AP131

300mA Low Dropout Linear Regulator with Shutdown

■ Features

- Input voltage range is up to 7V
- Dropout voltage 400mV at 300mA output current
- Guaranteed 300mA output current.
- Internal R_{on} =1.5Ω PMOS draws no base current
- Low quiescent current 50μA
- Output voltage 2% accuracy, and 1.5V to 5V with 0.1V step
- Active low shutdown function (EN pin).
- Fast transient response
- Good load regulation
- Current limit and thermal shutdown protection
- SOT89-5L and SOT23-5L packages

■ Applications

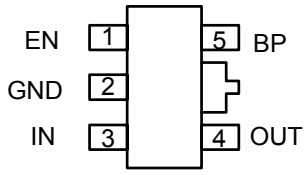
- Wireless Communication
- Battery Powered device
- CD-ROM, DVD, and LAN Card
- PC peripheral

■ General Descriptions

The AP131 is a 300mA, fixed output voltage, low dropout linear regulator. The Device included pass element, error amplifier, band-gap, current limit and thermal shutdown circuitry. The device is ON when EN pin is set to logic high level.
The characteristics of low dropout voltage and less quiescent current make it good for some critical current application, for example, some battery powered devices. The typical quiescent current is approximately 50μA from zero to maximum load. Due to internal flexible design, result in extensively fixed output voltage versions and make it convenient to use for applications. Built-in current-limit and thermal-shutdown functions prevent any fault condition from IC damage. An external capacitor can be connected to the BP pin and reduce the output noise.

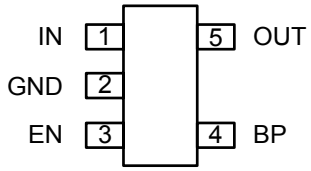
■ Pin Assignments

(Top View)



SOT89-5L

(Top View)

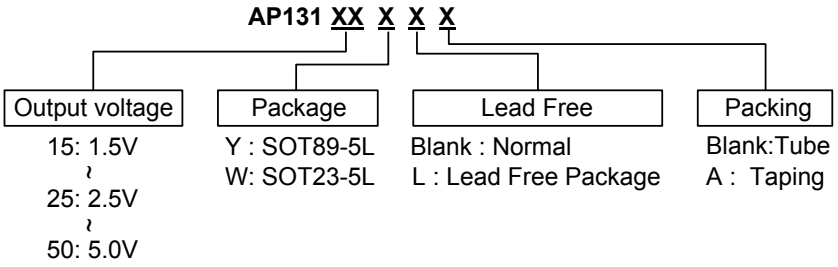


SOT23-5L

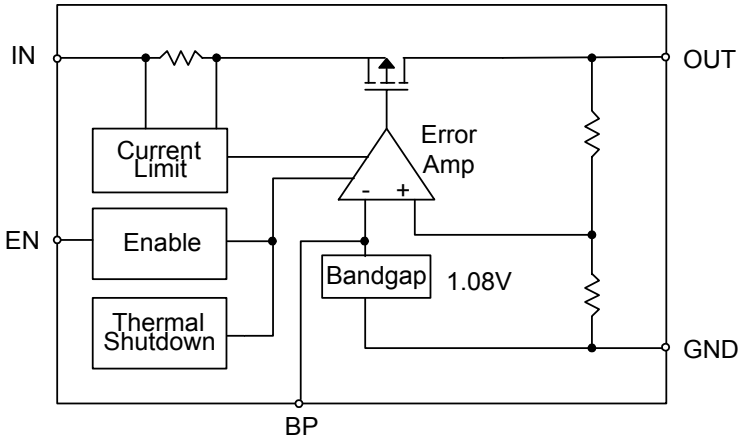
■ Pin Descriptions

Name	Description
IN	Input voltage
GND	Ground
EN	Enable pin
BP	Bandgap
OUT	Output voltage

■ Ordering Information



■ Block Diagram



■ Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{CC}	Input voltage	-0.1 to +7	V
T_{OP}	Operating junction temperature range	-40 to +125	ºC
T_{ST}	Storage temperature range	-65 to +150	ºC
P_D	Power dissipation, P_D @T_A=25ºC		
	SOT89-5L	+0.5	W
	SOT23-5L	+0.25	W
Θ_{JA}	Package thermal resistance		
	SOT89-5L	+100	ºC/W
	SOT23-5L	+250	ºC/W

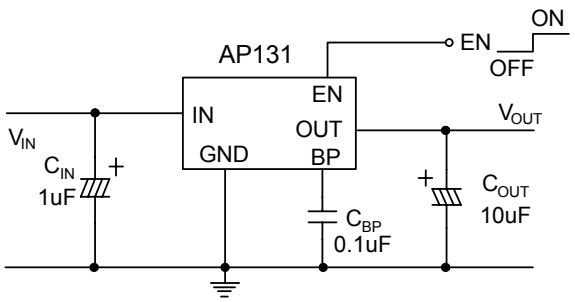
■ Electrical Characteristics

T_A=25ºC, C_{IN}=1µF, C_{OUT}=10µF, unless otherwise specified.

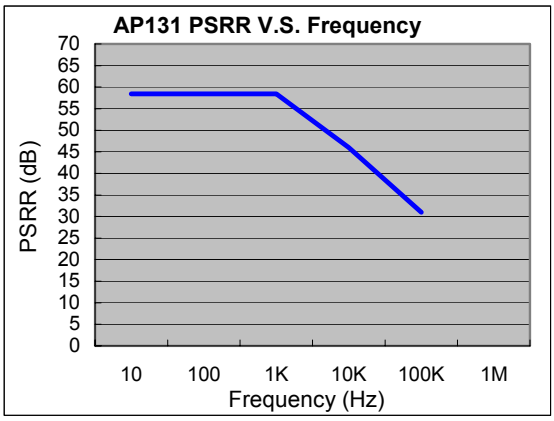
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{DROP}	Dropout voltage (Note 1)	I_L=300mA	-	400	500	mV
I_{LIMIT}	Current Limit (Note 2)	V_{IN}=5V, V_{OUT}=0V	350	450	-	mA
ΔV_{LINE}	Line regulation	I_L=1mA, V_{IN}=5~7V	-	0.1	0.3	%/V
ΔV_{LOAD}	Load regulation (Note 3)	I_L=1~300mA, V_{IN}=5V	-	30	35	mV
ΔV_{OUT}	Output voltage accuracy	I_L=1mA, V_{IN}=5V	-2	-	+2	%
	Output voltage temperature coefficient (Note 4)		-	50	150	PPM/ºC
PSRR	Ripple Rejection	F=100Hz, C_{IN}=1µF, C_O=10uF, I_L=100mA	-	60	-	dB
I_{SB}	Standby current	I_L=0mA, V_{IN}=5V, EN=0V	-	-	5	µA
I_Q	Quiescent current	I_L=0mA, V_{IN}=5V, EN=5V	-	50	100	µA
I_{EN}	Enable pin current		-	-	< 0.1	µA
V_{ENON}	Enable pin voltage	Output ON	1.5	-	V_{IN}	V
V_{ENOFF}		Output OFF	0	-	0.8	V
T_{DELAY}	Enable delay time	C_{BP}=0.1µF, C_{OUT}=1µF, I_{OUT}=30mA	-	8	-	µS

Note 1. Dropout voltage is defined as the input to output differential voltage. Dropout is measured at constant junction temperature by using pulsed ON time, and the criterion is V_{OUT} inside target value ±2%. This test is skipped at the condition of V_{IN}<3V.
Note 2. Current limit is measured at constant junction temperature by using pulsed testing with a low ON time.
Note 3. Regulation is measured at constant junction temperature by using pulsed testing with a low ON time.
Note 4. Guaranteed by design.

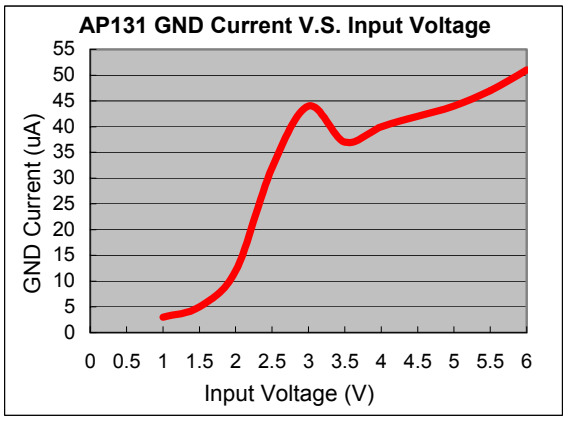
■ Typical Application Circuit



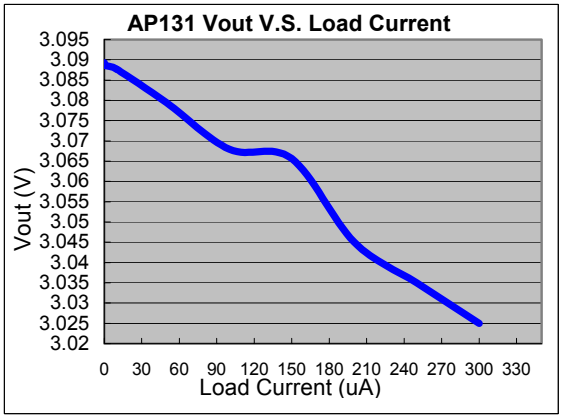
■ Typical Characteristics



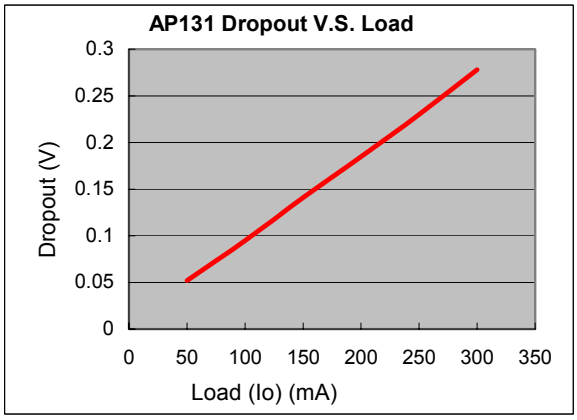
PSRR V.S. Frequency



GND Current V.S. Input Voltage

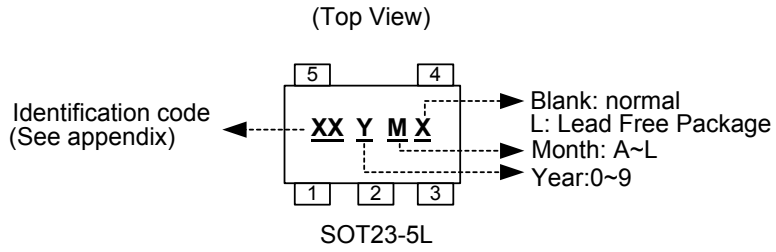


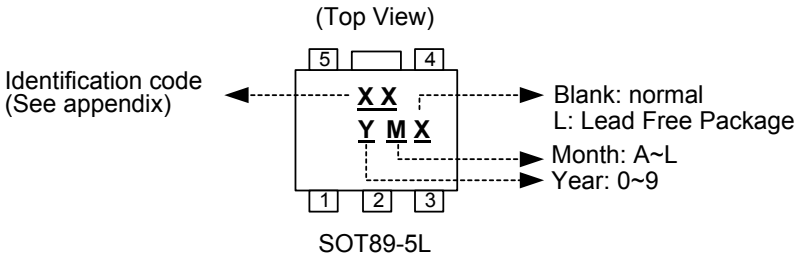
Vout V.S. Load Current



Dropout V.S. Load

■ Marking Information





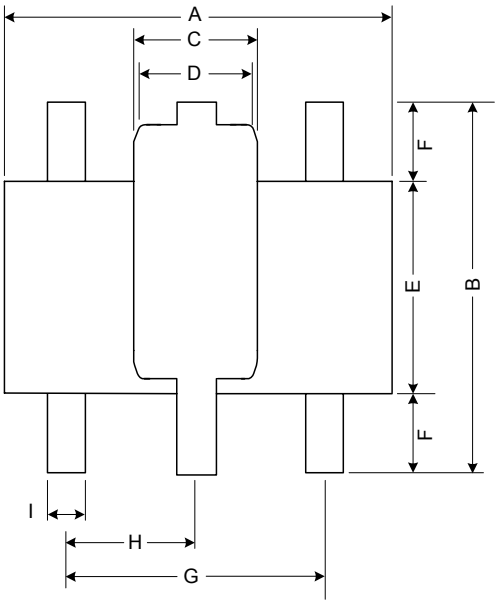
Appendix

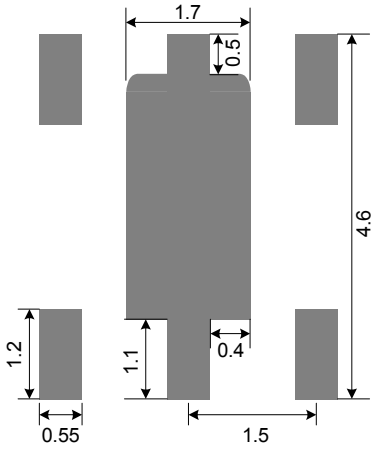
Part Number		Identification code
SOT23	SOT89	
AP131-15W	AP131-15Y	DA
AP131-16W	AP131-16Y	DB
AP131-17W	AP131-17Y	DC
AP131-18W	AP131-18Y	DD
AP131-19W	AP131-19Y	DE
AP131-20W	AP131-20Y	DF
AP131-21W	AP131-21Y	DG
AP131-22W	AP131-22Y	DH
AP131-23W	AP131-23Y	DI
AP131-24W	AP131-24Y	DJ
AP131-25W	AP131-25Y	DK
AP131-26W	AP131-26Y	DL
AP131-27W	AP131-27Y	DM
AP131-28W	AP131-28Y	DN
AP131-29W	AP131-29Y	DO
AP131-30W	AP131-30Y	DP
AP131-31W	AP131-31Y	DQ
AP131-32W	AP131-32Y	DR

Part Number		Identification code
SOT23	SOT89	
AP131-33W	AP131-33Y	DS
AP131-34W	AP131-34Y	DT
AP131-35W	AP131-35Y	DU
AP131-36W	AP131-36Y	DV
AP131-37W	AP131-37Y	DW
AP131-38W	AP131-38Y	DX
AP131-39W	AP131-39Y	DY
AP131-40W	AP131-40Y	DZ
AP131-41W	AP131-41Y	D0
AP131-42W	AP131-42Y	D1
AP131-43W	AP131-43Y	D2
AP131-44W	AP131-44Y	D3
AP131-45W	AP131-45Y	D4
AP131-46W	AP131-46Y	D5
AP131-47W	AP131-47Y	D6
AP131-48W	AP131-48Y	D7
AP131-49W	AP131-49Y	D8
AP131-50W	AP131-50Y	D9

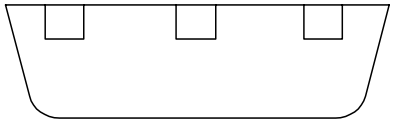
■ Package Information

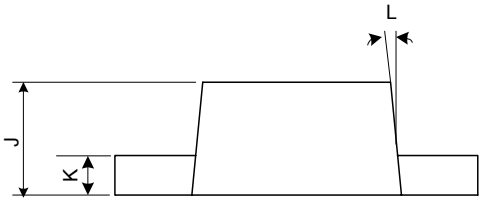
(1) Package Type: SOT89-5L





Land Pattern Recommendation (Unit: mm)

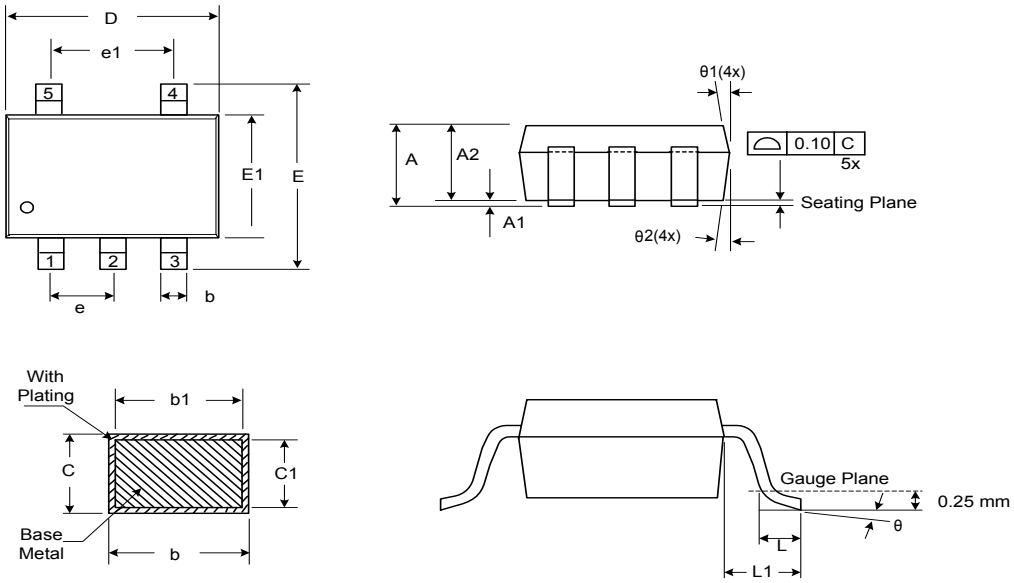




Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	4.40	4.50	4.60	0.173	0.177	0.181
B	4.05	4.15	4.25	0.159	0.163	0.167
C	1.50	1.60	1.70	0.059	0.063	0.067
D	1.30	1.40	1.50	0.051	0.055	0.059
E	2.40	2.50	2.60	0.094	0.098	0.102
F	0.80	-	-	0.031	-	-
G	3.00 Ref.			0.118 Ref.		
H	1.50 Ref.			0.059 Ref.		
I	0.40	0.46	0.52	0.016	0.018	0.020
J	1.40	1.50	1.60	0.055	0.059	0.063
K	0.35	0.39	0.43	0.014	0.015	0.017
L	5^{o} Typ.			5^{o} Typ.		

■ Package Information (Continued)

(2) Package Type: SOT23-5L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.05	1.20	1.35	0.041	0.047	0.053
A1	0.05	0.10	0.15	0.002	0.004	0.006
A2	1.00	1.10	1.20	0.039	0.043	0.047
b	0.25	-	0.55	0.010	-	0.022
b1	0.25	0.40	0.45	0.010	0.016	0.018
c	0.08	-	0.20	0.003	-	0.008
c1	0.08	0.11	0.15	0.003	0.004	0.006
D	2.70	2.85	3.00	0.106	0.112	0.118
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
L	0.35	0.45	0.55	0.014	0.018	0.022
L1	0.60 Ref.			0.024 Ref.		
e	0.95 Bsc.			0.037 Bsc.		
e1	1.90 Bsc.			0.075 Bsc.		
θ	0°	5°	10°	0°	5°	10°
θ1	3°	5°	7°	3°	5°	7°
θ2	6°	8°	10°	6°	8°	10°