

**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR****AP2125****General Description**

The AP2125 series are 300mA, positive voltage regulator ICs fabricated by CMOS process.

Each of these ICs is equipped with a voltage reference, an error amplifier, a resistor network for setting output voltage, a chip enable circuit, a current limit circuit and OTSD (over temperature shut down) circuit to prevent the IC from over current and over temperature.

The AP2125 series have features of high ripple rejection, low dropout voltage, low noise, high output voltage accuracy and low current consumption which make them ideal for use in various battery-powered apparatus.

The AP2125 have 1.8V, 2.5V, 2.8V, 3.0V, 3.3V, 4.15V and 4.2V fixed voltage versions.

These ICs are available in tiny SC-70-5 and SC-82 packages as well as industry standard SOT-23-3 and SOT-23-5 packages.

**Features**

- Excellent Ripple Rejection: 70dB Typical (1.8V Version)
- Low Dropout Voltage: 65mV ( $I_{OUT}=100mA$ , 3.3V Version)
- Low Standby Current: 0.01 $\mu A$  Typical
- Low Quiescent Current: 60 $\mu A$  Typical
- Extremely Low Noise: 50 $\mu V_{rms}$  Typical
- Maximum Output Current: 300mA (Min.)
- High Output Voltage Accuracy:  $\pm 2\%$
- Compatible with Low ESR Ceramic Capacitor
- Excellent Line/Load Regulation

**Applications**

- CDMA/GSM Cellular Handsets
- Battery-powered Equipments
- Laptops, Palmtops, Notebook Computers
- Hand-held Instruments
- PCMCIA Cards
- Portable Information Appliances

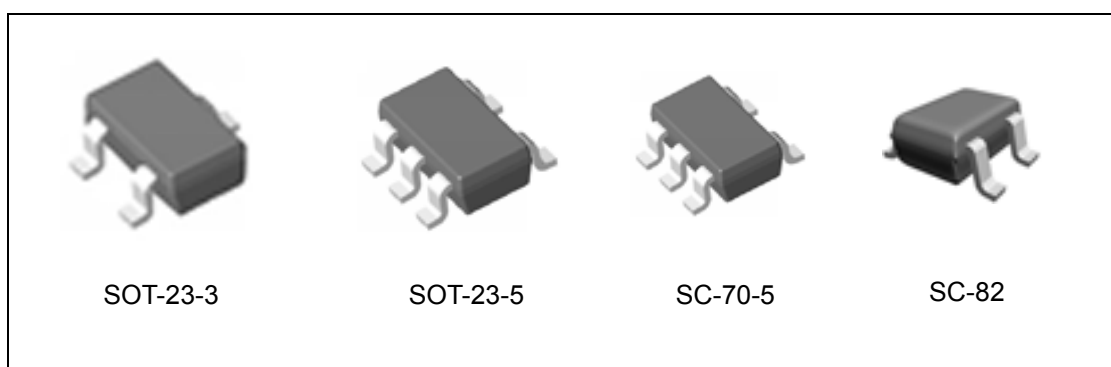


Figure 1. Package Types of AP2125



## Pin Configuration

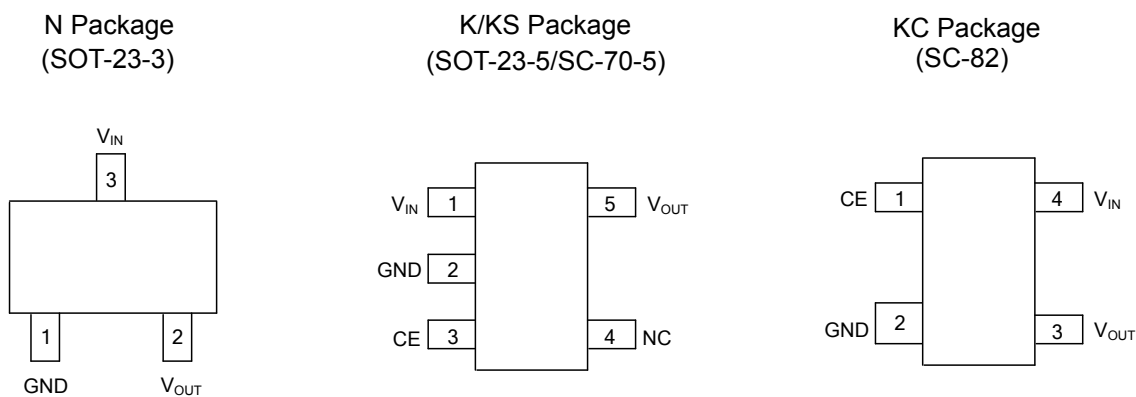
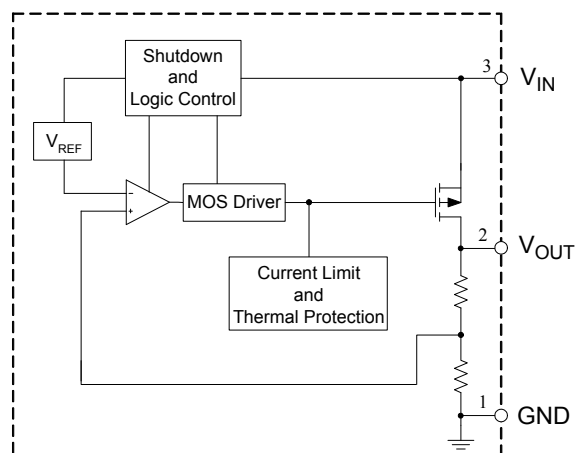


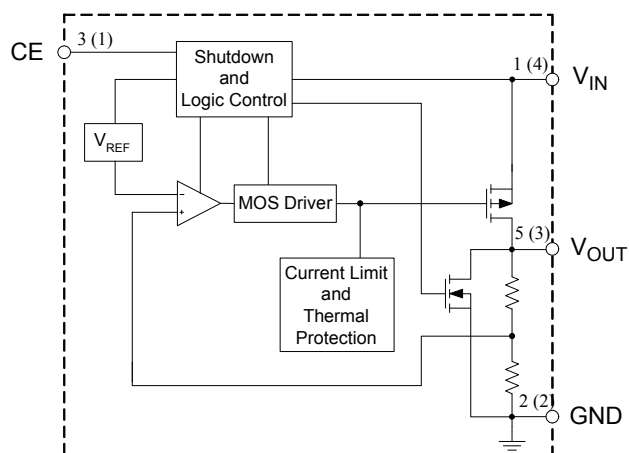
Figure 2. Pin Configuration of AP2125 (Top View)

## Pin Description

| Pin Number |                      |       | Pin Name         | Function                                                            |
|------------|----------------------|-------|------------------|---------------------------------------------------------------------|
| SOT-23-3   | SOT-23-5/<br>SC-70-5 | SC-82 |                  |                                                                     |
| 3          | 1                    | 4     | V <sub>IN</sub>  | Input voltage                                                       |
| 1          | 2                    | 2     | GND              | Ground                                                              |
|            | 3                    | 1     | CE               | Active high enable input pin. Logic high=enable, logic low=shutdown |
|            | 4                    |       | NC               | No connection                                                       |
| 2          | 5                    | 3     | V <sub>OUT</sub> | Regulated output voltage                                            |

**Functional Block Diagram**

SOT-23-3

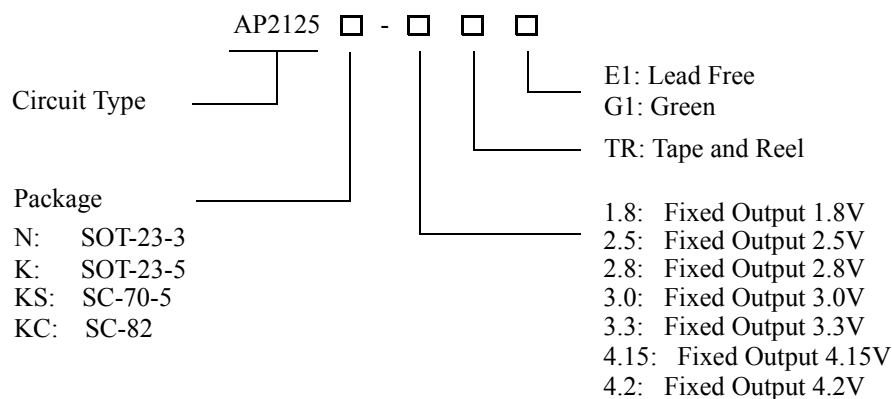


A(B)

A SOT-23-5/SC-70-5

B SC-82

Figure 3. Functional Block Diagram of AP2125

**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR****AP2125****Ordering Information**

| Package  | Temperature Range | Part Number      |                  | Marking ID |       | Packing Type |
|----------|-------------------|------------------|------------------|------------|-------|--------------|
|          |                   | Lead Free        | Green            | Lead Free  | Green |              |
| SOT-23-3 | -40 to 85°C       | AP2125N-1.8TRE1  | AP2125N-1.8TRG1  | EJ2        | GJ2   | Tape & Reel  |
|          |                   | AP2125N-2.5TRE1  | AP2125N-2.5TRG1  | EJ4        | GJ4   | Tape & Reel  |
|          |                   | AP2125N-2.8TRE1  | AP2125N-2.8TRG1  | EJ5        | GJ5   | Tape & Reel  |
|          |                   | AP2125N-3.0TRE1  | AP2125N-3.0TRG1  | EJ6        | GJ6   | Tape & Reel  |
|          |                   | AP2125N-3.3TRE1  | AP2125N-3.3TRG1  | EJ7        | GJ7   | Tape & Reel  |
|          |                   | AP2125N-4.2TRE1  | AP2125N-4.2TRG1  | EJ3        | GJ3   | Tape & Reel  |
| SOT-23-5 | -40 to 85°C       | AP2125K-1.8TRE1  | AP2125K-1.8TRG1  | ECB        | GCB   | Tape & Reel  |
|          |                   | AP2125K-2.5TRE1  | AP2125K-2.5TRG1  | ECD        | GCD   | Tape & Reel  |
|          |                   | AP2125K-2.8TRE1  | AP2125K-2.8TRG1  | ECE        | GCE   | Tape & Reel  |
|          |                   | AP2125K-3.0TRE1  | AP2125K-3.0TRG1  | ECF        | GCF   | Tape & Reel  |
|          |                   | AP2125K-3.3TRE1  | AP2125K-3.3TRG1  | ECG        | GCG   | Tape & Reel  |
|          |                   |                  | AP2125K-4.15TRG1 |            | GCJ   | Tape & Reel  |
| SC-70-5  | -40 to 85°C       | AP2125K-4.2TRE1  | AP2125K-4.2TRG1  | ECC        | GCC   | Tape & Reel  |
|          |                   | AP2125KS-1.8TRE1 | AP2125KS-1.8TRG1 | 26         | B6    | Tape & Reel  |
|          |                   | AP2125KS-2.5TRE1 | AP2125KS-2.5TRG1 | 35         | C5    | Tape & Reel  |
|          |                   | AP2125KS-2.8TRE1 | AP2125KS-2.8TRG1 | 27         | B7    | Tape & Reel  |
|          |                   | AP2125KS-3.0TRE1 | AP2125KS-3.0TRG1 | 36         | C6    | Tape & Reel  |
|          |                   | AP2125KS-3.3TRE1 | AP2125KS-3.3TRG1 | 28         | B8    | Tape & Reel  |
| SC-82    | -40 to 85°C       | AP2125KS-4.2TRE1 | AP2125KS-4.2TRG1 | 34         | C4    | Tape & Reel  |
|          |                   | AP2125KC-1.8TRE1 | AP2125KC-1.8TRG1 | 91         | T1    | Tape & Reel  |
|          |                   | AP2125KC-2.5TRE1 | AP2125KC-2.5TRG1 | 96         | T6    | Tape & Reel  |
|          |                   | AP2125KC-2.8TRE1 | AP2125KC-2.8TRG1 | 92         | T2    | Tape & Reel  |
|          |                   | AP2125KC-3.0TRE1 | AP2125KC-3.0TRG1 | 97         | T7    | Tape & Reel  |
|          |                   | AP2125KC-3.3TRE1 | AP2125KC-3.3TRG1 | 93         | T3    | Tape & Reel  |
|          |                   | AP2125KC-4.2TRE1 | AP2125KC-4.2TRG1 | 95         | T5    | Tape & Reel  |

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant. Products with "G1" suffix are available in green packages.

**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR****AP2125****Absolute Maximum Ratings (Note 1)**

| Parameter                           | Symbol        | Value                |     | Unit |
|-------------------------------------|---------------|----------------------|-----|------|
| Input Voltage                       | $V_{IN}$      | 6.5                  |     | V    |
| Enable Input Voltage                | $V_{CE}$      | -0.3 to $V_{IN}+0.3$ |     | V    |
| Output Current                      | $I_{OUT}$     | 450                  |     | mA   |
| Junction Temperature                | $T_J$         | 150                  |     | °C   |
| Storage Temperature Range           | $T_{STG}$     | -65 to 150           |     | °C   |
| Lead Temperature (Soldering, 10sec) | $T_{LEAD}$    | 260                  |     | °C   |
| Thermal Resistance                  | $\theta_{JA}$ | SOT-23-3             | 200 | °C/W |
|                                     |               | SOT-23-5             | 200 |      |
|                                     |               | SC-70-5              | 300 |      |
|                                     |               | SC-82                | 300 |      |
| ESD (Human Body Model)              | ESD           | 6000                 |     | V    |
| ESD (Machine Model)                 | ESD           | 400                  |     | 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 |
|-------------------------------------|----------|----------------|-----|------|
| Input Voltage                       | $V_{IN}$ | $V_{OUT}+0.5V$ | 6   | V    |
| Operating Ambient Temperature Range | $T_A$    | -40            | 85  | °C   |

**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR****AP2125****Electrical Characteristics****AP2125-1.8 Electrical Characteristics**(V<sub>IN</sub>=2.8V, T<sub>A</sub>=25°C, C<sub>IN</sub>=1μF, C<sub>OUT</sub>=1μF, **Bold** typeface applies over -40°C≤T<sub>J</sub>≤85°C, unless otherwise specified.)

| Parameter                              | Symbol                                    | Conditions                                                     | Min     | Typ  | Max   | Unit   |
|----------------------------------------|-------------------------------------------|----------------------------------------------------------------|---------|------|-------|--------|
| Output Voltage                         | V <sub>OUT</sub>                          | V <sub>IN</sub> =2.8V<br>1mA≤I <sub>OUT</sub> ≤30mA            | 1.764   | 1.8  | 1.836 | V      |
| Input Voltage                          | V <sub>IN</sub>                           |                                                                |         |      | 6     | V      |
| Maximum Output Current                 | I <sub>OUT(MAX)</sub>                     | V <sub>IN</sub> -V <sub>OUT</sub> =1V, V <sub>OUT</sub> =1.76V | 300     | 360  |       | mA     |
| Load Regulation                        | V <sub>RLOAD</sub>                        | V <sub>IN</sub> =2.8V<br>1mA≤I <sub>OUT</sub> ≤300mA           |         | 6    | 15    | mV     |
| Line Regulation                        | V <sub>RLINE</sub>                        | 2.8V≤V <sub>IN</sub> ≤6V<br>I <sub>OUT</sub> =30mA             |         | 1    | 15    | mV     |
| Dropout Voltage                        | V <sub>DROP</sub>                         | I <sub>OUT</sub> =10mA                                         |         | 10   | 12    | mV     |
|                                        |                                           | I <sub>OUT</sub> =100mA                                        |         | 100  | 120   |        |
|                                        |                                           | I <sub>OUT</sub> =300mA                                        |         | 300  | 360   |        |
| Quiescent Current                      | I <sub>Q</sub>                            | V <sub>IN</sub> =2.8V, I <sub>OUT</sub> =0mA                   |         | 60   | 90    | μA     |
| Standby Current                        | I <sub>STD</sub>                          | V <sub>IN</sub> =2.8V<br>V <sub>CE</sub> in OFF mode           |         | 0.01 | 1.0   | μA     |
| Power Supply Rejection Ratio           | PSRR                                      | Ripple 0.5Vp-p<br>V <sub>IN</sub> =2.8V                        | f=100Hz | 70   |       | dB     |
|                                        |                                           |                                                                | f=1KHz  | 70   |       | dB     |
| Output Voltage Temperature Coefficient | (ΔV <sub>OUT</sub> /V <sub>OUT</sub> )/ΔT | I <sub>OUT</sub> =30mA                                         |         | ±100 |       | ppm/°C |
| Short Current Limit                    | I <sub>SHORT</sub>                        | V <sub>OUT</sub> =0V                                           |         | 50   |       | mA     |
| RMS Output Noise                       | V <sub>NOISE</sub>                        | 10Hz ≤f≤100kHz                                                 |         | 50   |       | μVrms  |
| CE "High" Voltage                      |                                           | CE input voltage "High"                                        | 1.5     |      |       | V      |
| CE "Low" Voltage                       |                                           | CE input voltage "Low"                                         |         |      | 0.4   | V      |
| Thermal Shutdown                       |                                           |                                                                |         | 160  |       | °C     |
| Thermal Shutdown Hyster-esis           |                                           |                                                                |         | 25   |       | °C     |



**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR**

**AP2125**

**Electrical Characteristics (Continued)**

**AP2125-2.5 Electrical Characteristics**

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

| Parameter                              | Symbol                              | Conditions                                     | Min       | Typ                         | Max  | Unit             |
|----------------------------------------|-------------------------------------|------------------------------------------------|-----------|-----------------------------|------|------------------|
| Output Voltage                         | $V_{OUT}$                           | $V_{IN}=3.5V$<br>$1mA \leq I_{OUT} \leq 30mA$  | 2.45      | 2.5                         | 2.55 | V                |
| Input Voltage                          | $V_{IN}$                            |                                                |           |                             | 6    | V                |
| Maximum Output Current                 | $I_{OUT(MAX)}$                      | $V_{IN}-V_{OUT}=1V$ , $V_{OUT}=2.45V$          | 300       | 360                         |      | mA               |
| Load Regulation                        | $V_{RLOAD}$                         | $V_{IN}=3.5V$<br>$1mA \leq I_{OUT} \leq 300mA$ |           | 10                          | 15   | mV               |
| Line Regulation                        | $V_{RLINE}$                         | $3.5V \leq V_{IN} \leq 6V$<br>$I_{OUT}=30mA$   |           | 1                           | 15   | mV               |
| Dropout Voltage                        | $V_{DROP}$                          | $I_{OUT}=10mA$                                 |           | 6.5                         | 10   | mV               |
|                                        |                                     | $I_{OUT}=100mA$                                |           | 65                          | 100  |                  |
|                                        |                                     | $I_{OUT}=300mA$                                |           | 200                         | 300  |                  |
| Quiescent Current                      | $I_Q$                               | $V_{IN}=3.5V$ , $I_{OUT}=0mA$                  |           | 60                          | 90   | $\mu A$          |
| Standby Current                        | $I_{STD}$                           | $V_{IN}=3.5V$<br>$V_{CE}$ in OFF mode          |           | 0.01                        | 1.0  | $\mu A$          |
| Power Supply Rejection Ratio           | PSRR                                | Ripple 0.5Vp-p<br>$V_{IN}=3.5V$                | $f=100Hz$ | 65                          |      | dB               |
|                                        |                                     |                                                | $f=1KHz$  | 65                          |      | dB               |
| Output Voltage Temperature Coefficient | $(\Delta V_{OUT}/V_{OUT})/\Delta T$ | $I_{OUT}=30mA$                                 |           | <b><math>\pm 100</math></b> |      | ppm/ $^{\circ}C$ |
| Short Current Limit                    | $I_{SHORT}$                         | $V_{OUT}=0V$                                   |           | 50                          |      | mA               |
| RMS Output Noise                       | $V_{NOISE}$                         | $10Hz \leq f \leq 100kHz$                      |           | 50                          |      | $\mu V_{rms}$    |
| CE "High" Voltage                      |                                     | CE input voltage "High"                        | 1.5       |                             |      | V                |
| CE "Low" Voltage                       |                                     | CE input voltage "Low"                         |           |                             | 0.4  | V                |
| Thermal Shutdown                       |                                     |                                                |           | 160                         |      | $^{\circ}C$      |
| Thermal Shutdown Hysteresis            |                                     |                                                |           | 25                          |      | $^{\circ}C$      |


**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR**
**AP2125**
**Electrical Characteristics (Continued)**
**AP2125-2.8 Electrical Characteristics**

(V<sub>IN</sub>=3.8V, T<sub>A</sub>=25°C, C<sub>IN</sub>=1μF, C<sub>OUT</sub>=1μF, **Bold** typeface applies over -40°C≤T<sub>J</sub>≤85°C, unless otherwise specified.)

| Parameter                              | Symbol                                    | Conditions                                                     | Min     | Typ  | Max   | Unit   |
|----------------------------------------|-------------------------------------------|----------------------------------------------------------------|---------|------|-------|--------|
| Output Voltage                         | V <sub>OUT</sub>                          | V <sub>IN</sub> =3.8V<br>1mA≤I <sub>OUT</sub> ≤30mA            | 2.744   | 2.8  | 2.856 | V      |
| Input Voltage                          | V <sub>IN</sub>                           |                                                                |         |      | 6     | V      |
| Maximum Output Current                 | I <sub>OUT(MAX)</sub>                     | V <sub>IN</sub> -V <sub>OUT</sub> =1V, V <sub>OUT</sub> =2.74V | 300     | 360  |       | mA     |
| Load Regulation                        | V <sub>RLOAD</sub>                        | V <sub>IN</sub> =3.8V<br>1mA≤I <sub>OUT</sub> ≤300mA           |         | 11   | 15    | mV     |
| Line Regulation                        | V <sub>RLINE</sub>                        | 3.8V≤V <sub>IN</sub> ≤6V<br>I <sub>OUT</sub> =30mA             |         | 1    | 15    | mV     |
| Dropout Voltage                        | V <sub>DROP</sub>                         | I <sub>OUT</sub> =10mA                                         |         | 6.5  | 10    | mV     |
|                                        |                                           | I <sub>OUT</sub> =100mA                                        |         | 65   | 100   |        |
|                                        |                                           | I <sub>OUT</sub> =300mA                                        |         | 200  | 300   |        |
| Quiescent Current                      | I <sub>Q</sub>                            | V <sub>IN</sub> =3.8V, I <sub>OUT</sub> =0mA                   |         | 60   | 90    | μA     |
| Standby Current                        | I <sub>STD</sub>                          | V <sub>IN</sub> =3.8V<br>V <sub>CE</sub> in OFF mode           |         | 0.01 | 1.0   | μA     |
| Power Supply Rejection Ratio           | PSRR                                      | Ripple 0.5Vp-p<br>V <sub>IN</sub> =3.8V                        | f=100Hz | 65   |       | dB     |
|                                        |                                           |                                                                | f=1KHz  | 65   |       | dB     |
| Output Voltage Temperature Coefficient | (ΔV <sub>OUT</sub> /V <sub>OUT</sub> )/ΔT | I <sub>OUT</sub> =30mA                                         |         | ±100 |       | ppm/°C |
| Short Current Limit                    | I <sub>SHORT</sub>                        | V <sub>OUT</sub> =0V                                           |         | 50   |       | mA     |
| RMS Output Noise                       | V <sub>NOISE</sub>                        | 10Hz ≤f≤100kHz                                                 |         | 50   |       | μVrms  |
| CE "High" Voltage                      |                                           | CE input voltage "High"                                        | 1.5     |      |       | V      |
| CE "Low" Voltage                       |                                           | CE input voltage "Low"                                         |         |      | 0.4   | V      |
| Thermal Shutdown                       |                                           |                                                                |         | 160  |       | °C     |
| Thermal Shutdown Hyster-esis           |                                           |                                                                |         | 25   |       | °C     |



**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR AP2125**

**Electrical Characteristics (Continued)**

**AP2125-3.0 Electrical Characteristics**

( $V_{IN}=4.0V$ ,  $T_A=25^{\circ}C$ ,  $C_{IN}=1\mu F$ ,  $C_{OUT}=1\mu F$ , **Bold** typeface applies over  $-40^{\circ}C \leq T_J \leq 85^{\circ}C$ , unless otherwise specified.)

| Parameter                              | Symbol                              | Conditions                                     | Min       | Typ                         | Max  | Unit             |
|----------------------------------------|-------------------------------------|------------------------------------------------|-----------|-----------------------------|------|------------------|
| Output Voltage                         | $V_{OUT}$                           | $V_{IN}=4.0V$<br>$1mA \leq I_{OUT} \leq 30mA$  | 2.94      | 3.0                         | 3.06 | V                |
| Input Voltage                          | $V_{IN}$                            |                                                |           |                             | 6    | V                |
| Maximum Output Current                 | $I_{OUT(MAX)}$                      | $V_{IN}-V_{OUT}=1V$ , $V_{OUT}=2.94V$          | 300       | 360                         |      | mA               |
| Load Regulation                        | $V_{RLOAD}$                         | $V_{IN}=4.0V$<br>$1mA \leq I_{OUT} \leq 300mA$ |           | 12                          | 15   | mV               |
| Line Regulation                        | $V_{RLINE}$                         | $4.0V \leq V_{IN} \leq 6V$<br>$I_{OUT}=30mA$   |           | 1                           | 15   | mV               |
| Dropout Voltage                        | $V_{DROP}$                          | $I_{OUT}=10mA$                                 |           | 6.5                         | 10   | mV               |
|                                        |                                     | $I_{OUT}=100mA$                                |           | 65                          | 100  |                  |
|                                        |                                     | $I_{OUT}=300mA$                                |           | 200                         | 300  |                  |
| Quiescent Current                      | $I_Q$                               | $V_{IN}=4.0V$ , $I_{OUT}=0mA$                  |           | 60                          | 90   | $\mu A$          |
| Standby Current                        | $I_{STD}$                           | $V_{IN}=4.0V$<br>$V_{CE}$ in OFF mode          |           | 0.01                        | 1.0  | $\mu A$          |
| Power Supply Rejection Ratio           | PSRR                                | Ripple 0.5Vp-p<br>$V_{IN}=4.0V$                | $f=100Hz$ | 65                          |      | dB               |
|                                        |                                     |                                                | $f=1KHz$  | 65                          |      | dB               |
| Output Voltage Temperature Coefficient | $(\Delta V_{OUT}/V_{OUT})/\Delta T$ | $I_{OUT}=30mA$                                 |           | <b><math>\pm 100</math></b> |      | ppm/ $^{\circ}C$ |
| Short Current Limit                    | $I_{SHORT}$                         | $V_{OUT}=0V$                                   |           | 50                          |      | mA               |
| RMS Output Noise                       | $V_{NOISE}$                         | $10Hz \leq f \leq 100kHz$                      |           | 50                          |      | $\mu V_{rms}$    |
| CE "High" Voltage                      |                                     | CE input voltage "High"                        | 1.5       |                             |      | V                |
| CE "Low" Voltage                       |                                     | CE input voltage "Low"                         |           |                             | 0.4  | V                |
| Thermal Shutdown                       |                                     |                                                |           | 160                         |      | $^{\circ}C$      |
| Thermal Shutdown Hyster-esis           |                                     |                                                |           | 25                          |      | $^{\circ}C$      |


**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR**
**AP2125**
**Electrical Characteristics (Continued)**
**AP2125-3.3 Electrical Characteristics**

(V<sub>IN</sub>=4.3V, T<sub>A</sub>=25°C, C<sub>IN</sub>=1μF, C<sub>OUT</sub>=1μF, **Bold** typeface applies over -40°C≤T<sub>J</sub>≤85°C, unless otherwise specified.)

| Parameter                              | Symbol                                    | Conditions                                                     | Min     | Typ  | Max   | Unit   |
|----------------------------------------|-------------------------------------------|----------------------------------------------------------------|---------|------|-------|--------|
| Output Voltage                         | V <sub>OUT</sub>                          | V <sub>IN</sub> =4.3V<br>1mA≤I <sub>OUT</sub> ≤30mA            | 3.234   | 3.3  | 3.366 | V      |
| Input Voltage                          | V <sub>IN</sub>                           |                                                                |         |      | 6     | V      |
| Maximum Output Current                 | I <sub>OUT(MAX)</sub>                     | V <sub>IN</sub> -V <sub>OUT</sub> =1V, V <sub>OUT</sub> =3.23V | 300     | 360  |       | mA     |
| Load Regulation                        | V <sub>RLOAD</sub>                        | V <sub>IN</sub> =4.3V<br>1mA≤I <sub>OUT</sub> ≤300mA           |         | 13   | 15    | mV     |
| Line Regulation                        | V <sub>RLINE</sub>                        | 4.3V≤V <sub>IN</sub> ≤6V<br>I <sub>OUT</sub> =30mA             |         | 1    | 15    | mV     |
| Dropout Voltage                        | V <sub>DROP</sub>                         | I <sub>OUT</sub> =10mA                                         |         | 6.5  | 10    | mV     |
|                                        |                                           | I <sub>OUT</sub> =100mA                                        |         | 65   | 100   |        |
|                                        |                                           | I <sub>OUT</sub> =300mA                                        |         | 200  | 300   |        |
| Quiescent Current                      | I <sub>Q</sub>                            | V <sub>IN</sub> =4.3V, I <sub>OUT</sub> =0mA                   |         | 60   | 90    | μA     |
| Standby Current                        | I <sub>STD</sub>                          | V <sub>IN</sub> =4.3V<br>V <sub>CE</sub> in OFF mode           |         | 0.01 | 1.0   | μA     |
| Power Supply Rejection Ratio           | PSRR                                      | Ripple 0.5Vp-p<br>V <sub>IN</sub> =4.3V                        | f=100Hz | 65   |       | dB     |
|                                        |                                           |                                                                | f=1KHz  | 65   |       | dB     |
| Output Voltage Temperature Coefficient | (ΔV <sub>OUT</sub> /V <sub>OUT</sub> )/ΔT | I <sub>OUT</sub> =30mA                                         |         | ±100 |       | ppm/°C |
| Short Current Limit                    | I <sub>SHORT</sub>                        | V <sub>OUT</sub> =0V                                           |         | 50   |       | mA     |
| RMS Output Noise                       | V <sub>NOISE</sub>                        | 10Hz ≤f≤100kHz                                                 |         | 50   |       | μVrms  |
| CE "High" Voltage                      |                                           | CE input voltage "High"                                        | 1.5     |      |       | V      |
| CE "Low" Voltage                       |                                           | CE input voltage "Low"                                         |         |      | 0.4   | V      |
| Thermal Shutdown                       |                                           |                                                                |         | 160  |       | °C     |
| Thermal Shutdown Hyster-esis           |                                           |                                                                |         | 25   |       | °C     |


**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR**
**AP2125**
**Electrical Characteristics (Continued)**
**AP2125-4.15 Electrical Characteristics**

(V<sub>IN</sub>=5.15V, T<sub>A</sub>=25°C, C<sub>IN</sub>=1μF, C<sub>OUT</sub>=1μF, **Bold** typeface applies over -40°C≤T<sub>J</sub>≤85°C, unless otherwise specified.)

| Parameter                              | Symbol                                    | Conditions                                                     | Min     | Typ  | Max   | Unit   |
|----------------------------------------|-------------------------------------------|----------------------------------------------------------------|---------|------|-------|--------|
| Output Voltage                         | V <sub>OUT</sub>                          | V <sub>IN</sub> =5.15V<br>1mA≤I <sub>OUT</sub> ≤30mA           | 4.067   | 4.15 | 4.233 | V      |
| Input Voltage                          | V <sub>IN</sub>                           |                                                                |         |      | 6     | V      |
| Maximum Output Current                 | I <sub>OUT(MAX)</sub>                     | V <sub>IN</sub> -V <sub>OUT</sub> =1V, V <sub>OUT</sub> =4.06V | 300     | 360  |       | mA     |
| Load Regulation                        | V <sub>RLOAD</sub>                        | V <sub>IN</sub> =5.15V<br>1mA≤I <sub>OUT</sub> ≤300mA          |         | 13   | 15    | mV     |
| Line Regulation                        | V <sub>RLINE</sub>                        | 5.15V≤V <sub>IN</sub> ≤6V<br>I <sub>OUT</sub> =30mA            |         | 1    | 15    | mV     |
| Dropout Voltage                        | V <sub>DROP</sub>                         | I <sub>OUT</sub> =10mA                                         |         | 6.5  | 10    | mV     |
|                                        |                                           | I <sub>OUT</sub> =100mA                                        |         | 65   | 100   |        |
|                                        |                                           | I <sub>OUT</sub> =300mA                                        |         | 200  | 300   |        |
| Quiescent Current                      | I <sub>Q</sub>                            | V <sub>IN</sub> =5.15V, I <sub>OUT</sub> =0mA                  |         | 60   | 90    | μA     |
| Standby Current                        | I <sub>STD</sub>                          | V <sub>IN</sub> =5.15V<br>V <sub>CE</sub> in OFF mode          |         | 0.01 | 1.0   | μA     |
| Power Supply Rejection Ratio           | PSRR                                      | Ripple 0.5Vp-p<br>V <sub>IN</sub> =5.15V                       | f=100Hz | 65   |       | dB     |
|                                        |                                           |                                                                | f=1KHz  | 65   |       | dB     |
| Output Voltage Temperature Coefficient | (ΔV <sub>OUT</sub> /V <sub>OUT</sub> )/ΔT | I <sub>OUT</sub> =30mA                                         |         | ±100 |       | ppm/°C |
| Short Current Limit                    | I <sub>SHORT</sub>                        | V <sub>OUT</sub> =0V                                           |         | 50   |       | mA     |
| RMS Output Noise                       | V <sub>NOISE</sub>                        | 10Hz ≤f≤100kHz                                                 |         | 50   |       | μVrms  |
| CE "High" Voltage                      |                                           | CE input voltage "High"                                        | 1.5     |      |       | V      |
| CE "Low" Voltage                       |                                           | CE input voltage "Low"                                         |         |      | 0.4   | V      |
| Thermal Shutdown                       |                                           |                                                                |         | 160  |       | °C     |
| Thermal Shutdown Hyster-esis           |                                           |                                                                |         | 25   |       | °C     |


**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR**
**AP2125**
**Electrical Characteristics (Continued)**
**AP2125-4.2 Electrical Characteristics**

(V<sub>IN</sub>=5.2V, T<sub>A</sub>=25°C, C<sub>IN</sub>=1μF, C<sub>OUT</sub>=1μF, **Bold** typeface applies over -40°C≤T<sub>J</sub>≤85°C, unless otherwise specified.)

| Parameter                              | Symbol                                    | Conditions                                                     | Min     | Typ  | Max   | Unit   |
|----------------------------------------|-------------------------------------------|----------------------------------------------------------------|---------|------|-------|--------|
| Output Voltage                         | V <sub>OUT</sub>                          | V <sub>IN</sub> =5.2V<br>1mA≤I <sub>OUT</sub> ≤30mA            | 4.116   | 4.2  | 4.284 | V      |
| Input Voltage                          | V <sub>IN</sub>                           |                                                                |         |      | 6     | V      |
| Maximum Output Current                 | I <sub>OUT(MAX)</sub>                     | V <sub>IN</sub> -V <sub>OUT</sub> =1V, V <sub>OUT</sub> =4.12V | 300     | 360  |       | mA     |
| Load Regulation                        | V <sub>RLOAD</sub>                        | V <sub>IN</sub> =5.2V<br>1mA≤I <sub>OUT</sub> ≤300mA           |         | 13   | 15    | mV     |
| Line Regulation                        | V <sub>RLINE</sub>                        | 5.2V≤V <sub>IN</sub> ≤6V<br>I <sub>OUT</sub> =30mA             |         | 1    | 15    | mV     |
| Dropout Voltage                        | V <sub>DROP</sub>                         | I <sub>OUT</sub> =10mA                                         |         | 6.5  | 10    | mV     |
|                                        |                                           | I <sub>OUT</sub> =100mA                                        |         | 65   | 100   |        |
|                                        |                                           | I <sub>OUT</sub> =300mA                                        |         | 200  | 300   |        |
| Quiescent Current                      | I <sub>Q</sub>                            | V <sub>IN</sub> =5.2V, I <sub>OUT</sub> =0mA                   |         | 60   | 90    | μA     |
| Standby Current                        | I <sub>STD</sub>                          | V <sub>IN</sub> =5.2V<br>V <sub>CE</sub> in OFF mode           |         | 0.01 | 1.0   | μA     |
| Power Supply Rejection Ratio           | PSRR                                      | Ripple 0.5Vp-p<br>V <sub>IN</sub> =5.2V                        | f=100Hz | 65   |       | dB     |
|                                        |                                           |                                                                | f=1KHz  | 65   |       | dB     |
| Output Voltage Temperature Coefficient | (ΔV <sub>OUT</sub> /V <sub>OUT</sub> )/ΔT | I <sub>OUT</sub> =30mA                                         |         | ±100 |       | ppm/°C |
| Short Current Limit                    | I <sub>SHORT</sub>                        | V <sub>OUT</sub> =0V                                           |         | 50   |       | mA     |
| RMS Output Noise                       | V <sub>NOISE</sub>                        | 10Hz ≤f≤100kHz                                                 |         | 50   |       | μVrms  |
| CE "High" Voltage                      |                                           | CE input voltage "High"                                        | 1.5     |      |       | V      |
| CE "Low" Voltage                       |                                           | CE input voltage "Low"                                         |         |      | 0.4   | V      |
| Thermal Shutdown                       |                                           |                                                                |         | 160  |       | °C     |
| Thermal Shutdown Hysteresis            |                                           |                                                                |         | 25   |       | °C     |

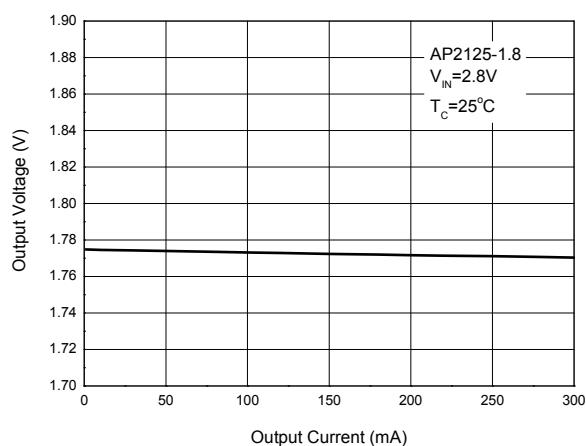
**Typical Performance Characteristics**

Figure 4. Output Voltage vs. Output Current

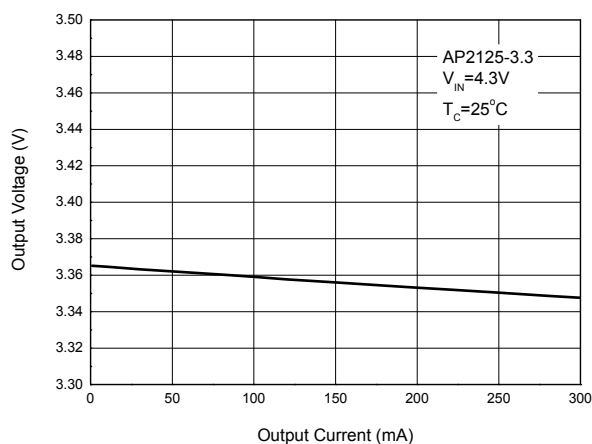


Figure 5. Output Voltage vs. Output Current

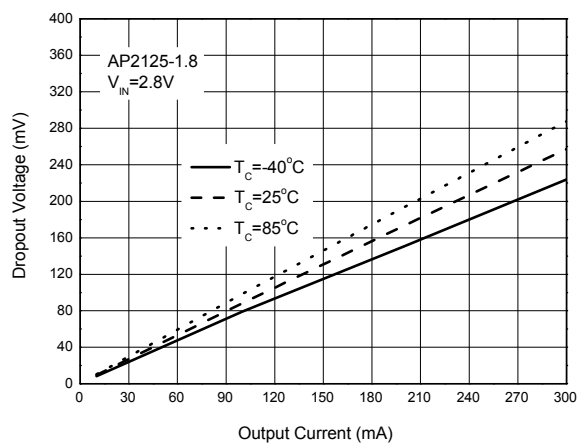


Figure 6. Dropout Voltage vs. Output Current

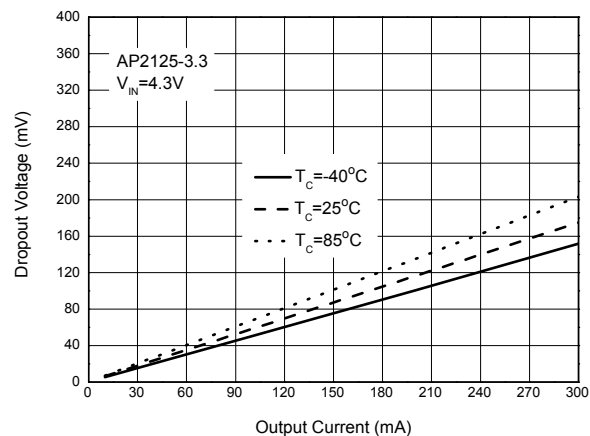


Figure 7. Dropout Voltage vs. Output Current



**Typical Performance Characteristics (Continued)**

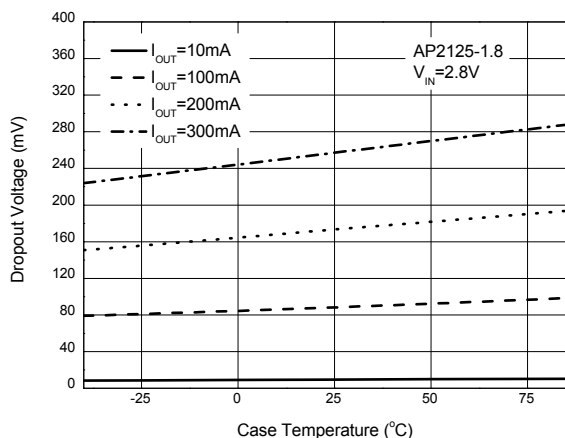


Figure 8. Dropout Voltage vs. Case Temperature

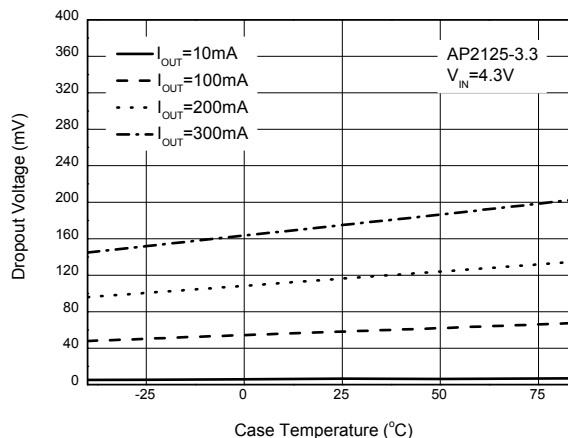


Figure 9. Dropout Voltage vs. Case Temperature

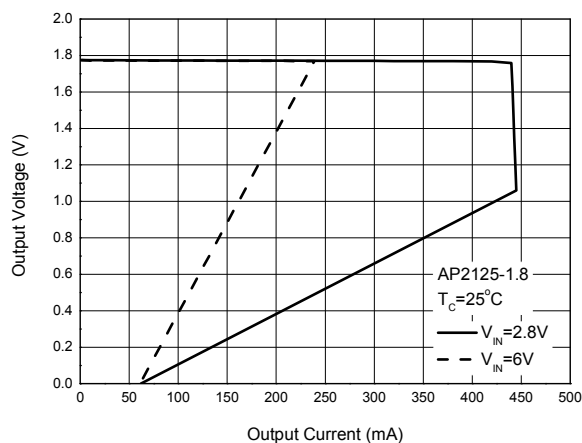


Figure 10. Current Limit

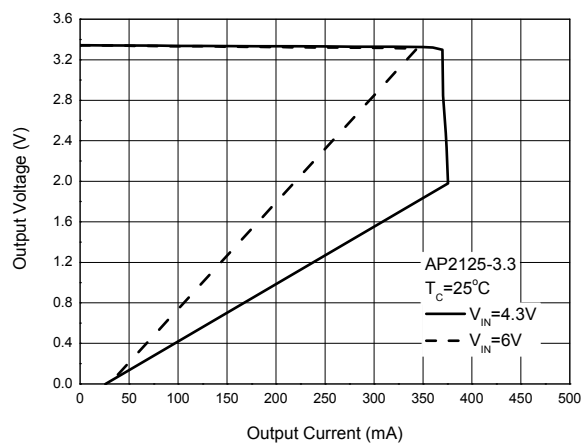


Figure 11. Current Limit

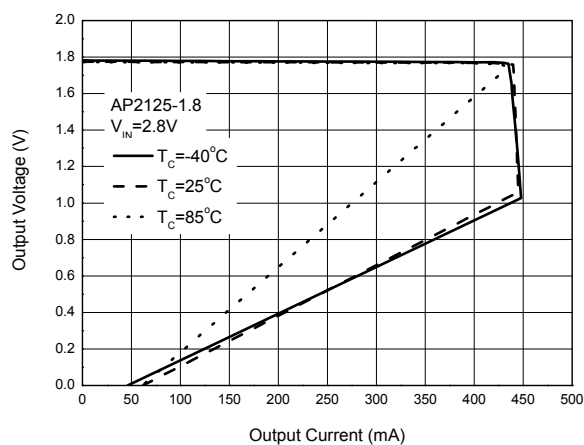
**Typical Performance Characteristics (Continued)**

Figure 12. Current Limit

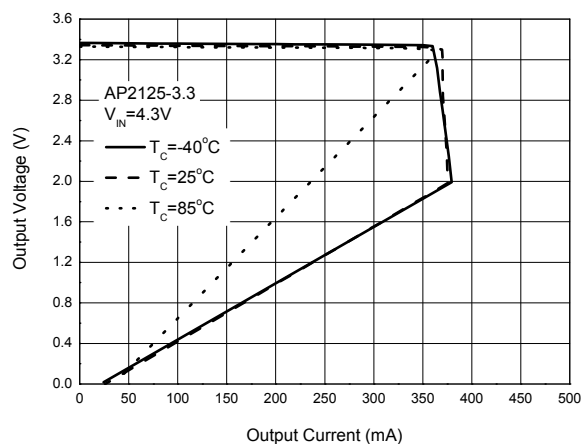


Figure 13. Current Limit

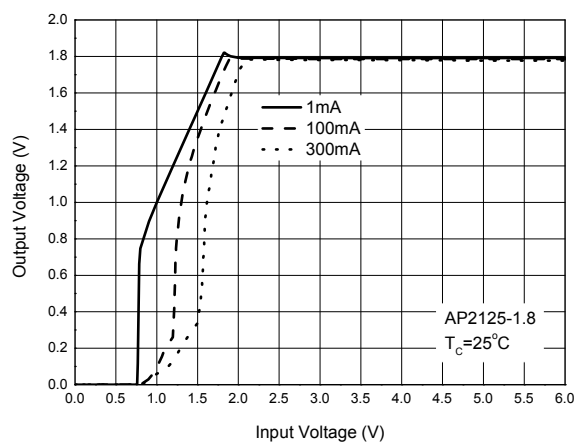


Figure 14. Output Voltage vs. Input Voltage

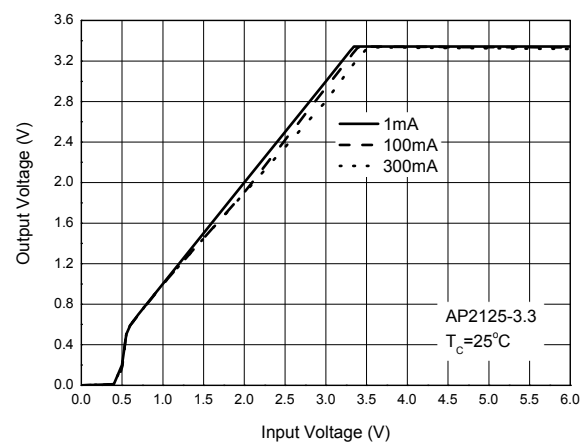


Figure 15. Output Voltage vs. Input Voltage

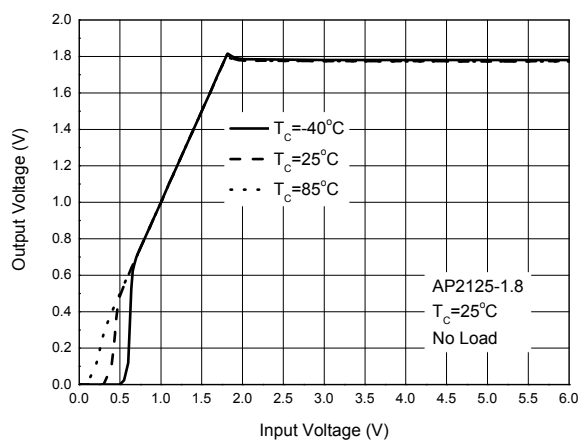
**Typical Performance Characteristics (Continued)**

Figure 16. Output Voltage vs. Input Voltage

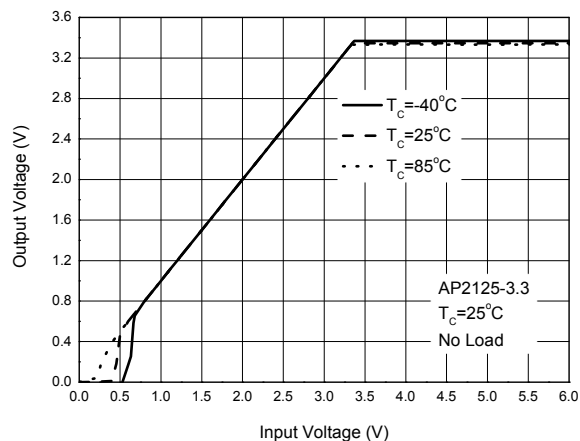


Figure 17. Output Voltage vs. Input Voltage

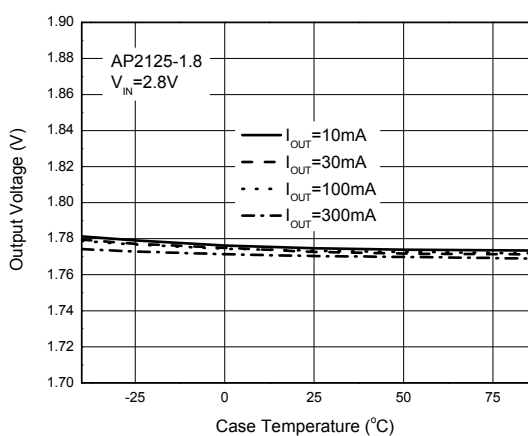


Figure 18. Output Voltage vs. Case Temperature

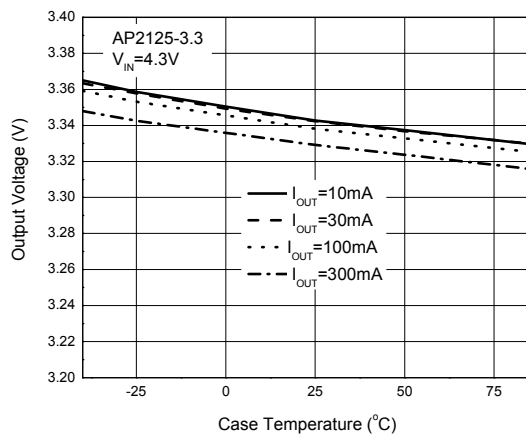


Figure 19. Output Voltage vs. Case Temperature

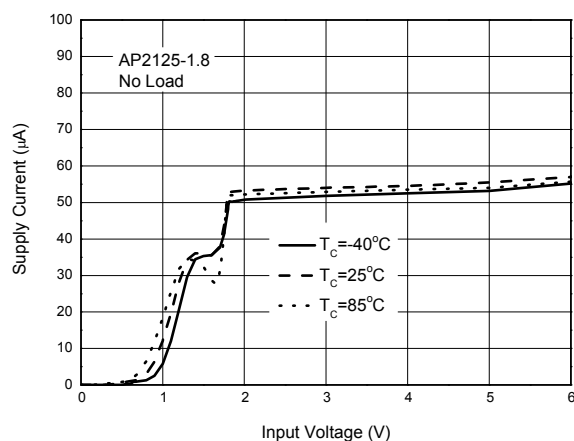
**Typical Performance Characteristics (Continued)**

Figure 20. Supply Current vs. Input Voltage

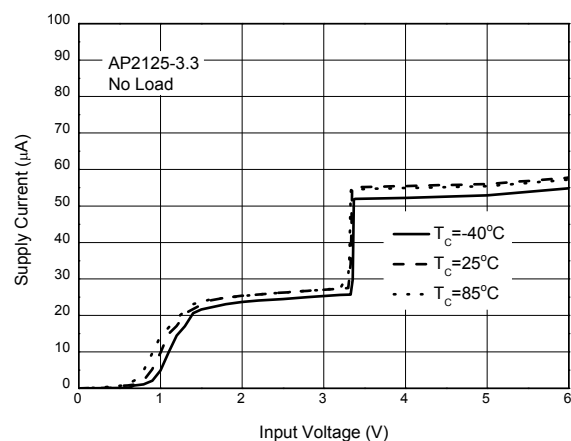


Figure 21. Supply Current vs. Input Voltage

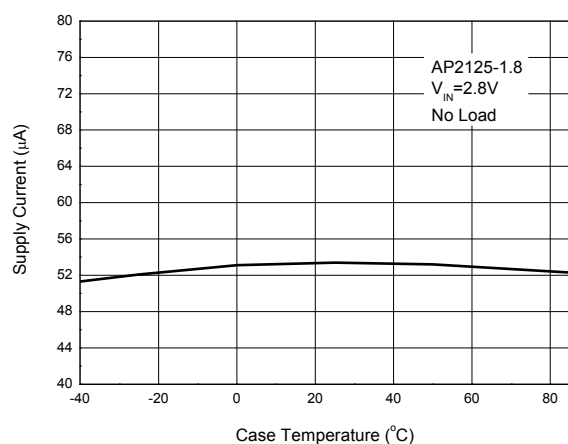


Figure 22. Supply Current vs. Case Temperature

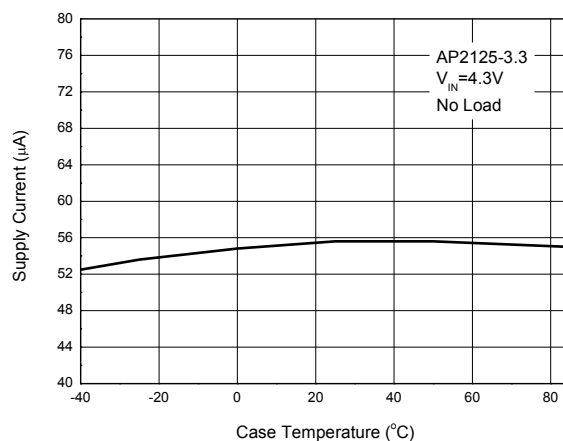


Figure 23. Supply Current vs. Case Temperature

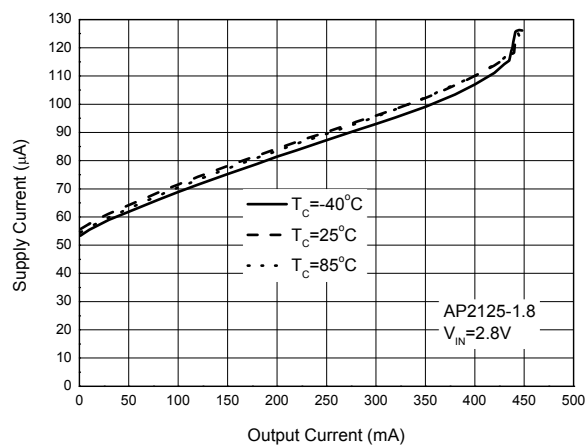
**Typical Performance Characteristics (Continued)**

Figure 24. Supply Current vs. Output Current

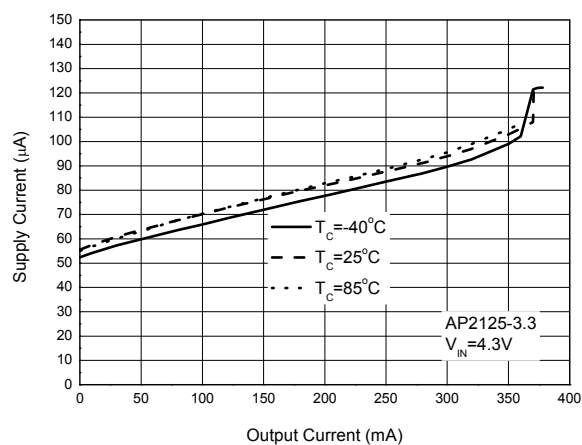


Figure 25. Supply Current vs. Output Current

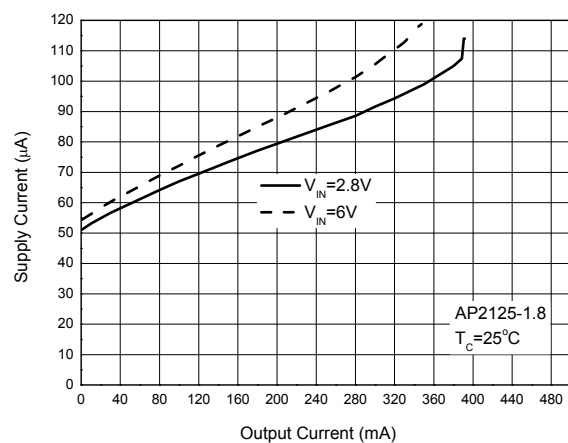


Figure 26. Supply Current vs. Output Current

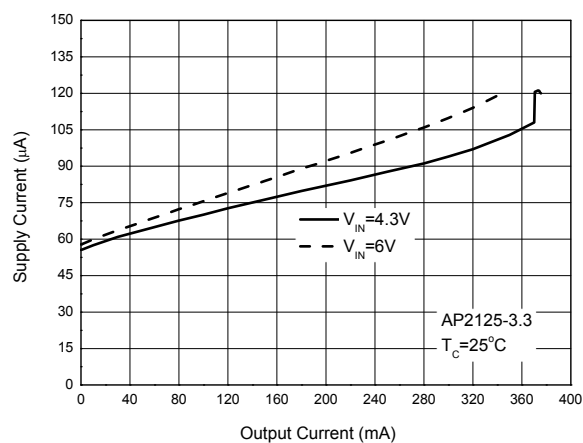


Figure 27. Supply Current vs. Output Current



**Typical Performance Characteristics (Continued)**

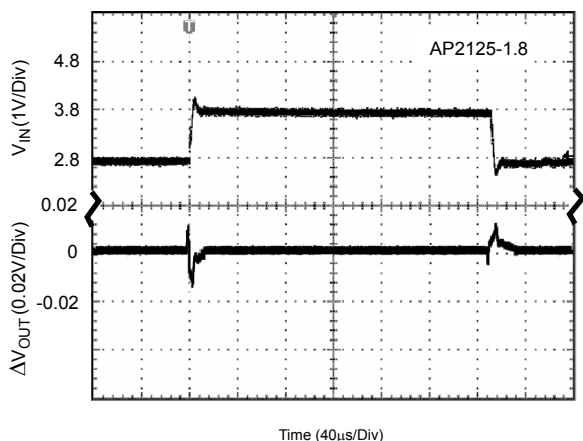


Figure 28. Line Transient  
(Conditions:  $I_{OUT}=30mA$ ,  $C_{OUT}=1\mu F$ ,  $V_{IN}=2.8$  to  $3.8V$ )

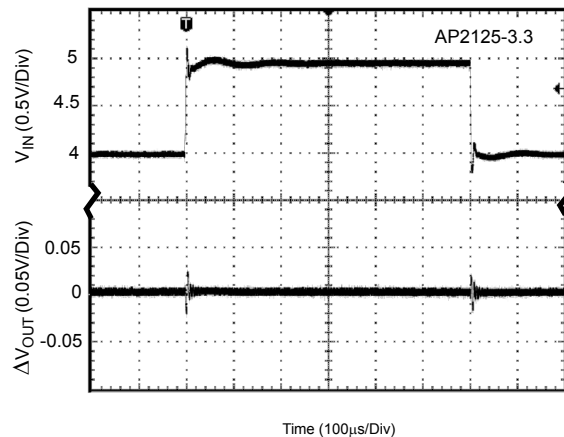


Figure 29. Line Transient  
(Conditions:  $I_{OUT}=30mA$ ,  $C_{OUT}=1\mu F$ ,  $V_{IN}=4$  to  $5V$ )

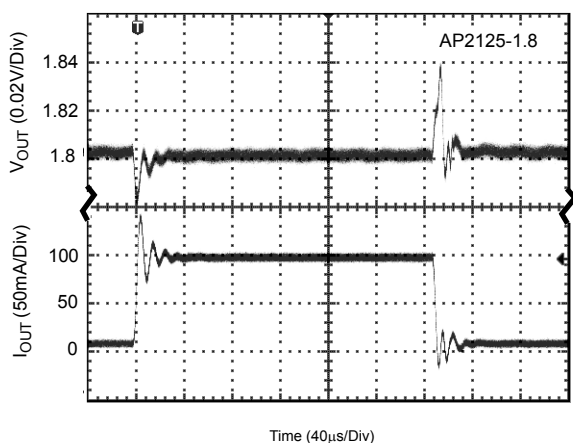


Figure 30. Load Transient  
(Conditions:  $I_{OUT}=10$  to  $100mA$ ,  $C_{IN}=1\mu F$ ,  $C_{OUT}=1\mu F$ ,  $V_{IN}=2.8V$ )

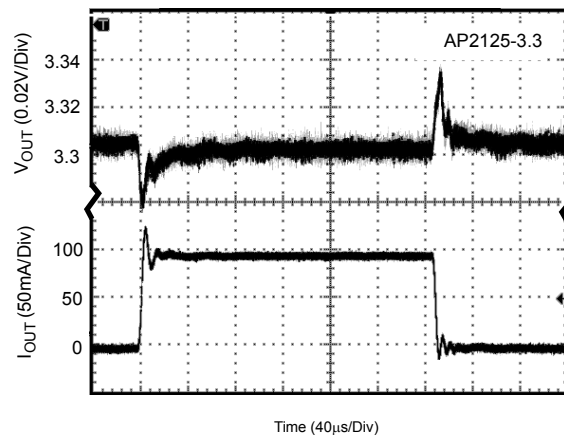


Figure 31. Load Transient  
(Conditions:  $I_{OUT}=10$  to  $100mA$ ,  $C_{IN}=1\mu F$ ,  $C_{OUT}=1\mu F$ ,  $V_{IN}=4.3V$ )

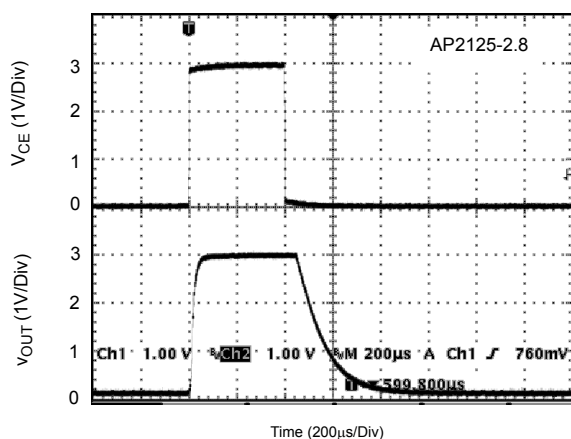
**Typical Performance Characteristics (Continued)**

Figure 32. Enable Input Response and Auto-discharge  
(Conditions:  $V_{CE}=0$  to 3V,  $C_{IN}=1\mu F$ ,  
 $C_{OUT}=1\mu F$ ,  $V_{IN}=3V$ , no load)

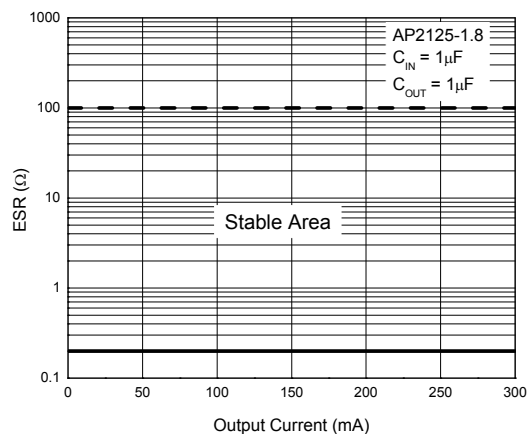


Figure 33. ESR vs. Output Current

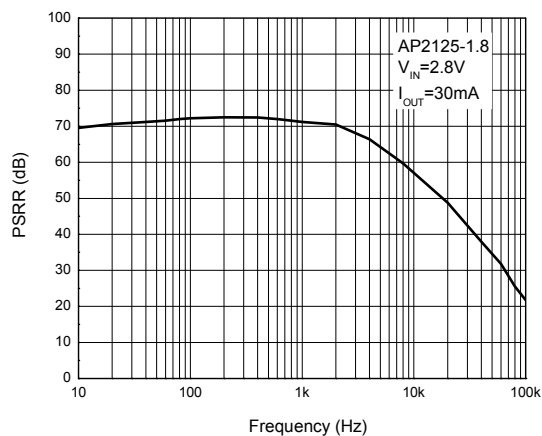


Figure 34. PSRR

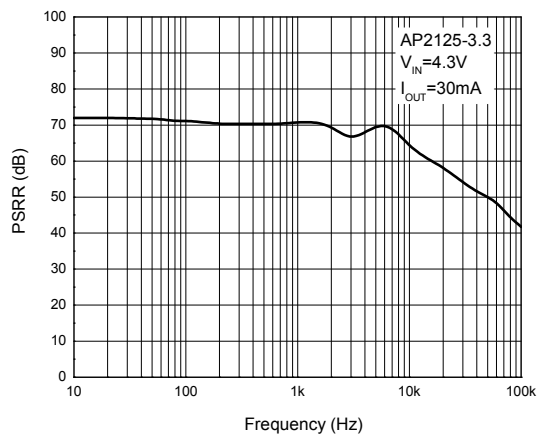


Figure 35. PSRR

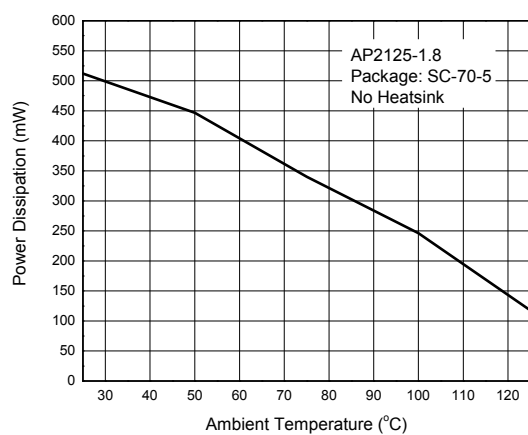
**Typical Performance Characteristics (Continued)**

Figure 36. Power Dissipation vs. Ambient Temperature

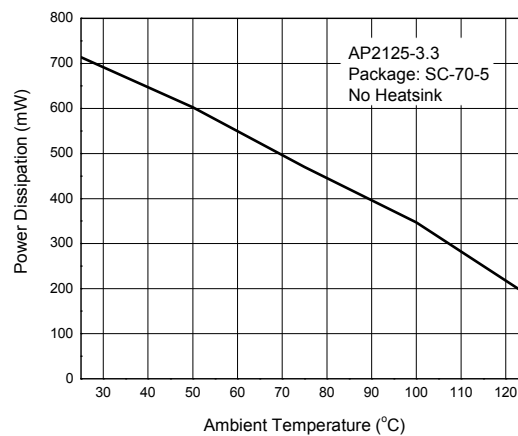


Figure 37. Power Dissipation vs. Ambient Temperature

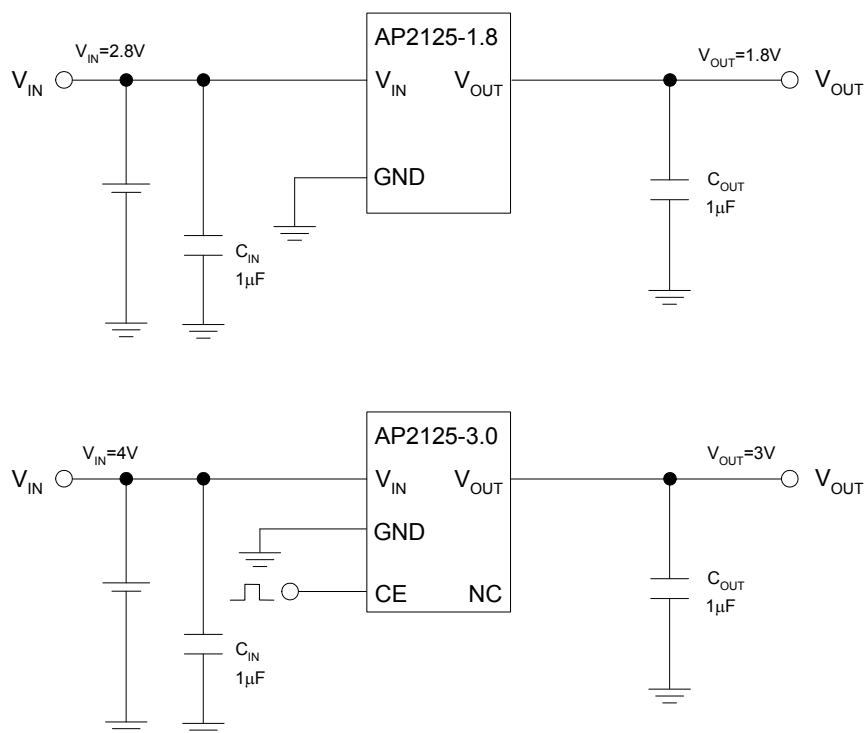
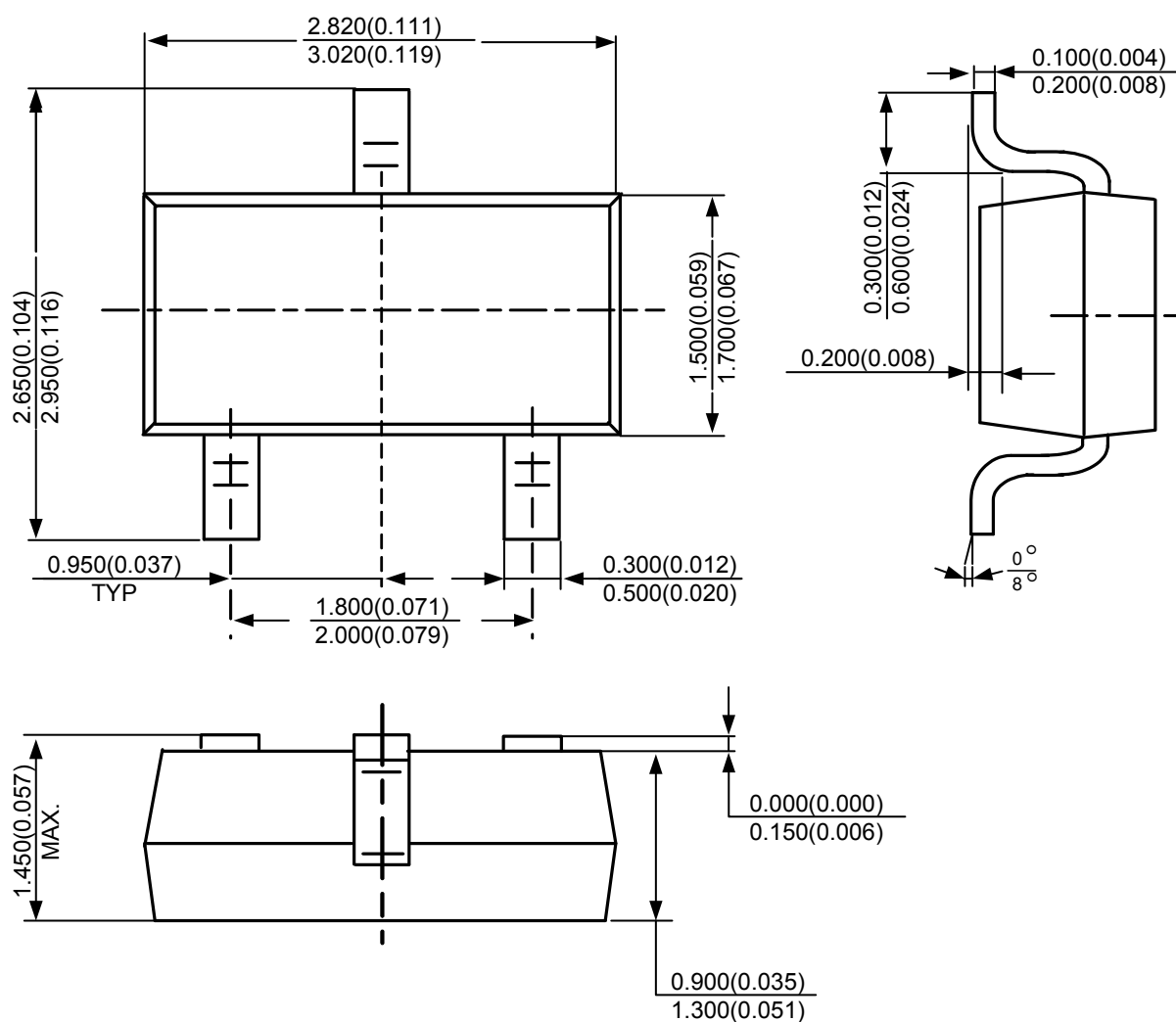
**Typical Application**

Figure 38. Typical Application of AP2125

**Mechanical Dimensions****SOT-23-3****Unit: mm(inch)**

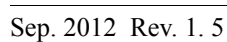


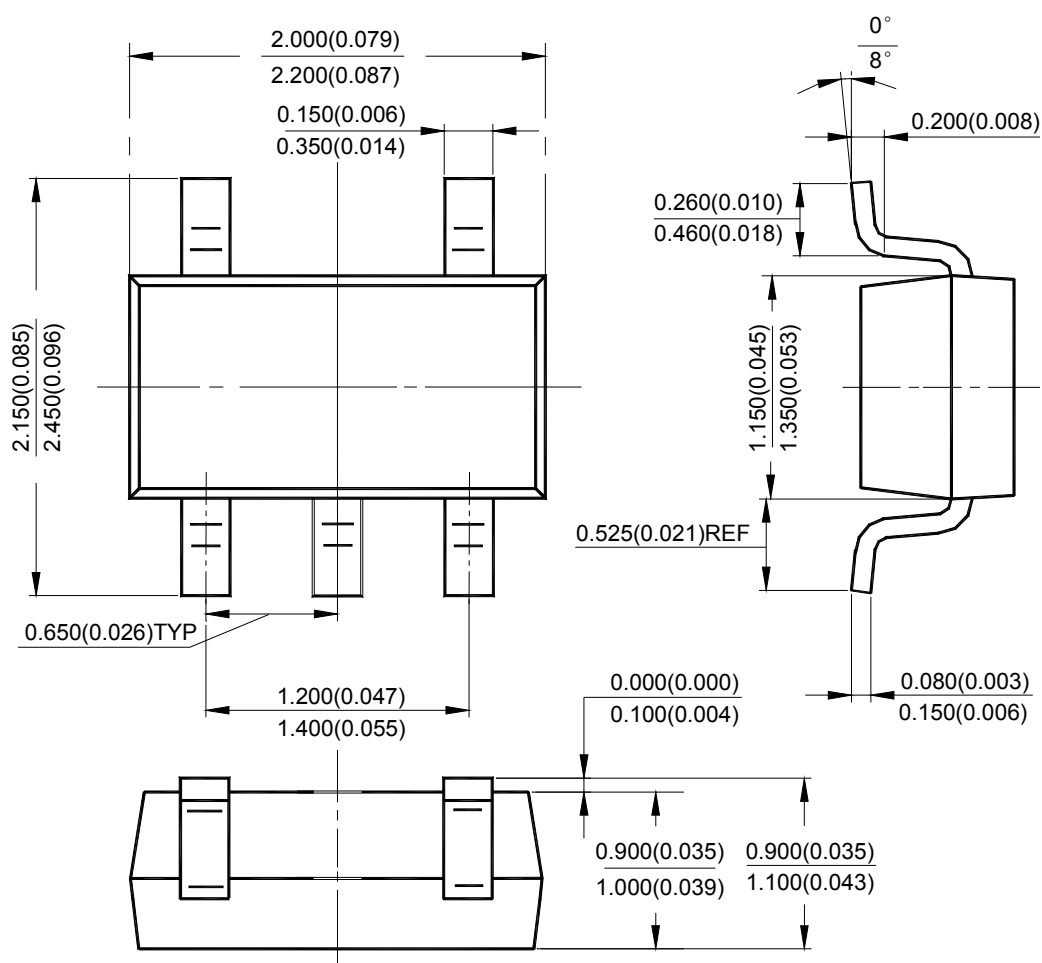
**AP2125**

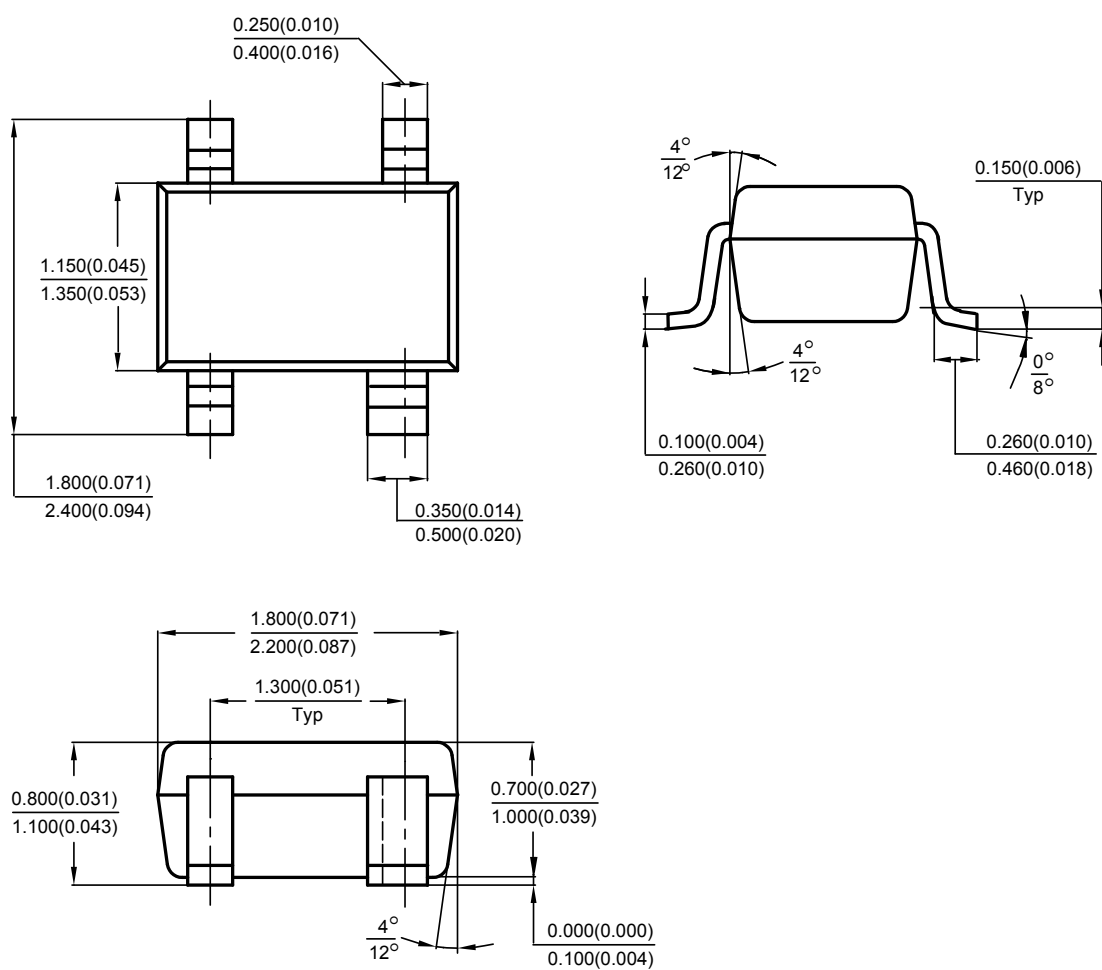
### Mechanical Dimensions (Continued)

**SOT-23-5**

Unit: mm(inch)



**Mechanical Dimensions (Continued)****SC-70-5****Unit: mm(inch)**

**Mechanical Dimensions (Continued)****SC-82****Unit: mm(inch)**



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