NCP4586

150 mA, Low Noise, Low Dropout Regulator

The NCP4586 is a CMOS 150 mA low dropout linear with low noise, high ripple rejection, low dropout, high output voltage accuracy and low supply current. The device is available in three configurations: enable high, enable low and enable high plus auto−discharge. Small packages allow mounting on high density PCBs. This is an excellent general purpose regulator, well suited to many applications.

Features

- Operating Input Voltage Range: 1.7 V to 6.5 V
- Output Voltage Range: 1.2 to 5.0 V (available in 0.1 V steps)
- Very Low Dropout: 320 mV Typ. at 150 mA
- ±1% Output Voltage Accuracy (V_{OUT} > 2 V, T_J = 25°C)
- High PSRR: 80 dB at 1 kHz
- Current Fold Back Protection
- Stable with a 0.47 μF Ceramic Capacitors
- Available in 1.0 x 1.0 UDFN, SC−82AB and SOT23−5 Package
- These are Pb−Free Devices

Typical Applications

- Battery Powered Equipment
- Portable Communication Equipment
- Cameras, MP3 Players and Camcorder
- High Stability Voltage Reference

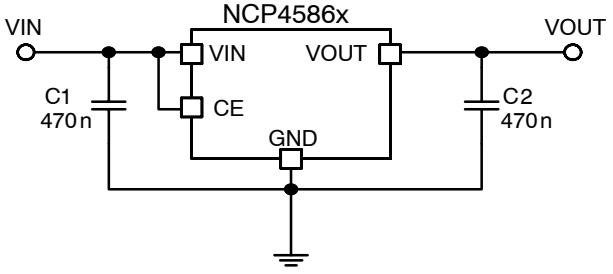


Figure 1. Typical Application Schematic

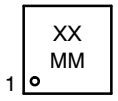
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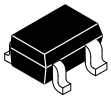
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MARKING DIAGRAMS

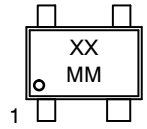


UDFN4
CASE 517BR



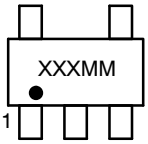


SC−82AB
CASE 419C





SOT−23−5
CASE 1212



XX, XXX = Specific Product Code
MM = Lot Number

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 15 of this data sheet.

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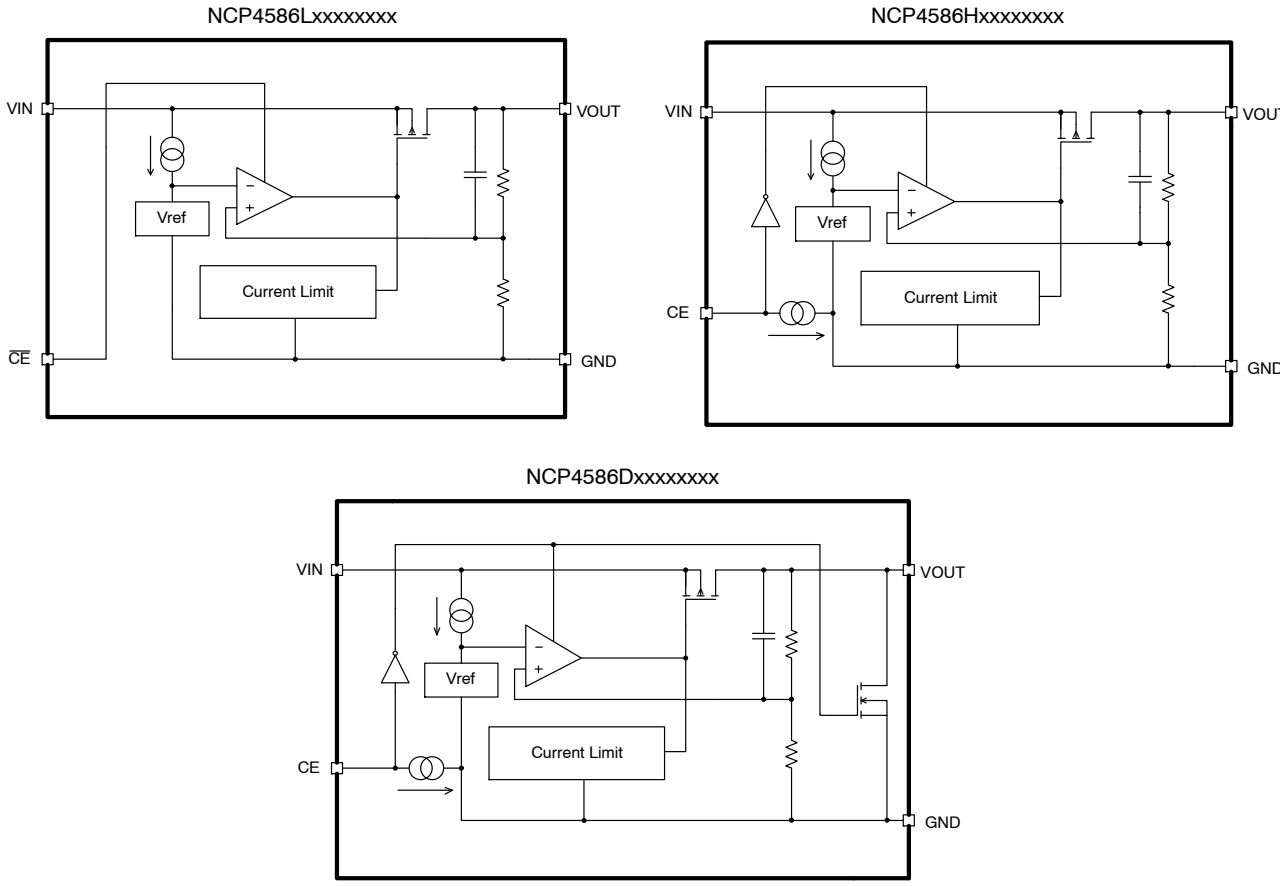


Figure 2. Simplified Schematic Block Diagram

PIN FUNCTION DESCRIPTION

Pin No. UDFN4	Pin No. SC82−AB	Pin No. SOT23−5	Pin Name	Description
4	4	1	VIN	Input pin
2	2	2	GND	Ground
3	1	3	$\overline{CE}$/CE	Chip enable pin (“L” active / “H” active)
1	3	5	VOUT	Output pin
–	–	4	NC	No connection

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Input Voltage (Note 1)	V_{IN}	7	V
Output Voltage	V_{OUT}	−0.3 to V_{IN} + 0.3	V
Chip Enable Input	V_{CE}	−0.3 to 7	V
Output Current	I_{OUT}	200	mA
Power Dissipation UDFN4	P_D	400	mW
Power Dissipation SC−82AB		380	
Power Dissipation SOT23−5		420	
Maximum Junction Temperature	$T_{J(MAX)}$	+150	°C
Operating Ambient Temperature	T_A	−40 to +85	°C
Storage Temperature	T_{STG}	−55 to +125	°C
ESD Capability, Human Body Model (Note 2)	ESD_{HBM}	2000	V
ESD Capability, Machine Model (Note 2)	ESD_{MM}	200	V

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Refer to ELECTRICAL CHARACTERISTIS and APPLICATION INFORMATION for Safe Operating Area.
2. This device series incorporates ESD protection and is tested by the following methods:
   ESD Human Body Model tested per AEC−Q100−002 (EIA/JESD22−A114)
   ESD Machine Model tested per AEC−Q100−003 (EIA/JESD22−A115)
   Latchup Current Maximum Rating tested per JEDEC standard: JESD78.

THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Thermal Characteristics, UDFN4 Thermal Resistance, Junction−to−Air	$R_{\theta JA}$	250	°C/W
Thermal Characteristics, SOT23−5 Thermal Resistance, Junction−to−Air	$R_{\theta JA}$	238	°C/W
Thermal Characteristics, SC 82AB Thermal Resistance, Junction−to−Air	$R_{\theta JA}$	263	°C/W

ELECTRICAL CHARACTERISTICS $-40°C \le T_A \le 85°C$; $V_{IN} = V_{OUT(NOM)} + 1$ V or 2.5 V, whichever is greater; I_{OUT} = 1 mA, $C_{IN} = C_{OUT}$ = 0.47 μF, unless otherwise noted. Typical values are at T_A = +25 °C.

Parameter	Test Conditions		Symbol	Min	Typ	Max	Unit
Operating Input Voltage			V_{IN}	1.7		6.5	V
Output Voltage	T_A = +25 °C	V_{OUT} > 2 V	V_{OUT}	x0.99		x1.01	V
		$V_{OUT} \le 2$ V		−20		20	mV
	$-40°C \le T_A \le 85°C$	V_{OUT} > 2 V		x0.985		x1.015	V
		$V_{OUT} \le 2$ V		−30		30	mV
Output Voltage Temp. Coefficient	$T_A = -40$ to 85°C				±20		ppm/°C
Line Regulation	$V_{IN} = V_{OUT}$ + 0.5 V to 5 V		$Line_{Reg}$		0.02	0.10	%/V
Load Regulation	I_{OUT} = 1 mA to 150 mA		$Load_{Reg}$		10	30	mV
Dropout Voltage	I_{OUT} = 150 mA	1.2 V ≤ V_{OUT} < 1.5 V	V_{DO}		0.67	1.00	V
		1.5 V ≤ V_{OUT} < 1.7 V			0.54	0.81	
		1.7 V ≤ V_{OUT} < 2.0 V			0.46	0.68	
		2.0 V ≤ V_{OUT} < 2.5 V			0.41	0.60	
		2.5 V ≤ V_{OUT} < 4.0 V			0.32	0.51	
		4.0 V ≤ V_{OUT}			0.24	0.37	
Output Current			I_{OUT}	150			mA
Short Current Limit	V_{OUT} = 0 V		I_{SC}		40		mA
Quiescent Current	I_{OUT} = 0 mA		I_Q		38	58	μA
Standby Current	$V_{CE} = V_{IN}$ (L version), V_{CE} = 0 V(H and D version), T_A = 25°C		I_{STB}		0.1	1	μA
$\overline{CE}$/CE Pin Threshold Voltage	$\overline{CE}$ / CE Input Voltage “H”		V_{CEH}	1.0			V
	$\overline{CE}$ / CE Input Voltage “L”		V_{CEL}			0.4	
CE Pull Down Current	H and D version		I_{PD}		0.4		μA
Power Supply Rejection Ratio	$V_{IN} = V_{OUT}$ + 1 V or 3.0 V whichever is higher, I_{OUT} = 30 mA, f = 1 kHz		PSRR		80		dB
Output Noise Voltage	V_{OUT} = 1.2 V, I_{OUT} = 30 mA, f = 10 Hz to 100 kHz		V_N		30		μV_{rms}
Low Output N−ch Tr. On Resistance	D Version only, V_{IN} = 4 V, V_{CE} = 0 V		R_{LOW}		30		Ω

TYPICAL CHARACTERISTICS

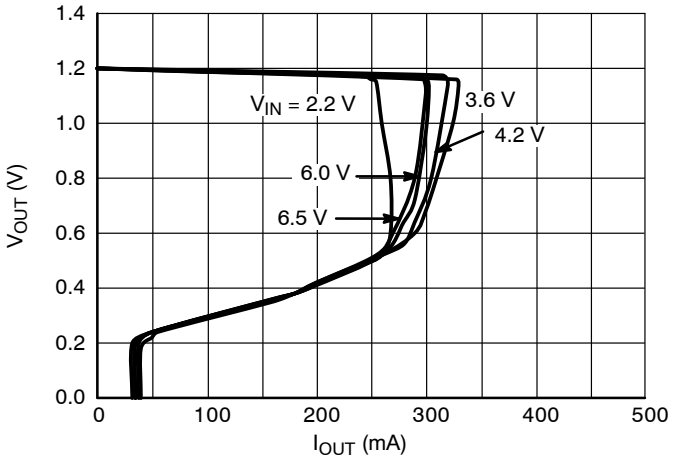


Figure 3. Output Voltage vs. Output Current 1.2 V Version (T_A = 25 °C)

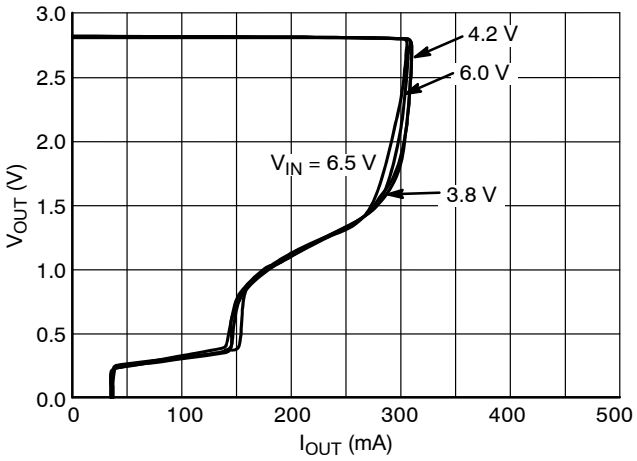


Figure 4. Output Voltage vs. Output Current 2.8 V Version (T_A = 25 °C)

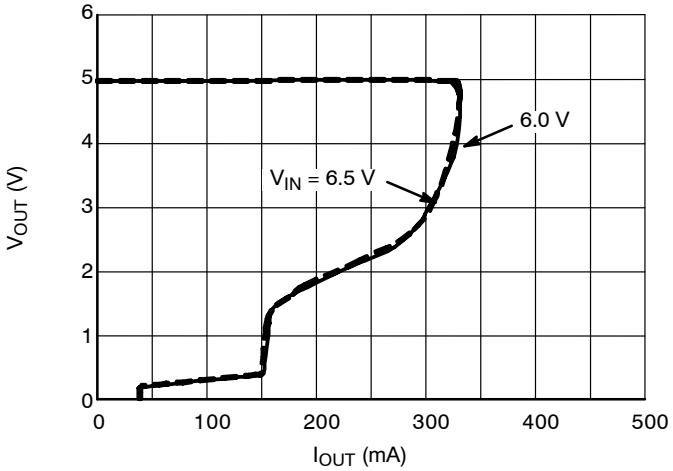


Figure 5. Output Voltage vs. Output Current 5.0 V version (T_A = 25°C)

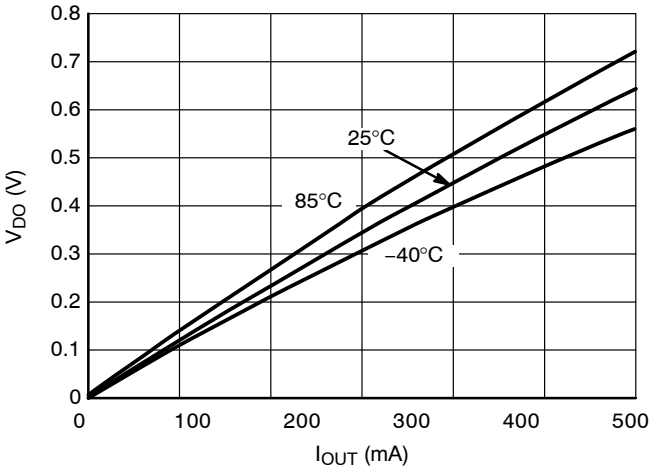


Figure 6. Dropout Voltage vs. Output Current 1.2 V version

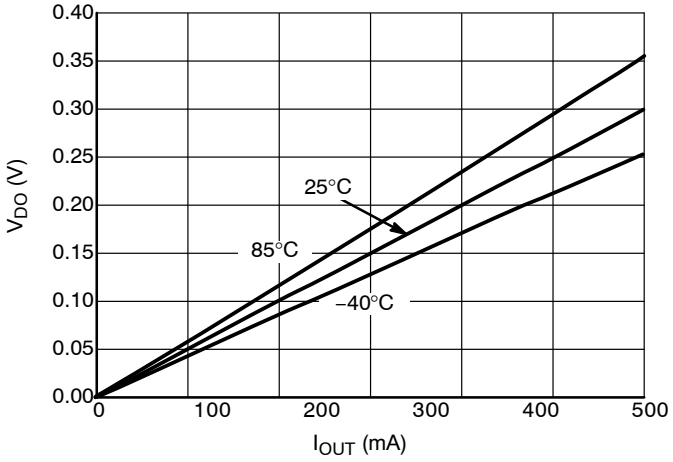


Figure 7. Dropout Voltage vs. Output Current 2.8 V Version

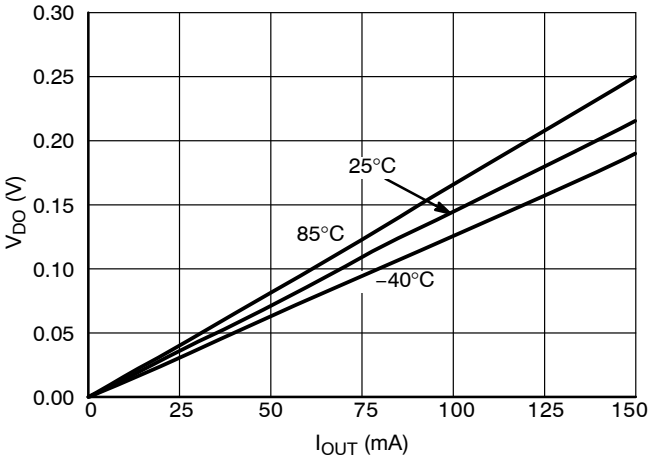


Figure 8. Dropout Voltage vs. Output Current 5.0 V Version

TYPICAL CHARACTERISTICS

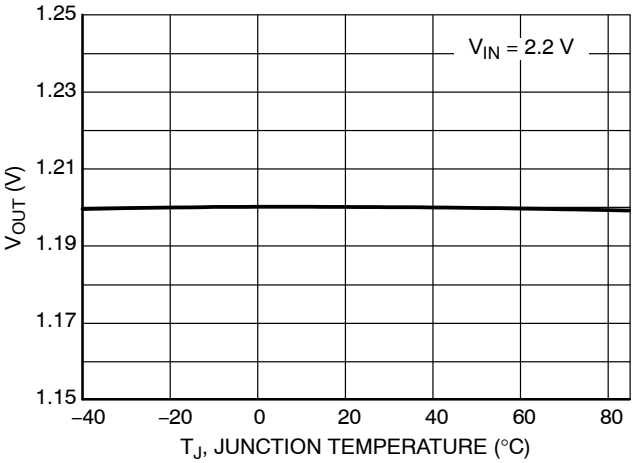


Figure 9. Output Voltage vs. Temperature, 1.2 V Version

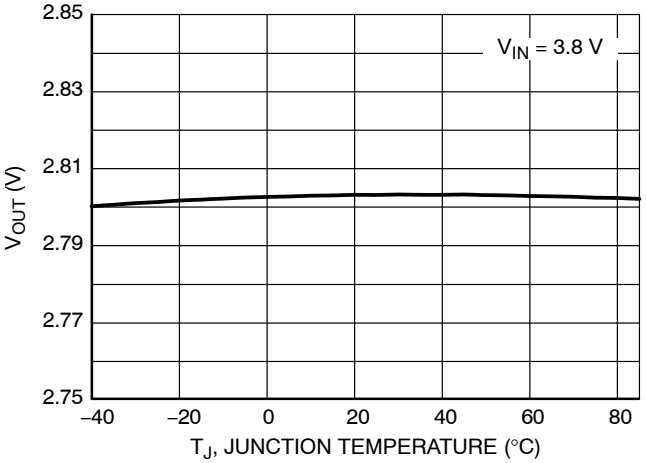


Figure 10. Output Voltage vs. Temperature, 2.8 V version

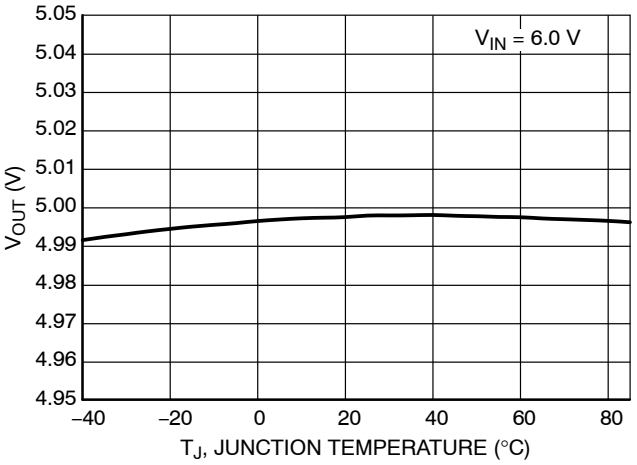


Figure 11. Output Voltage vs. Temperature, 5.0 V Version

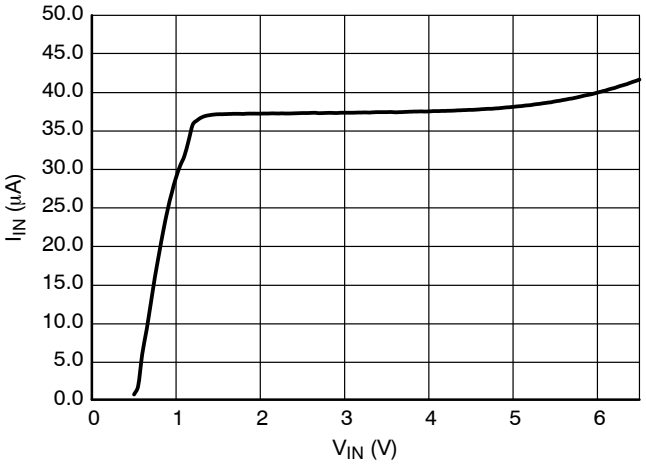


Figure 12. Supply Current vs. Input Voltage, 1.2 V Version

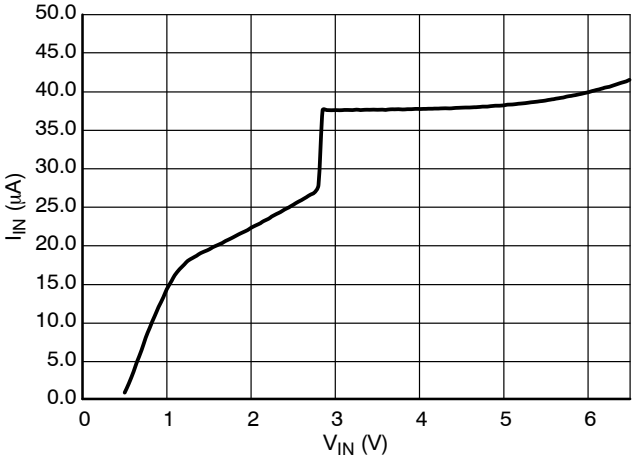


Figure 14. Supply Current vs. Input Voltage, 2.8 V Version

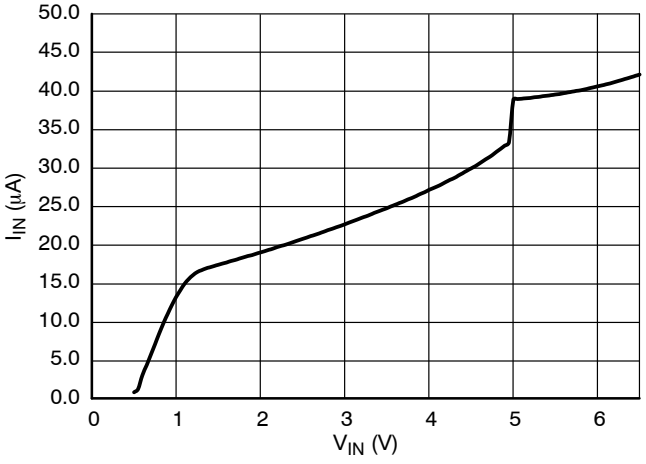


Figure 13. Supply Current vs. Input Voltage, 5.0 V version

TYPICAL CHARACTERISTICS

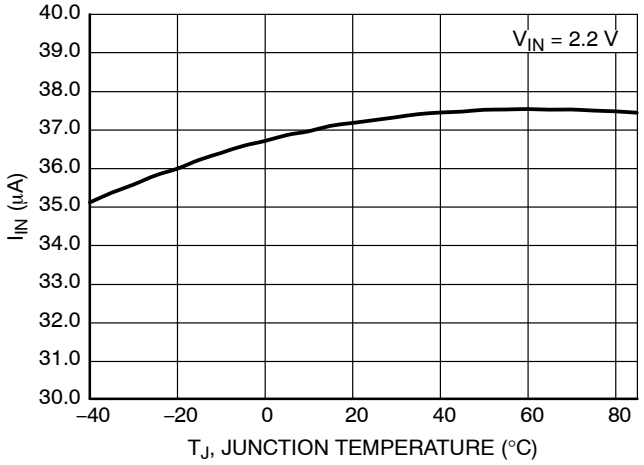


Figure 15. Supply Current vs. Temperature, 1.2 V Version

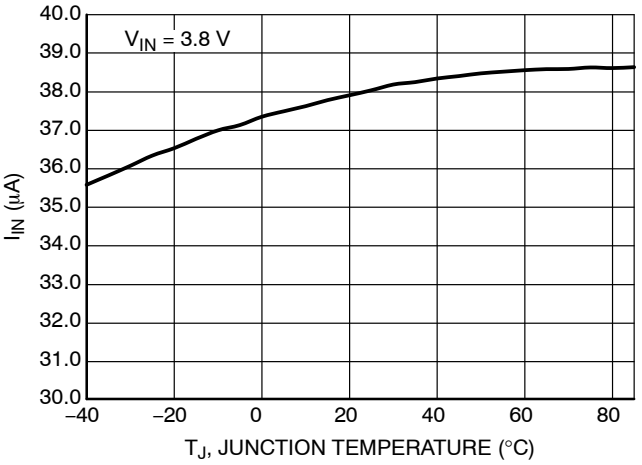


Figure 16. Supply Current vs. Temperature, 2.8 V Version

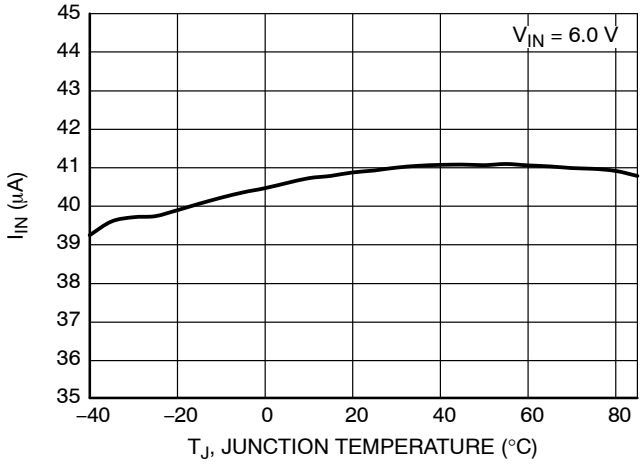


Figure 17. Supply Current vs. Temperature, 5.0 V Version

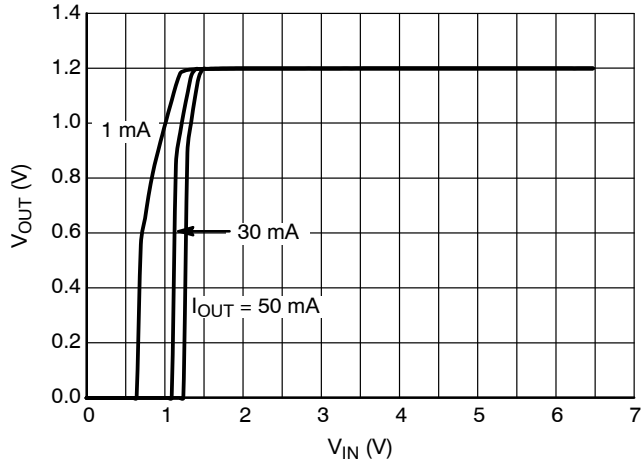


Figure 18. Output Voltage vs. Input Voltage, 1.2 V Version

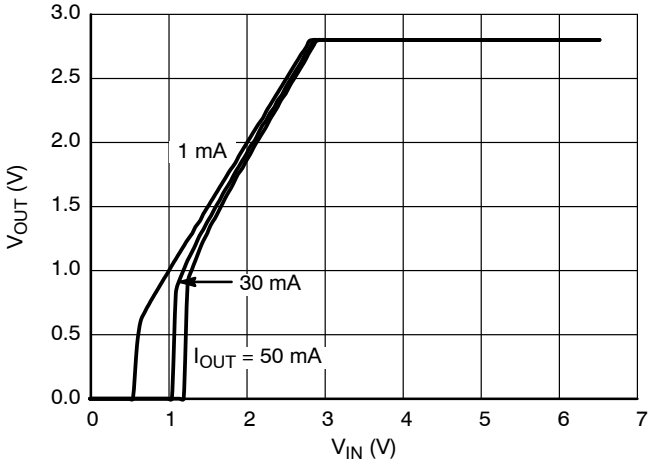


Figure 19. Output Voltage vs. Input Voltage, 2.8 V Version

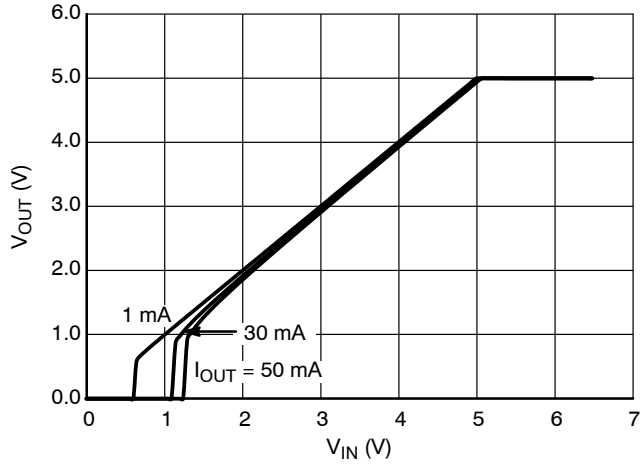


Figure 20. Output Voltage vs. Input Voltage, 5.0 V Version

TYPICAL CHARACTERISTICS

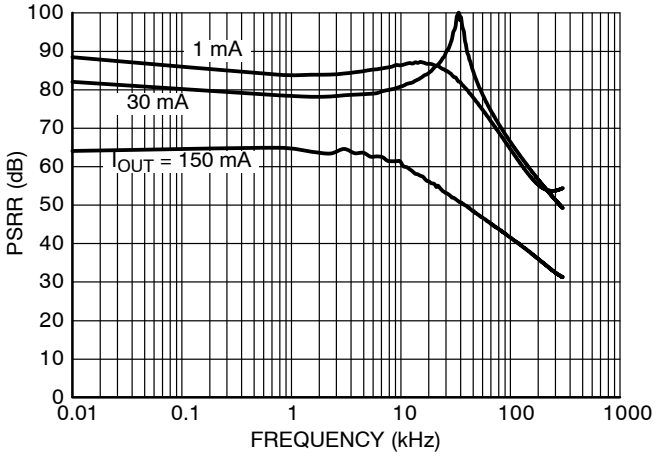


Figure 21. PSRR, 1.2 V Version

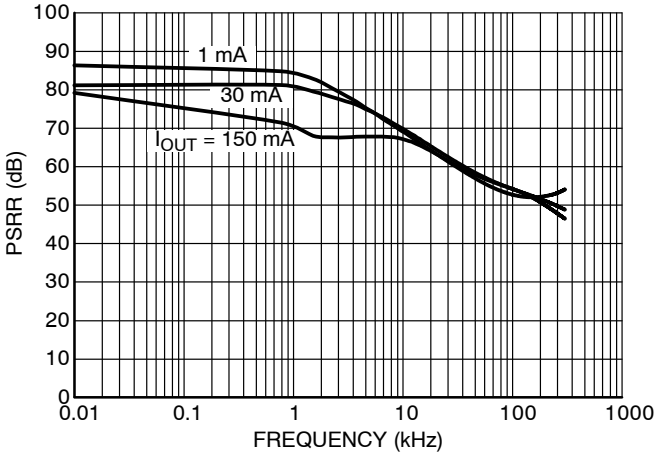


Figure 22. PSRR, 2.8 V Version

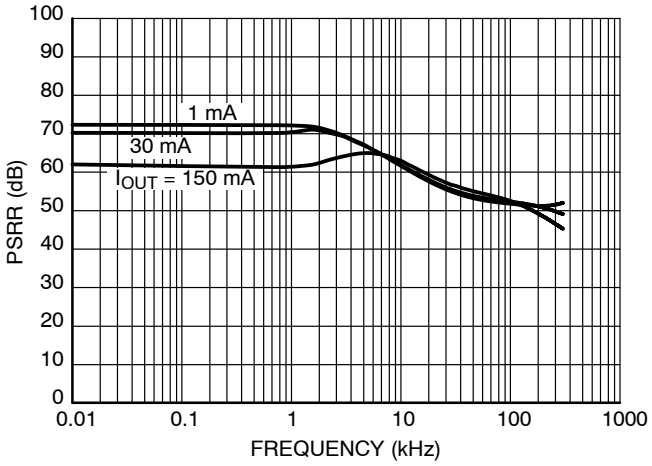


Figure 23. PSRR, 5.0 V Version

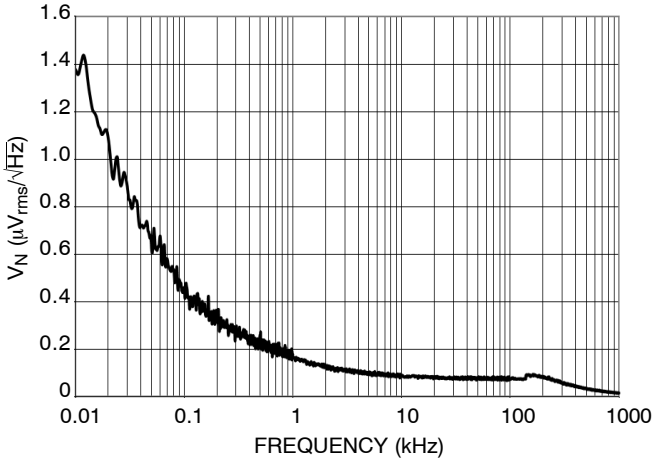


Figure 24. Output Voltage Noise, 1.2 V Version

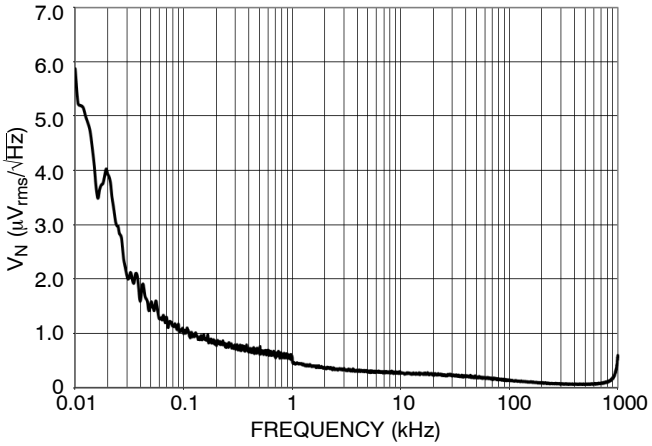


Figure 25. Output Voltage Noise, 2.8 V Version

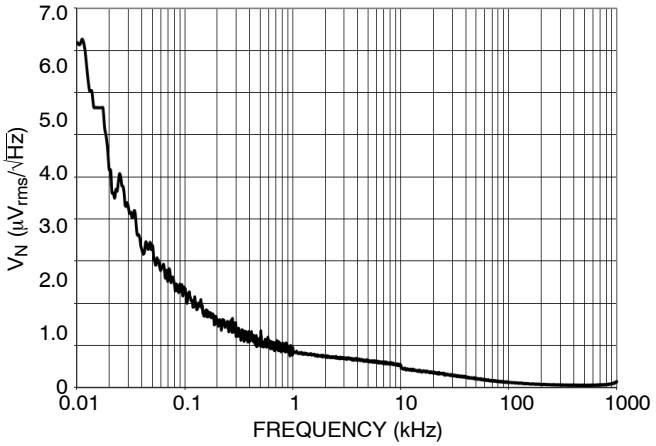


Figure 26. Output Voltage Noise, 5.0 V Version