

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 0.8V to 5V adjustable 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 μA (Typ.)
- Low Standby Current: 0.01 μA (Typ.)
- Low Output Noise: 50 μV_{RMS}
- PSRR: 100Hz -65dB, 1kHz -65dB
- OTSD Protection
- Stable with 1.0 μF 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

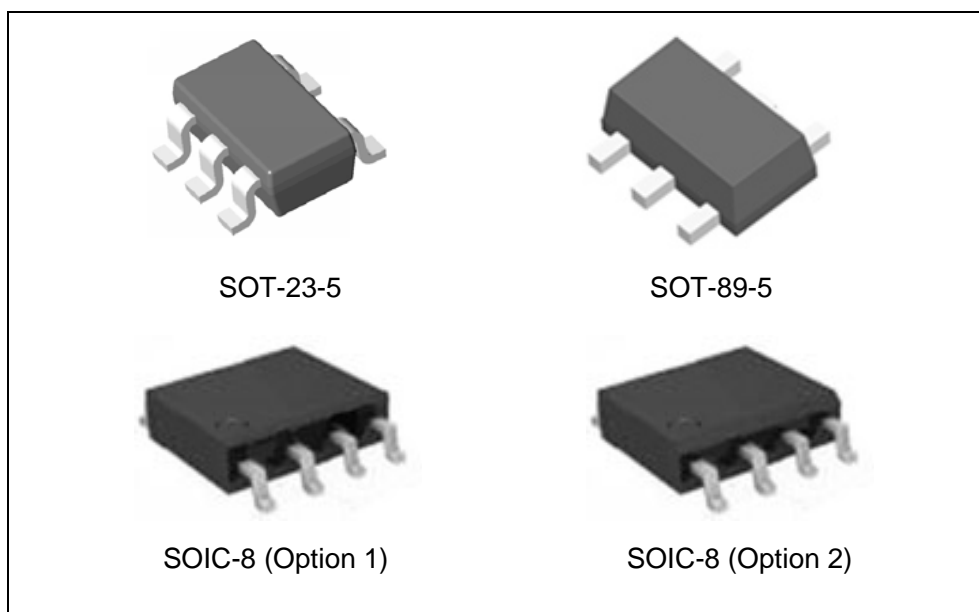


Figure 1. Package Types of AP2112

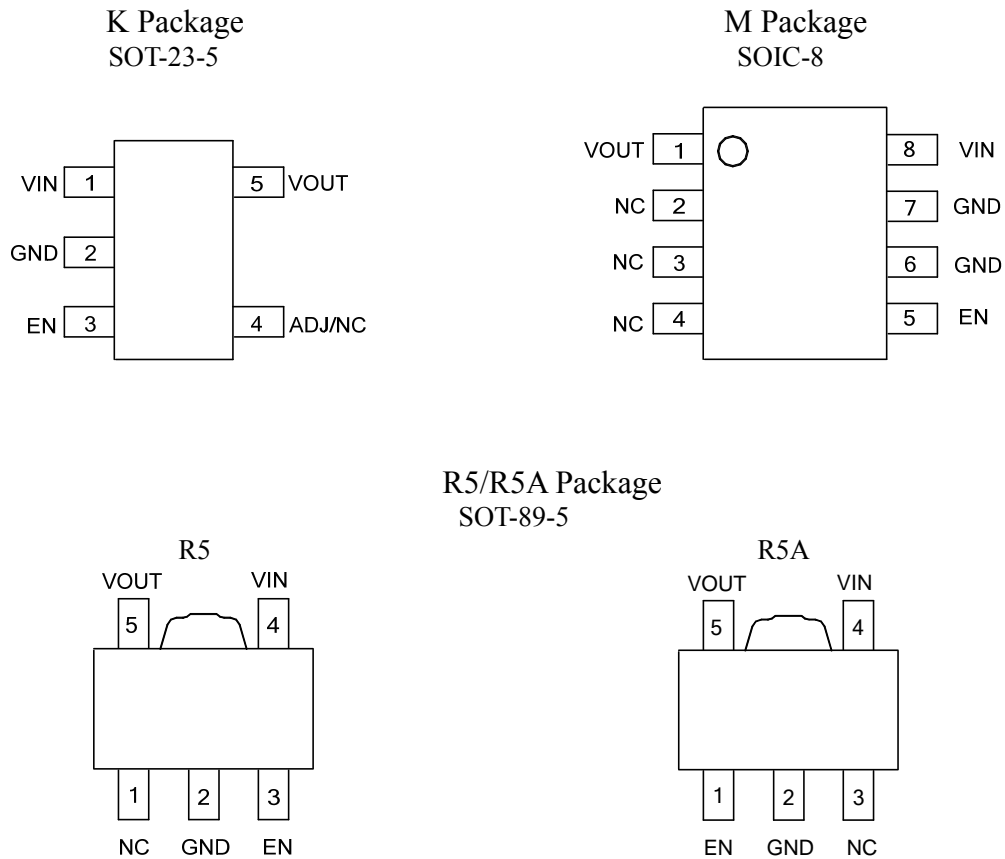
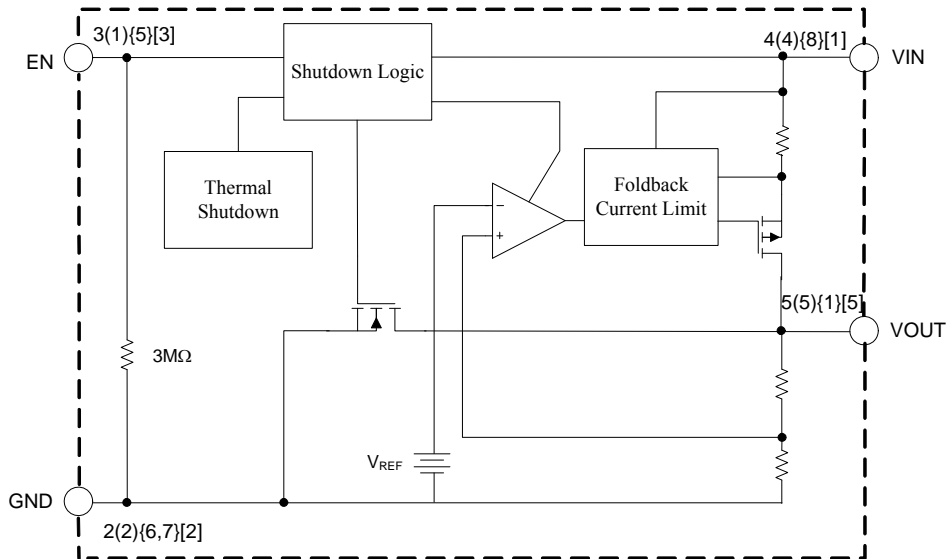
600mA CMOS LDO REGULATOR WITH ENABLE
AP2112
Pin Configuration


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) 1 (R5A) | 5 | EN | Chip Enable, H – normal work, L – shutdown output |
| 4 | | | ADJ/NC | Adjust Output for ADJ version/No Connection for Fixed Version |
| | 1 (R5) 3 (R5A) | 2, 3, 4 | NC | No Connection |
| 5 | 5 | 1 | VOUT | Output Voltage |

Functional Block Diagram



- A (B){C}[D]
- A: SOT-89-5 (R5)
- B: SOT-89-5 (R5A)
- C: SOIC-8
- D: SOT-23-5

Figure 3. Functional Block Diagram of AP2112 for Fixed Version

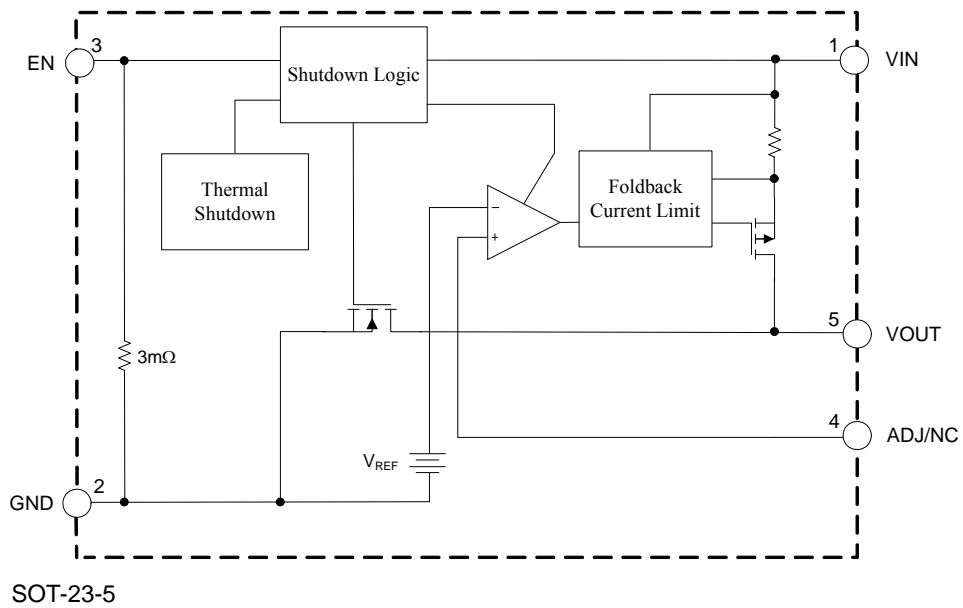
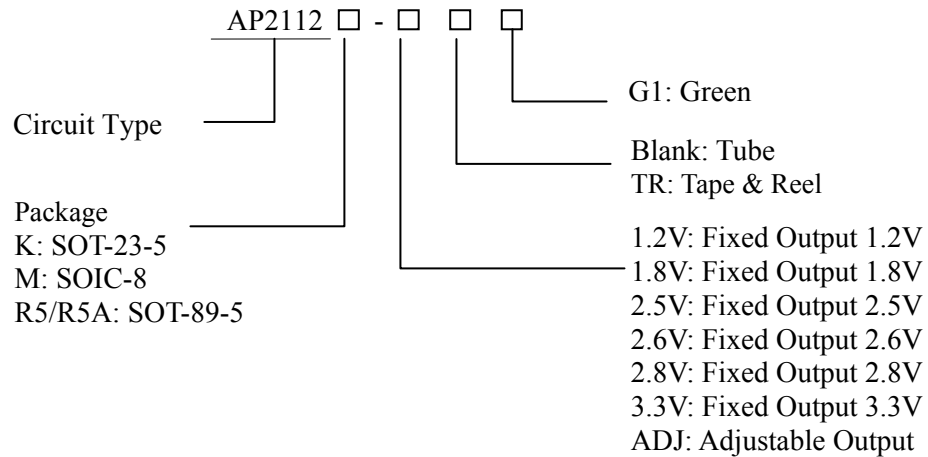


Figure 4. Functional Block Diagram of AP2112 for Adjustable Version

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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 |
| | | ADJ | AP2112K-ADJTRG1 | G3T | 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 |
| 3.3V | AP2112M-3.3G1 | 2112M-3.3G1 | Tube | | |
| | AP2112M-3.3TRG1 | 2112M-3.3G1 | Tape & Reel | | |
| SOT-89-5 | -40 to 85°C | 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 |
| | | 2.6V(R5) | AP2112R5-2.6TRG1 | G13F | Tape & Reel |
| | | 3.3V(R5) | AP2112R5-3.3TRG1 | G37G | Tape & Reel |
| SOT-89-5 | -40 to 85°C | 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 |
| | | 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) | θ_{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

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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 $T_A=25^\circ C$, 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 | $I_{OUT(MAX)}$ | $V_{IN}=2.5V$, $V_{OUT}=1.182V$ 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 | μA |
| Standby Current | I_{STD} | $V_{IN}=2.5V$, V_{EN} in OFF mode | | 0.01 | 1.0 | μA |
| Power Supply Rejection Ratio | PSRR | Ripple 0.5Vp-p $V_{IN}=2.5V$, $I_{OUT}=100mA$ | $f=100Hz$ | | 65 | dB |
| | | | $f=1KHz$ | | 65 | |
| Output Voltage Temperature Coefficient | $(\Delta V_{OUT}/V_{OUT})/\Delta T$ | $I_{OUT}=30mA$ $T_A = -40^\circ C$ to $85^\circ C$ | | ± 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 | | μV_{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 | | μs |
| EN Pull Down Resistor | R_{PD} | | | 3.0 | | $M\Omega$ |
| V_{OUT} Discharge Resistor | R_{DCHG} | Set EN pin at Low | | 60 | | Ω |
| Thermal Shutdown Temperature | T_{OTSD} | | | 160 | | $^\circ C$ |
| Thermal Shutdown Hysteresis | T_{HYOTSD} | | | 25 | | |
| Thermal Resistance | θ_{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

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Electrical Characteristics (Continued)

AP2112-1.8 Electrical Characteristic (Note 2)

V_{IN}=2.8V, C_{IN}=1.0μF (Ceramic), C_{OUT}=1.0μF (Ceramic), Typical T_A=25°C, unless otherwise specified (Note 3).

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--|--|---|----------------------------|------|-----------------------------|-------------------|
| Output Voltage | V _{OUT} | V _{IN} =2.8V, 1mA≤I _{OUT} ≤30mA | V _{OUT} *98.5% | 1.8 | V _{OUT} *101.5% | V |
| Maximum Output Current | I _{OUT(MAX)} | V _{IN} =2.8V, V _{OUT} =1.773V to 1.827V | 600 | | | mA |
| Load Regulation | (ΔV _{OUT} /V _{OUT})/ ΔI _{OUT} | V _{OUT} =1.8V, V _{IN} =V _{OUT} +1V, 1mA≤I _{OUT} ≤600mA | -1 | 0.2 | 1 | %/A |
| Line Regulation | (ΔV _{OUT} /V _{OUT})/ ΔV _{IN} | 2.8V≤V _{IN} ≤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 | μA |
| Standby Current | I _{STD} | V _{IN} =2.8V, V _{EN} in OFF mode | | 0.01 | 1.0 | μA |
| Power Supply Rejection Ratio | PSRR | Ripple 0.5Vp-p V _{IN} =2.8V, I _{OUT} =100mA | f=100Hz | | 65 | dB |
| | | | f=1KHz | | 65 | |
| Output Voltage Temperature Coefficient | (ΔV _{OUT} /V _{OUT})/ ΔT | I _{OUT} =30mA T _A =-40°C to 85°C | | ±100 | | ppm/°C |
| Short Current Limit | I _{SHORT} | V _{OUT} =0V | | 50 | | mA |
| RMS Output Noise | V _{NOISE} | No Load, 10Hz≤f≤100kHz | | 50 | | μV _{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 | | μs |
| EN Pull Down Resistor | R _{PD} | | | 3.0 | | MΩ |
| V _{OUT} Discharge Resistor | R _{DCHG} | Set EN pin at Low | | 60 | | Ω |
| Thermal Shutdown Temperature | T _{OTSD} | | | 160 | | °C |
| Thermal Shutdown Hysteresis | T _{HYOTSD} | | | 25 | | |
| Thermal Resistance | θ _{JC} | SOT-23-5 | | 96 | | °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°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}=1.0μF (Ceramic), C_{OUT}=1.0μF (Ceramic), Typical T_A=25°C, unless otherwise specified (Note 3).

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--|--|---|----------------------------|------|-----------------------------|-------------------|
| Output Voltage | V _{OUT} | V _{IN} =3.5V, 1mA≤I _{OUT} ≤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 | (ΔV _{OUT} /V _{OUT})/ ΔI _{OUT} | V _{OUT} =2.5V, V _{IN} =V _{OUT} +1V, 1mA≤I _{OUT} ≤600mA | -1 | 0.2 | 1 | %/A |
| Line Regulation | (ΔV _{OUT} /V _{OUT})/ ΔV _{IN} | 3.5V≤V _{IN} ≤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 | μA |
| Standby Current | I _{STD} | V _{IN} =3.5V, V _{EN} in OFF mode | | 0.01 | 1.0 | μA |
| Power Supply Rejection Ratio | PSRR | Ripple 0.5Vp-p V _{IN} =3.5V, I _{OUT} =100mA | f=100Hz | | 65 | dB |
| | | | f=1KHz | | 65 | |
| Output Voltage Temperature Coefficient | (ΔV _{OUT} /V _{OUT})/ ΔT | I _{OUT} =30mA T _A =-40°C to 85°C | | ±100 | | ppm/°C |
| Short Current Limit | I _{SHORT} | V _{OUT} =0V | | 50 | | mA |
| RMS Output Noise | V _{NOISE} | No Load, 10Hz≤f≤100kHz | | 50 | | μV _{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 | | μs |
| EN Pull Down Resistor | R _{PD} | | | 3.0 | | MΩ |
| V _{OUT} Discharge Resistor | R _{DCHG} | Set EN pin at Low | | 60 | | Ω |
| Thermal Shutdown Temperature | T _{OTSD} | | | 160 | | °C |
| Thermal Shutdown Hysteresis | T _{HYOTSD} | | | 25 | | |
| Thermal Resistance | θ _{JC} | SOT-23-5 | | 96 | | °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°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}=1.0μF (Ceramic), C_{OUT}=1.0μF (Ceramic), Typical T_A=25°C, unless otherwise specified (Note 3).

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--|--|---|----------------------------|------|-----------------------------|-------------------|
| Output Voltage | V _{OUT} | V _{IN} =3.6V, 1mA≤I _{OUT} ≤30mA | V _{OUT} *98.5% | 2.6 | V _{OUT} *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≤I _{OUT} ≤600mA | -1 | 0.2 | 1 | %/A |
| Line Regulation | $\frac{(\Delta V_{OUT}/V_{OUT})}{\Delta V_{IN}}$ | 3.6V≤V _{IN} ≤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 | μA |
| Standby Current | I _{STD} | V _{IN} =3.6V, V _{EN} in OFF mode | | 0.01 | 1.0 | μA |
| Power Supply Rejection Ratio | PSRR | Ripple 0.5Vp-p V _{IN} =3.6V, I _{OUT} =100mA | f=100Hz | | 65 | dB |
| | | | f=1KHz | | 65 | |
| Output Voltage Temperature Coefficient | $(\Delta V_{OUT}/V_{OUT})/\Delta T$ | I _{OUT} =30mA T _A =-40°C to 85°C | | ±100 | | ppm/°C |
| Short Current Limit | I _{SHORT} | V _{OUT} =0V | | 50 | | mA |
| RMS Output Noise | V _{NOISE} | No Load, 10Hz≤f≤100kHz | | 50 | | μV _{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 | | μs |
| EN Pull Down Resistor | R _{PD} | | | 3.0 | | MΩ |
| V _{OUT} Discharge Resistor | R _{DCHG} | Set EN pin at Low | | 60 | | Ω |
| Thermal Shutdown Temperature | T _{OTSD} | | | 160 | | °C |
| Thermal Shutdown Hysteresis | T _{HYOTSD} | | | 25 | | |
| Thermal Resistance | θ _{JC} | SOT-23-5 | | 96 | | °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°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}=1.0μF (Ceramic), C_{OUT}=1.0μF (Ceramic), Typical T_A=25°C, unless otherwise specified (Note 3).

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--|---|---|----------------------------|------|-----------------------------|-------------------|
| Output Voltage | V _{OUT} | V _{IN} =3.8V, 1mA≤I _{OUT} ≤30mA | V _{OUT} *98.5% | 2.8 | V _{OUT} *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, 1mA≤I _{OUT} ≤600mA | -1 | 0.2 | 1 | %/A |
| Line Regulation | $(\Delta V_{OUT}/V_{OUT})/\Delta V_{IN}$ | 3.8V≤V _{IN} ≤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 | μA |
| Standby Current | I _{STD} | V _{IN} =3.8V, V _{EN} in OFF mode | | 0.01 | 1.0 | μA |
| Power Supply Rejection Ratio | PSRR | Ripple 0.5Vp-p V _{IN} =3.8V, I _{OUT} =100mA | f=100Hz | | 65 | dB |
| | | | f=1KHz | | 65 | |
| Output Voltage Temperature Coefficient | $(\Delta V_{OUT}/V_{OUT})/\Delta T$ | I _{OUT} =30mA T _A =-40°C to 85°C | | ±100 | | ppm/°C |
| Short Current Limit | I _{SHORT} | V _{OUT} =0V | | 50 | | mA |
| RMS Output Noise | V _{NOISE} | No Load, 10Hz≤f≤100kHz | | 50 | | μV _{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 | | μs |
| EN Pull Down Resistor | R _{PD} | | | 3.0 | | MΩ |
| V _{OUT} Discharge Resistor | R _{DCHG} | Set EN pin at Low | | 60 | | Ω |
| Thermal Shutdown Temperature | T _{OTSD} | | | 160 | | °C |
| Thermal Shutdown Hysteresis | T _{HYOTSD} | | | 25 | | |
| Thermal Resistance | θ _{JC} | SOT-23-5 | | 96 | | °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°C. Over temperature specifications guaranteed by design only.



600mA CMOS LDO REGULATOR WITH ENABLE

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Electrical Characteristics (Continued)

AP2112-3.3 Electrical Characteristic (Note 2)

$V_{IN}=4.3V$, $C_{IN}=1.0\mu F$ (Ceramic), $C_{OUT}=1.0\mu F$ (Ceramic), Typical $T_A=25^\circ C$, 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 | μA |
| Standby Current | I_{STD} | $V_{IN}=4.3V$, V_{EN} in OFF mode | | 0.01 | 1.0 | μA |
| Power Supply Rejection Ratio | PSRR | Ripple 0.5Vp-p $V_{IN}=4.3V$, $I_{OUT}=100mA$ | $f=100Hz$ | | 65 | dB |
| | | | $f=1KHz$ | | 65 | |
| Output Voltage Temperature Coefficient | $(\Delta V_{OUT}/V_{OUT}) / \Delta T$ | $I_{OUT}=30mA$ $T_A=-40^\circ C$ to $85^\circ C$ | | ± 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 | | μV_{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 | | μs |
| EN Pull Down Resistor | R_{PD} | | | 3.0 | | $M\Omega$ |
| V_{OUT} Discharge Resistor | R_{DCHG} | Set EN pin at Low | | 60 | | Ω |
| Thermal Shutdown Temperature | T_{OTSD} | | | 160 | | $^\circ C$ |
| Thermal Shutdown Hysteresis | T_{HYOTSD} | | | 25 | | |
| Thermal Resistance | θ_{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

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Electrical Characteristics (Continued)

AP2112-ADJ Electrical Characteristic (Note 2)

V_{IN}=2.5V, C_{IN}=1.0μF (Ceramic), C_{OUT}=1.0μF (Ceramic), Typical T_A=25°C, unless otherwise specified (Note 3).

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|--|--|---|----------------------------|------|-----------------------------|-------------------|
| Reference Voltage | V _{REF} | V _{IN} =2.5V, 1mA≤I _{OUT} ≤30mA | V _{REF} ×98.5% | 0.8 | V _{REF} ×101.5% | V |
| Maximum Output Current | I _{OUT(Max)} | V _{IN} =2.5V, V _{REF} =0.788V to 0.812V | 600 | | | mA |
| Load Regulation | (ΔV _{OUT} /V _{OUT})/ ΔI _{OUT} | V _{IN} =2.5V, 1mA≤I _{OUT} ≤600mA | -1 | 0.2 | 1 | %/A |
| Line Regulation | (ΔV _{OUT} /V _{OUT})/ ΔV _{IN} | 2.5V≤V _{IN} ≤6V, I _{OUT} =30mA | -0.1 | 0.02 | 0.1 | %/V |
| Quiescent Current | I _Q | V _{IN} =2.5V, I _{OUT} =0mA | | 55 | 80 | μA |
| Standby Current | I _{STD} | V _{IN} =2.5V, V _{EN} in OFF mode | | 0.01 | 1.0 | μA |
| Power Supply Rejection Ratio | PSRR | Ripple 0.5Vp-p V _{IN} =2.5V, I _{OUT} =100mA | f=100Hz | 65 | | dB |
| | | | f=1kHz | 65 | | |
| Output Voltage Temperature Coefficient | (ΔV _{OUT} /V _{OUT})/ ΔT | I _{OUT} =30mA T _A =-40°C to 85°C | | ±100 | | ppm/°C |
| Short Current Limit | I _{SHORT} | V _{OUT} =0V | | 50 | | mA |
| RMS Output Noise | V _{NOISE} | No Load, 10Hz≤f≤100kHz | | 50 | | μV _{RMS} |
| VEN High Voltage | V _{IH} | Enable logic high, regulator on | 1.5 | | 6.0 | V |
| VEN Low Voltage | V _{IL} | Enable logic low, regulator off | 0 | | 0.4 | |
| Start-up Time | t _S | No Load | | 20 | | μs |
| EN Pull Down Resistor | R _{PD} | | | 3.0 | | MΩ |
| V _{OUT} Discharge Resistor | R _{DCHG} | Set EN pin at Low | | 60 | | Ω |
| Thermal Shutdown Temperature | T _{OTSD} | | | 160 | | °C |
| Thermal Shutdown Hysteresis | T _{HYOTSD} | | | 25 | | |
| Thermal Resistance | θ _{JC} | SOT-23-5 | | 96 | | °C/W |

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°C. Over temperature specifications guaranteed by design only.

Typical Performance Characteristics

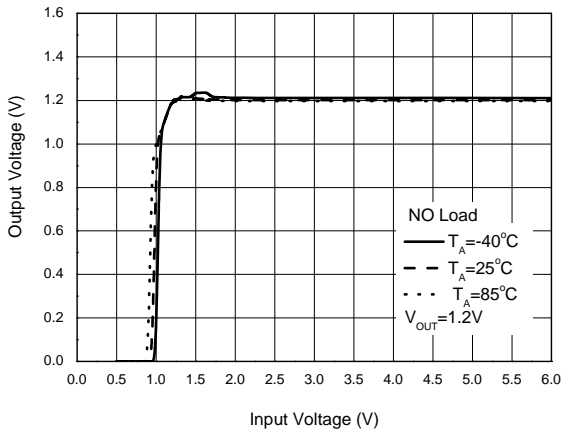


Figure 5. Output Voltage vs. Input Voltage

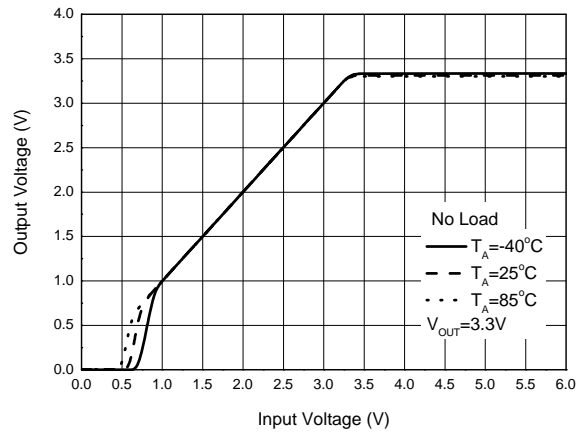


Figure 6. Output Voltage vs. Input Voltage

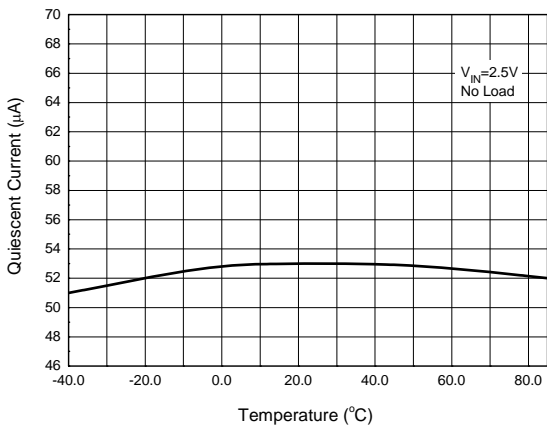


Figure 7. Quiescent Current vs. Temperature

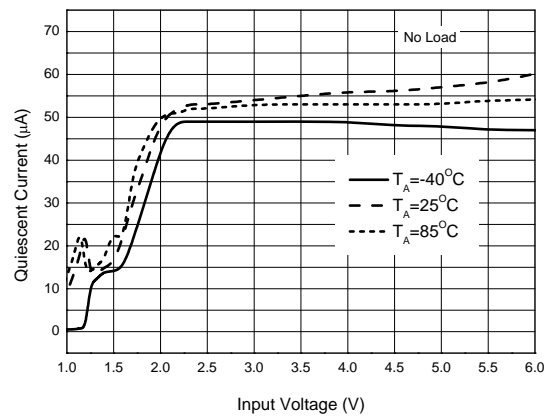


Figure 8. Quiescent Current vs. Input Voltage

Typical Performance Characteristics (Continued)

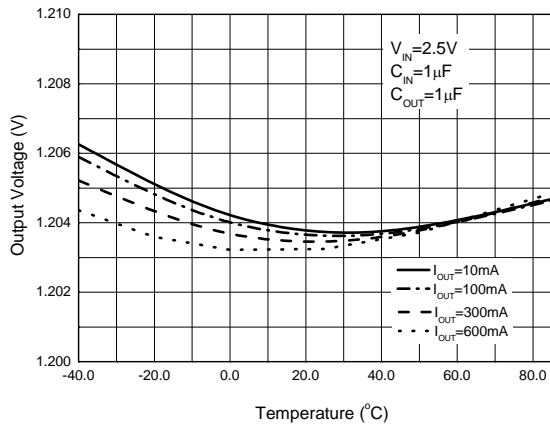


Figure 9. Output Voltage vs. Temperature

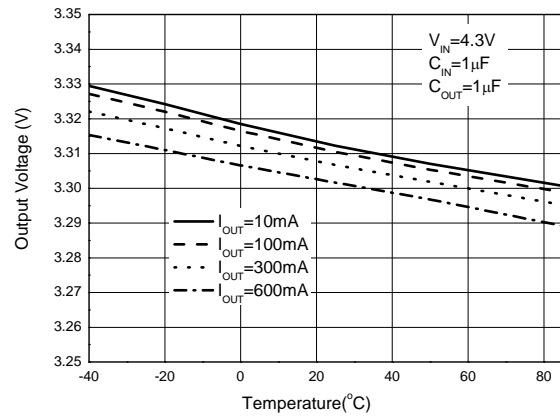


Figure 10. Output Voltage vs. Temperature

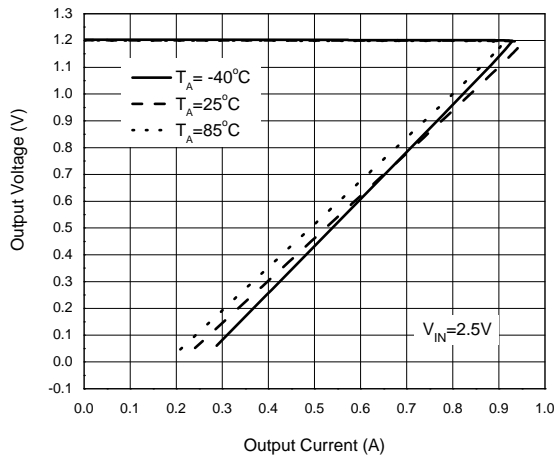


Figure 11. Output Voltage vs. Output Current

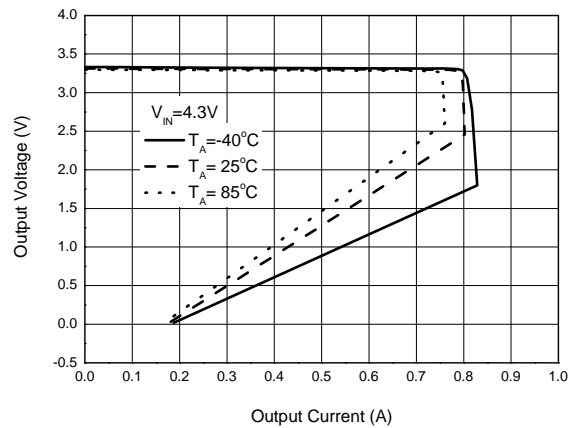


Figure 12. Output Voltage vs. Output Current

Typical Performance Characteristics (Continued)

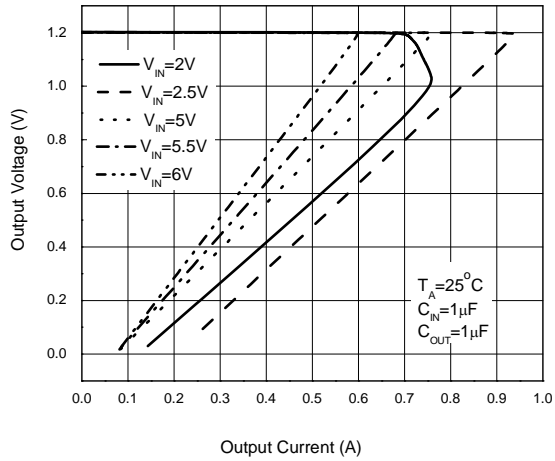


Figure 13. Output Voltage vs. Output Current

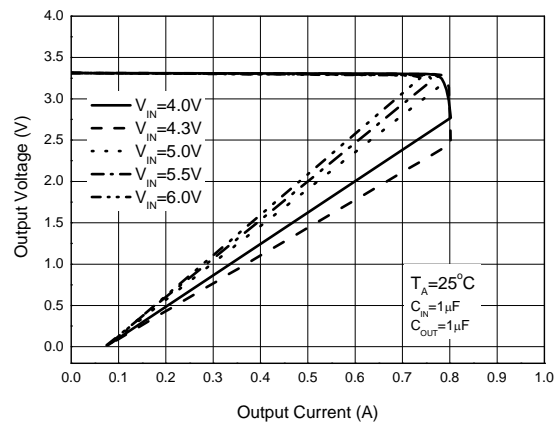


Figure 14. Output Voltage vs. Output Current

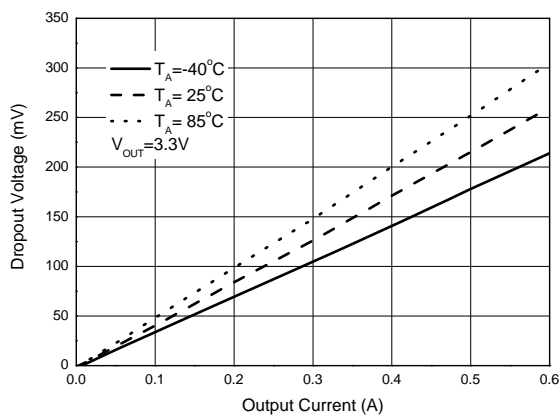


Figure 15. Dropout Voltage vs. Output Current

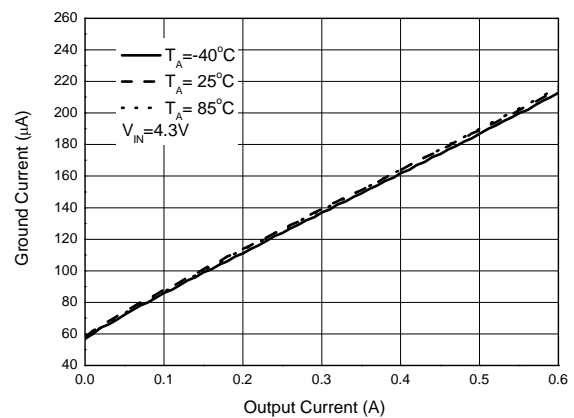


Figure 16. Ground Current vs. Output Current

600mA CMOS LDO REGULATOR WITH ENABLE

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Typical Performance Characteristics (Continued)

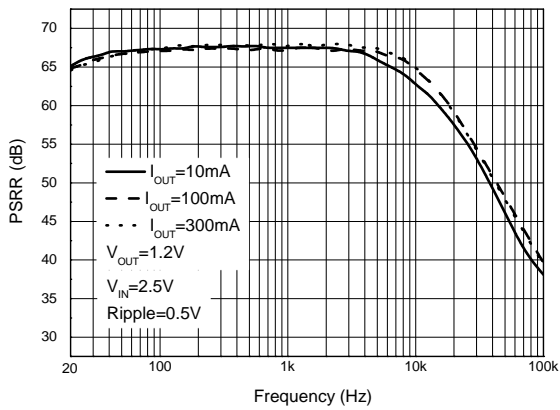


Figure 17. PSRR vs. Frequency

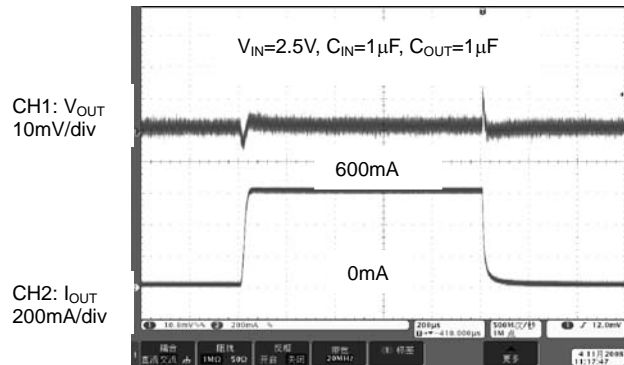


Figure 18. Load Transient

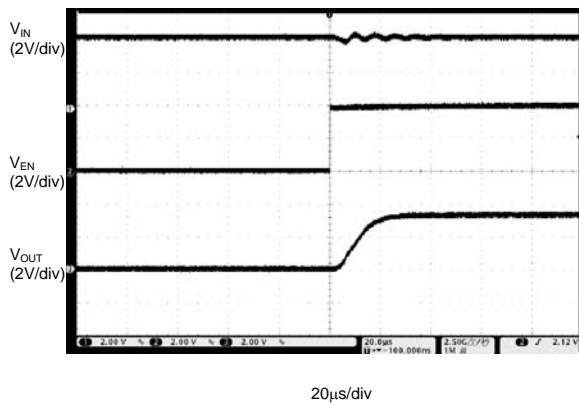


Figure 19. Enable On

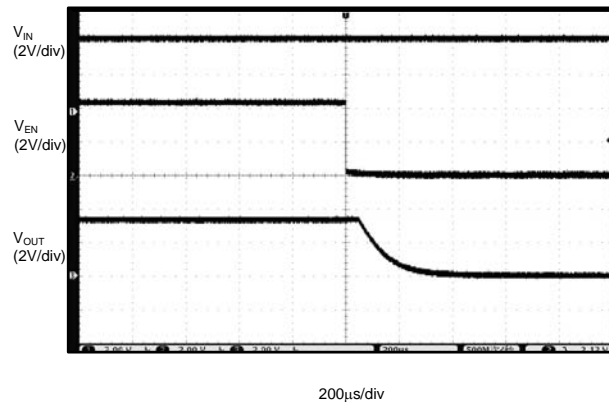
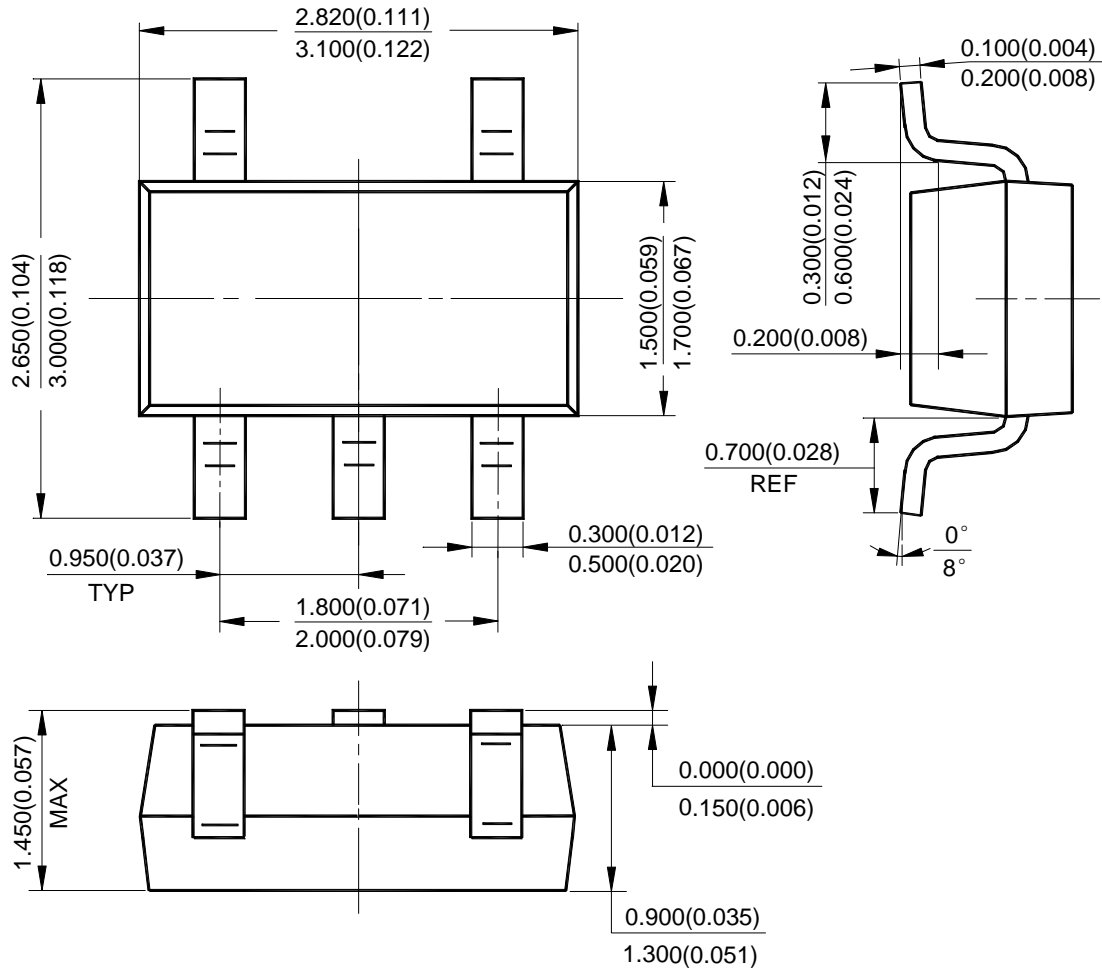


Figure 20. Enable Off

Mechanical Dimensions

SOT-23-5

Unit: mm(inch)



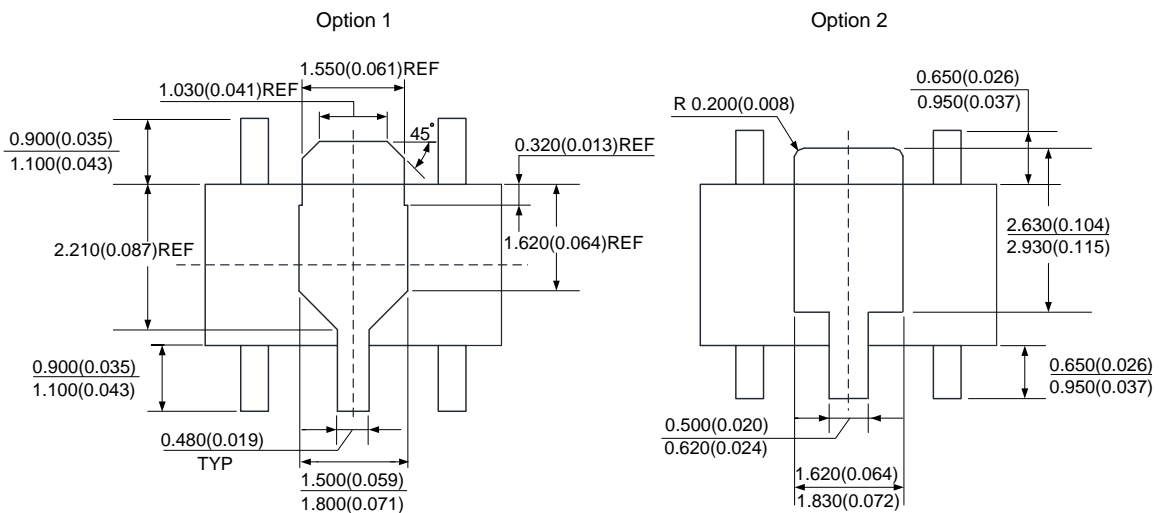
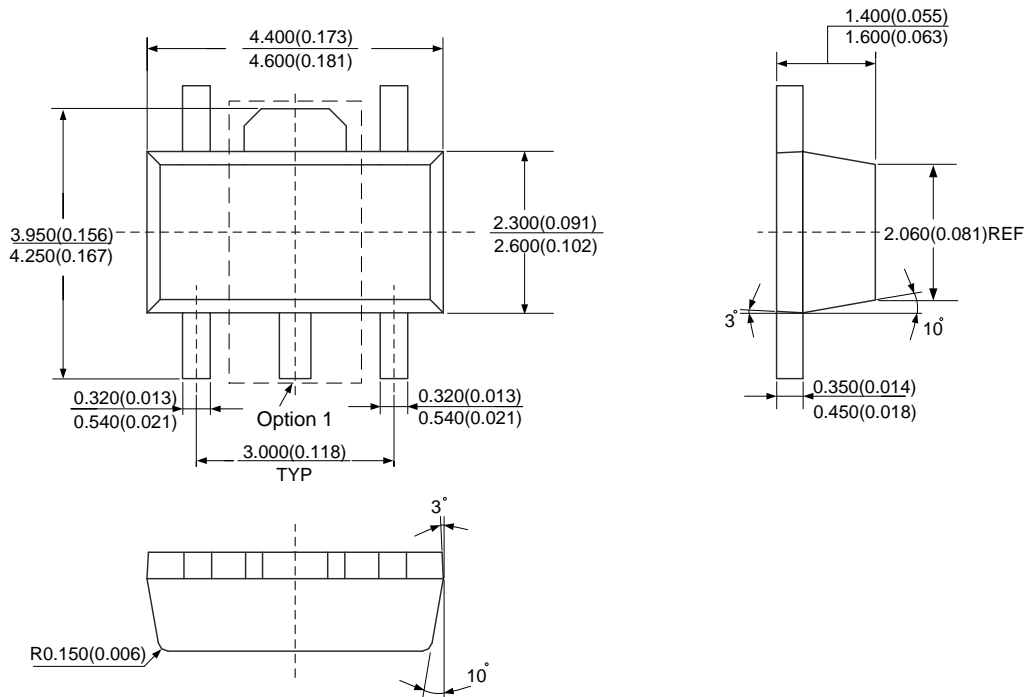
600mA CMOS LDO REGULATOR WITH ENABLE

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Mechanical Dimensions (Continued)

SOT-89-5

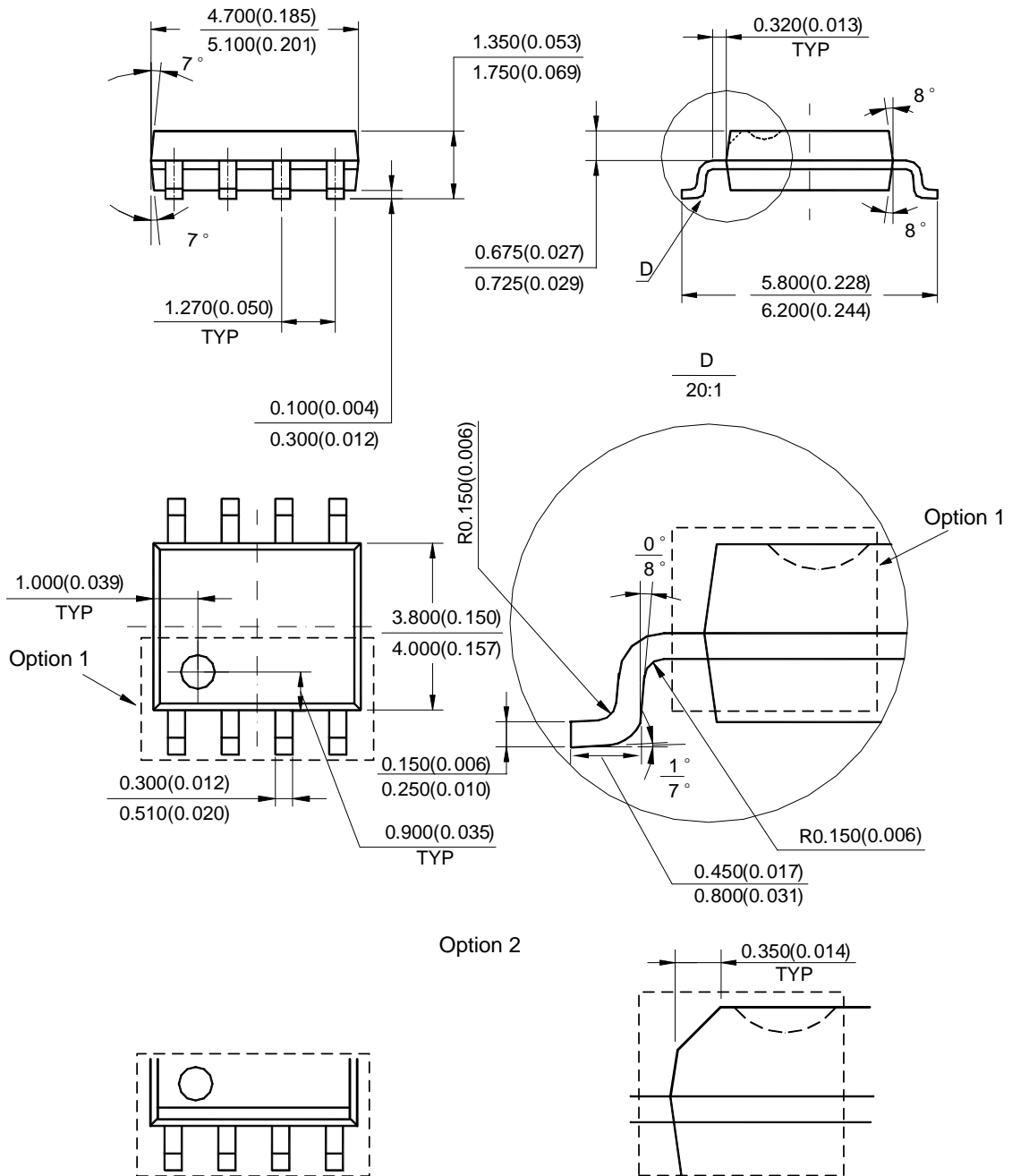
Unit: mm(inch)



Mechanical Dimensions (Continued)

SOIC-8

Unit: mm(inch)



Note: Eject hole, oriented hole and mold mark is optional.



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