GENERAL DESCRIPTION

The SP6260 family is a series of CMOS positive low noise voltage regulators capable of delivering up to 200mA of continuous current.

Each of these devices consists of a voltage reference, an error amplifier, a resistor network for setting the output voltage, a current limit circuit for current protection and a chip enable circuit.

The SP6260 series feature 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 and hand-held devices.

The SP6260 series is offered in the following fixed output voltage options: 1.2V, 1.5V, 1.8V, 2.5V, 2.8V, 3.0V, 3.2V and 3.3V.

The SP6260 family is available in standard lead free, RoHS compliant 5-pin SOT-23 package.

APPLICATIONS

- **Hand Held Equipments**
- **Wireless Communication Devices**
- **Battery Powered Equipments**
- **Industrial and Medical Equipments**

FEATURES

- **200mA Continuous Output Current**
  - 150mV Dropout Voltage @ I_{OUT}=100mA (Except 1.2V and 1.5V Version)
  - 1.2V to 3.3V Fixed Output Voltages
  - ±2% Output Voltage Accuracy
- **2V Minimum Input Voltage**
- **30µVrms Output Noise (10Hz-100KHz)**
- **70dB Power Supply Rejection Ratio**
- **4mV Line Regulation (typ)**
- **12mV Load Regulation (typ)**
- **Low Standby Current: 0.1µA Typical**
- **Low Quiescent Current: 25µA Typical**
- **Lead Free, RoHS Compliant**
  5-pin SOT-23 Package

3.3V version available, others obsolete

TYPICAL APPLICATION DIAGRAM

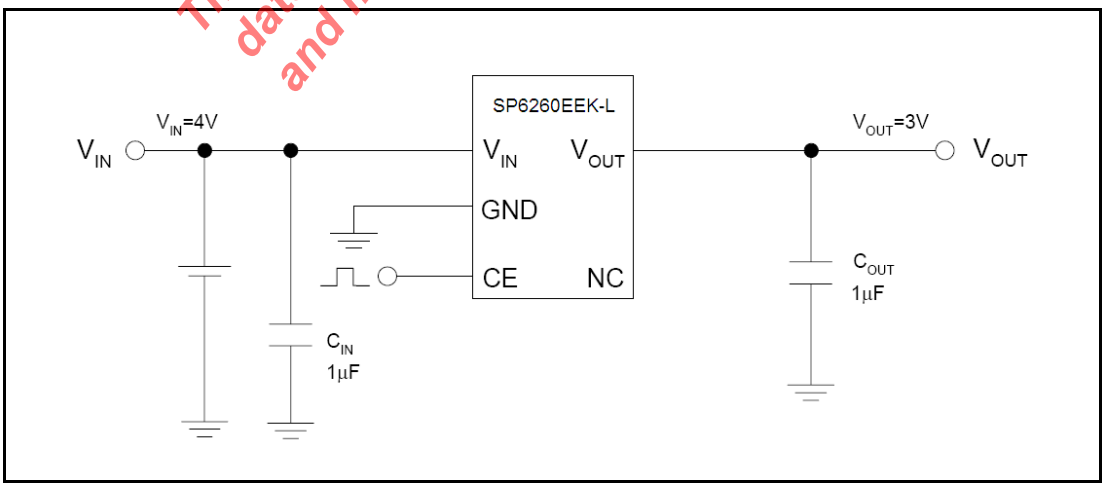


Fig. 1: SP6260 Application Diagram

ABSOLUTE MAXIMUM RATINGS

These are stress ratings only and functional operation of the device at these ratings or any other above those indicated in the operation sections of the specifications below is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

Input Voltage V_{IN} 6.5V
Enable Pin Input Voltage .....-0.3 to V_{IN}+0.3V
Output Current..... 300mA
Junction Temperature ..... 150°C
Storage Temperature Range ..... -65°C to 150°C
Lead Soldering (Sold. 10sec) ..... 260°C
ESD Rating (HBM - Human Body Model) 2kV
ESD Rating (MM - Machine Model) 200V

OPERATING RATINGS

Input Voltage Range V_{IN}.....2.0 to 6.0V
Junction Temperature Range T_J..... -40°C to 85°C
Thermal Resistance θ_{JA} .....250°C/W
Thermal Resistance θ_{JC} ..... 74°C/W

ELECTRICAL SPECIFICATIONS

Specifications with standard type are for an Operating Junction Temperature of T_J = 25°C only; limits applying over the full Operating Junction Temperature range of -40°C to 85°C are denoted by a "•". Minimum and Maximum limits are guaranteed through test, design, or statistical correlation. Typical values represent the most likely parametric norm at T_J = 25°C, and are provided for reference purposes only.

SP6260HEK (1.2V) 1.2V version is obsolete

Unless otherwise indicated, V_{IN} = 2.2V, C_{IN} = 1µF, C_{OUT} = 1µF.

Parameter	Min.	Typ.	Max.	Units		Conditions
Output Voltage V_{OUT}	1.176	1.2	1.224	V		V_{IN}=2.2V 1mA≤I_{OUT}≤30mA
Input Voltage V_{IN}			6	V		
Output Current I_{OUT}	200			mA		$V_{IN-}V_{OUT}$=1V
Load Regulation V_{RLOAD}		12	40	mV		V_{IN}=2.2V 1mA≤I_{OUT}≤80mA
Line Regulation V_{RLINE}		4	16	mV		2.2V≤V_{IN}=≤6V I_{OUT}=30mA
Dropout Voltage V_{DROP}		700	900	mV		I_{OUT}=10mA
		700	900			I_{OUT}=100mA
		700	900			I_{OUT}=150mA
		700	900			I_{OUT}=200mA
Quiescent Current I_Q		25	50	µA		V_{IN}=2.2V,I_{OUT}=0mA
Standby Current I_{STD}		0.1	1	µA		V_{IN}=2.2V V_{CE} in OFF mode
Power Supply Rejection Ratio PSRR		70		dB		Ripple 0.5V_{p-p}, f=10kHz V_{IN}=2.5V
Output Voltage Temperature Coefficient		±120		µV/°C	•	$\Delta V_{OUT}/\Delta T$
		±100		ppm/°C	•	$(\Delta V_{OUT}/V_{OUT})/\Delta T$
Short Current Limit I_{LIMIT}		50		mA		V_{OUT}=0V
RMS Output Noise V_{NOISE}		30		µVrms		T_A=25°C 10Hz≤f≤100kHz
CE "High" Voltage	1.5			V		CE input voltage "High"
CE "Low" Voltage			0.25	V		CE input voltage "Low"
CE Pull-down Resistance R_{PD}	2.5	5	10	MΩ		

SP6260AEK (1.5V) 1.5V version is obsolete

Unless otherwise indicated, V_{IN} = 2.5V, C_{IN} = 1µF, C_{OUT} = 1µF.

Parameter	Min.	Typ.	Max.	Units		Conditions
Output Voltage V_{OUT}	1.47	1.5	1.53	V		V_{IN}=2.5V 1mA≤I_{OUT}≤30mA
Input Voltage V_{IN}			6	V		
Output Current I_{OUT}	200			mA		V_{IN}–V_{OUT}=1V
Load Regulation V_{RLOAD}		12	40	mV		V_{IN}=2.5V 1mA≤I_{OUT}≤80mA
Line Regulation V_{RLINE}		4	16	mV		2.3V≤V_{IN}=≤6V I_{OUT}=30mA
Dropout Voltage V_{DROP}		400	600	mV		I_{OUT}=10mA
		400	600			I_{OUT}=100mA
		400	600			I_{OUT}=150mA
		400	600			I_{OUT}=200mA
Quiescent Current I_Q		25	50	µA		V_{IN}=2.5V,I_{OUT}=0mA
Standby Current I_{STD}		0.1	1	µA		V_{IN}=2.5V V_{CE} in OFF mode
Power Supply Rejection Ratio PSRR		70		dB		Ripple 0.5V_{p-p}, f=10kHz V_{IN}=2.5V
Output Voltage Temperature Coefficient		±150		µV/°C	•	$\Delta V_{OUT}/\Delta T$
		±100		ppm/°C	•	$(\Delta V_{OUT}/V_{OUT})/\Delta T$
Short Current Limit I_{LIMIT}		50		mA		V_{OUT}=0V
RMS Output Noise V_{NOISE}		30		µVrms		T_A=25°C 10Hz≤f≤100kHz
CE "High" Voltage	1.5			V		CE input voltage "High"
CE "Low" Voltage			0.25	V		CE input voltage "Low"
CE Pull-down Resistance R_{PD}	2.5	5	10	MΩ		

SP6260BEK (1.8V) 1.8V version is obsolete

Unless otherwise indicated, V_{IN} = 2.8V, C_{IN} = 1µF, C_{OUT} = 1µF.

Parameter	Min.	Typ.	Max.	Units		Conditions
Output Voltage V_{OUT}	1.764	1.8	1.836	V		V_{IN}=2.8V 1mA≤I_{OUT}≤30mA
Input Voltage V_{IN}			6	V		
Output Current I_{OUT}	200			mA		V_{IN}–V_{OUT}=1V
Load Regulation V_{RLOAD}		12	40	mV		V_{IN}=2.8V 1mA≤I_{OUT}≤80mA
Line Regulation V_{RLINE}		4	16	mV		2.3V≤V_{IN}=≤6V I_{OUT}=30mA
Dropout Voltage V_{DROP}		20	40	mV		I_{OUT}=10mA
		150	300			I_{OUT}=100mA
		200	400			I_{OUT}=150mA
		250	500			I_{OUT}=200mA
Quiescent Current I_Q		25	50	µA		V_{IN}=2.8V,I_{OUT}=0mA
Standby Current I_{STD}		0.1	1	µA		V_{IN}=2.8V V_{CE} in OFF mode
Power Supply Rejection Ratio PSRR		70		dB		Ripple 0.5V_{p-p}, f=10kHz V_{IN}=2.5V
Output Voltage Temperature Coefficient		±180		µV/°C	•	$\Delta V_{OUT}/\Delta T$
		±100		ppm/°C	•	$(\Delta V_{OUT}/V_{OUT})/\Delta T$

Short Current Limit I_{LIMIT}		50		mA		V_{OUT}=0V
RMS Output Noise V_{NOISE}		30		µVrms		T_A=25°C 10Hz≤f≤100kHz
CE "High" Voltage	1.5			V		CE input voltage "High"
CE "Low" Voltage			0.25	V		CE input voltage "Low"
CE Pull-down Resistance R_{PD}	2.5	5	10	MΩ		

SP6260CEK (2.5V) 2.5V version is obsolete

Unless otherwise indicated, V_{IN} = 3.5V, C_{IN} = 1µF, C_{OUT} = 1µF.

Parameter	Min.	Typ.	Max.	Units		Conditions
Output Voltage V_{OUT}	2.45	2.5	2.55	V		V_{IN}=3.5V 1mA≤I_{OUT}≤30mA
Input Voltage V_{IN}			6	V		
Output Current I_{OUT}	200			mA		V_{IN}–V_{OUT}=1V
Load Regulation V_{RLOAD}		12	40	mV		V_{IN}=3.5V 1mA≤I_{OUT}≤80mA
Line Regulation V_{RLINE}		4	16	mV		3.0V≤V_{IN}=≤6V I_{OUT}=30mA
Dropout Voltage V_{DROP}		20	40	mV		I_{OUT}=10mA
		150	300			I_{OUT}=100mA
		200	400			I_{OUT}=150mA
		250	500			I_{OUT}=200mA
Quiescent Current I_Q		25	50	µA		V_{IN}=3.5V,I_{OUT}=0mA
Standby Current I_{STD}		0.1	1	µA		V_{IN}=3.5V V_{CE} in OFF mode
Power Supply Rejection Ratio PSRR		70		dB		Ripple 0.5V_{p-p}, f=10kHz V_{IN}=2.5V
Output Voltage Temperature Coefficient		±250		µV/°C	•	$\Delta V_{OUT}/\Delta T$
		±100		ppm/°C	•	$(\Delta V_{OUT}/V_{OUT})/\Delta T$
Short Current Limit I_{LIMIT}		50		mA		V_{OUT}=0V
RMS Output Noise V_{NOISE}		30		µVrms		T_A=25°C 10Hz≤f≤100kHz
CE "High" Voltage	1.5			V		CE input voltage "High"
CE "Low" Voltage			0.25	V		CE input voltage "Low"
CE Pull-down Resistance R_{PD}	2.5	5	10	MΩ		

SP6260DEK (2.8V) 2.8V version is obsolete

Unless otherwise indicated, V_{IN} = 3.8V, C_{IN} = 1µF, C_{OUT} = 1µF.

Parameter	Min.	Typ.	Max.	Units		Conditions
Output Voltage V_{OUT}	2.744	2.8	2.856	V		V_{IN}=3.8V 1mA≤I_{OUT}≤30mA
Input Voltage V_{IN}			6	V		
Output Current I_{OUT}	200			mA		V_{IN}–V_{OUT}=1V
Load Regulation V_{RLOAD}		12	40	mV		V_{IN}=3.8V 1mA≤I_{OUT}≤80mA
Line Regulation V_{RLINE}		4	16	mV		3.3V≤V_{IN}=≤6V I_{OUT}=30mA
Dropout Voltage V_{DROP}		20	40	mV		I_{OUT}=10mA
		150	300			I_{OUT}=100mA
		200	400			I_{OUT}=150mA
		250	500			I_{OUT}=200mA

Quiescent Current I_Q		25	50	µA		V_{IN}=3.8V,I_{OUT}=0mA
Standby Current I_{STD}		0.1	1	µA		V_{IN}=3.8V V_{CE} in OFF mode
Power Supply Rejection Ratio PSRR		70		dB		Ripple 0.5V_{p-p}, f=10kHz V_{IN}=2.5V
Output Voltage Temperature Coefficient		±280		µV/°C	•	$\Delta V_{OUT}/\Delta T$
		±100		ppm/°C	•	$(\Delta V_{OUT}/V_{OUT})/\Delta T$
Short Current Limit I_{LIMIT}		50		mA		V_{OUT}=0V
RMS Output Noise V_{NOISE}		30		µVrms		T_A=25°C 10Hz≤f≤100kHz
CE "High" Voltage	1.5			V		CE input voltage "High"
CE "Low" Voltage			0.25	V		CE input voltage "Low"
CE Pull-down Resistance R_{PD}	2.5	5	10	MΩ		

SP6260EEK (3.0V) 3.0V version is obsolete

Unless otherwise indicated, V_{IN} = 4.0V, C_{IN} = 1µF, C_{OUT} = 1µF.

Parameter	Min.	Typ.	Max.	Units		Conditions
Output Voltage V_{OUT}	2.940	3.0	3.060	V		V_{IN}=4.0V 1mA≤I_{OUT}≤30mA
Input Voltage V_{IN}			6	V		
Output Current I_{OUT}	200			mA		$V_{IN-}V_{OUT}$=1V
Load Regulation V_{RLOAD}		12	40	mV		V_{IN}=4.0V 1mA≤I_{OUT}≤80mA
Line Regulation V_{RLINE}		4	16	mV		3.5V≤V_{IN}=≤6V I_{OUT}=30mA
Dropout Voltage V_{DROP}		20	40	mV		I_{OUT}=10mA
		150	300			I_{OUT}=100mA
		200	400			I_{OUT}=150mA
		250	500			I_{OUT}=200mA
Quiescent Current I_Q		25	50	µA		V_{IN}=4.0V,I_{OUT}=0mA
Standby Current I_{STD}		0.1	1	µA		V_{IN}=4.0V V_{CE} in OFF mode
Power Supply Rejection Ratio PSRR		70		dB		Ripple 0.5V_{p-p}, f=10kHz V_{IN}=2.5V
Output Voltage Temperature Coefficient		±300		µV/°C	•	$\Delta V_{OUT}/\Delta T$
		±100		ppm/°C	•	$(\Delta V_{OUT}/V_{OUT})/\Delta T$
Short Current Limit I_{LIMIT}		50		mA		V_{OUT}=0V
RMS Output Noise V_{NOISE}		30		µVrms		T_A=25°C 10Hz≤f≤100kHz
CE "High" Voltage	1.5			V		CE input voltage "High"
CE "Low" Voltage			0.25	V		CE input voltage "Low"
CE Pull-down Resistance R_{PD}	2.5	5	10	MΩ		

SP6260FEK (3.2V) 3.2V version is obsolete

Unless otherwise indicated, V_{IN} = 4.2V, C_{IN} = 1µF, C_{OUT} = 1µF.

Parameter	Min.	Typ.	Max.	Units		Conditions
Output Voltage V_{OUT}	3.136	3.2	3.264	V		V_{IN}=4.2V 1mA≤I_{OUT}≤30mA
Input Voltage V_{IN}			6	V		
Output Current I_{OUT}	200			mA		$V_{IN-}V_{OUT}$=1V

Load Regulation V_{RLOAD}		12	40	mV		V_{IN}=4.2V 1mA≤I_{OUT}≤80mA
Line Regulation V_{RLINE}		4	16	mV		3.7V≤V_{IN}=≤6V I_{OUT}=30mA
Dropout Voltage V_{DROP}		20	40	mV		I_{OUT}=10mA
		150	300			I_{OUT}=100mA
		200	400			I_{OUT}=150mA
		250	500			I_{OUT}=200mA
Quiescent Current I_Q		25	50	µA		V_{IN}=4.2V,I_{OUT}=0mA
Standby Current I_{STD}		0.1	1	µA		V_{IN}=4.2V V_{CE} in OFF mode
Power Supply Rejection Ratio PSRR		70		dB		Ripple 0.5V_{p-p}, f=10kHz V_{IN}=2.5V
Output Voltage Temperature Coefficient		±320		µV/°C	•	$\Delta V_{OUT}/\Delta T$
		±100		ppm/°C	•	$(\Delta V_{OUT}/V_{OUT})/\Delta T$
Short Current Limit I_{LIMIT}		50		mA		V_{OUT}=0V
RMS Output Noise V_{NOISE}		30		µVrms		T_A=25°C 10Hz≤f≤100kHz
CE "High" Voltage	1.5			V		CE input voltage "High"
CE "Low" Voltage			0.25	V		CE input voltage "Low"
CE Pull-down Resistance R_{PD}	2.5	5	10	MΩ		

SP6260GEK (3.3V) Available

Unless otherwise indicated, V_{IN} = 4.3V, C_{IN} = 1µF, C_{OUT} = 1µF.

Parameter	Min.	Typ.	Max.	Units		Conditions
Output Voltage V_{OUT}	3.234	3.3	3.366	V		V_{IN}=4.3V 1mA≤I_{OUT}≤30mA
Input Voltage V_{IN}			6	V		
Output Current I_{OUT}	200			mA		$V_{IN-}V_{OUT}$=1V
Load Regulation V_{RLOAD}		12	40	mV		V_{IN}=4.3V 1mA≤I_{OUT}≤80mA
Line Regulation V_{RLINE}		4	16	mV		3.8V≤V_{IN}=≤6V I_{OUT}=30mA
Dropout Voltage V_{DROP}		20	40	mV		I_{OUT}=10mA
		150	300			I_{OUT}=100mA
		200	400			I_{OUT}=150mA
		250	500			I_{OUT}=200mA
Quiescent Current I_Q		25	50	µA		V_{IN}=4.3V,I_{OUT}=0mA
Standby Current I_{STD}		0.1	1	µA		V_{IN}=4.3V V_{CE} in OFF mode
Power Supply Rejection Ratio PSRR		70		dB		Ripple 0.5V_{p-p}, f=10kHz V_{IN}=2.5V
Output Voltage Temperature Coefficient		±330		µV/°C	•	$\Delta V_{OUT}/\Delta T$
		±100		ppm/°C	•	$(\Delta V_{OUT}/V_{OUT})/\Delta T$
Short Current Limit I_{LIMIT}		50		mA		V_{OUT}=0V
RMS Output Noise V_{NOISE}		30		µVrms		T_A=25°C 10Hz≤f≤100kHz
CE "High" Voltage	1.5			V		CE input voltage "High"
CE "Low" Voltage			0.25	V		CE input voltage "Low"
CE Pull-down Resistance R_{PD}	2.5	5	10	MΩ		

BLOCK DIAGRAM

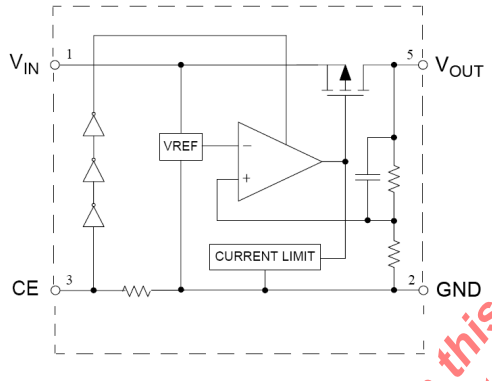


Fig. 2: SP6260 Block Diagram

PIN ASSIGNEMENT

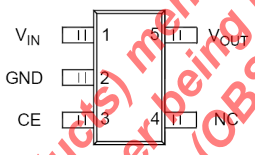


Fig. 3: SP6260 Pin Assignment

PIN DESCRIPTION

Name	Pin Number	Description
V_{IN}	1	Input voltage
GND	2	Ground
CE	3	Enable input pin. high=enable low=shutdown
NC	4	No connection
V_{OUT}	5	Regulated output voltage

ORDERING INFORMATION(1)

Part Number	Junction Temperature Range	Package	Packing Method	Lead free(2)	Note 1
SP6260GEK-L/TR	-40°C to +85°C	SOT-23-5	Tape & Reel	Yes	3.3V version

Notes:

1. Refer to www.maxlinear.com/SP6260 for most up-to-date Ordering Information.
2. Visit www.maxlinear.com for additional information on Environmental Rating.

TYPICAL PERFORMANCE CHARACTERISTICS

All data taken at V_{IN} = 2.7V to 5.5V, $T_J = T_A$ = 25°C, unless otherwise specified - Schematic and BOM from Application Information section of this datasheet.

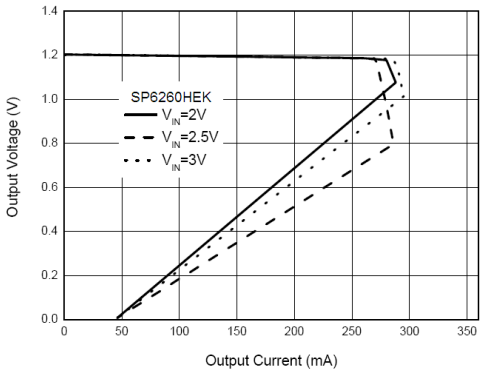


Fig. 4: Output Voltage vs. Output Current
SP6260HEK (1.2V)

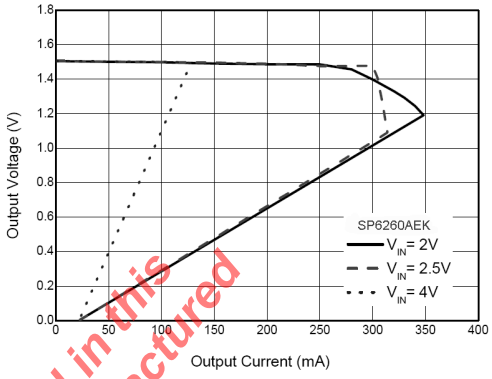


Fig. 5: Output Voltage vs. Output Current
SP6260AEK (1.5V)

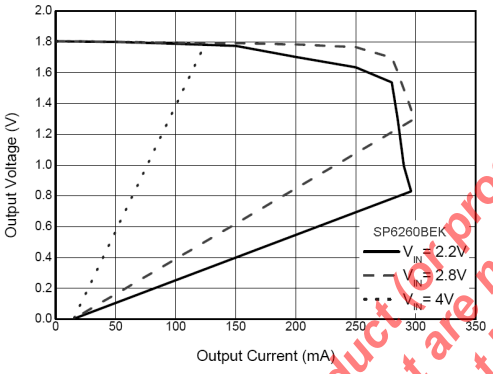


Fig. 6: Output Voltage vs. Output Current
SP6260BEK (1.8V)

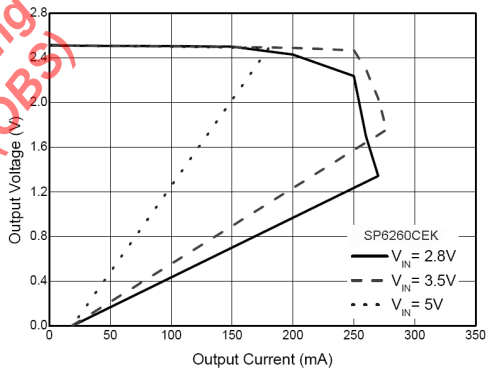


Fig. 7: Output Voltage vs. Output Current
SP6260CEK (2.5V)

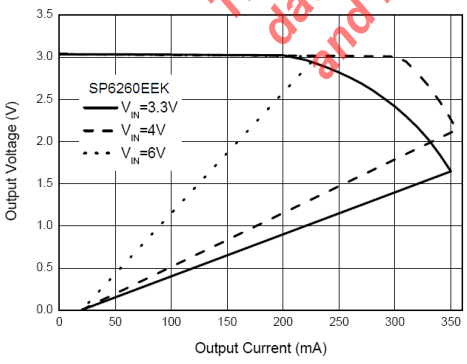


Fig. 8: Output Voltage vs. Output Current
SP6260EEK (3.0V)

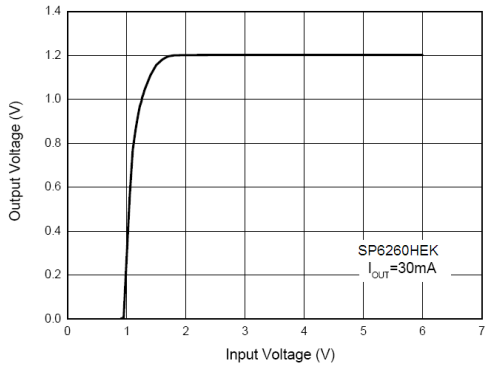


Fig. 9: Output Voltage vs. Input Voltage
SP6260HEK (1.2V)

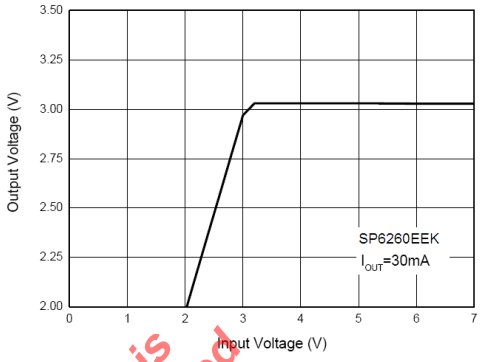


Fig. 10: Output Voltage vs. Input Voltage
SP6260EEK (3.0V)

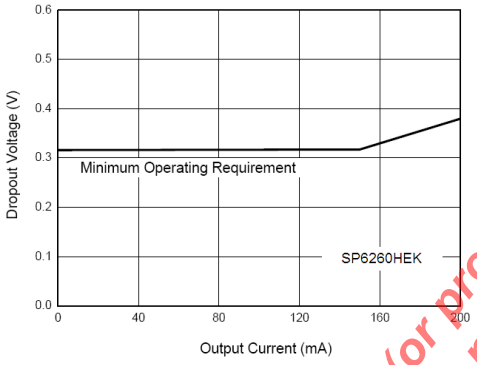


Fig. 11: Dropout Voltage vs. Output Current
SP6260HEK-L (1.2V)

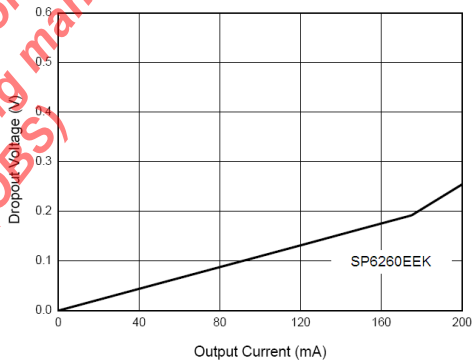


Fig. 12: Dropout Voltage vs. Output Current
SP6260EEK-L (3.0V)

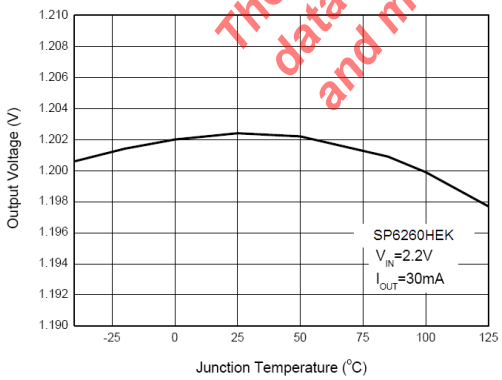


Fig. 13: Output Voltage vs. Junction Temparature
SP6260HEK-L (1.2V)

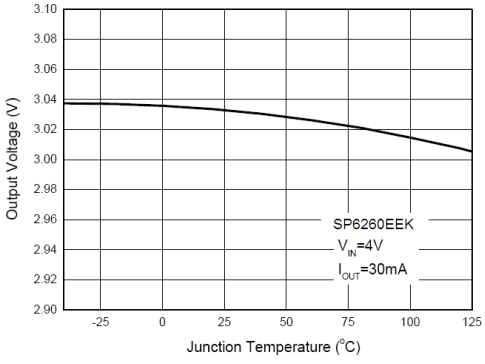


Fig. 14: Output Voltage vs. Junction Temperature
SP6260EEK-L (3.0V)

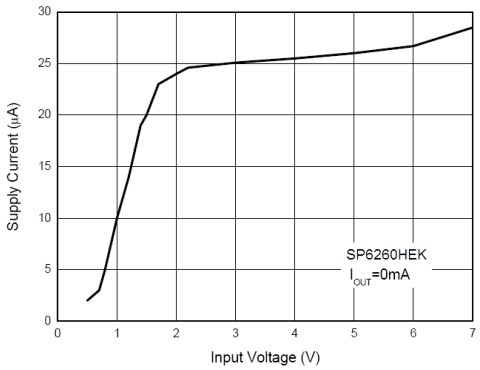


Fig. 15: Supply Current vs. Input Voltage
SP6260HEK (1.2V)

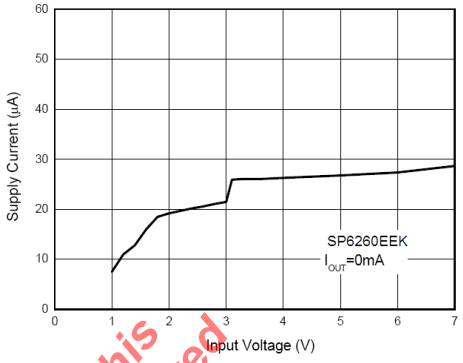


Fig. 16: Supply Current vs. Input Voltage
SP6260EEK (3.0V)

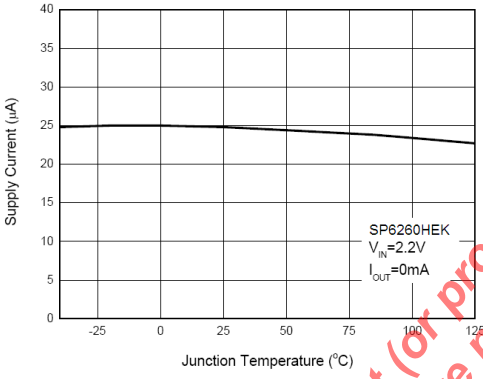


Fig. 17: Supply Current vs. Junction Temperature
SP6260HEK (1.2V)

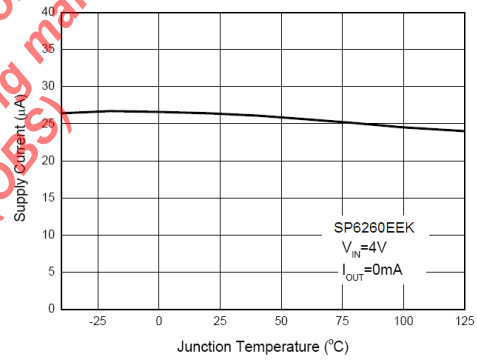


Fig. 18: Supply Current vs. Junction Temperature
SP6260EEK (3.0)

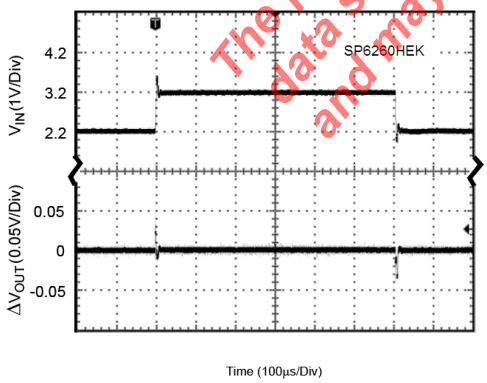


Fig. 19: Line Transient SP6260HEK (1.2V)
(Conditions: I_{OUT}=30mA, C_{IN}=1µF, C_{OUT}=1µF)

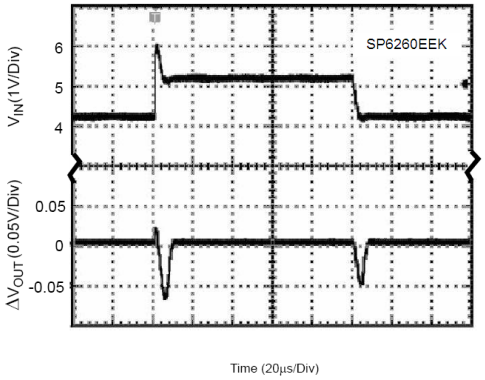


Fig. 20: Line Transient SP6260EEK (3.0V)
(Conditions: I_{OUT}=30mA, C_{IN}=1µF, C_{OUT}=1µF)

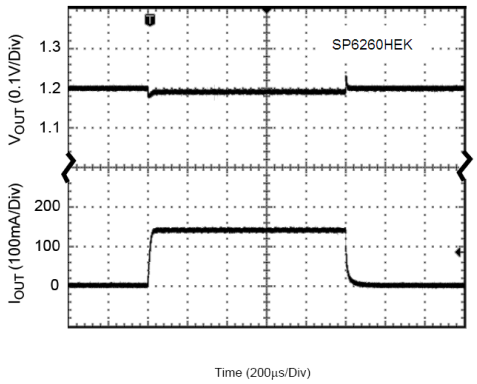


Fig. 21: Line Transient SP6260HEK (1.2V)
(Conditions: V_{IN}=2.5V, C_{IN}=1µF, C_{OUT}=1µF)

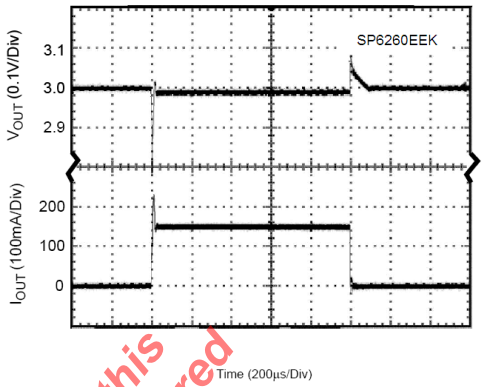


Fig. 22: Line Transient SP6260EEK (3.0V)
(Conditions: V_{IN}=4V, C_{IN}=1µF, C_{OUT}=1µF)

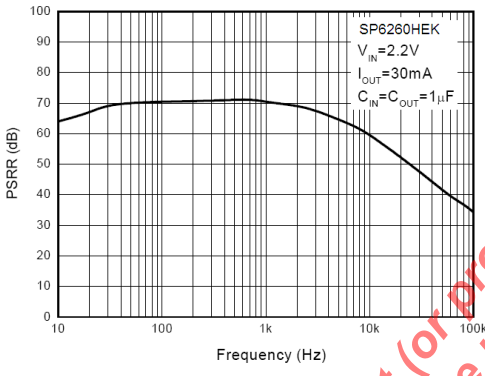


Fig. 23: PSRR vs. Frequency
SP6260HEK (1.2V)

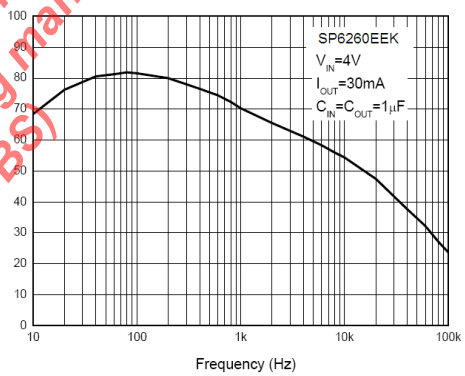
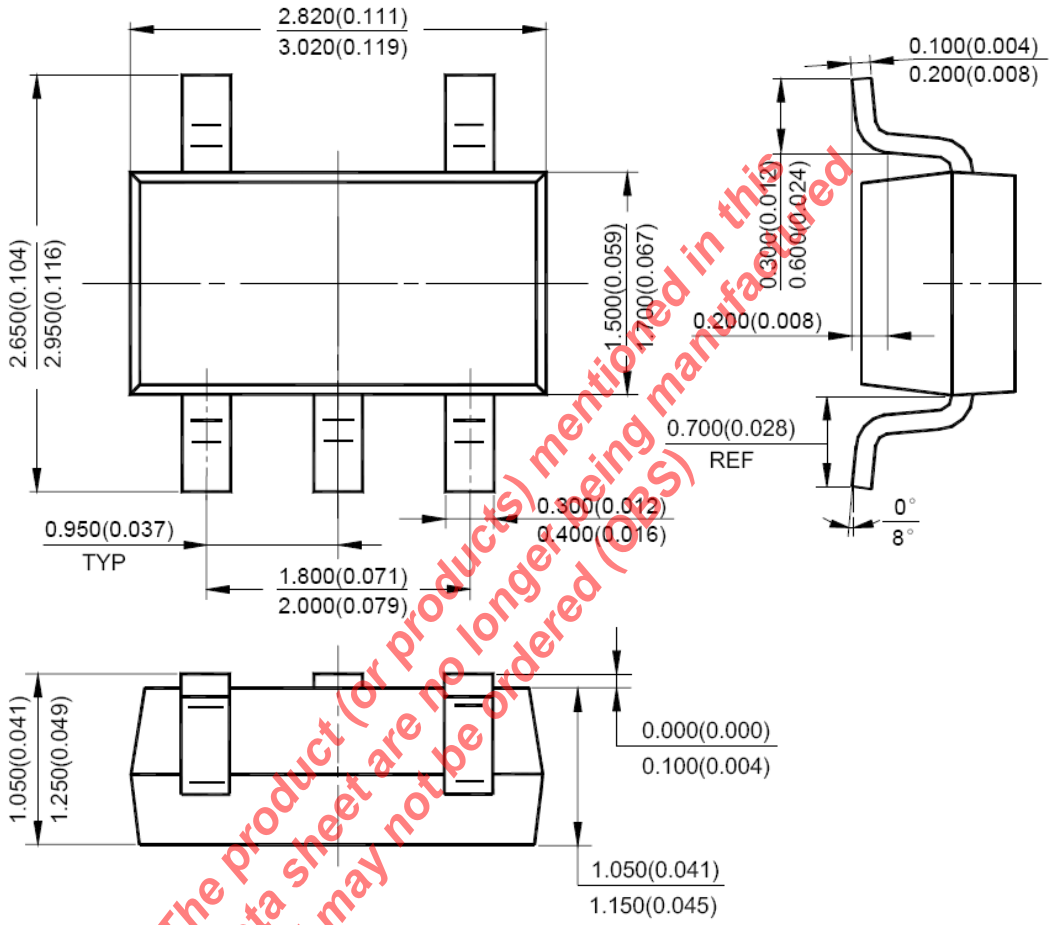


Fig. 21: PSRR vs. Frequency
SP6260EEK (3.0V)

PACKAGE SPECIFICATION

5-PIN SOT-23

Unit: mm (inch)



REVISION HISTORY

Revision	Date	Description
0.1		Initial Data Sheet
2.0.0	10/27/2010	Reformat of datasheet Increased output current capabilities to 200mA Removal of 1.5V version curves Addition of the 1.2V version data and curves
2.1.0	01/26/2011	Corrected Electrical tables V_{OUT} range for SP6260E, SP6260F and SP6260G Addition of "Output Current vs Output Voltage" curves figures 5, 6 and 7.
2.1.1	01/24/20	Updated to MaxLinear logo. Updated Ordering Information.

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