

**600mA CMOS LDO REGULATOR WITH ENABLE****AP2112****General Description**

The AP2112 is CMOS process low dropout linear regulator with enable function, the regulator delivers a guaranteed 600mA (min.) continuous load current.

The AP2112 provides 1.2V, 1.8V, 2.5V, 2.6V, 2.8V and 3.3V regulated output, and provides excellent output accuracy  $\pm 1.5\%$ , also provides an excellent load regulation, line regulation and excellent load transient performance due to very fast loop response. The AP2112 has built-in auto discharge function.

The regulator features low power consumption, and provides SOT-23-5, SOT-89-5, and SOIC-8 packages.

**Features**

- Output Voltage Accuracy:  $\pm 1.5\%$
- Output Current: 600mA (Min.)
- Foldback Short Current Protection: 50mA
- Enable Function to Turn ON/OFF  $V_{OUT}$
- Low Dropout Voltage (3.3V): 250mV (Typ.) @  $I_{OUT}=600mA$
- Excellent Load Regulation: 0.2%/A (Typ.)
- Excellent Line Regulation: 0.02%/V (Typ.)
- Low Quiescent Current: 55 $\mu A$  (Typ.)
- Low Standby Current: 0.01 $\mu A$  (Typ.)
- Low Output Noise: 50 $\mu V_{RMS}$
- PSRR: 100Hz -65dB, 1kHz -65dB
- OTSD Protection
- Stable with 1.0 $\mu F$  Flexible Cap: Ceramic, Tantalum and Aluminum Electrolytic
- Operation Temperature Range: -40°C to 85°C
- ESD: MM 400V, HBM 4000V

**Applications**

- Laptop Computer
- Portable DVD
- LCD Monitor

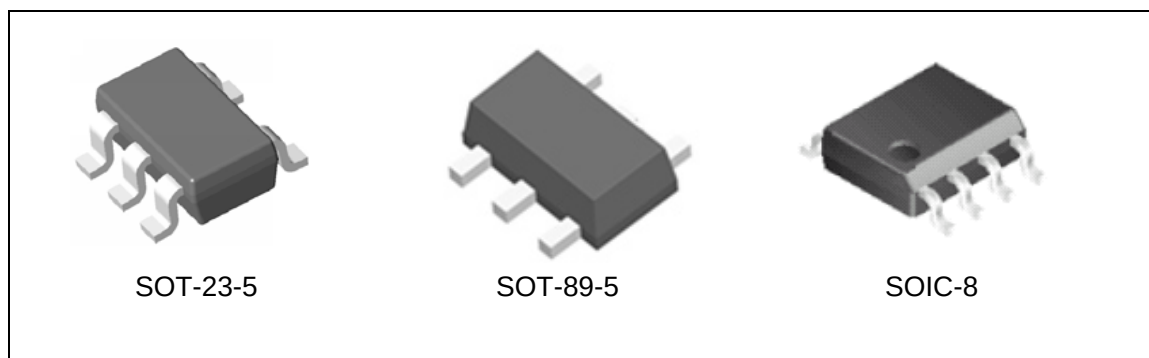


Figure 1. Package Types of AP2112

# 600mA CMOS LDO REGULATOR WITH ENABLE

AP2112

## Pin Configuration

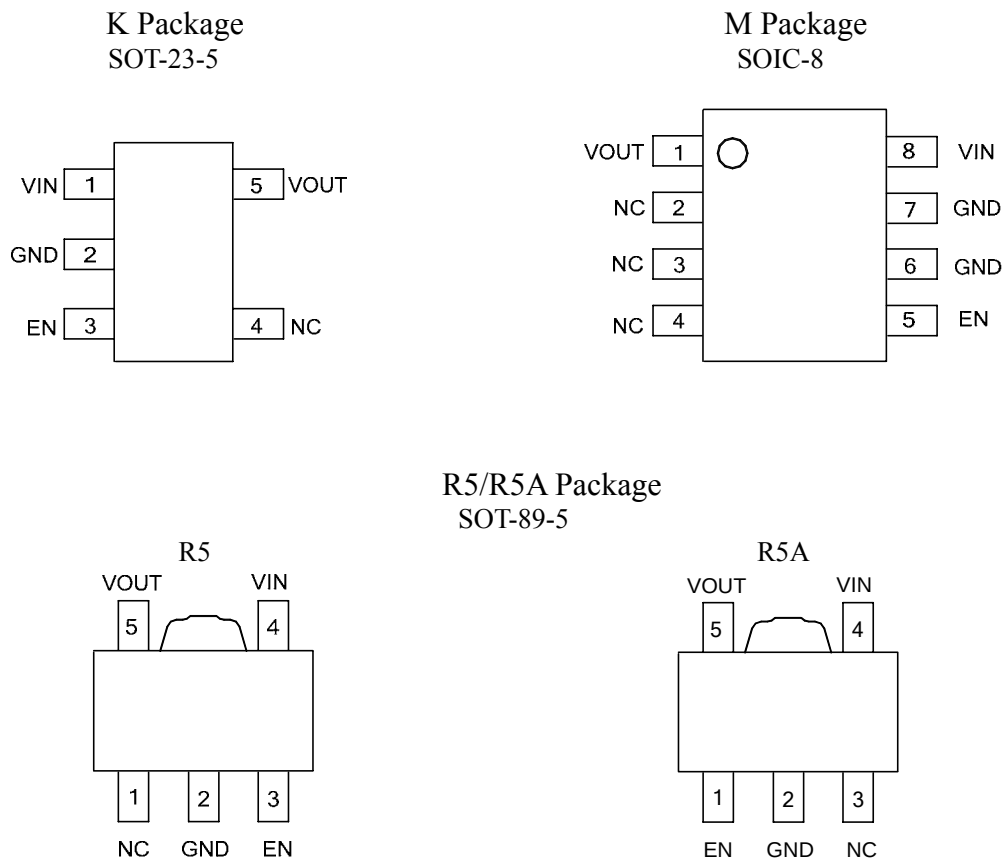


Figure 2. Pin Configuration of AP2112 (Top View)

## Pin Descriptions

| PIN No.  |                   |         | Name | Descriptions                                      |
|----------|-------------------|---------|------|---------------------------------------------------|
| SOT-23-5 | SOT-89-5          | SOIC-8  |      |                                                   |
| 1        | 4                 | 8       | VIN  | Input Voltage                                     |
| 2        | 2                 | 6, 7    | GND  | GND                                               |
| 3        | 3 (R5)<br>1 (R5A) | 5       | EN   | Chip Enable, H – normal work, L – shutdown output |
| 4        | 1 (R5)<br>3 (R5A) | 2, 3, 4 | NC   | No Connection                                     |
| 5        | 5                 | 1       | VOUT | Output Voltage                                    |

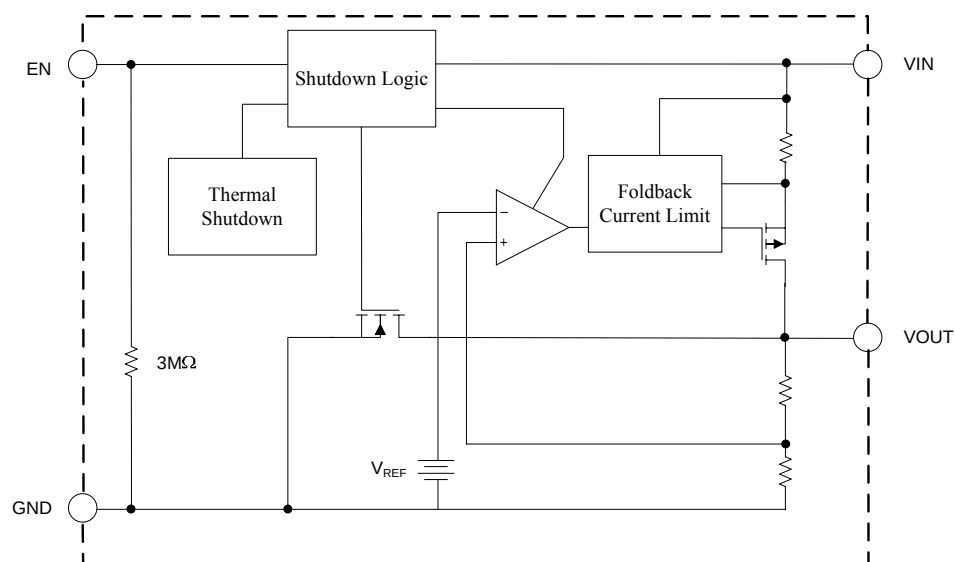
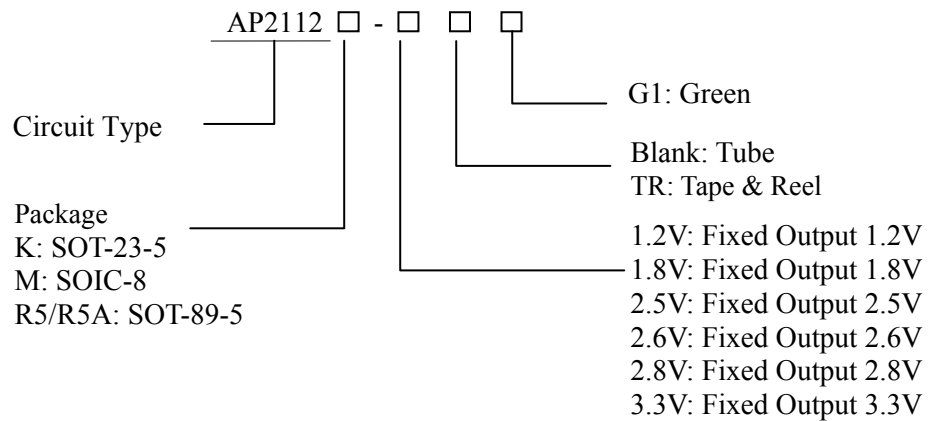
**Functional Block Diagram**

Figure 3. Functional Block Diagram of AP2112

**600mA CMOS LDO REGULATOR WITH ENABLE****AP2112****Ordering Information**

| Package  | Temperature Range | Condition | Part Number       | Marking ID  | Packing Type |
|----------|-------------------|-----------|-------------------|-------------|--------------|
| SOT-23-5 | -40 to 85°C       | 1.2V      | AP2112K-1.2TRG1   | G3L         | Tape & Reel  |
|          |                   | 1.8V      | AP2112K-1.8TRG1   | G3M         | Tape & Reel  |
|          |                   | 2.5V      | AP2112K-2.5TRG1   | G3N         | Tape & Reel  |
|          |                   | 2.6V      | AP2112K-2.6TRG1   | G5N         | Tape & Reel  |
|          |                   | 2.8V      | AP2112K-2.8TRG1   | G3Q         | Tape & Reel  |
|          |                   | 3.3V      | AP2112K-3.3TRG1   | G3P         | Tape & Reel  |
| SOIC-8   | -40 to 85°C       | 1.2V      | AP2112M-1.2G1     | 2112M-1.2G1 | Tube         |
|          |                   |           | AP2112M-1.2TRG1   | 2112M-1.2G1 | Tape & Reel  |
|          |                   | 1.8V      | AP2112M-1.8G1     | 2112M-1.8G1 | Tube         |
|          |                   |           | AP2112M-1.8TRG1   | 2112M-1.8G1 | Tape & Reel  |
|          |                   | 2.5V      | AP2112M-2.5G1     | 2112M-2.5G1 | Tube         |
|          |                   |           | AP2112M-2.5TRG1   | 2112M-2.5G1 | Tape & Reel  |
|          |                   | 2.6V      | AP2112M-2.6G1     | 2112M-2.6G1 | Tube         |
|          |                   |           | AP2112M-2.6TRG1   | 2112M-2.6G1 | Tape & Reel  |
| SOT-89-5 | -40 to 85°C       | 3.3V      | AP2112M-3.3G1     | 2112M-3.3G1 | Tube         |
|          |                   |           | AP2112M-3.3TRG1   | 2112M-3.3G1 | Tape & Reel  |
|          |                   | 1.2V(R5)  | AP2112R5-1.2TRG1  | G37D        | Tape & Reel  |
|          |                   | 1.8V(R5)  | AP2112R5-1.8TRG1  | G37E        | Tape & Reel  |
|          |                   | 2.5V(R5)  | AP2112R5-2.5TRG1  | G37F        | Tape & Reel  |
| SOT-89-5 | -40 to 85°C       | 2.6V(R5)  | AP2112R5-2.6TRG1  | G13F        | Tape & Reel  |
|          |                   | 3.3V(R5)  | AP2112R5-3.3TRG1  | G37G        | Tape & Reel  |
|          |                   | 1.2V(R5A) | AP2112R5A-1.2TRG1 | G33C        | Tape & Reel  |
|          |                   | 1.8V(R5A) | AP2112R5A-1.8TRG1 | G33E        | Tape & Reel  |
|          |                   | 2.5V(R5A) | AP2112R5A-2.5TRG1 | G28G        | Tape & Reel  |
| SOT-89-5 | -40 to 85°C       | 2.6V(R5A) | AP2112R5A-2.6TRG1 | G13E        | Tape & Reel  |
|          |                   | 3.3V(R5A) | AP2112R5A-3.3TRG1 | G28H        | Tape & Reel  |

BCD Semiconductor's Pb-free products, as designated with "G1" suffix in the part number, are RoHS compliant and Green.

**600mA CMOS LDO REGULATOR WITH ENABLE****AP2112****Absolute Maximum Ratings (Note 1)**

| Parameter                                              | Symbol        | Value      |     | Unit  |
|--------------------------------------------------------|---------------|------------|-----|-------|
| Power Supply Voltage                                   | $V_{CC}$      | 6.5        |     | V     |
| Operating Junction Temperature Range                   | $T_J$         | 150        |     | °C    |
| Storage temperature Range                              | $T_{STG}$     | -65 to 150 |     | °C    |
| Lead Temperature (Soldering, 10 Seconds)               | $T_{LEAD}$    | 260        |     | °C    |
| Thermal Resistance (Junction to Ambient) (No Heatsink) | $\theta_{JA}$ | SOT-23-5   | 184 | °C /W |
|                                                        |               | SOIC-8     | 114 |       |
|                                                        |               | SOT-89-5   | 120 |       |
| ESD (Machine Model)                                    |               | 400        |     | V     |
| ESD (Human Body Model)                                 |               | 4000       |     | V     |

Note 1: Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

**Recommended Operating Conditions**

| Parameter                           | Symbol   | Min | Max | Unit |
|-------------------------------------|----------|-----|-----|------|
| Supply Voltage                      | $V_{IN}$ | 2.5 | 6.0 | V    |
| Ambient Operation Temperature Range | $T_A$    | -40 | 85  | °C   |

**600mA CMOS LDO REGULATOR WITH ENABLE****AP2112****Electrical Characteristics****AP2112-1.2 Electrical Characteristic (Note 2)**

$V_{IN}=2.5V$ ,  $C_{IN}=1.0\mu F$  (Ceramic),  $C_{OUT}=1.0\mu F$  (Ceramic), Typical  $T_A=25^\circ C$ , **Bold** typeface applies over  $-40^\circ C \leq T_J \leq 85^\circ C$  ranges, unless otherwise specified (Note 3).

| Parameter                              | Symbol                                    | Test Conditions                                      | Min                 | Typ       | Max                  | Unit            |
|----------------------------------------|-------------------------------------------|------------------------------------------------------|---------------------|-----------|----------------------|-----------------|
| Output Voltage                         | $V_{OUT}$                                 | $V_{IN}=2.5V$ , $1mA \leq I_{OUT} \leq 30mA$         | $V_{OUT}^{*98.5\%}$ | 1.2       | $V_{OUT}^{*101.5\%}$ | V               |
| Maximum Output Current                 | $I_{OUT(MAX)}$                            | $V_{IN}=2.5V$ ,<br>$V_{OUT}=1.182V$ to $1.218V$      | 600                 |           |                      | mA              |
| Load Regulation                        | $(\Delta V_{OUT}/V_{OUT})/\Delta I_{OUT}$ | $V_{IN}=2.5V$ , $1mA \leq I_{OUT} \leq 600mA$        | -1                  | 0.2       | 1                    | %/A             |
| Line Regulation                        | $(\Delta V_{OUT}/V_{OUT})/\Delta V_{IN}$  | $2.5V \leq V_{IN} \leq 6V$ , $I_{OUT}=30mA$          | -0.1                | 0.02      | 0.1                  | %/V             |
| Dropout Voltage                        | $V_{DROP}$                                | $I_{OUT}=10mA$                                       |                     | 1000      | 1300                 | mV              |
|                                        |                                           | $I_{OUT}=300mA$                                      |                     | 1000      | 1300                 |                 |
|                                        |                                           | $I_{OUT}=600mA$                                      |                     | 1000      | 1300                 |                 |
| Quiescent Current                      | $I_Q$                                     | $V_{IN}=2.5V$ , $I_{OUT}=0mA$                        |                     | 55        | 80                   | $\mu A$         |
| Standby Current                        | $I_{STD}$                                 | $V_{IN}=2.5V$ , $V_{EN}$ in OFF mode                 |                     | 0.01      | 1.0                  | $\mu A$         |
| Power Supply Rejection Ratio           | PSRR                                      | Ripple 0.5Vp-p<br>$V_{IN}=2.5V$ ,<br>$I_{OUT}=100mA$ | $f=100Hz$           | 65        |                      | dB              |
|                                        |                                           |                                                      | $f=1KHz$            | 65        |                      |                 |
| Output Voltage Temperature Coefficient | $(\Delta V_{OUT}/V_{OUT})/\Delta T$       | $I_{OUT}=30mA$<br>$T_A=-40^\circ C$ to $85^\circ C$  |                     | $\pm 100$ |                      | ppm/ $^\circ C$ |
| Short Current Limit                    | $I_{SHORT}$                               | $V_{OUT}=0V$                                         |                     | 50        |                      | mA              |
| RMS Output Noise                       | $V_{NOISE}$                               | No Load, $10Hz \leq f \leq 100kHz$                   |                     | 50        |                      | $\mu V_{RMS}$   |
| $V_{EN}$ High Voltage                  | $V_{IH}$                                  | Enable logic high, regulator on                      | 1.5                 |           | 6.0                  | V               |
| $V_{EN}$ Low Voltage                   | $V_{IL}$                                  | Enable logic low, regulator off                      | 0                   |           | 0.4                  |                 |
| Start-up Time                          | $t_S$                                     | No Load                                              |                     | 20        |                      | $\mu s$         |
| EN Pull Down Resistor                  | $R_{PD}$                                  |                                                      |                     | 3.0       |                      | $M\Omega$       |
| $V_{OUT}$ discharge Resistor           | $R_{DCHG}$                                | Set EN pin at Low                                    |                     | 60        |                      | $\Omega$        |
| Thermal Shutdown Temperature           | $T_{OTSD}$                                |                                                      |                     | 160       |                      | $^\circ C$      |
| Thermal Shutdown Hysteresis            | $T_{HYOTSD}$                              |                                                      |                     | 25        |                      |                 |
| Thermal Resistance                     | $\theta_{JC}$                             | SOT-23-5                                             |                     | 96        |                      | $^\circ C/W$    |
|                                        |                                           | SOIC-8                                               |                     | 75        |                      |                 |
|                                        |                                           | SOT-89-5                                             |                     | 47        |                      |                 |

Note 2: To prevent the Short Circuit Current protection feature from being prematurely activated, the input voltage must be applied before a current source load is applied.

Note 3: Production testing at  $T_A=25^\circ C$ . Over temperature specifications guaranteed by design only.

**600mA CMOS LDO REGULATOR WITH ENABLE****AP2112****Electrical Characteristics (Continued)****AP2112-1.8 Electrical Characteristic (Note 2)**

$V_{IN}=2.8V$ ,  $C_{IN}=1\mu F$  (Ceramic),  $C_{OUT}=1\mu F$  (Ceramic), Typical  $T_A=25^\circ C$ , **Bold** typeface applies over  $-40^\circ C \leq T_J \leq 85^\circ C$  ranges, unless otherwise specified (Note 3).

| Parameter                              | Symbol                                      | Test Conditions                                                         | Min                | Typ       | Max                 | Unit            |
|----------------------------------------|---------------------------------------------|-------------------------------------------------------------------------|--------------------|-----------|---------------------|-----------------|
| Output Voltage                         | $V_{OUT}$                                   | $V_{IN}=2.8V$ , $1mA \leq I_{OUT} \leq 30mA$                            | $V_{OUT} * 98.5\%$ | 1.8       | $V_{OUT} * 101.5\%$ | V               |
| Maximum Output Current                 | $I_{OUT(MAX)}$                              | $V_{IN}=2.8V$ ,<br>$V_{OUT}=1.773V$ to $1.827V$                         | 600                |           |                     | mA              |
| Load Regulation                        | $(\Delta V_{OUT}/V_{OUT}) / \Delta I_{OUT}$ | $V_{OUT}=1.8V$ , $V_{IN}=V_{OUT}+1V$ ,<br>$1mA \leq I_{OUT} \leq 600mA$ | -1                 | 0.2       | 1                   | %/A             |
| Line Regulation                        | $(\Delta V_{OUT}/V_{OUT}) / \Delta V_{IN}$  | $2.8V \leq V_{IN} \leq 6V$ , $I_{OUT}=30mA$                             | -0.1               | 0.02      | 0.1                 | %/V             |
| Dropout Voltage                        | $V_{DROP}$                                  | $I_{OUT}=10mA$                                                          |                    | 500       | 700                 | mV              |
|                                        |                                             | $I_{OUT}=300mA$                                                         |                    | 500       | 700                 |                 |
|                                        |                                             | $I_{OUT}=600mA$                                                         |                    | 500       | 700                 |                 |
| Quiescent Current                      | $I_Q$                                       | $V_{IN}=2.8V$ , $I_{OUT}=0mA$                                           |                    | 55        | 80                  | $\mu A$         |
| Standby Current                        | $I_{STD}$                                   | $V_{IN}=2.8V$ , $V_{EN}$ in OFF mode                                    |                    | 0.01      | 1.0                 | $\mu A$         |
| Power Supply Rejection Ratio           | PSRR                                        | Ripple 0.5Vp-p<br>$V_{IN}=2.8V$ ,<br>$I_{OUT}=100mA$                    | $f=100Hz$          | 65        |                     | dB              |
|                                        |                                             |                                                                         | $f=1KHz$           | 65        |                     |                 |
| Output Voltage Temperature Coefficient | $(\Delta V_{OUT}/V_{OUT}) / \Delta T$       | $I_{OUT}=30mA$ ,<br>$T_A=-40^\circ C$ to $85^\circ C$                   |                    | $\pm 100$ |                     | ppm/ $^\circ C$ |
| Short Current Limit                    | $I_{SHORT}$                                 | $V_{OUT}=0V$                                                            |                    | 50        |                     | mA              |
| RMS Output Noise                       | $V_{NOISE}$                                 | No Load, $10Hz \leq f \leq 100kHz$                                      |                    | 50        |                     | $\mu V_{RMS}$   |
| $V_{EN}$ High Voltage                  | $V_{IH}$                                    | Enable logic high, regulator on                                         | 1.5                |           | 6.0                 | V               |
| $V_{EN}$ Low Voltage                   | $V_{IL}$                                    | Enable logic low, regulator off                                         | 0                  |           | 0.4                 |                 |
| Start-up Time                          | $t_S$                                       | No Load                                                                 |                    | 20        |                     | $\mu s$         |
| EN Pull Down Resistor                  | $R_{PD}$                                    |                                                                         |                    | 3.0       |                     | $M\Omega$       |
| $V_{OUT}$ Discharge Resistor           | $R_{DCHG}$                                  | Set EN pin at Low                                                       |                    | 60        |                     | $\Omega$        |
| Thermal Shutdown Temperature           | $T_{OTSD}$                                  |                                                                         |                    | 160       |                     | $^\circ C$      |
| Thermal Shutdown Hysteresis            | $T_{HYOTSD}$                                |                                                                         |                    | 25        |                     |                 |
| Thermal Resistance                     | $\theta_{JC}$                               | SOT-23-5                                                                |                    | 96        |                     | $^\circ C/W$    |
|                                        |                                             | SOIC-8                                                                  |                    | 75        |                     |                 |
|                                        |                                             | SOT-89-5                                                                |                    | 47        |                     |                 |

Note 2: To prevent the Short Circuit Current protection feature from being prematurely activated, the input voltage must be applied before a current source load is applied.

Note 3: Production testing at  $T_A=25^\circ C$ . Over temperature specifications guaranteed by design only.

**600mA CMOS LDO REGULATOR WITH ENABLE****AP2112****Electrical Characteristics (Continued)****AP2112-2.5 Electrical Characteristic (Note 2)**

$V_{IN}=3.5V$ ,  $C_{IN}=1\mu F$  (Ceramic),  $C_{OUT}=1\mu F$  (Ceramic), Typical  $T_A=25^\circ C$ , **Bold** typeface applies over  $-40^\circ C \leq T_J \leq 85^\circ C$  ranges, unless otherwise specified (Note 3).

| Parameter                              | Symbol                                      | Test Conditions                                                      | Min                | Typ       | Max                 | Unit            |
|----------------------------------------|---------------------------------------------|----------------------------------------------------------------------|--------------------|-----------|---------------------|-----------------|
| Output Voltage                         | $V_{OUT}$                                   | $V_{IN}=3.5V$ , $1mA \leq I_{OUT} \leq 30mA$                         | $V_{OUT} * 98.5\%$ | 2.5       | $V_{OUT} * 101.5\%$ | V               |
| Maximum Output Current                 | $I_{OUT(MAX)}$                              | $V_{IN}=3.5V$ , $V_{OUT}=2.463V$ to $2.537V$                         | 600                |           |                     | mA              |
| Load Regulation                        | $(\Delta V_{OUT}/V_{OUT}) / \Delta I_{OUT}$ | $V_{OUT}=2.5V$ , $V_{IN}=V_{OUT}+1V$ , $1mA \leq I_{OUT} \leq 600mA$ | -1                 | 0.2       | 1                   | %/A             |
| Line Regulation                        | $(\Delta V_{OUT}/V_{OUT}) / \Delta V_{IN}$  | $3.5V \leq V_{IN} \leq 6V$ , $I_{OUT}=30mA$                          | -0.1               | 0.02      | 0.1                 | %/V             |
| Dropout Voltage                        | $V_{DROP}$                                  | $I_{OUT}=10mA$                                                       |                    | 5         | 8                   | mV              |
|                                        |                                             | $I_{OUT}=300mA$                                                      |                    | 125       | 200                 |                 |
|                                        |                                             | $I_{OUT}=600mA$                                                      |                    | 250       | 400                 |                 |
| Quiescent Current                      | $I_Q$                                       | $V_{IN}=3.5V$ , $I_{OUT}=0mA$                                        |                    | 55        | 80                  | $\mu A$         |
| Standby Current                        | $I_{STD}$                                   | $V_{IN}=3.5V$ , $V_{EN}$ in OFF mode                                 |                    | 0.01      | 1.0                 | $\mu A$         |
| Power Supply Rejection Ratio           | PSRR                                        | Ripple 0.5Vp-p<br>$V_{IN}=3.5V$ ,<br>$I_{OUT}=100mA$                 | $f=100Hz$          | 65        |                     | dB              |
|                                        |                                             |                                                                      | $f=1KHz$           | 65        |                     |                 |
| Output Voltage Temperature Coefficient | $(\Delta V_{OUT}/V_{OUT}) / \Delta T$       | $I_{OUT}=30mA$<br>$T_A=-40^\circ C$ to $85^\circ C$                  |                    | $\pm 100$ |                     | ppm/ $^\circ C$ |
| Short Current Limit                    | $I_{SHORT}$                                 | $V_{OUT}=0V$                                                         |                    | 50        |                     | mA              |
| RMS Output Noise                       | $V_{NOISE}$                                 | No Load, $10Hz \leq f \leq 100kHz$                                   |                    | 50        |                     | $\mu V_{RMS}$   |
| $V_{EN}$ High Voltage                  | $V_{IH}$                                    | Enable logic high, regulator on                                      | 1.5                |           | 6.0                 | V               |
| $V_{EN}$ Low Voltage                   | $V_{IL}$                                    | Enable logic low, regulator off                                      | 0                  |           | 0.4                 |                 |
| Start-up Time                          | $t_S$                                       | No Load                                                              |                    | 20        |                     | $\mu s$         |
| EN Pull Down Resistor                  | $R_{PD}$                                    |                                                                      |                    | 3.0       |                     | $M\Omega$       |
| $V_{OUT}$ Discharge Resistor           | $R_{DCHG}$                                  | Set EN pin at Low                                                    |                    | 60        |                     | $\Omega$        |
| Thermal Shutdown Temperature           | $T_{OTSD}$                                  |                                                                      |                    | 160       |                     | $^\circ C$      |
| Thermal Shutdown Hysteresis            | $T_{HYOTSD}$                                |                                                                      |                    | 25        |                     |                 |
| Thermal Resistance                     | $\theta_{JC}$                               | SOT-23-5                                                             |                    | 96        |                     | $^\circ C/W$    |
|                                        |                                             | SOIC-8                                                               |                    | 75        |                     |                 |
|                                        |                                             | SOT-89-5                                                             |                    | 47        |                     |                 |

Note 2: To prevent the Short Circuit Current protection feature from being prematurely activated, the input voltage must be applied before a current source load is applied.

Note 3: Production testing at  $T_A=25^\circ C$ . Over temperature specifications guaranteed by design only.



**600mA CMOS LDO REGULATOR WITH ENABLE****AP2112****Electrical Characteristics (Continued)****AP2112-2.6 Electrical Characteristic (Note 2)**

$V_{IN}=3.6V$ ,  $C_{IN}=1\mu F$  (Ceramic),  $C_{OUT}=1\mu F$  (Ceramic), Typical  $T_A=25^\circ C$ , **Bold** typeface applies over  $-40^\circ C \leq T_J \leq 85^\circ C$  ranges, unless otherwise specified (Note 3).

| Parameter                              | Symbol                                           | Test Conditions                                                      | Min                 | Typ       | Max                  | Unit            |
|----------------------------------------|--------------------------------------------------|----------------------------------------------------------------------|---------------------|-----------|----------------------|-----------------|
| Output Voltage                         | $V_{OUT}$                                        | $V_{IN}=3.6V$ , $1mA \leq I_{OUT} \leq 30mA$                         | $V_{OUT}$<br>*98.5% | 2.6       | $V_{OUT}$<br>*101.5% | V               |
| Maximum Output Current                 | $I_{OUT(MAX)}$                                   | $V_{IN}=3.6V$ , $V_{OUT}=2.561V$ to $2.639V$                         | 600                 |           |                      | mA              |
| Load Regulation                        | $\frac{\Delta V_{OUT}/V_{OUT}}{\Delta I_{OUT}}$  | $V_{OUT}=2.6V$ , $V_{IN}=V_{OUT}+1V$ , $1mA \leq I_{OUT} \leq 600mA$ | -1                  | 0.2       | 1                    | %/A             |
| Line Regulation                        | $\frac{(\Delta V_{OUT}/V_{OUT})}{\Delta V_{IN}}$ | $3.6V \leq V_{IN} \leq 6V$ , $I_{OUT}=30mA$                          | -0.1                | 0.02      | 0.1                  | %/V             |
| Dropout Voltage                        | $V_{DROP}$                                       | $I_{OUT}=10mA$                                                       |                     | 5         | 8                    | mV              |
|                                        |                                                  | $I_{OUT}=300mA$                                                      |                     | 125       | 200                  |                 |
|                                        |                                                  | $I_{OUT}=600mA$                                                      |                     | 250       | 400                  |                 |
| Quiescent Current                      | $I_Q$                                            | $V_{IN}=3.6V$ , $I_{OUT}=0mA$                                        |                     | 55        | 80                   | $\mu A$         |
| Standby Current                        | $I_{STD}$                                        | $V_{IN}=3.6V$ , $V_{EN}$ in OFF mode                                 |                     | 0.01      | 1.0                  | $\mu A$         |
| Power Supply Rejection Ratio           | PSRR                                             | Ripple 0.5Vp-p<br>$V_{IN}=3.6V$ ,<br>$I_{OUT}=100mA$                 | $f=100Hz$           | 65        |                      | dB              |
|                                        |                                                  |                                                                      | $f=1KHz$            | 65        |                      |                 |
| Output Voltage Temperature Coefficient | $(\Delta V_{OUT}/V_{OUT})/\Delta T$              | $I_{OUT}=30mA$<br>$T_A=-40^\circ C$ to $85^\circ C$                  |                     | $\pm 100$ |                      | ppm/ $^\circ C$ |
| Short Current Limit                    | $I_{SHORT}$                                      | $V_{OUT}=0V$                                                         |                     | 50        |                      | mA              |
| RMS Output Noise                       | $V_{NOISE}$                                      | No Load, $10Hz \leq f \leq 100kHz$                                   |                     | 50        |                      | $\mu V_{RMS}$   |
| $V_{EN}$ High Voltage                  | $V_{IH}$                                         | Enable logic high, regulator on                                      | 1.5                 |           | 6.0                  | V               |
| $V_{EN}$ Low Voltage                   | $V_{IL}$                                         | Enable logic low, regulator off                                      | 0                   |           | 0.4                  |                 |
| Start-up Time                          | $t_s$                                            | No Load                                                              |                     | 20        |                      | $\mu s$         |
| EN Pull Down Resistor                  | $R_{PD}$                                         |                                                                      |                     | 3.0       |                      | M $\Omega$      |
| $V_{OUT}$ Discharge Resistor           | $R_{DCHG}$                                       | Set EN pin at Low                                                    |                     | 60        |                      | $\Omega$        |
| Thermal Shutdown Temperature           | $T_{OTSD}$                                       |                                                                      |                     | 160       |                      | $^\circ C$      |
| Thermal Shutdown Hysteresis            | $T_{HYOTSD}$                                     |                                                                      |                     | 25        |                      |                 |
| Thermal Resistance                     | $\theta_{JC}$                                    | SOT-23-5                                                             |                     | 96        |                      | $^\circ C/W$    |
|                                        |                                                  | SOIC-8                                                               |                     | 75        |                      |                 |
|                                        |                                                  | SOT-89-5                                                             |                     | 47        |                      |                 |

Note 2: To prevent the Short Circuit Current protection feature from being prematurely activated, the input voltage must be applied before a current source load is applied.

Note 3: Production testing at  $T_A=25^\circ C$ . Over temperature specifications guaranteed by design only.

**600mA CMOS LDO REGULATOR WITH ENABLE****AP2112****Electrical Characteristics (Continued)****AP2112-2.8 Electrical Characteristic (Note 2)**

$V_{IN}=3.8V$ ,  $C_{IN}=1\mu F$  (Ceramic),  $C_{OUT}=1\mu F$  (Ceramic), Typical  $T_A = 25^\circ C$ , **Bold** typeface applies over  $-40^\circ C \leq T_J \leq 85^\circ C$  ranges, unless otherwise specified (Note 3).

| Parameter                              | Symbol                                    | Test Conditions                                                         | Min                 | Typ       | Max                  | Unit            |
|----------------------------------------|-------------------------------------------|-------------------------------------------------------------------------|---------------------|-----------|----------------------|-----------------|
| Output Voltage                         | $V_{OUT}$                                 | $V_{IN}=3.8V$ , $1mA \leq I_{OUT} \leq 30mA$                            | $V_{OUT}$<br>*98.5% | 2.8       | $V_{OUT}$<br>*101.5% | V               |
| Maximum Output Current                 | $I_{OUT(MAX)}$                            | $V_{IN}=3.8V$ , $V_{OUT}=2.758V$ to $2.842V$                            | 600                 |           |                      | mA              |
| Load Regulation                        | $(\Delta V_{OUT}/V_{OUT})/\Delta I_{OUT}$ | $V_{OUT}=2.8V$ , $V_{IN}=V_{OUT}+1V$ ,<br>$1mA \leq I_{OUT} \leq 600mA$ | -1                  | 0.2       | 1                    | %/A             |
| Line Regulation                        | $(\Delta V_{OUT}/V_{OUT})/\Delta V_{IN}$  | $3.8V \leq V_{IN} \leq 6V$ , $I_{OUT}=30mA$                             | -0.1                | 0.02      | 0.1                  | %/V             |
| Dropout Voltage                        | $V_{DROP}$                                | $I_{OUT}=10mA$                                                          |                     | 5         | 8                    | mV              |
|                                        |                                           | $I_{OUT}=300mA$                                                         |                     | 125       | 200                  |                 |
|                                        |                                           | $I_{OUT}=600mA$                                                         |                     | 250       | 400                  |                 |
| Quiescent Current                      | $I_Q$                                     | $V_{IN}=3.8V$ , $I_{OUT}=0mA$                                           |                     | 55        | 80                   | $\mu A$         |
| Standby Current                        | $I_{STD}$                                 | $V_{IN}=3.8V$ , $V_{EN}$ in OFF mode                                    |                     | 0.01      | 1.0                  | $\mu A$         |
| Power Supply Rejection Ratio           | PSRR                                      | Ripple 0.5Vp-p<br>$V_{IN}=3.8V$ ,<br>$I_{OUT}=100mA$                    | $f=100Hz$           | 65        |                      | dB              |
|                                        |                                           |                                                                         | $f=1KHz$            | 65        |                      |                 |
| Output Voltage Temperature Coefficient | $(\Delta V_{OUT}/V_{OUT})/\Delta T$       | $I_{OUT}=30mA$<br>$T_A = -40^\circ C$ to $85^\circ C$                   |                     | $\pm 100$ |                      | ppm/ $^\circ C$ |
| Short Current Limit                    | $I_{SHORT}$                               | $V_{OUT}=0V$                                                            |                     | 50        |                      | mA              |
| RMS Output Noise                       | $V_{NOISE}$                               | No Load, $10Hz \leq f \leq 100kHz$                                      |                     | 50        |                      | $\mu V_{RMS}$   |
| $V_{EN}$ High Voltage                  | $V_{IH}$                                  | Enable logic high, regulator on                                         | 1.5                 |           | 6.0                  | V               |
| $V_{EN}$ Low Voltage                   | $V_{IL}$                                  | Enable logic low, regulator off                                         | 0                   |           | 0.4                  |                 |
| Start-up Time                          | $t_S$                                     | No Load                                                                 |                     | 20        |                      | $\mu s$         |
| EN Pull Down Resistor                  | $R_{PD}$                                  |                                                                         |                     | 3.0       |                      | M $\Omega$      |
| $V_{OUT}$ Discharge Resistor           | $R_{DCHG}$                                | Set EN pin at Low                                                       |                     | 60        |                      | $\Omega$        |
| Thermal Shutdown Temperature           | $T_{OTSD}$                                |                                                                         |                     | 160       |                      | $^\circ C$      |
| Thermal Shutdown Hysteresis            | $T_{HYOTSD}$                              |                                                                         |                     | 25        |                      |                 |
| Thermal Resistance                     | $\theta_{JC}$                             | SOT-23-5                                                                |                     | 96        |                      | $^\circ C/W$    |
|                                        |                                           | SOIC-8                                                                  |                     | 75        |                      |                 |
|                                        |                                           | SOT-89-5                                                                |                     | 47        |                      |                 |

Note 2: To prevent the Short Circuit Current protection feature from being prematurely activated, the input voltage must be applied before a current source load is applied.

Note 3: Production testing at  $T_A=25^\circ C$ . Over temperature specifications guaranteed by design only.

**600mA CMOS LDO REGULATOR WITH ENABLE****AP2112****Electrical Characteristics (Continued)****AP2112-3.3 Electrical Characteristic (Note 2)**

$V_{IN}=4.3V$ ,  $C_{IN}=1\mu F$  (Ceramic),  $C_{OUT}=1\mu F$  (Ceramic), Typical  $T_A = 25^\circ C$ , **Bold** typeface applies over  $-40^\circ C \leq T_J \leq 85^\circ C$  ranges, unless otherwise specified (Note 3).

| Parameter                              | Symbol                                    | Test Conditions                                       | Min                | Typ       | Max                 | Unit            |
|----------------------------------------|-------------------------------------------|-------------------------------------------------------|--------------------|-----------|---------------------|-----------------|
| Output Voltage                         | $V_{OUT}$                                 | $V_{IN}=4.3V$ , $1mA \leq I_{OUT} \leq 30mA$          | $V_{OUT} * 98.5\%$ | 3.3       | $V_{OUT} * 101.5\%$ | V               |
| Maximum Output Current                 | $I_{OUT(MAX)}$                            | $V_{IN}=4.3V$ , $V_{OUT}=3.251V$ to $3.350V$          | 600                |           |                     | mA              |
| Load Regulation                        | $(\Delta V_{OUT}/V_{OUT})/\Delta I_{OUT}$ | $V_{IN}=4.3V$ , $1mA \leq I_{OUT} \leq 600mA$         | -1                 | 0.2       | 1                   | %/A             |
| Line Regulation                        | $(\Delta V_{OUT}/V_{OUT})/\Delta V_{IN}$  | $4.3V \leq V_{IN} \leq 6V$ , $I_{OUT}=30mA$           | -0.1               | 0.02      | 0.1                 | %/V             |
| Dropout Voltage                        | $V_{DROP}$                                | $I_{OUT}=10mA$                                        |                    | 5         | 8                   | mV              |
|                                        |                                           | $I_{OUT}=300mA$                                       |                    | 125       | 200                 |                 |
|                                        |                                           | $I_{OUT}=600mA$                                       |                    | 250       | 400                 |                 |
| Quiescent Current                      | $I_Q$                                     | $V_{IN}=4.3V$ , $I_{OUT}=0mA$                         |                    | 55        | 80                  | $\mu A$         |
| Standby Current                        | $I_{STD}$                                 | $V_{IN}=4.3V$ , $V_{EN}$ in OFF mode                  |                    | 0.01      | 1.0                 | $\mu A$         |
| Power Supply Rejection Ratio           | PSRR                                      | Ripple 0.5Vp-p<br>$V_{IN}=4.3V$ ,<br>$I_{OUT}=100mA$  | $f=100Hz$          | 65        |                     | dB              |
|                                        |                                           |                                                       | $f=1KHz$           | 65        |                     |                 |
| Output Voltage Temperature Coefficient | $(\Delta V_{OUT}/V_{OUT})/\Delta T$       | $I_{OUT}=30mA$<br>$T_A = -40^\circ C$ to $85^\circ C$ |                    | $\pm 100$ |                     | ppm/ $^\circ C$ |
| Short Current Limit                    | $I_{SHORT}$                               | $V_{OUT}=0V$                                          |                    | 50        |                     | mA              |
| RMS Output Noise                       | $V_{NOISE}$                               | No Load, $10Hz \leq f \leq 100kHz$                    |                    | 50        |                     | $\mu V_{RMS}$   |
| $V_{EN}$ High Voltage                  | $V_{IH}$                                  | Enable logic high, regulator on                       | 1.5                |           | 6.0                 | V               |
| $V_{EN}$ Low Voltage                   | $V_{IL}$                                  | Enable logic low, regulator off                       | 0                  |           | 0.4                 |                 |
| Start-up Time                          | $t_S$                                     | No Load                                               |                    | 20        |                     | $\mu s$         |
| EN Pull Down Resistor                  | $R_{PD}$                                  |                                                       |                    | 3.0       |                     | $M\Omega$       |
| $V_{OUT}$ Discharge Resistor           | $R_{DCHG}$                                | Set EN pin at Low                                     |                    | 60        |                     | $\Omega$        |
| Thermal Shutdown Temperature           | $T_{OTSD}$                                |                                                       |                    | 160       |                     | $^\circ C$      |
| Thermal Shutdown Hysteresis            | $T_{HYOTSD}$                              |                                                       |                    | 25        |                     |                 |
| Thermal Resistance                     | $\theta_{JC}$                             | SOT-23-5                                              |                    | 96        |                     | $^\circ C/W$    |
|                                        |                                           | SOIC-8                                                |                    | 75        |                     |                 |
|                                        |                                           | SOT-89-5                                              |                    | 47        |                     |                 |

Note 2: To prevent the Short Circuit Current protection feature from being prematurely activated, the input voltage must be applied before a current source load is applied.

Note 3: Production testing at  $T_A = 25^\circ C$ . Over temperature specifications guaranteed by design only.

# 600mA CMOS LDO REGULATOR WITH ENABLE

AP2112

## Typical Performance Characteristics

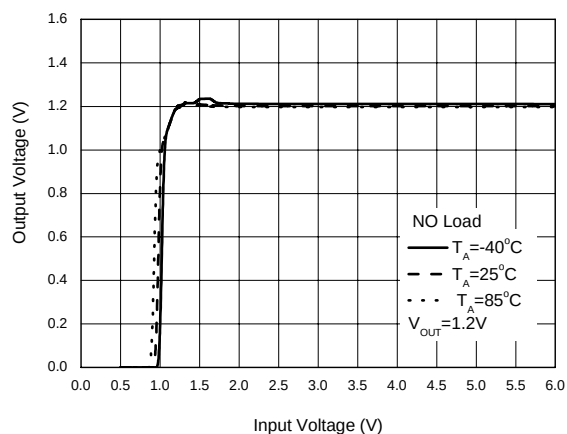


Figure 4. Output Voltage vs. Input Voltage

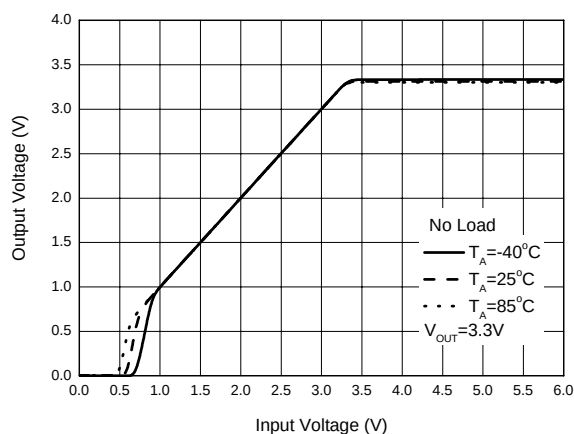


Figure 5. Output Voltage vs. Input Voltage

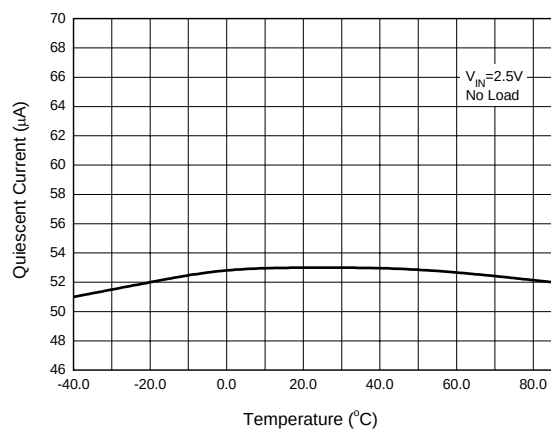


Figure 6. Quiescent Current vs. Temperature

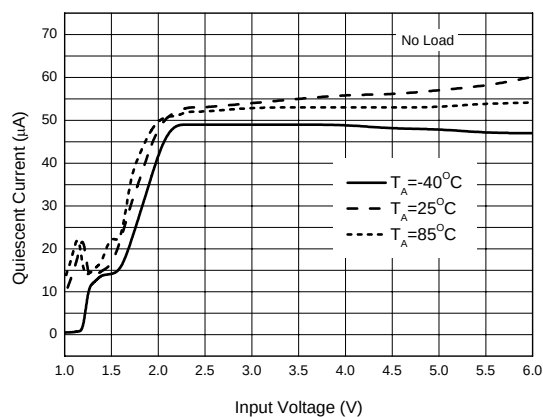


Figure 7. Quiescent Current vs. Input Voltage

# 600mA CMOS LDO REGULATOR WITH ENABLE

AP2112

## Typical Performance Characteristics (Continued)

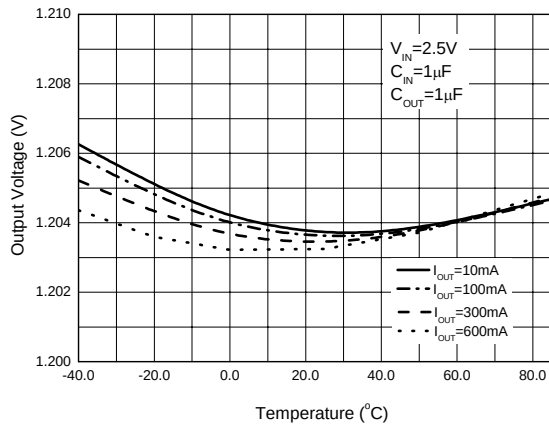


Figure 8. Output Voltage vs. Temperature

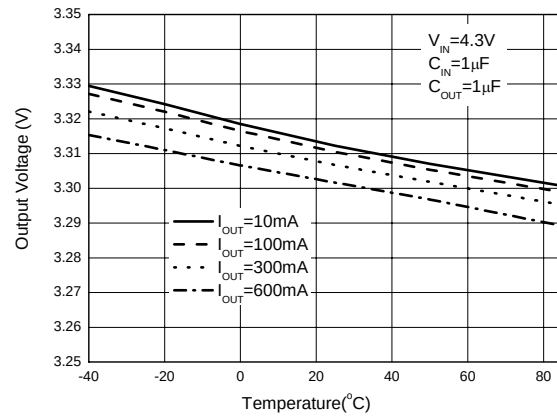


Figure 9. Output Voltage vs. Temperature

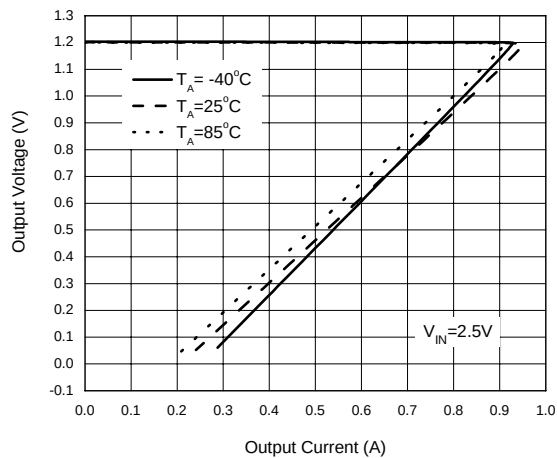


Figure 10. Output Voltage vs. Output Current

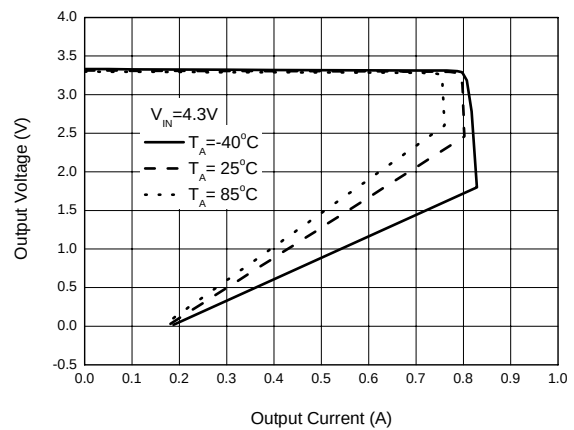


Figure 11. Output Voltage vs. Output Current

# 600mA CMOS LDO REGULATOR WITH ENABLE

AP2112

## Typical Performance Characteristics (Continued)

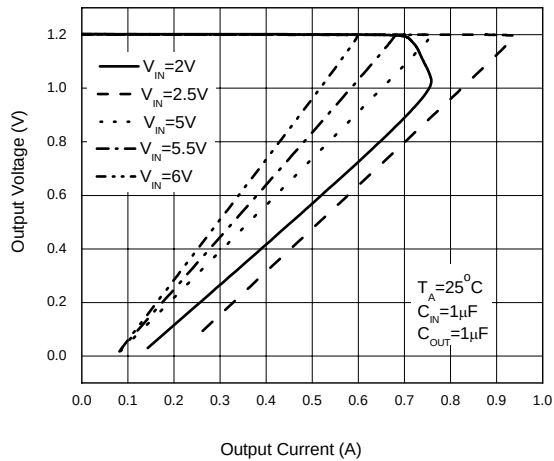


Figure 12. Output Voltage vs. Output Current

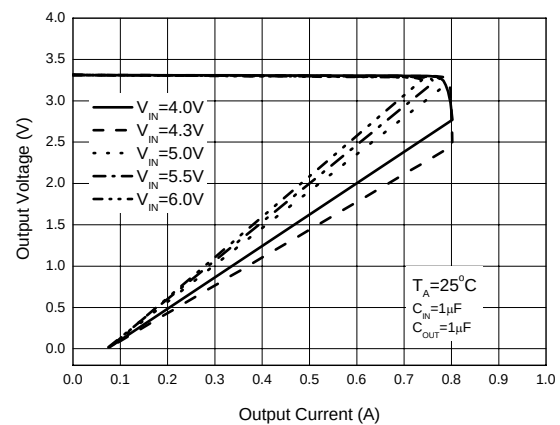


Figure 13. Output Voltage vs. Output Current

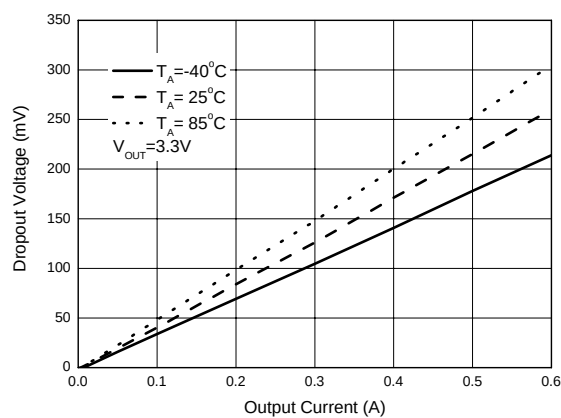


Figure 14. Dropout Voltage vs. Output Current

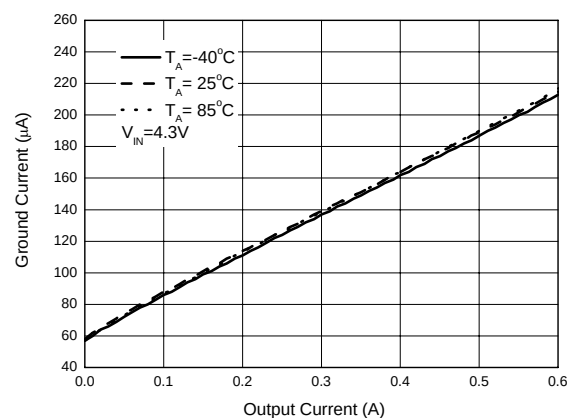


Figure 15. Ground Current vs. Output Current

# 600mA CMOS LDO REGULATOR WITH ENABLE

AP2112

## Typical Performance Characteristics (Continued)

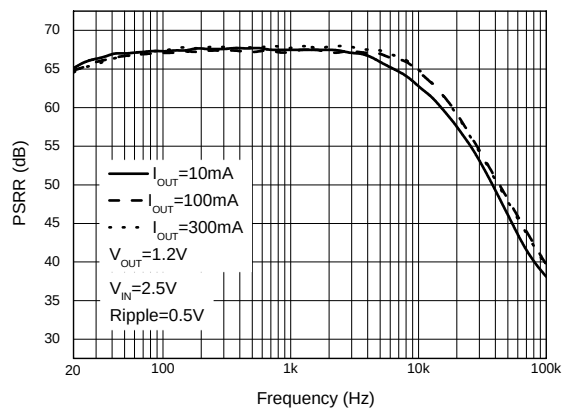


Figure 16. PSRR vs. Frequency

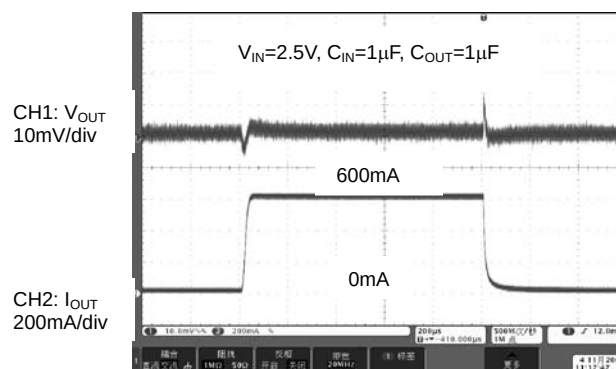


Figure 17. Load Transient

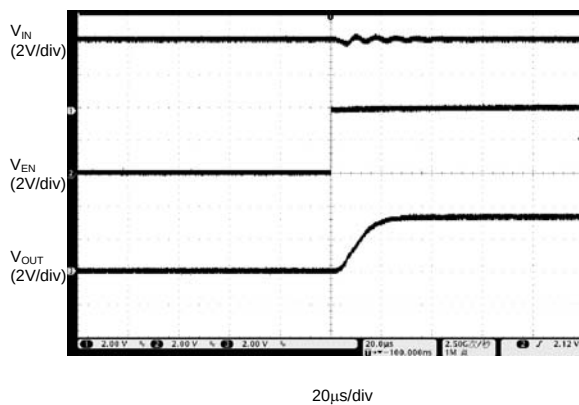


Figure 18. Enable On

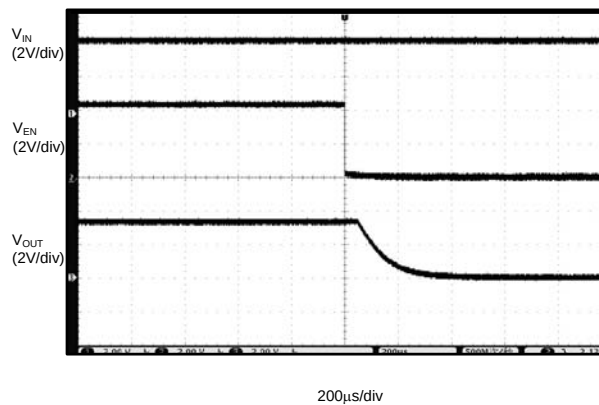
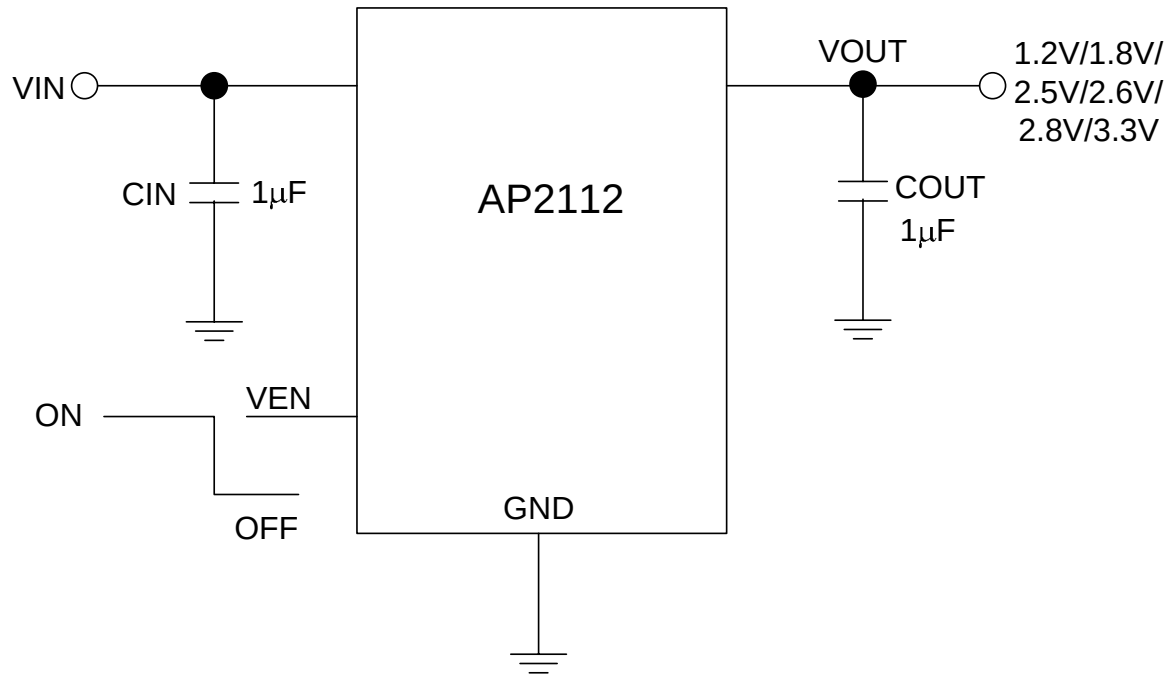


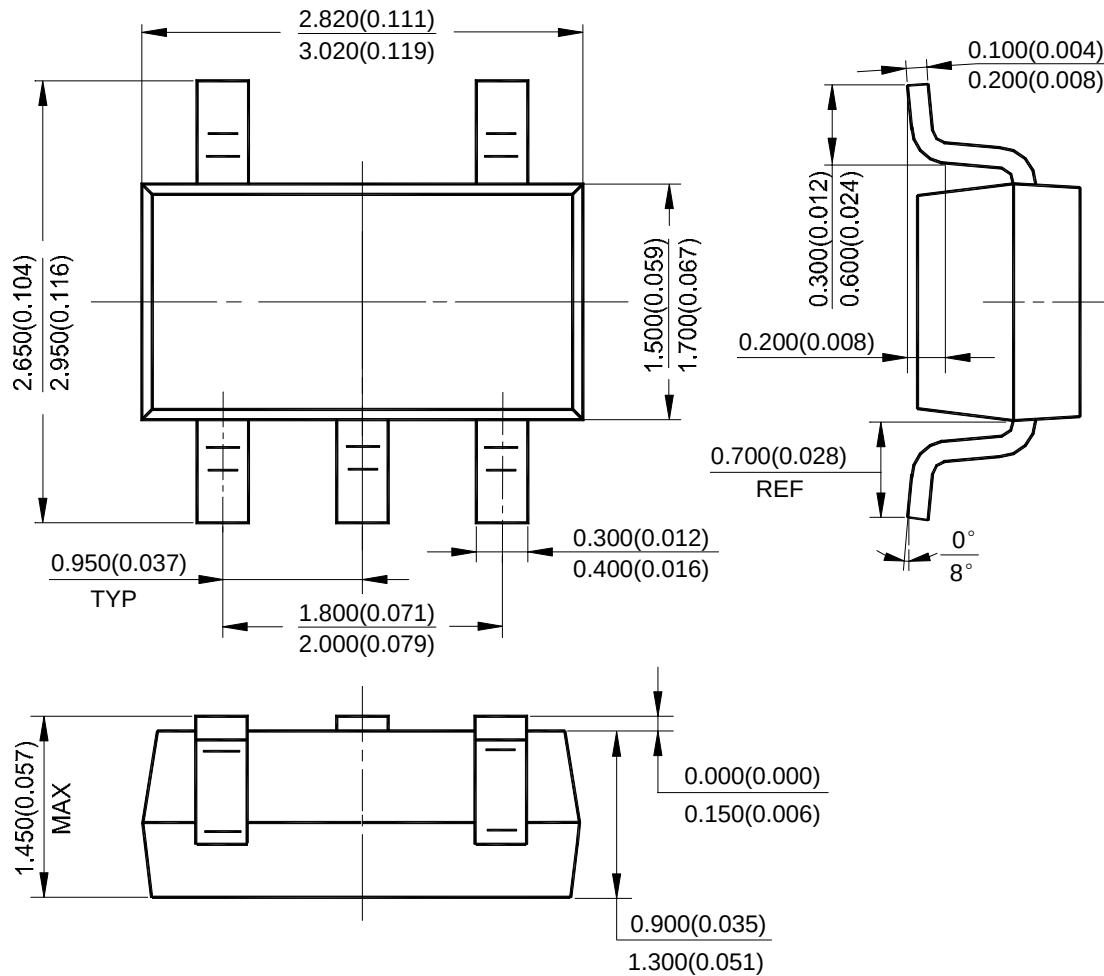
Figure 19. Enable Off

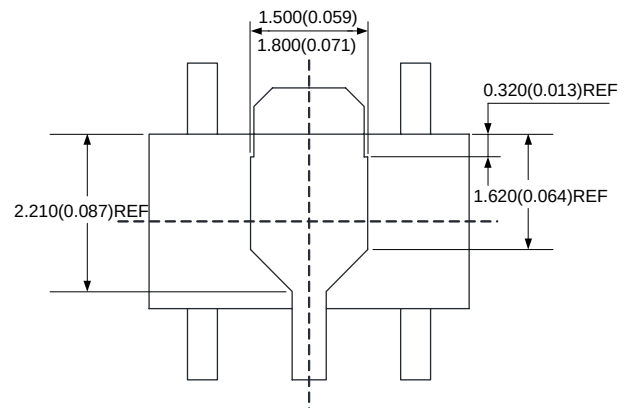
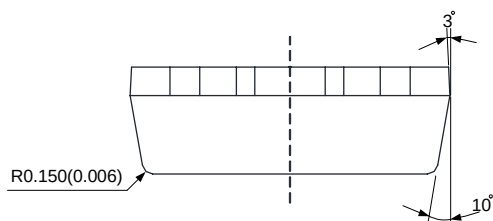
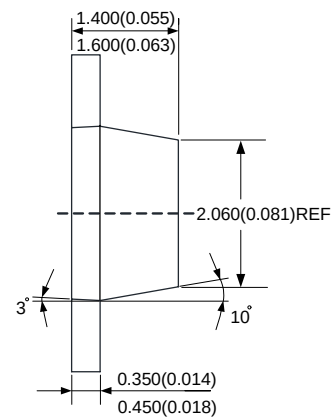
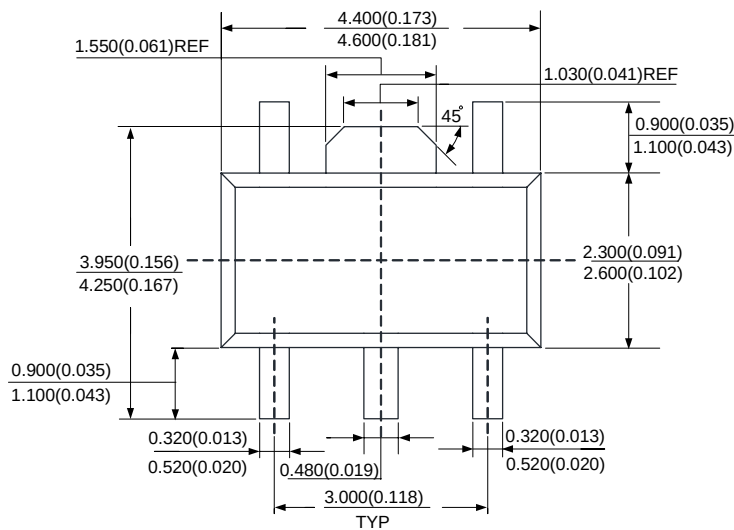
**600mA CMOS LDO REGULATOR WITH ENABLE****AP2112****Typical Application (Note 4)**

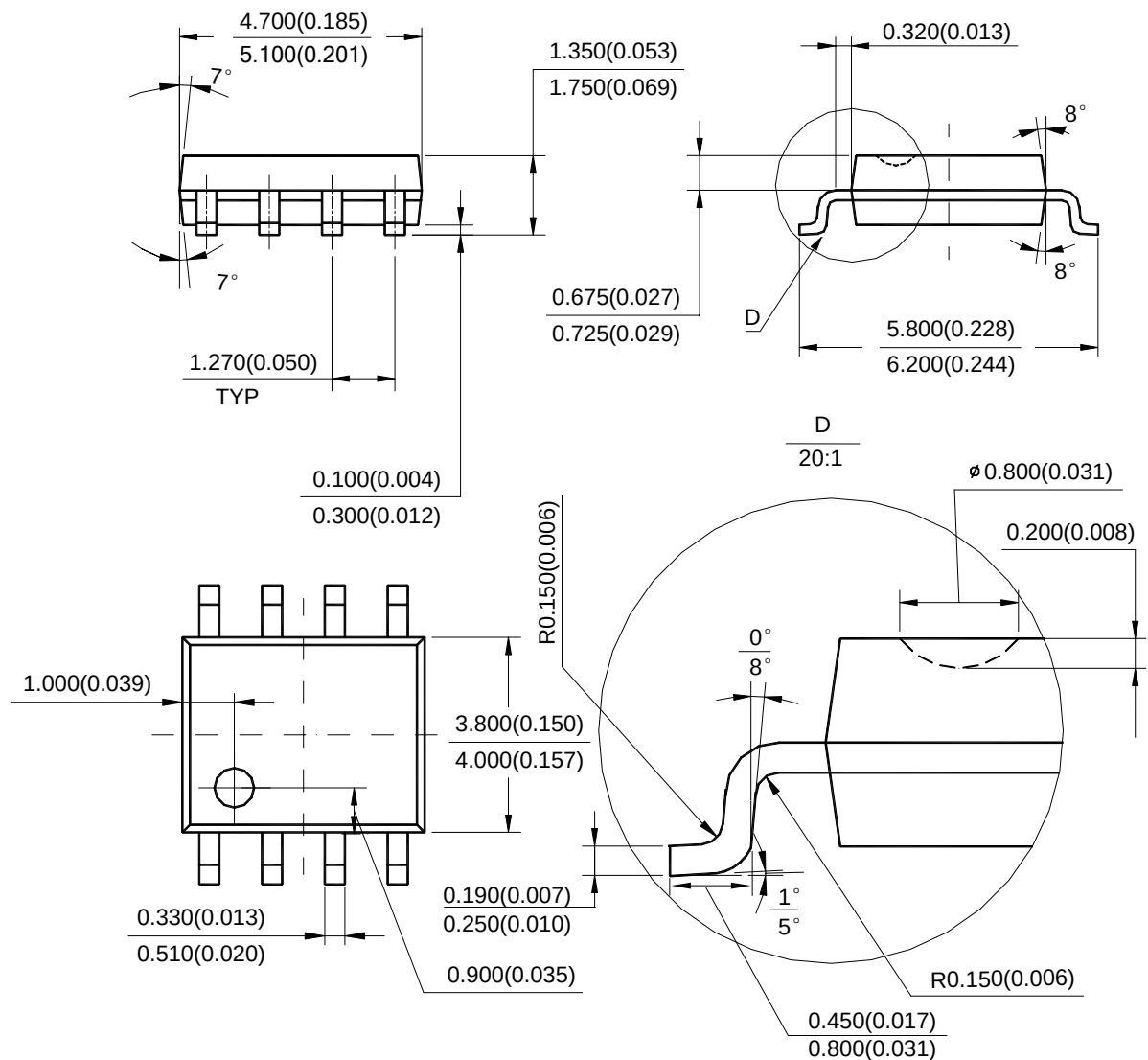
Note 4: It is recommended to use X7R or X5R dielectric capacitor if 1.0  $\mu F$  ceramic capacitor is selected as input/output capacitors.

Figure 20. AP2112 Typical Application



**600mA CMOS LDO REGULATOR WITH ENABLE**
**AP2112**
**Mechanical Dimensions**
**SOT-23-5**
**Unit: mm(inch)**


**600mA CMOS LDO REGULATOR WITH ENABLE**
**AP2112**
**Mechanical Dimensions (Continued)**
**SOT-89-5**
**Unit: mm(inch)**


**600mA CMOS LDO REGULATOR WITH ENABLE**
**AP2112**
**Mechanical Dimensions (Continued)**
**SOIC-8**
**Unit: mm(inch)**




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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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