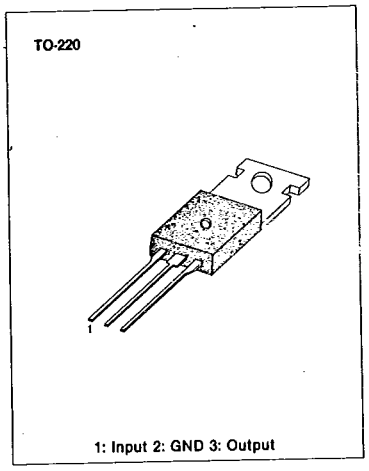
MC78XX/MC78XXA LINEAR INTEGRATED CIRCUIT

3-TERMINAL 1A POSITIVE VOLTAGE REGULATORS

The MC78XX/MC78XXA series of three-terminal positive regulators are available in TO-220 package and with several fixed output voltages, making it useful in a wide range of applications. These Regulators can provide local oncard regulation, eliminating the distribution problems associated with single point regulation. Each type employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.



FEATURES

- **Output Current up to 1.5A**
- **Output voltages of 5; 6; 8; 8.5; 9; 10; 11; 12; 15; 18; 24V**
- **Thermal Overload Protection**
- **Short Circuit Protection**
- **Output Transistor SOA Protection**

ORDERING INFORMATION

Device	Package	Operating Temperature
MC78XXIT	TO-220	−40°C ~ +125°C
MC78XXCT	TO-220	0°C ~ +125°C
MC78XXACT	TO-220	

BLOCK DIAGRAM

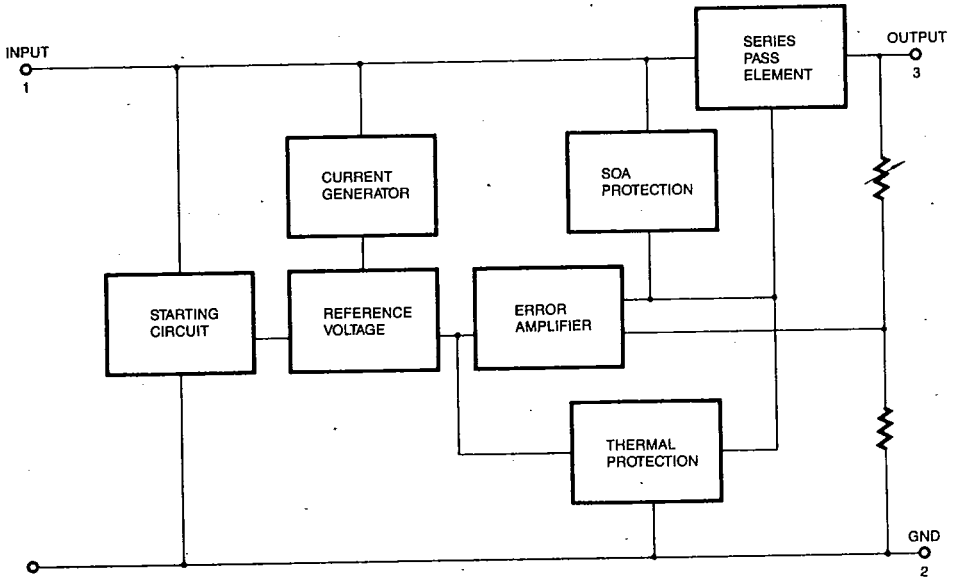


Fig. 1

SCHEMATIC DIAGRAM

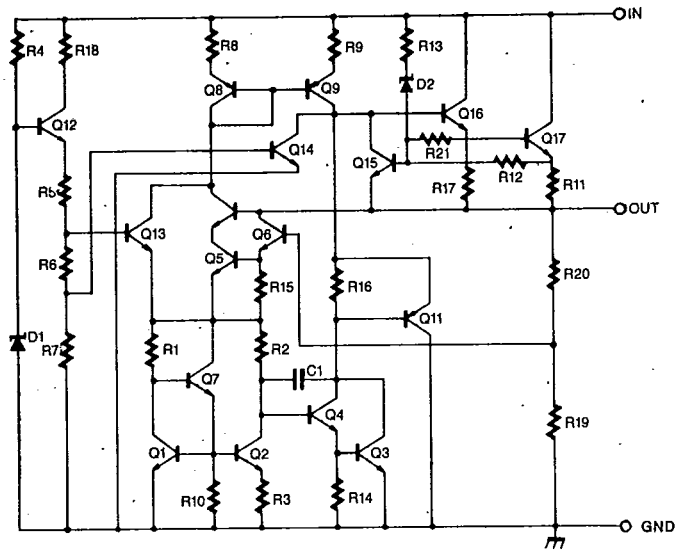


Fig. 2

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Input Voltage (for V_o = 5V to 18V)	V_i	35	V
(for V_o = 24V)	V_i	40	V
Thermal Resistance Junction-Cases	Θ_{JC}	5	°C/W
Thermal Resistance Junction-Air	Θ_{JA}	65	°C/W
Junction Operating Temperature MC78XXI	T_{opr}	−40 ~ +150	°C
MC78XXC/AC		0 ~ +150	°C
Storage Temperature	T_{stg}	−65 ~ +150	°C

ELECTRICAL CHARACTERISTICS MC7805

(Refer to test circuit, $T_{min} < T_j < T_{max}$, $I_o = 500mA$, $V_I = 10V$, $C_I = 0.33\mu F$, $C_o = 0.1\mu F$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		MC7805I			MC7805C			Unit
				Min	Typ	Max	Min	Typ	Max	
Output Voltage	V_o	$T_j = 25°C$		4.8	5.0	5.2	4.8	5.0	5.2	V
		$5.0mA \leq I_o \leq 1.0A$, $P_D \leq 15W$ $V_I = 7V$ to $20V$ $V_I = 8V$ to $20V$		4.75	5.0	5.25	4.75	5.0	5.25	
Line Regulation	ΔV_o	$T_j = 25°C$	$V_I = 7V$ to $25V$		3.0	100		3.0	100	mV
			$V_I = 8V$ to $12V$		1.0	50		1.0	50	
Load Regulation	ΔV_o	$T_j = 25°C$	$I_o = 5.0mA$ to $1.5A$		15	100		15	100	mV
			$I_o = 250mA$ to $750mA$		5	50		5	50	
Quiescent Current	I_d	$T_j = 25°C$			4.2	8		4.2	8	mA
Quiescent Current Change	ΔI_d	$I_o = 5mA$ to $1.0A$				0.5			0.5	mA
		$V_I = 7V$ to $25V$							1.3	
		$V_I = 8V$ to $25V$				1.3				
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$			−1.1			−1.1		mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_j = 25°C$			40			40		μV
Ripple Rejection	RR	$f = 120Hz$ $V_I = 8$ to $18V$		62	78		62	78		dB
Dropout Voltage	V_D	$I_o = 1A$, $T_j = 25°C$			2			2		V
Output Resistance	R_O	$f = 1KHz$			17			17		mΩ
Short Circuit Current	I_{SC}	$V_I = 35V$, $T_j = 25°C$			750			750		mA
Peak Current	I_{peak}	$T_j = 25°C$			2.2			2.2		A

* $T_{min} < T_j < T_{max}$
  MC78XXI: $T_{min} = -40°C$, $T_{max} = 125°C$
  MC78XXC, $T_{min} = 0°C$, $T_{max} = 125°C$
* 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 is used.

ELECTRICAL CHARACTERISTICS MC7806

(Refer to test circuit, $T_{min} < T_j < T_{max}$, $I_o = 500mA$, $V_i = 11V$, $C_i = 0.33\mu F$, $C_o = 0.1\mu F$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		MC7806I			MC7806C			Unit
				Min	Typ	Max	Min	Typ	Max	
Output Voltage	V_o	$T_j = 25°C$		5.75	6.0	6.25	5.75	6.0	6.25	V
		$5.0mA \leq I_o \leq 1.0A$, $P_D \leq 15W$ $V_i = 8.0V$ to $21V$ $V_i = 9.0V$ to $21V$		5.7	6.0	6.3	5.7	6.0	6.3	
Line Regulation	ΔV_o	$T_j = 25°C$	$V_i = 8V$ to $25V$		5	120		5	120	mV
			$V_i = 9V$ to $13V$		1.5	60		1.5	60	
Load Regulation	ΔV_o	$T_j = 25°C$	$I_o = 5mA$ to $1.5A$		14	120		14	120	mV
			$I_o = 250mA$ to $750mA$		4	60		4	60	
Quiescent Current	I_d	$T_j = 25°C$			4.3	8		4.3	8	mA
Quiescent Current Change	ΔI_d	$I_o = 5mA$ to $1A$				0.5			0.5	mA
		$V_i = 8V$ to $25V$							1.3	
		$V_i = 9V$ to $25V$				1.3				
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$			−0.8			−0.8		mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_j = 25°C$			45			45		μV
Ripple Rejection	RR	$f = 120Hz$ $V_i = 9$ to $19V$		59	75		59	75		dB
Dropout Voltage	V_D	$I_o = 1A$, $T_j = 25°C$			2			2		V
Output Resistance	R_O	$f = 1KHz$			19			19		mΩ
Short Circuit Current	I_{SC}	$V_i = 35V$, $T_j = 25°C$			550			550		mA
Peak Current	I_{peak}	$T_j = 25°C$			2.2			2.2		A

* $T_{min} < T_j < T_{max}$
  MC78XXI: $T_{min} = -40°C$, $T_{max} = 125°C$
  MC78XXC, $T_{min} = 0°C$, $T_{max} = 125°C$
* 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 is used.

ELECTRICAL CHARACTERISTICS MC7808

(Refer to test circuit, $T_{min}<T_j<T_{max}$, $I_o=500mA$, $V_i=14V$, $C_i=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		MC7808I			MC7808C			Unit
				Min	Typ	Max	Min	Typ	Max	
Output Voltage	V_o	$T_j=25°C$		7.7	8.0	8.3	7.7	8.0	8.3	V
		$5.0mA \le I_o \le 1.0A$, $P_D \le 15W$ $V_i=10.5V$ to $23V$ $V_i=11.5V$ to $23V$		7.6	8.0	8.4	7.6	8.0	8.4	
Line Regulation	ΔV_o	$T_j=25°C$	$V_i=10.5V$ to $25V$		6.0	160		6.0	160	mV
			$V_i=11.5V$ to $17V$		2.0	80		2.0	80	
Load Regulation	ΔV_o	$T_j=25°C$	$I_o=5.0mA$ to $1.5A$		12	160		12	160	mV
			$I_o=250mA$ to $750mA$		4.0	80		4.0	80	
Quiescent Current	I_d	$T_j=25°C$			4.3	8		4.3	8	mA
Quiescent Current Change	ΔI_d	$I_o=5mA$ to $1.0A$				0.5			0.5	mA
		$V_i=10.5V$ to $25V$							1.0	
		$V_i=11.5V$ to $25V$				1.0				
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o=5mA$			−0.8			−0.8		mV/°C
Output Noise Voltage	V_N	$f=10Hz$ to $100KHz$ $T_j=25°C$			52			52		μV
Ripple Rejection	RR	$f=120Hz$, $V_i=11.5V$ to 21.5		56	72		56	72		dB
Dropout Voltage	V_D	$I_o=1A$, $T_j=25°C$			2			2		V
Output Resistance	R_O	$f=1KHz$			16			16		mΩ
Short Circuit Current	I_{sc}	$V_i=35V$, $T_j=25°C$			450			450		mA
Peak Current	I_{peak}	$T_j=25°C$			2.2			2.2		A

* $T_{min}<T_j<T_{max}$
MC78XXI: $T_{min}=-40°C$, $T_{max}=125°C$
MC78XXC, $T_{min}=0°C$, $T_{max}=125°C$

* 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 is used.

ELECTRICAL CHARACTERISTICS MC7885

(Refer to test circuit $T_{min} < T_j < T_{max}$, $I_o = 500mA$, $V_i = 14.5V$, $C_i = 0.33\mu F$, $C_o = 0.1\mu F$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		MC7885I			MC7885C			Unit
				Min	Typ	Max	Min	Typ	Max	
Output Voltage	V_o	$T_j = 25°C$		8.15	8.5	8.85	8.15	8.5	8.85	V
		$I_o = 5mA$ to $1.0A$, $P_D \leq 15W$ $V_i = 11V$ to $23.5V$ $V_i = 12V$ to $23.5V$		8.1	8.5	8.9	8.1	8.5	8.9	
Line Regulation	ΔV_o	$T_j = 25°C$	$V_i = 11V$ to $25V$		12	170		12	170	mV
			$V_i = 11.5V$ to $18V$		5.0	85		5.0	85	
Load Regulation	ΔV_o	$T_j = 25°C$	$I_o = 5mA$ to $1.5A$		45	170		45	170	mV
			$I_o = 250mA$ to $750mA$		16	85		16	85	
Quiescent Current	I_d	$T_j = 25°C$			4.3	8.0		4.3	8.0	mA
Quiescent Current Change	ΔI_d	$I_o = 5mA$ to $1.0A$				0.5			0.5	mA
		$V_i = 11V$ to $25V$							1.0	
		$V_i = 12V$ to $25V$				1.0				
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$			−1.0			−1.0		mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$, $Ta = 25°C$			55			55		μV
Ripple Rejection	RR	$f = 120Hz$, $V_i = 12V$ to $22V$		56	72		56	72		dB
Dropout Voltage	V_D	$I_o = 1.0A$, $T_j = 25°C$			2.0			2.0		V
Output Resistance	R_o	$f = 1KHz$			17			17		mΩ
Short Circuit Current	I_{sc}	$V_i = 35V$, $T_j = 25°C$			450			450		mA
Peak Current	I_{peak}	$T_j = 25°C$			2.2			2.2		A

* $T_{min} < T_j < T_{max}$
  MC78XXI: $T_{min} = -40°C$, $T_{max} = 125°C$
  MC78XXC: $T_{min} = 0°C$, $T_{max} = 125°C$
* 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 is used.

ELECTRICAL CHARACTERISTICS MC7809

(Refer to test circuit, $T_{min} < T_j < T_{max}$, $I_o = 500mA$, $V_i = 15V$, $C_i = 0.33\mu F$, $C_o = 0.1\mu F$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		MC7809I			MC7809C			Unit
				Min	Typ	Max	Min	Typ	Max	
Output Voltage	V_o	$T_j = 25°C$		8.65	9	9.35	8.65	9	9.35	V
		$5.0mA \leq I_o \leq 1.0A$, $P_D \leq 15W$ $V_i = 11.5V$ to $24V$ $V_i = 12.5V$ to $24V$		8.6	9	9.4	8.6	9	9.4	
Line Regulation	ΔV_o	$T_j = 25°C$	$V_i = 11.5V$ to $25V$		6	180		6	180	mV
			$V_i = 12V$ to $25V$		2	90		2	90	
Load Regulation	ΔV_o	$T_j = 25°C$	$I_o = 5mA$ to $1.5A$		12	180		12	180	mV
			$I_o = 250mA$ to $750mA$		4	80		4	90	
Quiescent Current	I_d	$T_j = 25°C$			4.3	8		4.3	8.0	mA
Quiescent Current Change	ΔI_d	$I_o = 5mA$ to $1.0A$				0.5			0.5	mA
		$V_i = 11.5V$ to $26V$							1.3	
		$V_i = 12.5V$ to $26V$				1.3				
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$			−1			−1		mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_j = 25°C$			58			58		μV
Ripple Rejection	RR	$f = 120Hz$ $V_i = 13V$ to $23V$		56	71		56	71		dB
Dropout Voltage	V_D	$I_o = 1A$, $T_j = 25°C$			2			2		V
Output Resistance	R_O	$f = 1KHz$			17			17		mΩ
Short Circuit Current	I_{SC}	$V_i = 35V$, $T_j = 25°C$			450			450		mA
Peak Current	I_{peak}	$T_j = 25°C$			2.2			2.2		A

* $T_{min} < T_j < T_{max}$
  MC78XXI: $T_{min} = -40°C$, $T_{max} = 125°C$
  MC78XXC, $T_{min} = 0°C$, $T_{max} = 125°C$
* 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 is used.

MC78XX/MC78XXA LINEAR INTEGRATED CIRCUIT

ELECTRICAL CHARACTERISTICS MC7810

(Refer to test circuit, $T_{min} < T_J < T_{max}$, $I_o = 500mA$, $V_I = 16V$, $C_I = 0.33\mu F$, $C_o = 0.1\mu F$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		MC7810I			MC7810C			Unit
				Min	Typ	Max	Min	Typ	Max	
Output Voltage	V_o	$T_J = 25°C$		9.6	10	10.4	9.6	10	10.4	V
		$5.0mA \leq I_o \leq 1.0A$, $P_D \leq 15W$ $V_I = 12.5V$ to $25V$ $V_I = 13.5V$ to $25V$		9.5	10	10.5	9.5	10	10.5	
Line Regulation	ΔV_o	$T_J = 25°C$	$V_I = 12.5V$ to $25V$		10	200		10	200	mV
			$V_I = 13V$ to $20V$		3	100		3	100	
Load Regulation	ΔV_o	$T_J = 25°C$	$I_o = 5mA$ to $1.5A$		12	200		12	200	mV
			$I_o = 250mA$ to $750mA$		4	100		4	100	
Quiescent Current	I_d	$T_J = 25°C$			4.3	8		4.3	8	mA
Quiescent Current Change	ΔI_d	$I_o = 5mA$ to $1.0A$				0.5			0.5	mA
		$V_I = 12.5V$ to $29V$							1.0	
		$V_I = 13.5V$ to $29V$				1.0				
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$			−1			−1		mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_J = 25°C$			58			58		μV
Ripple Rejection	RR	$f = 120Hz$ $V_I = 14V$ to $23V$		56	71		56	71		dB
Dropout Voltage	V_D	$I_o = 1A$, $T_J = 25°C$			2			2		V
Output Resistance	R_O	$f = 1KHz$			17			17		mΩ
Short Circuit Current	I_{SC}	$V_I = 35V$, $T_J = 25°C$			420			420		mA
Peak Current	I_{peak}	$T_J = 25°C$			2.2			2.2		A

* $T_{min} < T_J < T_{max}$
  MC78XXI: $T_{min} = -40°C$, $T_{max} = 125°C$
  MC78XXC, $T_{min} = 0°C$, $T_{max} = 125°C$
* 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 is used.

ELECTRICAL CHARACTERISTICS MC7811

(Refer to test circuit, $T_{min}<T_j<T_{max}$, $I_o=500mA$, $V_i=18V$, $C_i=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	MC7811I			MC7811C			Unit
			Min	Typ	Max	Min	Typ	Max	
Output Voltage	V_o	$T_j=25°C$	10.6	11	11.4	10.6	11	11.4	V
		$5.0mA\leq I_o\leq 1.0A$, $P_D\leq 15W$ $V_i=13.5V$ to $26V$				10.5	11	11.5	
		$V_i=14.5V$ to $26V$	10.5	11	11.5				
Line Regulation	ΔV_o	$T_j=25°C$, $V_i=13.5$ to $25V$		10	220		10	220	mV
		$T_j=25°C$, $V_i=14$ to $21V$		3.0	110		3.0	110	
Load Regulation	ΔV_o	$T_j=25°C$, $I_o=5.0mA$ to $1.5A$		12	220		12	220	mV
		$T_j=25°C$, $I_o=250mA$ to $750mA$		4	110		4	110	
Quiescent Current	I_d	$T_j=25°C$		4.3	8		4.3	8	mA
Quiescent Current Change	ΔI_d	$I_o=5mA$ to $1A$			0.5			0.5	mA
		$V_i=13.5V$ to $29V$						1.0	
		$V_i=14.5V$ to $29V$			1.0				
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o=5mA$		−1			−1		mV/°C
Output Noise Voltage	V_N	$f=10Hz$ to $100KHz$ $T_j=25°C$		70			70		μV
Ripple Rejection	RR	$f=120Hz$ $V_i=14V$ to $24V$	55	71		55	71		dB
Dropout Voltage	V_D	$I_o=1A$, $T_j=25°C$		2			2		V
Output Resistance	R_O	$f=1KHz$		18			18		mΩ
Short Circuit Current	I_{SC}	$V_i=35V$, $T_j=25°C$		390			390		mA
Peak Current	I_{peak}	$T_j=25°C$		2.2			2.2		A

* $T_{min}<T_j<T_{max}$
  MC78XXI: $T_{min}=-40°C$, $T_{max}=125°C$
  MC78XXC, $T_{min}=0°C$, $T_{max}=125°C$
* 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 is used.

MC78XX/MC78XXA LINEAR INTEGRATED CIRCUIT

ELECTRICAL CHARACTERISTICS MC7812

(Refer to test circuit, $T_{min} < T_j < T_{max}$, $I_o = 500mA$, $V_i = 19V$, $C_i = 0.33\mu F$, $C_o = 0.1\mu F$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		MC7812I			MC7812C			Unit
				Min	Typ	Max	Min	Typ	Max	
Output Voltage	V_o	$T_j = 25°C$		11.5	12	12.5	11.5	12	12.5	V
		$5.0mA \leq I_o \leq 1.0A$, $P_D \leq 15W$ $V_{in} = 14.5V$ to $27V$ $V_i = 15.5V$ to $27V$		11.4	12	12.6	11.4	12	12.6	
Line Regulation	ΔV_o	$T_j = 25°C$	$V_i = 14.5$ to $30V$		10	240		10	240	mV
			$V_i = 16$ to $22V$		3.0	120		3.0	120	
Load Regulation	ΔV_o	$T_j = 25°C$	$I_o = 5mA$ to $1.5A$		12	240		12	240	mV
			$I_o = 250mA$ to $750mA$		4.0	120		4.0	120	
Quiescent Current	I_d	$T_j = 25°C$			4.3	8		4.3	8	mA
Quiescent Current Change	ΔI_d	$I_o = 5mA$ to $1.0A$				0.5			0.5	mA
		$V_i = 14.5V$ to $30V$							1.0	
		$V_i = 15V$ to $30V$				1.0				
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$			−1			−1		mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_j = 25°C$			75			75		μV
Ripple Rejection	RR	$f = 120Hz$ $V_i = 15V$ to $25V$		55	71		55	71		dB
Dropout Voltage	V_D	$I_o = 1A$, $T_j = 25°C$			2			2		V
Output Resistance	R_O	$f = 1KHz$			18			18		mΩ
Short Circuit Current	I_{SC}	$V_i = 35V$, $T_j = 25°C$			350			350		mA
Peak Current	I_{peak}	$T_j = 25°C$			2.2			2.2		A

* $T_{min} < T_j < T_{max}$
  MC78XXI: $T_{min} = -40°C$, $T_{max} = 125°C$
  MC78XXC, $T_{min} = 0°C$, $T_{max} = 125°C$
* 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 is used.

ELECTRICAL CHARACTERISTICS MC7815

(Refer to test circuit, $T_{min} < T_J < T_{max}$, $I_o = 500mA$, $V_I = 23V$, $C_I = 0.33\mu F$, $C_o = 0.1\mu F$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	MC7815I			MC7815C			Unit
			Min	Typ	Max	Min	Typ	Max	
Output Voltage	V_o	$T_J = 25°C$	14.4	15	15.6	14.4	15	15.6	V
		$5.0mA \leq I_o \leq 1.0A$, $P_D \leq 15W$ $V_I = 17.5V$ to $30V$ $V_I = 18.5V$ to $30V$	14.25	15	15.75	14.25	15	15.75	
Line Regulation	ΔV_o	$T_J = 25°C$, $V_I = 17.5$ to $30V$		11	300		11	300	mV
		$T_J = 25°C$, $V_I = 20$ to $26V$		3	150		3	150	
Load Regulation	ΔV_o	$T_J = 25°C$, $I_o = 5.0mA$ to $1.5A$		12	300		12	300	mV
		$T_J = 25°C$, $I_o = 250mA$ to $750mA$		4	150		4	150	
Quiescent Current	I_d	$T_J = 25°C$		4.4	8		4.4	8	mA
Quiescent Current Change	ΔI_d	$I_o = 5mA$ to $1.0A$			0.5			0.5	mA
		$V_I = 17.5V$ to $30V$						1.0	
		$V_I = 18.5V$ to $30V$			1.0				
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$		−1			−1		mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_J = 25°C$		90			90		μV
Ripple Rejection	RR	$f = 120Hz$ $V_I = 18.5V$ to $28.5V$	54	70		54	70		dB
Dropout Voltage	V_D	$I_o = 1A$, $T_j = 25°C$		2			2		V
Output Resistance	R_O	$f = 1KHz$		19			19		mΩ
Short Circuit Current	I_{SC}	$V_i = 35V$, $T_J = 25°C$		230			230		mA
Peak Current	I_{peak}	$T_j = 25°C$		2.2			2.2		A

* $T_{min} < T_j < T_{max}$
MC78XXI: $T_{min} = -40°C$, $T_{max} = 125°C$
MC78XXC, $T_{min} = 0°C$, $T_{max} = 125°C$

* 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 is used.

ELECTRICAL CHARACTERISTICS MC7818

(Refer to test circuit, $T_{min} < T_j < T_{max}$, $I_o = 500mA$, $V_I = 27V$, $C_i = 0.33\mu F$, $C_o = 0.1\mu F$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		MC7818I			MC7818C			Unit
				Min	Typ	Max	Min	Typ	Max	
Output Voltage	V_o	$T_j = 25°C$		17.3	18	18.7	17.3	18	18.7	V
		$5.0mA \leq I_o \leq 1.0A$, $P_D \leq 15W$ $V_I = 21V$ to $33V$ $V_I = 22V$ to $33V$		17.1	18	18.9	17.1	18	18.9	
Line Regulation	ΔV_o	$T_j = 25°C$	$V_I = 21$ to $33V$		15	360		15	360	mV
			$V_I = 24$ to $30V$		5	180		5	180	
Load Regulation	ΔV_o	$T_j = 25°C$	$I_o = 5mA$ to $1.5A$		12	360		12	360	mV
			$I_o = 250mA$ to $750mA$		4.0	180		4.0	180	
Quiescent Current	I_d	$T_j = 25°C$			4.3	8		4.3	8	mA
Quiescent Current Change	ΔI_d	$I_o = 5mA$ to $1A$				0.5			0.5	mA
		$V_I = 21V$ to $33V$							1	
		$V_I = 22V$ to $33V$				1				
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$			−1			−1		mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_j = 25°C$			110			110		μV
Ripple Rejection	RR	$f = 120Hz$ $V_I = 22V$ to $32V$		53	69		53	69		dB
Dropout Voltage	V_D	$I_o = 1A$, $T_j = 25°C$			2			2		V
Output Resistance	R_O	$f = 1KHz$			22			22		mΩ
Short Circuit Current	I_{SC}	$V_I = 35V$, $T_j = 25°C$			200			200		mA
Peak Current	I_{peak}	$T_j = 25°C$			2.2			2.2		A

* $T_{min} < T_j < T_{max}$
  MC78XXI: $T_{min} = -40°C$, $T_{max} = 125°C$
  MC78XXC, $T_{min} = 0°C$, $T_{max} = 125°C$
* 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 is used.

ELECTRICAL CHARACTERISTICS MC7824

(Refer to test circuit, $T_{min} < T_j < T_{max}$, $I_o = 500mA$, $V_i = 33V$, $C_i = 0.33\mu F$, $C_o = 0.1\mu F$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		MC7824I			MC7824C			Unit
				Min	Typ	Max	Min	Typ	Max	
Output Voltage	V_o	$T_j = 25°C$		23	24	25	23	24	25	V
		$5.0mA \leq I_o \leq 1.0A$, $P_D \leq 15W$ $V_i = 27V$ to $38V$ $V_i = 28V$ to $38V$		22.8	24	25.2	22.8	24	25.2	
Line Regulation	ΔV_o	$T_j = 25°C$	$V_i = 27V$ to $38V$		18	480		18	480	mV
			$V_i = 30V$ to $36V$		6	240		6	240	
Load Regulation	ΔV_o	$T_j = 25°C$	$I_o = 5mA$ to $1.5A$		12	480		12	480	mV
			$I_o = 250mA$ to $750mA$		4	240		4	240	
Quiescent Current	I_d	$T_j = 25°C$			4.3	8		4.3	8	mA
Quiescent Current Change	ΔI_d	$I_o = 5mA$ to $1A$				0.5			0.5	mA
		$V_i = 27V$ to $38V$							1	
		$V_i = 28V$ to $38V$				1				
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$			−1.5			−1.5		mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_j = 25°C$			170			170		μV
Ripple Rejection	RR	$f = 120Hz$ $V_i = 28V$ to $38V$		50	66		50	66		dB
Dropout Voltage	V_D	$I_o = 1A$, $T_j = 25°C$			2			2		V
Output Resistance	R_O	$f = 1KHz$			28			28		mΩ
Short Circuit Current	I_{SC}	$V_i = 35V$, $T_j = 25°C$			150			150		mA
Peak Current	I_{peak}	$T_j = 25°C$			2.2			2.2		A

* $T_{min} < T_j < T_{max}$
MC78XXI: $T_{min} = -40°C$, $T_{max} = 125°C$
MC78XXC, $T_{min} = 0°C$, $T_{max} = 125°C$

* 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 is used.

ELECTRICAL CHARACTERISTICS MC7805AC

(Refer to the test circuits, T_j=0 to 125°C, I_o=1A, V_i=10V, C_i=0.33μF, C_o=0.1μF unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	T_j=25°C	4.9	5	5.1	V
		I_o=5mA to 1A, $P_D \leq$15W, V_i=7.5 to 20V	4.8	5	5.2	
*Line Regulation	ΔV_o	V_i=7.5 to 25V, I_o=500mA		7	50	mV
		V_i=8 to 12V		10	50	
		T_j=25°C, V_i=7.3 to 25V		7	50	
		T_j=25°C, V_i=8 to 12V		2	25	
*Load Regulation	ΔV_o	T_j=25°C, I_o=5mA to 1.5A		25	100	mV
		I_o=5mA to 1A		25	100	
		I_o=250 to 750mA		8	50	
Quiescent Current	I_d	T_j=25°C		4.3	6	mA
Quiescent Current Change	ΔI_d	I_o=5mA to 1A			0.5	mA
		V_i=8 to 25V, I_o=500mA			0.8	
		V_i=7.5 to 20V, T_j=25°C			0.8	
Output Voltage Drift	$\frac{\Delta V_o}{\Delta T}$	I_o=5mA		−1.1		mV/°C
Output Noise Voltage	V_N	f=10Hz to 100KHz: T_a=25°C		10		$\frac{\mu V}{V_o}$
Ripple Rejection	RR	f=120Hz, I_o=500mA, V_i=8 to 18V		68		dB
Dropout Voltage	V_D	I_o=1A, T_j=25°C		2		V
Output Resistance	R_o	f=1KHz		17		mΩ
Short Circuit Current	I_{sc}	V_i=35V, T_a=25°C		750		mA
Peak Current	I_{peak}	T_j=25°C		2.2		A

* 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.

ELECTRICAL CHARACTERISTICS MC7806AC

(Refer to the test circuits, T_J=0 to 150°C, I_o=1A, V_i=11V, C_i=0.33μF, C_o=0.1μF unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	T_J=25°C	5.88	6	6.12	V
		I_o=5mA to 1A, $P_D \leq$ 15W, V_i=8.6 to 21V	5.76	6	6.24	
*Line Regulation	ΔV_o	V_i=8.6 to 25V, I_o=500mA		9	60	mV
		V_i=9 to 13V		11	60	
		T_J=25°C, V_i=8.3 to 21V		9	60	
		T_J=25°C, V_i=9 to 13V		3	30	
*Load Regulation	ΔV_o	T_J=25°C, I_o=5mA to 1.5A		43	100	mV
		I_o=5mA to 1A		43	100	
		I_o=250 to 750mA		16	50	
Quiescent Current	I_d	T_J=25°C		4.3	6	mA
Quiescent Current Change	ΔI_d	I_o=5mA to 1A			0.5	mA
		V_i=9 to 25V, I_o=500mA			0.8	
		V_i=8.6 to 21V, T_J=25°C			0.8	
Output Voltage Drift	$\frac{\Delta V_o}{\Delta T}$	I_o=5mA		−0.8		mV/°C
Output Noise Voltage	V_N	f=10Hz to 100KHz, T_a=25°C		10		$\frac{\mu V}{V_o}$
Ripple Rejection	RR	f=120Hz, I_o=500mA, V_i=9 to 19V		65		dB
Dropout Voltage	V_d	I_o=1A, T_j=25°C		2		V
Output Resistance	R_o	f=1KHz		17		mΩ
Short Circuit Current	I_{sc}	V_i=35V, T_a=25°C		550		mA
Peak Current	I_{peak}	T_j=25°C		2.2		A

* 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.

ELECTRICAL CHARACTERISTICS MC7808AC

(Refer to the test circuits, T_J=0 to 150°C, I_o=1A, V_i=14V, C_i=0.33μF, C_o=0.1μF unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	T_j=25°C	7.84	8	8.16	V
		I_o=5mA to 1A, $P_D \leq$ 15W, V_i=10.6 to 23V	7.7	8	8.3	
*Line Regulation	ΔV_o	V_i=10.6 to 25V, I_o=500mA		12	80	mV
		V_i=11 to 17V		15	80	
		T_j=25°C, V_i=10.4 to 23V		12	80	
		T_j=25°C, V_i=11 to 17V		5	40	
*Load Regulation	ΔV_o	T_j=25°C, I_o=5mA to 1.5A		45	100	mV
		I_o=5mA to 1A		45	100	
		I_o=250 to 750mA		16	50	
Quiescent Current	I_d	T_j=25°C		4.3	6	mA
Quiescent Current Change	ΔI_d	I_o=5mA to 1A			0.5	mA
		V_i=11 to 25V, I_o=500mA			0.8	
		V_i=10.6 to 23V, T_j=25°C			0.8	
Output Voltage Drift	$\frac{\Delta V_o}{\Delta T}$	I_o=5mA		−0.8		mV/°C
Output Noise Voltage	V_N	f=10Hz to 100KHz, T_a=25°C		10		$\frac{\mu V}{V_o}$
Ripple Rejection	RR	f=120Hz, I_o=500mA, V_i=11.5 to 21.5V		62		dB
Dropout Voltage	V_D	I_o=1A, T_j=25°C		2		V
Output Resistance	R_o	f=1KHz		18		mΩ
Short Circuit Current	I_{sc}	V_i=35V, T_a=25°C		450		mA
Peak Current	I_{peak}	T_j=25°C		2.2		A

* 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.

ELECTRICAL CHARACTERISTICS MC7885AC

(Refer to the test circuits, T_j = 0 to 125°C, I_o = 1A, V_i = 14V, C_i = 0.33μF, C_o = 0.1μF unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	T_j = 25°C	8.33	8.5	8.67	V
		I_o = 5mA to 1.0A, $P_D \leq$ 15W V_i = 11.2V to 23.5V	8.15	8.5	8.85	
Line Regulation	ΔV_o	V_i = 11.2V to 25V I_o = 500mA		12	85	mV
		V_i = 11.5V to 18V		15	43	
		T_j = 25°C, V_i = 11V to 23.5V		12	85	
		T_j = 25°C, V_i = 11.5V to 18V		5.0	43	
Load Regulation	ΔV_o	T_j = 25°C I_o = 5mA to 1.5A		45	100	mV
		I_o = 5mA to 1.0A		45	100	
		I_o = 250mA to 750mA		16	50	
Quiescent Current	I_d	T_j = 25°C		4.3	6.0	mA
Quiescent Current Change	ΔI_d	I_o = 5mA to 1.0A			0.5	mA
		V_i = 11.5V to 25V, T_j = 25°C			0.8	
		V_i = 11.2V to 23.5V, I_o = 500mA			0.8	
Output Voltage Drift	$\Delta V_o/\Delta T$	I_o = 5mA		−1.0		mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz, Ta = 25°C		10		μV/V_o
Ripple Rejection	RR	f = 120Hz, V_i = 12V to 22V I_o = 500mA		62		dB
Dropout Voltage	V_D	I_o = 1.0A, T_j = 25°C		2.0		V
Output Resistance	R_o	f = 1KHz		17		m
Short Circuit Current	I_{short}	V_i = 35V, T_a = 25°C		450		mA
Peak Current	I_{peak}	T_j = 25°C		2.2		A

* 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.

ELECTRICAL CHARACTERISTICS MC7809AC

(Refer to the test circuits, $T_j = 0$ to 125°C, $I_o = 1A$, $V_I = 15V$, $C_i = 0.33\mu F$, $C_o = 0.1\mu F$ unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	$T_j = 25°C$	8.82	9.0	9.18	V
		$I_o = 5mA$ to 1.0A, $P_D \leq 15W$ $V_I = 11.2V$ to 24V	8.65	9.0	9.35	
Line Regulation	ΔV_o	$V_I = 11.7V$ to 25V $I_o = 500mA$		12	90	mV
		$V_I = 12.5V$ to 19V		15	45	
		$T_j = 25°C$, $V_I = 11.5V$ to 24V		12	90	
		$T_j = 25°C$, $V_I = 12.5V$ to 19V		5.0	45	
Load Regulation	ΔV_o	$T_j = 25°C$ $I_o = 5mA$ to 1.0A		46	100	mV
		$I_o = 5mA$ to 1.0A		46	100	
		$I_o = 250mA$ to 750mA		17	50	
Quiescent Current	I_d	$T_j = 25°C$		4.3	6.0	mA
Quiescent Current Change	ΔI_d	$V_I = 11.7V$ to 24V, $T_j = 25°C$			0.8	mA
		$V_I = 12V$ to 25V, $I_o = 500mA$			0.8	
		$I_o = 5mA$ to 1.0A			0.5	
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$		−1.0		mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz, Ta = 25°C		10		$\mu V/V_o$
Ripple Rejection	RR	f = 120Hz, $V_I = 12V$ to 22V $I_o = 500mA$		62		dB
Dropout Voltage	V_D	$I_o = 1.0A$, $T_j = 25°C$		2.0		V
Output Resistance	R_o	f = 1KHz		17		m
Short Circuit Current	I_{short}	$V_I = 35V$, $T_j = 25°C$		420		mA
Peak Current	I_{peak}	$T_j = 25°C$		2.2		A

* 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.

ELECTRICAL CHARACTERISTICS MC7811AC

(Refer to the test circuits, T_j = 0 to 125°C, I_o = 1A, V_i = 18V, C_i = 0.33μF, C_o = 0.1μF unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	T_j = 25°C	10.8	11.0	11.2	V
		I_o = 5mA to 1.0A, $P_D \leq$ 15W V_i = 13.8V to 26V	10.6	11.0	11.4	
Line Regulation	ΔV_o	V_i = 13.8V to 27V I_o = 500mA		13	110	mV
		V_i = 15V to 21V		16	55	
		T_j = 25°C, V_i = 13.5V to 26V		13	110	
		T_j = 25°C, V_i = 15V to 21V		6.0	5.5	
Load Regulation	ΔV_o	T_j = 25°C I_o = 5mA to 1.5A		46	100	mV
		I_o = 5mA to 1.0A		46	100	
		I_o = 250mA to 750mA		17	50	
Quiescent Current	I_d	T_j = 25°C		4.4	6.0	mA
					6.0	
Quiescent Current Change	ΔI_d	V_i = 13.8V to 26V, T_j = 25°C			0.8	mA
		V_i = 14V to 27V, I_o = 500mA			0.8	
		I_o = 5mA to 1.0A			0.5	
Output Voltage Drift	$\Delta V_o/\Delta T$	I_o = 5mA		– 1.0		mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz, Ta = 25°C		10		μV/V_o
Ripple Rejection	RR	f = 120Hz, V_i = 14V to 24V I_o = 500mA		61		dB
Dropout Voltage	V_D	I_o = 1.0A, T_j = 25°C		2.0		V
Output Resistance	R_o	f = 1KHz		18		m
Short Circuit Current	I_{short}	V_i = 35V, T_j = 25°C		390		mA
Peak Current	I_{peak}	T_j = 25°C		2.2		A

* 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.

ELECTRICAL CHARACTERISTICS MC7812AC

(Refer to the test circuits, T_j=0 to 150°C, I_o=1A, V_i=19V, C_i=0.33μF, C_o=0.1μF unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	T_j=25°C	11.75	12	12.25	V
		I_o=5mA to 1A, $P_D \leq$ 15W, V_i=14.8 to 27V	11.5	12	12.5	
*Line Regulation	ΔV_o	V_i=14.8 to 30V, I_o=500mA		13	120	mV
		V_i=16 to 22V		16	120	
		T_j=25°C, V_i=14.5 to 27V		13	120	
		T_j=25°C, V_i=16 to 22V		6	60	
*Load Regulation	ΔV_o	T_j=25°C, I_o=5mA to 1.5A		46	100	mV
		I_o=5mA to 1A		46	100	
		I_o=250 to 750mA		17	50	
Quiescent Current	I_d	T_j=25°C		4.4	6	mA
Quiescent Current Change	ΔI_d	I_o=5mA to 1A			0.5	mA
		V_i=15 to 30V, I_o=500mA			0.8	
		V_i=14.8 to 27V, T_j=25°C			0.8	
Output Voltage Drift	$\frac{\Delta V_o}{\Delta T}$	I_o=5mA		−1		mV/°C
Output Noise Voltage	V_N	f=10Hz to 100KHz, T_a=25°C		10		$\frac{\mu V}{V_o}$
Ripple Rejection	RR	f=120Hz, I_o=500mA, V_i=15 to 25V		60		dB
Dropout Voltage	V_D	I_o=1A, T_j=25°C		2		V
Output Resistance	R_o	f=1KHz		18		mΩ
Short Circuit Current	I_{sc}	V_i=35V, T_a=25°C		350		mA
Peak Current	I_{peak}	T_j=25°C		2.2		A

* 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.

ELECTRICAL CHARACTERISTICS MC7815AC

(Refer to the test circuits, T_j=0 to 150°C, I_o=1A, V_i=23V, C_i=0.33μF, C_o=0.1μF unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	T_j=25°C	14.7	15	15.3	V
		I_o=5mA to 1A, $P_D \leq$ 15W V_i=17.7 to 30V	14.4	15	15.6	
*Line Regulation	ΔV_o	V_i=17.9 to 30V, I_o=500mA		13	150	mV
		V_i=20 to 26V		16	150	
		T_j=25°C, V_i=17.5 to 30V		13	150	
		T_j=25°C, V_i=20 to 26V		6	75	
*Load Regulation	ΔV_o	T_j=25°C I_o=5mA to 1.5A		52	100	mV
		I_o=5mA to 1A		52	100	
		I_o=250 to 750mA		20	50	
Quiescent Current	I_d	T_j=25°C		4.4	6	mA
Quiescent Current Change	ΔI_d	I_o=5mA to 1A			0.5	mA
		V_i=17.5 to 30V, I_o=500mA			0.8	
		V_i=17.5 to 30V, T_j=25°C			0.8	
Output Voltage Drift	$\frac{\Delta V_o}{\Delta T}$	I_o=5mA		−1		mV/°C
Output Noise Voltage	V_N	f=10Hz to 100KHz T_a=25°C		10		$\frac{\mu V}{V_o}$
Ripple Rejection	RR	f=120Hz, I_o=500mA V_i=18.5 to 28.5V		58		dB
Dropout Voltage	V_D	I_o=1A, T_j=25°C		2		V
Output Resistance	R_o	f=1KHz		19		mΩ
Short Circuit Current	I_{sc}	V_i=35V, T_a=25°C		230		mA
Peak Current	I_{peak}	T_j=25°C		2.2		A

* 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.

ELECTRICAL CHARACTERISTICS MC7818AC

(Refer to the test circuits, T_j=0 to 150°C, I_o=1A, V_i=27V, C_i=0.33μF, C_o=0.1μF unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	T_j=25°C	17.64	18	18.36	V
		I_o=5mA to 1A, $P_D \leq$ 15W, V_i=21 to 33V	17.3	18	18.7	
*Line Regulation	ΔV_o	V_i=21 to 33V, I_o=500mA		25	180	mV
		V_i=24 to 30V		28	180	
		T_j=25°C, V_i=20.6 to 33V		25	180	
		T_j=25°C, V_i=24 to 30V		10	90	
*Load Regulation	ΔV_o	T_j=25°C, I_o=5mA to 1.5A		55	100	mV
		I_o=5mA to 1A		55	100	
		I_o=250 to 750mA		22	50	
Quiescent Current	I_d	T_j=25°C		4.5	6	mA
Quiescent Current Change	ΔI_d	I_o=5mA to 1A			0.5	mA
		V_i=21 to 33V, I_o=500mA			0.8	
		V_i=21 to 33V, T_j=25°C			0.8	
Output Voltage Drift	$\frac{\Delta V_o}{\Delta T}$	I_o=5mA		-1		mV/°C
Output Noise Voltage	V_N	f=10Hz to 100KHz, T_a=25°C		10		$\frac{\mu V}{V_o}$
Ripple Rejection	RR	f=120Hz, I_o=500mA, V_i=22 to 32V		57		dB
Dropout Voltage	V_D	I_o=1A, T_j=25°C		2		V
Output Resistance	R_o	f=1KHz		19		mΩ
Short Circuit Current	I_{sc}	V_i=35V, T_a=25°C		200		mA
Peak Current	I_{peak}	T_j=25°C		2.2		A

* 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.

ELECTRICAL CHARACTERISTICS MC7824AC

(Refer to the test circuits, T_j=0 to 150°C, I_o=1A, V_i=33V, C_i=0.33μF, C_o=0.1μF unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	T_j=25°C	23.5	24	24.5	V
		I_o=5mA to 1A, $P_D \leq$ 15W, V_i=27.3 to 38V	23	24	25	
*Line Regulation	ΔV_o	V_i=27 to 38V, I_o=500mA		31	240	mV
		V_i=30 to 36V		35	240	
		T_j=25°C, V_i=26.7 to 38V		31	240	
		T_j=25°C, V_i=30 to 36V		14	120	
*Load Regulation	ΔV_o	T_j=25°C, I_o=5mA to 1.5A		60	100	mV
		I_o=5mA to 1A		60	100	
		I_o=250 to 750mA		25	50	
Quiescent Current	I_d	T_j=25°C		4.6	6	mA
Quiescent Current Change	ΔI_d	I_o=5mA to 1A			0.5	mA
		V_i=27.3 to 38V, I_o=500mA			0.8	
		V_i=27.3 to 38V, T_j=25°C			0.8	
Output Voltage Drift	$\frac{\Delta V_o}{\Delta T}$	I_o=1mA		−1.5		mV/°C
Output Noise Voltage	V_N	f=10Hz to 100KHz, T_a=25°C		10		$\frac{\mu V}{V_o}$
Ripple Rejection	RR	f=120Hz, I_o=500mA, V_i=28 to 38V		54		dB
Dropout Voltage	V_D	I_o=1A, T_j=25°C		2		V
Output Resistance	R_o	f=1KHz		20		mΩ
Short Circuit Current	I_{sc}	V_i=35V, T_a=25°C		150		mA
Peak Current	I_{peak}	T_j=25°C		2.2		A

* 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.

TEST CIRCUIT

DC parameters

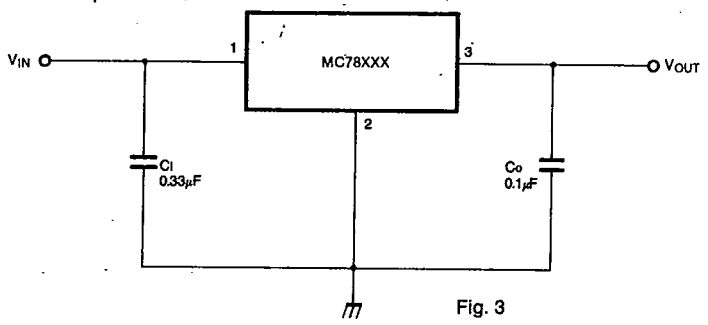


Fig. 3

Load regulation

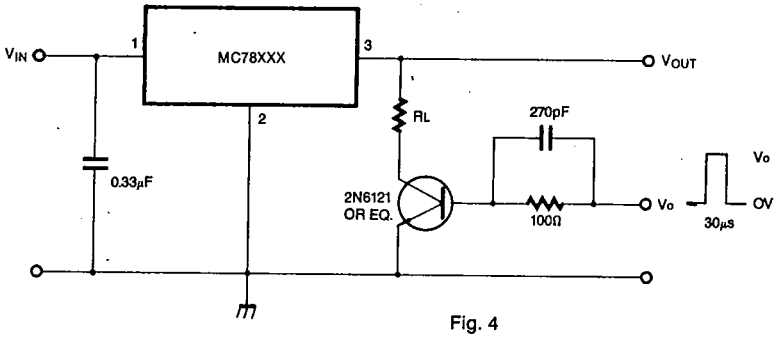


Fig. 4

Ripple rejection

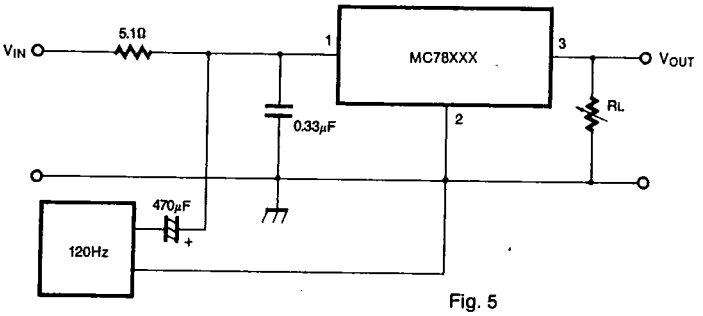


Fig. 5

APPLICATION CIRCUIT

Fixed output regulator

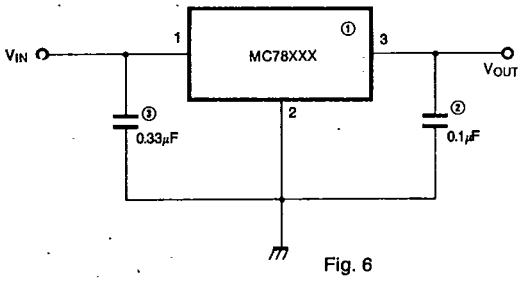


Fig. 6

Constant current regulator

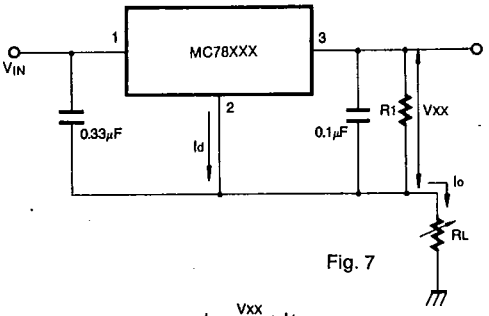


Fig. 7

$$I_o = \frac{V_{XX}}{R_1} + I_d$$

Notes:
(1) To specify an output voltage, substitute voltage value for "XX."
(2) Although no output capacitor is needed for stability, it does improve transient response.
(3) Required if regulator is located an appreciable distance from power supply filter.

Circuit for increasing output voltage

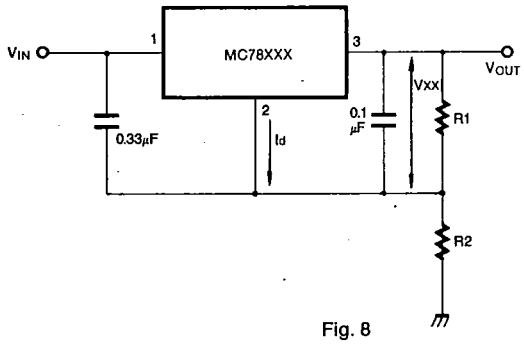


Fig. 8

$I_{R1} \geq 5I_d$
$V_O = V_{XX}(1 + R_2/R_1) + I_d R_2$

Adjustable output regulator (7 to 30V)

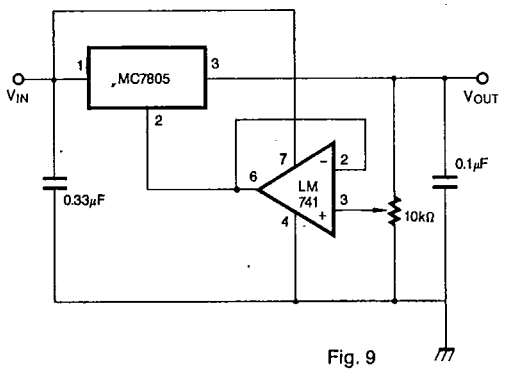
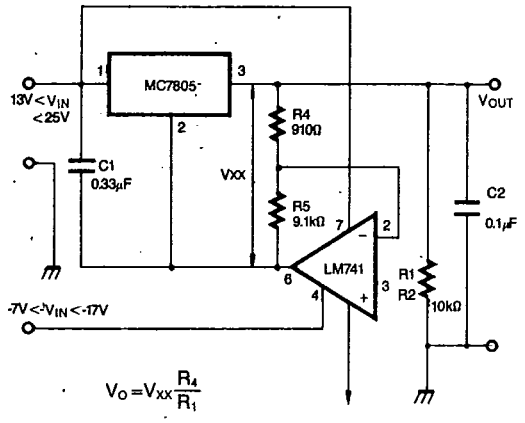


Fig. 9

APPLICATION CIRCUIT (continued)

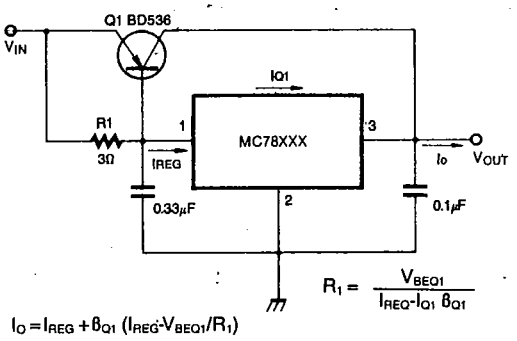
0.5 to 10V regulator



$$V_O = V_{XX}\frac{R_4}{R_1}$$

Fig. 10

High current voltage regulator

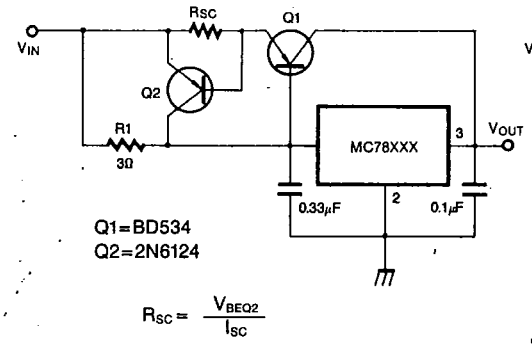


$$R_1 = \frac{V_{BEQ1}}{I_{REG} - I_{Q1}\,\beta_{Q1}}$$

$$I_O = I_{REG} + \beta_{Q1}\,(I_{REG} - V_{BEQ1}/R_1)$$

Fig. 11

High output current with short circuit protection



$$R_{SC} = \frac{V_{BEQ2}}{I_{SC}}$$

Fig. 12

Tracking voltage regulator

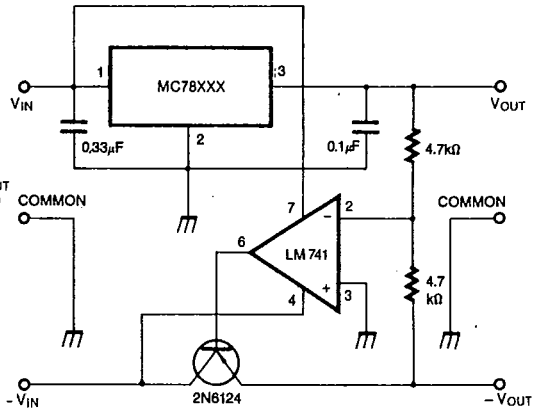


Fig. 13

Split power supply (± 15V — 1A)

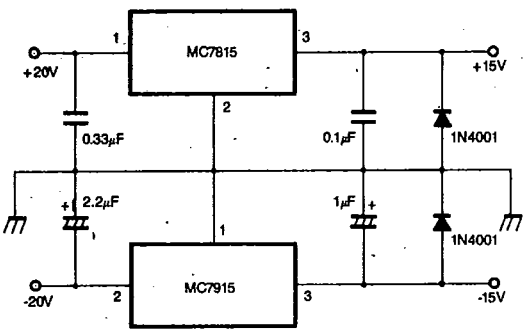


Fig. 14

Negative output voltage circuit

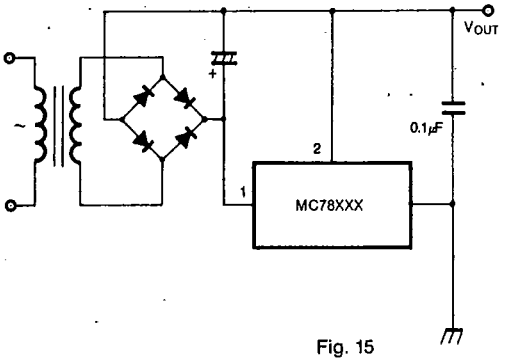


Fig. 15

Switching regulator

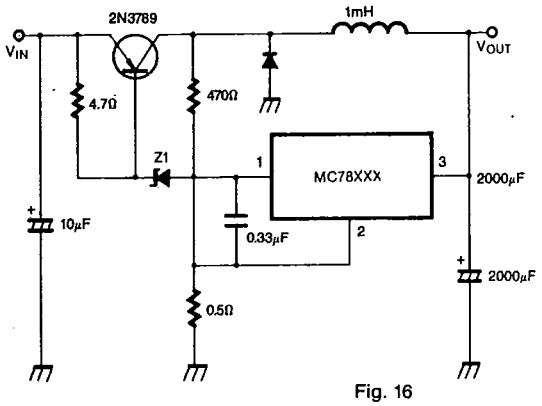
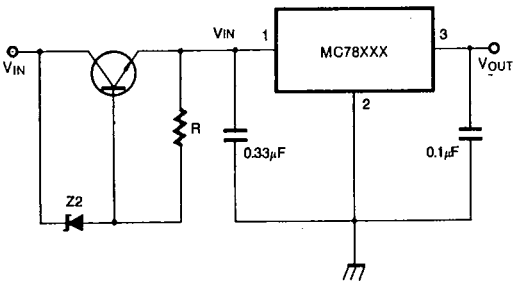


Fig. 16

High input voltage circuit



$V_{IN} = V_i - (V_Z + V_{BE})$

Fig. 17

APPLICATION CIRCUIT (continued)

High input voltage circuit

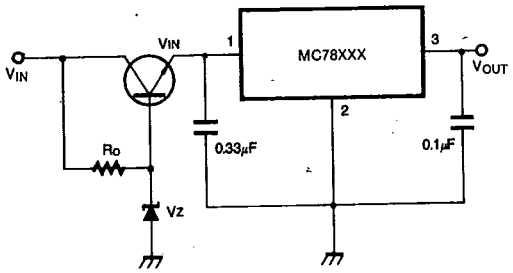


Fig. 18

$V_{IN} = V_Z - V_{BE}$

High output voltage regulator

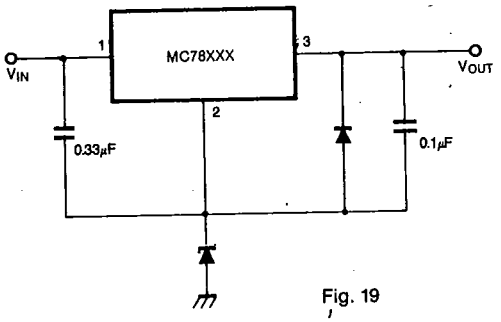
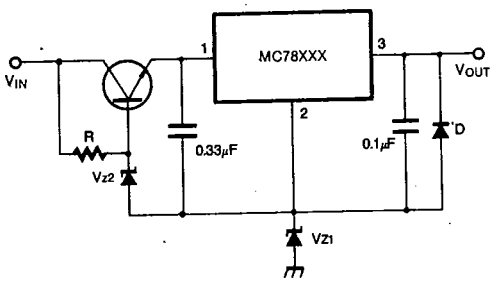


Fig. 19

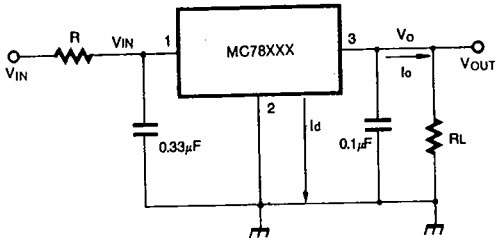
High input and output voltage



$V_O = V_{XX} + V_{Z1}$

Fig. 20

Reducing power dissipation with dropping resitor



$$R = \frac{V_{i\,(min)} - V_{XX} - V_{DROP\,(max)}}{I_{O\,(max)} + I_{O\,(max)}}$$

Fig. 21

APPLICATION CIRCUIT (continued)

Remote shuntdown

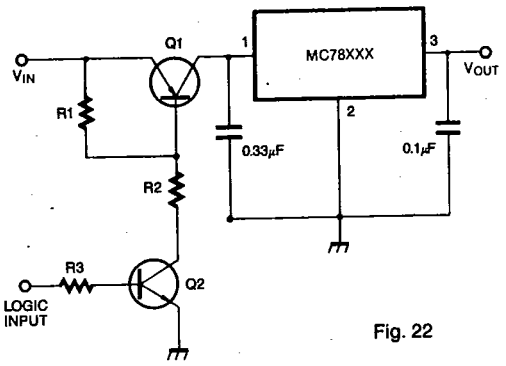


Fig. 22

Power AM modulator
(unity voltage gain, $I_O \leq 1A$)

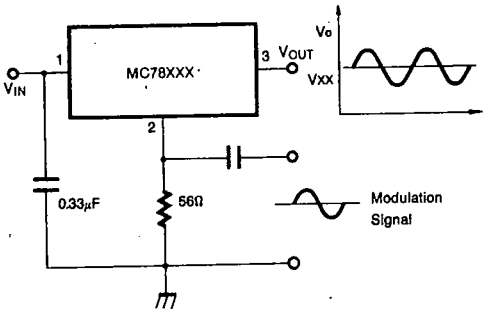


Fig. 23

Note: The circuit performs well up to 100 KHz.

Adjustable output voltage with temperature compensation

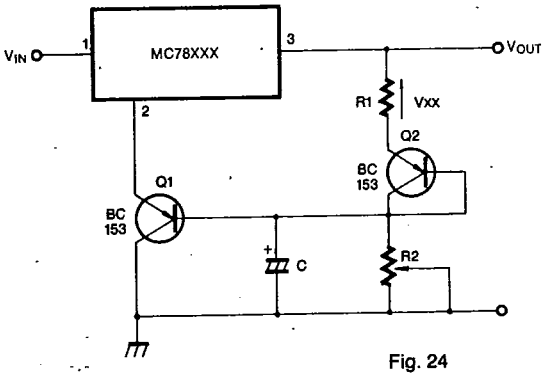


Fig. 24

Note: Q2 is connected as a diode in order to compensate the variation of the Q1 V_{BE} with the temperature. C allows a slow rise-time of the V_O

$$V_O = V_{XX}\left(1 + \frac{R_2}{R_1}\right) + V_{BE}$$

Light controllers (V_O min=V_{XX}+V_{BE})

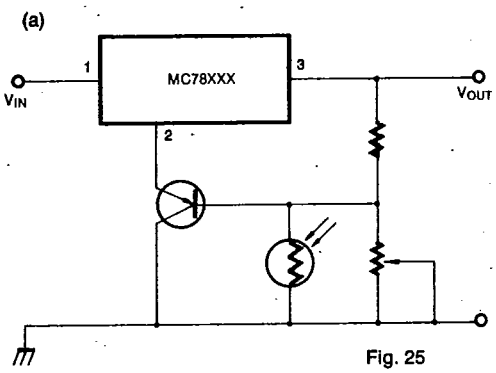
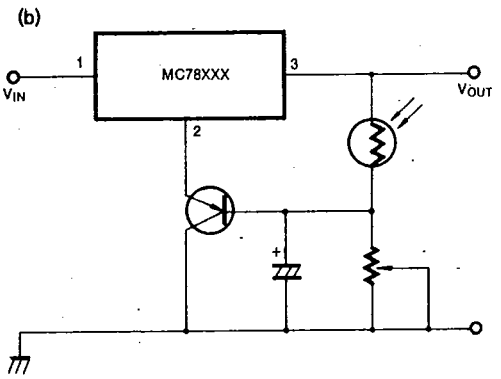


Fig. 25

V_O falls when the light goes up



V_O rises when the light goes up

Protection against input short-circuit with high capacitane loads

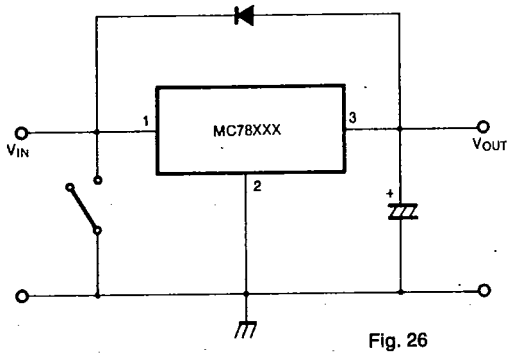


Fig. 26

Applications with high capacitance loads and an output voltage greater than 6 volts need an external diode (see fig. 26) to protect the device against input short circuit. In this case the input voltage falls rapidly while the output voltage decreases showly. The capacitance discharges by means of the Base-Emitter junction of the series pass transistor in the regulator. If the energy is sufficiently high, the transistor may be destroyed. The external diode by-passes the current from the IC to ground.