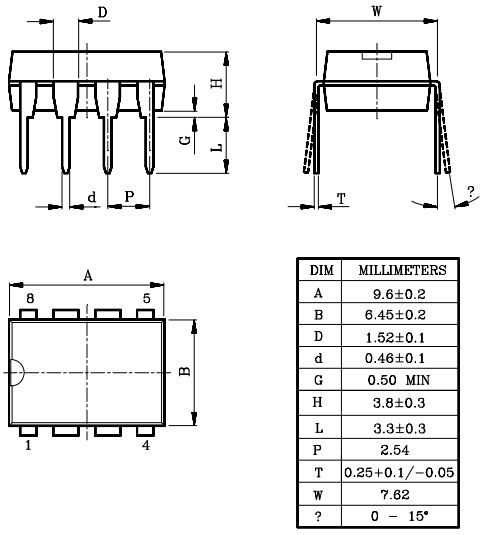
SERIES OF ADJUSTABLE MICROPOWER VOLTAGE REGULATOR

The KIA2951P/F are micropower voltage regulators with very low quiescent current (75μA Typ.) and very low dropout voltage (Typ. 40mV at light loads and 380mV at 100mA). They are ideally suited for use in battery-powered systems. Furthermore, the quiescent current of the KIA2951P/F increases only slightly in dropout, prolonging battery life.
One such feature is an error flag output which warns of a low output voltage, often due to falling batteries on the input.
It may be used for a power-on reset. A second feature is the logic-compatible shutdown input which enables the regulator to be switched on and off. Also the part may be pin-strapped for a 5V, 3V, or 3.3V output (depending on the version), or programmed from 1.24V to 10V with an external pair of resistors.
Careful design of the KIA2951P/F has minimized all contributions to the error budget. This includes a tight initial tolerance(5% typ.), extremely good load and line regulation (0.05% typ.) and a very low output voltage temperature coefficient, marking the part useful as a low-power voltage reference.

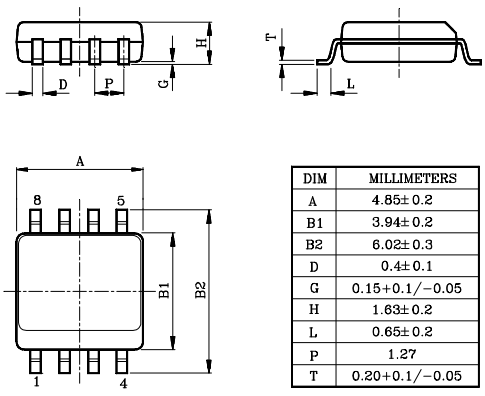


DIM	MILLIMETERS
A	9.6±0.2
B	6.45±0.2
D	1.52±0.1
d	0.46±0.1
G	0.50 MIN
H	3.8±0.3
L	3.3±0.3
P	2.54
T	0.25+0.1/−0.05
W	7.62
?	0 ~ 15°

DIP-8

FEATURES

- 5V, 3V and 3.3V versios available.
- Highaccuracy output voltage.
- Guaranteed 100mA output current.
- Extrenmely tight load and line reglation.
- Very low temperature coefficiet.
- Use as Regulator or Reference.
- Needs minimum capacitance for stabliity.
- Current and Thermal Limiting.
- Stable with low-ESR output dropout.
- Error flag warns of output dropout.
- Logic-controlled electronic shutdown.
- Output programmable from 1.24 to 10V.



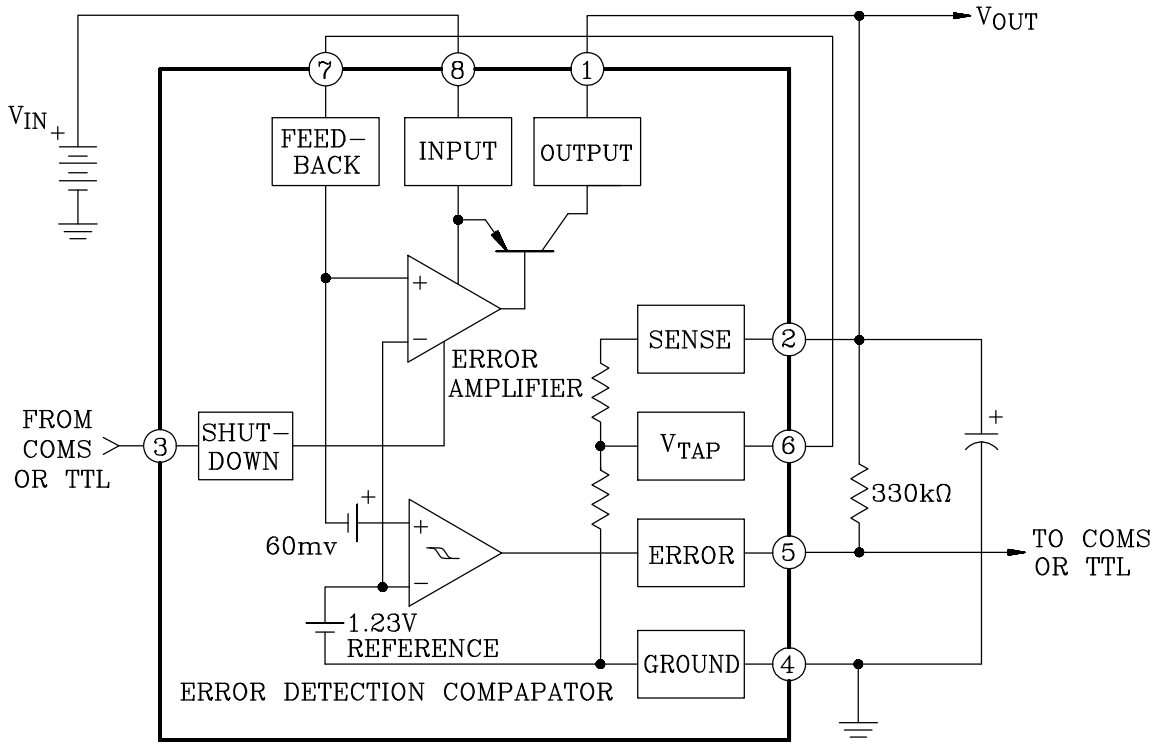
DIM	MILLIMETERS
A	4.85± 0.2
B1	3.94± 0.2
B2	6.02± 0.3
D	0.4± 0.1
G	0.15+0.1/−0.05
H	1.63± 0.2
L	0.65± 0.2
P	1.27
T	0.20+0.1/−0.05

FLP-8

MAXIMUM RATINGS (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Input Supply Voltage		V_{IN}	-0.3~30	V
Shutdown Input Voltage		V_{SD}	-1.5~30	V
Error Comparator Output Voltage		V_{EC}	-1.5~30	V
FeedBack Input Voltage		V_{FB}	-1.5~30	V
Power Dissipation	P	P_D	500	W
	F		240	
Junction Temperature		T_j	150	℃
Operating Junction Temperature		T_{opr}	-55~150	℃
Storage Junction Temperature		T_{stg}	-65~150	℃

BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS

3V CONDITION

(Unless otherwise Specified : $V_{IN}=V_{O(TYP)}+1$, $I_{OUT}=100\mu A$, $C_{OUT}=2.2\mu F$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT1}	$T_J=25℃$	2.985	3.0	3.015	V
	V_{OUT2}	$-25℃ \leq T_J \leq 85℃$	-	3.0	-	V
	V_{OUT3}	Full Operating Temperature Range	2.964	3.0	3.036	V
Output Voltage	V_{OUT4}	$100\mu A \leq I_{OUT} \leq 100mA$, $T_J \leq T_{J(MAX)}$	2.955	3.0	3.045	V

3.3V CONDITION

(Unless otherwise Specified : $V_{IN}=V_{O(TYP)}+1$, $I_{OUT}=100\mu A$, $C_{OUT}=2.2\mu F$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT1}	$T_J=25℃$	3.284	3.3	3.317	V
	V_{OUT2}	$-25℃ \leq T_J \leq 85℃$	-	3.3	-	V
	V_{OUT3}	Full Operating Temperature Range	3.260	3.3	3.340	V
Output Voltage	V_{OUT4}	$100\mu A \leq I_{OUT} \leq 100mA$, $T_J \leq T_{J(MAX)}$	3.251	3.3	3.350	V

5V CONDITION

(Unless otherwise Specified : $V_{IN}=V_{O(TYP)}+1$, $I_{OUT}=100\mu A$, $C_{OUT}=1\mu F$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT1}	$T_J=25℃$	4.975	5.0	5.025	V
	V_{OUT2}	$-25℃ \leq T_J \leq 85℃$	-	5.0	-	V
	V_{OUT3}	Full Operating Temperature Range	4.940	5.0	5.060	V
Output Voltage	V_{OUT4}	$100\mu A \leq I_{OUT} \leq 100mA$, $T_J \leq T_{J(MAX)}$	4.925	5.0	5.075	V

ALL VOLTAGE CONDITION

(Unless otherwise Specified : $V_{IN}=V_{O(TYP)}+1$, $I_{OUT}=100\mu A$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage Temperature Coefficient	TCVo		-	20	120	ppm/℃
Line Regulation	Reg line	$V_{O(TYP)}+1 \leq V_{IN} \leq 30V$	-	0.03	0.1	%
Load Regulation	Reg load	$100\mu A \leq I_{OUT} \leq 100mA$	-	0.04	0.1	%
Dropout Voltage	V_{D1}	$I_{OUT}=100\mu A$	-	50	80	mV
	V_{D2}	$I_{OUT}=100mA$	-	380	450	mV
Quiescent Current	I_{Q1}	$I_{OUT}=100\mu A$	-	75	120	μA
	I_{Q2}	$V_{IN}=V_{O(TYP)}-0.5$, $I_{OUT}=100\mu A$	-	110	170	μA
	I_{Q3}	$I_{OUT}=100mA$	-	8	12	mA
Current Limit	I_{LIMIT}	$V_{OUT}=0$	-	160	200	mA
Output Noise Voltage	V_{NO1}	$C_{OUT}=1\mu F$ (5V Only), BW=10Hz~100kHz	-	430	-	μV_{rms}
	V_{NO2}	$C_{OUT}=220\mu F$, BW=10Hz~100kHz	-	160	-	μV_{rms}
	V_{NO3}	$C_{OUT}=3.3\mu F$, (Bypass=0.01μF, Pin 7 to 1) BW=10Hz~100kHz	-	100	-	μV_{rms}

REFERENCE PART

(Unless otherwise Specified : $V_{IN}=V_{O(TYP)}+1$, $I_{OUT}=100\mu A$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Reference Voltage	V_{REF1}		1.22	1.235	1.25	V
	V_{REF2}	(Note 1)	1.19	-	1.27	V
Feed Back Pin Bias Current	I_{FB}		-	20	40	nA
Reference Voltage Temperature Coefficient	TCV_O		-	20	-	ppm/℃
Feed Back Pin Bias Current Temperature Coefficient	TCI_O		-	0.1	-	nA/℃

ERROR COMPARATOR PART

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Leakage Current	I_{OH}	$V_{OH}=30V$	-	0.01	1	μA
Output Low Voltage	V_{OL}	$V_{IN}=V_{O(TYP)}-0.5$, $I_{OUT}=400\mu A$	-	150	250	mV
Upper Threshold Voltage	$V_{TH(UPPER)}$		40	60	-	mV
Lower Threshold Voltage	$V_{TH(LOWER)}$		-	75	95	mV
Hysteresis	ΔV_{TH}		-	15	-	mV

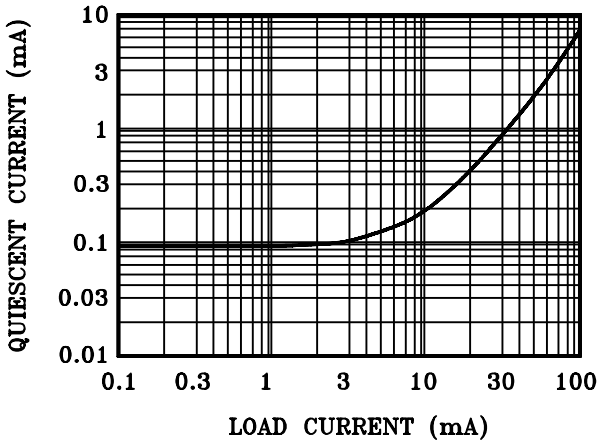
SHUTDOWN INPUT PART

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Logic Voltage	V_H	Low (Regulator ON)	-	-	0.6	V
	V_L	Low (Regulator OFF)	2.0	-	-	V
Shutdown Pin Input Current	I_{SI1}	$V_{SHUTDOWN}$=2.4V	-	30	50	㎂
	I_{SI2}	$V_{SHUTDOWN}$=30V	-	450	600	㎂
Regulator Output Current in Shutdown	I_{OUT}	(Note 2)	-	3	10	㎂

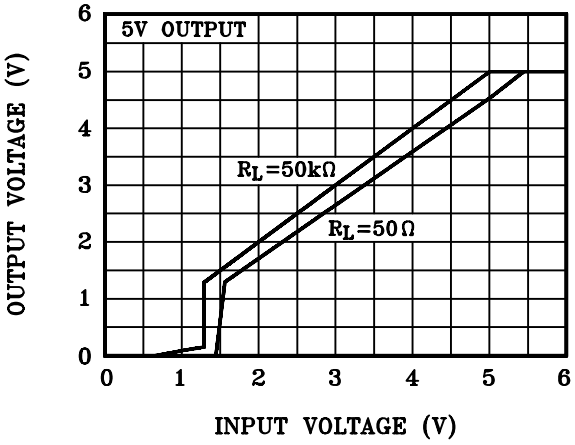
Note1) $V_{REF} \leq V_{OUT} \leq V_{IN}-1$, $2.3 \leq V_{IN} \leq 30V$, $100\mu A \leq I_{OUT} \leq 100mA$, $T_J \leq T_{J(MAX)}$

Note2) $V_{SHUTDOWN} \leq 2V$, $V_{IN} \leq 30V$, V_{OUT}=0, Feed Back Pin to V_{TAB}

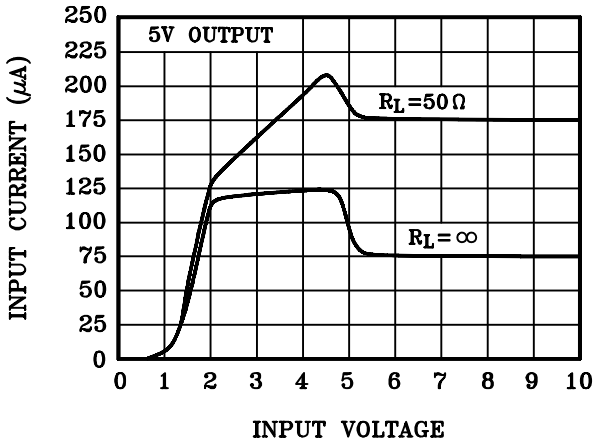
QUIESCENT CURRENT



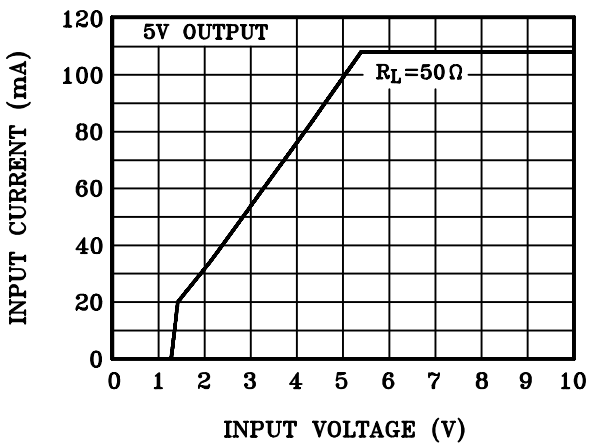
DROPOUT CHARACTERISTICS



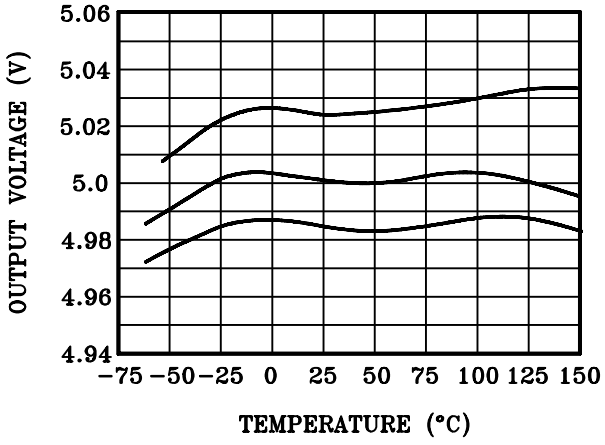
INPUT CURRENT



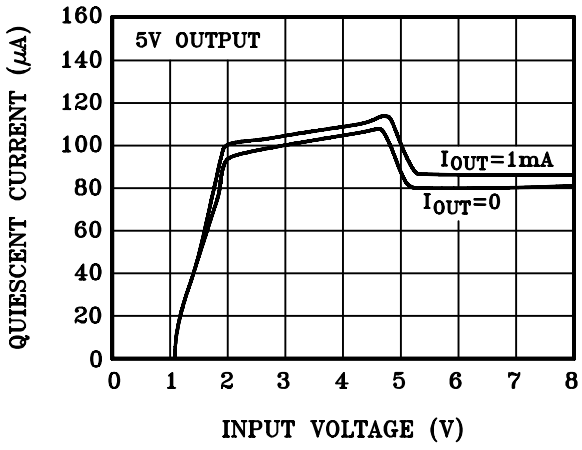
INPUT CURRENT



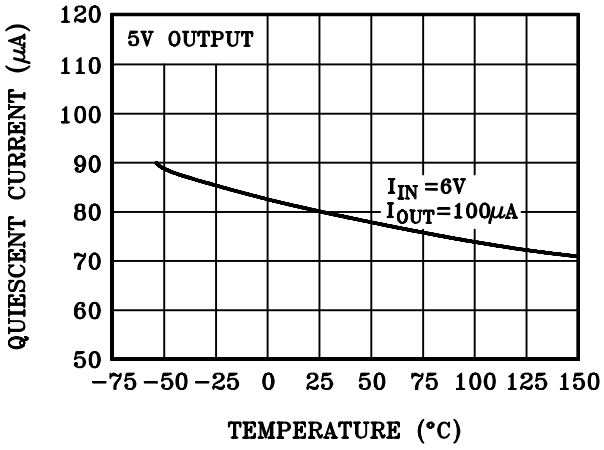
OUTPUT VOLTAGE VS. TEMPERATURE OF 3 REPRESENTATIVE UNITS



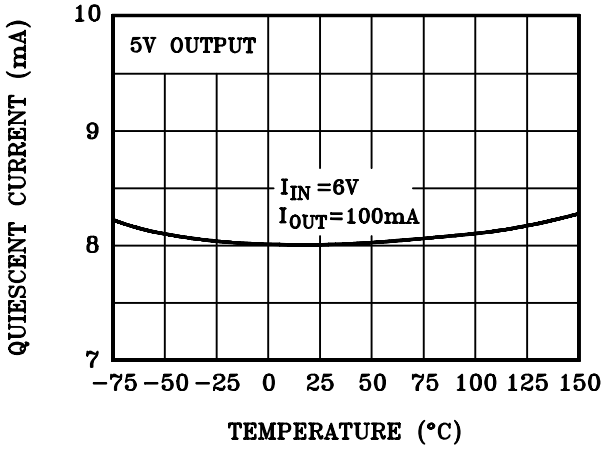
QUIESCENT CURRENT



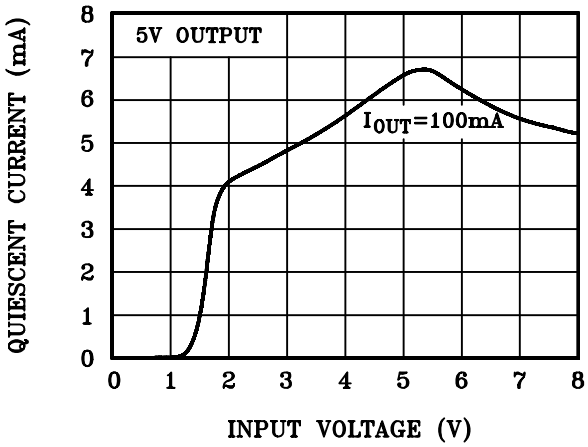
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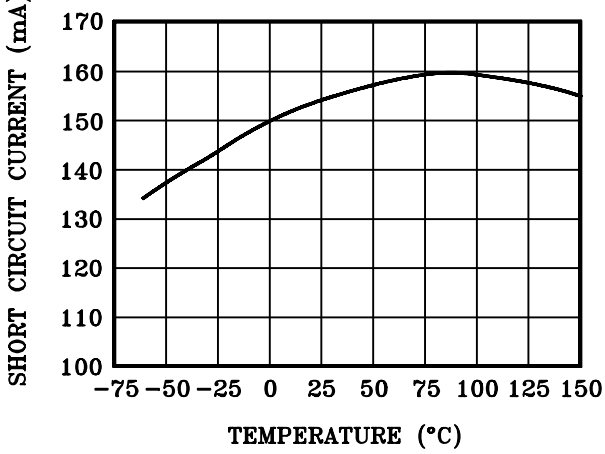
QUIESCENT CURRENT



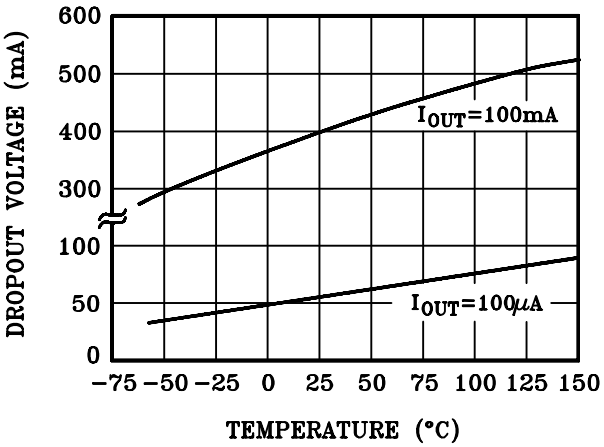
QUIESCENT CURRENT



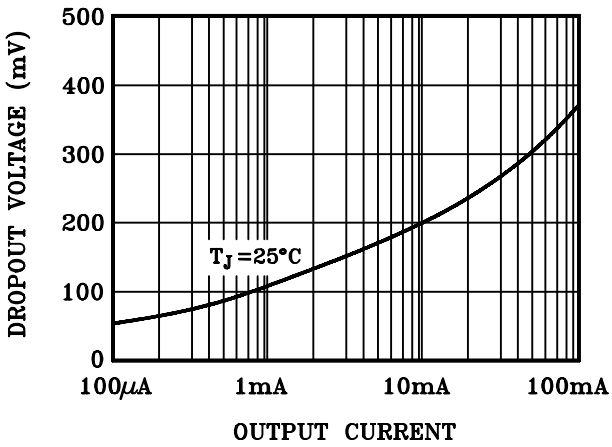
SHORT CIRCUIT CURRENT



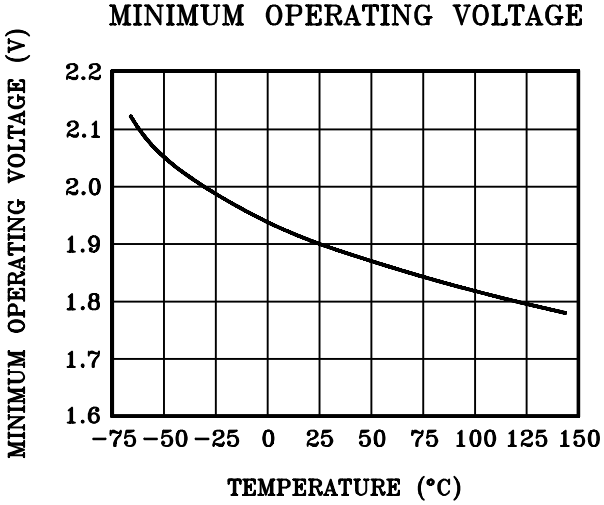
DROPOUT VOLTAGE



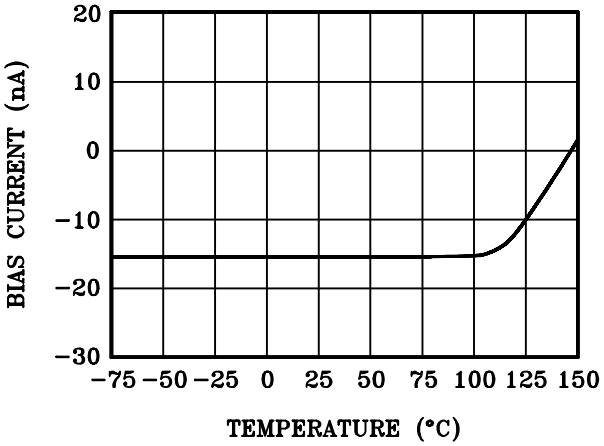
DROPOUT VOLTAGE



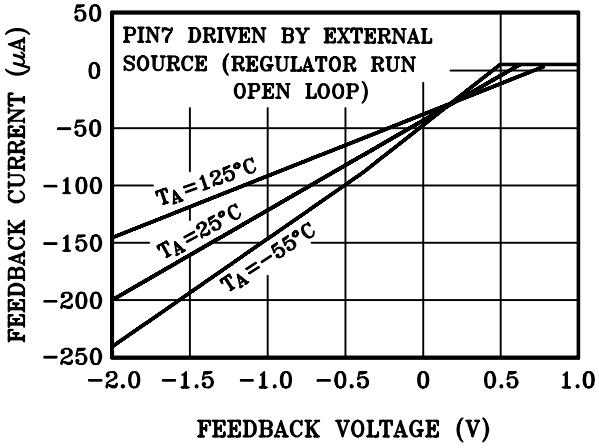
MINIMUM OPERATING VOLTAGE



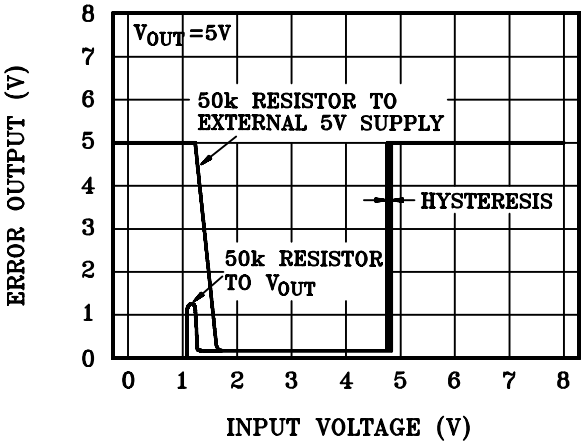
FEEDBACK BIAS CURRENT



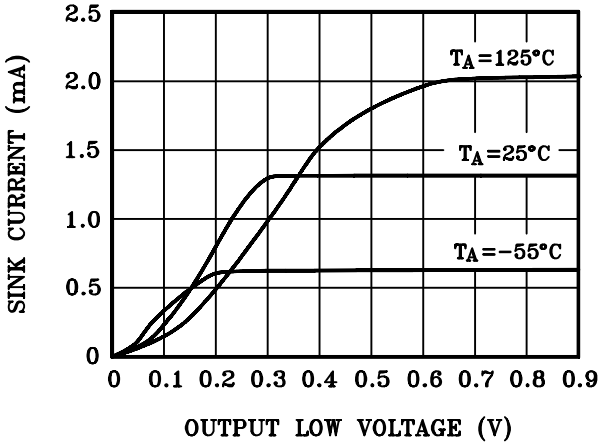
FEEDBACK PIN CURRENT



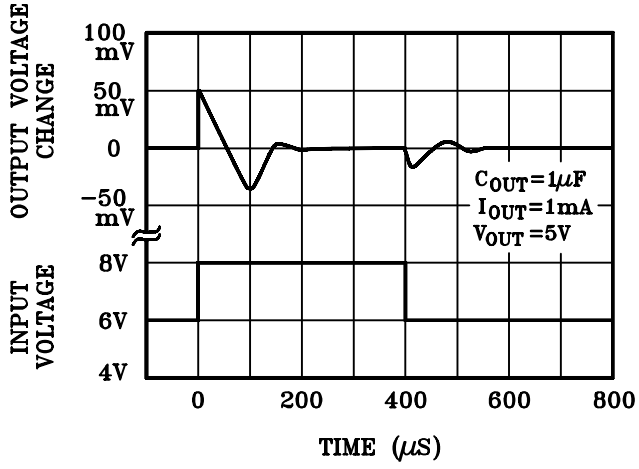
ERROR COMPARATOR OUTPUT



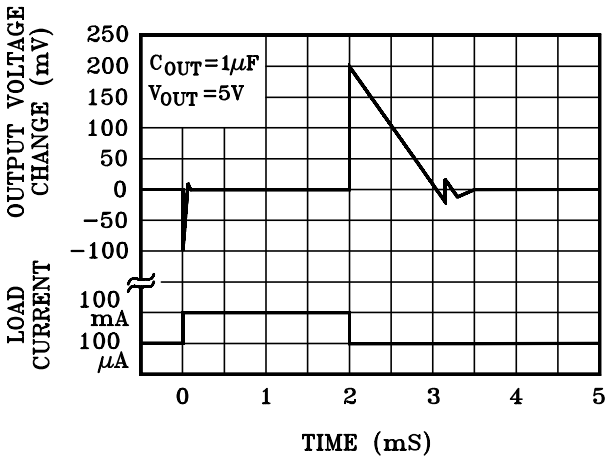
COMPARATOR SINK CURRENT



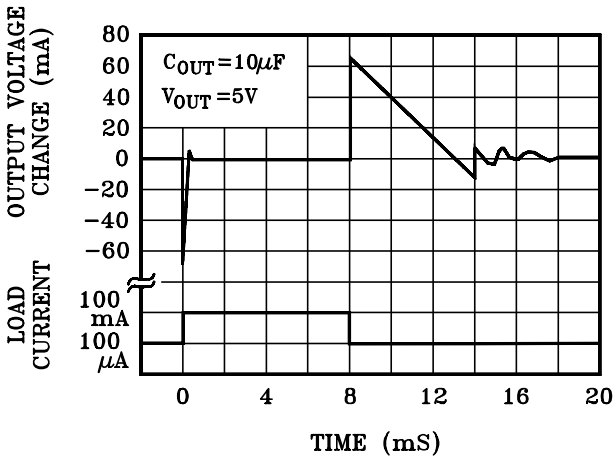
LINE TRANSIENT RESPONSE



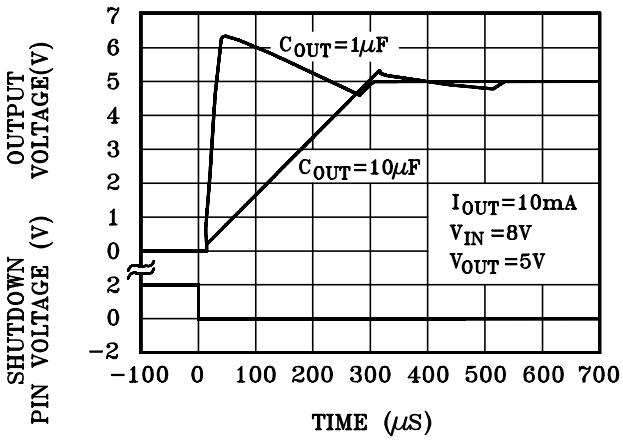
LOAD TRANSIENT RESPONSE



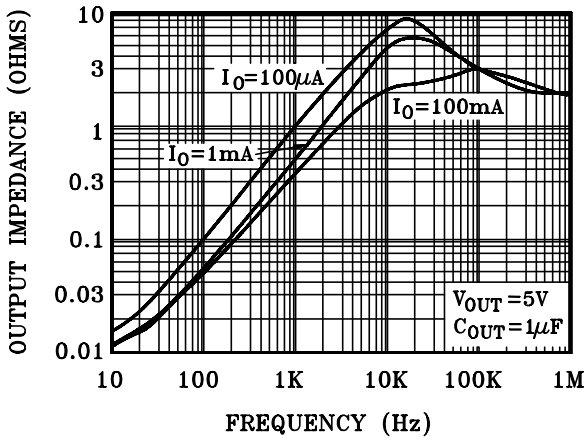
LOAD TRANSIENT RESPONSE



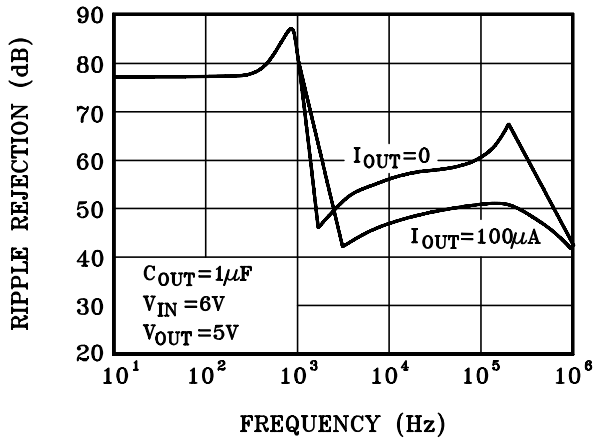
ENABLE TRANSIENT



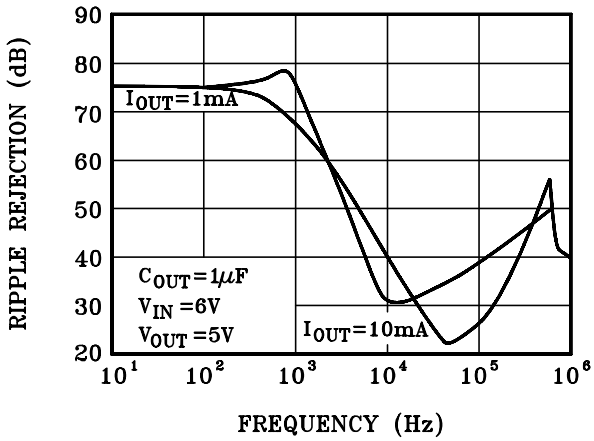
OUTPUT IMPEDANCE



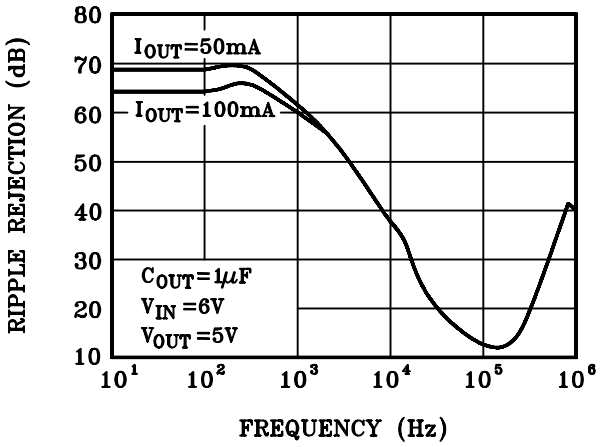
RIPPLE REJECTION



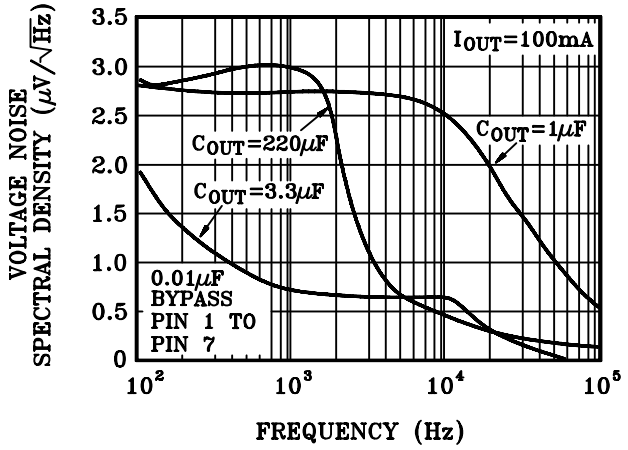
RIPPLE REJECTION



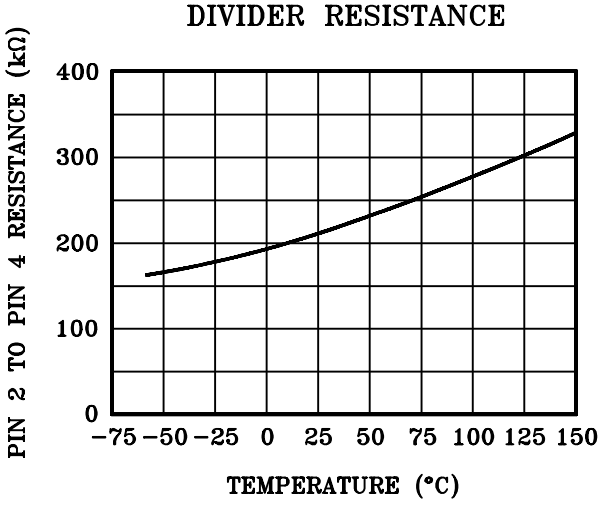
RIPPLE REJECTION



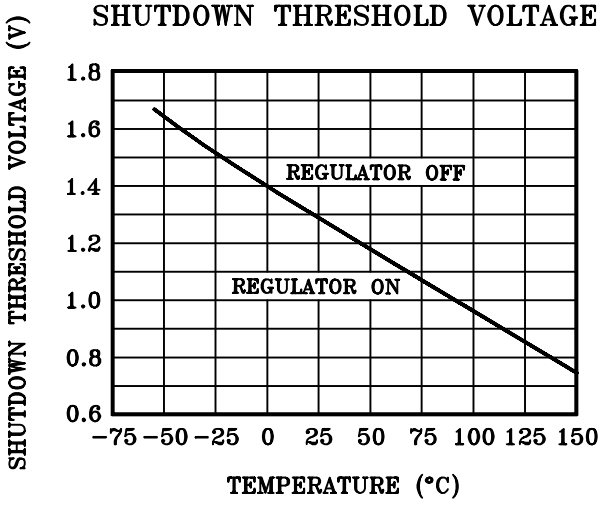
OUTPUT NOISE



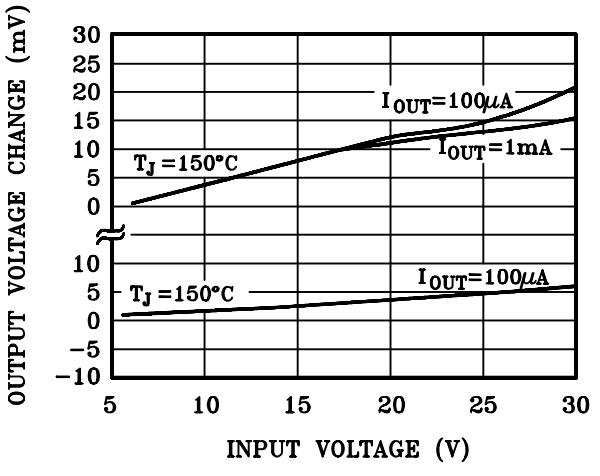
DIVIDER RESISTANCE



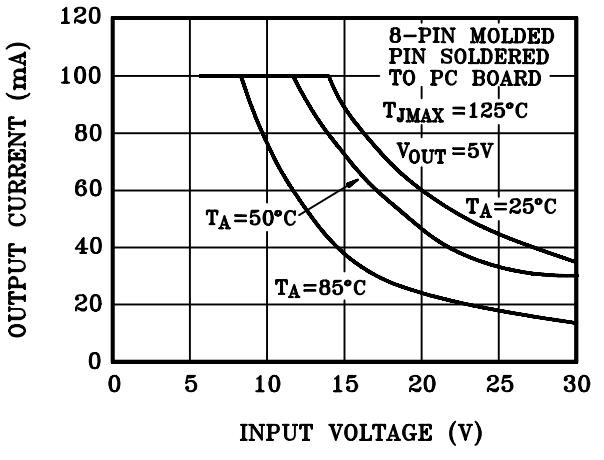
SHUTDOWN THRESHOLD VOLTAGE

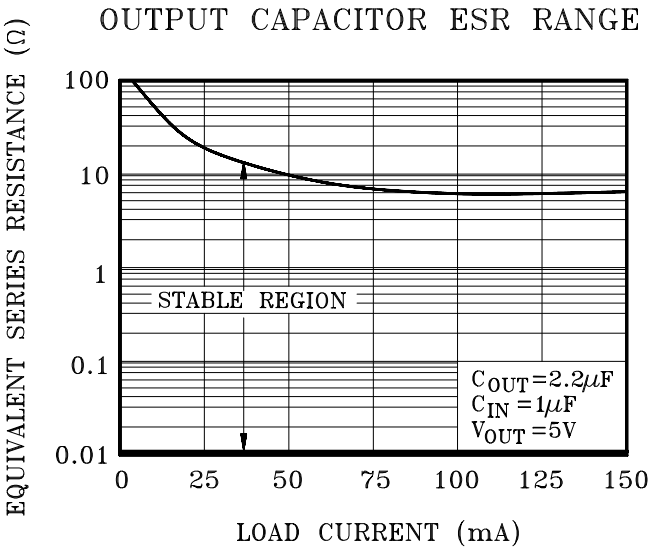


LINE REGULATION



MAXIMUM RATED OUTPUT CURRENT




OUTPUT CAPACITOR ESR RANGE
EQUIVALENT SERIES RESISTANCE (Ω)
100
10
1
0.1
0.01
STABLE REGION
C_{OUT}=2.2μF
C_{IN} =1μF
V_{OUT} =5V
0
25
50
75
100
125
150
LOAD CURRENT (mA)