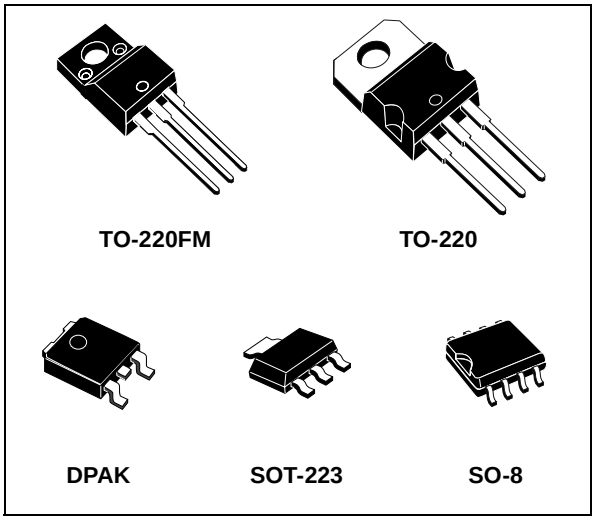
LD1117 SERIES

LOW DROP FIXED AND ADJUSTABLE POSITIVE VOLTAGE REGULATORS

- LOW DROPOUT VOLTAGE (1V TYP.)
- 2.85V DEVICE PERFORMANCES ARE SUITABLE FOR SCSI-2 ACTIVE TERMINATION
- OUTPUT CURRENT UP TO 800 mA
- FIXED OUTPUT VOLTAGE OF: 1.2V, 1.8V, 2.5V, 2.85V, 3.0V, 3.3V, 5.0V
- ADJUSTABLE VERSION AVAILABILITY (V_{rel}=1.25V)
- INTERNAL CURRENT AND THERMAL LIMIT
- AVAILABLE IN ± 1% (AT 25°C) AND 2% IN FULL TEMPERATURE RANGE
- SUPPLY VOLTAGE REJECTION: 75dB (TYP.)



DESCRIPTION

The LD1117 is a LOW DROP Voltage Regulator able to provide up to 800mA of Output Current, available even in adjustable version (Vref=1.25V). Concerning fixed versions, are offered the following Output Voltages: 1.2V,1.8V,2.5V,2.85V, 3.0V 3.3V and 5.0V. The 2.85V type is ideal for SCSI-2 lines active termination. The device is supplied in: SOT-223, DPAK, SO-8, TO-220 and TO-220FM. The SOT-223 and DPAK surface mount packages optimize the thermal characteristics even offering a relevant space saving effect. High efficiency is assured by NPN pass transistor. In fact in this case, unlike than PNP one, the Quiescent Current flows mostly into the load. Only a very common 10µF minimum capacitor is needed for stability. On chip trimming allows the regulator to reach a very tight output voltage tolerance, within ± 1% at 25°C. The ADJUSTABLE LD1117 is pin to pin compatible with the other standard. Adjustable voltage regulators maintaining the better performances in terms of Drop and Tolerance.

Figure 1: Block Diagram

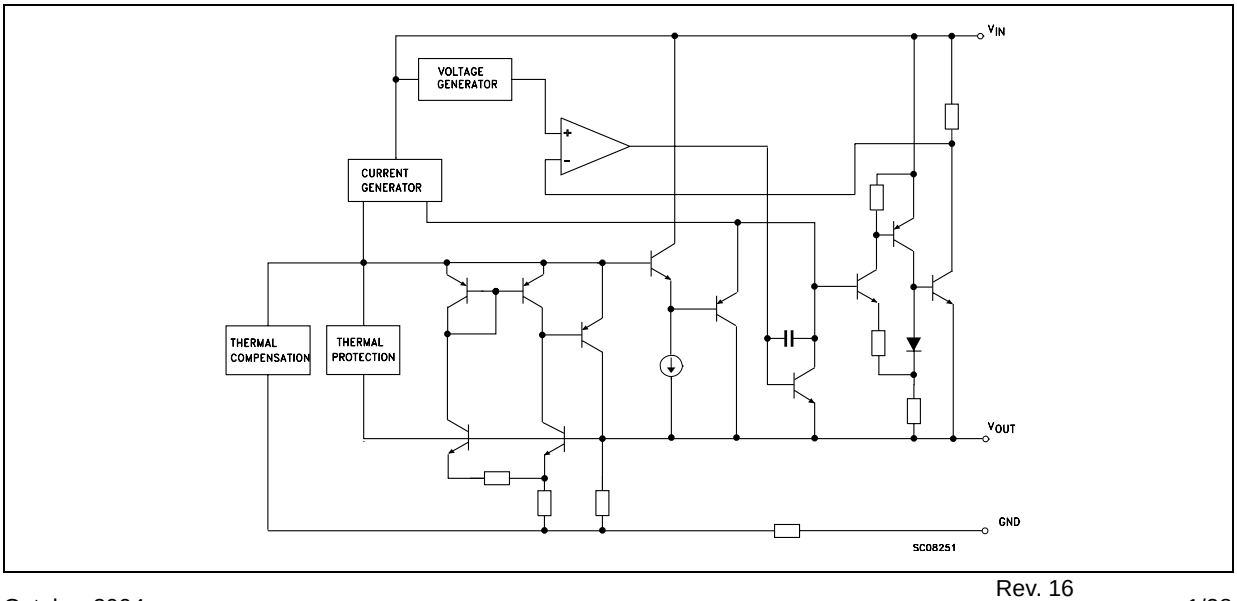
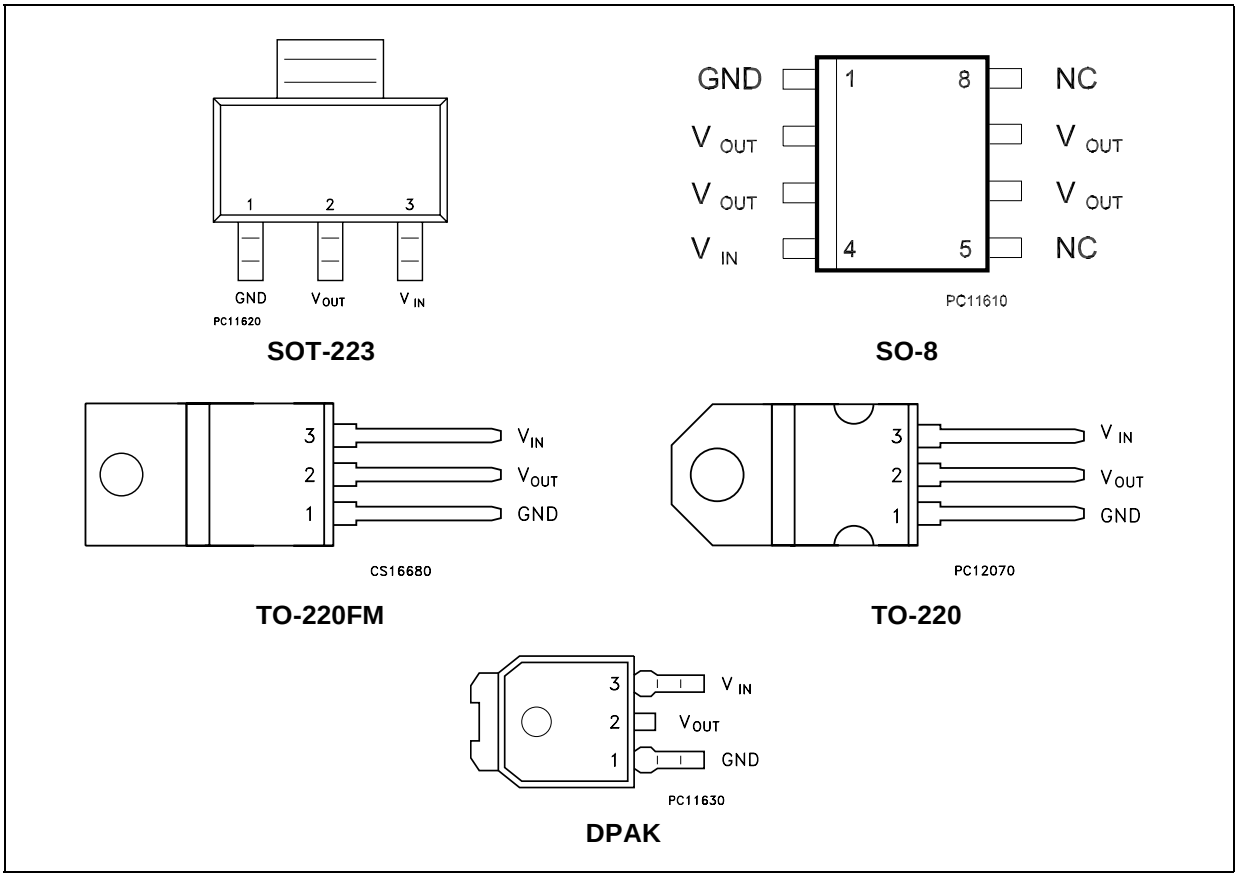


Figure 2: Pin Connection (top view)



NOTE: The TAB is connected to the V_{OUT}.

Table 1: Order Codes

SOT-223	SO-8	DPAK	TO-220	TO-220FM	OUTPUT VOLTAGE
LD1117S12	LD1117D12 (*)	LD1117DT12	LD1117V12 (*)	LD1117F12 (*)	1.2 V
LD1117S12C (*)	LD1117D12C (*)	LD1117DT12C	LD1117V12C (*)	LD1117F12C (*)	1.2 V
LD1117S18	LD1117D18	LD1117DT18	LD1117V18	LD1117F18	1.8 V
LD1117S18C	LD1117D18C	LD1117DT18C	LD1117V18C	LD1117F18C	1.8 V
LD1117S25	LD1117D25	LD1117DT25	LD1117V25	LD1117F25	2.5 V
LD1117S25C	LD1117D25C	LD1117DT25C	LD1117V25C	LD1117F25C	2.5 V
LD1117S28	LD1117D28	LD1117DT28	LD1117V28	LD1117F28	2.85 V
LD1117S30	LD1117D30	LD1117DT30	LD1117V30	LD1117F30	3 V
LD1117S30C	LD1117D30C	LD1117DT30C	LD1117V30C	LD1117F30C	3 V
LD1117S33	LD1117D33	LD1117DT33	LD1117V33	LD1117F33	3.3 V
LD1117S33C	LD1117D33C	LD1117DT33C	LD1117V33C	LD1117F33C	3.3 V
LD1117S50	LD1117D50	LD1117DT50	LD1117V50	LD1117F50	5 V
LD1117S50C	LD1117D50C	LD1117DT50C	LD1117V50C	LD1117F50C	5 V
LD1117S	LD1117D	LD1117DT	LD1117V	LD1117F	ADJ FROM 1.25 TO 15V
LD1117SC	LD1117DC	LD1117DTC	LD1117VC	LD1117FC	ADJ FROM 1.25 TO 15V

(*) Available on request

Table 2: Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V_{IN}	DC Input Voltage		15	V
P_{tot}	Power Dissipation		12	W
T_{stg}	Storage Temperature Range		-40 to +150	°C
T_{op}	Operating Junction Temperature Range	for C Version	-40 to +125	°C
		for standard Version	0 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. Over the above suggested Max Power Dissipation a Short Circuit could definitively damage the device.

Table 3: Thermal Data

Symbol	Parameter	SOT-223	SO-8	DPAK	TO-220	TO-220FM	Unit
$R_{thj\text{-}case}$	Thermal Resistance Junction-case	15	20	8	3	4	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient				50	60	°C/W

Figure 3: Application Circuit (FOR 1.2 V)

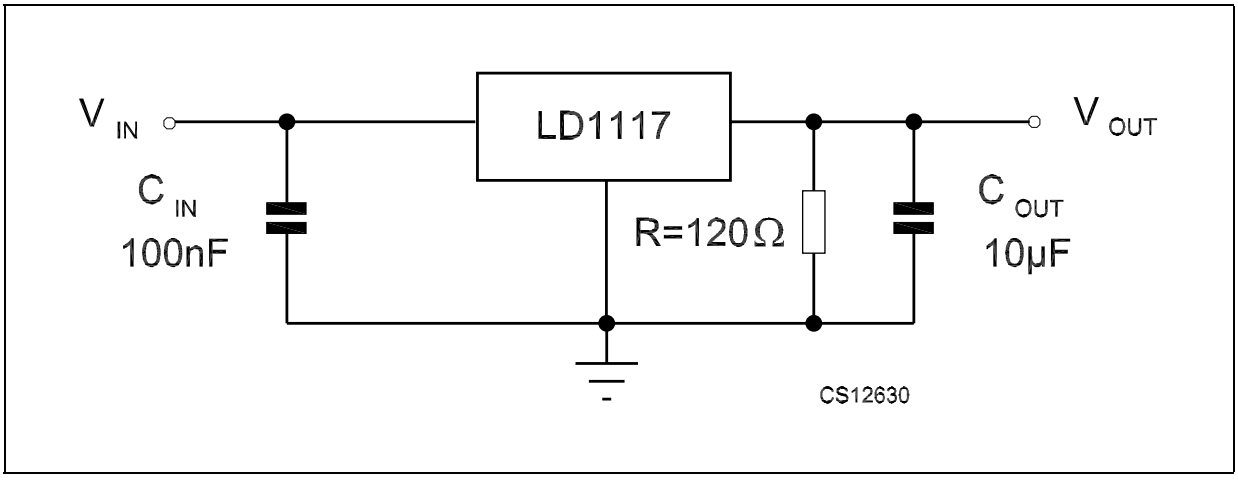


Figure 4: Application Circuit (FOR OTHER FIXED OUTPUT VOLTAGES)

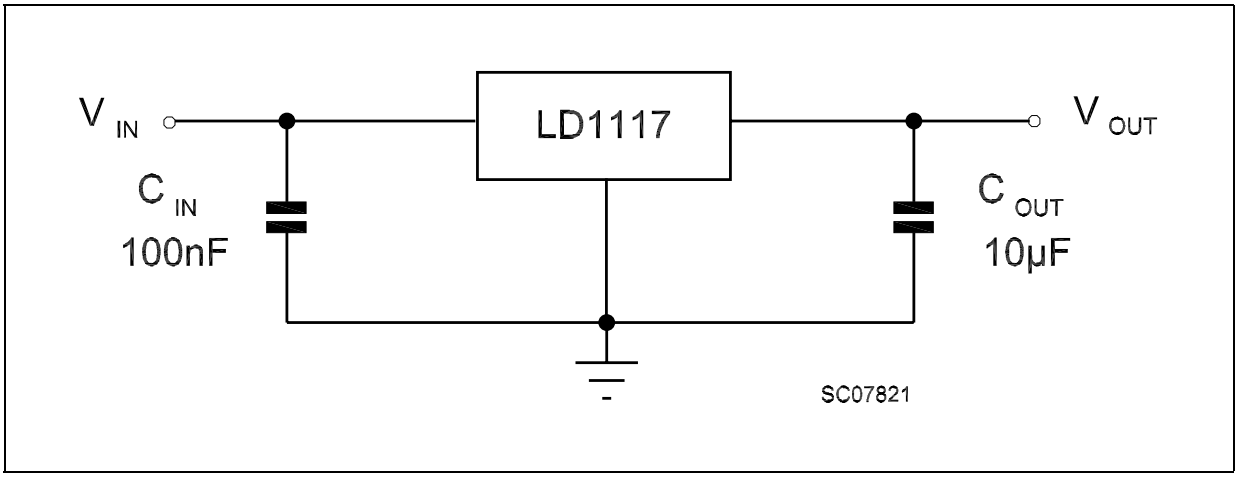


Table 4: Electrical Characteristics Of LD1117#12 (refer to the test circuits, T_J = 0 to 125°C, C_O = 10 µF, R = 120 Ω between GND and OUT pins, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_{in} = 3.2 V I_O = 10 mA T_J = 25°C	1.188	1.20	1.212	V
V_O	Reference Voltage	I_O = 10 to 800 mA V_{in} - V_O= 1.4 to 10 V	1.140	1.20	1.260	V
ΔV_O	Line Regulation	V_{in} - V_O = 1.5 to 13.75 V I_O = 10 mA		0.035	0.2	%
ΔV_O	Load Regulation	V_{in} - V_O = 3 V I_O = 10 to 800 mA		0.1	0.4	%
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage				15	V
I_{adj}	Adjustment Pin Current	$V_{in} \leq$ 15 V		60	120	µA
ΔI_{adj}	Adjustment Pin Current Change	V_{in} - V_O = 1.4 to 10 V I_O = 10 to 800 mA		1	5	µA
$I_{O(min)}$	Minimum Load Current	V_{in} = 15 V		2	5	mA
I_O	Output Current	V_{in} - V_O = 5 V T_J = 25°C	800	950	1300	mA
eN	Output Noise (%V_O)	B =10Hz to 10KHz T_J = 25°C		0.003		%
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} - V_O = 3 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 5: Electrical Characteristics Of LD1117#18 (refer to the test circuits, T_J = 0 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_{in} = 3.8 V I_O = 10 mA T_J = 25°C	1.78	1.8	1.82	V
V_O	Output Voltage	I_O = 0 to 800 mA V_{in} = 3.3 to 8 V	1.76		1.84	V
ΔV_O	Line Regulation	V_{in} = 3.3 to 8 V I_O = 0 mA		1	6	mV
ΔV_O	Load Regulation	V_{in} = 3.3 V I_O = 0 to 800 mA		1	10	mV
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage	I_O = 100 mA			10	V
I_d	Quiescent Current	$V_{in} \leq$ 8 V		5	10	mA
I_O	Output Current	V_{in} = 6.8 V T_J = 25°C	800	950	1300	mA
eN	Output Noise Voltage	B =10Hz to 10KHz T_J = 25°C		100		µV
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} = 5.5 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 6: Electrical Characteristics Of LD1117#25 (refer to the test circuits, T_J = 0 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_{in} = 4.5 V I_O = 10 mA T_J = 25°C	2.475	2.5	2.525	V
V_O	Output Voltage	I_O = 0 to 800 mA V_{in} = 3.9 to 10 V	2.45		2.55	V
ΔV_O	Line Regulation	V_{in} = 3.9 to 10 V I_O = 0 mA		1	6	mV
ΔV_O	Load Regulation	V_{in} = 3.9 V I_O = 0 to 800 mA		1	10	mV
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage	I_O = 100 mA			15	V
I_d	Quiescent Current	$V_{in} \leq$ 10 V		5	10	mA
I_O	Output Current	V_{in} = 7.5 V T_J = 25°C	800	950	1300	mA
eN	Output Noise Voltage	B =10Hz to 10KHz T_J = 25°C		100		µV
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} = 5.5 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 7: Electrical Characteristics Of LD1117#28 (refer to the test circuits, T_J = 0 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_{in} = 4.85 VI_O = 10 mA T_J = 25°C	2.82	2.85	2.88	V
V_O	Output Voltage	I_O = 0 to 800 mA V_{in} = 4.25 to 10 V	2.79		2.91	V
ΔV_O	Line Regulation	V_{in} = 4.25 to 10 V I_O = 0 mA		1	6	mV
ΔV_O	Load Regulation	V_{in} = 4.25 V I_O = 0 to 800 mA		1	10	mV
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage	I_O = 100 mA			15	V
I_d	Quiescent Current	$V_{in} \leq$ 10 V		5	10	mA
I_O	Output Current	V_{in} = 7.85 VT_J = 25°C	800	950	1300	mA
eN	Output Noise Voltage	B =10Hz to 10KHz T_J = 25°C		100		µV
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} = 5.85 VV_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 8: Electrical Characteristics Of LD1117#30 (refer to the test circuits, T_J = 0 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_{in} = 5 V I_O = 10 mA T_J = 25°C	2.97	3	3.03	V
V_O	Output Voltage	I_O = 0 to 800 mA V_{in} = 4.5 to 10 V	2.94		3.06	V
ΔV_O	Line Regulation	V_{in} = 4.5 to 12 V I_O = 0 mA		1	6	mV
ΔV_O	Load Regulation	V_{in} = 4.5 V I_O = 0 to 800 mA		1	10	mV
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage	I_O = 100 mA			15	V
I_d	Quiescent Current	$V_{in} \leq$ 12 V		5	10	mA
I_O	Output Current	V_{in} = 8 V T_J = 25°C	800	950	1300	mA
eN	Output Noise Voltage	B =10Hz to 10KHz T_J = 25°C		100		µV
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} = 6 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 9: Electrical Characteristics Of LD1117#33 (refer to the test circuits, T_J = 0 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_{in} = 5.3 V I_O = 10 mA T_J = 25°C	3.267	3.3	3.333	V
V_O	Output Voltage	I_O = 0 to 800 mA V_{in} = 4.75 to 10 V	3.235		3.365	V
ΔV_O	Line Regulation	V_{in} = 4.75 to 15 V I_O = 0 mA		1	6	mV
ΔV_O	Load Regulation	V_{in} = 4.75 V I_O = 0 to 800 mA		1	10	mV
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage	I_O = 100 mA			15	V
I_d	Quiescent Current	$V_{in} \leq$ 15 V		5	10	mA
I_O	Output Current	V_{in} = 8.3 V T_J = 25°C	800	950	1300	mA
eN	Output Noise Voltage	B =10Hz to 10KHz T_J = 25°C		100		µV
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} = 6.3 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 10: Electrical Characteristics Of LD1117#50 (refer to the test circuits, T_J = 0 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_{in} = 7 V I_O = 10 mA T_J = 25°C	4.95	5	5.05	V
V_O	Output Voltage	I_O = 0 to 800 mA V_{in} = 6.5 to 15 V	4.9		5.1	V
ΔV_O	Line Regulation	V_{in} = 6.5 to 15 V I_O = 0 mA		1	10	mV
ΔV_O	Load Regulation	V_{in} = 6.5 V I_O = 0 to 800 mA		1	15	mV
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage	I_O = 100 mA			15	V
I_d	Quiescent Current	$V_{in} \leq$ 15 V		5	10	mA
I_O	Output Current	V_{in} = 10 V T_J = 25°C	800	950	1300	mA
eN	Output Noise Voltage	B =10Hz to 10KHz T_J = 25°C		100		µV
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} = 8 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 11: Electrical Characteristics Of LD1117 (ADJUSTABLE) (refer to the test circuits, T_J = 0 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{ref}	Reference Voltage	V_{in} - V_O = 2 V I_O = 10 mA T_J = 25°C	1.238	1.25	1.262	V
V_{ref}	Reference Voltage	I_O = 10 to 800 mA V_{in} - V_O= 1.4 to 10 V	1.225		1.275	V
ΔV_O	Line Regulation	V_{in} - V_O = 1.5 to 13.75 V I_O = 10 mA		0.035	0.2	%
ΔV_O	Load Regulation	V_{in} - V_O = 3 V I_O = 10 to 800 mA		0.1	0.4	%
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage				15	V
I_{adj}	Adjustment Pin Current	$V_{in} \leq$ 15 V		60	120	µA
ΔI_{adj}	Adjustment Pin Current Change	V_{in} - V_O = 1.4 to 10 V I_O = 10 to 800 mA		1	5	µA
$I_{O(min)}$	Minimum Load Current	V_{in} = 15 V		2	5	mA
I_O	Output Current	V_{in} - V_O = 5 V T_J = 25°C	800	950	1300	mA
eN	Output Noise (%V_O)	B =10Hz to 10KHz T_J = 25°C		0.003		%
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} - V_O = 3 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 12: Electrical Characteristics Of LD1117#12C (refer to the test circuits, T_J = 0 to 125°C, C_O = 10 µF, R = 120 Ω between GND and OUT pins, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{ref}	Reference Voltage	V_{in} - V_O= 2V I_O = 10 mA T_J = 25°C	1.176	1.20	1.224	V
V_{ref}	Reference Voltage	I_O = 10 to 800 mA V_{in} - V_O= 1.4 to 10 V	1.120	1.20	1.280	V
ΔV_O	Line Regulation	V_{in} - V_O = 1.5 to 13.75 V I_O = 10 mA			1	%
ΔV_O	Load Regulation	V_{in} - V_O = 3 V I_O = 10 to 800 mA			1	%
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage				15	V
I_{adj}	Adjustment Pin Current	$V_{in} \leq$ 15 V		60	120	µA
ΔI_{adj}	Adjustment Pin Current Change	V_{in} - V_O = 1.4 to 10 V I_O = 10 to 800 mA		1	5	µA
$I_{O(min)}$	Minimum Load Current	V_{in} = 15 V		2	5	mA
I_O	Output Current	V_{in} - V_O = 5 V T_J = 25°C	800	950	1300	mA
eN	Output Noise (%V_O)	B =10Hz to 10KHz T_J = 25°C		0.003		%
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} - V_O = 3 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA T_J = 0 to 125°C		1	1.1	V
		I_O = 500 mA T_J = 0 to 125°C		1.05	1.2	
		I_O = 800 mA T_J = 0 to 125°C		1.10	1.3	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 13: Electrical Characteristics Of LD1117#18C (refer to the test circuits, T_J = -40 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_{in} = 3.8 V I_O = 10 mA T_J = 25°C	1.76	1.8	1.84	V
V_O	Output Voltage	I_O = 0 to 800 mA V_{in} = 3.9 to 10 V	1.73		1.87	V
ΔV_O	Line Regulation	V_{in} = 3.3 to 8 V I_O = 0 mA		1	30	mV
ΔV_O	Load Regulation	V_{in} = 3.3 V I_O = 0 to 800 mA		1	30	mV
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage	I_O = 100 mA			10	V
I_d	Quiescent Current	$V_{in} \leq$ 8 V		5	10	mA
I_O	Output Current	V_{in} = 6.8 V T_J = 25°C	800	950	1300	mA
eN	Output Noise Voltage	B =10Hz to 10KHz T_J = 25°C		100		µV
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} = 5.5 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA T_J = 0 to 125°C		1	1.1	V
		I_O = 500 mA T_J = 0 to 125°C		1.05	1.15	
		I_O = 800 mA T_J = 0 to 125°C		1.10	1.2	
V_d	Dropout Voltage	I_O = 100 mA			1.1	V
		I_O = 500 mA			1.2	
		I_O = 800 mA			1.3	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 14: Electrical Characteristics Of LD1117#25C (refer to the test circuits, T_J = -40 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_{in} = 4.5 V I_O = 10 mA T_J = 25°C	2.45	2.5	2.55	V
V_O	Output Voltage	I_O = 0 to 800 mA V_{in} = 3.9 to 10 V	2.4		2.6	V
ΔV_O	Line Regulation	V_{in} = 3.9 to 10 V I_O = 0 mA		1	30	mV
ΔV_O	Load Regulation	V_{in} = 3.9 V I_O = 0 to 800 mA		1	30	mV
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage	I_O = 100 mA			15	V
I_d	Quiescent Current	$V_{in} \leq$ 10 V		5	10	mA
I_O	Output Current	V_{in} = 7.5 V T_J = 25°C	800	950	1300	mA
eN	Output Noise Voltage	B =10Hz to 10KHz T_J = 25°C		100		µV
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} = 5.5 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA T_J = 0 to 125°C		1	1.1	V
		I_O = 500 mA T_J = 0 to 125°C		1.05	1.15	
		I_O = 800 mA T_J = 0 to 125°C		1.10	1.2	
V_d	Dropout Voltage	I_O = 100 mA			1.1	V
		I_O = 500 mA			1.2	
		I_O = 800 mA			1.3	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 15: Electrical Characteristics Of LD1117#30C (refer to the test circuits, T_J = -40 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_{in} = 5 V I_O = 10 mA T_J = 25°C	2.94	3	3.06	V
V_O	Output Voltage	I_O = 0 to 800 mA V_{in} = 4.5 to 10 V	2.88		3.12	V
ΔV_O	Line Regulation	V_{in} = 4.5 to 12 V I_O = 0 mA		1	30	mV
ΔV_O	Load Regulation	V_{in} = 4.5 V I_O = 0 to 800 mA		1	30	mV
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage	I_O = 100 mA			15	V
I_d	Quiescent Current	$V_{in} \leq$ 12 V		5	10	mA
I_O	Output Current	V_{in} = 8 V T_J = 25°C	800	950	1300	mA
eN	Output Noise Voltage	B =10Hz to 10KHz T_J = 25°C		100		µV
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} = 6 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA T_J = 0 to 125°C		1	1.1	V
		I_O = 500 mA T_J = 0 to 125°C		1.05	1.15	
		I_O = 800 mA T_J = 0 to 125°C		1.10	1.2	
V_d	Dropout Voltage	I_O = 100 mA			1.1	V
		I_O = 500 mA			1.2	
		I_O = 800 mA			1.3	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 16: Electrical Characteristics Of LD1117#33C (refer to the test circuits, T_J = -40 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_{in} = 5.3 V I_O = 10 mA T_J = 25°C	3.24	3.3	3.36	V
V_O	Output Voltage	I_O = 0 to 800 mA V_{in} = 4.75 to 10 V	3.16		3.44	V
ΔV_O	Line Regulation	V_{in} = 4.75 to 15 V I_O = 0 mA		1	30	mV
ΔV_O	Load Regulation	V_{in} = 4.75 V I_O = 0 to 800 mA		1	30	mV
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage	I_O = 100 mA			15	V
I_d	Quiescent Current	$V_{in} \leq$ 15 V		5	10	mA
I_O	Output Current	V_{in} = 8.3 V T_J = 25°C	800	950	1300	mA
eN	Output Noise Voltage	B =10Hz to 10KHz T_J = 25°C		100		µV
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} = 6.3 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA T_J = 0 to 125°C		1	1.1	V
		I_O = 500 mA T_J = 0 to 125°C		1.05	1.15	
		I_O = 800 mA T_J = 0 to 125°C		1.10	1.2	
V_d	Dropout Voltage	I_O = 100 mA			1.1	V
		I_O = 500 mA			1.2	
		I_O = 800 mA			1.3	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 17: Electrical Characteristics Of LD1117#50C (refer to the test circuits, T_J = -40 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	V_{in} = 7 V I_O = 10 mA T_J = 25°C	4.9	5	5.1	V
V_O	Output Voltage	I_O = 0 to 800 mA V_{in} = 6.5 to 15 V	4.8		5.2	V
ΔV_O	Line Regulation	V_{in} = 6.5 to 15 V I_O = 0 mA		1	50	mV
ΔV_O	Load Regulation	V_{in} = 6.5 V I_O = 0 to 800 mA		1	50	mV
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage	I_O = 100 mA			15	V
I_d	Quiescent Current	$V_{in} \leq$ 15 V		5	10	mA
I_O	Output Current	V_{in} = 10 V T_J = 25°C	800	950	1300	mA
eN	Output Noise Voltage	B =10Hz to 10KHz T_J = 25°C		100		µV
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} = 8 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA T_J = 0 to 125°C		1	1.1	V
		I_O = 500 mA T_J = 0 to 125°C		1.05	1.15	
		I_O = 800 mA T_J = 0 to 125°C		1.10	1.2	
V_d	Dropout Voltage	I_O = 100 mA			1.1	V
		I_O = 500 mA			1.2	
		I_O = 800 mA			1.3	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

Table 18: Electrical Characteristics Of LD1117C (ADJUSTABLE) (refer to the test circuits, T_J = -40 to 125°C, C_O = 10 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{ref}	Reference Voltage	V_{in} - V_O = 2 V I_O = 10 mA T_J = 25°C	1.225	1.25	1.275	V
V_{ref}	Reference Voltage	I_O = 10 to 800 mA V_{in} - V_O= 1.4 to 10 V	1.2		1.3	V
ΔV_O	Line Regulation	V_{in} - V_O = 1.5 to 13.75 V I_O = 10 mA			1	%
ΔV_O	Load Regulation	V_{in} - V_O = 3 V I_O = 10 to 800 mA			1	%
ΔV_O	Temperature Stability			0.5		%
ΔV_O	Long Term Stability	1000 hrs, T_J = 125°C		0.3		%
V_{in}	Operating Input Voltage				15	V
I_{adj}	Adjustment Pin Current	$V_{in} \leq$ 15 V		60	120	µA
ΔI_{adj}	Adjustment Pin Current Change	V_{in} - V_O = 1.4 to 10 V I_O = 10 to 800 mA		1	10	µA
$I_{O(min)}$	Minimum Load Current	V_{in} = 15 V		2	5	mA
I_O	Output Current	V_{in} - V_O = 5 V T_J = 25°C	800	950	1300	mA
eN	Output Noise (%V_O)	B =10Hz to 10KHz T_J = 25°C		0.003		%
SVR	Supply Voltage Rejection	I_O = 40 mA f = 120Hz T_J = 25°C V_{in} - V_O = 3 V V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout Voltage	I_O = 100 mA T_J = 0 to 125°C		1	1.1	V
		I_O = 500 mA T_J = 0 to 125°C		1.05	1.15	
		I_O = 800 mA T_J = 0 to 125°C		1.10	1.2	
V_d	Dropout Voltage	I_O = 100 mA			1.1	V
		I_O = 500 mA			1.2	
		I_O = 800 mA			1.3	
	Thermal Regulation	T_a = 25°C 30ms Pulse		0.01	0.1	%/W

TYPICAL APPLICATIONS

Figure 5: Negative Supply

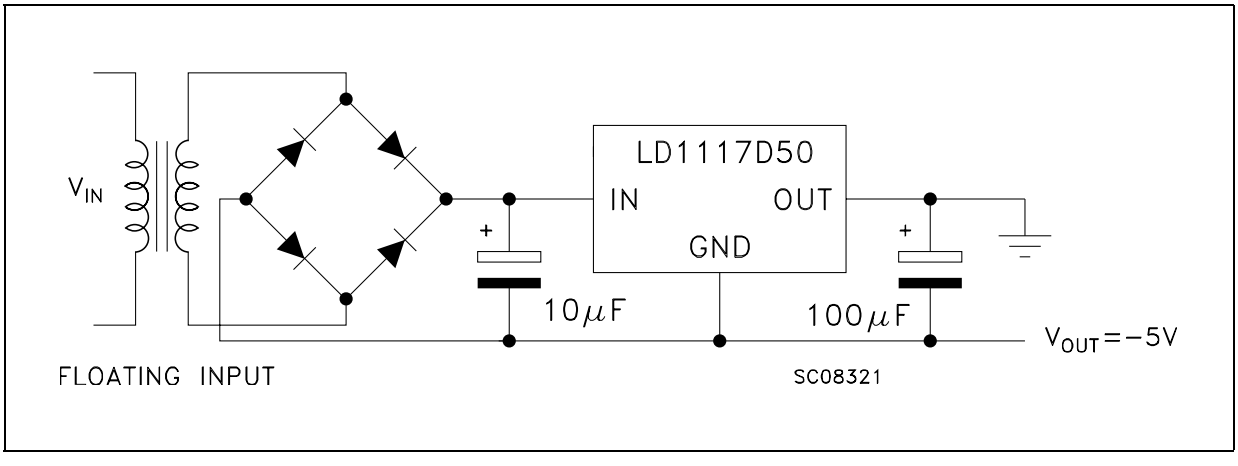


Figure 6: Active Terminator for SCSI-2 BUS

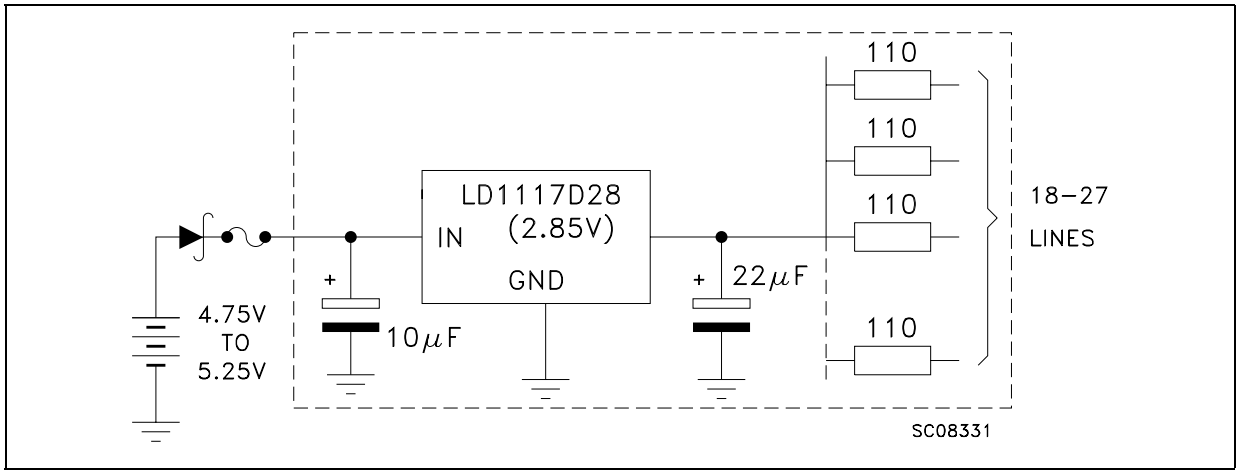


Figure 7: Circuit for Increasing Output Voltage

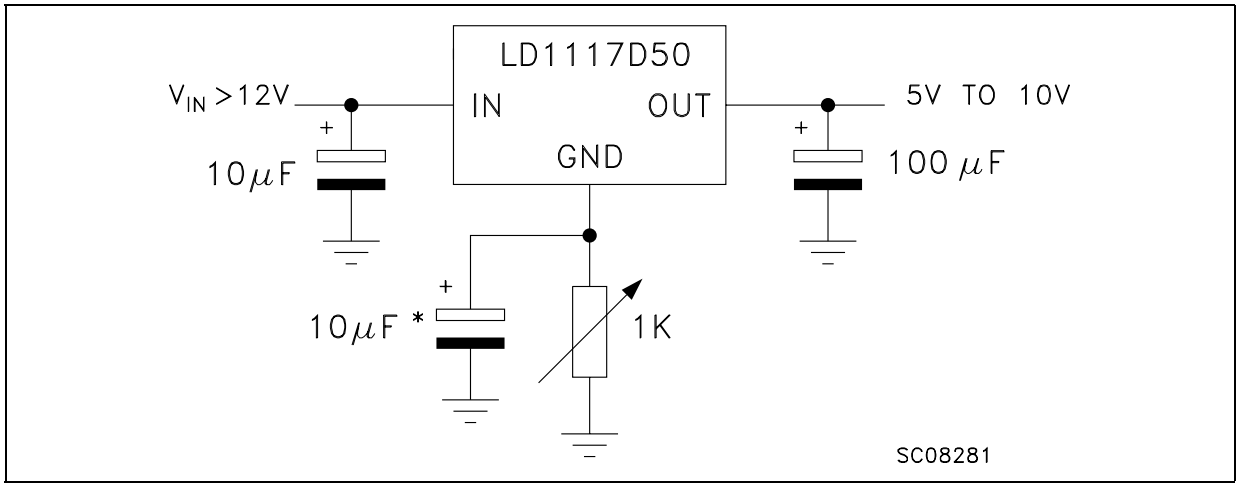


Figure 8: Voltage Regulator With Reference

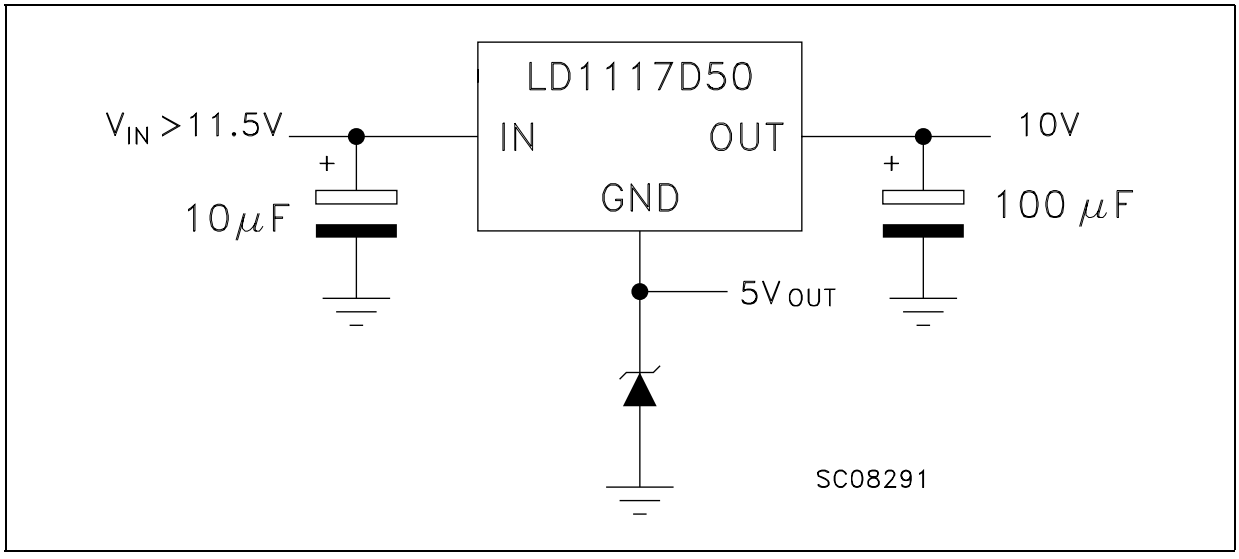


Figure 9: Battery Backed-up Regulated Supply

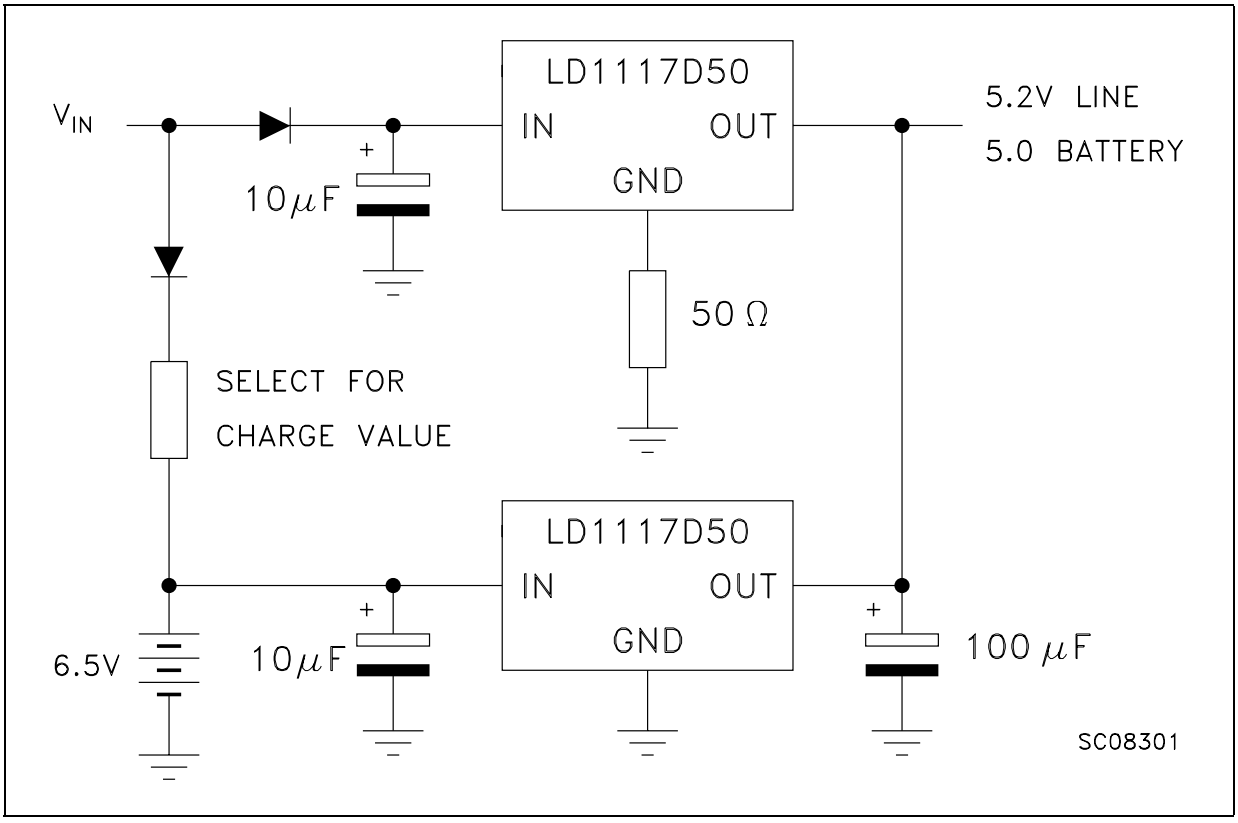
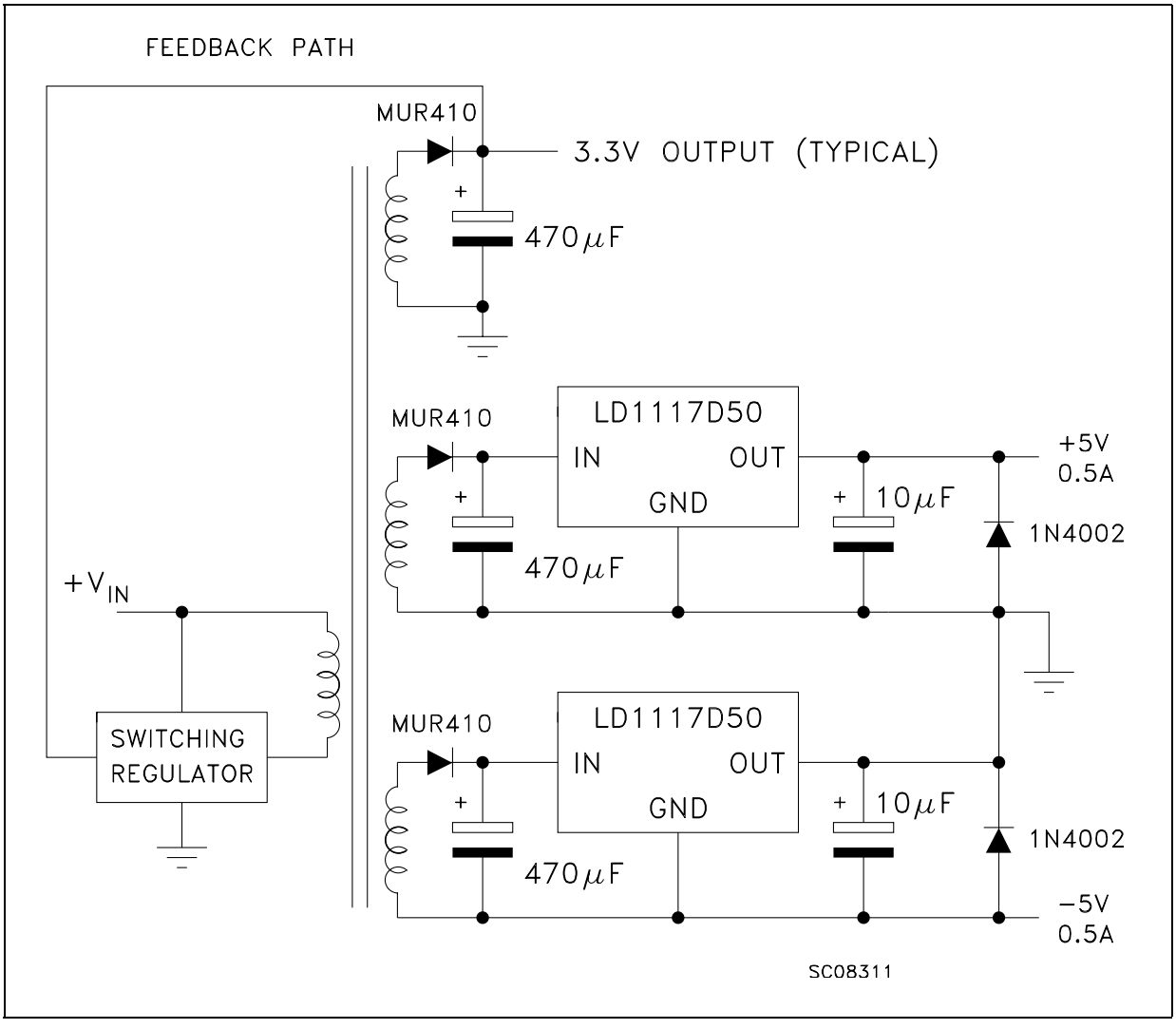


Figure 10: Post-Regulated Dual Supply



LD1117 ADJUSTABLE: APPLICATION NOTE

The LD1117 ADJUSTABLE has a thermal stabilized 1.25±0.012V reference voltage between the OUT and ADJ pins. I_{ADJ} is 60µA typ. (120µA max.) and ΔI_{ADJ} is 1µA typ. (5µA max.).
R1 is normally fixed to 120Ω. From figure 7 we obtain:
$V_{OUT} = V_{REF} + R2 (I_{ADJ} + I_{R1}) = V_{REF} + R2 (I_{ADJ} + V_{REF} / R1) = V_{REF} (1 + R2 / R1) + R2 \times I_{ADJ}$.
In normal application R2 value is in the range of few kohm, so the R2 x I_{DJ} product could not be considered in the V_{OUT} calculation; then the above expression becomes:

$V_{OUT} = V_{REF} (1 + R2 / R1)$.

In order to have the better load regulation it is important to realize a good Kelvin connection of R1 and R2 resistors. In particular R1 connection must be realized very close to OUT and ADJ pin, while R2 ground connection must be placed as near as possible to the negative Load pin. Ripple rejection can be improved by introducing a 10µF electrolytic capacitor placed in parallel to the R2 resistor (see Fig.8).

Figure 11: Adjustable Output Voltage Application

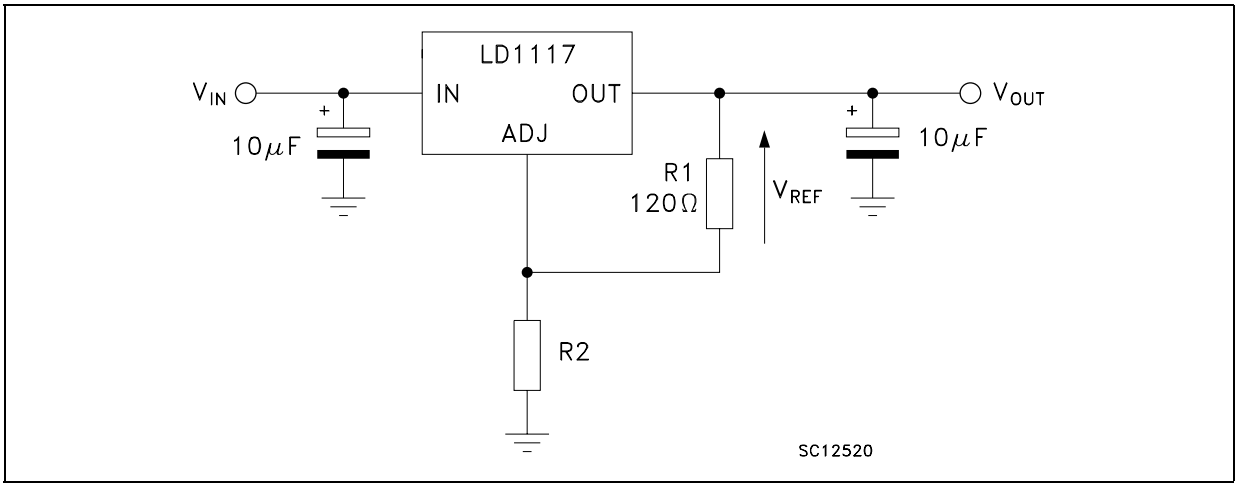
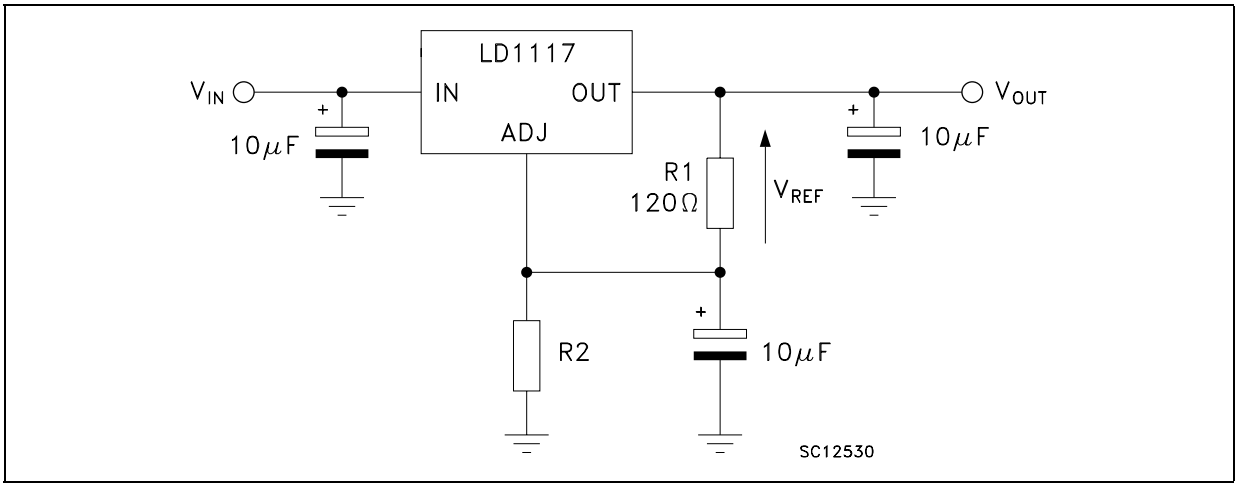
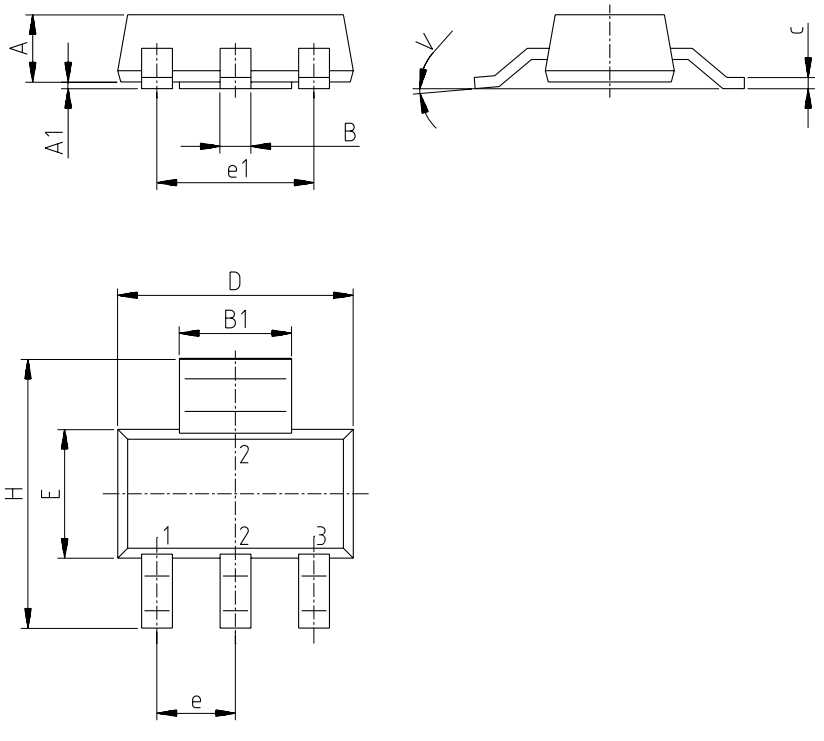


Figure 12: Adjustable Output Voltage Application with improved Ripple Rejection



SOT-223 MECHANICAL DATA

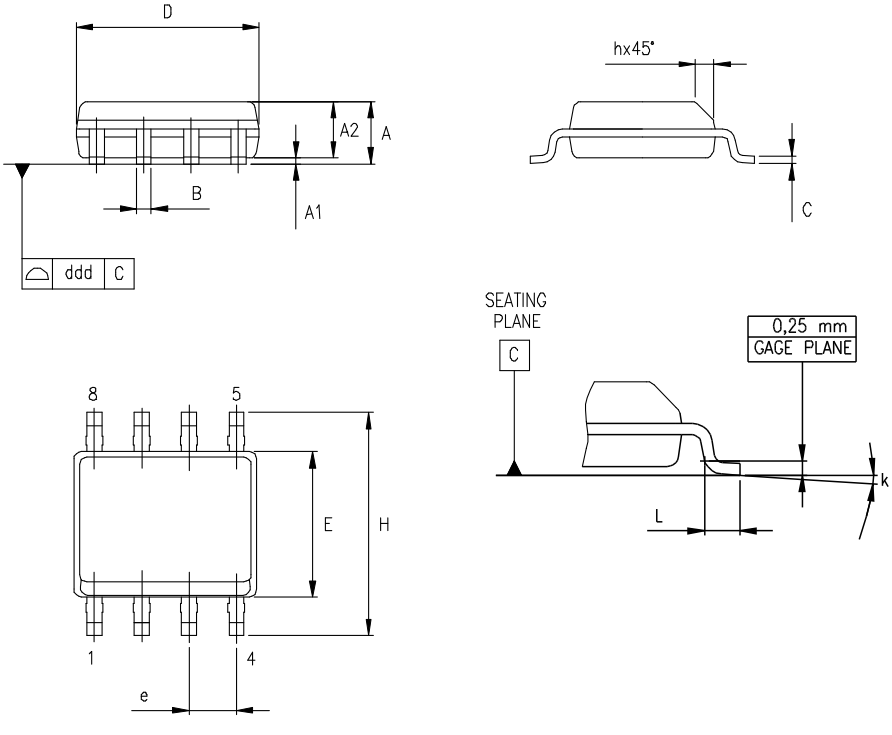
DIM.	mm.			mils		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.8			70.9
A1	0.02		0.1	0.8		3.9
B	0.6	0.7	0.85	23.6	27.6	33.5
B1	2.9	3	3.15	114.2	118.1	124.0
c	0.24	0.26	0.35	9.4	10.2	13.8
D	6.3	6.5	6.7	248.0	255.9	263.8
e		2.3			90.6	
e1		4.6			181.1	
E	3.3	3.5	3.7	129.9	137.8	145.7
H	6.7	7	7.3	129.9	137.8	145.7
V			10°			10°



0046067/H

SO-8 MECHANICAL DATA

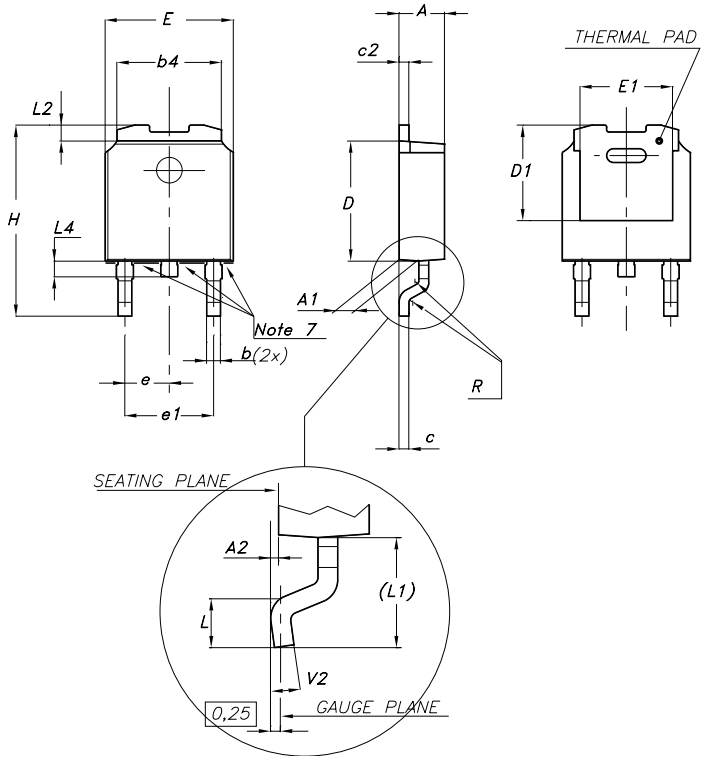
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	1.35		1.75	0.053		0.069
A1	0.10		0.25	0.04		0.010
A2	1.10		1.65	0.043		0.065
B	0.33		0.51	0.013		0.020
C	0.19		0.25	0.007		0.010
D	4.80		5.00	0.189		0.197
E	3.80		4.00	0.150		0.157
e		1.27			0.050	
H	5.80		6.20	0.228		0.244
h	0.25		0.50	0.010		0.020
L	0.40		1.27	0.016		0.050
k	8° (max.)					
ddd			0.1			0.04



0016023/C

DPAK MECHANICAL DATA

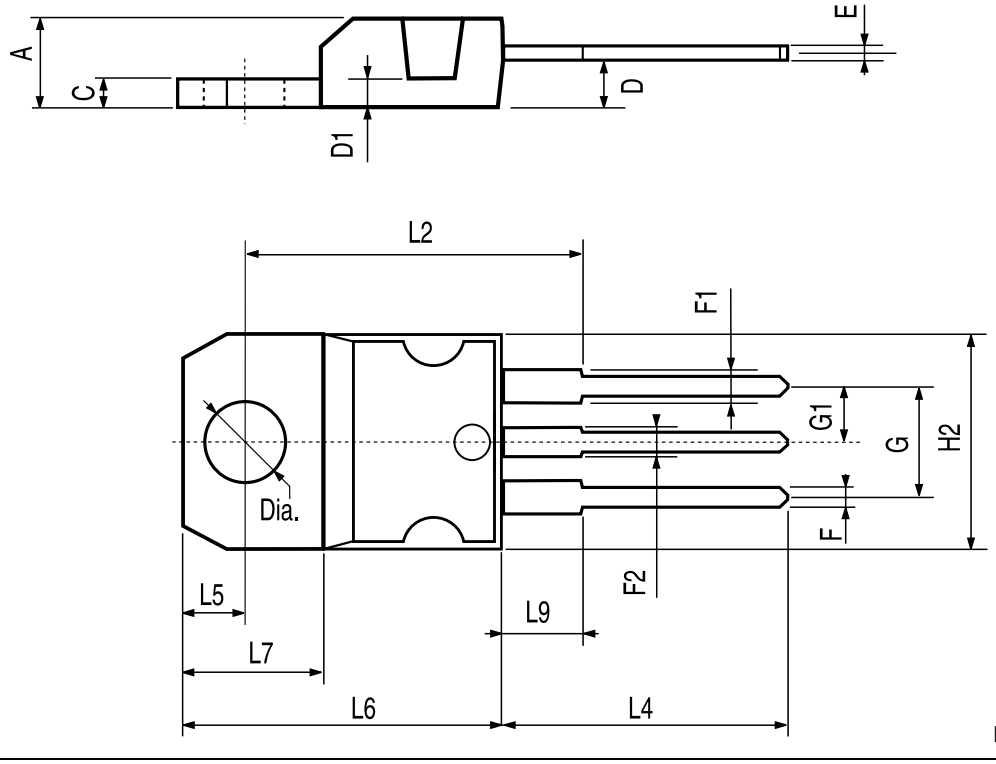
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.9	0.025		0.035
B2	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
D1		5.1			0.200	
E	6.4		6.6	0.252		0.260
E1		4.7			0.185	
e		2.28			0.090	
e1	4.4		4.6	0.173		0.181
H	9.35		10.1	0.368		0.397
L	1			0.039		
(L1)		2.8			0.110	
L2		0.8			0.031	
L4	0.6		1	0.023		0.039



0068772-F

TO-220 MECHANICAL DATA

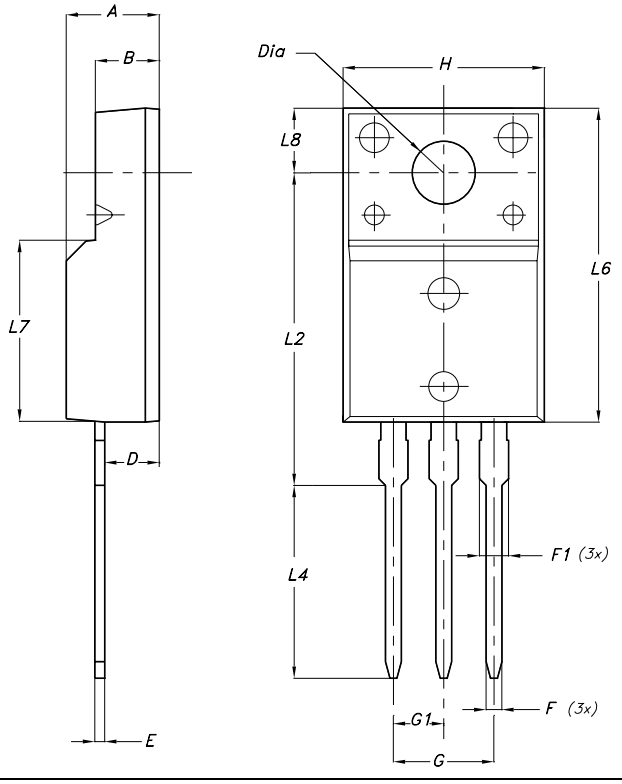
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



P011C

TO-220FM MECHANICAL DATA

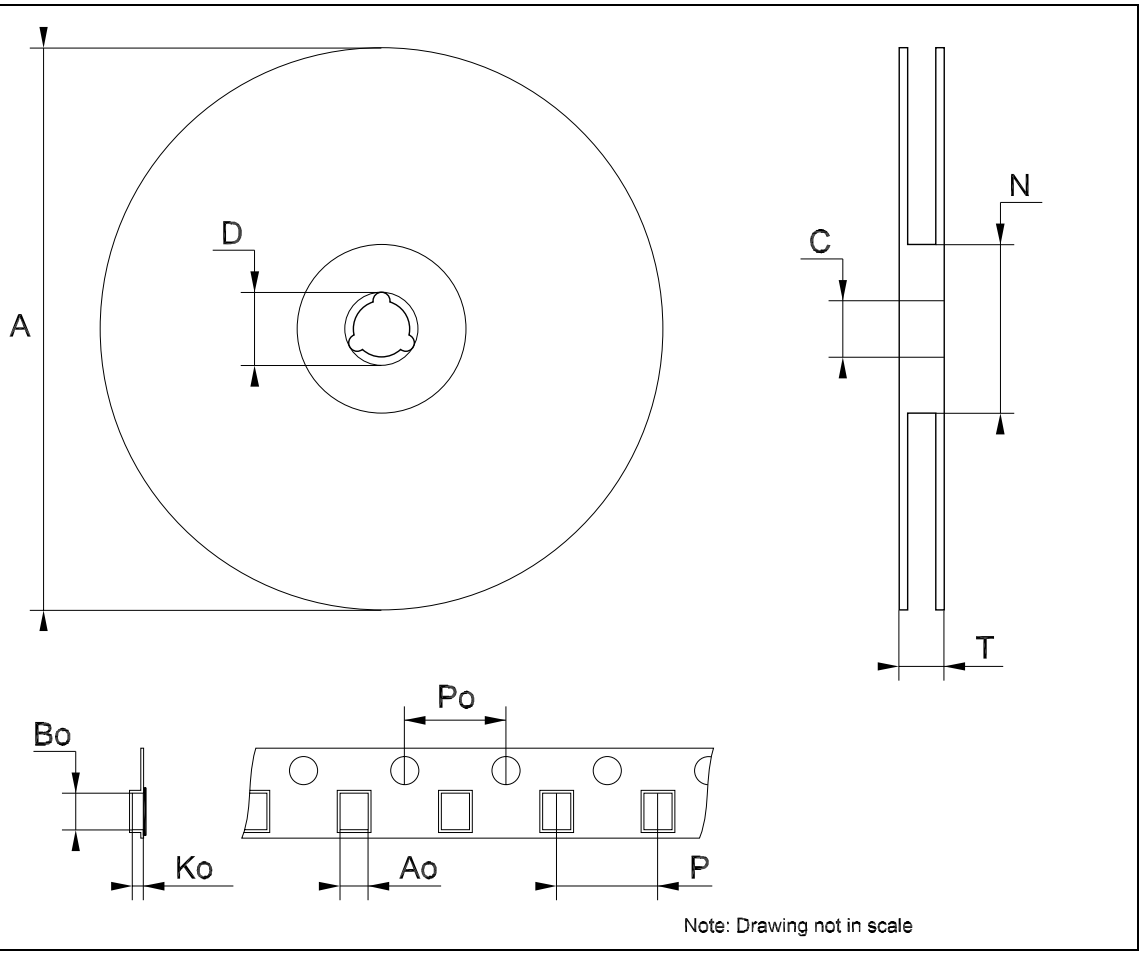
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.50		4.90	0.177		0.193
B	2.34		2.74	0.092		0.108
D	2.56		2.96	0.101		0.117
E	0.45	0.50	0.60	0.018	0.020	0.024
F	0.70		0.90	0.028		0.035
F1			1.47			0.058
G		5.08			0.200	
G1	2.34	2.54	2.74	0.092	0.100	0.108
H	9.96		10.36	0.392		0.408
L2		15.8			0.622	
L4	9.45		10.05	0.372		0.396
L6	15.67		16.07	0.617		0.633
L7	8.99		9.39	0.354		0.370
L8		3.30			0.130	
DIA.	3.08		3.28	0.121		0.129



7012510C-H

Tape & Reel SOT223 MECHANICAL DATA

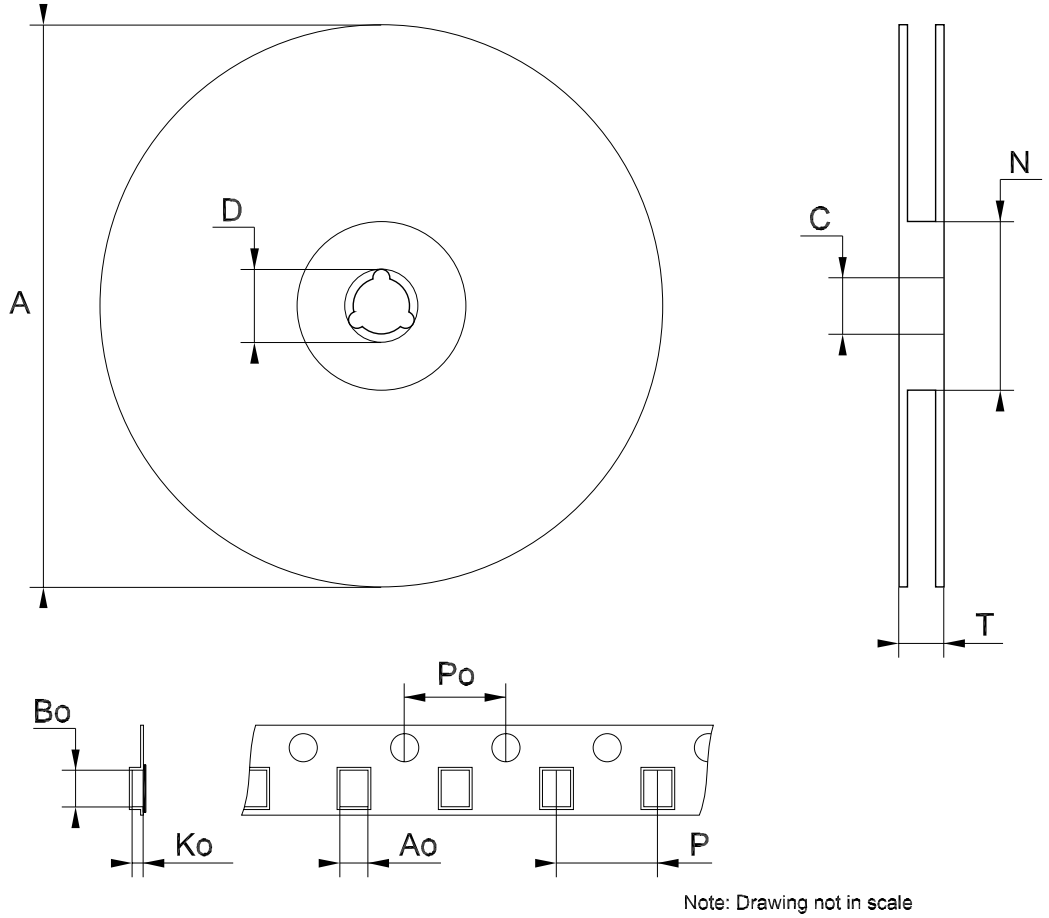
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			330			12.992
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			14.4			0.567
Ao	6.73	6.83	6.93	0.265	0.269	0.273
Bo	7.32	7.42	7.52	0.288	0.292	0.296
Ko	1.78		2	0.070		0.078
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	7.9	8.0	8.1	0.311	0.315	0.319



Note: Drawing not in scale

Tape & Reel SO-8 MECHANICAL DATA

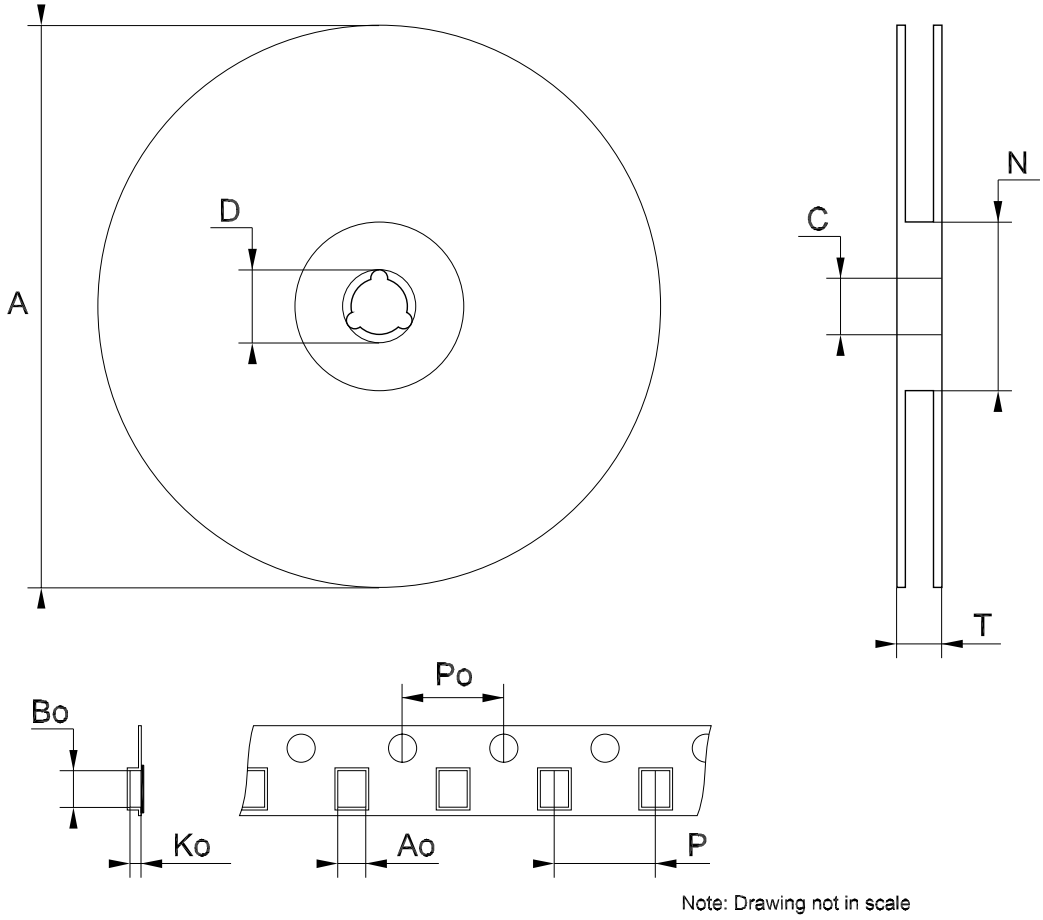
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			330			12.992
C	12.8		13.2	0.504		0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	8.1		8.5	0.319		0.335
Bo	5.5		5.9	0.216		0.232
Ko	2.1		2.3	0.082		0.090
Po	3.9		4.1	0.153		0.161
P	7.9		8.1	0.311		0.319



Note: Drawing not in scale

Tape & Reel DPAK-PPAK MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			330			12.992
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	6.80	6.90	7.00	0.268	0.272	0.2.76
Bo	10.40	10.50	10.60	0.409	0.413	0.417
Ko	2.55	2.65	2.75	0.100	0.104	0.105
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	7.9	8.0	8.1	0.311	0.315	0.319



Note: Drawing not in scale

Table 19: Revision History

Date	Revision	Description of Changes
22-Sep-2004	15.0	Add new Part Number #12C; Typing Error: Note on table 2.
25-Oct-2004	16.0	Add V_{ref} Reference Voltage on Table 12.