LD2985 SERIES

VERY LOW DROP AND LOW NOISE VOLTAGE REGULATOR WITH INHIBIT FUNCTION

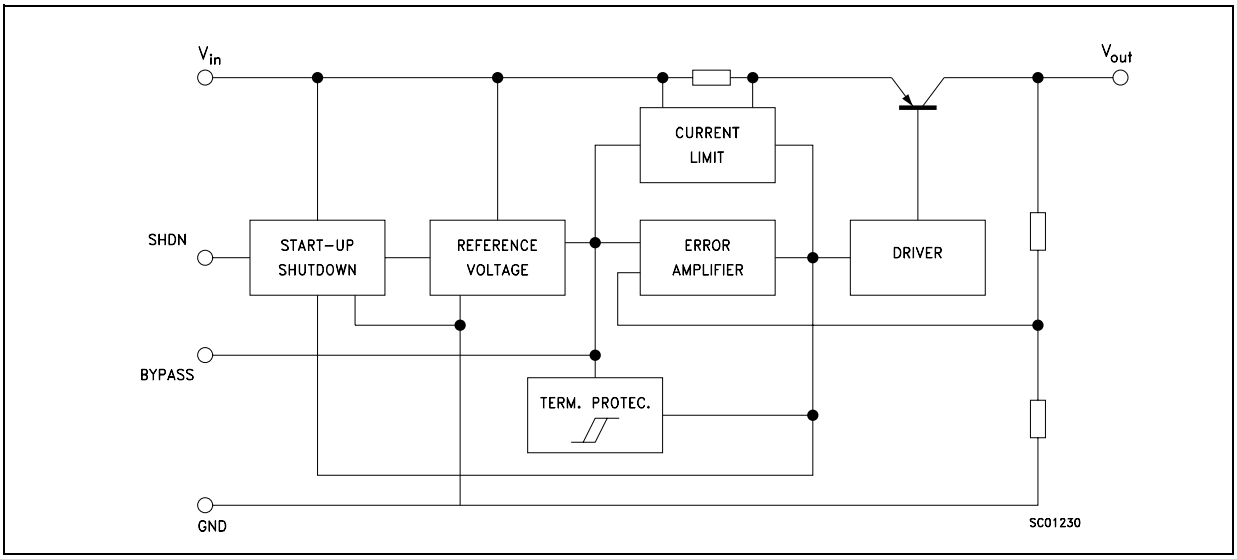
- VERY LOW DROPOUT VOLTAGE (280mV AT 150mA AND 7mV AT 1mA LOAD)
- VERY LOW QUIESCENT CURRENT (2.2mA TYP. AT 150mA LOAD AND 75µA AT NO LOAD)
- OUTPUT CURRENT UP TO 150mA
- LOGIC CONTROLLED ELECTRONIC SHUTDOWN
- OUTPUT VOLTGAE OF 1.8, 2.5, 2.8, 3, 3.1, 3.2, 3.3, 3.5, 3.6, 3.8, 4, 4.7, 5V
- INTERNAL CURRENT AND THERMAL LIMIT
- AVAILABLE IN ±1% TOLLERANCE (AT 25°C, A VERSION)
- LOW OUTPUT NOISE VOLTAGE 30µVrms
- SMALLEST PASCKAGE SOT23-5L
- TEMPERATURE RANGE: -40°C TO 125°C

SOT23-5L

DESCRIPTION

The LD2985 is a 150mA fixed output voltage regulator. The ultra low drop voltage and the low quiescent current make them particularly suitable for low noise, low power applications, and in battery powered systems. In sleep mode quiescent current is less than 1µA when INHIBIT pin is pulled low. Shutdown Logic Control Function is available on pin 3 (TTL compatible). This means that when the device is used as local regulator, it is possible to put a part of the board in standby, decreasing the total power consumption.
AN internal capacitor connected to the bypass pin C_{OUT} 30mVrms.
Typical application are in cellular phone, palmtop/ laptop computer, personal fdigital assistant (PDA), personal stereo, camdorder and camera.

SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

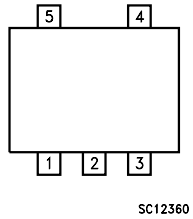
Symbol	Parameter	Value	Unit
V_I	DC Input Voltage	16	V
V_{INH}	INHIBIT Input Voltage	16	V
I_O	Output Current	Internally limited	
P_{tot}	Power Dissipation	Internally limited	
T_{stg}	Storage Temperature Range	-65 to +150	°C
T_{op}	Operating Junction Temperature Range	-40 to +125	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

THERMAL DATA

Symbol	Parameter	SOT23-5L	Unit
$R_{thj\text{-}case}$	Thermal Resistance Junction-case	81	°C/W

CONNECTION DIAGRAM (top view)



SOT23-5L

PIN DESCRIPTION

Pin N°	Symbol	Name and Function
1	IN	Input Port
2	GND	Ground Pin
3	INHIBIT	Control switch ON/OFF. Inhibit is not internally pulled-up; it cannot be left floating. Disable the device when connected to GND or to a positive voltage less than 0.18V
4	Bypass	Bypass Pin: Capacitor to be connected to GND in order to improve the thermal noise performances.
5	OUT	Output Port

ORDERING CODES

A VERSION	B VERSION	OUTPUT VOLTAGES
LD2985AM18R	LD2985BM18R	1.8V
LD2985AM25R	LD2985BM25R	2.5V
LD2985AM28R	LD2985BM28R	2.8V
LD2985AM30R	LD2985BM30R	3.0V
LD2985AM31R	LD2985BM31R	3.1V
LD2985AM32R	LD2985BM32R	3.2V
LD2985AM33R	LD2985BM33R	3.3V
LD2985AM35R	LD2985BM35R	3.5V
LD2985AM36R	LD2985BM36R	3.6V
LD2985AM38R	LD2985BM38R	3.8V
LD2985AM40R	LD2985BM40R	4.0V
LD2985AM47R	LD2985BM47R	4.7V
LD2985AM50R	LD2985BM50R	5.0V

ELECTRICAL CHARACTERISTICS FOR LD2985A (T_j = 25°C, V_{IN}=V_{OUT}+1V, I_{OUT}=1mA, V_{SHDN}=2V, C_I = 1µF, C_O = 1µF, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_I = 2.8V	1.782	1.8	1.818	V
		I_O = 1 to 150mA	1.755		1.845	V
		I_O = 1 to 150mA T_J= -40 to 125°C	1.737		1.863	V
V_O	Output Voltage	V_I = 3.5V	2.475	2.5	2.525	V
		I_O = 1 to 150mA	2.4375		2.5625	V
		I_O = 1 to 150mA T_J= -40 to 125°C	2.4125		2.5875	V
V_O	Output Voltage	V_I = 3.8V	2.772	2.8	2.828	V
		I_O = 1 to 150mA	2.730		2.870	V
		I_O = 1 to 150mA T_J= -40 to 125°C	2.702		2.898	V
V_O	Output Voltage	V_I = 4.0V	2.970	3.0	3.030	V
		I_O = 1 to 150mA	2.925		3.075	V
		I_O = 1 to 150mA T_J= -40 to 125°C	2.895		3.105	V
V_O	Output Voltage	V_I = 4.1V	3.069	3.1	3.131	V
		I_O = 1 to 150mA	3.022		3.1775	V
		I_O = 1 to 150mA T_J= -40 to 125°C	2.9915		3.2085	V
V_O	Output Voltage	V_I = 4.2V	3.168	3.2	3.232	V
		I_O = 1 to 150mA	3.120		3.280	V
		I_O = 1 to 150mA T_J= -40 to 125°C	3.088		3.312	V
V_O	Output Voltage	V_I = 4.3V	3.267	3.3	3.333	V
		I_O = 1 to 150mA	3.2175		3.3825	V
		I_O = 1 to 150mA T_J= -40 to 125°C	3.1845		3.4155	V
V_O	Output Voltage	V_I = 4.5V	3.465	3.5	3.535	V
		I_O = 1 to 150mA	3.412		3.587	V
		I_O = 1 to 150mA T_J= -40 to 125°C	3.377		3.622	V
V_O	Output Voltage	V_I = 4.6V	3.564	3.6	3.636	V
		I_O = 1 to 150mA	3.510		3.690	V
		I_O = 1 to 150mA T_J= -40 to 125°C	3.474		3.726	V
V_O	Output Voltage	V_I = 4.8V	3.762	3.8	3.838	V
		I_O = 1 to 150mA	3.705		3.895	V
		I_O = 1 to 150mA T_J= -40 to 125°C	3.667		3.933	V
V_O	Output Voltage	V_I = 5.0V	3.96	4	4.04	V
		I_O = 1 to 150mA	3.9		4.1	V
		I_O = 1 to 150mA T_J= -40 to 125°C	3.86		4.14	V
V_O	Output Voltage	V_I = 5.7V	4.653	4.7	4.747	V
		I_O = 1 to 150mA	4.582		4.817	V
		I_O = 1 to 150mA T_J= -40 to 125°C	4.5355		4.8645	V
V_O	Output Voltage	V_I = 6.0V	4.95	5	5.05	V
		I_O = 1 to 150mA	4.875		5.125	V
		I_O = 1 to 150mA T_J= -40 to 125°C	4.825		5.175	V
I_{SC}	Short Circuit Current	R_L = 0		400		mA

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$\Delta V_O/\Delta V_I$	Line Regulation	$V_I = V_O$+1V to 16V, I_O = 1mA		0.003	0.014	%/V_I
		$V_I = V_O$+1V to 16V, I_O = 1mA T_J= -40 to 125°C			0.032	%/V_I
V_d	Dropout Voltage	I_O = 0		1	3	mV
		I_O = 0 T_J= -40 to 125°C			5	mV
		I_O = 1mA		7	10	mV
		I_O = 1mA T_J= -40 to 125°C			15	mV
		I_O = 10mA		40	60	mV
		I_O = 10mA T_J= -40 to 125°C			90	mV
		I_O = 50mA		120	150	mV
		I_O = 50mA T_J= -40 to 125°C			225	mV
		I_O = 150mA		280	350	mV
		I_O = 150mA TJ= -40 to 125°C			575	mV
I_d	Quiescent Current	I_O = 0		80	100	µA
		I_O = 0 T_J= -40 to 125°C			150	µA
		I_O = 1mA		100	150	µA
		I_O = 1mA T_J= -40 to 125°C			200	µA
		I_O = 10mA		200	300	µA
		I_O = 10mA T_J= -40 to 125°C			400	µA
		I_O = 50mA		600	900	µA
		I_O = 50mA T_J= -40 to 125°C			1200	µA
		I_O = 150mA		2000	3000	µA
		I_O = 150mA T_J= -40 to 125°C			4000	µA
		OFF MODE V_{INH}<0.18V		0		µA
		OFF MODE V_{INH}<0.18V T_J= -40 to 125°C			2	µA
SVR	Supply Voltage Rejection	C_{BYP} = 0.01µFC_O = 10µF f = 1KHz		45		dB
V_{IL}	Control Input Logic Low	T_J= -40 to 125°C			0.15	V
V_{IH}	Control Input Logic High	T_J= -40 to 125°C	2			V
I_{iNH}	Control Input Current	T_J= -40 to 125°C V_{SHDN} = 5V		5	15	µA
		T_J= -40 to 125°C V_{SHDN} = 0V		0	-1	µA
eN	Output Noise Voltage	B= 300Hz to 50KHz C_{BYP} = 0.01µF C_O = 10µF		30		µV

ELECTRICAL CHARACTERISTICS FOR LD2985B (T_j = 25°C, V_{IN}=V_{OUT}+1V, I_{OUT}=1mA, V_{SHDN}=2V, C_I = 1µF, C_O = 1µF, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_I = 2.8V	1.773	1.8	1.827	V
		I_O = 1 to 150mA	1.746		1.854	V
		I_O = 1 to 150mA T_J= -40 to 125°C	1.728		1.872	V
V_O	Output Voltage	V_I = 3.5V	2.4625	2.5	2.5375	V
		I_O = 1 to 150mA	2.425		2.575	V
		I_O = 1 to 150mA T_J= -40 to 125°C	2.4		2.6	V
V_O	Output Voltage	V_I = 3.8V	2.758	2.8	2.842	V
		I_O = 1 to 150mA	2.716		2.884	V
		I_O = 1 to 150mA T_J= -40 to 125°C	2.688		2.912	V
V_O	Output Voltage	V_I = 4.0V	2.955	3.0	3.045	V
		I_O = 1 to 150mA	2.91		3.09	V
		I_O = 1 to 150mA T_J= -40 to 125°C	2.88		3.12	V
V_O	Output Voltage	V_I = 4.1V	3.0535	3.1	3.1465	V
		I_O = 1 to 150mA	3.007		3.193	V
		I_O = 1 to 150mA T_J= -40 to 125°C	2.976		3..224	V
V_O	Output Voltage	V_I = 4.2V	3.152	3.2	3.248	V
		I_O = 1 to 150mA	3.104		3.296	V
		I_O = 1 to 150mA T_J= -40 to 125°C	3.072		3.328	V
V_O	Output Voltage	V_I = 4.3V	3.2505	3.3	3.3495	V
		I_O = 1 to 150mA	3.201		3.399	V
		I_O = 1 to 150mA T_J= -40 to 125°C	3.168		3.432	V
V_O	Output Voltage	V_I = 4.5V	3.447	3.5	3.552	V
		I_O = 1 to 150mA	3.395		3.605	V
		I_O = 1 to 150mA T_J= -40 to 125°C	3.360		3.640	V
V_O	Output Voltage	V_I = 4.6V	3.546	3.6	3.654	V
		I_O = 1 to 150mA	3.492		3.708	V
		I_O = 1 to 150mA T_J= -40 to 125°C	3.456		3.744	V
V_O	Output Voltage	V_I = 4.8V	3.743	3.8	3.857	V
		I_O = 1 to 150mA	3.686		3.914	V
		I_O = 1 to 150mA T_J= -40 to 125°C	3.648		3.952	V
V_O	Output Voltage	V_I = 5.0V	3.94	4	4.06	V
		I_O = 1 to 150mA	3.88		4.12	V
		I_O = 1 to 150mA T_J= -40 to 125°C	3.84		4.16	V
V_O	Output Voltage	V_I = 5.7V	4.6295	4.7	4.7705	V
		I_O = 1 to 150mA	4.559		4.841	V
		I_O = 1 to 150mA T_J= -40 to 125°C	4.512		4.888	V
V_O	Output Voltage	V_I = 6.0V	4.925	5	5.075	V
		I_O = 1 to 150mA	4.85		5.15	V
		I_O = 1 to 150mA T_J= -40 to 125°C	4.8		5.2	V
I_{SC}	Short Circuit Current	R_L = 0		400		mA

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$\Delta V_O/\Delta V_I$	Line Regulation	$V_I = V_O+1V$ to 16V, I_O = 1mA		0.003	0.014	%/V_I
		$V_I = V_O+1V$ to 16V, I_O = 1mA T_J= -40 to 125°C			0.032	%/V_I
V_d	Dropout Voltage	I_O = 0		1	3	mV
		I_O = 0 T_J= -40 to 125°C			5	mV
		I_O = 1mA		7	10	mV
		I_O = 1mA T_J= -40 to 125°C			15	mV
		I_O = 10mA		40	60	mV
		I_O = 10mA T_J= -40 to 125°C			90	mV
		I_O = 50mA		120	150	mV
		I_O = 50mA T_J= -40 to 125°C			225	mV
		I_O = 150mA		280	350	mV
		I_O = 150mA T_J= -40 to 125°C			575	mV
I_d	Quiescent Current	I_O = 0		80	100	µA
		I_O = 0 T_J= -40 to 125°C			150	µA
		I_O = 1mA		100	150	µA
		I_O = 1mA T_J= -40 to 125°C			200	µA
		I_O = 10mA		200	300	µA
		I_O = 10mA T_J= -40 to 125°C			400	µA
		I_O = 50mA		600	900	µA
		I_O = 50mA T_J= -40 to 125°C			1200	µA
		I_O = 150mA		2000	3000	µA
		I_O = 150mA T_J= -40 to 125°C			4000	µA
		OFF MODE V_{INH}<0.18V		0		µA
		OFF MODE V_{INH}<0.18V T_J= -40 to 125°C			2	µA
SVR	Supply Voltage Rejection	C_{BYP} = 0.01µFC_O = 10µF f = 1KHz		45		dB
V_{IL}	Control Input Logic Low	T_J= -40 to 125°C			0.15	V
V_{IH}	Control Input Logic High	T_J= -40 to 125°C	2			V
I_{iNH}	Control Input Current	T_J= -40 to 125°C V_{SHDN} = 5V		5	15	µA
		T_J= -40 to 125°C V_{SHDN} = 0V		0	-1	µA
eN	Output Noise Voltage	B= 300Hz to 50KHz C_{BYP} = 0.01µF C_O = 10µF		30		µV

TYPICAL CHARACTERISTICS (unless otherwise specified T_j = 25°C, C_I=1µF, C_O=2.2µF, C_{BYP}=100nF)

Figure 1 : Output Voltage vs Temperature

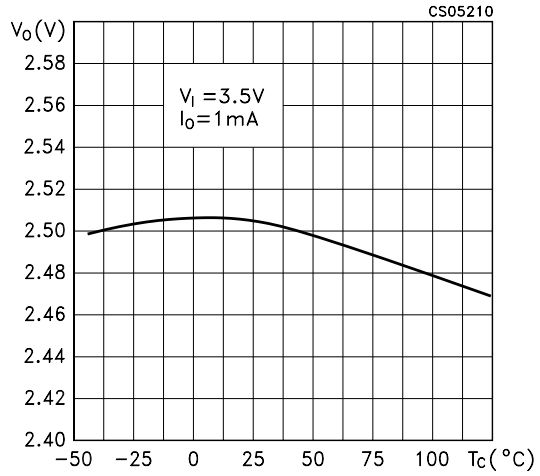


Figure 2 : Dropout Voltage vs Temperature

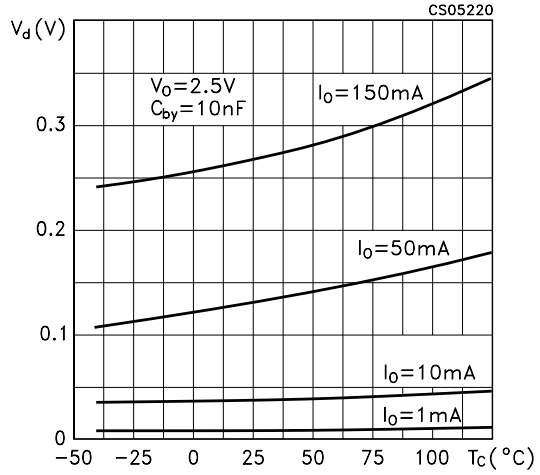


Figure 3 : Dropout Voltage vs Output Current

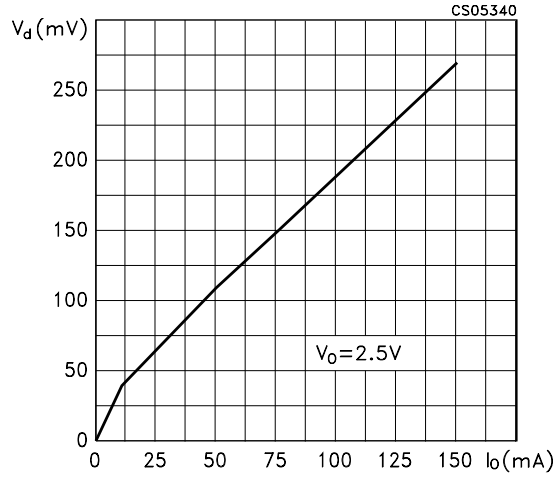


Figure 4 : Quiescent Current vs Load Current

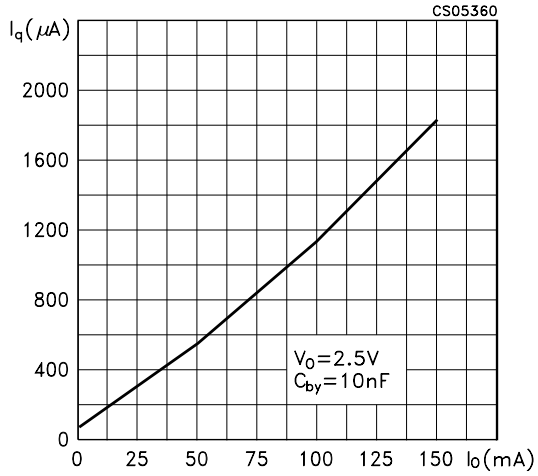


Figure 5 : Quiescent Current vs Temperature

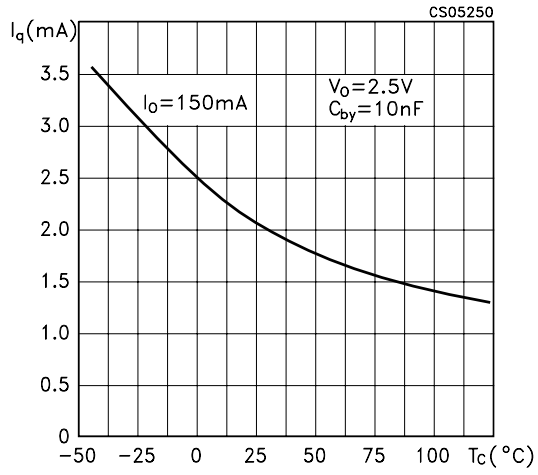


Figure 6 : Supply Voltage Rejection vs Temperature

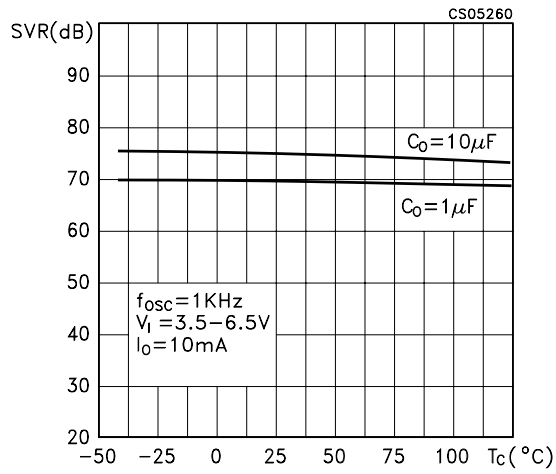


Figure 7 : Supply Voltage Rejection vs Output Current

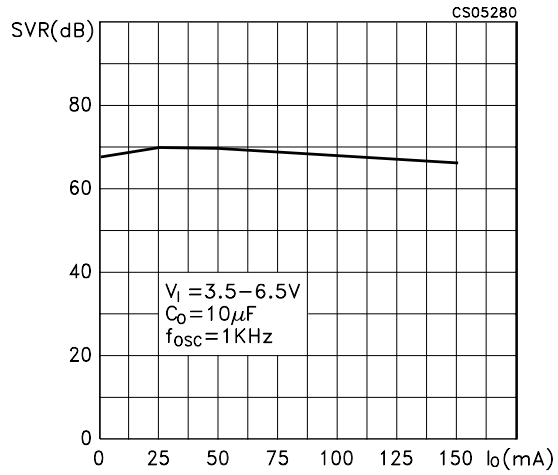


Figure 8 : Supply Voltage Rejection vs Output Current

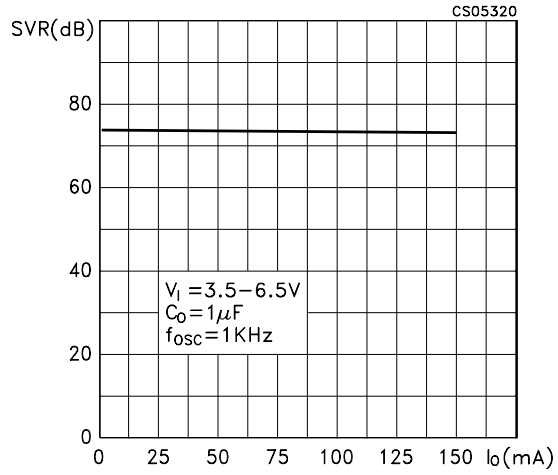


Figure 9 : Supply Voltage Rejection vs Frequency

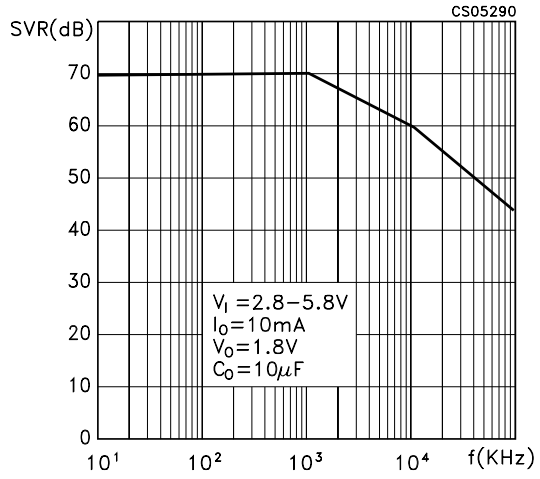


Figure 10 : Supply Voltage Rejection vs Frequency

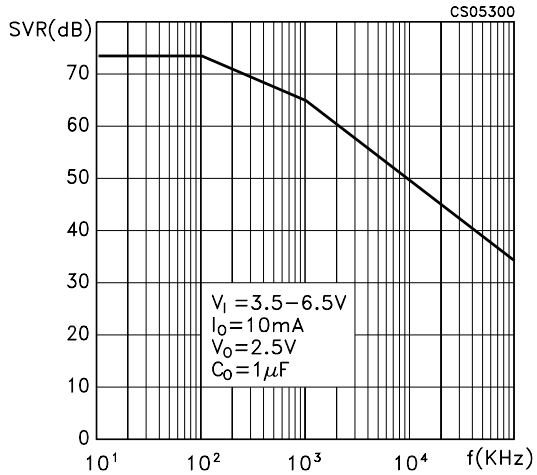
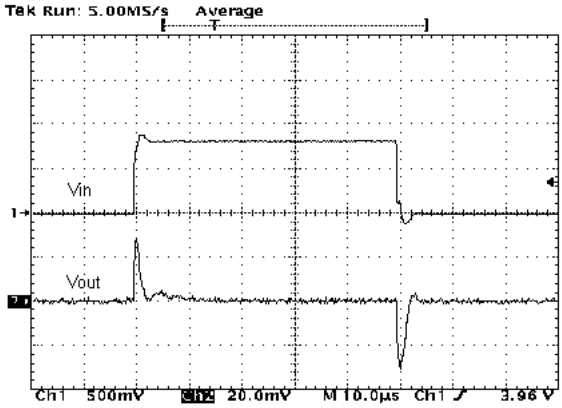
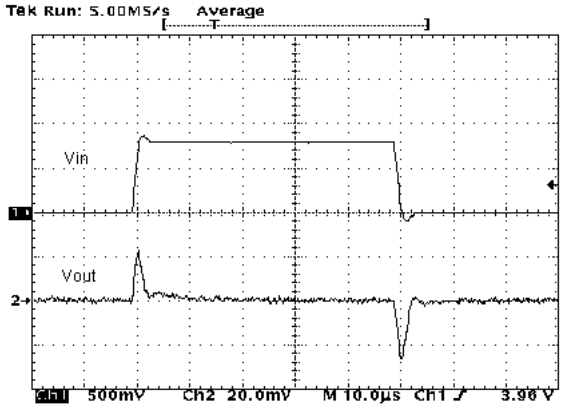


Figure 11 : Line Transient



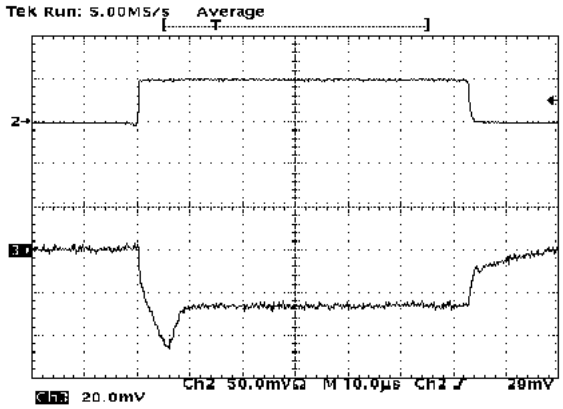
V_O=2.5V, I_O= 50mA, no C_I, C_O=4.7µF, t_r=t_f=2ns

Figure 12 : Line Transient



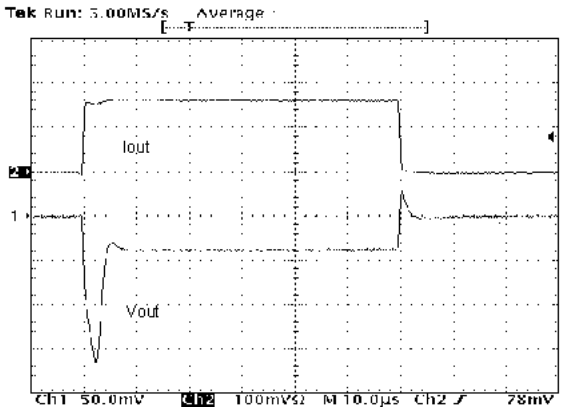
V_O=2.5V, I_O= 50mA, no C_I, C_O=4.7µF, t_r=t_f=1µs

Figure 13 : Load Transient



V_O=2.5V, I_O=0 to 50mA, no C_I, C_O=10µF, t_s=t_f=2ns

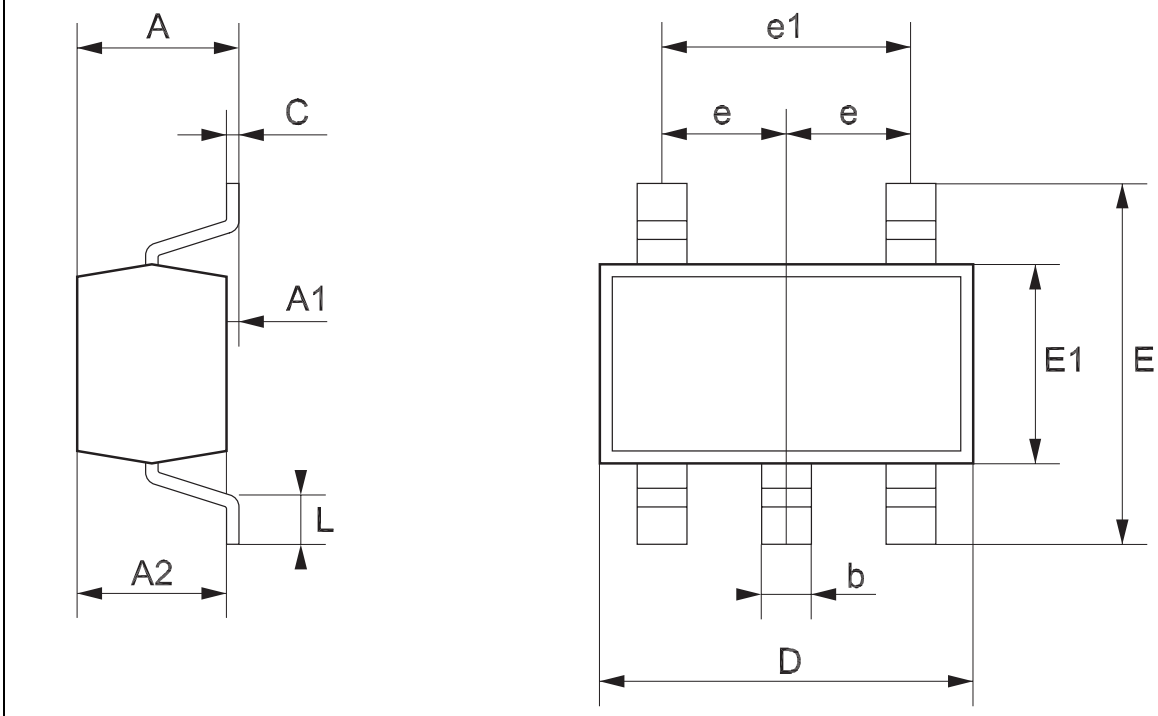
Figure 14 : Load Transient



V_O=2.5V, I_O=0 to 50mA, no C_I, C_O=4.7µF, t_s=t_f=2ns

SOT23-5L MECHANICAL DATA

DIM.	mm.			mils		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	0.90		1.45	35.4		57.1
A1	0.00		0.15	0.0		5.9
A2	0.90		1.30	35.4		51.2
b	0.35		0.50	13.7		19.7
C	0.09		0.20	3.5		7.8
D	2.80		3.00	110.2		118.1
E	2.60		3.00	102.3		118.1
E1	1.50		1.75	59.0		68.8
e		0.95			37.4	
e1		1.9			74.8	
L	0.35		0.55	13.7		21.6



Tape & Reel SOT23-xL MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			180			7.086
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			14.4			0.567
Ao	3.13	3.23	3.33	0.123	0.127	0.131
Bo	3.07	3.17	3.27	0.120	0.124	0.128
Ko	1.27	1.37	1.47	0.050	0.054	0.0.58
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	3.9	4.0	4.1	0.153	0.157	0.161