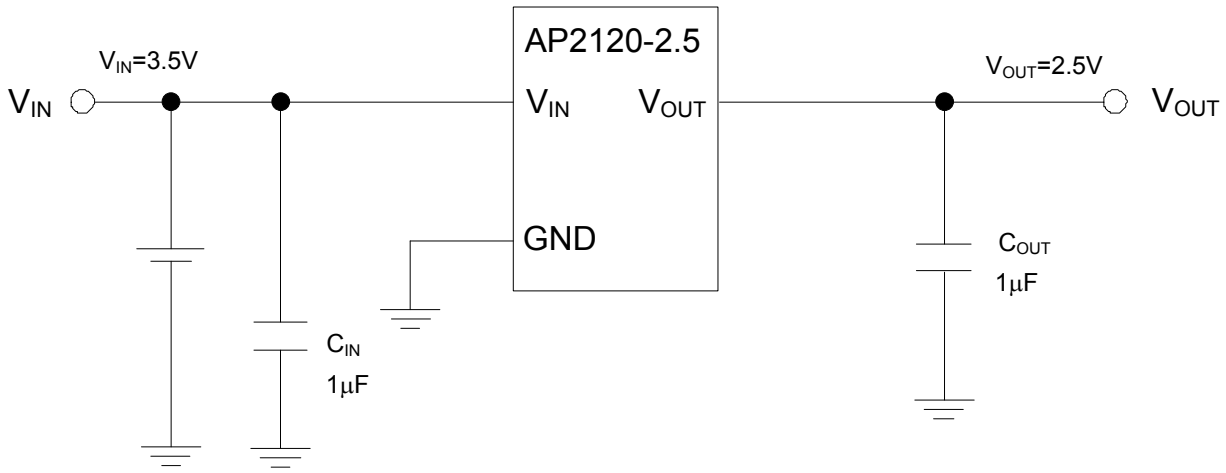
Typical Applications Circuit

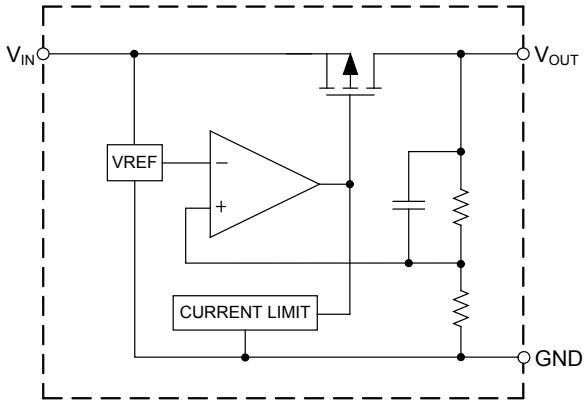


Note: Filter capacitors are required at the AP2120's input and output. 1μF capacitor is required at the input.
The minimum output capacitance required for stability should be more than 1μF with ESR from 0.01Ω to 100Ω. Ceramic capacitors are recommended.

Pin Descriptions

Pin Number	Pin Name	Function
SOT-23 (N)		
1	GND	Ground
2	V_{OUT}	Regulated Output Voltage
3	V_{IN}	Input Voltage

Functional Block Diagram



Absolute Maximum Ratings (Note 4)

Symbol	Parameter	Rating		Unit
V_{IN}	Input Voltage	6.5		V
V_{CE}	Enable Input Voltage	-0.3 to V_{IN} +0.3		V
I_{OUT}	Output Current	300		mA
T_J	Junction Temperature	+150		°C
T_{STG}	Storage Temperature Range	-65 to +150		°C
T_{LEAD}	Lead Temperature (Soldering, 10s)	+260		°C
θ_{JA}	Thermal Resistance (Junction to Ambient) (Note 5)	SOT-23	250	°C/W
ESD	ESD (Human Body Model)	2000		V
ESD	ESD (Machine Model)	200		V

Notes:
4. Stresses greater than those listed under "*Absolute Maximum Ratings*" can 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 can affect device reliability.
5. Absolute maximum ratings indicate limits beyond which damage to the component can occur. Electrical specifications do not apply when operating the device outside of its operating ratings. The maximum allowable power dissipation is a function of the maximum junction temperature, $T_{J(max)}$, the junction to-ambient thermal resistance, θ_{JA}, and the ambient temperature, T_A. The maximum allowable power dissipation at any ambient temperature is calculated using: $P_{D(max)} = (T_{J(max)} - T_A)/\theta_{JA}$. Exceeding the maximum allowable power dissipation will result in excessive die temperature.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{IN}	Input Voltage	2	6	V
T_J	Operating Junction Temperature Range	-40	+85	°C

Electrical Characteristics – AP2120-1.2

(@ V_{IN} = 2.2V, T_J = +25°C, C_{IN} = 1µF, C_{OUT} = 1µF, **Bold** typeface applies over -40°C ≤ T_J ≤ +85°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	V_{IN} = 2.2V 1mA ≤ I_{OUT} ≤ 30mA	1.176	1.2	1.224	V
V_{IN}	Input Voltage	—	—	—	6	V
I_{OUT}	Output Current	V_{IN}-V_{OUT} = 1V	150	—	—	mA
V_{RLOAD}	Load Regulation	V_{IN} = 2.2V 1mA ≤ I_{OUT} ≤ 80mA	—	12	40	mV
V_{RLINE}	Line Regulation	2.2V ≤ V_{IN} ≤ 6V I_{OUT} = 30mA	—	4	16	mV
V_{DROP}	Dropout Voltage	I_{OUT} = 10mA	—	700	900	mV
		I_{OUT} = 100mA	—	700	900	
		I_{OUT} = 150mA	—	700	900	
		I_{OUT} = 200mA	—	700	900	
I_Q	Quiescent Current	V_{IN} = 2.2V, I_{OUT} = 0mA	—	25	50	µA
PSRR	Power Supply Rejection Ratio	Ripple 0.5Vp-p, f = 1kHz V_{IN} = 2.2V	—	65	—	dB
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT} = 30mA	—	**±120**	—	µV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$			—	**±100**	—	ppm/°C
I_{LIMIT}	Short Current Limit	V_{OUT} = 0V	—	50	—	mA
V_{NOISE}	RMS Output Noise	T_A = +25°C, I_{OUT} = 0 10Hz ≤ f ≤ 100kHz	—	15	—	µVrms

Electrical Characteristics – AP2120-1.3

(@ V_{IN} = 2.3V, T_J = +25°C, C_{IN} = 1µF, C_{OUT} = 1µF, **Bold** typeface applies over -40°C ≤ T_J ≤ +85°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	V_{IN} = 2.3V 1mA ≤ I_{OUT} ≤ 30mA	1.274	1.3	1.326	V
V_{IN}	Input Voltage	—	—	—	6	V
I_{OUT}	Output Current	V_{IN}-V_{OUT} = 1V	150	—	—	mA
V_{RLOAD}	Load Regulation	V_{IN} = 2.3V 1mA ≤ I_{OUT} ≤ 80mA	—	12	40	mV
V_{RLINE}	Line Regulation	2.3V ≤ V_{IN} ≤ 6V I_{OUT} = 30mA	—	4	16	mV
V_{DROP}	Dropout Voltage	I_{OUT} = 10mA	—	600	800	mV
		I_{OUT} = 100mA	—	600	800	
		I_{OUT} = 150mA	—	600	800	
		I_{OUT} = 200mA	—	600	800	
I_Q	Quiescent Current	V_{IN} = 2.3V, I_{OUT} = 0mA	—	25	50	µA
PSRR	Power Supply Rejection Ratio	Ripple 0.5Vp-p, f = 1kHz V_{IN} = 2.3V	—	65	—	dB
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT} = 30mA	—	**±130**	—	µV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$			—	**±100**	—	ppm/°C
I_{LIMIT}	Short Current Limit	V_{OUT} = 0V	—	50	—	mA
V_{NOISE}	RMS Output Noise	T_A = +25°C, I_{OUT} = 0 10Hz ≤ f ≤ 100kHz	—	15	—	µVrms

Electrical Characteristics – AP2120-1.5

(@ V_{IN} = 2.5V, T_J = +25°C, C_{IN} = 1µF, C_{OUT} = 1µF, **Bold** typeface applies over -40°C ≤ T_J ≤ +85°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	V_{IN} = 2.5V 1mA ≤ I_{OUT} ≤ 30mA	1.47	1.5	1.53	V
V_{IN}	Input Voltage	—	—	—	6	V
I_{OUT}	Output Current	V_{IN}-V_{OUT} = 1V	150	—	—	mA
V_{RLOAD}	Load Regulation	V_{IN} = 2.5V 1mA ≤ I_{OUT} ≤ 80mA	—	12	40	mV
V_{RLINE}	Line Regulation	2.3V ≤ V_{IN} ≤ 6V I_{OUT} = 30mA	—	4	16	mV
V_{DROP}	Dropout Voltage	I_{OUT} = 10mA	—	400	600	mV
		I_{OUT} = 100mA	—	400	600	
		I_{OUT} = 150mA	—	400	600	
		I_{OUT} = 200mA	—	400	600	
I_Q	Quiescent Current	V_{IN} = 2.5V, I_{OUT} = 0mA	—	25	50	µA
PSRR	Power Supply Rejection Ratio	Ripple 0.5Vp-p, f = 1kHz V_{IN} = 2.5V	—	65	—	dB
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT} = 30mA	—	**±150**	—	µV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$			—	**±100**	—	ppm/°C
I_{LIMIT}	Short Current Limit	V_{OUT} = 0V	—	50	—	mA
V_{NOISE}	RMS Output Noise	T_A = +25°C, I_{OUT} = 0 10Hz ≤ f ≤ 100kHz	—	15	—	µVrms

Electrical Characteristics – AP2120-1.8

(@ V_{IN} = 2.8V, T_J = +25°C, C_{IN} = 1µF, C_{OUT} = 1µF, **Bold** typeface applies over -40°C ≤ T_J ≤ +85°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	V_{IN} = 2.8V 1mA ≤ I_{OUT} ≤ 30mA	1.764	1.8	1.836	V
V_{IN}	Input Voltage	—	—	—	6	V
I_{OUT}	Output Current	V_{IN}-V_{OUT} = 1V	150	—	—	mA
V_{RLOAD}	Load Regulation	V_{IN} = 2.8V 1mA ≤ I_{OUT} ≤ 80mA	—	12	40	mV
V_{RLINE}	Line Regulation	2.3V ≤ V_{IN} ≤ 6V I_{OUT} = 30mA	—	4	16	mV
V_{DROP}	Dropout Voltage	I_{OUT} = 10mA	—	20	40	mV
		I_{OUT} = 100mA	—	200	300	
		I_{OUT} = 150mA	—	300	500	
I_Q	Quiescent Current	V_{IN} = 2.8V, I_{OUT} = 0mA	—	25	50	µA
PSRR	Power Supply Rejection Ratio	Ripple 0.5Vp-p, f = 1kHz V_{IN} = 2.8V	—	65	—	dB
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT} = 30mA	—	**±180**	—	µV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$			—	**±100**	—	ppm/°C
I_{LIMIT}	Short Current Limit	V_{OUT} = 0V	—	50	—	mA
V_{NOISE}	RMS Output Noise	T_A = +25°C 10Hz ≤ f ≤ 100kHz	—	30	—	µVrms

Electrical Characteristics – AP2120-2.5

(@ V_{IN} = 3.5V, T_J = +25°C, C_{IN} = 1µF, C_{OUT} = 1µF, **Bold** typeface applies over -40°C ≤ T_J ≤ +85°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	V_{IN} = 3.5V 1mA ≤ I_{OUT} ≤ 30mA	2.45	2.5	2.55	V
V_{IN}	Input Voltage	—	—	—	6	V
I_{OUT}	Output Current	V_{IN}-V_{OUT} = 1V	150	—	—	mA
V_{RLOAD}	Load Regulation	V_{IN} = 3.5V 1mA ≤ I_{OUT} ≤ 80mA	—	12	40	mV
V_{RLINE}	Line Regulation	3V ≤ V_{IN} ≤ 6V I_{OUT} = 30mA	—	4	16	mV
V_{DROP}	Dropout Voltage	I_{OUT} = 10mA	—	20	40	mV
		I_{OUT} = 100mA	—	200	300	
		I_{OUT} = 150mA	—	300	500	
I_Q	Quiescent Current	V_{IN} = 3.5V, I_{OUT} = 0mA	—	25	50	µA
PSRR	Power Supply Rejection Ratio	Ripple 0.5Vp-p, f = 1kHz V_{IN} = 3.5V	—	65	—	dB
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT} = 30mA	—	**±250**	—	µV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$			—	**±100**	—	ppm/°C
I_{LIMIT}	Short Current Limit	V_{OUT} = 0V	—	50	—	mA
V_{NOISE}	RMS Output Noise	T_A = +25°C 10Hz ≤ f ≤ 100kHz	—	30	—	µVrms

Electrical Characteristics – AP2120-2.8

(@ V_{IN} = 3.8V, T_J = +25°C, C_{IN} = 1µF, C_{OUT} = 1µF, **Bold** typeface applies over -40°C ≤ T_J ≤ +85°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	V_{IN} = 3.8V 1mA ≤ I_{OUT} ≤ 30mA	2.744	2.8	2.856	V
V_{IN}	Input Voltage	—	—	—	6	V
I_{OUT}	Output Current	V_{IN}-V_{OUT} = 1V	150	—	—	mA
V_{RLOAD}	Load Regulation	V_{IN} = 3.8V 1mA ≤ I_{OUT} ≤ 80mA	—	12	40	mV
V_{RLINE}	Line Regulation	3.3V ≤ V_{IN} ≤ 6V I_{OUT} = 30mA	—	4	16	mV
V_{DROP}	Dropout Voltage	I_{OUT} = 10mA	—	20	40	mV
		I_{OUT} = 100mA	—	200	300	
		I_{OUT} = 150mA	—	300	500	
I_Q	Quiescent Current	V_{IN} = 3.8V, I_{OUT} = 0mA	—	25	50	µA
PSRR	Power Supply Rejection Ratio	Ripple 0.5Vp-p, f = 1kHz V_{IN} = 3.8V	—	65	—	dB
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT} = 30mA	—	**±280**	—	µV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$			—	**±100**	—	ppm/°C
I_{LIMIT}	Short Current Limit	V_{OUT} = 0V	—	50	—	mA
V_{NOISE}	RMS Output Noise	T_A = +25°C 10Hz ≤ f ≤ 100kHz	—	30	—	µVrms

Electrical Characteristics – AP2120-3.0

(@ V_{IN} = 4V, T_J = +25°C, C_{IN} = 1µF, C_{OUT} = 1µF, **Bold** typeface applies over -40°C ≤ T_J ≤ +85°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	V_{IN} = 4V 1mA ≤ I_{OUT} ≤ 30mA	2.94	3.0	3.06	V
V_{IN}	Input Voltage	—	—	—	6	V
I_{OUT}	Output Current	V_{IN}-V_{OUT} = 1V	150	—	—	mA
V_{RLOAD}	Load Regulation	V_{IN} = 4V 1mA ≤ I_{OUT} ≤ 80mA	—	12	40	mV
V_{RLINE}	Line Regulation	3.5V ≤ V_{IN} ≤ 6V I_{OUT} = 30mA	—	4	16	mV
V_{DROP}	Dropout Voltage	I_{OUT} = 10mA	—	20	40	mV
		I_{OUT} = 100mA	—	200	300	
		I_{OUT} = 150mA	—	300	500	
I_Q	Quiescent Current	V_{IN} = 4V, I_{OUT} = 0mA	—	25	50	µA
PSRR	Power Supply Rejection Ratio	Ripple 0.5Vp-p, f = 1kHz V_{IN} = 4V	—	65	—	dB
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT} = 30mA	—	**±300**	—	µV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$			—	**±100**	—	ppm/°C
I_{LIMIT}	Short Current Limit	V_{OUT} = 0V	—	50	—	mA
V_{NOISE}	RMS Output Noise	T_A = +25°C 10Hz ≤ f ≤ 100kHz	—	30	—	µVrms

Electrical Characteristics – AP2120-3.2

(@ V_{IN} = 4.2V, T_J = +25°C, C_{IN} = 1µF, C_{OUT} = 1µF, **Bold** typeface applies over -40°C ≤ T_J ≤ +85°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	V_{IN} = 4.2V 1mA ≤ I_{OUT} ≤ 30mA	3.136	3.2	3.264	V
V_{IN}	Input Voltage	—	—	—	6	V
I_{OUT}	Output Current	V_{IN}-V_{OUT} = 1V	150	—	—	mA
V_{RLOAD}	Load Regulation	V_{IN} = 4.2V 1mA ≤ I_{OUT} ≤ 80mA	—	12	40	mV
V_{RLINE}	Line Regulation	3.7V ≤ V_{IN} ≤ 6V I_{OUT} = 30mA	—	4	16	mV
V_{DROP}	Dropout Voltage	I_{OUT} = 10mA	—	20	40	mV
		I_{OUT} = 100mA	—	200	300	
		I_{OUT} = 150mA	—	300	500	
I_Q	Quiescent Current	V_{IN} = 4.2V, I_{OUT} = 0mA	—	25	50	µA
PSRR	Power Supply Rejection Ratio	Ripple 0.5Vp-p, f = 1kHz V_{IN} = 4.2V	—	65	—	dB
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT} = 30mA	—	**±320**	—	µV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$			—	**±100**	—	ppm/°C
I_{LIMIT}	Short Current Limit	V_{OUT} = 0V	—	50	—	mA
V_{NOISE}	RMS Output Noise	T_A = +25°C 10Hz ≤ f ≤ 100kHz	—	30	—	µVrms

Electrical Characteristics – AP2120-3.3

(@ V_{IN} = 4.3V, T_J = +25°C, C_{IN} = 1µF, C_{OUT} = 1µF, **Bold** typeface applies over -40°C ≤ T_J ≤ +85°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	V_{IN} = 4.3V 1mA ≤ I_{OUT} ≤ 30mA	3.234	3.3	3.366	V
V_{IN}	Input Voltage	—	—	—	6	V
I_{OUT}	Output Current	V_{IN}-V_{OUT} = 1V	150	—	—	mA
V_{RLOAD}	Load Regulation	V_{IN} = 4.3V 1mA ≤ I_{OUT} ≤ 80mA	—	12	40	mV
V_{RLINE}	Line Regulation	3.8V ≤ V_{IN} ≤ 6V I_{OUT} = 30mA	—	4	16	mV
V_{DROP}	Dropout Voltage	I_{OUT} = 10mA	—	20	40	mV
		I_{OUT} = 100mA	—	200	300	
		I_{OUT} = 150mA	—	300	500	
I_Q	Quiescent Current	V_{IN} = 4.3V, I_{OUT} = 0mA	—	25	50	µA
PSRR	Power Supply Rejection Ratio	Ripple 0.5Vp-p, f = 1kHz V_{IN} = 4.3V	—	65	—	dB
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT} = 30mA	—	**±330**	—	µV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$			—	**±100**	—	ppm/°C
I_{LIMIT}	Short Current Limit	V_{OUT} = 0V	—	50	—	mA
V_{NOISE}	RMS Output Noise	T_A = +25°C 10Hz ≤ f ≤ 100kHz	—	30	—	µVrms

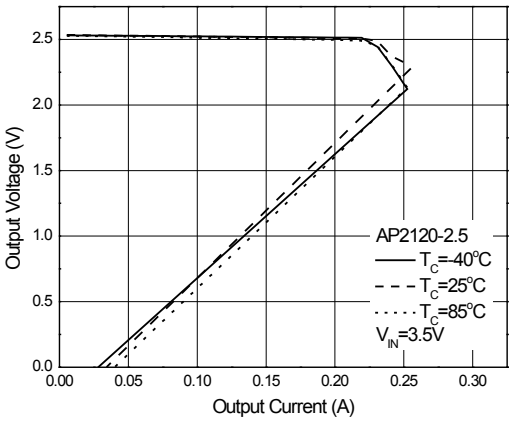
Electrical Characteristics – AP2120-5.0

(@ V_{IN} = 6.0V, T_J = +25°C, C_{IN} = 1µF, C_{OUT} = 1µF, **Bold** typeface applies over -40°C ≤ T_J ≤ +85°C, unless otherwise specified.)

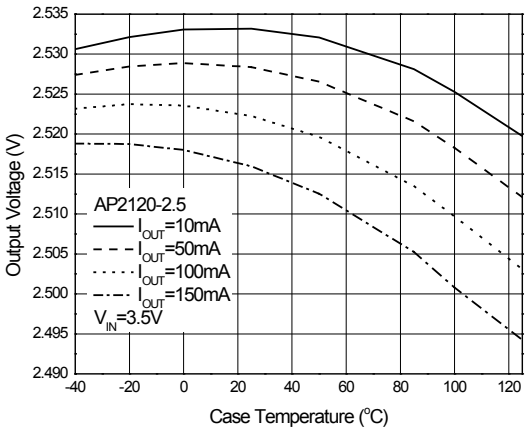
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	V_{IN} = 6.0V 1mA ≤ I_{OUT} ≤ 30mA	4.9	5.0	5.1	V
V_{IN}	Input Voltage	—	—	—	6	V
I_{OUT}	Output Current	V_{IN}-V_{OUT} = 1V	150	—	—	mA
V_{RLOAD}	Load Regulation	V_{IN} = 4.3V 1mA ≤ I_{OUT} ≤ 80mA	—	12	40	mV
V_{RLINE}	Line Regulation	5.5V ≤ V_{IN} ≤ 6V I_{OUT} = 30mA	—	4	16	mV
V_{DROP}	Dropout Voltage	I_{OUT} = 10mA	—	20	40	mV
		I_{OUT} = 100mA	—	200	300	
		I_{OUT} = 150mA	—	300	500	
I_Q	Quiescent Current	V_{IN} = 6.0V, I_{OUT} = 0mA	—	25	50	µA
PSRR	Power Supply Rejection Ratio	Ripple 0.5Vp-p, f = 1kHz V_{IN} = 6.0V	—	65	—	dB
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT} = 30mA	—	**±330**	—	µV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$			—	**±100**	—	ppm/°C
I_{LIMIT}	Short Current Limit	V_{OUT} = 0V	—	50	—	mA
V_{NOISE}	RMS Output Noise	T_A = +25°C 10Hz ≤ f ≤ 100kHz	—	30	—	µVrms

Performance Characteristics

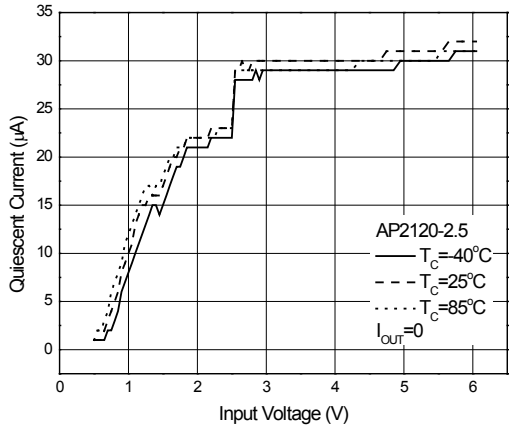
Output Voltage vs. Output Current



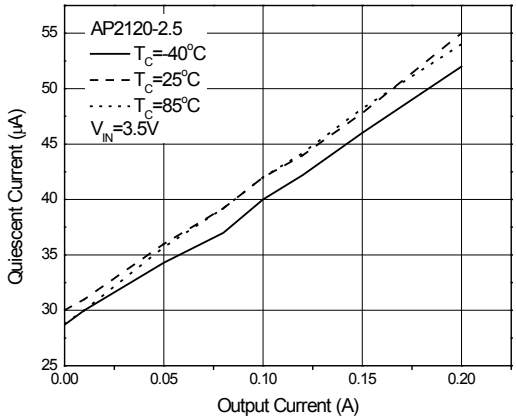
Output Voltage vs. Case Temperature



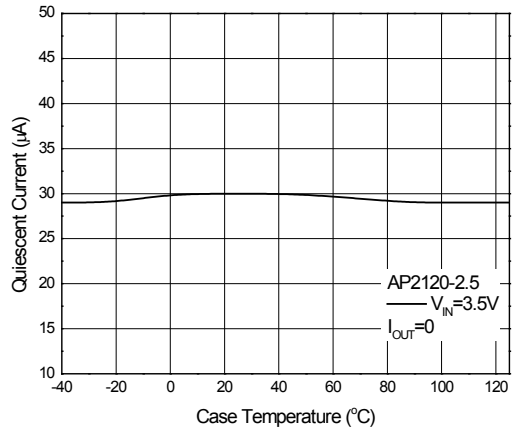
Quiescent Current vs. Input Voltage



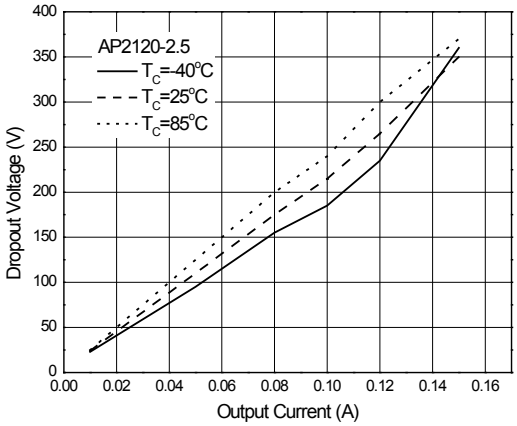
Quiescent Current vs. Output Current



Quiescent Current vs. Case Temperature

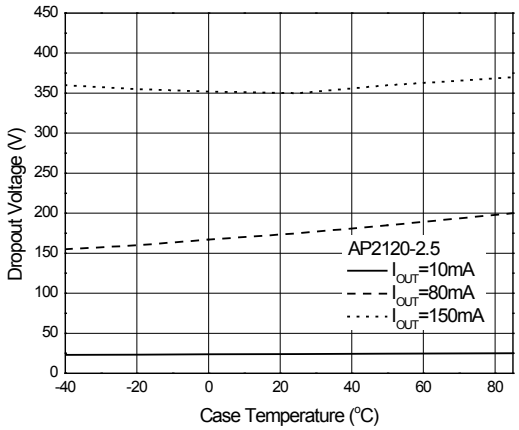


Dropout Voltage vs. Output Current

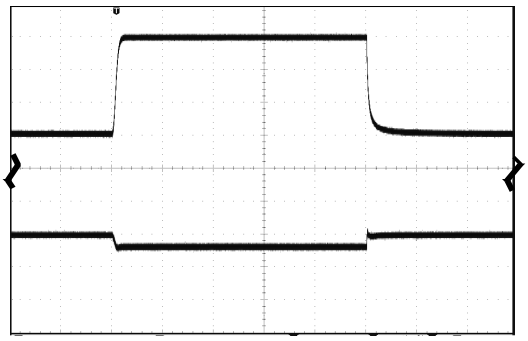


Performance Characteristics (continued)

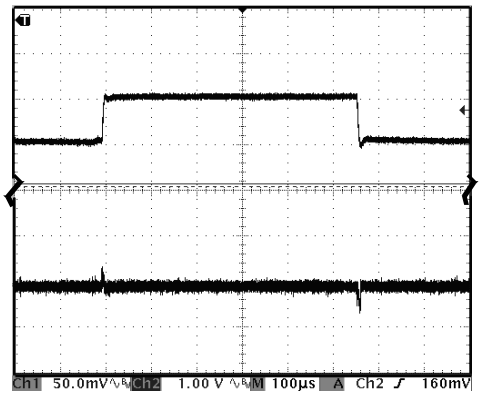
Dropout Voltage vs. Case Temperature



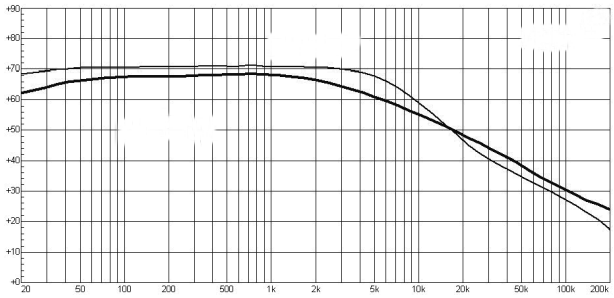
Load Transient (I_{OUT}=0 to 150mA)



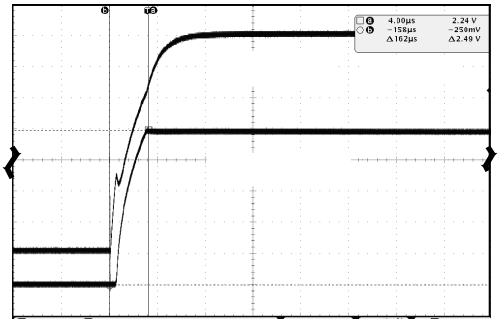
Line Transient (Condition: V_{IN}=2.5V to 3.5V, I_{OUT}=10mA)



PSRR vs. Frequency



Start-up



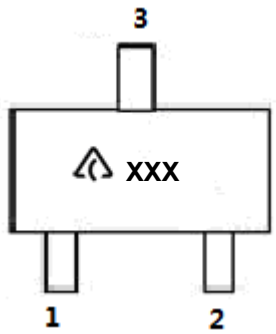
Ordering Information

Product Nar / Package	Temperature Range	Output Voltage	Part Number	Marking ID	Packing
SOT-23	-40 to +85°C	1.2V(N)	AP2120N-1.2TRG1	GR4	3000/Tape & Reel
		1.3V(N) (NRND) (Note 6)	AP2120N-1.3TRG1	GR5	3000/Tape & Reel
		1.5V(N)	AP2120N-1.5TRG1	GR6	3000/Tape & Reel
		1.8V(N)	AP2120N-1.8TRG1	GR7	3000/Tape & Reel
		2.5V(N)	AP2120N-2.5TRG1	GR8	3000/Tape & Reel
		2.8V(N) (NRND) (Note 6)	AP2120N-2.8TRG1	GR9	3000/Tape & Reel
		3.0V(N)	AP2120N-3.0TRG1	GS2	3000/Tape & Reel
		3.2V(N)	AP2120N-3.2TRG1	GS3	3000/Tape & Reel
		3.3V(N)	AP2120N-3.3TRG1	GS4	3000/Tape & Reel
		5.0V(N)	AP2120N-5.0TRG1	GS5	3000/Tape & Reel

Note: 6. NRND: Not Recommended for New Design.

Marking Information

(Top View)

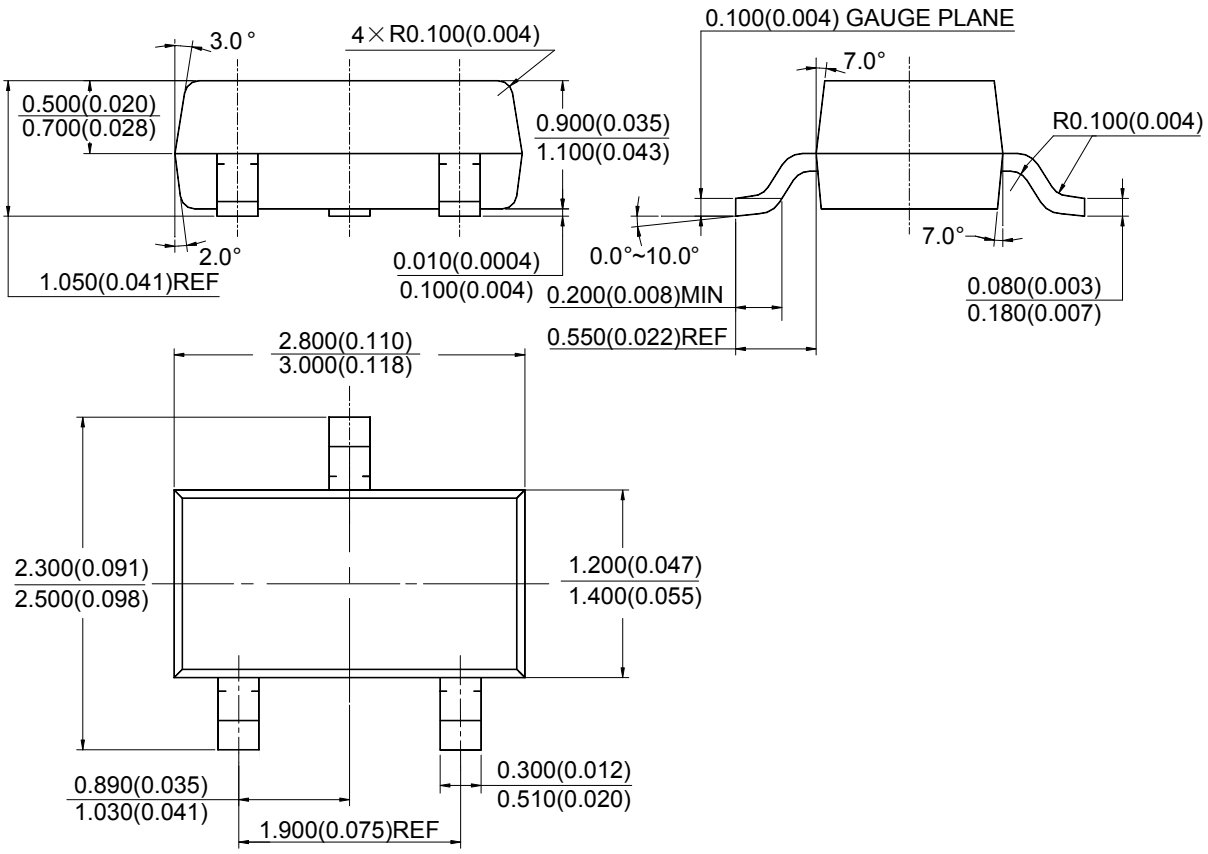


: Logo
XXX: Marking ID
(See Ordering Information)

Package Outline Dimensions (All dimensions in mm(inch).)

Please see http://www.diodes.com/package-outlines.html for the latest version.

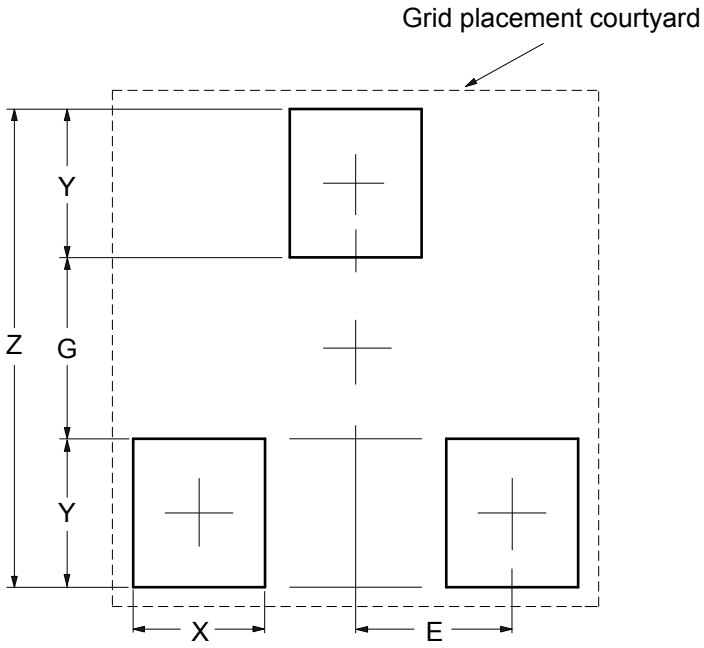
SOT-23



Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT-23



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E (mm)/(inch)
Value	2.900/0.114	1.100/0.043	0.800/0.031	0.900/0.035	0.950/0.037

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