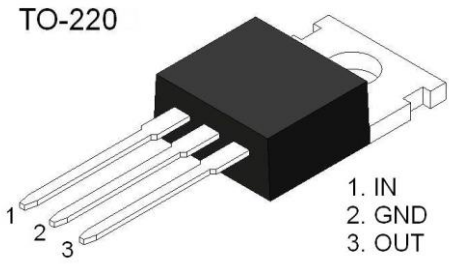
3-terminal 1A positive voltage regulator

Description

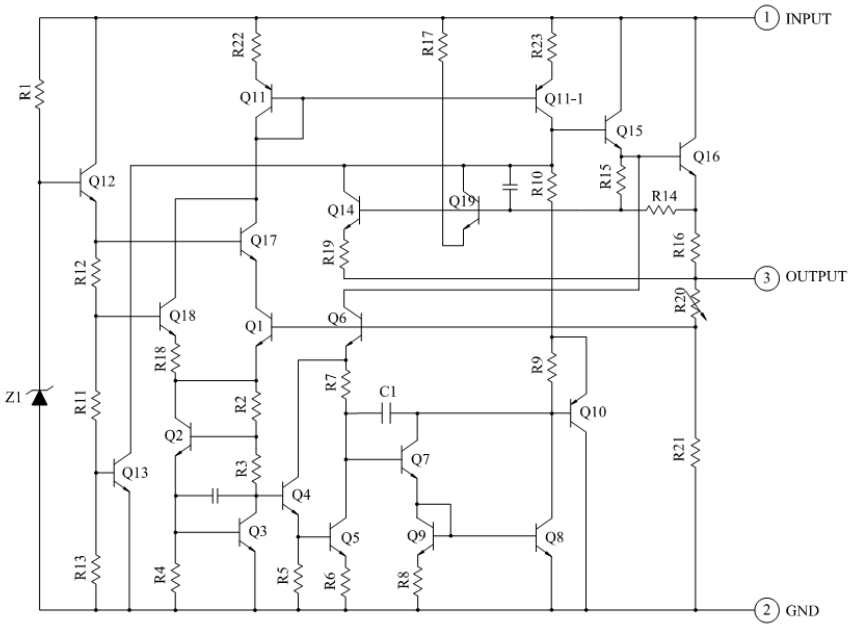
The L78xxCV-Y family is monolithic fixed voltage regulator integrated circuit. They are suitablefor applications that required supply current up to 1 A.



Features

- Output Current up to 1A
- Output Voltages of 5V,6V,8V,9V,10V,12V, 15V, 18V ,20V and 24V available
- Thermal overload shutdown protection
- Short circuit protection
- Output transistor SOA protection

Test Crcuit



Absolute Maximum Ratings

(Operating temperature range applies unless otherwise specified)

Parameter		Symbol	Value	Unit
Input Voltage	for V_O=5V~15V	V_{IN}	30	V
	for V_O=18V~24V		40	
Output Current		I_O	1	A
Power Dissipation		P_D	InternallyLimited	W
Operating Junction Temperature		T_{OPR}	-40 ~ + 150	℃
Storage Temperature		T_{STG}	-55 ~ + 150	℃

L7805CV-Y **Electrical Characteristics**

(V_I = 10V, I_O = 0.5A,C_I = 0.33μF, C_O = 0.1μF, T_j= 0 to 125℃, unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_j = 25℃, I_O=5mA ~ 1A		4.80	5.0	5.20	V
		V_I = 7.5V ~ 20V, I_O=5mA ~ 1A		4.75	5.0	5.25	V
Line Regulation	Δ V_O	T_j = 25℃ I_O= 0.5A	V_I = 7.0V ~ 25V			100	mV
			V_I = 8.0V ~ 12V			50	
Load Regulation	Δ V_O	T_j = 25℃	I_O= 5mA ~ 1A			100	mV
			I_O= 0.25A ~ 0.75A			50	
Quiescent Current	I_Q	T_j = 25℃, I_O=5mA				8.0	mA
Quiescent Current Change	Δ I_Q	I_O=5mA ~ 1A				0.5	mA
		V_I = 7.0V ~ 25V				1.3	
Output Voltage Drift	ΔV /ΔT	I_O = 5mA			-0.6		mV/℃
Output Noise Voltage	V_N	10H_Z ≤ f ≤ 100KH_Z			40		μV/V_O
Ripple Rejection	RR	T_j = 25℃, V_I = 8V ~ 18V f = 120Hz, I_O = 300mA		55	78		dB
Short Circuit Current	I_{SC}	T_j=25℃			230		mA
Peak Out Current	I_{PK}	T_j=25℃			1.6		A
Dropout Voltage	V_d	T_j=25℃, I_O=500mA			2.0		V

L7806CV-Y **Electrical Characteristics**

(V_I = 11V, I_O = 0.5A,C_I = 0.33μF, C_O = 0.1μF, T_j= 0 to 125℃, unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_j = 25℃, I_O=5mA ~ 1A		5.76	6.0	6..24	V
		V_I = 7.5V ~ 20V, I_O=5mA ~ 1A		5.70	6.0	6.30	V
Line Regulation	Δ V_O	T_j = 25℃ I_O= 0.5A	V_I = 8.0V ~ 25V			120	mV
			V_I = 9.0V ~ 13V			60	
Load Regulation	Δ V_O	T_j = 25℃	I_O= 5mA ~ 1A			120	mV
			I_O= 0.25A ~ 0.75A			60	
Quiescent Current	I_Q	T_j = 25℃, I_O=5mA				8.0	mA
Quiescent Current Change	Δ I_Q	I_O=5mA ~ 1A				0.5	mA
		V_I = 8.0V ~ 25V				1.3	
Output Voltage Drift	ΔV /ΔT	I_O = 5mA			-0.7		mV/℃
Output Noise Voltage	V_N	10H_Z ≤ f ≤ 100KH_Z			40		μV/V_O
Ripple Rejection	RR	T_j = 25℃, V_I = 9V ~ 19V f = 120Hz, I_O = 300mA		55	75		dB
Short Circuit Current	I_{SC}	T_j=25℃			230		mA
Peak Out Current	I_{PK}	T_j=25℃			1.6		A
Dropout Voltage	V_d	T_j=25℃, I_O=500mA			2.0		V

L7808CV-Y **Electrical Characteristics**

(V_I = 14V, I_O = 0.5A,C_I = 0.33μF, C_O = 0.1μF, T_j= 0 to 125℃, unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_j = 25℃, I_O=5mA ~ 1A		7.70	8.0	8.30	V
		V_I = 10.5V ~ 23V, I_O=5mA ~ 1A		7.60	8.0	8.40	V
Line Regulation	Δ V_O	T_j = 25℃ I_O= 0.5A	V_I = 10.5V ~ 25V			160	mV
			V_I = 11V ~ 17V			80	
Load Regulation	Δ V_O	T_j = 25℃	I_O= 5mA ~ 1A			160	mV
			I_O= 0.25A ~ 0.75A			80	
Quiescent Current	I_Q	T_j = 25℃, I_O=5mA				8.0	mA
Quiescent Current Change	Δ I_Q	I_O=5mA ~ 1A				0.5	mA
		V_I = 10.5V ~ 25V				1.3	
Output Voltage Drift	ΔV /ΔT	I_O = 5mA			-0.7		mV/℃
Output Noise Voltage	V_N	10H_Z ≤ f ≤ 100KH_Z			58		μV/V_O
Ripple Rejection	RR	T_j = 25℃, V_I = 11.5V ~ 21.5V f = 120Hz, I_O = 300mA		55	75		dB
Short Circuit Current	I_{SC}	T_j=25℃			230		mA
Peak Out Current	I_{PK}	T_j=25℃			1.6		A
Dropout Voltage	V_d	T_j=25℃, I_O=500mA			2.0		V

L7809CV-Y **Electrical Characteristics**

(V_I = 15V, I_O = 0.5A,C_I = 0.33μF, C_O = 0.1μF, T_j= 0 to 125℃, unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_j = 25℃, I_O=5mA ~ 1A		8.64	9.0	9.36	V
		V_I = 11.5V ~ 24V, I_O=5mA ~ 1A		8.55	9.0	9.45	V
Line Regulation	Δ V_O	T_j = 25℃ I_O= 0.5A	V_I = 11.5V ~ 27V			160	mV
			V_I = 12V ~ 16V			80	
Load Regulation	Δ V_O	T_j = 25℃	I_O= 5mA ~ 1A			160	mV
			I_O= 0.25A ~ 0.75A			80	
Quiescent Current	I_Q	T_j = 25℃, I_O=5mA				8.0	mA
Quiescent Current Change	Δ I_Q	I_O=5mA ~ 1A				0.5	mA
		V_I = 11.5V ~ 27V				1.3	
Output Voltage Drift	ΔV /ΔT	I_O = 5mA			-1		mV/℃
Output Noise Voltage	V_N	10H_Z ≤ f ≤ 100KH_Z			58		μV/V_O
Ripple Rejection	RR	T_j = 25℃, V_I = 12V ~ 22V f = 120Hz, I_O = 300mA		55	75		dB
Short Circuit Current	I_{SC}	T_j=25℃			230		mA
Peak Out Current	I_{PK}	T_j=25℃			1.6		A
Dropout Voltage	V_d	T_j=25℃, I_O=500mA			2.0		V

L7810CV-Y **Electrical Characteristics**

(V_I = 16V, I_O = 0.5A,C_I = 0.33μF, C_O = 0.1μF, T_j= 0 to 125℃, unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_j = 25℃, I_O=5mA ~ 1A		9.6	10.0	10.4	V
		V_I = 12.5V ~ 25V, I_O=5mA ~ 1A		9.5	10.0	10.5	V
Line Regulation	Δ V_O	T_j = 25℃ I_O= 0.5A	V_I = 12.5V ~ 27V			240	mV
			V_I = 13V ~ 17V			120	
Load Regulation	Δ V_O	T_j = 25℃	I_O= 5mA ~ 1A			240	mV
			I_O= 0.25A ~ 0.75A			120	
Quiescent Current	I_Q	T_j = 25℃, I_O=5mA				8.0	mA
Quiescent Current Change	Δ I_Q	I_O=5mA ~ 1A				0.5	mA
		V_I = 12.5V ~ 27V				1.3	
Output Voltage Drift	ΔV /ΔT	I_O = 5mA			-1		mV/℃
Output Noise Voltage	V_N	10H_Z ≤ f ≤ 100KH_Z			58		μV/V_O
Ripple Rejection	RR	T_j = 25℃, V_I = 13V ~ 23V f = 120Hz, I_O = 300mA		55	75		dB
Short Circuit Current	I_{SC}	T_j=25℃			230		mA
Peak Out Current	I_{PK}	T_j=25℃			1.6		A
Dropout Voltage	V_d	T_j=25℃, I_O=500mA			2.0		V

L7812CV-Y **Electrical Characteristics**

(V_I = 19V, I_O = 0.5A,C_I = 0.33μF, C_O = 0.1μF, T_j= 0 to 125℃, unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_j = 25℃, I_O=5mA ~ 1A		11.5	12.0	12.5	V
		V_I = 14.5V ~ 27V I_O=5mA ~ 1A		11.4	12.0	12.6	V
Line Regulation	Δ V_O	T_j = 25℃ I_O= 0.5A	V_I = 14.5V ~ 30V			240	mV
			V_I = 16V ~ 22V			120	
Load Regulation	Δ V_O	T_j = 25℃,	I_O= 5mA ~ 1A			240	mV
			I_O= 0.25A ~ 0.75A			120	
Quiescent Current	I_Q	T_j = 25℃				8.0	mA
Quiescent Current Change	Δ I_Q	I_O=5mA ~ 1A				0.5	mA
		V_I = 14.5V ~ 30V				1.3	
Output Voltage Drift	ΔV /ΔT	I_O = 5mA			-1.0		mV/℃
Output Noise Voltage	V_N	10H_Z ≤ f ≤ 100KH_Z			76		μV/V_O
Ripple Rejection	RR	T_j = 25℃, V_I = 15V ~ 25V f = 120Hz, I_O = 300mA		55	71		dB
Short Circuit Current	I_{SC}	T_j=25℃			230		mA
Peak Out Current	I_{PK}	T_j=25℃			1.6		A
Dropout Voltage	V_d	T_j=25℃, I_O=500mA			2.0		V

L7815CV-Y **Electrical Characteristics**

(V_I = 23V, I_O = 0.5A,C_I = 0.33μF, C_O = 0.1μF, T_j= 0 to 125℃, unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_j = 25℃, I_O=5mA ~ 1A		14.4	15.0	15.6	V
		V_I = 14.5V ~ 27V I_O=5mA ~ 1A		11.25	15.0	15.75	V
Line Regulation	Δ V_O	T_j = 25℃ I_O= 0.5A	V_I = 17.5V ~ 30V			300	mV
			V_I = 20V ~ 26V			150	
Load Regulation	Δ V_O	T_j = 25℃,	I_O= 5mA ~ 1A			300	mV
			I_O= 0.25A ~ 0.75A			150	
Quiescent Current	I_Q	T_j = 25℃				8.0	mA
Quiescent Current Change	Δ I_Q	I_O=5mA ~ 1A				0.5	mA
		V_I = 17.5V ~ 30V				1.3	
Output Voltage Drift	ΔV /ΔT	I_O = 5mA			-1.0		mV/℃
Output Noise Voltage	V_N	10H_Z ≤ f ≤ 100KH_Z			76		μV/V_O
Ripple Rejection	RR	T_j = 25℃, V_I = 18.5V ~ 28.5V f = 120Hz, I_O = 300mA		55	71		dB
Short Circuit Current	I_{SC}	T_j=25℃			230		mA
Peak Out Current	I_{PK}	T_j=25℃			1.6		A
Dropout Voltage	V_d	T_j=25℃, I_O=500mA			2.0		V

L7818CV-Y **Electrical Characteristics**

(V_I = 27V, I_O = 0.5A,C_I = 0.33μF, C_O = 0.1μF, T_j= 0 to 125℃, unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_j = 25℃, I_O=5mA ~ 1A		17.3	18.0	18.7	V
		V_I = 21V ~ 33V I_O=5mA ~ 1A		17.1	18.0	18.9	V
Line Regulation	Δ V_O	T_j = 25℃ I_O= 0.5A	V_I = 21V ~ 33V			360	mV
			V_I = 24V ~ 30V			180	
Load Regulation	Δ V_O	T_j = 25℃,	I_O= 5mA ~ 1A			360	mV
			I_O= 0.25A ~ 0.75A			180	
Quiescent Current	I_Q	T_j = 25℃				8.0	mA
Quiescent Current Change	Δ I_Q	I_O=5mA ~ 1A				0.5	mA
		V_I = 21V ~ 33V				1.3	
Output Voltage Drift	ΔV /ΔT	I_O = 5mA			-1.0		mV/℃
Output Noise Voltage	V_N	10H_Z ≤ f ≤ 100KH_Z			76		μV/V_O
Ripple Rejection	RR	T_j = 25℃, V_I = 22V ~ 32V f = 120Hz, I_O = 300mA		55	71		dB
Short Circuit Current	I_{SC}	T_j=25℃			230		mA
Peak Out Current	I_{PK}	T_j=25℃			1.6		A
Dropout Voltage	V_d	T_j=25℃, I_O=500mA			2.0		V

L7820CV-Y **Electrical Characteristics**

(V_I = 29V, I_O = 0.5A,C_I = 0.33μF, C_O = 0.1μF, T_j= 0 to 125℃, unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_j = 25℃, I_O=5mA ~ 1A		19.2	20.0	20.8	V
		V_I = 23V ~ 35V I_O=5mA ~ 1A		19.0	20.0	21.0	V
Line Regulation	Δ V_O	T_j = 25℃ I_O= 0.5A	V_I = 23V ~ 35V			400	mV
			V_I = 26V ~ 32V			200	
Load Regulation	Δ V_O	T_j = 25℃,	I_O= 5mA ~ 1A			400	mV
			I_O= 0.25A ~ 0.75A			200	
Quiescent Current	I_Q	T_j = 25℃				8.0	mA
Quiescent Current Change	Δ I_Q	I_O=5mA ~ 1A				0.5	mA
		V_I = 23V ~ 35V				1.3	
Output Voltage Drift	ΔV /ΔT	I_O = 5mA			-1.0		mV/℃
Output Noise Voltage	V_N	10H_Z ≤ f ≤ 100KH_Z			76		μV/V_O
Ripple Rejection	RR	T_j = 25℃, V_I = 24V ~ 34V f = 120Hz, I_O = 300mA		55	71		dB
Short Circuit Current	I_{SC}	T_j=25℃			230		mA
Peak Out Current	I_{PK}	T_j=25℃			1.6		A
Dropout Voltage	V_d	T_j=25℃, I_O=500mA			2.0		V

L7824CV-Y **Electrical Characteristics**

(V_I = 33V, I_O = 0.5A,C_I = 0.33μF, C_O = 0.1μF, T_j= 0 to 125℃, unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_j = 25℃, I_O=5mA ~ 1A		23.0	24.0	25.0	V
		V_I = 27V ~ 38V I_O=5mA ~ 1A		22.8	24.0	25.2	V
Line Regulation	Δ V_O	T_j = 25℃ I_O= 0.5A	V_I = 27V ~ 35V			400	mV
			V_I = 30V ~ 36V			200	
Load Regulation	Δ V_O	T_j = 25℃,	I_O= 5mA ~ 1A			400	mV
			I_O= 0.25A ~ 0.75A			200	
Quiescent Current	I_Q	T_j = 25℃				8.0	mA
Quiescent Current Change	Δ I_Q	I_O=5mA ~ 1A				0.5	mA
		V_I = 27V ~ 38V				1.3	
Output Voltage Drift	ΔV /ΔT	I_O = 5mA			-1.0		mV/℃
Output Noise Voltage	V_N	10H_Z ≤ f ≤ 100KH_Z			76		μV/V_O
Ripple Rejection	RR	T_j = 25℃, V_I = 28V ~ 38V f = 120Hz, I_O = 300mA		55	71		dB
Short Circuit Current	I_{SC}	T_j=25℃			230		mA
Peak Out Current	I_{PK}	T_j=25℃			1.6		A
Dropout Voltage	V_d	T_j=25℃, I_O=500mA			2.0		V

Test and Application Circuits

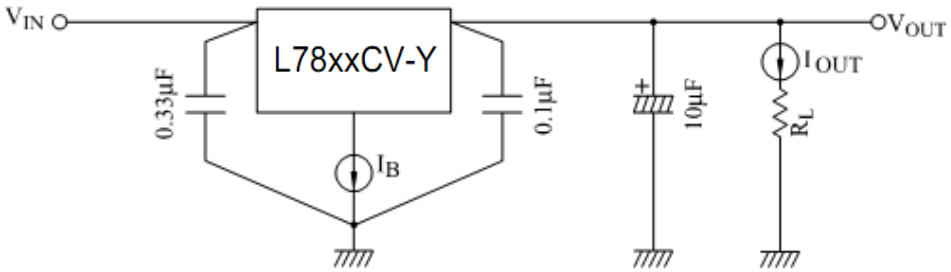


Figure 1. Test and Application Circuits

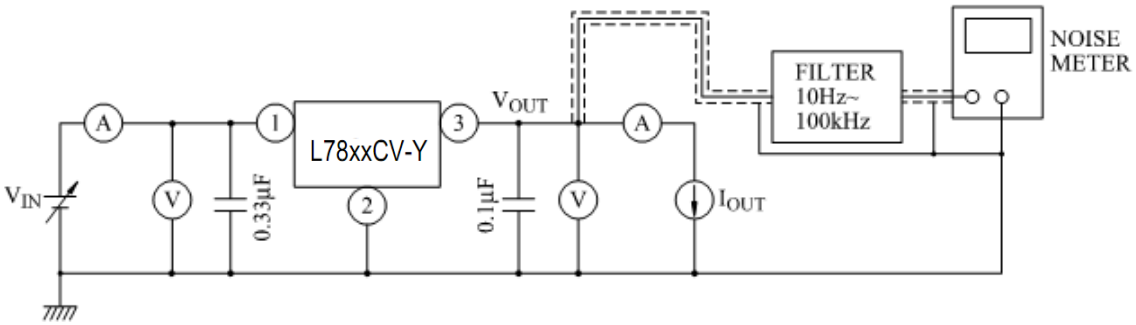


Figure 2. V_N Test Circuits

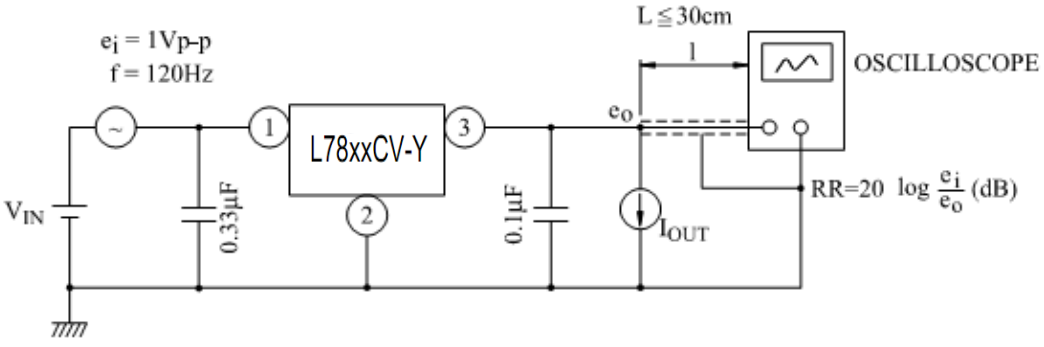


Figure 3. Ripple Rejection

Application Circuits

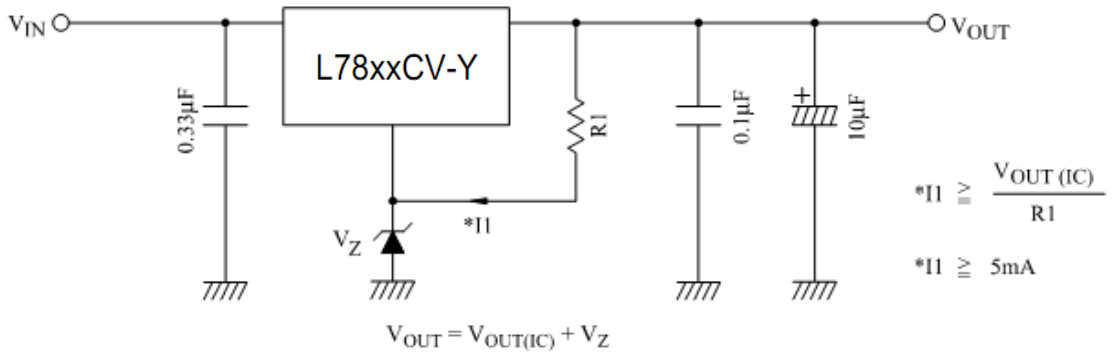


Figure 4. Voltage boost by use of zener diode

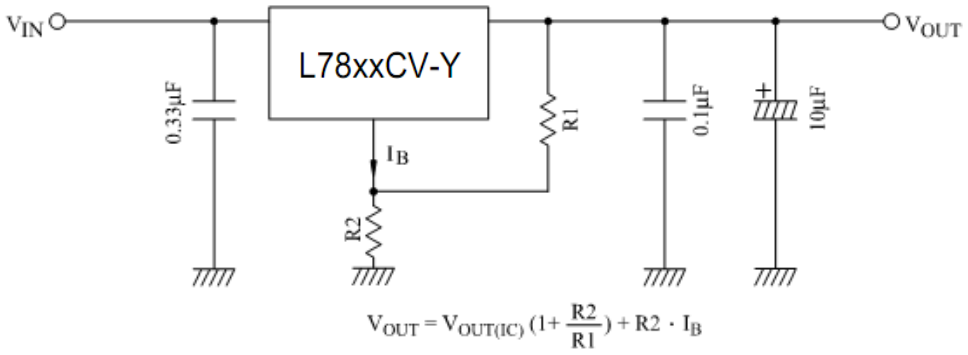


Figure 5. Voltage boost by use of resistor

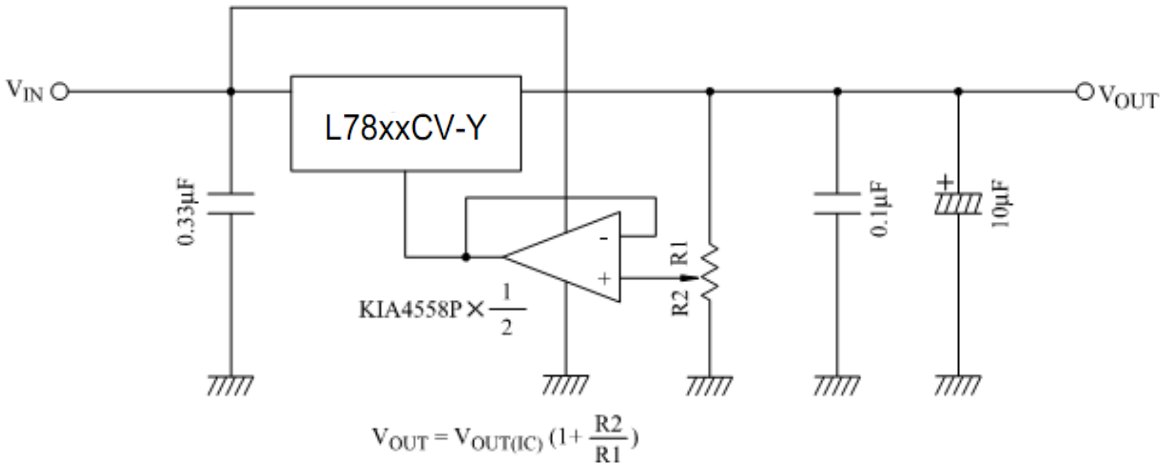


Figure 6. Adjustable output regulator

Application Circuits

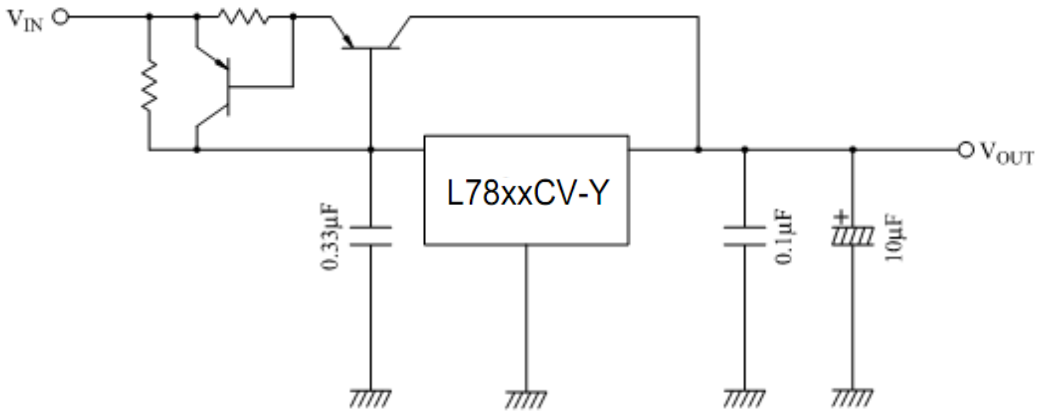


Figure 7. Current boost regulator

Typical Characteristics

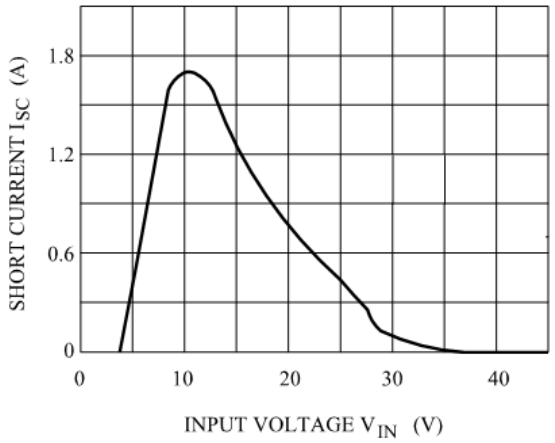


Figure 8. Peak Output Current vs Dropout Voltage

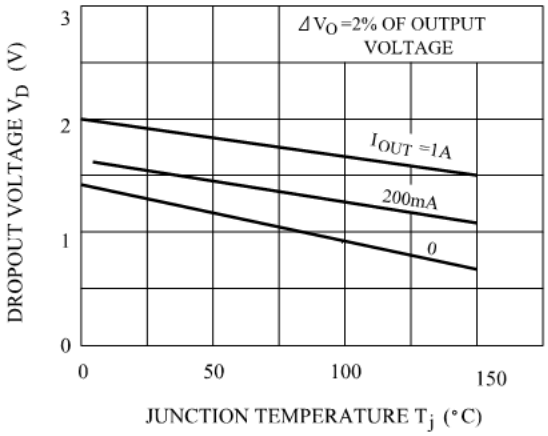


Figure 9. Dropout Voltage vs Junction Temperature

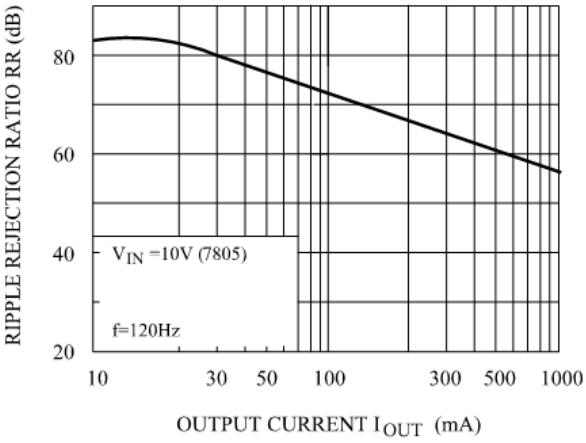


Figure 10. Ripple Rejection vs Frequency

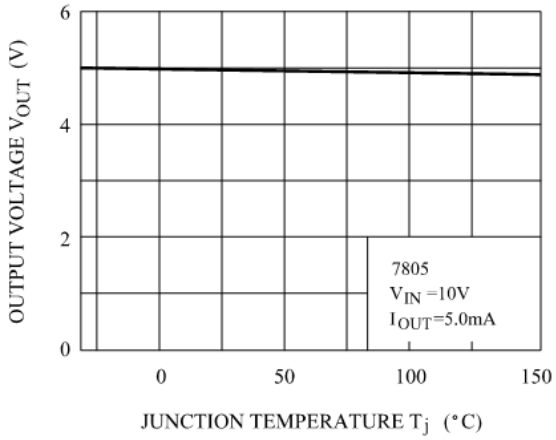
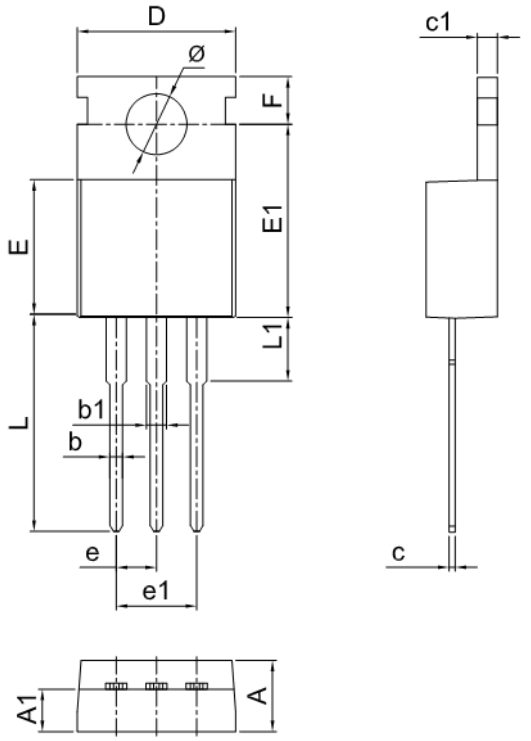


Figure 11. Output Voltage vs Junction Temperature

Package Dimensions



Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.34	4.67	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	0.30	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