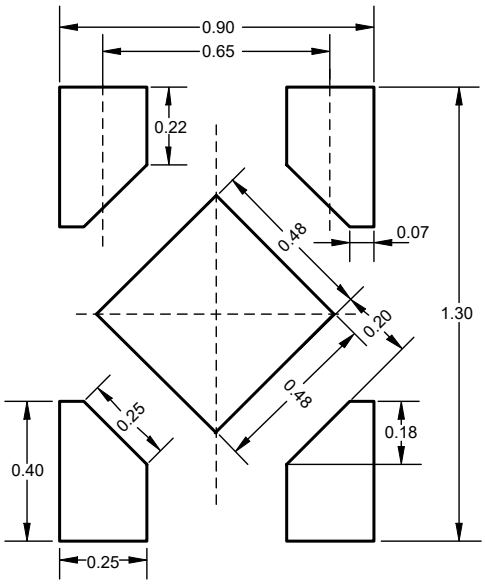
Recommended Land Pattern

Unit: mm

DFN4(1x1)

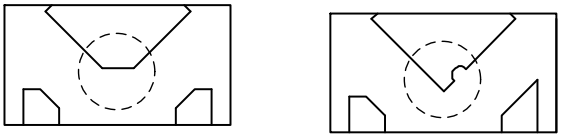






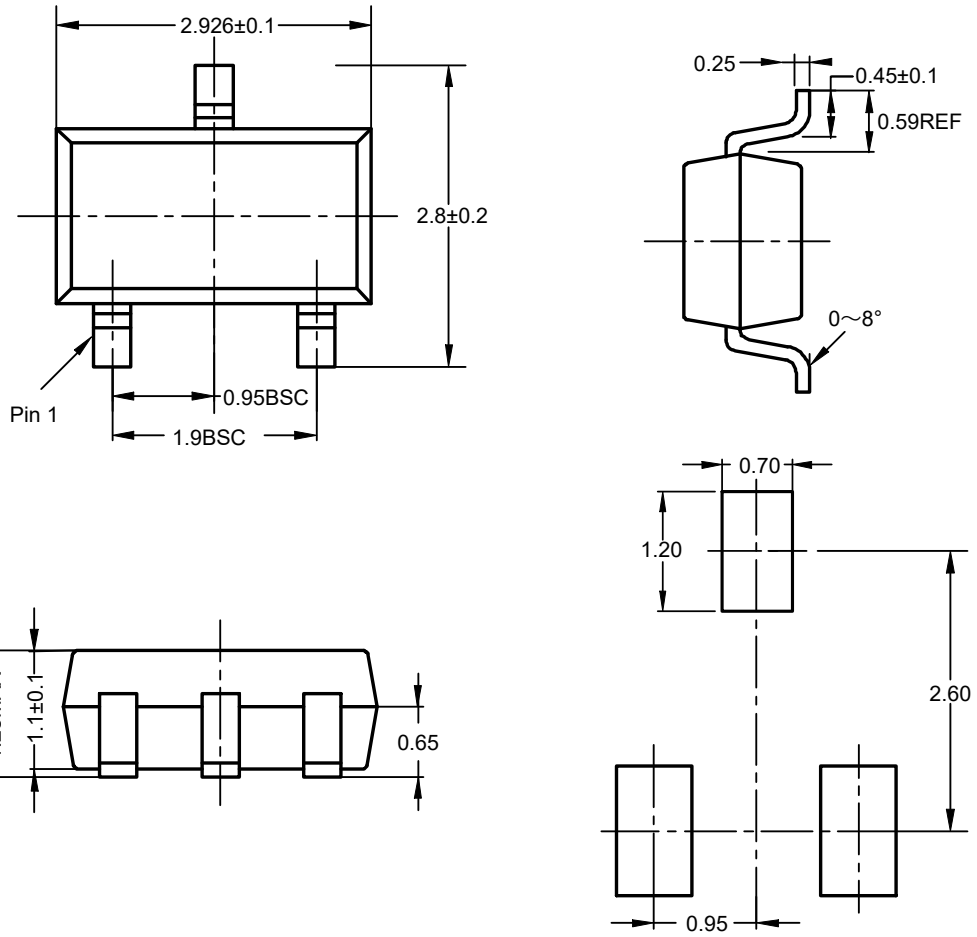
Recommended Land Pattern

Detail A: (PIN1 shape)



Unit: mm

SOT23-3



Recommended Land Pattern

Unit: mm

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
0.1	2022-3-21	Preliminary Version	Wuhan shibo	Liuxm	Liujy
1.0	2023-3-22	Updata Typset	Tuguozhu	Liuxm	Liujy
1.1	2023-10-7	Update package	Shibo		