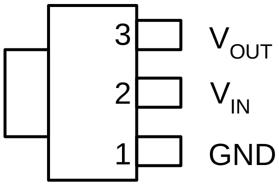
Pin Assignments

(1) SOT89-3L

(Top View)

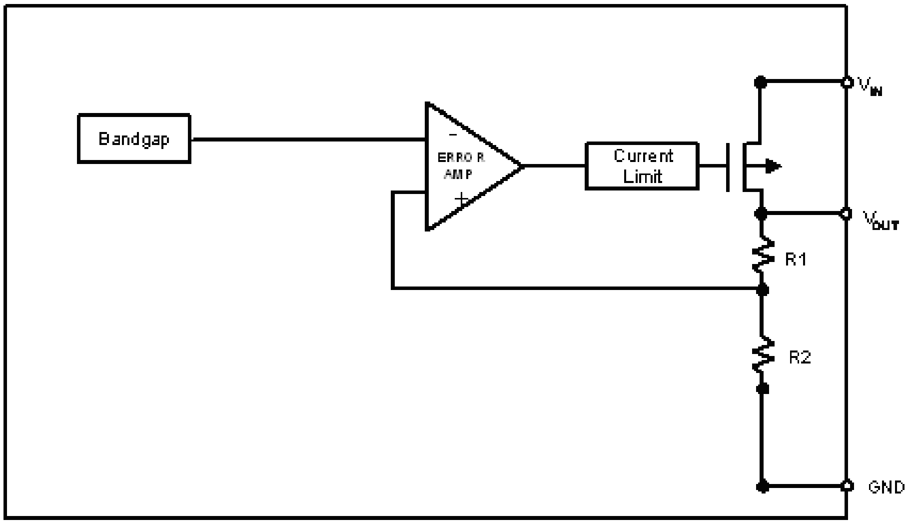


Tab is V_{IN}

Pin Descriptions

Pin Name	Pin No.	Function
GND	1	Ground
V_{IN}	2	Supply Voltage
V_{OUT}	3	Voltage Output

Block Diagram



Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
ESD HBM	Human Body Model ESD Protection		3	KV
ESD MM	Machine Model ESD Protection		450	V
V_{IN}	Input Voltage		+6	V
P_D	Power Dissipation @ TA=25 ºC (Note 3)	SOT89-3L	578	mW
T_{MJ}	Maximum Junction Temperature		150	ºC

Notes: 3. Maximum P_D is under minimum recommended pad layout condition.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{IN}	Input Voltage	2.5	5.5	V
I_{OUT}	Output Current	0	600	mA
T_A	Operating Ambient Temperature	-40	85	ºC
T_J	Operating Junction Temperature	-40	125	ºC

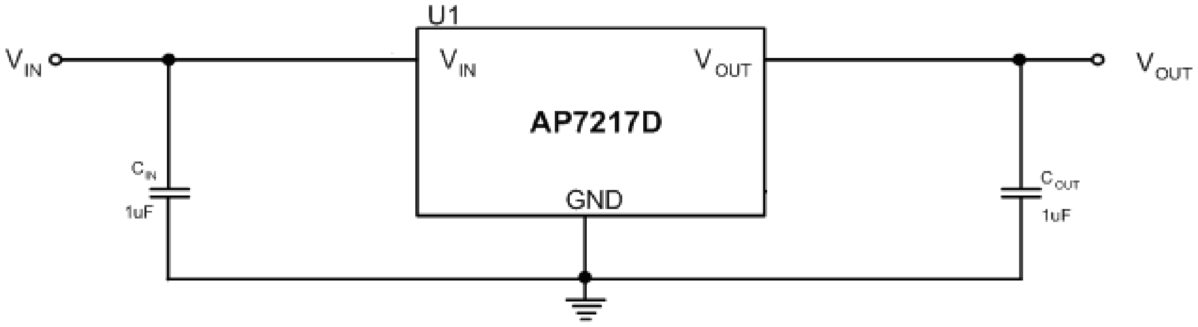
Electrical Characteristics

(T_A = 25°C, C_{IN} = 1µF, C_{OUT} = 1µF, V_{IN}=5V, unless otherwise noted)

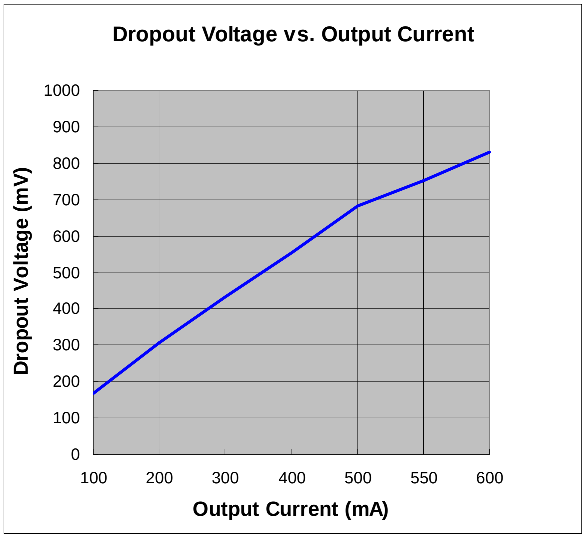
Symbol	Parameter	Test Conditions	Min	Typ.	Max	Unit
I_Q	Quiescent Current	I_O = 0mA	-	40	60	µA
V_{OUT}	Output Voltage Accuracy	I_O = 30mA	1.176	1.2	1.224	V
	V_{OUT} Temperature Coefficient	-40°C to 85°C, I_{OUT} = 30mA	-	±100	-	ppm / °C
$V_{DROPOUT}$	Dropout Voltage	I_{OUT} = 600mA, V_{OUT} = 1.2V	-	850	1300	mV
I_{OUT}	Maximum Output Current		600	-	-	mA
I_{LIMIT}	Current Limit		-	850	-	mA
I_{SHORT}	Short Circuit Current		-	200	-	mA
ΔV_{LINE}	Line Regulation	2.5V ≤ V_{IN} ≤ 5.5V; I_{OUT} = 30mA	-	0.2	-	%/V
ΔV_{LOAD}	Load Regulation (Note 4)	1mA ≤ I_{OUT} ≤ 300mA		15	35	mV
		1mA ≤ I_{OUT} ≤ 600mA		30	55	mV
PSRR	Power Supply Rejection	V_{IN} = 4.3V+0.5Vp-pAC, I_{OUT} = 50mA F = 1KHz	-	55	-	dB
	Thermal Shutdown Temperature		-	150	-	ºC
	Thermal Shutdown Hysteresis		-	30	-	ºC
θ_{JA}	Thermal Resistance Junction-to-Ambient	SOT89-3L (Note 5)	-	173	-	ºC/W
θ_{JC}	Thermal Resistance Junction-to-Case	SOT89-3L (Note 5)	-	51	-	ºC/W

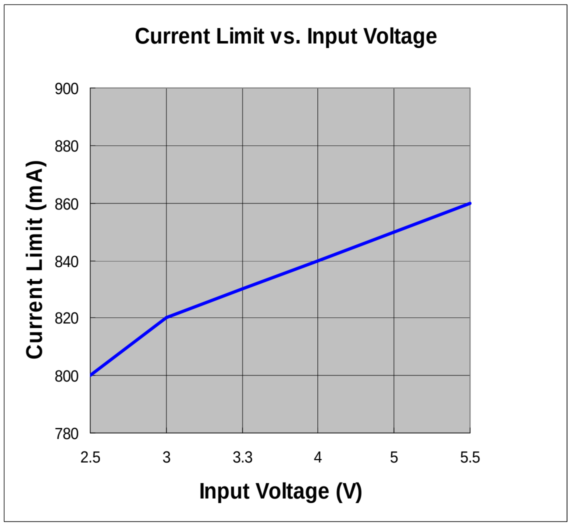
Notes: 4. Regulation is measured at constant junction temperature by low duty cycle pulse testing.
5. Test condition for SOT89-3L: Devices mounted on FR-4 substrate, single sided PC board, 2oz copper, with minimum recommended pad layout, no air flow.

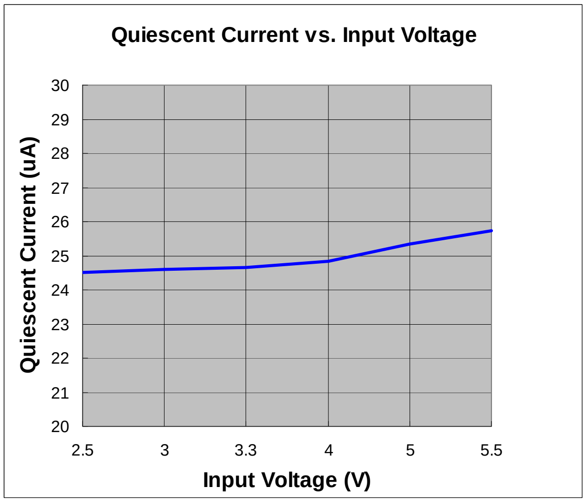
Typical Application

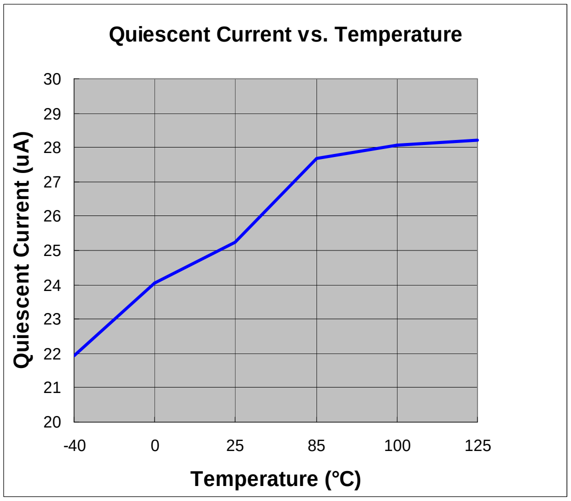


Typical Performance Characteristics

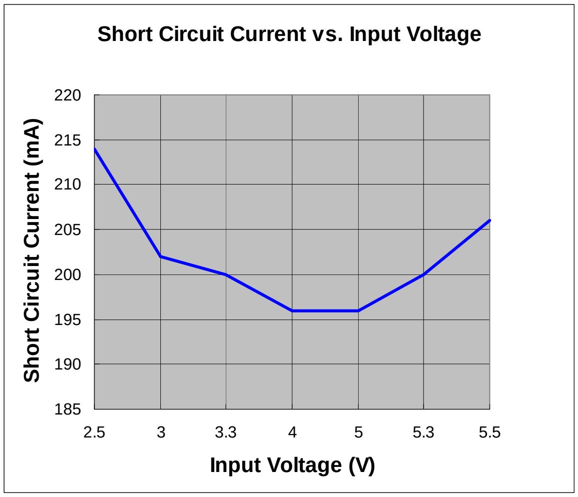

Dropout Voltage vs. Output Current


Current Limit vs. Input Voltage

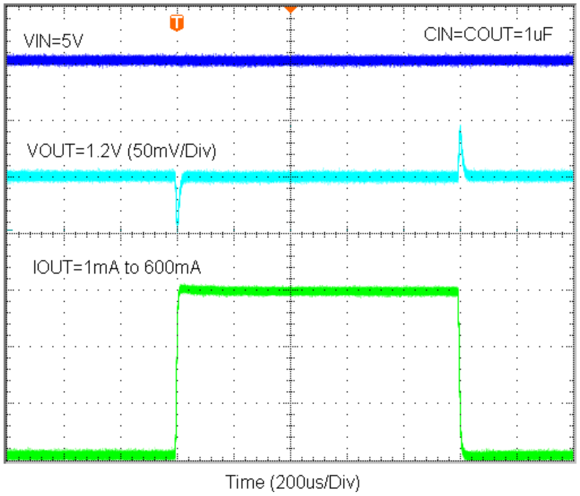

Quiescent Current vs. Input Voltage


Quiescent Current vs. Temperature

Typical Performance Characteristics (Continued)



Load Transient Response



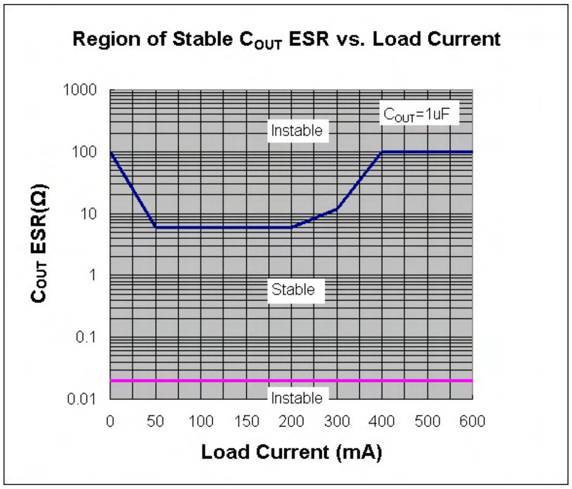
Application Information

Input Capacitor

A 1µF ceramic capacitor is recommended to connect between IN and GND pins to decouple input power supply glitch and noise. The amount of the capacitance may be increased without limit. A lower ESR (Equivalent Series Resistance) capacitor allows the use of less capacitance, while higher ESR type requires more capacitance. 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 IN and GND.

Output Capacitor

The output capacitor is required to stabilize and help the transient response of the LDO. The AP7217D is designed to have excellent transient response for most applications with a small amount of output capacitance. The AP7217D is stable with any small ceramic output capacitors of 1.0µF or higher value, and the temperature coefficients of X7R or X5R type. Additional capacitance helps to reduce undershoot and overshoot during transient. For PCB layout, the output capacitor must be placed as close as possible to OUT and GND pins, and keep the leads as short as possible.



Thermal Considerations

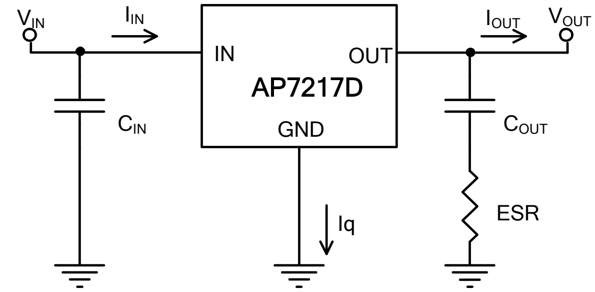
Thermal Shutdown Protection limits power dissipation in AP7217D. When the operation junction temperature exceeds 150°C, the Over Temperature Protection circuit starts the thermal shutdown function and turns the pass element off. The pass element turn on again after the junction temperature cools by 30°C. For continuous operation, do not exceed recommend maximum operation junction temperature 125°C. The power dissipation definition in device is:

$$P_D = (V_{IN} - V_{OUT}) \times I_{OUT} + V_{IN} \times I_Q$$

The maximum power dissipation depends on the thermal resistance of IC package, PCB layout, the rate of surroundings airflow and temperature difference between junctions to ambient. The maximum power dissipation can be calculated by following formula:

$$P_{D(MAX)} = (T_{J(MAX)} - TA) / \theta_{JA}$$

Where $T_{J(MAX)}$ is the maximum operation junction temperature 125°C, T_A is the ambient temperature and the θ_{JA} is the junction to ambient thermal resistance.



Current Limit Protection

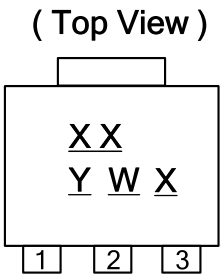
When output current at OUT pin is higher than current limit threshold, the current limit protection will be triggered and clamp the output current to approximately 850mA to prevent over-current and to protect the regulator from damage due to overheating.

Short circuit protection

When V_{OUT} pin is shorted to GND or V_{OUT} voltage is less than 200mV, short circuit protection will be triggered and clamp the output current to approximately 200mA.

Marking Information

(1) SOT89-3L



XX : N4 : AP7217D-12
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week;
z represents 52 and 53 week
X : Internal code
A~Z : Green

Package Information (All Dimensions in mm)

(1) Package Type: SOT89-3L