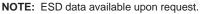
Three-Terminal Positive Voltage Regulators

These voltage regulators are monolithic integrated circuits designed as fixed–voltage regulators for a wide variety of applications including local, on–card regulation. These regulators employ internal current limiting, thermal shutdown, and safe–area compensation. With adequate heatsinking they can deliver output currents in excess of 1.0 A. Although designed primarily as a fixed voltage regulator, these devices can be used with external components to obtain adjustable voltages and currents.

- Output Current in Excess of 1.0 A
- No External Components Required
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limiting
- Output Transistor Safe-Area Compensation
- Output Voltage Offered in 2% and 4% Tolerance
- Available in Surface Mount D²PAK and Standard 3–Lead Transistor Packages

MAXIMUM RATINGS (T_A = 25°C, unless otherwise noted.)

Rating	Symbol	Value	Unit
Input Voltage (5.0 – 18 V) (24 V)	VI	35 40	Vdc
Power Dissipation Case 221A	T.T.M		NWY
T _A = 25°C	PD	Internally Limited	W
Thermal Resistance, Junction-to-Ambient Thermal Resistance, Junction-to-Case	R _{θJA} R _{θJC}	65 5.0	°C/W °C/W
Case 936 (D ² PAK)	COM.		
T _A = 25°C	PD	Internally Limited	W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	See Figure 13	°C/W
Thermal Resistance, Junction-to-Case	R _{0JA}	5.0	°C/W
Storage Junction Temperature Range	T _{stg}	-65 to +150	°C
Operating Junction Temperature	Тј	+150	°C



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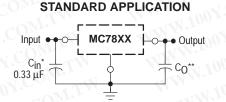
TO-220 T SUFFIX CASE 221A

Heatsink surface connected to Pin 2

D²PAK Pin 1. Input D2T SUFFIX 2. Ground CASE 936 3. Output

Heatsink surface (shown as terminal 4 in case outline drawing) is connected to Pin 2.

٦



A common ground is required between the input and the output voltages. The input voltage must remain typically 2.0 V above the output voltage even during the low point on the input ripple voltage.

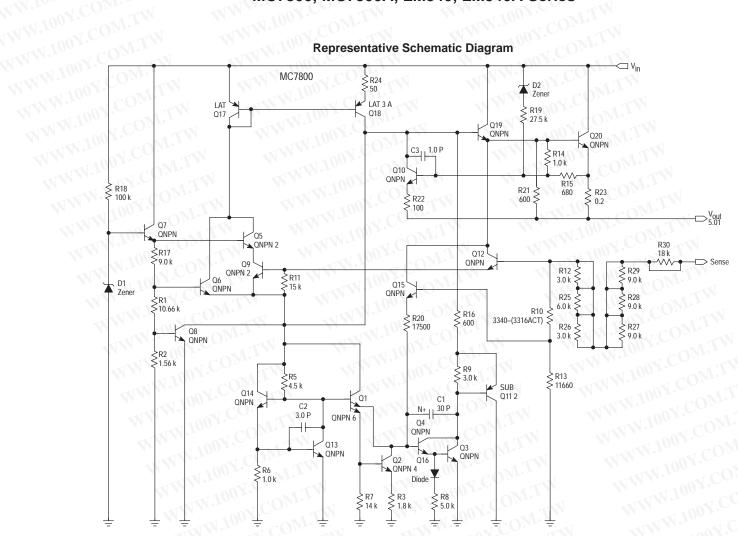
- XX, These two digits of the type number indicate nominal voltage.
 - C_{in} is required if regulator is located an appreciable distance from power supply filter.
 - * C_O is not needed for stability; however, it does improve transient response. Values of less than 0.1 μF could cause instability.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 16 of this data sheet.

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 18 of this data sheet.



Representative Schematic Diagram

This device contains 22 active transistors.

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V.COMMAN WWW.	ANY.CO	WT	MC7805B	NN.	MC7	805C/LM34	0T–5	
Characteristic	Symbol	Min	Тур	Max	Min	Тур	🔨 Max	Unit
Output Voltage (T _J = 25°C)	Vo	4.8	5.0	5.2	4.8	5.0	5.2	Vdc
$\begin{array}{l} Output \mbox{ Voltage } (5.0\mbox{ mA} \leq I_O \leq 1.0\mbox{ A},\mbox{ P}_D \\ \leq 15\mbox{ W}) \\ 7.0\mbox{ Vdc} \leq V_{in} \leq 20\mbox{ Vdc} \\ 8.0\mbox{ Vdc} \leq V_{in} \leq 20\mbox{ Vdc} \end{array}$	Vo	4.75	- 5.0	- 5.25	4.75	5.0	5.25	Vdc
Line Regulation (Note 2.) 7.5 Vdc \leq V _{in} \leq 20 Vdc, 1.0 A 8.0 Vdc \leq V _{in} \leq 12 Vdc	Reg _{line}	Noxicol	5.0 1.3	100 50	WININ.	0.5 0.8	20 10	mV
Load Regulation (Note 2.) 5.0 mA \leq I _O \leq 1.0 A 5.0 mA \leq I _O \leq 1.5 A (T _A = 25°C)	Reg _{load}	100X.C	1.3 0.15	100 50	M-MM	1.3 1.3	25 25	mV
Quiescent Current	Ι _Β	1100Y.	3.2	8.0	- <u>7</u> ,	3.2	6.5	mA
	ΔIB	1005 1100	Y.COM	0.5		0.3 0.08	1.0 0.8	mA
Ripple Rejection 8.0 Vdc \leq V _{in} \leq 18 Vdc, f = 120 Hz	RR 📢	WW.10	68	M.FW	62	83	00 <u>7-</u> 02	dB
Dropout Voltage (I _O = 1.0 A, T _J = 25° C)	VI – VO	W	2.0	DW-		2.0	100-	Vdc
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	Vn	NWW N T	10	0 ^{1.1}		10	1.100 x.	μ٧/٧
Output Resistance f = 1.0 kHz	rO	W	0.9	COINT	- 77	0.9	<u> </u>	mΩ
Short Circuit Current Limit (T _A = 25°C) V_{in} = 35 Vdc	ISC	-WW	0.2	I.COM	WT.	0.6	141-Jan	A
Peak Output Current ($T_J = 25^{\circ}C$)	Imax	- 11	2.2	N.Con	N ^P LA	2.2 🔨	-	A
Average Temperature Coefficient of Output Voltage	TCVO	- 4	-0.3	00X.CO	WT.M	-0.3	<u> </u>	mV/°C

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ELECTRICAL CHARACTERISTICS (V_{in} = 10 V, I_O = 1.0 A, T_J = T_{low} to T_{high} [Note 1.], unless otherwise noted.)

	W.100 1	MC78	05AC/LM340	DAT-5	N.100	
Characteristic	Symbol	Min	Тур	Max	Unit	
Output Voltage (T _J = 25°C)	Vo	4.9	5.0	5.1	Vdc	
Output Voltage (5.0 mA \leq I_O \leq 1.0 A, P_D \leq 15 W) 7.5 Vdc \leq V_in \leq 20 Vdc	Vo	4.8	5.0	5.2 🔨	Vdc	
$ \begin{array}{l} \mbox{Line Regulation (Note 2.)} \\ \mbox{7.5 Vdc} \leq V_{in} \leq 25 \mbox{Vdc}, \mbox{I}_{O} = 500 \mbox{ mA} \\ \mbox{8.0 Vdc} \leq V_{in} \leq 12 \mbox{Vdc}, \mbox{I}_{O} = 1.0 \mbox{ A} \\ \mbox{8.0 Vdc} \leq V_{in} \leq 12 \mbox{Vdc}, \mbox{I}_{O} = 1.0 \mbox{ A}, \mbox{T}_{J} = 25^{\circ}\mbox{C} \\ \mbox{7.3 Vdc} \leq V_{in} \leq 20 \mbox{Vdc}, \mbox{I}_{O} = 1.0 \mbox{ A}, \mbox{T}_{J} = 25^{\circ}\mbox{C} \\ \end{array} $	Reg _{line}	1003. 1000. 1003.	0.5 0.8 1.3 4.5	10 12 4.0 10	mV	
Load Regulation (Note 2.) $5.0 \text{ mA} \le I_O \le 1.5 \text{ A}, T_J = 25^{\circ}\text{C}$ $5.0 \text{ mA} \le I_O \le 1.0 \text{ A}$ $250 \text{ mA} \le I_O \le 750 \text{ mA}$	Reg _{load}	WN <u>-</u> 100	1.3 0.8 0.53	25 25 15	mV	
Quiescent Current	Ι _Β	-	3.2	6.0	mA	
	ΔI _B	- - -	0.3 - 0.08	0.8 0.8 0.5	mA	

1. $T_{low} = 0^{\circ}C$ for MC78XXAC, C, LM340AT-XX, LM340T-XX $= -40^{\circ}$ C for MC78XXB

Thigh = +125°C for MC78XXAC, C, LM340AT–XX, LM340T–XX

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

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WW.100Y.COM.TW **ELECTRICAL CHARACTERISTICS (continued)** (V_{in} = 10 V, I_O = 1.0 A, T_J = T_{low} to T_{high} [Note 1.], unless otherwise noted.)

	WW	MC78	0AT-5		
Characteristic	Symbol	Min	Тур	Max	Unit
Ripple Rejection 8.0 Vdc \leq V _{in} \leq 18 Vdc, f = 120 Hz, I _O = 500 mA	RR	68	83	WT	dB
Dropout Voltage ($I_O = 1.0 \text{ A}, T_J = 25^{\circ}\text{C}$)	VI-VO	M T.	2.0	N=Tra	Vdc
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	V _n	MA L M.T	1000	WT.M	μV/V _O
Output Resistance (f = 1.0 kHz)	ro	<u> </u>	0.9	NT.TV	mΩ
Short Circuit Current Limit ($T_A = 25^{\circ}C$) V _{in} = 35 Vdc	I _{SC}	41 10 10	0.2	COM.T	A
Peak Output Current (T _J = 25°C)	I _{max}	-	2.2	CON.	А
Average Temperature Coefficient of Output Voltage	TCVO		-0.3	-oN	mV/°C

ELECTRICAL CHARACTERISTICS (V_{in} = 11 V, I_O = 500 mA, T_J = T_{low} to T_{high} [Note 1.], unless otherwise noted.)

WW.IOU COM.	NWW.I	N C	MC7806B	N	WW.	MC7806C	09.VO	V
Characteristic	Symbol	Min	Тур	Мах	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo	5.75	6.0	6.25	5.75	6.0	6.25	Vdc
Output Voltage (5.0 mA \le I _O \le 1.0 A, P _D \le 15 W) 8.0 Vdc \le V _{in} \le 21 Vdc 9.0 Vdc \le V _{in} \le 21 Vdc	VO	- 5.7	6.0	- 6.3	5.7 -	6.0 -	6.3	Vdc
Line Regulation, $T_J = 25^{\circ}C$ (Note 2.) 8.0 Vdc $\leq V_{in} \leq 25$ Vdc 9.0 Vdc $\leq V_{in} \leq 13$ Vdc	Reg _{line}	VN.10	5.5 1.4	120 60	V - -	0.5 0.8	24 12	mV
Load Regulation, T _J = 25°C (Note 2.) 5.0 mA \leq I _O \leq 1.5 A	Regload	WWW	1.3	120		1.3	30	mV
Quiescent Current ($T_J = 25^{\circ}C$)	_ ^I B	VITTO	3.3	8.0	N.	3.3	8.0	mA
Quiescent Current Change 8.0 Vdc \leq V _{in} \leq 25 Vdc 5.0 mA \leq I _O \leq 1.0 A	ΔlB	W III	M-700	0.5	N 2 .1	0.3 0.08	1.3 0.5	mA
Ripple Rejection 9.0 Vdc \leq V _{in} \leq 19 Vdc, f = 120 Hz	RR	-4	65	00¥.C	58	65	<u>NN</u>	dB
Dropout Voltage ($I_O = 1.0 \text{ A}, T_J = 25^{\circ}\text{C}$)	VI – VO	- <	2.0	105Y.C		2.0		Vdc
Dutput Noise Voltage (T _A = 25°C) 10 Hz ≤ f ≤ 100 kHz	Vn	-	10	1.100Y	CO ^D	10	- <	μV/VO
Output Resistance f = 1.0 kHz	rO	-	0.9	00 1 . IN	105	0.9	-	mΩ
Short Circuit Current Limit ($T_A = 25^{\circ}C$) V _{in} = 35 Vdc	ISC	N –	0.2	VN-10	N. <u>-</u>	0.2	-	A
Peak Output Current (T _J = 25°C)	Imax		2.2	WAN'T	- C	2.2	-	A
Average Temperature Coefficient of Output Voltage	TCVO	<u>TVI</u>	-0.3	NN.	1003.	-0.3	-	mV/°C

1. $T_{low} = 0^{\circ}C$ for MC78XXAC, C, LM340AT–XX, LM340T–XX = -40° C for MC78XXB

Thigh = +125°C for MC78XXAC, C, LM340AT–XX, LM340T–XX

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

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Characteristic	Symbol	Min	Тур	📢 Max	Unit
Output Voltage (T _J = 25° C)	Vo	5.88	6.0	6.12	Vdc
Output Voltage (5.0 mA \le I _O \le 1.0 A, P _D \le 15 W) 8.6 Vdc \le V _{in} \le 21 Vdc	Vo	5.76	6.0	6.24	Vdc
Line Regulation (Note 2.) 8.6 Vdc \leq V _{in} \leq 25 Vdc, I _O = 500 mA 9.0 Vdc \leq V _{in} \leq 13 Vdc, I _O = 1.0 A	Reg _{line}	N.W-W.L	5.0 1.4	12 15	mV
Load Regulation (Note 2.) $5.0 \text{ mA} \le I_O \le 1.5 \text{ A}, \text{ T}_J = 25^{\circ}\text{C}$ $5.0 \text{ mA} \le I_O \le 1.0 \text{ A}$ $250 \text{ mA} \le I_O \le 750 \text{ mA}$	Reg _{load}	PLAN MUNI	1.3 0.9 0.2	25 25 15	mV
Quiescent Current	IB.	100	3.3	6.0	mA
	Δl _B	- 14	NN.100	0.8 0.8 0.5	mA
Ripple Rejection 9.0 Vdc \leq V _{in} \leq 19 Vdc, f = 120 Hz, I _O = 500 mA	RR	58	65	100 <u>7</u> .C	dB
Dropout Voltage ($I_O = 1.0 \text{ A}, T_J = 25^{\circ}C$)	VI – VO	-	2.0	100-	Vdc
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	Vn		10	N.100	μV/V _C
Output Resistance (f = 1.0 kHz)	ro	T	0.9	M	mΩ
Short Circuit Current Limit (T _A = 25°C) V _{in} = 35 Vdc	ISC	WT.M	0.2	N.N-10	A)
Peak Output Current (T _J = 25°C)	Imax	WEIN	2.2		A
Average Temperature Coefficient of Output Voltage	TCVO	0	-0.3	N.L.	mV/°C

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ELECTRICAL CHARACTERISTICS (V_{in} = 14 V, I_O = 500 mA, T_J = T_{low} to T_{high} [Note 1.], unless otherwise noted.)

	2	A.M.	MC7808E		NT.N	MC7808C		1100×
Characteristic	Symbol	Min	Тур	Max	Min	Тур	Max	Unit
Output Voltage (T _J = 25° C)	Vo	7.7	8.0	8.3	7.7	8.0	8.3	Vdc
Output Voltage (5.0 mA \le I _O \le 1.0 A, P _D \le 15 W) 10.5 Vdc \le V _{in} \le 23 Vdc 11.5 Vdc \le V _{in} \le 23 Vdc	Vo	_ 7.6	_ 8.0	8.4	7.6	8.0	8.4 _	Vdc
Line Regulation, $T_J = 25^{\circ}C$, (Note 2.) 10.5 Vdc $\leq V_{in} \leq 25$ Vdc 11 Vdc $\leq V_{in} \leq 17$ Vdc	Reg _{line}		6.0 1.7	160 80	COM	6.0 1.7	32 16	mV
Load Regulation, T _J = 25°C (Note 2.) 5.0 mA \leq I _O \leq 1.5 A	Regload	N -	1.4	160	oy. C O	1.4	35	mV
Quiescent Current	ΙB	<u>[]</u>	3.3	8.0	00 <u>7</u> .0	3.3	8.0	mA
Quiescent Current Change 10.5 Vdc \leq V _{in} \leq 25 Vdc 5.0 mA \leq I _O \leq 1.0 A	ΔlB	17 <u>1</u>	-	_ 0.5			1.0 0.5	mA

1. $T_{Iow} = 0^{\circ}C$ for MC78XXAC, C, LM340AT–XX, LM340T–XX = -40° C for MC78XXB

Thigh = +125°C for MC78XXAC, C, LM340AT-XX, LM340T-XX

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

WW.100Y.COM.TW **ELECTRICAL CHARACTERISTICS (continued)** (V_{in} = 14 V, I_O = 500 mA, T_J = T_{low} to T_{high} [Note 1.], unless

Y.COM WWW 100Y.	TIM	MC7808B			N.CC	MC7808C	;	
Characteristic	Symbol	Min	Тур	Max	Min	Тур	Max	Unit
Ripple Rejection 11.5 Vdc \leq V _{in} \leq 18 Vdc, f = 120 Hz	RR	LA <u>.</u>	62	W TAY	56	62	- 17	dB
Dropout Voltage ($I_O = 1.0 \text{ A}, T_J = 25^{\circ}\text{C}$)	VI – VO	T.I	2.0	<u> </u>	100x.	2.0	1.1	Vdc
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	Vn	N.TW	10	WZW.	N.1007	10	T.T.	μV/V _C
Output Resistance f = 1.0 kHz	ro	DV-L	0.9	-	W-100	0.9	<u> </u>	mΩ
Short Circuit Current Limit ($T_A = 25^{\circ}C$) V _{in} = 35 Vdc	ISC	01.1	0.2	<u>N</u>	NN.10	0.2	T III	A
Peak Output Current (T _J = 25°C)	Imax	COM.	2.2		M-W.	2.2	02	A
Average Temperature Coefficient of Output Voltage	TCVO	CON	-0.4	-	W Bring	-0.4	COM.	mV/°C

ELECTRICAL CHARACTERISTICS (V_{in} = 14 V, I_O = 1.0 A, T_J = T_{low} to T_{high} [Note 1.], unless otherwise noted.)

	NTO ON	1	MC7808AC		VTI
Characteristic	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo	7.84	8.0	8.16	Vdc
Output Voltage (5.0 mA \le I _O \le 1.0 A, P _D \le 15 W) 10.6 Vdc \le V _{in} \le 23 Vdc	Vo	7.7	8.0	8.3	Vdc
Line Regulation (Note 2.) 10.6 Vdc $\leq V_{in} \leq 25$ Vdc, I _O = 500 mA 11 Vdc $\leq V_{in} \leq 17$ Vdc, I _O = 1.0 A 10.4 Vdc $\leq V_{in} \leq 23$ Vdc, T _J = 25°C	Reg _{line}	L.T.W M.FW	6.0 1.7 5.0	15 18 15	mV
Load Regulation (Note 2.) $5.0 \text{ mA} \le I_O \le 1.5 \text{ A}, T_J = 25^{\circ}\text{C}$ $5.0 \text{ mA} \le I_O \le 1.0 \text{ A}$ $250 \text{ mA} \le I_O \le 750 \text{ mA}$	Reg _{load}	DM.1 DM.TV CM.T	1.4 1.0 0.22	25 25 15	mV
Quiescent Current	IB 00Y		3.3	6.0	mA
Quiescent Current Change 11 Vdc $\leq V_{in} \leq 25$ Vdc, I _O = 500 mA 10.6 Vdc $\leq V_{in} \leq 23$ Vdc, I _O = 1.0 A, T _J = 25°C 5.0 mA \leq I _O \leq 1.0 A	ΔlB	X.COM	1.TU 1.TU TW	0.8 0.8 0.5	mA
Ripple Rejection 11.5 Vdc \leq V _{in} \leq 21.5 Vdc, f = 120 Hz, I _O = 500 mA	RR	56	62	- <	dB
Dropout Voltage ($I_O = 1.0 \text{ A}, T_J = 25^{\circ}C$)	VI – VO	INGY.C	2.0	-	Vdc
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	Vn	N.100Y.C	10	N -	μV/VO
Output Resistance f = 1.0 kHz	rO	X00t.Kr	0.9		mΩ
Short Circuit Current Limit (T _A = 25°C) V _{in} = 35 Vdc	ISC	NW.100	0.2	-	A
Peak Output Current (T _J = 25°C)	I _{max}	-	2.2	-	A
Average Temperature Coefficient of Output Voltage	TCVO	-	-0.4	_	mV/°C

 $T_{IOW} = 0^{\circ}C$ for MC78XXAC, C, LM340AT–XX, LM340T–XX = -40°C for MC78XXB

T_{high} = +125°C for MC78XXAC, C, LM340AT–XX, LM340T–XX

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



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O.Yoo WWW	WT	I	MC7809B	T_100	1.00			
Characteristic	Symbol	📢 Min	Тур	Max	Min	Тур	Max	Unit
Output Voltage (T _J = 25° C)	Vo	8.65	9.0	9.35	8.65	9.0	9.35	Vdc
Output Voltage (5.0 mA \leq I _O \leq 1.0 A, P _D \leq 15 W) 11.5 Vdc \leq V _{in} \leq 24 Vdc	Vo	8.55	9.0	9.45	8.55	9.0	9.45	Vdc
Line Regulation, $T_J = 25^{\circ}C$ (Note 2.) 11 Vdc $\leq V_{in} \leq 26$ Vdc 11.5 Vdc $\leq V_{in} \leq 17$ Vdc	Reg _{line}	1. <u>1</u> 1.1	6.2 1.8	32 16	100X.	6.2 1.8	32 16	mV
Load Regulation, T _J = 25°C (Note 2.) 5.0 mA \leq I _O \leq 1.5 A	Regload	DMT.TV	1.5	35	W. <u>1</u> 00	1.5	35	mV
Quiescent Current	IB	014.1	3.4	8.0	NH.10	3.4	8.0	mA
Quiescent Current Change 11.5 Vdc $\leq V_{in} \leq 26$ Vdc 5.0 mA $\leq I_O \leq 1.0$ A	ΔlB	COM:	<u>14</u>	1.0 0.5	NTALIN .	10 <u>0</u> 7.0	1.0 0.5	mA
Ripple Rejection 11.5 Vdc $\leq V_{in} \leq$ 21.5 Vdc, f = 120 Hz	RR	56	61	-	56	61	L.CON	dB
Dropout Voltage ($I_O = 1.0 \text{ A}, T_J = 25^{\circ}C$)	VI – VO	J-CC	2.0	s -	WW	2.0	N.EO	Vdd
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	Vn	00 <u>7</u> .C	10	W -	W	10	ov.co	μV/V
Output Resistance f = 1.0 kHz	ro	Your	1.0	LA T	- 1	1.0	100×.C	mΩ
Short Circuit Current Limit (T _A = 25°C) V _{in} = 35 Vdc	ISC	N.1005	0.2	171		0.2	.100Y.	A
Peak Output Current ($T_J = 25^{\circ}C$)	Imax	00 T.V.	2.2	$T_{\overline{L}}$	-	2.2	N.100	Α
Average Temperature Coefficient of Output Voltage	TCVO	- 10	-0.5	17-1	_	-0.5	200	mV/ª

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ELECTRICAL CHARACTERISTICS (Vin = 19 V, IO = 500 mA, TJ = Tlow to Thigh [Note 1.], unless otherwise noted.)

WY TALLON. TW		N	MC7812B	COM.	MC78	12C/LM34	0T–12	00 -1 (
Characteristic	Symbol	Min	Тур	Max	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	V Vo	11.5	12	12.5	11.5	12	12.5	Vdc
$\begin{array}{l} \mbox{Output Voltage (5.0 mA \le I_O \le 1.0 A, P_D \le 15 W)} \\ \mbox{14.5 Vdc} \le V_{in} \le 27 \mbox{Vdc} \\ \mbox{15.5 Vdc} \le V_{in} \le 27 \mbox{Vdc} \end{array}$	Vo	-	- 12	_ 12.6	11.4	12 -	12.6	Vdc
Line Regulation, $T_J = 25^{\circ}C$ (Note 2.) 14.5 Vdc $\leq V_{in} \leq 30$ Vdc 16 Vdc $\leq V_{in} \leq 22$ Vdc 14.8 Vdc $\leq V_{in} \leq 27$ Vdc, $I_O = 1.0$ A	Reg _{line}	- 1	7.5 2.2 -	240 120 -	co <u>M</u> .T	3.8 0.3	24 24 48	mV
Load Regulation, $T_J = 25^{\circ}C$ (Note 2.) 5.0 mA $\leq I_O \leq 1.5$ A	Regload	-	1.6	240	K.CON	8.1	60	mV
Quiescent Current	ΙB	- N	3.4	8.0	N.CO	3.4	6.5	mA
$ \begin{array}{l} \mbox{Quiescent Current Change} \\ \mbox{14.5 Vdc} \leq \mbox{V}_{in} \leq \mbox{30 Vdc}, \mbox{ I}_{O} = \mbox{1.0 A}, \mbox{ T}_{J} = \mbox{25^{\circ}C} \\ \mbox{15 Vdc} \leq \mbox{V}_{in} \leq \mbox{30 Vdc} \\ \mbox{5.0 mA} \leq \mbox{I}_{O} \leq \mbox{1.0 A} \end{array} $		<u></u>	 	- 1.0 0.5	00 <u>7</u> .C4	- - -	0.7 0.8 0.5	mA
Ripple Rejection 15 Vdc \leq V _{in} \leq 25 Vdc, f = 120 Hz	RR	U.L.	60	-	55	60	-	dB
Dropout Voltage ($I_O = 1.0 \text{ A}, T_J = 25^{\circ}\text{C}$)	VI – VO	-	2.0	-	-	2.0	-	Vdc

1. $T_{IOW} = 0^{\circ}C$ for MC78XXAC, C, LM340AT–XX, LM340T–XX = -40° C for MC78XXB

Thigh = +125°C for MC78XXAC, C, LM340AT-XX, LM340T-XX

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

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WW.100Y.COM.TW **ELECTRICAL CHARACTERISTICS (continued)** (V_{in} = 19 V, I_O = 500 mA, T_J = T_{low} to T_{high} [Note 1.], unless

N.CO. TW WW 100Y.	TIM		MC7812E	3 10	MC78	12C/LM34	IOT-12	
Characteristic	Symbol	Min	Тур	Max	Min	Тур	Max	Unit
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	Vn	LA <u>.</u>	10	W TAY	1007.C	10	- 17	μV/V _O
Output Resistance f = 1.0 kHz	rO	17	1.1	<u> </u>	100X.	1.1	<u>tri</u>	mΩ
Short Circuit Current Limit ($T_A = 25^{\circ}C$) V _{in} = 35 Vdc	ISC	N.TW	0.2	A ZA	N.1007	0.2	T.I	A
Peak Output Current (TJ = 25°C)	I _{max}	DWEIL	2.2	-	W-Jor	2.2	<u> </u>	A
Average Temperature Coefficient of Output Voltage	TCVO	T.H.	-0.8	-24.	16	-0.8	M-T	mV/°C

ELECTRICAL CHARACTERISTICS (Vin = 19 V, IO = 1.0 A, TJ = Tlow to Thigh [Note 1.], unless otherwise noted.)

WW.100 COM.1	DM.	MC781	2AC/LM340)AT-12	W
Characteristic	Symbol	Min	Тур	Max	Unit
Output Voltage (TJ = 25°C)	Vo	11.75	12	12.25	Vdc
Output Voltage (5.0 mA \le I _O \le 1.0 A, P _D \le 15 W) 14.8 Vdc \le V _{in} \le 27 Vdc	Vo	11.5	12	12.5	Vdc
Line Regulation (Note 2.) 14.8 Vdc $\leq V_{in} \leq 30$ Vdc, I _O = 500 mA 16 Vdc $\leq V_{in} \leq 22$ Vdc, I _O = 1.0 A 14.5 Vdc $\leq V_{in} \leq 27$ Vdc, T _J = 25°C	Reg _{line}	1.1 <u>1</u> 1.11	3.8 2.2 6.0	18 20 120	O mV
Load Regulation (Note 2.) 5.0 mA \leq I _O \leq 1.5 A, T _J = 25°C 5.0 mA \leq I _O \leq 1.0 A	Reg _{load}	N.T.N	- 47	25 25	mV
Quiescent Current	IB	M.F.M.	3.4	6.0	mA
Quiescent Current Change 15 Vdc $\leq V_{in} \leq 30$ Vdc, I _O = 500 mA 14.8 Vdc $\leq V_{in} \leq 27$ Vdc, T _J = 25°C 5.0 mA $\leq I_O \leq 1.0$ A, T _J = 25°C	ΔlB	COPILITY	- V	0.8 0.8 0.5	mA
Ripple Rejection 15 Vdc \leq V _{in} \leq 25 Vdc, f = 120 Hz, I _O = 500 mA	RR	55	60	MM	dB
Dropout Voltage (I _O = 1.0 A, T_J = 25°C)	VI-VO	N.C	2.0	-4/	Vdc
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	Vn	007 <u>.</u> CO	10	- 1	μ٧/٧Ο
Output Resistance (f = 1.0 kHz)	rO	700 <u>7</u> .	1.1	-	mΩ
Short Circuit Current Limit (T _A = 25°C) V _{in} = 35 Vdc	ISC	1.10 ⁰ Y.C	0.2	- N	A
Peak Output Current (T _J = 25°C)	Imax	N.10	2.2	- N	A
Average Temperature Coefficient of Output Voltage	TCVO	W.100 ×	-0.8	-	mV/°C

1. $T_{low} = 0^{\circ}C$ for MC78XXAC, C, LM340AT-XX, LM340T-XX $T_{high} = +125^{\circ}C$ for MC78XXAC, C, LM340AT-XX, LM340T-XX = -40°C for MC78XXB

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

COM WWW. OOY.C	WT		MC7815E	3	MC78	15C/LM34	40T–15	
Characteristic	Symbol	Min	Тур	Max	Min	Тур	Max	Unit
Output Voltage (TJ = 25°C)	Vo	14.4	15	15.6	14.4	15	15.6	Vdc
$\begin{array}{l} \mbox{Output Voltage (5.0 mA \leq I_O \leq 1.0 \mbox{ A}, \mbox{ P}_D \leq 15 \mbox{ W}) \\ \mbox{17.5 Vdc} \leq V_{in} \leq 30 \mbox{ Vdc} \\ \mbox{18.5 Vdc} \leq V_{in} \leq 30 \mbox{ Vdc} \end{array}$	Vo	_ 14.25	- 15	_ 15.75	14.25	15	15.75	Vdo
Line Regulation, $T_J = 25^{\circ}C$ (Note 2.) 17.9 Vdc $\leq V_{in} \leq 30$ Vdc 20 Vdc $\leq V_{in} \leq 26$ Vdc	Reg _{line}	W 2 .M	8.5 3.0	300 150	N.1 9 07	8.5 3.0	30 28	mV
Load Regulation, T _J = 25°C (Note 2.) 5.0 mA \leq I _O \leq 1.5 A	Regload	WF.	1.8	300	10	1.8	55	mV
Quiescent Current	ΙB		3.5	8.0		3.5	6.5	mA
$ \begin{array}{l} \mbox{Quiescent Current Change} \\ 17.5 \mbox{ Vdc} \leq V_{in} \leq 30 \mbox{ Vdc} \\ 17.5 \mbox{ Vdc} \leq V_{in} \leq 30 \mbox{ Vdc}, \mbox{ I}_{O} = 1.0 \mbox{ A}, \mbox{ T}_{J} = 25^{\circ}\mbox{C} \\ 5.0 \mbox{ mA} \leq I_{O} \leq 1.0 \mbox{ A} \end{array} $	ΔIB	CON 1.C <u>D</u> M	1.1 <u>4</u> 1.1	_ 1.0 0.5	N N N N	10 <u>07.</u> (1.1 0 07.(0.8 0.7 0.5	mA
Ripple Rejection 18.5 Vdc $\leq V_{in} \leq$ 28.5 Vdc, f = 120 Hz	RR	NOY.CC	58	- N	54	58	N.CON	dB
Dropout Voltage ($I_O = 1.0 \text{ A}, T_J = 25^{\circ}C$)	VI-VO	O.Tool	2.0	- 14	-11	2.0	001 <u>-</u> CC	Vdc
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	Vn	100Y.	10	LM.	- 4	10	007.0	μV/V
Output Resistance f = 1.0 kHz	rO	× 100Y	1.2	TT.	- 1	1.2	1001.	mΩ
Short Circuit Current Limit ($T_A = 25^{\circ}C$) V _{in} = 35 Vdc	ISC	W.100	0.2	WT.N	-	0.2	N.100Y	A
Peak Output Current (T _J = 25°C)	I _{max}	10	2.2	ON-L	-	2.2	W-100	Α
Average Temperature Coefficient of Output Voltage	TCVO		-1.0	The	- 1	-1.0	10	mV/º

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ELECTRICAL CHARACTERISTICS (Vin = 23 V, IO = 1.0 A, TJ = Tlow to Thigh [Note 1.], unless otherwise noted.)

WW.100X. COM.1	W.100	MC781	15AC/LM340	AT-15	. Voc
Characteristic	Symbol	Min	Тур	Max	Unit
Output Voltage (TJ = 25°C)	Vo	14.7	15	15.3	Vdc
Output Voltage (5.0 mA \le I _O \le 1.0 A, P _D \le 15 W) 17.9 Vdc \le V _{in} \le 30 Vdc	Vo	14.4	15	15.6	Vdc
Line Regulation (Note 2.) 17.9 Vdc $\leq V_{in} \leq 30$ Vdc, I _O = 500 mA 20 Vdc $\leq V_{in} \leq 26$ Vdc 17.5 Vdc $\leq V_{in} \leq 30$ Vdc, I _O = 1.0 A, T _J = 25°C	Regline	100 <u>7</u> .CO	8.5 3.0 7.0	20 22 20	mV
Load Regulation (Note 2.) $5.0 \text{ mA} \le I_O \le 1.5 \text{ A}, T_J = 25^{\circ}\text{C}$ $5.0 \text{ mA} \le I_O \le 1.0 \text{ A}$ $250 \text{ mA} \le I_O \le 750 \text{ mA}$	Reg _{load}	N.100X.	1.8 1.5 1.2	25 25 15	mV
Quiescent Current	IB 🔨	M.M.	3.5	6.0	mA
Quiescent Current Change 17.5 Vdc $\leq V_{in} \leq 30$ Vdc, I _O = 500 mA 17.5 Vdc $\leq V_{in} \leq 30$ Vdc, I _O = 1.0 A, T _J = 25°C 5.0 mA \leq I _O \leq 1.0 A	ΔIB	- - -		0.8 0.8 0.5	mA

1. $T_{IOW} = 0^{\circ}C$ for MC78XXAC, C, LM340AT–XX, LM340T–XX = -40°C for MC78XXB

Thigh = +125°C for MC78XXAC, C, LM340AT-XX, LM340T-XX

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

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WW.100Y.COM.TW WWW.100XCOM.T ELECTRICAL CHARACTERISTICS (continued) (V_{in} = 23 V, I_O = 1.0 A, T_J = T_{low} to T_{high} [Note 1.], unless otherwise noted.)

	WW	MC781	5AC/LM340	DAT-15	
Characteristic	Symbol	Min	Тур	Max	Unit
Ripple Rejection 18.5 Vdc ≤ V _{in} ≤ 28.5 Vdc, f = 120 Hz, I _O = 500 mA	RR	60	80	TVI	dB
Dropout Voltage (I _O = 1.0 A, T _J = 25°C)	VI – VO		2.0	N.T.2	Vdc
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	Vn	NWW.	10	OM. T W	μV/V _O
Output Resistance f = 1.0 kHz	rO	N INT	1.2	01.	mΩ
Short Circuit Current Limit ($T_A = 25^{\circ}C$) V _{in} = 35 Vdc	ISC	WW.	0.2	CO ⁴ 1.1	A
Peak Output Current (T _J = 25°C)	Imax	100-	2.2	COM	A
Average Temperature Coefficient of Output Voltage	TCVO		-1.0	- CON	mV/°C

ELECTRICAL CHARACTERISTICS ($V_{in} = 27 V$, $I_O = 500 mA$, $T_J = T_{Iow}$ to T_{high} [Note 1.], unless otherwise noted.)

WWW.Low COM. TW	NWW.L	N.CL	MC7818E	5	WW	MC78180	Y.CO.	WT 1
Characteristic	Symbol	Min	Тур	Max	Min	Тур	Max	Unit
Output Voltage (TJ = 25°C)	Vo	17.3	18	18.7	17.3	18	18.7	Vdc
$\begin{array}{l} \text{Output Voltage (5.0 mA \leq I_O \leq 1.0 A, P_D \leq 15 W)} \\ \text{21 Vdc} \leq \text{V}_{in} \leq 33 \text{ Vdc} \\ \text{22 Vdc} \leq \text{V}_{in} \leq 33 \text{ Vdc} \end{array}$	VO	- 17.1	18	_ 18.9	17.1	18	18.9 _	Vdc
Line Regulation, (Note 2.) 21 Vdc \leq V _{in} \leq 33 Vdc 24 Vdc \leq V _{in} \leq 30 Vdc	Reg _{line}	N/ <u>1</u> 10	9.5 3.2	360 180	-	9.5 3.2	50 25	mV
Load Regulation, (Note 2.) 5.0 mA \leq I _O \leq 1.5 A	Regload	WW.	2.0	360	W_	2.0	55	mV
Quiescent Current	IB	N AN	3.5	8.0	PT	3.5 🔨	6.5	mA
Quiescent Current Change 21 Vdc \leq V _{in} \leq 33 Vdc 5.0 mA \leq I _O \leq 1.0 A	ΔIB	A.M.	00 <u>±</u> .W	_ 0.5	LTW MT		1.0 0.5	mA
Ripple Rejection 22 Vdc \leq V _{in} \leq 33 Vdc, f = 120 Hz	RR	-71	57	NOT.CC	53	57	41	dB
Dropout Voltage ($I_O = 1.0 \text{ A}, T_J = 25^{\circ}\text{C}$)	V _{il} – V _O	- 1	2.0	002.0	1.17	2.0	_7/	Vdc
Output Noise Voltage (T _A = 25°C) 10 Hz ≤ f ≤ 100 kHz	Vn	- <	10	.100Y.	COM	10	- 1	μV/VO
Output Resistance f = 1.0 kHz	rO	-	1.3	N.100,	100N	1.3	-	mΩ
Short Circuit Current Limit (T _A = 25°C) V _{in} = 35 Vdc	ISC	- N	0.2	W.100	N.CO	0.2	-	A
Peak Output Current (T _J = 25°C)	Imax		2.2	M. M.	O.T.C	2.2	-	A
Average Temperature Coefficient of Output Voltage	TCVO		-1.5	N-N-	00 -	-1.5	-	mV/°C

1. $T_{low} = 0^{\circ}C$ for MC78XXAC, C, LM340AT-XX, LM340T-XX $T_{high} = +125^{\circ}C$ for MC78XXAC, C, LM340AT-XX, LM340T-XX = -40°C for MC78XXB

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

	M WW.	100Y.C	MC7818AC		
Characteristic	Symbol	Min	Тур	Max 🔨	Uni
Output Voltage ($T_J = 25^{\circ}C$)	Vo	17.64	18	18.36	Vdc
Output Voltage (5.0 mA \leq I_O \leq 1.0 A, P_D \leq 15 W) 21 Vdc \leq V_{in} \leq 33 Vdc	VO	17.3	18	18.7	Vdo
Line Regulation (Note 2.) 21 Vdc $\leq V_{in} \leq 33$ Vdc, I _O = 500 mA 24 Vdc $\leq V_{in} \leq 30$ Vdc, I _O = 1.0 A 24 Vdc $\leq V_{in} \leq 30$ Vdc, I _O = 1.0 A, T _J = 25°C 20.6 Vdc $\leq V_{in} \leq 33$ Vdc, I _O = 1.0 A, T _J = 25°C	Regline	11-11-1 11-1-11-1 11-1-11-1 11-1-11-1 11-1-11-1	9.5 3.2 3.2 8.0	22 25 10.5 22	mV
Load Regulation (Note 2.) $5.0 \text{ mA} \le I_O \le 1.5 \text{ A}, \text{ T}_J = 25^{\circ}\text{C}$ $5.0 \text{ mA} \le I_O \le 1.0 \text{ A}$ $250 \text{ mA} \le I_O \le 750 \text{ mA}$	Reg _{load}	-MA- 	2.0 1.8 1.5	25 25 15	mV
Quiescent Current	IB N		3.5	6.0	mA
Quiescent Current Change 21 Vdc \leq V _{in} \leq 33 Vdc, I _O = 500 mA 21.5 Vdc \leq V _{in} \leq 30 Vdc, T _J = 25°C 5.0 mA \leq I _O \leq 1.0 A	Δl _B	- 1	NWW.20	0.8 0.8 0.5	mA
Ripple Rejection 22 Vdc \leq V _{in} \leq 32 Vdc, f = 120 Hz, I _O = 500 mA	RR	53	57	1001.	dB
Dropout Voltage ($I_O = 1.0 \text{ A}, T_J = 25^{\circ}C$)	VI – VO	- N	2.0	N.J	Vdd
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	VnOV	WT	10	W.LO	μV/V
Output Resistance f = 1.0 kHz	ro	N=T	1.3 🔨	- 10	mΩ
Short Circuit Current Limit (T _A = 25°C) $V_{in} = 35 \text{ Vdc}$	ISC	WT.WO	0.2	WN.	00XA
Peak Output Current (T _J = 25°C)	Imax	NT.TV	2.2		A
Average Temperature Coefficient of Output Voltage	TCVO	- 1	-1.5	ANT.	mV/°

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ELECTRICAL CHARACTERISTICS (Vin = 33 V, IO = 500 mA, TJ = Tlow to Thigh [Note 1.], unless otherwise noted.)

	En		MC7824B)) ()	M.L.	MC7824C		W.100
Characteristic	Symbol	Min	Тур	Max	Min	Тур	Max	Unit
Dutput Voltage (T _J = 25°C)	VO	23 📢	24	25	23	24	25	Vdc
Dutput Voltage (5.0 mA \le I _O \le 1.0 A, P _D \le 15 W) 27 Vdc \le V _{in} \le 38 Vdc 28 Vdc \le V _{in} \le 38 Vdc	VO	_ 22.8	- 24	_ 25.2	22.8	24	25.2 -	Vdc
ine Regulation, (Note 2.) 27 Vdc \leq V _{in} \leq 38 Vdc 30 Vdc \leq V _{in} \leq 36 Vdc	Reg _{line}	8 <u>-</u>	11.5 3.8	480 240	V.CO	2.7 2.7	60 48	mV
oad Regulation, (Note 2.) 5.0 mA \leq IO \leq 1.5 A	Regload	-117	2.1	480	00 7 .C	4.4	65	mV
Quiescent Current	IB	$\overline{x}\overline{\overline{x}}$	3.6	8.0	-	3.6	6.5	mA
Quiescent Current Change 27 Vdc \leq V _{in} \leq 38 Vdc 5.0 mA \leq I _O \leq 1.0 A	ΔlB	1.TW	-	_ 0.5		_	1.0 0.5	mA

1. $T_{IOW} = 0^{\circ}C$ for MC78XXAC, C, LM340AT–XX, LM340T–XX = -40° C for MC78XXB

Thigh = +125°C for MC78XXAC, C, LM340AT-XX, LM340T-XX

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

WW.100Y.COM.TW **ELECTRICAL CHARACTERISTICS (continued)** (V_{in} = 33 V, I_O = 500 mA, T_J = T_{low} to T_{high} [Note 1.], unless

X.COM TW WWW 100X	TIM	MC7824B			N.CC			
Characteristic	Symbol	Min	Тур	Max	Min	Тур	Max	Unit
Ripple Rejection 28 Vdc \leq V _{in} \leq 38 Vdc, f = 120 Hz	RR	LM.	54	M.M.	50	54	- N	dB
Dropout Voltage ($I_O = 1.0 \text{ A}, T_J = 25^{\circ}\text{C}$)	VI – VO	17.	2.0	<u> </u>	1001.	2.0	<u> </u>	Vdc
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	Vn	W ^T .I	10	21 M	N.1005	10	TN	μV/V _O
Output Resistance f = 1.0 kHz	ro	DVEL	1.4	-	W-100	1.4	<u> </u>	mΩ
Short Circuit Current Limit (T _A = 25°C) V _{in} = 35 Vdc	ISC	0171.7	0.2	<u>N</u>	NN.10	0.2	1-1/1	A
Peak Output Current (TJ = 25°C)	Imax	COM.	2.2		M-W.	2.2	02	A
Average Temperature Coefficient of Output Voltage	TCVO	NGO.	-2.0	-	W Bring	-2.0	COM.	mV/°C

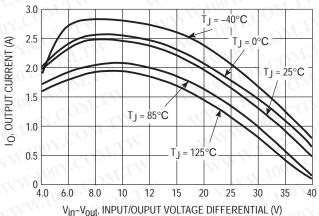
ELECTRICAL CHARACTERISTICS (V_{in} = 33 V, I_O = 1.0 A, T_J = T_{low} to T_{high} [Note 1.], unless otherwise noted.)

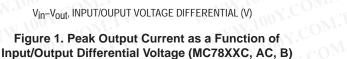
	CONTRACT		MC7824AC		WT
Characteristic	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo	23.5	24	24.5	Vdc
Output Voltage (5.0 mA \leq IO \leq 1.0 A, PD \leq 15 W) 27.3 Vdc \leq Vin \leq 38 Vdc	Vo	23.2	24	25.8	Vdc
	Reg _{line}	N.T.W M.T.W	11.5 3.8 3.8 10	25 28 12 25	mV 7.00
Load Regulation (Note 2.) $5.0 \text{ mA} \le I_O \le 1.5 \text{ A}, T_J = 25^{\circ}\text{C}$ $5.0 \text{ mA} \le I_O \le 1.0 \text{ A}$ $250 \text{ mA} \le I_O \le 750 \text{ mA}$	Reg _{load}	CO <u>N</u> .TV	2.1 2.0 1.8	15 25 15	mV
Quiescent Current	IB	COM.	3.6	6.0	mA
	ΔIB	DY.COM	N.T.V	0.8 0.8 0.5	mA
Ripple Rejection 28 Vdc \leq V _{in} \leq 38 Vdc, f = 120 Hz, I _O = 500 mA	RR	45	54	-	dB
Dropout Voltage ($I_O = 1.0 \text{ A}, T_J = 25^{\circ}\text{C}$)	VI – VO	1.100	2.0	× -	Vdc
Output Noise Voltage (T _A = 25°C) 10 Hz \leq f \leq 100 kHz	Vn	N.100X	CC ¹⁰	- 17	μV/V _O
Output Resistance (f = 1.0 kHz)	ro 🔨	W	1.4	-	mΩ
Short Circuit Current Limit (T _A = 25°C) V _{in} = 35 Vdc	ISC V	MMT00	0.2	-	A
Peak Output Current (T _J = 25°C)	Imax	-	2.2	-	A
Average Temperature Coefficient of Output Voltage	TCVO	-	-2.0	-	mV/°C

1. $T_{IOW} = 0^{\circ}C$ for MC78XXAC, C, LM340AT–XX, LM340T–XX = -40°C for MC78XXB

Thigh = +125°C for MC78XXAC, C, LM340AT–XX, LM340T–XX

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





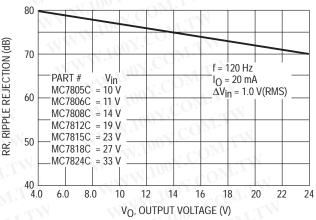


Figure 2. Ripple Rejection as a Function of Output Voltages (MC78XXC, AC, B)

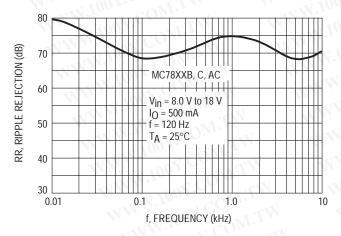
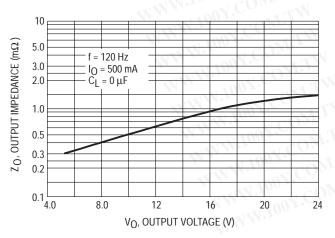
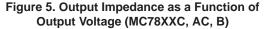


Figure 3. Ripple Rejection as a Function of Frequency (MC78XXC, AC, B)





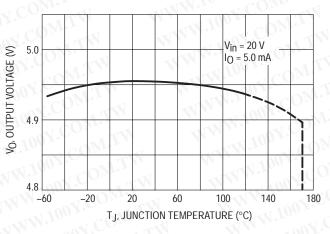
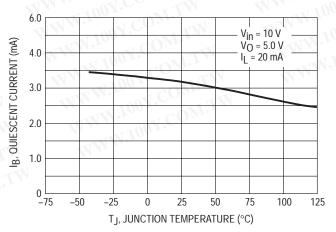


Figure 4. Output Voltage as a Function of Junction Temperature (MC7805C, AC, B)







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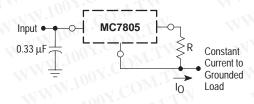
APPLICATIONS INFORMATION

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Design Considerations

The MC7800 Series of fixed voltage regulators are designed with Thermal Overload Protection that shuts down the circuit when subjected to an excessive power overload condition, Internal Short Circuit Protection that limits the maximum current the circuit will pass, and Output Transistor Safe–Area Compensation that reduces the output short circuit current as the voltage across the pass transistor is increased.

In many low current applications, compensation capacitors are not required. However, it is recommended that the regulator input be bypassed with a capacitor if the regulator is connected to the power supply filter with long wire lengths, or if the output load capacitance is large. An input bypass capacitor should be selected to provide good high–frequency characteristics to insure stable operation under all load conditions. A 0.33 μ F or larger tantalum, mylar, or other capacitor having low internal impedance at high frequencies should be chosen. The bypass capacitor should be mounted with the shortest possible leads directly across the regulators input terminals. Normally good construction techniques should be used to minimize ground loops and lead resistance drops since the regulator has no external sense lead.



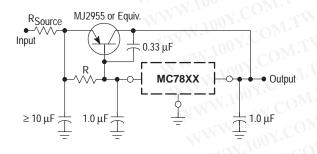
The MC7800 regulators can also be used as a current source when connected as above. In order to minimize dissipation the MC7805C is chosen in this application. Resistor R determines the current as follows:

$$I_{O} = \frac{5.0 \text{ V}}{\text{R}} + I_{B}$$

 $I_B \cong 3.2 \text{ mA}$ over line and load changes.

For example, a 1.0 A current source would require R to be a 5.0 $\Omega,$ 10 W resistor and the output voltage compliance would be the input voltage less 7.0 V.

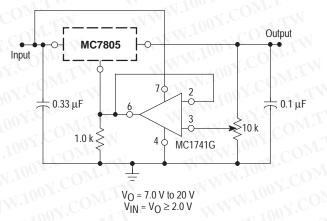
Figure 7. Current Regulator



XX = 2 digits of type number indicating voltage

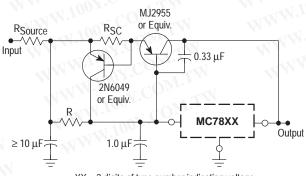
The MC7800 series can be current boosted with a PNP transistor. The MJ2955 provides current to 5.0 A. Resistor R in conjunction with the VBE of the PNP determines when the pass transistor begins conducting; this circuit is not short circuit proof. Input/output differential voltage minimum is increased by VBE of the pass transistor.

Figure 9. Current Boost Regulator



The addition of an operational amplifier allows adjustment to higher or intermediate values while retaining regulation characteristics. The minimum voltage obtainable with this arrangement is 2.0 V greater than the regulator voltage.

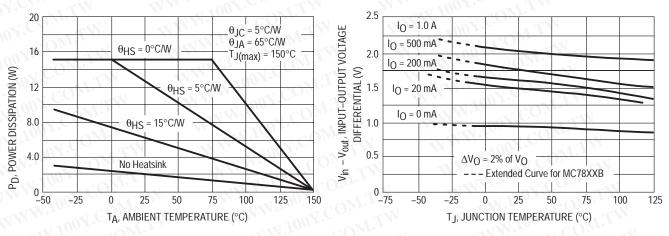
Figure 8. Adjustable Output Regulator

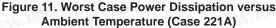


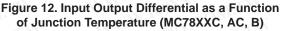
XX = 2 digits of type number indicating voltage.

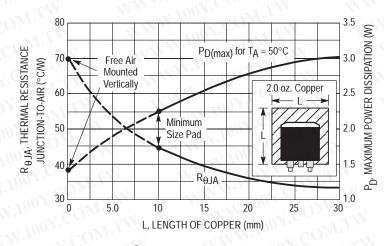
The circuit of Figure 9 can be modified to provide supply protection against short circuits by adding a short circuit sense resistor, R_{SC} , and an additional PNP transistor. The current sensing PNP must be able to handle the short circuit current of the three-terminal regulator. Therefore, a four-ampere plastic power transistor is specified.

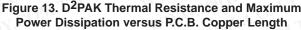
Figure 10. Short Circuit Protection











DEFINITIONS

Line Regulation – The change in output voltage for a change in the input voltage. The measurement is made under conditions of low dissipation or by using pulse techniques such that the average chip temperature is not significantly affected.

Load Regulation – The change in output voltage for a change in load current at constant chip temperature.

Maximum Power Dissipation – The maximum total device dissipation for which the regulator will operate within specifications.

Quiescent Current – That part of the input current that is not delivered to the load.

Output Noise Voltage – The rms ac voltage at the output, with constant load and no input ripple, measured over a specified frequency range.

Long Term Stability – Output voltage stability under accelerated life test conditions with the maximum rated voltage listed in the devices' electrical characteristics and maximum power dissipation.

WWW.100Y.C MC7800, MC7800A, LM340, LM340A Series W.100Y.COM.TW WWW.100Y.

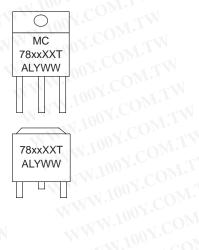
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COMIT	WWW	CON'T A	WW.100	Shi	pping
Device	Output Voltage	Temperature Range	Package	Rails (No Suffix)	Tape & Reel (R4 Suffix)
MC7805.2CT	WWW I	NT. COM TW	TO-220	MY.COF	- 12
MC7805ACD2T/R4	Terra I		D2PAK	LOONL.	800 Units/Reel
MC7805ACT			TO-220	.100 r. COM	-
MC7805CD2T/R4	LM MW	$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	D2PAK	N 100Y.C	800 Units/Reel
MC7805CT	5.0 V		WW	1007.00	WTN
LM340T-5			TO-220	W.ICON.CO	WIT
LM340AT-5	A.TW	1001. COM.1		NW.100	ON.L
MC7805BD2T/R4	WILL	TJ = −40° to +125°C	D2PAK	N.100X.C	800 Units/Reel
MC7805BT	W. T.	19 10 10 1120 0	V V	W 100Y.	WILL
MC7806ACT	OM.	T _J = 0° to +125°C	TO-220	VWW.LOOV	COM-TW
MC7806CT	6.0 V	1.10 CON		WW.100	CONF
MC7806BD2T/R4		$T_{J} = -40^{\circ} \text{ to } +125^{\circ}\text{C}$	D2PAK	W 1,100	800 Units/Reel
MC7806BT	WT NO.		WTI	WW 10	N TY
MC7808ABT	V CONT.		TO-220	WWW.L	N.COM
MC7808ACT	COMIT	T _J = 0° to +125°C	OM. I	.WW.J	COM.
MC7808CD2T/R4	8.0 V	.1007.0	D2PAK		800 Units/Reel
MC7808CT	on V.COm TN	YOOT WWW	TO-220	WW	1007.0
MC7808BD2T/R4	CONT.	$T_{J} = -40^{\circ} \text{ to } +125^{\circ}\text{C}$	D2PAK	WWV	800 Units/Reel
MC7808BT	100 r. COM.1	J. 100	TO-220	WW	19.10° - CO
MC7809ACT	100Y. OM.		M.I.	50 Units/Rail	W.1001. CO
MC7809CD2T/R4	9.0 V	$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	D2PAK	N 11	800 Units/Reel
MC7809CT	W.10 N.COM	WWW.	TO-220	W W	N. Took
MC7809BT	NN.100 CON	$T_{J} = -40^{\circ} \text{ to } +125^{\circ}\text{C}$	COM.	A Mar	NW.
MC7812ACD2T/R4	W.1001.C		D2PAK		800 Units/Reel
MC7812ACT	1007.0		TO-220	I.TW	
MC7812CD2T/R4	NMM. CONC	$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	D2PAK	WILL	800 Units/Reel
MC7812CT	12 V		TO OCO	WT	WWW.L
LM340T-12	W.1001		TO-220	DW.	WW.I
LM340AT-12	WW 1008	NITH N	DODALI	N.I.W	
MC7812BD2T/R4	WWW.	$T_{\rm J} = -40^{\circ}$ to +125°C	D2PAK	WIM	800 Units/Reel
MC7812BT	N.W.W.	N.COM.	TO-220	NT NOO.	
MC7815ACD2T/R4	V 10		D2PAK	COM.	800 Units/Reel
MC7815ACT	WW		TO-220	COM.TW	
MC7815CD2T/R4	WWW.	$T_{\rm J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	D2PAK	DY.C.	800 Units/Reel
MC7815CT	15 V		TO 000	MY.COM	
LM340T-15 LM340AT-15			TO-220	0.0	-

CONT	WWW.P	N.COM.	WWW.	Ship	pping	
Device Output Vo	Output Voltage	Temperature Range	Package	Rails (No Suffix)	Tape & Ree (R4 Suffix)	
MC7818ACT	NW.	TW.COMETW	TO-220	TIM YOUNG	· _	
MC7818CD2T/R4	18 V	$T_J = 0^\circ$ to +125°C	D2PAK	ON.COM	800 Units/Re	
MC7818CT	- 18 V		WW	LOO COM.		
MC7818BT	U 11	$T_{J} = -40^{\circ} \text{ to } +125^{\circ}\text{C}$	TO-220	1001. OM	-	
MC7824ACT	NN NN	ТЈ = 0° to +125°С	WW	50 Units/Rail	- VI.	
MC7824CD2T			D2PAK		WT.	
MC7824CT	24 V		TO-220	W.IU CO		
MC7824BD2T/R4	N.T.W	$T_{1} = -40^{\circ} \text{ to } +125^{\circ}\text{C}$	D2PAK	W.1001.	800 Units/Re	
MC7824BT	WT	$1 J = -40 \ 10 + 123 \ C$	TO-220	1001.0	TIM	

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MARKING DIAGRAMS MC7800, MC7800A Series



MARKING DIAGRAMS LM340, LM340A Series



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= Wafer Lot L

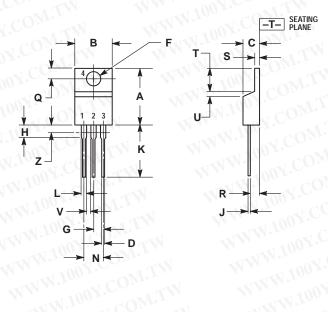
Y = Year

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TO-220 **T SUFFIX** CASE 221A-09 **ISSUE AA**



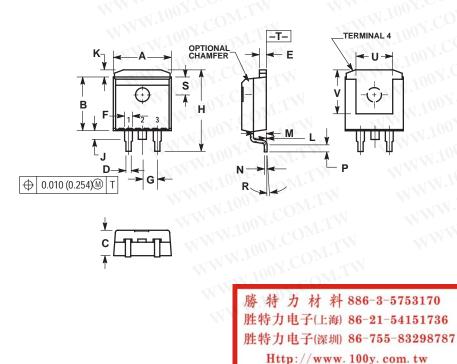
CONTROLLING DIMENSION: INCH DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE 3. ALLOWED. INCHES MILLIMETERS DIM MIN MAX MIN MAX A 0.570 0.620 14.48 15.75 В 0.380 0.405 9.66 10.28 C 0.160 0.190 4.82 D 0.025 0.035 0.64 0.88 F 0.142 0.147 3.61 3.73 G 0.095 0.105 2.42 2.66 H 0.110 0.155 2.80 3.93 0.018 0.025 0.46 0.64 J К 0.500 0.562 12.70 14.27 0.060 L 0.045 1.15 1.52 5.33 N 0.190 0.210 4.83 Q 0.100 0.120 2.54 3.04 R 0.080 0.110 2.04 2.79 S T 0.045 0.055 1.15 5.97 1.39 0.235 0.255 6.47 **U** 0.000 0.050 0.00 V 0.045 1.15 2.04 0.080

DIMENSIONING AND TOLERANCING PER ANSI Y14.5M. 1982.

NOTES:

2

D2PAK **D2T SUFFIX** CASE 936-03 **ISSUE B**



NOTES 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M. 1982.

- CONTROLLING DIMENSION: INCH 2
- TAB CONTOUR OPTIONAL WITHIN DIMENSIONS A AND K. 3.
- DIMENSIONS U AND V ESTABLISH A MINIMUM MOUNTING SURFACE FOR TERMINAL 4. 4. 5
- DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH OR GATE PROTRUSIONS. MOLD FLASH AND GATE PROTRUSIONS NOT TO EXCEED 0.025 (0.635) MAXIMUM.

Y	12	INCHES		MILLIMETERS	
	DIM	MIN	MAX	MIN	MAX
	Α	0.386	0.403	9.804	10.236
	В	0.356	0.368	9.042	9.347
	C	0.170	0.180	4.318	4.572
	D	0.026	0.036	0.660	0.914
	Ε	0.045	0.055	1.143	1.397
	É.	0.051 REF		1.295 REF	
•	G	0.100 BSC		2.540 BSC	
	H	0.539	0.579	13.691	14.707
đ	J	0.125 MAX		3.175 MAX	
2	K	0.050 REF		1.270 REF	
	L	0.000	0.010	0.000	0.254
	Μ	0.088	0.102	2.235	2.591
	Ν	0.018	0.026	0.457	0.660
	Р	0.058	0.078	1.473	1.981
	R	5° REF		5°REF	
	S	0.116	REF	2.946 REF	
	U	U 0.200 MIN V 0.250 MIN		5.080 MIN	
	V			6.350 MIN	

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