

REGULATORK-14

Linear positive and negative voltage regulators

Item		P/N	Output Voltage	Min.	Max.	Max. Current	Package
1	Positive	L7805CV	5V DC	8V DC	35V DC	1.5A	TO-220
2	Positive	L7806CV	6V DC	11V DC	35V DC	1.5A	TO-220
3	Positive	L7808CV	8V DC	14V DC	35V DC	1.5A	TO-220
4	Positive	L7809CV	9V DC	15V DC	35V DC	1.5A	TO-220
5	Positive	L7812CV	12V DC	16V DC	35V DC	1.5A	TO-220
6	Positive	L7815CV	15V DC	19V DC	35V DC	1.5A	TO-220
7	Positive	L7824CV	24V DC	28V DC	35V DC	1.5A	TO-220
8	Negative	L7915CV	-15V DC	-19V DC	-35V DC	1.5A	TO-220
9	Negative	L7912CV	-12V DC	-16V DC	-35V DC	1.5A	TO-220
10	Negative	L7909CV	-9V DC	-15V DC	-35V DC	1.5A	TO-220
11	Negative	L7908CV	-8V DC	-14V DC	-35V DC	1.5A	TO-220
12	Negative	L7906CV	-6V DC	-11V DC	-35V DC	1.5A	TO-220
13	Negative	L7905CV	-5V DC	-8V DC	-35V DC	1.5A	TO-220
14	Positive	LM317T	1.25V DC to 37V DC	4.25V DC	40V DC	1.5A	TO-220



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L7805CV

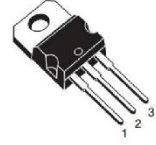
Three-terminal positive voltage regulator

TO-220

FEATURES

- Maximum Output Current I_{OM} : 1.5A
- Output Voltage V_O : 5V
- Continuous total dissipation
 P_D : 1.5W($T_A=25^\circ\text{C}$)
15W($T_C=25^\circ\text{C}$)

1.IN
2.GND
3.OUT



ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

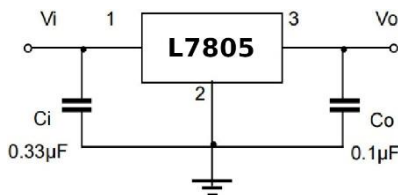
Parameter	Symbol	Value	UNIT
Input Voltage	V_i	35	V
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	83.3	$^\circ\text{C/W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	8.3	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_{OPR}	0 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JUNCTION TEMPERATURE

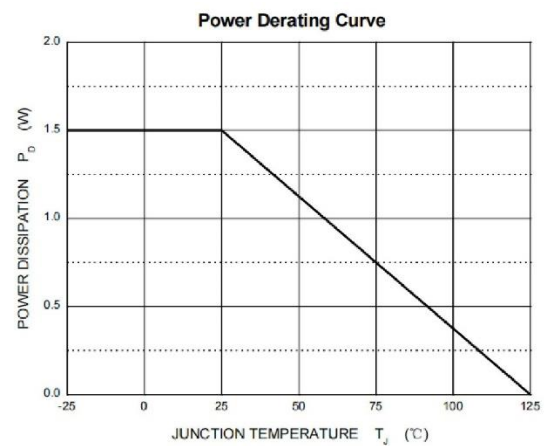
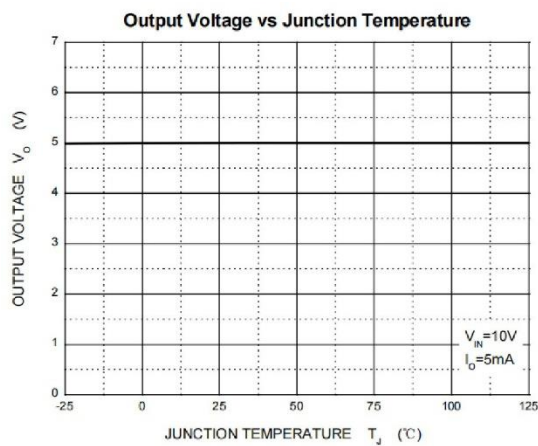
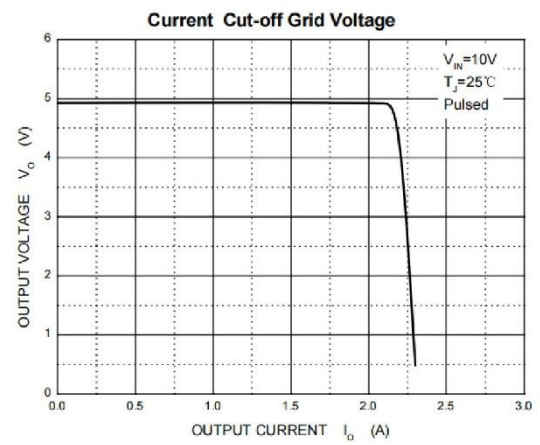
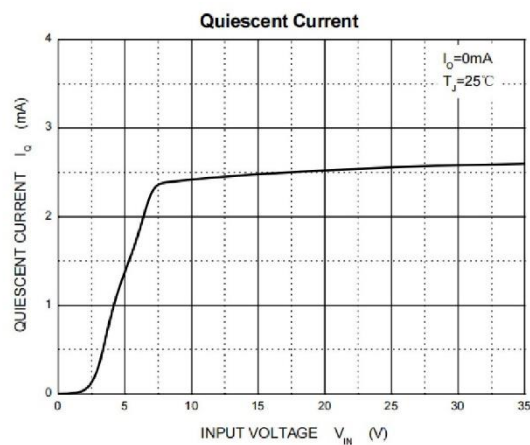
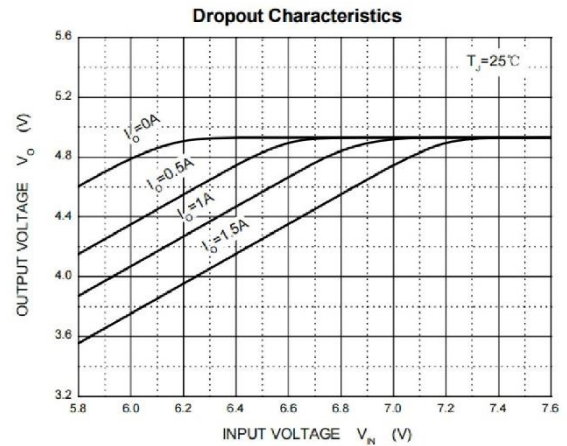
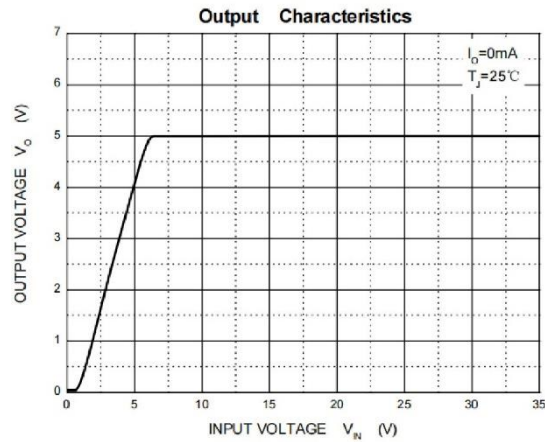
($V_i=10\text{V}$, $I_o=500\text{mA}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Test conditions		MIN	TYP	MAX	UNIT
Output Voltage	V_O		25 $^\circ\text{C}$	4.8	5.0	5.2	V
		$7\text{V} \leq V_i \leq 20\text{V}$, $I_o=5\text{mA}-1\text{A}$, $P \leq 15\text{W}$	0~125 $^\circ\text{C}$	4.75	5.00	5.25	
Load Regulation	ΔV_O	$I_o=5\text{mA}-1.5\text{A}$	25 $^\circ\text{C}$		9	100	mV
		$I_o=250\text{mA}-750\text{mA}$	25 $^\circ\text{C}$		4	50	
Line Regulation	ΔV_O	$7\text{V} \leq V_i \leq 25\text{V}$	25 $^\circ\text{C}$		4	100	mV
		$8\text{V} \leq V_i \leq 12\text{V}$	25 $^\circ\text{C}$		1.6	50	
Quiescent Current	I_Q		25 $^\circ\text{C}$		5	8	mA
Quiescent Current Change	ΔI_Q	$7\text{V} \leq V_i \leq 25\text{V}$	0~125 $^\circ\text{C}$		0.3	1.3	mA
		$5\text{mA} \leq I_o \leq 1\text{A}$	0~125 $^\circ\text{C}$		0.03	0.5	
Output Noise Voltage	V_N	10Hz $\leq F \leq$ 100KHz	25 $^\circ\text{C}$		42		μV
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_o=5\text{mA}$	0~125 $^\circ\text{C}$		-1.1		mV/ $^\circ\text{C}$
Ripple Rejection	RR	$8\text{V} \leq V_i \leq 18\text{V}$, $F=120\text{Hz}$	0~125 $^\circ\text{C}$	62	73		dB
Dropout Voltage	V_D	$I_o=1\text{A}$	25 $^\circ\text{C}$		2		V
Output Resistance	R_O	$F=1\text{KHz}$	25 $^\circ\text{C}$		10		m Ω
Short Circuit Current	I_{SC}		25 $^\circ\text{C}$		230		mA
Peak Current	I_{PK}		25 $^\circ\text{C}$		2.2		A

TYPICAL APPLICATION

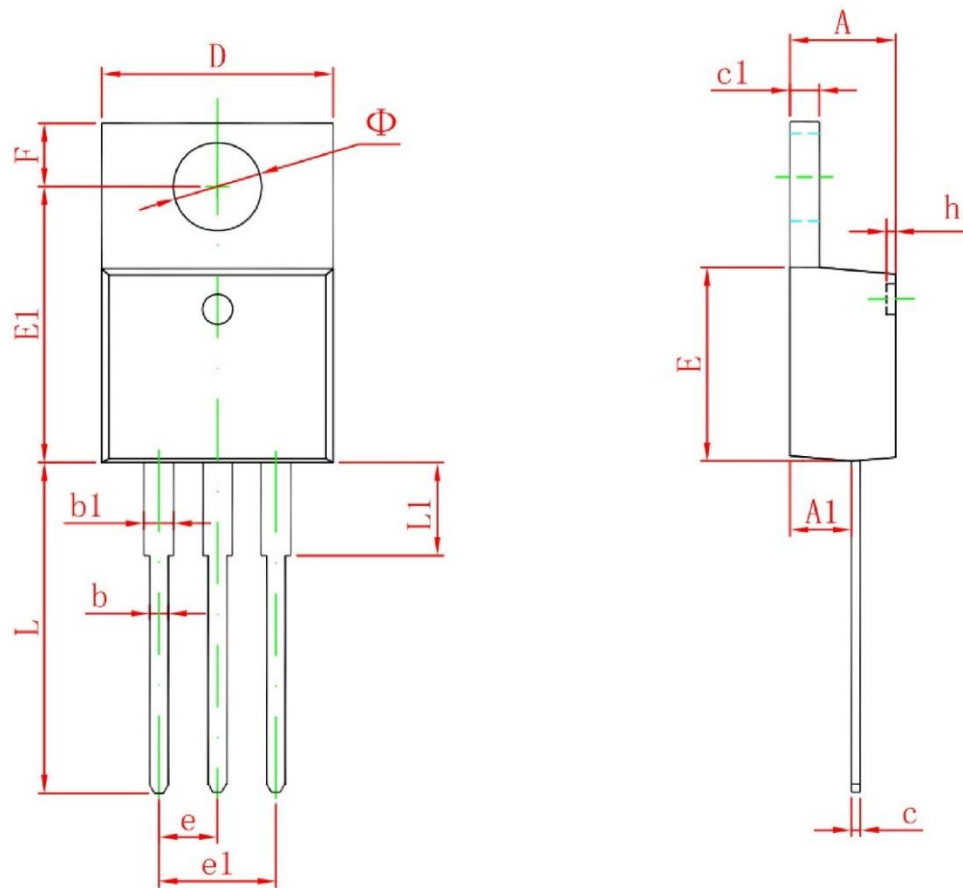


TYPICAL CHARACTERISTICS



All products, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.

TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

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L7806CV

Three-terminal positive voltage regulator

TO-220

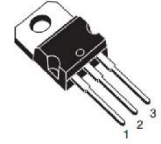
FEATURES

- Maximum Output Current I_{OM} : 1.5A
- Output Voltage V_O : 6V
- Continuous total dissipation
 P_D : 1.5W($T_A=25^\circ\text{C}$)

1.IN

2.GND

3.OUT



ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

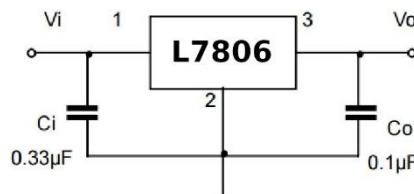
Parameter	Symbol	Value	UNIT
Input Voltage	V_i	35	V
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	66.7	$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	T_{OPR}	-25 ~ +125	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 ~ +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JUNCTION TEMPERATURE

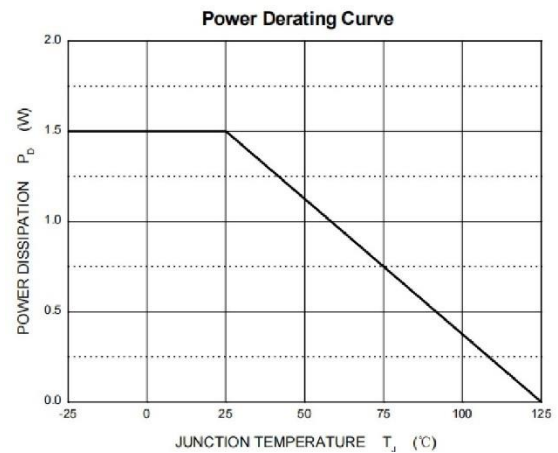
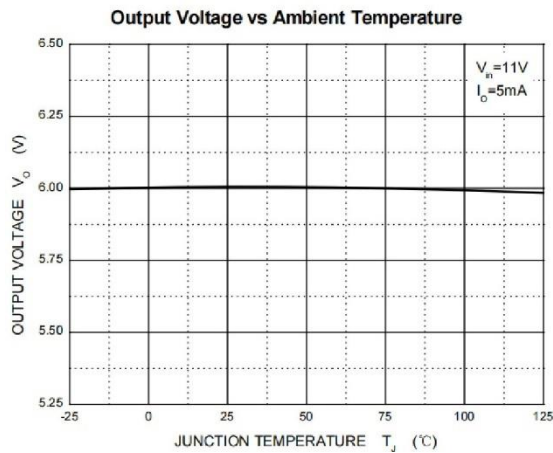
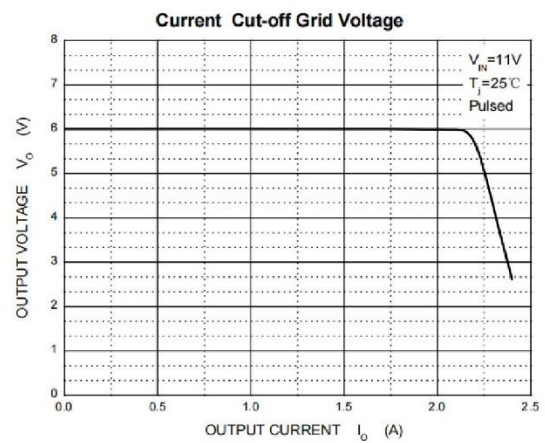
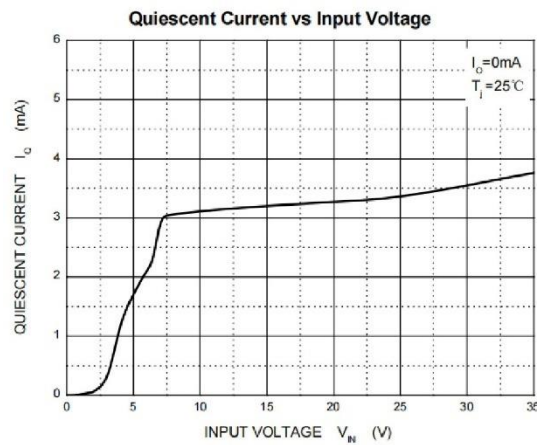
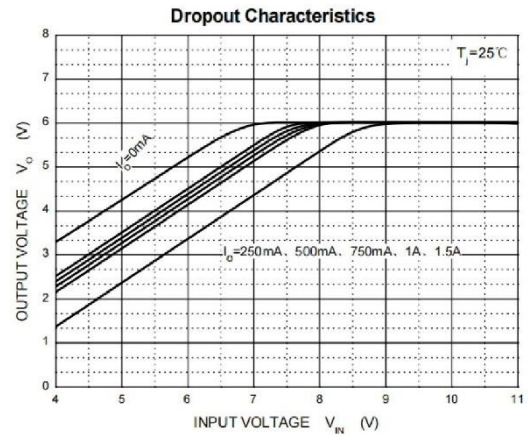
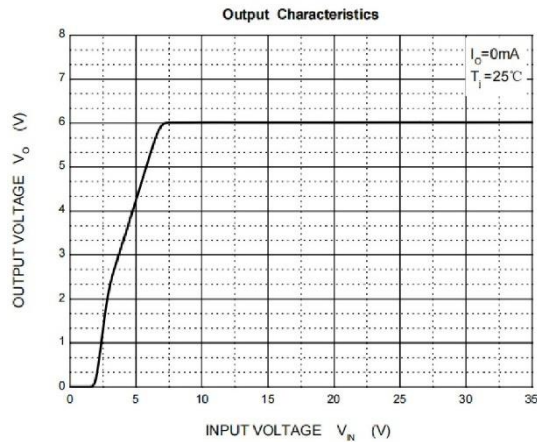
($V_i=11\text{V}$, $I_O=500\text{mA}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	25°C	5.75	6	6.25	V
		$8\text{V} \leq V_i \leq 21\text{V}$, $I_O=5\text{mA}-1\text{A}$	-25~125 $^\circ\text{C}$	5.7	6.3	
Load Regulation	ΔV_O	$I_O=5\text{mA}-1.5\text{A}$	25°C	14	120	mV
		$I_O=250\text{mA}-750\text{mA}$	25°C	4	60	
Line Regulation	ΔV_O	$8\text{V} \leq V_i \leq 25\text{V}$	25°C	5	120	mV
		$9\text{V} \leq V_i \leq 13\text{V}$	25°C	1.5	60	
Quiescent Current	I_Q	25°C		4.3	8	mA
Quiescent Current Change	ΔI_Q	$8\text{V} \leq V_i \leq 25\text{V}$	-25~125 $^\circ\text{C}$		1.3	mA
		$5\text{mA} \leq I_O \leq 1\text{A}$	-25~125 $^\circ\text{C}$		0.5	
Output Noise Voltage	V_N	$10\text{Hz} \leq F \leq 100\text{KHz}$	25°C	45		mV/ V_O
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_O=5\text{mA}$	0~125 $^\circ\text{C}$	-0.8		mV/ $^\circ\text{C}$
Ripple Rejection	RR	$9\text{V} \leq V_i \leq 19\text{V}$, $F=120\text{Hz}$	-25~125 $^\circ\text{C}$	59	75	dB
Dropout Voltage	V_D	$I_O=1\text{A}$	25°C	2		V
Output Resistance	R_O	$F=1\text{KHz}$	25°C	10		m Ω
Short Circuit Current	I_{SC}	25°C		550		mA
Peak Current	I_{PK}	25°C		2.2		A

TYPICAL APPLICATION

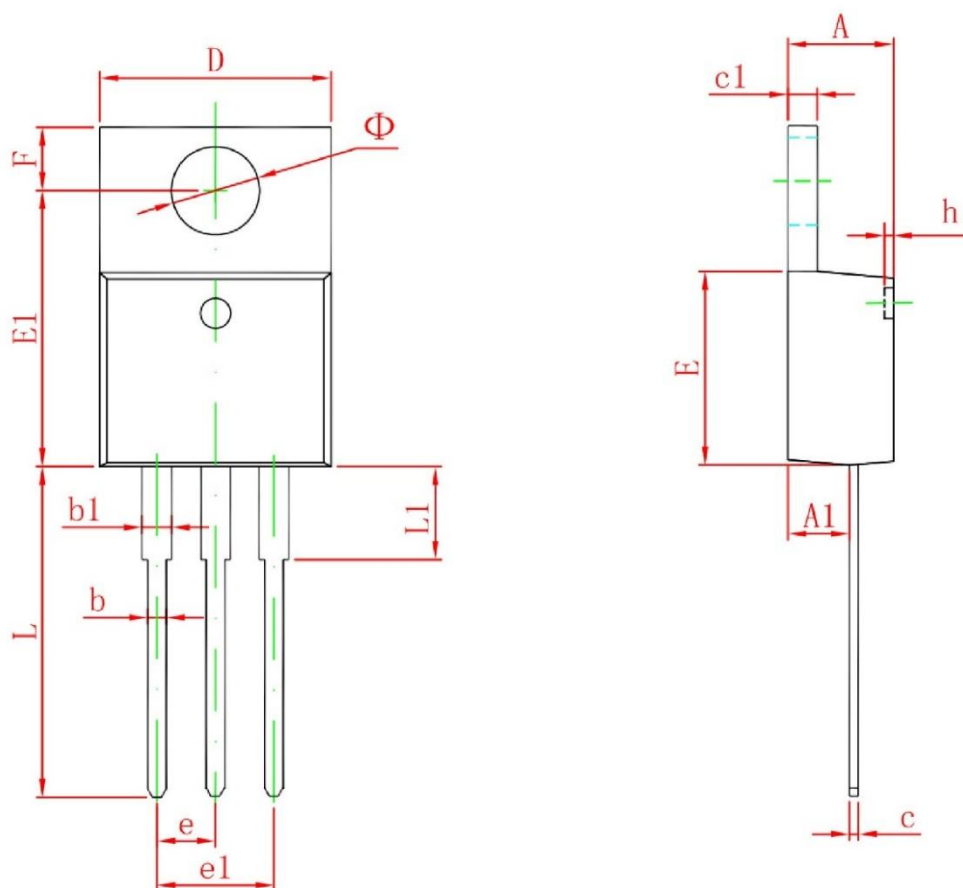


Typical Characteristics



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TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

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L7808CV

Three-terminal positive voltage regulator

TO-220

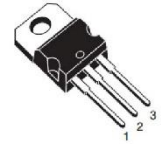
FEATURES

- Maximum Output Current I_{OM} : 1.5A
- Output Voltage V_O : 8V
- Continuous total dissipation
 P_D : 1.5W($T_A=25^\circ\text{C}$)
15W($T_C=25^\circ\text{C}$)

1.IN

2.GND

3.OUT



ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

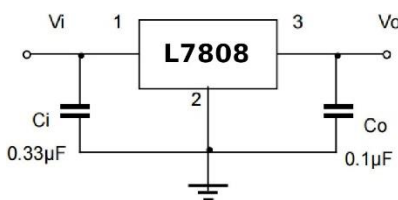
Parameter	Symbol	Value	UNIT
Input Voltage	V_i	35	V
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	83.3	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	8.3	$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	T_{OPR}	0 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JUNCTION TEMPERATURE

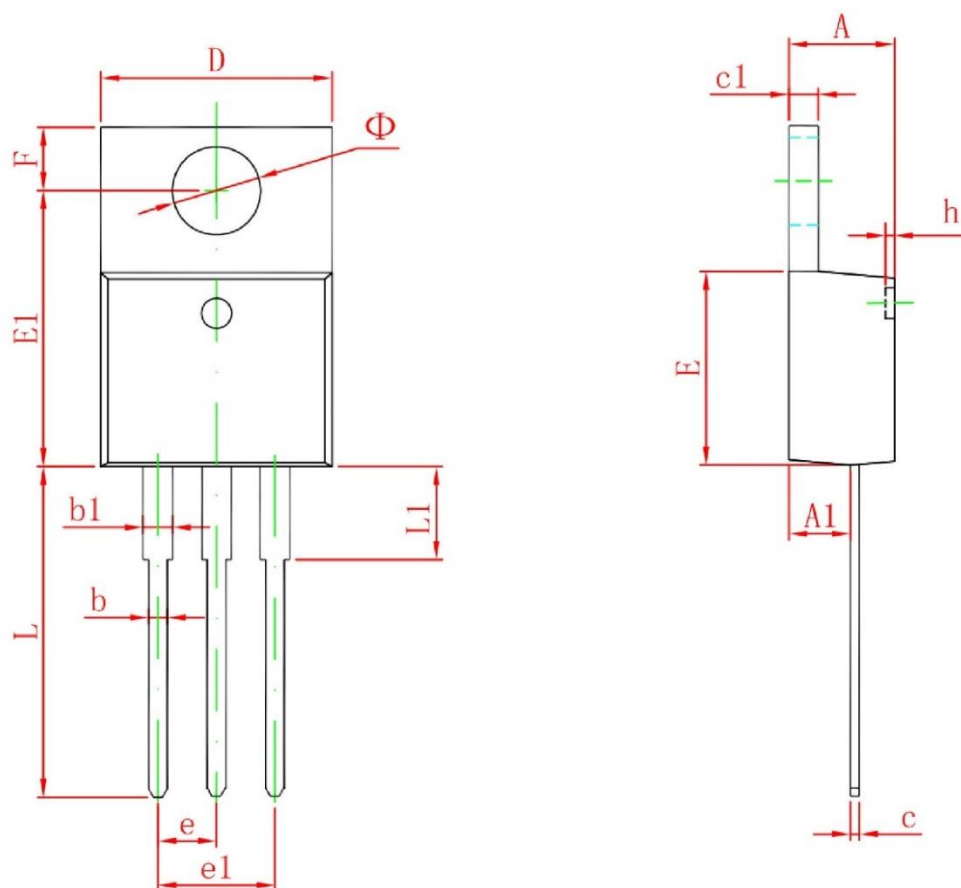
($V_i=14\text{V}$, $I_o=500\text{mA}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O		25 $^\circ\text{C}$	7.7	8	8.3
		10.5V $\leq V_i \leq 23\text{V}$, $I_o=5\text{mA}-1\text{A}$, $P \leq 15\text{W}$	0~125 $^\circ\text{C}$	7.6	8	8.4
Load Regulation	ΔV_O	$I_o=5\text{mA}-1.5\text{A}$	25 $^\circ\text{C}$		12	160
		$I_o=250\text{mA}-750\text{mA}$	25 $^\circ\text{C}$		4	80
Line Regulation	ΔV_O	10.5V $\leq V_i \leq 25\text{V}$	25 $^\circ\text{C}$		6	160
		11V $\leq V_i \leq 17\text{V}$	25 $^\circ\text{C}$		2	80
Quiescent Current	I_Q		25 $^\circ\text{C}$		4.3	8
Quiescent Current Change	ΔI_Q	10.5V $\leq V_i \leq 25\text{V}$	0~125 $^\circ\text{C}$			1
		5mA $\leq I_o \leq 1\text{A}$	0~125 $^\circ\text{C}$			0.5
Output Noise Voltage	V_N	10Hz $\leq F \leq 100\text{KHz}$	25 $^\circ\text{C}$		52	μV
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_o=5\text{mA}$	0~125 $^\circ\text{C}$		-0.8	mV/ $^\circ\text{C}$
Ripple Rejection	RR	11.5V $\leq V_i \leq 21.5\text{V}$, $F=120\text{Hz}$	0~125 $^\circ\text{C}$	55	72	dB
Dropout Voltage	V_D	$I_o=1\text{A}$	25 $^\circ\text{C}$		2	V
Output Resistance	R_O	$F=1\text{KHz}$	25 $^\circ\text{C}$		10	m Ω
Short Circuit Current	I_{SC}		25 $^\circ\text{C}$		450	mA
Peak Current	I_{PK}		25 $^\circ\text{C}$		2.2	A

TYPICAL APPLICATION



TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

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L7809CV

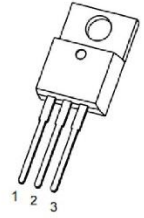
Three-terminal positive voltage regulator

FEATURES

- Maximum Output Current I_{OM} : 1.5A
- Output Voltage V_O : 9V
- Continuous total dissipation
 P_D : 1.5W($T_A=25^\circ\text{C}$)

TO-220-3L

1. IN
2. GND
3. OUT



ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

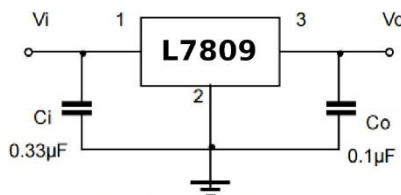
Parameter	Symbol	Value	UNIT
Input Voltage	V_i	35	V
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	83.3	$^\circ\text{C/W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	8.3	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_{OPR}	0 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JUNCTION TEMPERATURE

($V_i=16\text{V}$, $I_o=500\text{mA}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, unless otherwise specified)

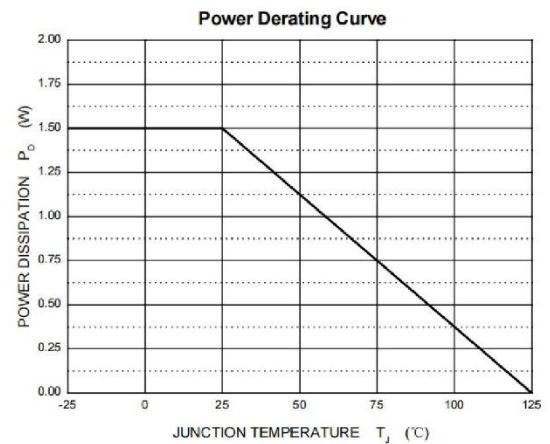
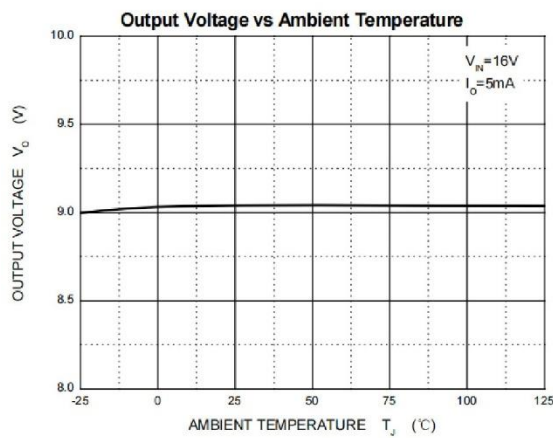
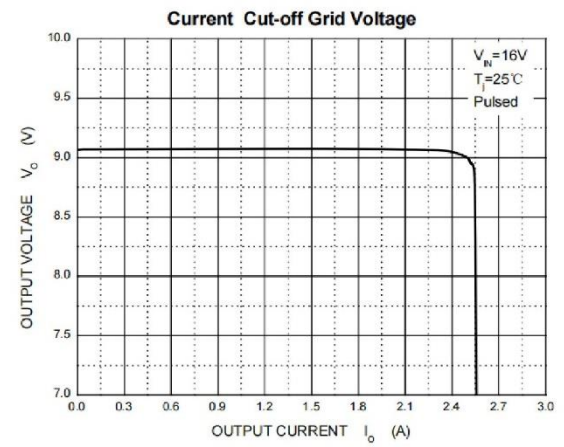
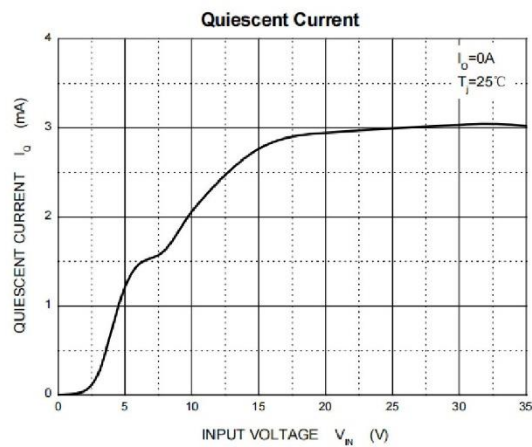
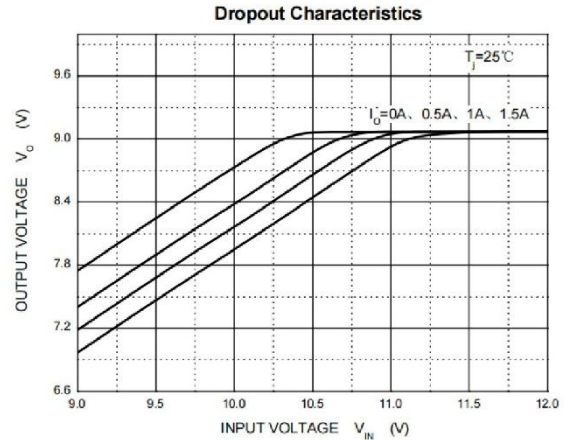
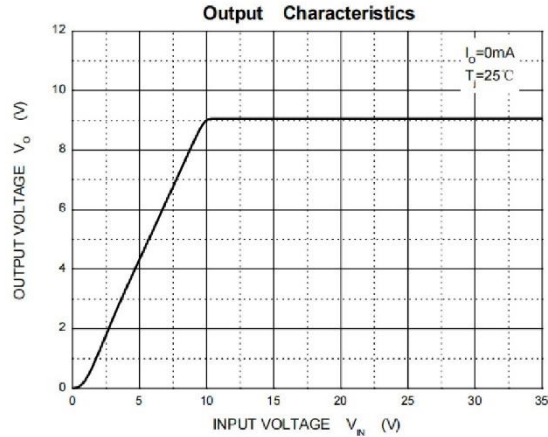
Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	25 $^\circ\text{C}$	8.65	9	9.35	V
		11.5V $\leq V_i \leq 24\text{V}$, $I_o=5\text{mA}-1\text{A}$, $P \leq 15\text{W}$	-25~125 $^\circ\text{C}$	8.55	9	9.45
Load Regulation	ΔV_O	$I_o=5\text{mA}-1.5\text{A}$	25 $^\circ\text{C}$	12	180	mV
		$I_o=250\text{mA}-750\text{mA}$	25 $^\circ\text{C}$	4	90	
Line Regulation	ΔV_O	11.5V $\leq V_i \leq 27\text{V}$	25 $^\circ\text{C}$	7	180	mV
		13V $\leq V_i \leq 19\text{V}$	25 $^\circ\text{C}$	2	90	
Quiescent Current	I_Q	25 $^\circ\text{C}$		4.3	8	mA
Quiescent Current Change	ΔI_Q	11.5V $\leq V_i \leq 27\text{V}$	-25~125 $^\circ\text{C}$		1	mA
		5mA $\leq I_o \leq 1\text{A}$	-25~125 $^\circ\text{C}$		0.5	
Output Noise Voltage	V_N	10Hz $\leq F \leq 100\text{KHz}$	25 $^\circ\text{C}$	60		$\mu\text{V}/V_O$
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_o=5\text{mA}$	-25~125 $^\circ\text{C}$	-1		mV/ $^\circ\text{C}$
Ripple Rejection	RR	12V $\leq V_i \leq 22\text{V}$, $F=120\text{Hz}$	-25~125 $^\circ\text{C}$	55	70	dB
Dropout Voltage	V_D	$I_o=1\text{A}$	25 $^\circ\text{C}$	2		V
Output Resistance	R_O	$F=1\text{KHz}$	25 $^\circ\text{C}$	18		m Ω
Short Circuit Current	I_{SC}	25 $^\circ\text{C}$		400		mA
Peak Current	I_{PK}	25 $^\circ\text{C}$		2.2		A

TYPICAL APPLICATION



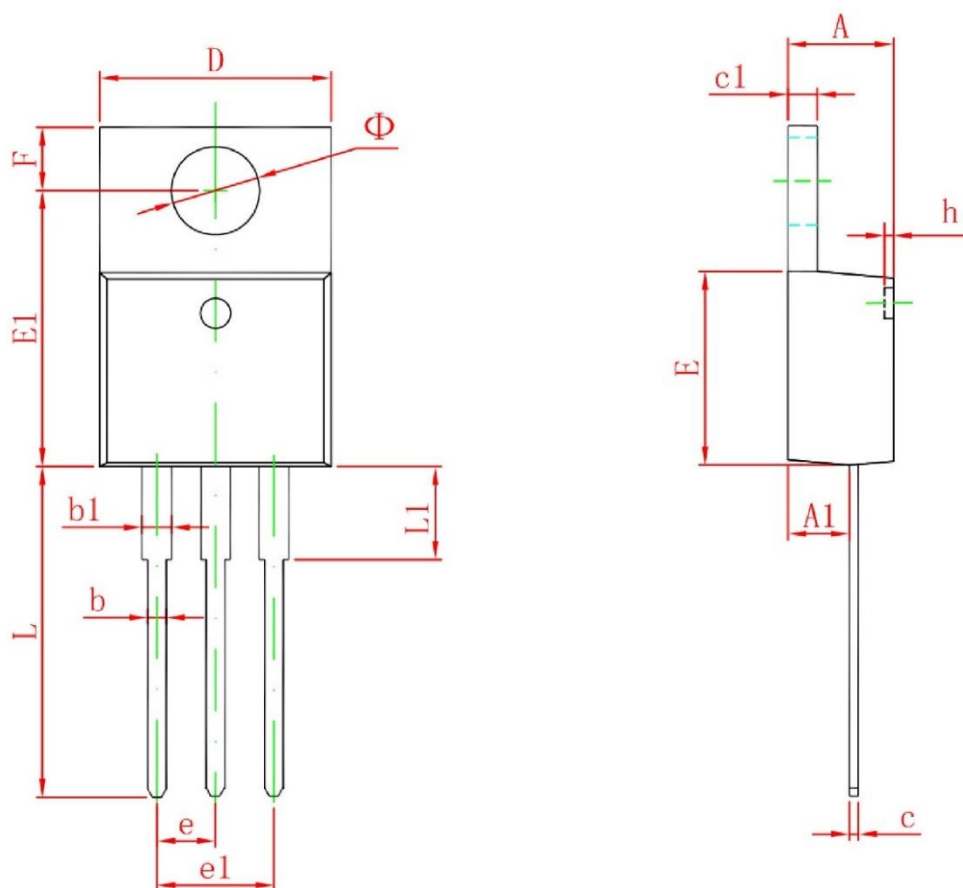
Note: Bypass capacitors are recommended for optimum stability and transient response and should be located as close as possible to the regulators.

TYPICAL CHARACTERISTICS



All products, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.

TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

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L7812CV

Three-terminal positive voltage regulator

TO-220

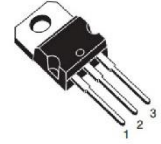
FEATURES

- Maximum Output Current I_{OM} : 1.5A
- Output Voltage V_O : 12V
- Continuous total dissipation
 P_D : 1.5W($T_A=25^\circ\text{C}$)
15W($T_C=25^\circ\text{C}$)

1.IN

2.GND

3.OUT



ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

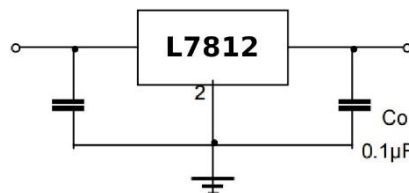
Parameter	Symbol	Value	UNIT
Input Voltage	V_i	35	V
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	83.3	$^\circ\text{C/W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	8.3	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_{OPR}	0 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JUNCTION TEMPERATURE

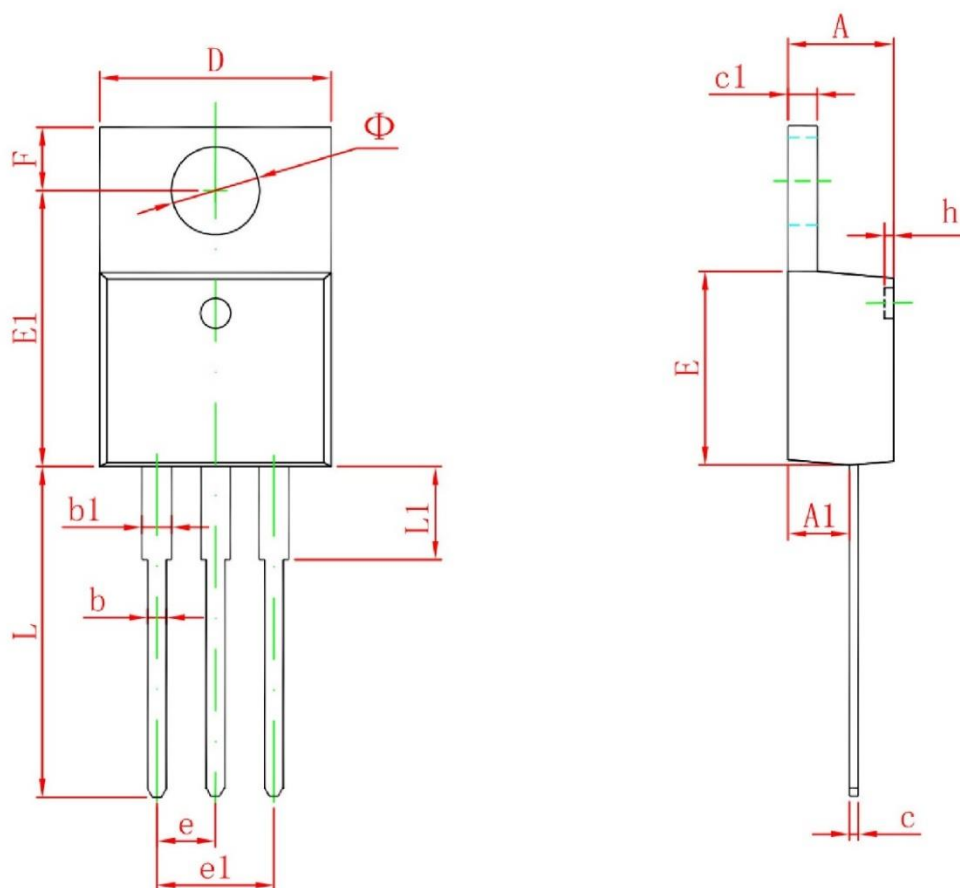
($V_i=19\text{V}$, $I_o=500\text{mA}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	25 $^\circ\text{C}$	11.5	12.0	12.5	V
		14.5V $\leq V_i \leq 27\text{V}$, $I_o=5\text{mA}-1\text{A}$, $P \leq 15\text{W}$ 0~125 $^\circ\text{C}$	11.4	12	12.6	
Load Regulation	ΔV_O	$I_o=5\text{mA}-1.5\text{A}$ 25 $^\circ\text{C}$		12	240	mV
		$I_o=250\text{mA}-750\text{mA}$ 25 $^\circ\text{C}$		4	120	
Line Regulation	ΔV_O	14.5V $\leq V_i \leq 30\text{V}$ 25 $^\circ\text{C}$		10	240	mV
		16V $\leq V_i \leq 22\text{V}$ 25 $^\circ\text{C}$		3	120	
Quiescent Current	I_Q	25 $^\circ\text{C}$		4.3	8	mA
Quiescent Current Change	ΔI_Q	5mA $\leq I_o \leq 1\text{A}$ 0~125 $^\circ\text{C}$			0.5	mA
		14.5V $\leq V_i \leq 30\text{V}$ 0~125 $^\circ\text{C}$			1.0	
Output Noise Voltage	V_N	10Hz $\leq F \leq 100\text{KHz}$ 25 $^\circ\text{C}$		75		μV
Output Voltage Drift	$\Delta V_O / \Delta T$	$I_o=5\text{mA}$ 0~125 $^\circ\text{C}$		-1		mV/ $^\circ\text{C}$
Ripple Rejection	RR	15V $\leq V_i \leq 25\text{V}$, $F=120\text{Hz}$ 0~125 $^\circ\text{C}$	55	71		dB
Dropout Voltage	V_D	$I_o=1\text{A}$ 25 $^\circ\text{C}$		2		V
Output Resistance	R_O	$F=1\text{KHz}$ 25 $^\circ\text{C}$		18		m Ω
Short Circuit Current	I_{SC}	25 $^\circ\text{C}$		350		mA
Peak Current	I_{PK}	25 $^\circ\text{C}$		2.2		A

TYPICAL APPLICATION



TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

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L7815CV

Three-terminal positive voltage regulator

TO-220

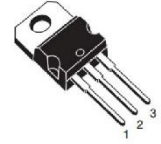
FEATURE

- Maximum Output Current I_{OM} : 1.5A
- Output Voltage V_O : 15V
- Continuous total dissipation
 P_D : 1.5W($T_A=25^\circ\text{C}$)
15W($T_C=25^\circ\text{C}$)

1.IN

2.GND

3.OUT



ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

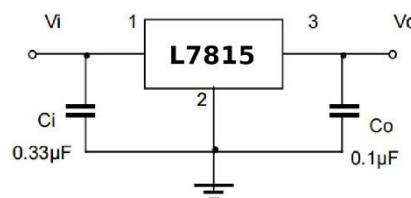
Parameter	Symbol	Value	UNIT
Input Voltage	V_i	35	V
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	83.3	$^\circ\text{C/W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	8.33	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_{OPR}	0 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JUNCTION TEMPERATURE

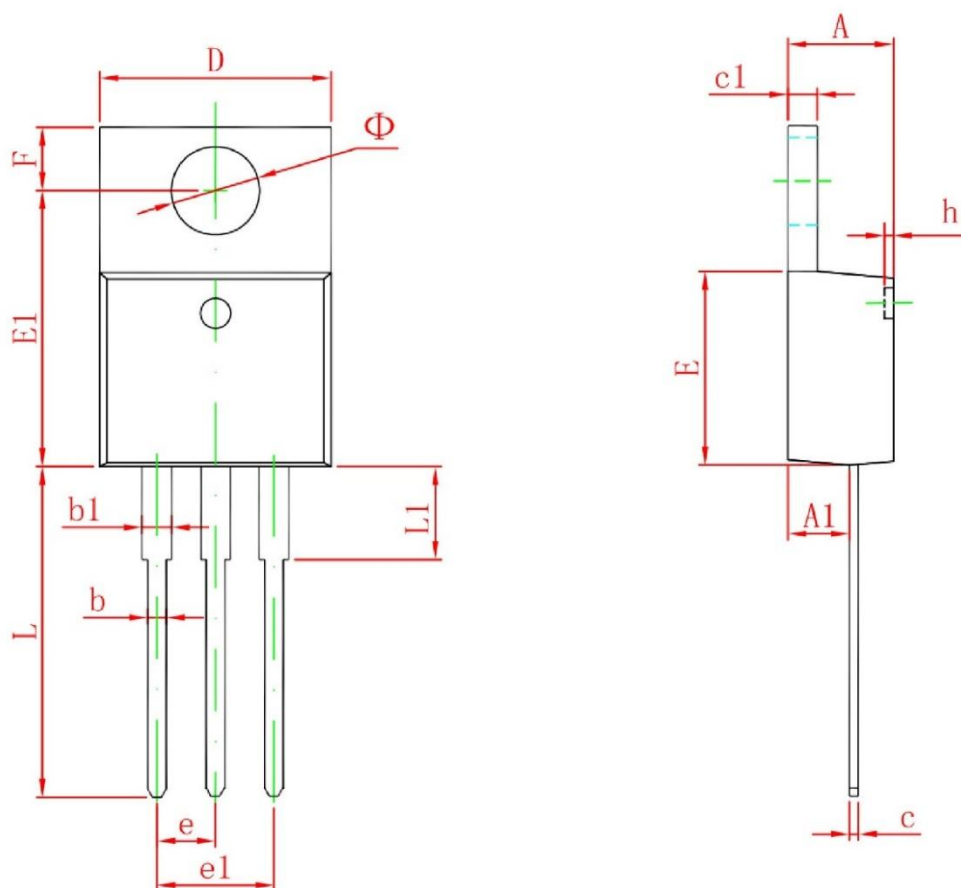
($V_i=23\text{V}$, $I_o=500\text{mA}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O		25 $^\circ\text{C}$	14.4	15	15.6
		17.5V $\leq V_i \leq 30\text{V}$, $I_o=5\text{mA}-1\text{A}$, $P \leq 15\text{W}$	0~125 $^\circ\text{C}$	14.25	15	15.75
Load Regulation	ΔV_O	$I_o=5\text{mA}-1.5\text{A}$	25 $^\circ\text{C}$		12	300
		$I_o=250\text{mA}-750\text{mA}$	25 $^\circ\text{C}$		4	150
Line Regulation	ΔV_O	17.5V $\leq V_i \leq 30\text{V}$	25 $^\circ\text{C}$		12	300
		20V $\leq V_i \leq 26\text{V}$	25 $^\circ\text{C}$		3	150
Quiescent Current	I_Q		25 $^\circ\text{C}$		4.3	8
Quiescent Current Change	ΔI_Q	17.5V $\leq V_i \leq 30\text{V}$	0~125 $^\circ\text{C}$			1
		5mA $\leq I_o \leq 1\text{A}$	0~125 $^\circ\text{C}$			0.5
Output Noise Voltage	V_N	10Hz $\leq F \leq 100\text{KHz}$	25 $^\circ\text{C}$		90	μV
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_o=5\text{mA}$	0~125 $^\circ\text{C}$		-1	mV/ $^\circ\text{C}$
Ripple Rejection	RR	18.5V $\leq V_i \leq 28.5\text{V}$, $F=120\text{Hz}$	0~125 $^\circ\text{C}$	54	70	dB
Dropout Voltage	V_D	$I_o=1\text{A}$	25 $^\circ\text{C}$		2	V
Output Resistance	R_O	$F=1\text{KHz}$	25 $^\circ\text{C}$		19	m Ω
Short Circuit Current	I_{SC}		25 $^\circ\text{C}$		230	mA
Peak Current	I_{PK}		25 $^\circ\text{C}$		2.1	A

TYPICAL APPLICATION



TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

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L7824CV

Three-terminal positive voltage regulator

FEATURES

- Output Current up to 1.5A
- Fixed output voltage 24V available
- Thermal overload shutdown protection
- Short circuit current limiting
- Output transistor SOA protection
- RoHS Compliance

APPLICATIONS

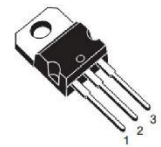
- High-efficiency linear regulator
- Post regulation for switching supply
- Microprocessor power supply
- Mother Board

TO-220

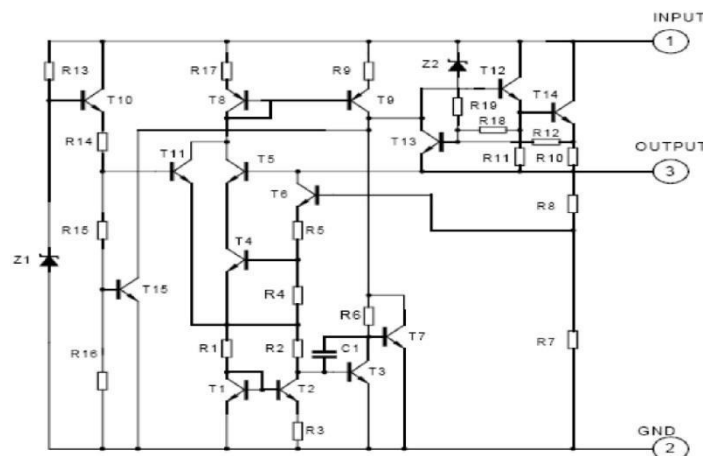
1.IN

2.GND

3.OUT



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	UNIT
Input Voltage	V_i	35	V
		40	
Output Current	I_{OUT}	1.5	A
Power Dissipation	P_D	Internally Limited	mW
Junction Temperature	T_J	150	°C
Operating Temperature Range	T_{OPR}	-20 ~ +150	°C
Storage Temperature Range	T_{STG}	-55 ~ +150	°C

Note: 1. Absolute maximum ratings are stress ratings only and functional device operation is not implied. The device could be damaged beyond absolute maximum ratings.

2. The maximum steady state usable output current are dependent on input voltage, heat sinking, lead length of the package and copper pattern of PCB. The data are showed as electrical characteristics table represents pulse test conditions with junction temperatures specified at the initiation of test.

ELECTRICAL CHARACTERISTICS (T_J=25°C, P_D≤15W, unless otherwise specified)

L7824(V_I=33V, I_O=500mA, C_I=0.33μF, C_O=0.1μF)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V _O	I _O =5mA-1A	23.04	24.0	24.96	V
		27V≤V _I ≤38V, I _O =5mA-1A	22.08		25.20	
Load Regulation	ΔV _O	I _O =5mA-1A			240	mV
		I _O =250mA-750mA			120	
Line Regulation	ΔV _O	27V≤V _I ≤38V			240	mV
		27V≤V _I ≤38V, I _O =1A			240	
Quiescent Current	I _Q	I _O ≤1A			8	mA
Quiescent Current Change	ΔI _Q	28V≤V _I ≤38V			1	mA
		I _O =5mA-1A			0.5	
Output Noise Voltage	V _N	10Hz≤F≤100KHz		170		μV
Output Voltage Drift	ΔV _O /ΔT	I _O =5mA		-2.8		mV/°C
Ripple Rejection	RR	28V≤V _I ≤38V, F=120Hz	50	66		dB
Dropout Voltage	V _D			2.0		V
Short Circuit Current	I _{SC}			250		mA
Peak Current	I _{PK}			1.8		A

TYPICAL CHARACTERISTICS CURVES

Fig.1- Peak Output Current vs. Input/Output Differential Voltage

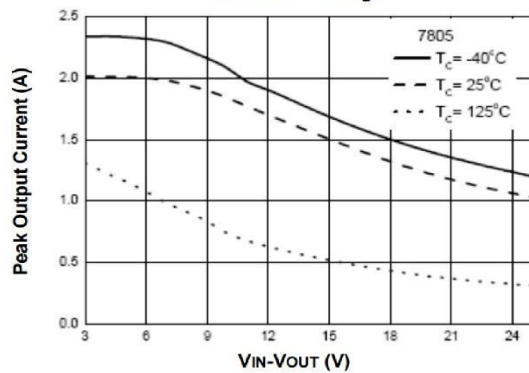


Fig.2- Output Voltage vs. Junction Temperature

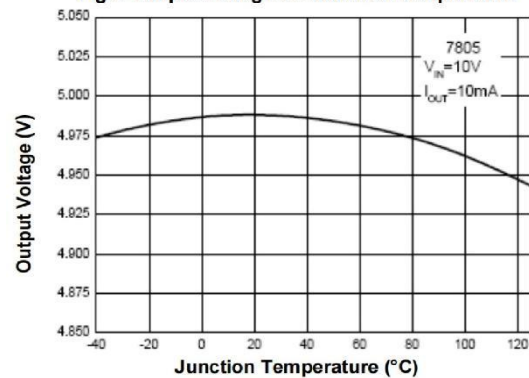


Fig.3- Quiescent Current vs. Junction Temperature

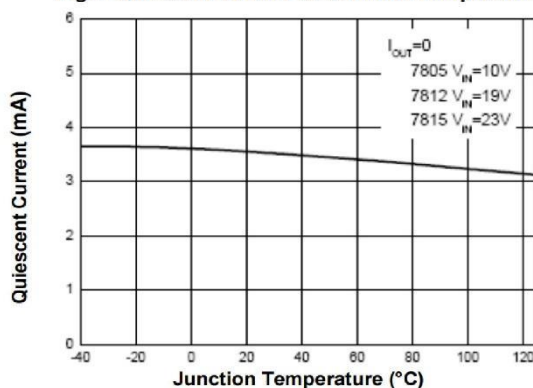
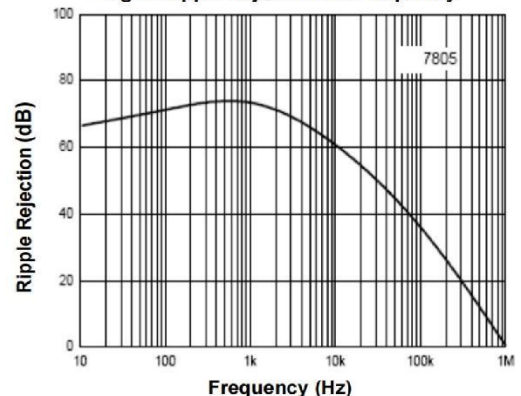


Fig.4- Ripple Rejection vs. Frequency



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TYPICAL CHARACTERISTICS CURVES (Continued)

Fig.5- Dropout Voltage vs. Junction Temperature

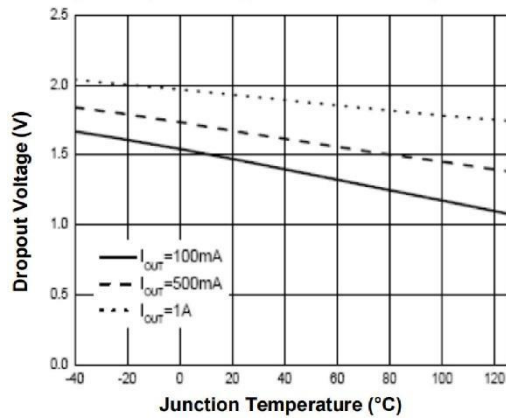


Fig.6- Power Dissipation vs. Case Temperature

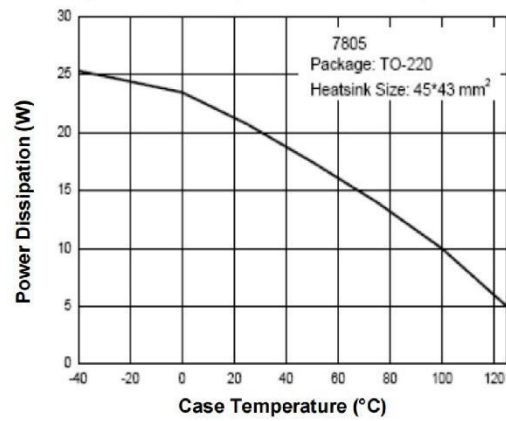
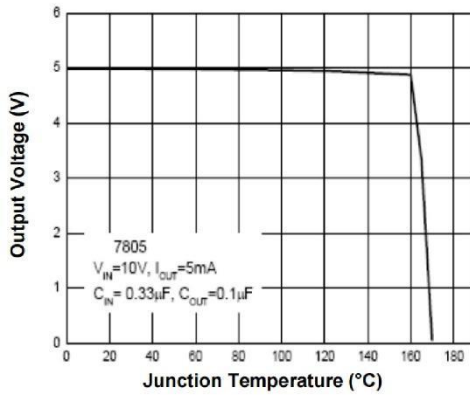
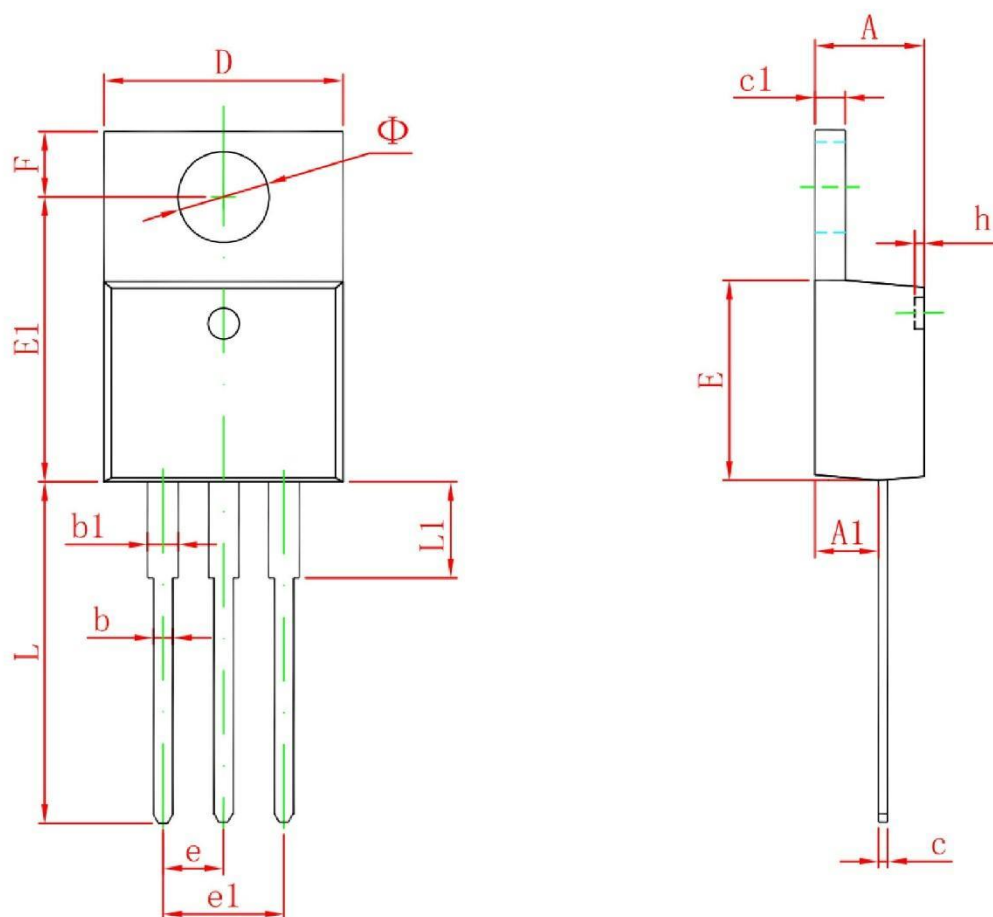


Fig.7- Thermal Shutdown Protection



TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

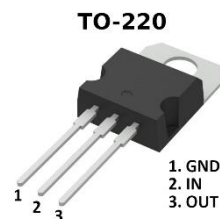
All products, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.

L7915CV

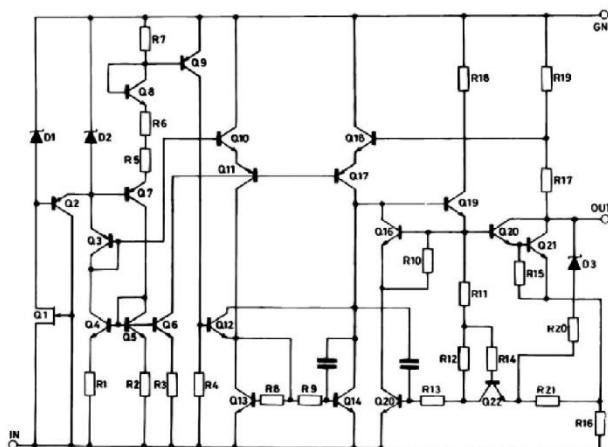
Three-terminal negative voltage regulator

FEATURES

- Maximum Output Current I_{OM} : 1.5A
- Output Voltage V_O : -15V
- Thermal Overload Protection
- Short Circuit Protection
- Output transition SOA protection



SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	UNIT
Input Voltage	V_I	-35	V
Output Current	I_O	-1.5	A
Operating Junction Temperature Range	T_{OPR}	0 ~ +150	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

Thermal Resistances ($T_A=25^\circ\text{C}$)

Parameter	Symbol	Value	UNIT
Thermal Resistance Junction – Case	$R_{\theta JC}$	5	°C/W
Thermal Resistance Junction – Air	$R_{\theta JA}$	65	°C/W

ELECTRICAL CHARACTERISTICS

(Refer to the test circuit, $V_i = -23V$, $I_o = -750mA$, $C_i = 2.2\mu F$, $C_o = 1\mu F$, unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_J = 25^\circ C$	-14.40	-15.0	-12.60	V
		$-17.5V \leq V_i \leq -30V$, $P_o \leq 15W$, $I_o = 5mA \sim 1.5A$	-14.25	-15.0	-15.75	
Load Regulation*	ΔV_o	$I_o = -5mA \sim -1.5A$			300	mV
		$I_o = -250mA \sim -750mA$			150	
Line Regulation*	ΔV_o	$-17.5V \leq V_i \leq -30V$			300	mV
		$-20V \leq V_i \leq -26V$, $T_J = 25^\circ C$			150	
Quiescent Current	I_Q	$T_J = 25^\circ C$			8.0	mA
Quiescent Current Change	ΔI_Q	$-17.5V \leq V_i \leq -30.5V$			0.5	mA
		$-5mA \leq I_o \leq -1.5A$			1.0	
Output Noise Voltage	V_N	$10Hz \leq F \leq 100KHz$, $T_J = 25^\circ C$		250		μV
Output Voltage Drift	$\Delta V_o / \Delta T$	$I_o = 5mA$		-0.9		mV/ $^\circ C$
Ripple Rejection	RR	$F = 120Hz$, $\Delta V_i = 10V$		60		dB
Dropout Voltage	V_D	$I_o = 1.5A$, $T_J = 25^\circ C$		2		V
Short Circuit Current	I_{SC}	$V_i = -35V$, $T_J = 25^\circ C$		300		mA
Peak Current	I_{PK}	$T_J = 25^\circ C$		2.2		A

* Notes: Load and line regulation are specified at constant junction temperature. Changes in V_o due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

APPLICATION INFORMATION

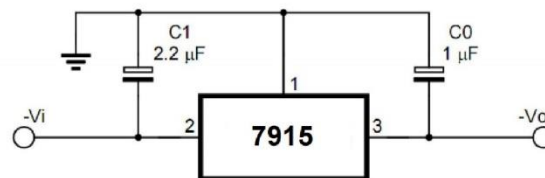


Figure 1. Fixed Output regulator

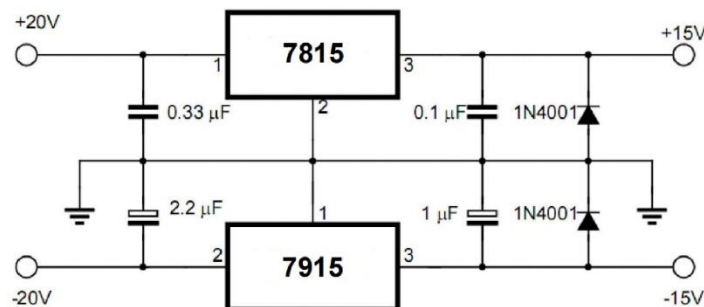
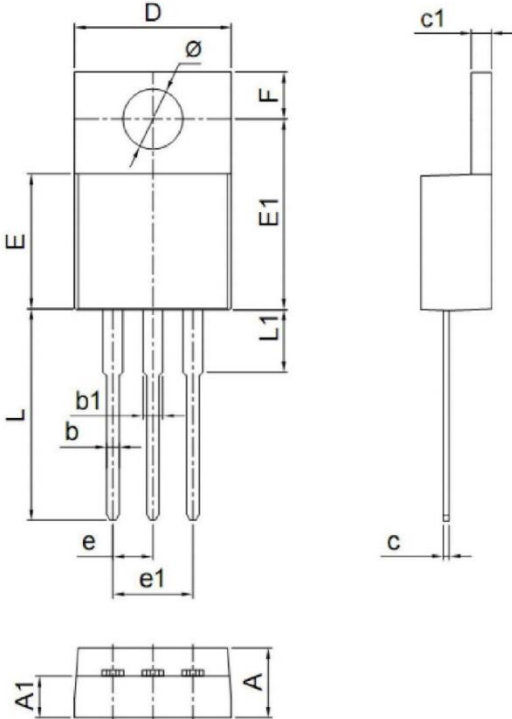


Figure 2. Split power supply ($\pm 15V$, $-1.5A$)

TO-220-3L Package Outline Dimensions

TO-220AB

TO-220AB	Dim	Millimeter		Inches	
		Min.	Max.	Min.	Max.
	A	4.30	4.70	0.169	0.185
	A1	0.00	0.15	0.000	0.006
	b	0.71	0.91	0.028	0.036
	b1	1.17	1.37	0.046	0.054
	c	0.30	0.50	0.012	0.020
	c1	1.17	1.37	0.046	0.054
	D	9.90	10.20	0.390	0.402
	E	8.50	8.90	0.335	0.350
	E1	12.00	12.50	0.472	0.492
	e	2.44	2.64	0.096	0.104
	e1	4.88	5.28	0.192	0.208
	F	2.60	2.80	0.102	0.110
	L	13.20	13.80	0.520	0.543
	L1	3.80	4.20	0.150	0.165
	Φ	3.60	3.96	0.142	0.156

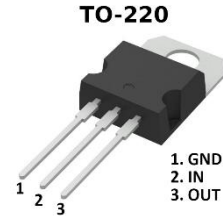
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L7912CV

Three-terminal negative voltage regulator

FEATURES

- Maximum Output Current I_{OM} : 1.5A
- Output Voltage V_O : -12V
- Continuous total dissipation
 P_D : 1.5W($T_A=25^\circ\text{C}$)



ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

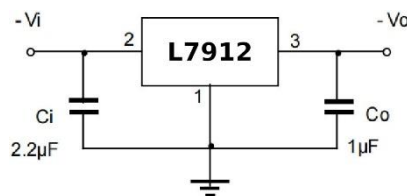
Parameter	Symbol	Value	UNIT
Input Voltage	V_i	-35	V
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	83.3	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_{OPR}	0 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 ~ +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JUNCTION TEMPERATURE

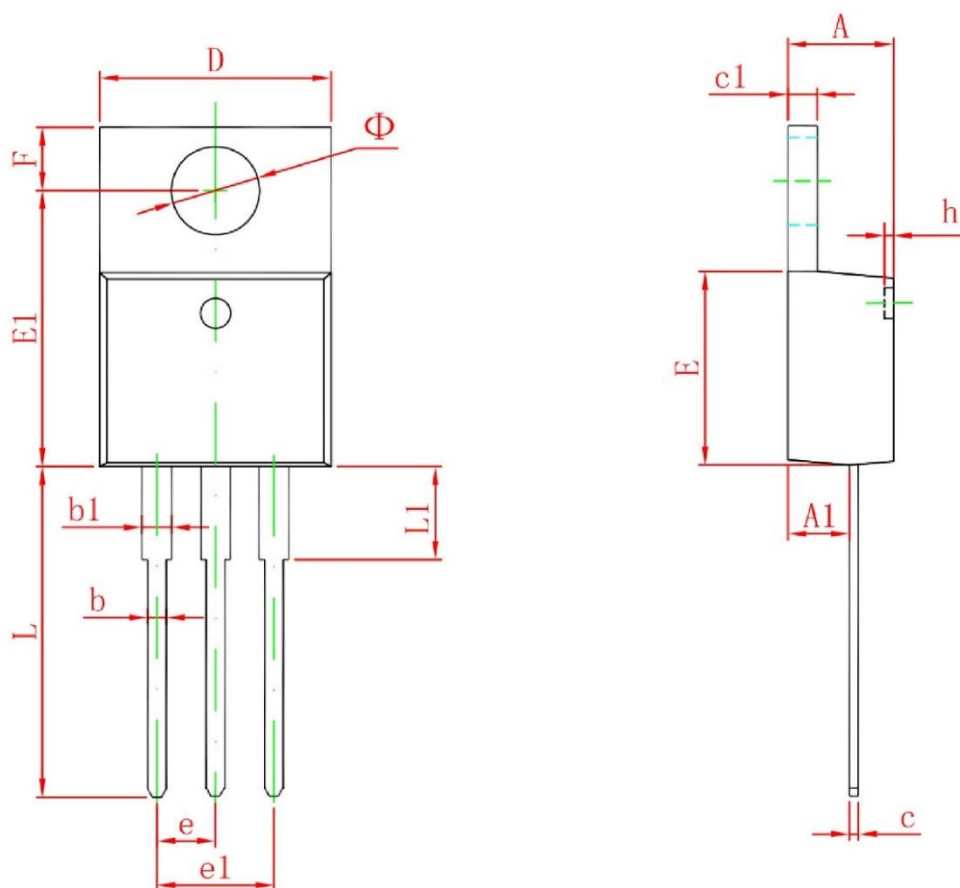
($V_i=-19\text{V}$, $I_O=500\text{mA}$, $C_i=2.2\mu\text{F}$, $C_o=1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	25 $^\circ\text{C}$	-11.52	-12	-12.48	V
		-14.5V $\leq V_i \leq$ -27V, $I_O=5\text{mA}-1\text{A}$ 0~125 $^\circ\text{C}$	-11.4	-12	-12.6	
Load Regulation	ΔV_O	$I_O=5\text{mA}-1.5\text{A}$ 25 $^\circ\text{C}$		15	200	mV
		$I_O=250\text{mA}-750\text{mA}$ 25 $^\circ\text{C}$		5	75	
Line Regulation	ΔV_O	-14.5V $\leq V_i \leq$ -30V 25 $^\circ\text{C}$		5	80	mV
		-16V $\leq V_i \leq$ -22V 25 $^\circ\text{C}$		3	30	
Quiescent Current	I_Q	25 $^\circ\text{C}$		2	3	mA
Quiescent Current Change	ΔI_Q	-14.5V $\leq V_i \leq$ -30V 0~125 $^\circ\text{C}$			0.5	mA
		5mA $\leq I_O \leq$ 1A 0~125 $^\circ\text{C}$			0.5	
Output Noise Voltage	V_N	10Hz $\leq F \leq$ 100KHz 25 $^\circ\text{C}$		300		$\mu\text{V}/V_O$
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_O=5\text{mA}$ 0~125 $^\circ\text{C}$		-0.8		mV/ $^\circ\text{C}$
Ripple Rejection	RR	-15V $\leq V_i \leq$ -25V, F=120Hz 0~125 $^\circ\text{C}$	54	60		dB
Dropout Voltage	V_D	$I_O=1\text{A}$ 25 $^\circ\text{C}$		1.1		V
Peak Current	I_{PK}	25 $^\circ\text{C}$		2.1		A

TYPICAL APPLICATION



TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

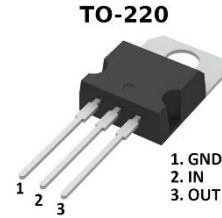
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L7909CV

Three-terminal negative voltage regulator

FEATURES

- Maximum Output Current I_{OM} : 1.5A



ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$)

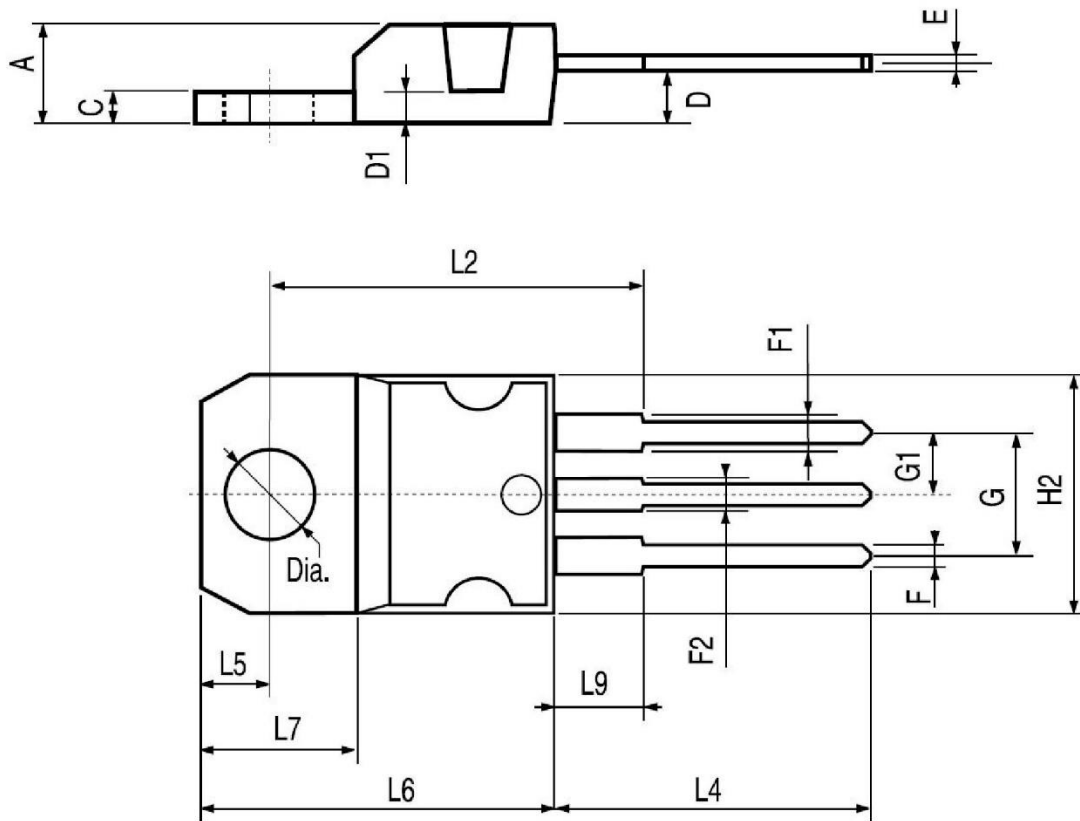
Parameter	Symbol	Value	UNIT
Input Voltage	V_i	-35	V
Operating Junction Temperature Range	T_{OPR}	-20 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 ~ +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS

($V_i=-16\text{V}$, $I_o=500\text{mA}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, $T_A=-20\sim 125^\circ\text{C}$)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_A=25^\circ\text{C}$	-8.60	-9.0	-9.40	V
		$11.8\text{V} \leq V_i \leq 25\text{V}$, $I_o=5\text{mA}-1\text{A}$, $P_o \leq 15\text{W}$	-8.50	-9.0	-9.50	
Load Regulation	ΔV_o	$I_o=5\text{mA}-1.5\text{A}$		12	98	mV
		$I_o=250\text{mA}-750\text{mA}$		5.0	50	
Line Regulation	ΔV_o	$11.8\text{V} \leq V_i \leq 26\text{V}$		8	98	mV
		$12\text{V} \leq V_i \leq 20\text{V}$		4	98	
		$11.5\text{V} \leq V_i \leq 25\text{V}$		8	98	
		$12\text{V} \leq V_i \leq 20\text{V}$		3	50	
Quiescent Current	I_Q	$T_A=25^\circ\text{C}$		2.5	5	mA
Quiescent Current Change	ΔI_Q	$12\text{V} \leq V_i \leq 26\text{V}$			0.8	mA
		$11.8\text{V} \leq V_i \leq 25\text{V}$, $T_A=25^\circ\text{C}$			0.8	
		$5\text{mA} \leq I_o \leq 1\text{A}$			0.5	
Output Noise Voltage	V_N	$10\text{Hz} \leq F \leq 100\text{kHz}$, $T_A=25^\circ\text{C}$		190		μV
Output Voltage Drift	$\Delta V_o / \Delta T$	$I_o=5\text{mA}$		-1		$\text{mV}/^\circ\text{C}$
Ripple Rejection	RR	$13\text{V} \leq V_i \leq 24\text{V}$, $F=120\text{Hz}$		60		dB
Dropout Voltage	V_D	$I_o=1\text{A}$, $T_A=25^\circ\text{C}$		1.5		V
Output Resistance	R_o	$F=1\text{KHz}$		17		$\text{m}\Omega$
Short Circuit Current	I_{SC}	$V_i=35\text{V}$, $T_A=25^\circ\text{C}$		10		mA
Peak Current	I_{PK}	$T_A=25^\circ\text{C}$		1.8		A

TO-220-3L Package Outline Dimensions



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

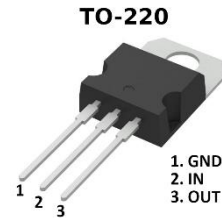
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L7908CV

Three-terminal negative voltage regulator

FEATURES

- Maximum Output Current I_{OM} : 1.5A



ABSOLUTE MAXIMUM RATINGS

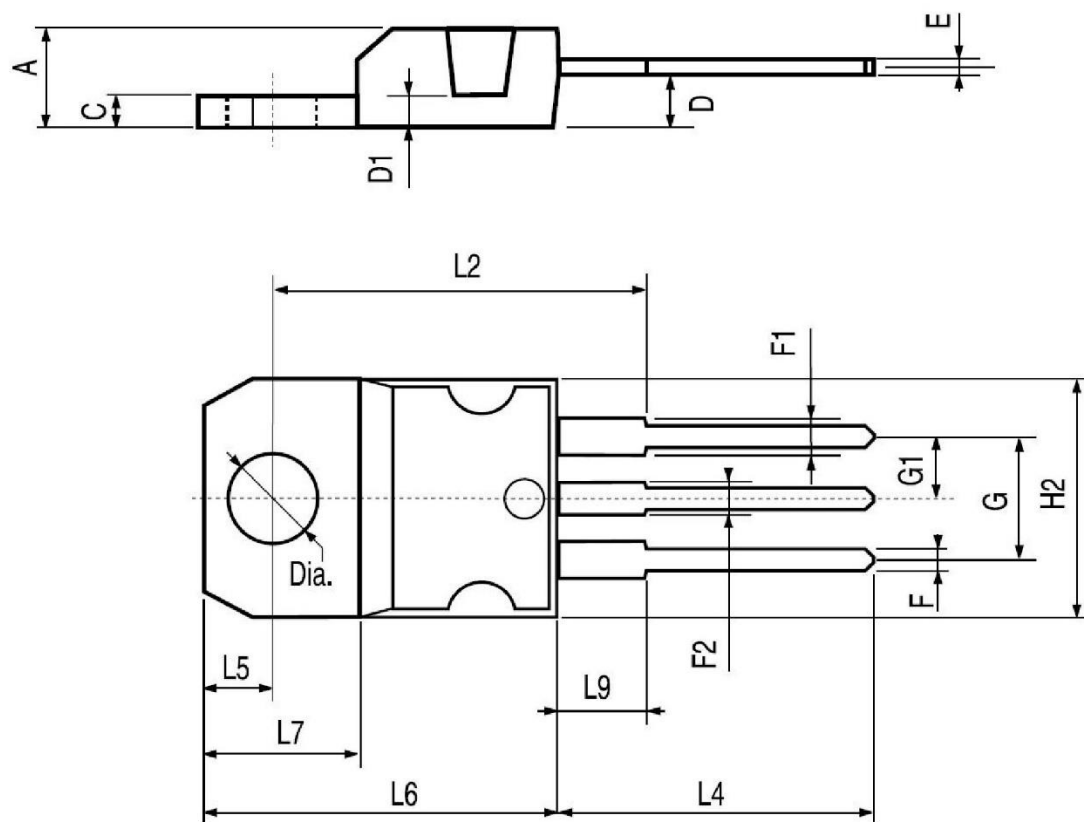
Parameter	Symbol	Value	UNIT
Input Voltage	V_i	-35	V
Operating Junction Temperature Range	T_{OPR}	-20 ~ +150	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°C

ELECTRICAL CHARACTERISTICS

($V_i = -14V$, $I_o = 500mA$, $C_i = 0.33\mu F$, $C_o = 0.1\mu F$, $T_A = -20 \sim 125^\circ C$)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_A = 25^\circ C$	-7.68	-8.0	-8.32	V
		$10.6V \leq V_i \leq 23V$, $I_o = 5mA - 1A$, $P_o \leq 15W$	-7.60	-8.0	-8.40	
Load Regulation	ΔV_o	$I_o = 5mA - 1.5A$		12	78	mV
		$I_o = 250mA - 750mA$		5.0	40	
Line Regulation	ΔV_o	$10.6V \leq V_i \leq 25V$		6	78	mV
		$11V \leq V_i \leq 17V$		3	78	
		$10.4V \leq V_i \leq 21V$		6	78	
		$11V \leq V_i \leq 17V$		2	40	
Quiescent Current	I_Q	$T_A = 25^\circ C$		2.5	5	mA
Quiescent Current Change	ΔI_Q	$11V \leq V_i \leq 25V$			0.8	mA
		$10.6V \leq V_i \leq 23V$, $T_A = 25^\circ C$			0.8	
		$5mA \leq I_o \leq 1A$			0.5	
Output Noise Voltage	V_N	$10Hz \leq F \leq 100KHz$, $T_A = 25^\circ C$		175		μV
Output Voltage Drift	$\Delta V_o / \Delta T$	$I_o = 5mA$		-0.8		mV/°C
Ripple Rejection	RR	$11.5V \leq V_i \leq 21.5V$, $F = 120Hz$		60		dB
Dropout Voltage	V_D	$I_o = 1A$, $T_A = 25^\circ C$		1.5		V
Output Resistance	R_o	$F = 1KHz$		18		mΩ
Short Circuit Current	I_{SC}	$V_i = 35V$, $T_A = 25^\circ C$		10		mA
Peak Current	I_{PK}	$T_A = 25^\circ C$		1.8		A

TO-220-3L Package Outline Dimensions



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

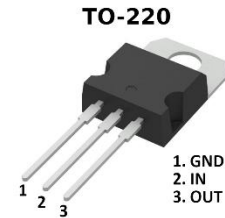
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L7906CV

Three-terminal negative voltage regulator

FEATURES

- Maximum Output Current I_{OM} : 1.5A



ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$)

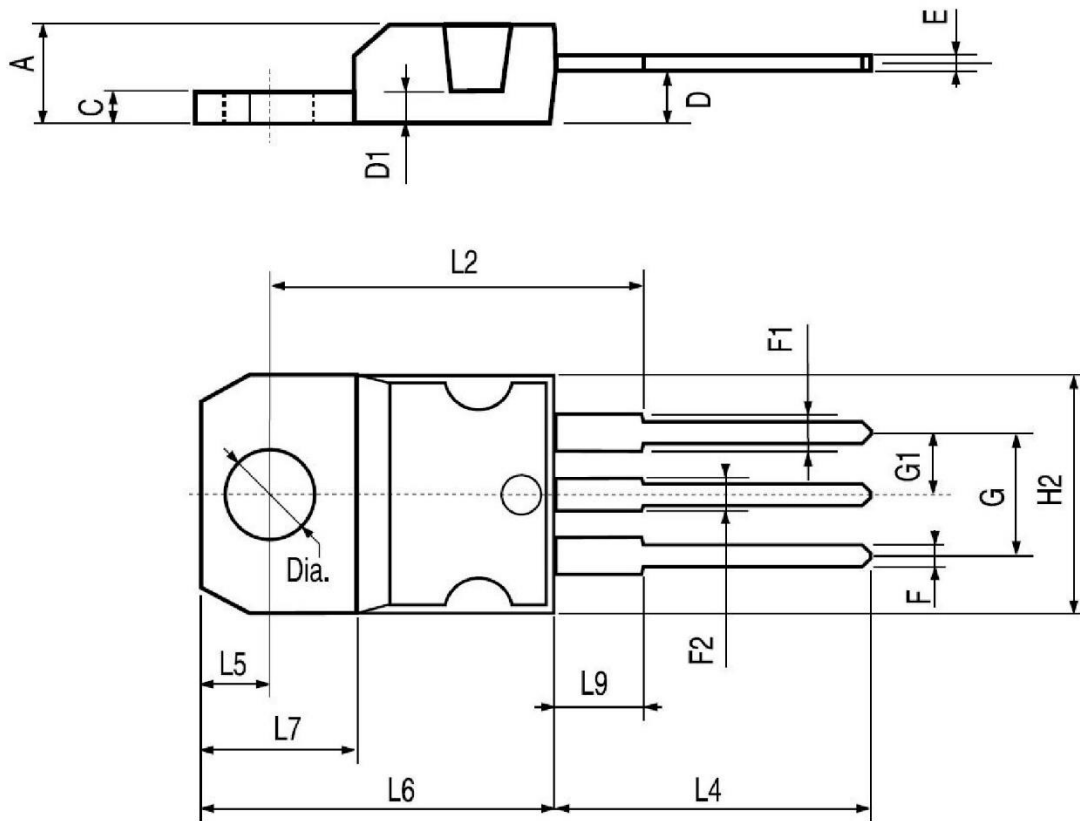
Parameter	Symbol	Value	UNIT
Input Voltage	V_i	-35	V
Operating Junction Temperature Range	T_{OPR}	-25 ~ +125	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 ~ +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS

($V_i=-11\text{V}$, $I_o=500\text{mA}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, $T_A=-20 \sim 125^\circ\text{C}$)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_A=25^\circ\text{C}$	-5.76	-6.0	-6.24	V
		$8.6\text{V} \leq V_i \leq 21\text{V}$, $5\text{mA} \leq I_o \leq 1\text{A}$, $P_o \leq 15\text{W}$	-5.70	-6.0	-6.30	
Load Regulation	ΔV_o	$I_o=5\text{mA}-1.5\text{A}$		9	58	mV
		$I_o=250\text{mA}-750\text{mA}$		5.0	30	
Line Regulation	ΔV_o	$8.6\text{V} \leq V_i \leq 25\text{V}$		5	58	mV
		$9\text{V} \leq V_i \leq 13\text{V}$		4	58	
		$8.3\text{V} \leq V_i \leq 21\text{V}$		5	58	
		$8.6\text{V} \leq V_i \leq 12\text{V}$		1.5	30	
Quiescent Current	I_Q	$T_A=25^\circ\text{C}$		2.5	5	mA
Quiescent Current Change	ΔI_Q	$9\text{V} \leq V_i \leq 25\text{V}$			0.8	mA
		$8.5\text{V} \leq V_i \leq 21\text{V}$, $T_A=25^\circ\text{C}$			0.8	
		$5\text{mA} \leq I_o \leq 1\text{A}$			0.5	
Output Noise Voltage	V_N	$10\text{Hz} \leq F \leq 100\text{kHz}$, $T_A=25^\circ\text{C}$		115		μV
Output Voltage Drift	$\Delta V_o / \Delta T$	$I_o=5\text{mA}$		-0.8		$\text{mV}/^\circ\text{C}$
Ripple Rejection	RR	$9\text{V} \leq V_i \leq 19\text{V}$, $F=120\text{Hz}$		60		dB
Dropout Voltage	V_D	$I_o=1\text{A}$, $T_A=25^\circ\text{C}$		1.5		V
Output Resistance	R_o	$F=1\text{KHz}$		19		$\text{m}\Omega$
Short Circuit Current	I_{SC}	$V_i=35\text{V}$, $T_A=25^\circ\text{C}$		10		mA
Peak Current	I_{PK}	$T_A=25^\circ\text{C}$		1.8		A

TO-220-3L Package Outline Dimensions



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

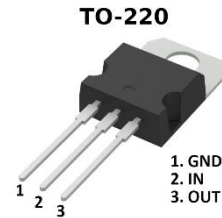
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L7905CV

Three-terminal negative voltage regulator

FEATURES

- Maximum Output Current I_{OM} : 1.5A
- Output Voltage V_O : -5V
- Continuous total dissipation
 P_D : 1.5W($T_A=25^\circ\text{C}$)



ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

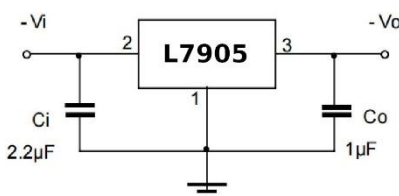
Parameter	Symbol	Value	UNIT
Input Voltage	V_i	-35	V
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	83.3	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_{OPR}	0 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 ~ +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JUNCTION TEMPERATURE

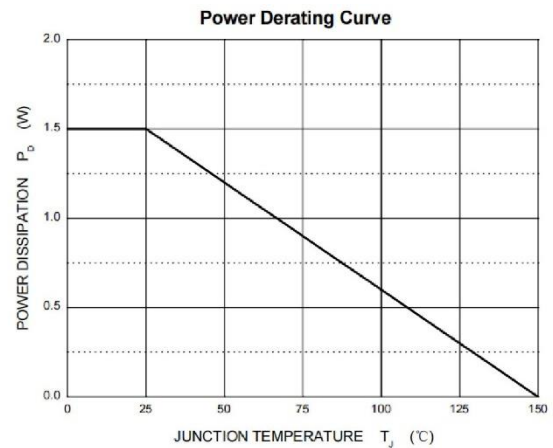
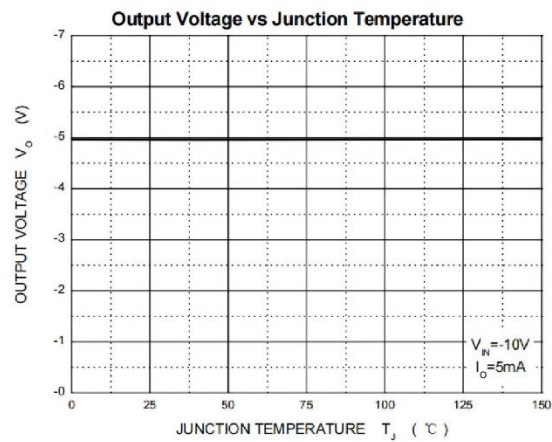
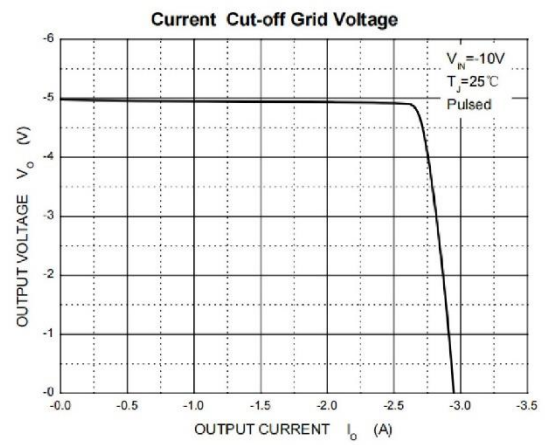
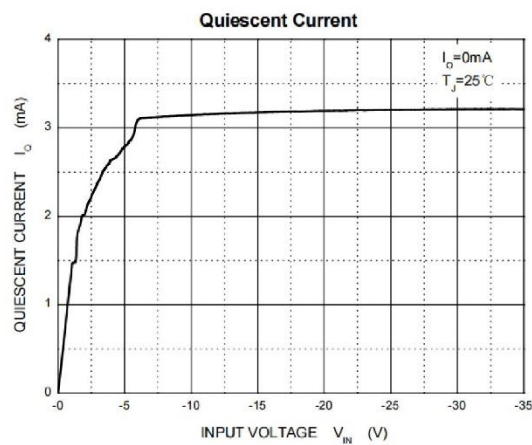
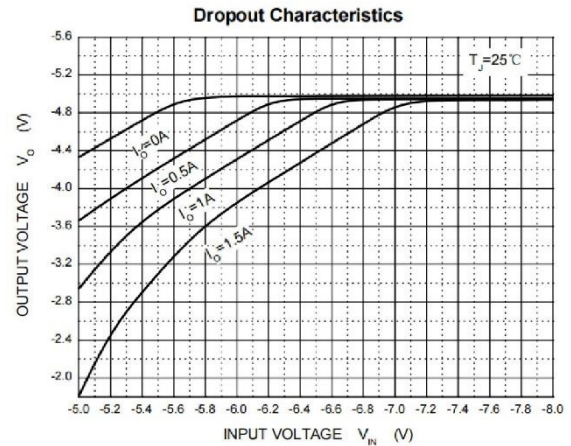
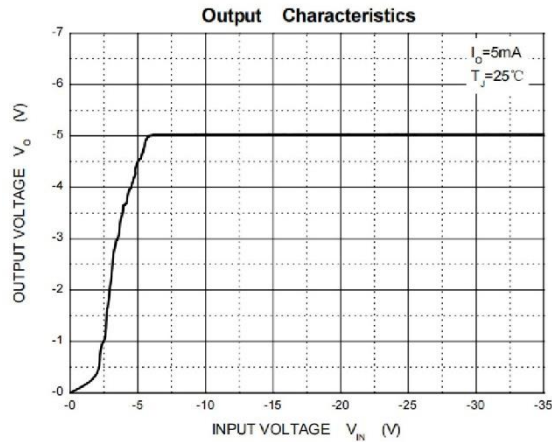
($V_i=-10\text{V}$, $I_O=500\text{mA}$, $C_i=2.2\mu\text{F}$, $C_o=1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	25°C	-4.8	-5	-5.2	V
		$-7\text{V} \leq V_i \leq -20\text{V}$, $I_O=5\text{mA}-1\text{A}$, $0 \sim 125^\circ\text{C}$	-4.75	-5	-5.25	
Load Regulation	ΔV_O	$I_O=5\text{mA}-1.5\text{A}$, 25°C		15	100	mV
		$I_O=250\text{mA}-750\text{mA}$, 25°C		5	50	
Line Regulation	ΔV_O	$-7\text{V} \leq V_i \leq -25\text{V}$, 25°C		12.5	50	mV
		$-8\text{V} \leq V_i \leq -12\text{V}$, 25°C		4	15	
Quiescent Current	I_Q	25°C		1.5	2	mA
Quiescent Current Change	ΔI_Q	$-7\text{V} \leq V_i \leq -25\text{V}$, $0 \sim 125^\circ\text{C}$			0.5	mA
		$5\text{mA} \leq I_O \leq 1\text{A}$, $0 \sim 125^\circ\text{C}$			0.5	
Output Noise Voltage	V_N	$10\text{Hz} \leq F \leq 100\text{KHz}$, 25°C		125		$\mu\text{V}/V_O$
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_O=5\text{mA}$, $0 \sim 125^\circ\text{C}$		-0.4		$\text{mV}/^\circ\text{C}$
Ripple Rejection	RR	$-8\text{V} \leq V_i \leq -18\text{V}$, $F=120\text{Hz}$, $0 \sim 125^\circ\text{C}$	54	60		dB
Dropout Voltage	V_D	$I_O=1\text{A}$, 25°C		1.1		V
Peak Current	I_{PK}	25°C		2.1		A

TYPICAL APPLICATION

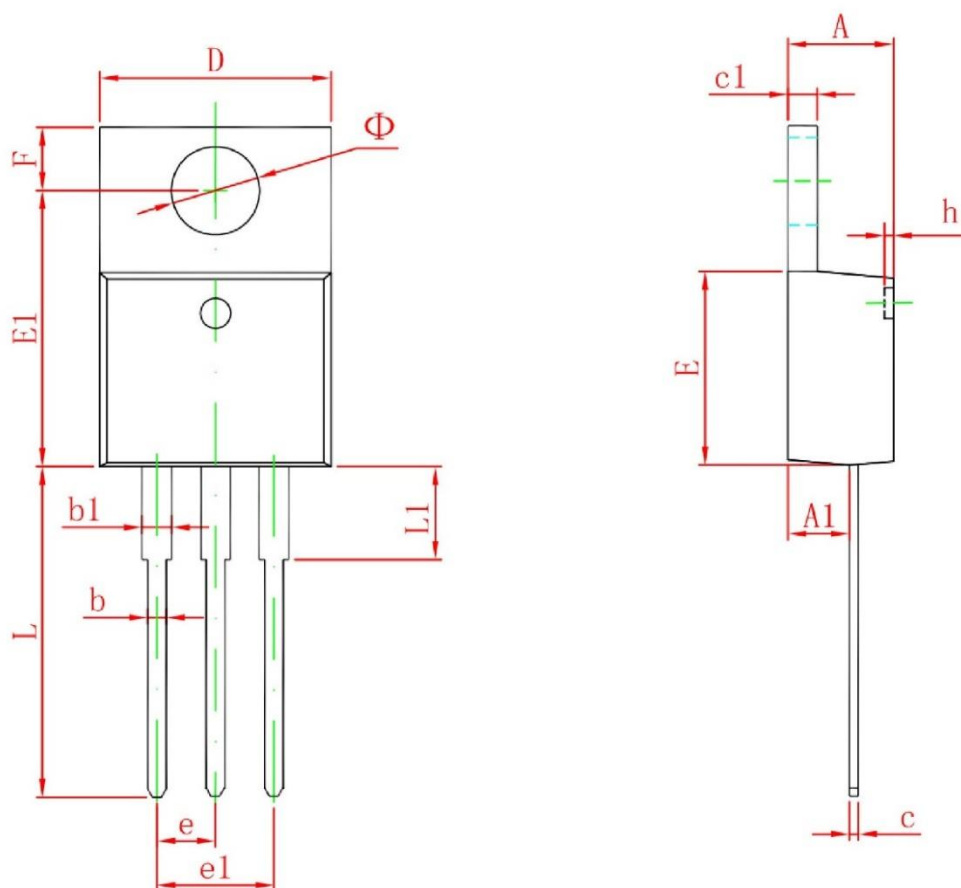


TYPICAL CHARACTERISTICS



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TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

All products, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.

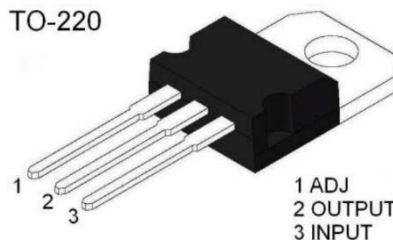
LM317T

Three-terminal adjustable positive voltage regulator

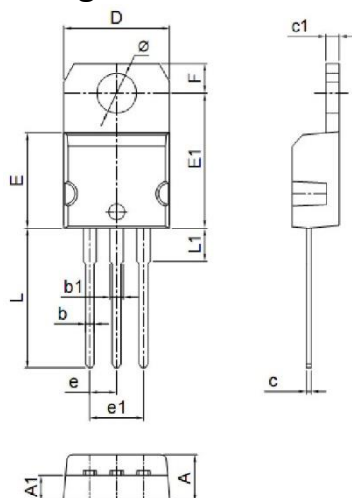
FEATURES

- Output current up to 1.5A
- Output voltage adjustable from 1.3V to 37V
- Internal short circuit protection
- Internal over temperature protection
- RoHS and Reach compliant

TO-220

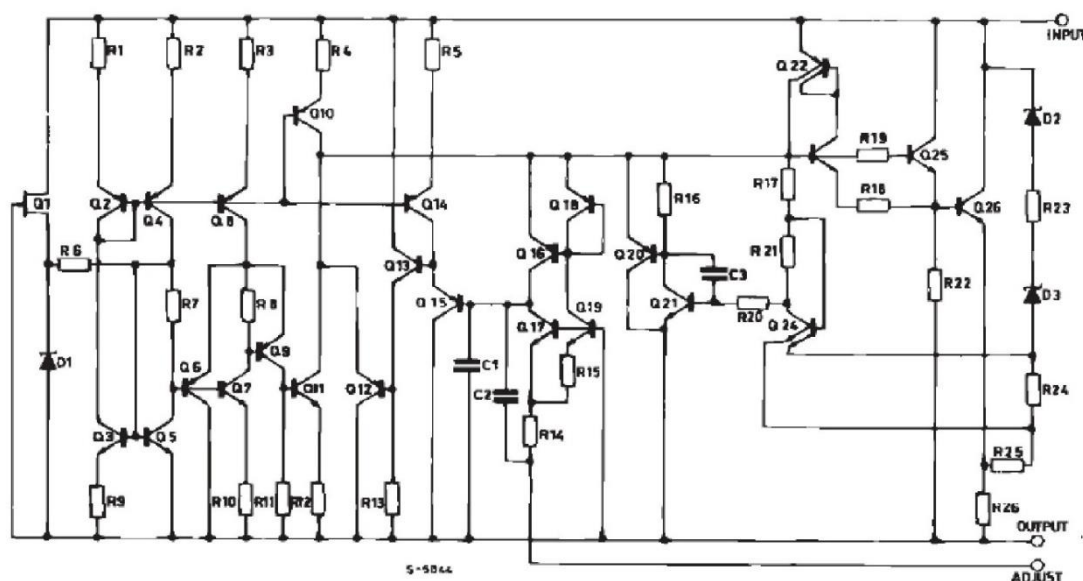


Package Outline Dimensions



Symbol	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.70	0.171	0.184
A1	2.52	2.82	0.099	0.111
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
c	0.40	0.55	0.012	0.020
c1	1.17	1.37	0.046	0.054
D	9.90	10.20	0.390	0.402
E	8.90	9.10	0.335	0.350
E1	12.50	13.00	0.472	0.492
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
F	2.60	2.80	0.102	0.110
L	12.70	13.70	0.520	0.543
L1	2.90	3.30	0.150	0.165
Φ	3.75	3.95	0.142	0.156

SCHEMATIC DIAGRAM



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ABSOLUTE MAXIMUM RATINGS

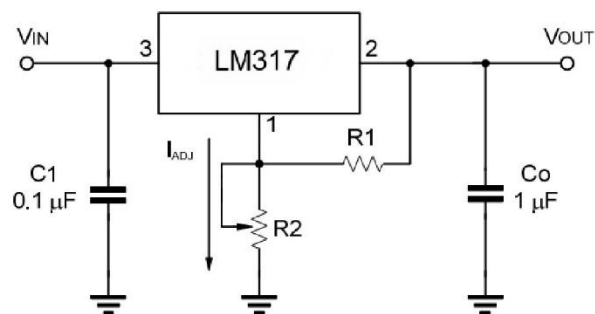
Parameter	Symbol	Value	UNIT
Input-Output Differential Voltage	V_{I-O}	40	V
Output Current	I_O	Internally Limited	
Output Voltage	V_O	5	V
Operating Junction Temperature	T_{OP}	0 ~ +125	°C
Storage Temperature	T_{STG}	-60 ~ +150	°C

ELECTRICAL CHARACTERISTICS

($V_I - V_O = 5V$, $I_O = 500mA$, $I_{MAX} = 1.5A$ and $P_{MAX} = 20W$, unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Line Regulation	ΔV_O	$V_I - V_O = 3 \text{ to } 40V$			0.04	%V
					0.07	
Load Regulation	ΔV_O	$V_O \leq 5V$ $I_O = 10mA \sim I_{MAX} 1.5A$	$T_J = 25^\circ C$		25	mV
					70	
		$V_O \geq 5V$ $I_O = 10mA \sim I_{MAX} 1.5A$	$T_J = 25^\circ C$		0.5	%V
					1.5	
Adjustable Pin Current	I_{ADJ}	$T_J = 25^\circ C$			100	μA
Adjustable Pin Current	ΔI_{ADJ}	$V_I - V_O = 2.5 \text{ to } 40V$ $I_O = 10mA \sim I_{MAX} 1.5A$			5	μA
Output Voltage Drift	$\Delta V / \Delta T$	$I_O = 5mA$		-0.8		mV/°C
Reference Voltage (between pin3 and pin1)	V_{REF}	$V_I - V_O = 2.5 \text{ to } 40V$ $I_O = 10mA \sim I_{MAX} 1.5A$ $P_D \leq P_{MAX}$	1.2	1.25	1.3	V
Output Voltage Temperature Stability	$\Delta V_O / \Delta T$			1		%
Minimum Load Current	$I_{O(MIN)}$	$V_I - V_O = 40V$			10	mA
Maximum Load Current	$I_{O(MAX)}$	$V_I - V_O \leq 15V$, $P_D < P_{MAX}$	1.5			A
		$V_I - V_O = 40V$, $P_D < P_{MAX}$, $T_J = 25^\circ C$		0.4		

APPLICATION CIRCUITS



$$V_{out} = 1.25 \cdot (1 + R2/R1) + I_{ADJ} \cdot R2$$

Fig.1 Programmable Voltage Regulator

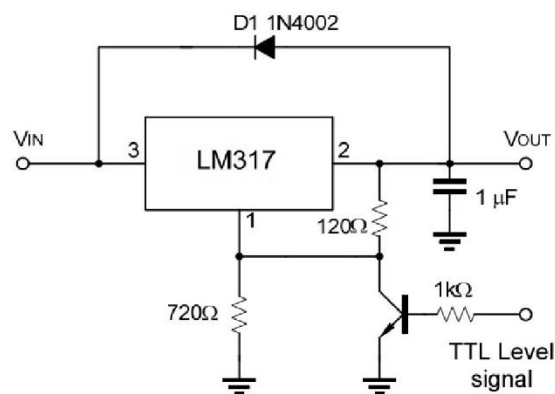


Fig.2 Regulator with ON-off controll

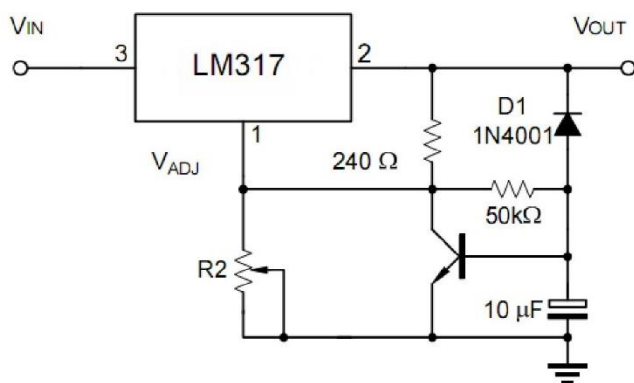


Fig.3 Soft Start Application

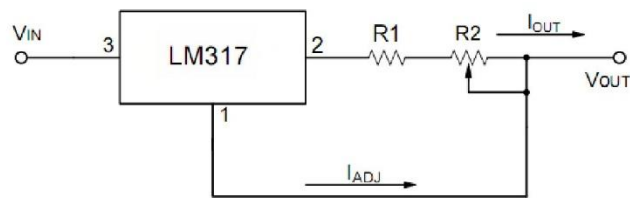


Fig.4. Constant Current Application

TYPICAL CHARACTERISTICS

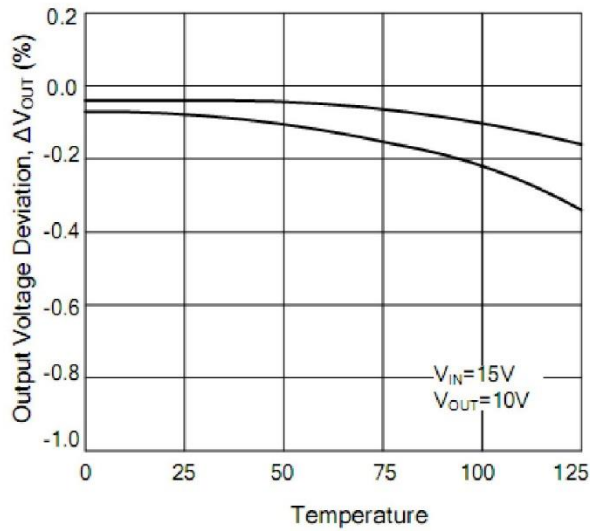


Fig.1. Load Regulation vs. temperature

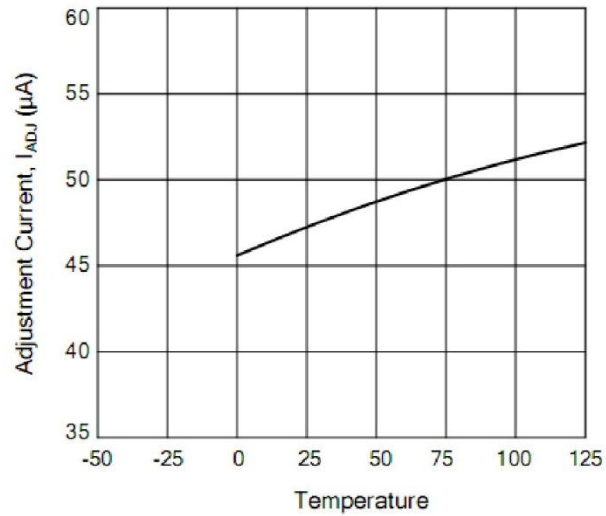


Fig.2. Adjustment Current vs. Temperature

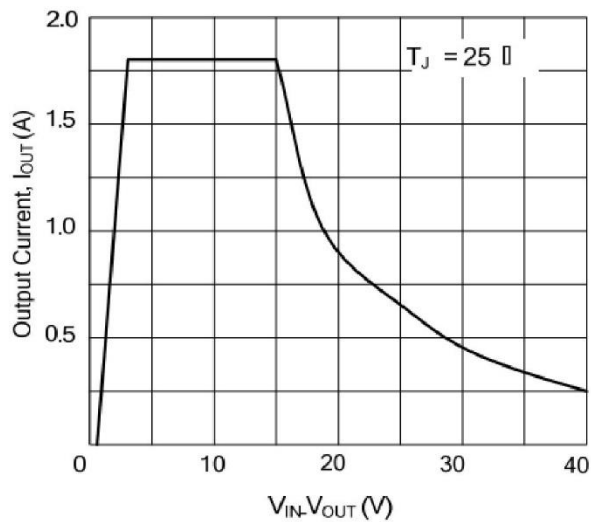


Fig.3. Currents Limit

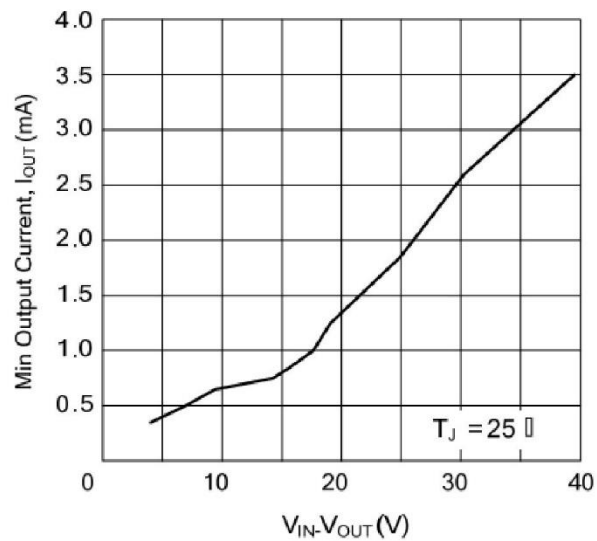


Fig.4. Minimum Operating Current