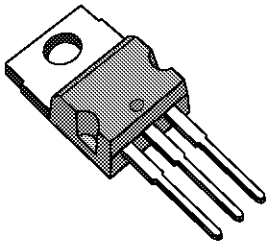
SGS-THOMSON MICROELECTRONICS

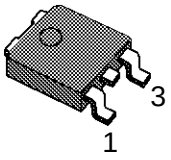
L78M00AB/AC SERIES

PRECISION 500mA REGULATORS

- OUTPUT CURRENT UP TO 0.5A
- OUTPUT VOLTAGES OF 5; 6; 8; 9: 10; 12; 15; 18; 20; 24V
- THERMAL OVERLOAD PROTECTION
- SHORT CIRCUIT PROTECTION
- OUTPUT TRANSISTORS SOA PROTECTION
- ± 2% OUTPUT VOLTAGE TOLERANCE
- GUARANTEED IN EXTENDED TEMPERATURE RANGES



TO-220

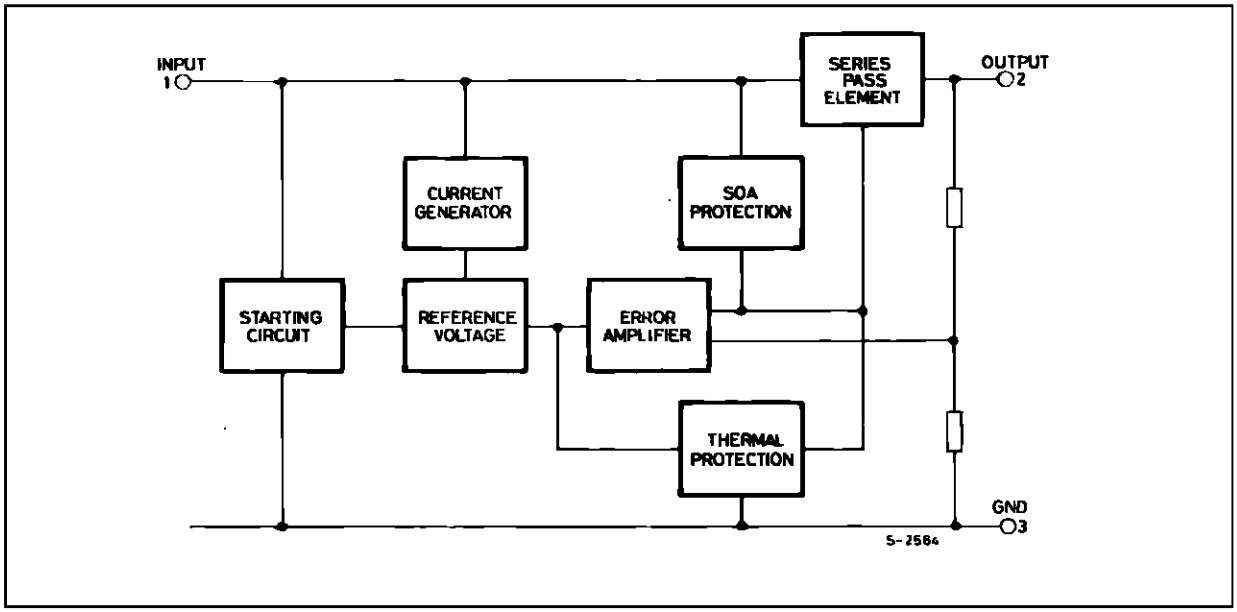


DPAK
(TO-252)

DESCRIPTION

The L78M00AB series of three-therminal positive regulators is available in TO-220 and DPAK packages and with several fixed output voltages, making it useful in a wide range of applications. These regulators can provide local on-card 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 0.5A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

BLOCK DIAGRAM



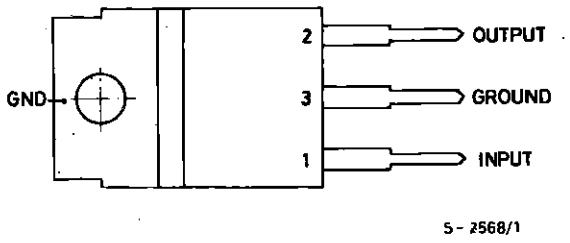
ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_i	DC Input Voltage (for V_o = 5 to 18V) (for V_o = 20, 24V)	35 40	V V
I_o	Output Current	Internally Limited	
P_{tot}	Power Dissipation	Internally Limited	
T_{stg}	Storage Temperature	-65 to 150	^oC
T_j	Operating Junction Temperature for L78M00AC L78M00AB	0 to 125 -40 to 125	^oC ^oC

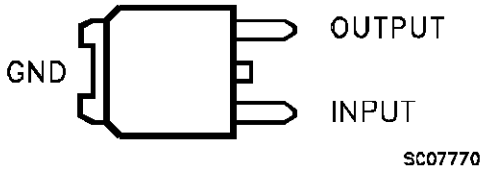
THERMAL DATA

			TO-220	DPAK	
$R_{thj\text{-}case}$	Thermal Resistance Junction-case	MAX	3	8	$^oC/W$
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient	MAX	50	100	$^oC/W$

CONNECTION DIAGRAM AND ORDER CODES (top view)



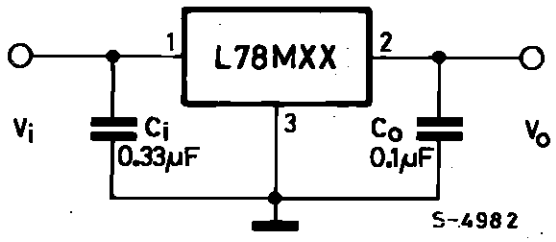
TO-220



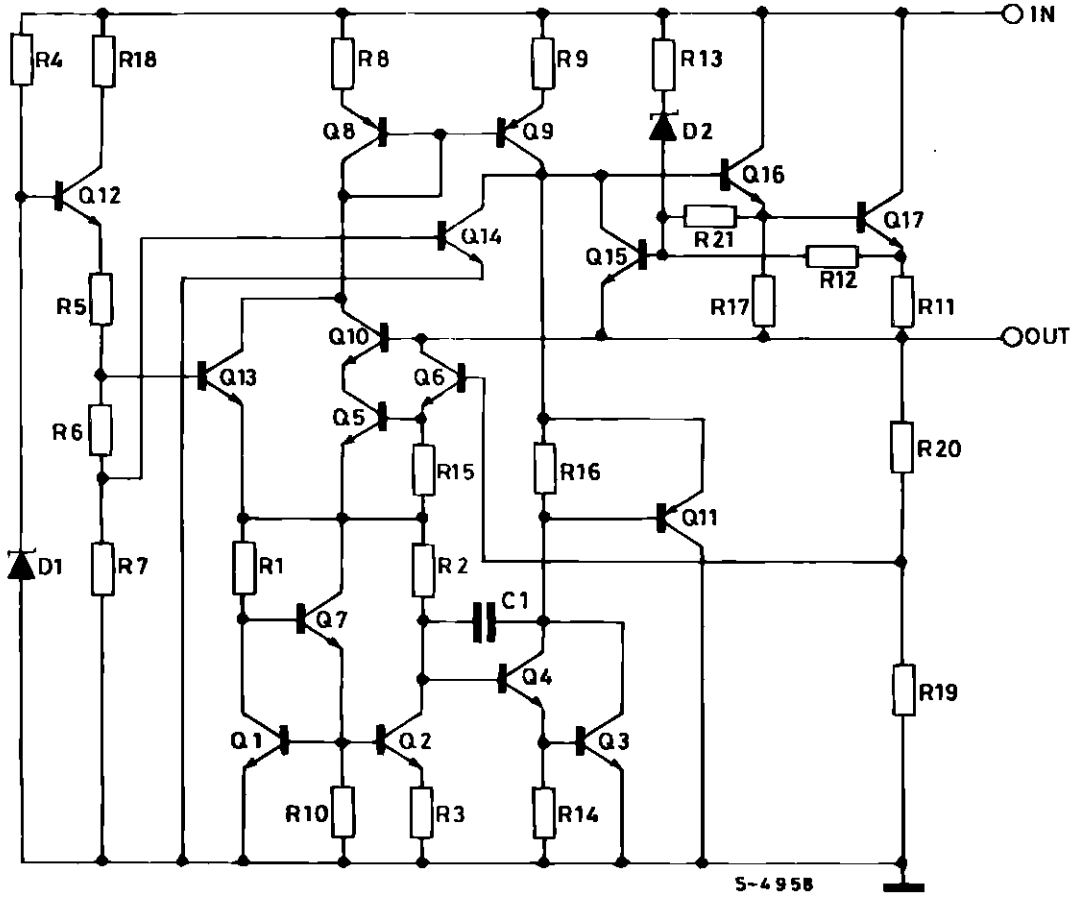
DPAK

Order Codes			Output Voltage
0 to 125 oC	-40 to 125 oC		
DPAK	TO-220	DPAK	
L78M05ACDT	L78M05ABV	L78M05ABDT	5V
L78M06ACDT	L78M06ABV	L78M06ABDT	6V
L78M08ACDT	L78M08ABV	L78M08ABDT	8V
L78M09ACDT	L78M09ABV	L78M09ABDT	9V
L78M10ACDT	L78M10ABV	L78M10ABDT	10V
L78M12ACDT	L78M12ABV	L78M12ABDT	12V
L78M15ACDT	L78M15ABV	L78M15ABDT	15V
L78M18ACDT	L78M18ABV	L78M18ABDT	18V
L78M20ACDT	L78M20ABV	L78M20ABDT	20V
L78M24ACDT	L78M24ABV	L78M24ABDT	24V

APPLICATION CIRCUIT



SCHEMATIC DIAGRAM



TEST CIRCUITS

Figure 1 : DC Parameters.

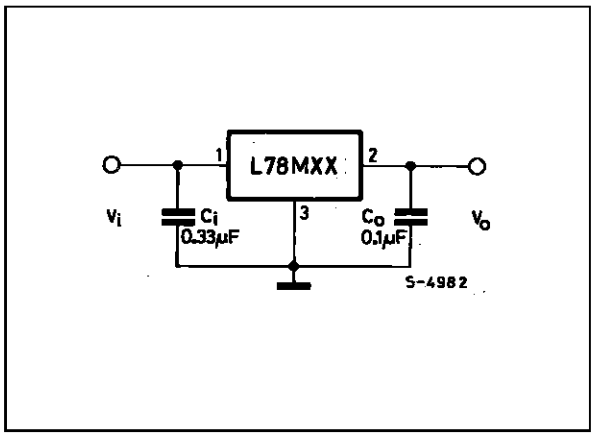


Figure 2 : Load Regulation.

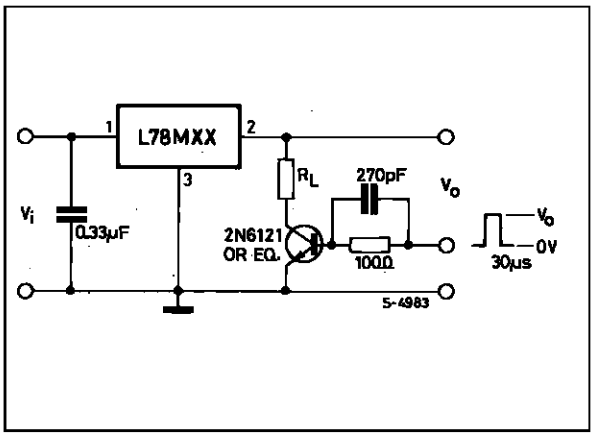
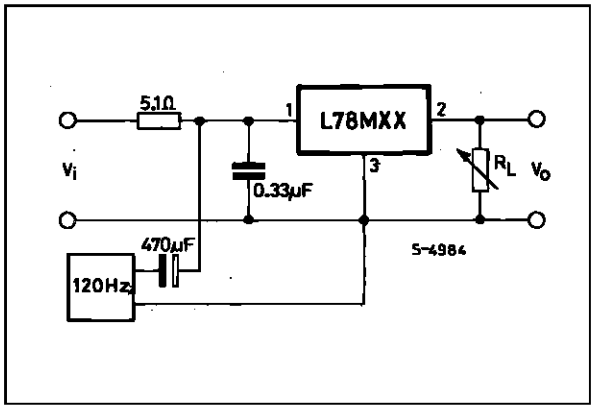


Figure 3 : Ripple Rejection.



ELECTRICAL CHARACTERISTICS FOR L78M05XX (refer to the test circuits, V_i = 10V, I_o = 350 mA, C_i = 0.33 µF, C_o = 0.1 µF, T_j = -40 to 125 °C (AB), T_j = 0 to 125 °C (AC) unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	T_j = 25 °C	4.9	5	5.1	V
V_o	Output Voltage	I_o = 5 mA to 350 mA V_i = 7 to 20 V	4.8	5	5.2	V
ΔV_o	Line Regulation	I_o = 200 mA T_j = 25 °C V_i = 7 to 25 V V_i = 8 to 25 V			 100 30	 mV mV
ΔV_o	Load Regulation	I_o = 5 to 500 mA T_j = 25 °C I_o = 5 to 200 mA T_j = 25 °C			100 50	mV mV
I_d	Quiescent Current	T_j = 25 °C			6	mA
ΔI_d	Quiescent Current Change	I_o = 5 to 350 mA			0.5	mA
ΔI_d	Quiescent Current Change	Io = 200 mA V_i = 8 to 25 V			0.8	mA
$\frac{\Delta V_o}{\Delta T}$	Output Voltage Drift	I_o = 5 mA		-0.5		mV/°C
e_N	Output Noise Voltage	B = 10Hz to 100KHz T_j = 25 °C		40		µV
SVR	Supply Voltage Rejection	Io = 300 mA f = 120 Hz T_j = 25 °C V_i = 8 to 18 V	62			dB
V_d	Dropout Voltage	T_j = 25 °C		2		V
I_{sc}	Short Circuit Current	T_j = 25 °C V_i = 35 V		300		mA
I_{scp}	Short Circuit Peack Current	T_j = 25 °C		700		mA

ELECTRICAL CHARACTERISTICS FOR L78M06XX (refer to the test circuits, V_i = 11V, I_o = 350 mA, C_i = 0.33 µF, C_o = 0.1 µF, T_j = -40 to 125 °C (AB), T_j = 0 to 125 °C (AC) unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	T_j = 25 °C	5.88	6	6.12	V
V_o	Output Voltage	I_o = 5 mA to 350 mA V_i = 8 to 21 V	5.75	6	6.3	V
ΔV_o	Line Regulation	I_o = 200 mA T_j = 25 °C V_i = 8 to 25 V V_i = 9 to 25 V			 100 30	 mV mV
ΔV_o	Load Regulation	I_o = 5 to 500 mA T_j = 25 °C I_o = 5 to 200 mA T_j = 25 °C			120 60	mV mV
I_d	Quiescent Current	T_j = 25 °C			6	mA
ΔI_d	Quiescent Current Change	I_o = 5 to 350 mA			0.5	mA
ΔI_d	Quiescent Current Change	Io = 200 mA V_i = 9 to 25 V			0.8	mA
$\frac{\Delta V_o}{\Delta T}$	Output Voltage Drift	I_o = 5 mA		-0.5		mV/°C
e_N	Output Noise Voltage	B = 10Hz to 100KHz T_j = 25 °C		45		µV
SVR	Supply Voltage Rejection	Io = 300 mA f = 120 Hz T_j = 25 °C V_i = 9 to 19 V	59			dB
V_d	Dropout Voltage	T_j = 25 °C		2		V
I_{sc}	Short Circuit Current	T_j = 25 °C V_i = 35 V		270		mA
I_{scp}	Short Circuit Peack Current	T_j = 25 °C		700		mA

ELECTRICAL CHARACTERISTICS FOR L78M08XX (refer to the test circuits, V_i = 14V, I_o = 350 mA, C_i = 0.33 µF, C_o = 0.1 µF, T_j = -40 to 125 °C (AB), T_j = 0 to 125 °C (AC) unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	T_j = 25 °C	7.84	8	8.16	V
V_o	Output Voltage	I_o = 5 mA to 350 mA V_i = 10.5 to 23 V	7.7	8	8.3	V
ΔV_o	Line Regulation	I_o = 200 mA T_j = 25 °C V_i = 10.5 to 25 V V_i = 11 to 25 V			 100 30	 mV mV
ΔV_o	Load Regulation	I_o = 5 to 500 mA T_j = 25 °C I_o = 5 to 200 mA T_j = 25 °C			160 80	mV mV
I_d	Quiescent Current	T_j = 25 °C			6	mA
ΔI_d	Quiescent Current Change	I_o = 5 to 350 mA			0.5	mA
ΔI_d	Quiescent Current Change	Io = 200 mA V_i = 10.5 to 25 V			0.8	mA
$\frac{\Delta V_o}{\Delta T}$	Output Voltage Drift	I_o = 5 mA		-0.5		mV/°C
e_N	Output Noise Voltage	B = 10Hz to 100KHz T_j = 25 °C		52		µV
SVR	Supply Voltage Rejection	Io = 300 mA f = 120 Hz T_j = 25 °C V_i = 11.5 to 21.5 V	56			dB
V_d	Dropout Voltage	T_j = 25 °C		2		V
I_{sc}	Short Circuit Current	T_j = 25 °C V_i = 35 V		250		mA
I_{scp}	Short Circuit Peack Current	T_j = 25 °C		700		mA

ELECTRICAL CHARACTERISTICS FOR L78M09XX (refer to the test circuits, V_i = 15V, I_o = 350 mA, C_i = 0.33 µF, C_o = 0.1 µF, T_j = -40 to 125 °C (AB), T_j = 0 to 125 °C (AC) unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	T_j = 25 °C	8.82	9	9.18	V
V_o	Output Voltage	I_o = 5 mA to 350 mA V_i = 11.5 to 24 V	8.64	9	9.36	V
ΔV_o	Line Regulation	I_o = 200 mA T_j = 25 °C V_i = 11.5 to 25 V V_i = 12 to 25 V			 100 30	 mV mV
ΔV_o	Load Regulation	I_o = 5 to 500 mA T_j = 25 °C I_o = 5 to 200 mA T_j = 25 °C			180 90	mV mV
I_d	Quiescent Current	T_j = 25 °C			6	mA
ΔI_d	Quiescent Current Change	I_o = 5 to 350 mA			0.5	mA
ΔI_d	Quiescent Current Change	Io = 200 mA V_i = 11.5 to 25 V			0.8	mA
$\frac{\Delta V_o}{\Delta T}$	Output Voltage Drift	I_o = 5 mA		-0.5		mV/°C
e_N	Output Noise Voltage	B = 10Hz to 100KHz T_j = 25 °C		52		µV
SVR	Supply Voltage Rejection	Io = 300 mA f = 120 Hz T_j = 25 °C V_i = 12.5 to 23 V	56			dB
V_d	Dropout Voltage	T_j = 25 °C		2		V
I_{sc}	Short Circuit Current	T_j = 25 °C V_i = 35 V		250		mA
I_{scp}	Short Circuit Peack Current	T_j = 25 °C		700		mA

ELECTRICAL CHARACTERISTICS FOR L78M10XX (refer to the test circuits, V_i = 16V, I_o = 350 mA, C_i = 0.33 µF, C_o = 0.1 µF, T_j = -40 to 125 °C (AB), T_j = 0 to 125 °C (AC) unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	T_j = 25 °C	9.8	10	10.2	V
V_o	Output Voltage	I_o = 5 mA to 350 mA V_i = 12.5 to 25 V	9.6	10	10.4	V
ΔV_o	Line Regulation	I_o = 200 mA T_j = 25 °C V_i = 12.5 to 30 V V_i = 13 to 30 V			 100 30	 mV mV
ΔV_o	Load Regulation	I_o = 5 to 500 mA T_j = 25 °C I_o = 5 to 200 mA T_j = 25 °C			200 100	mV mV
I_d	Quiescent Current	T_j = 25 °C			6	mA
ΔI_d	Quiescent Current Change	I_o = 5 to 350 mA			0.5	mA
ΔI_d	Quiescent Current Change	Io = 200 mA V_i = 12.5 to 30 V			0.8	mA
$\frac{\Delta V_o}{\Delta T}$	Output Voltage Drift	I_o = 5 mA		-0.5		mV/°C
e_N	Output Noise Voltage	B = 10Hz to 100KHz T_j = 25 °C		64		µV
SVR	Supply Voltage Rejection	Io = 300 mA f = 120 Hz T_j = 25 °C V_i = 13.5 to 24 V	56			dB
V_d	Dropout Voltage	T_j = 25 °C		2		V
I_{sc}	Short Circuit Current	T_j = 25 °C V_i = 35 V		245		mA
I_{scp}	Short Circuit Peack Current	T_j = 25 °C		700		mA

ELECTRICAL CHARACTERISTICS FOR L78M12XX (refer to the test circuits, V_i = 19V, I_o = 350 mA, C_i = 0.33 µF, C_o = 0.1 µF, T_j = -40 to 125 °C (AB), T_j = 0 to 125 °C (AC) unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	T_j = 25 °C	11.75	12	12.25	V
V_o	Output Voltage	I_o = 5 mA to 350 mA V_i = 14.5 to 27 V	11.5	12	12.5	V
ΔV_o	Line Regulation	I_o = 200 mA T_j = 25 °C V_i = 14.5 to 30 V V_i = 16 to 30 V			 100 30	 mV mV
ΔV_o	Load Regulation	I_o = 5 to 500 mA T_j = 25 °C I_o = 5 to 200 mA T_j = 25 °C			240 120	mV mV
I_d	Quiescent Current	T_j = 25 °C			6	mA
ΔI_d	Quiescent Current Change	I_o = 5 to 350 mA			0.5	mA
ΔI_d	Quiescent Current Change	Io = 200 mA V_i = 14.5 to 30 V			0.8	mA
$\frac{\Delta V_o}{\Delta T}$	Output Voltage Drift	I_o = 5 mA		-1		mV/°C
e_N	Output Noise Voltage	B = 10Hz to 100KHz T_j = 25 °C		75		µV
SVR	Supply Voltage Rejection	Io = 300 mA f = 120 Hz T_j = 25 °C V_i = 15 to 25 V	55			dB
V_d	Dropout Voltage	T_j = 25 °C		2		V
I_{sc}	Short Circuit Current	T_j = 25 °C V_i = 35 V		240		mA
I_{scp}	Short Circuit Peack Current	T_j = 25 °C		700		mA

ELECTRICAL CHARACTERISTICS FOR L78M15XX (refer to the test circuits, V_i = 23V, I_o = 350 mA, C_i = 0.33 µF, C_o = 0.1 µF, T_j = -40 to 125 °C (AB), T_j = 0 to 125 °C (AC) unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	T_j = 25 °C	14.7	15	15.3	V
V_o	Output Voltage	I_o = 5 mA to 350 mA V_i = 17 to 30 V	14.4	15	15.6	V
ΔV_o	Line Regulation	I_o = 200 mA T_j = 25 °C V_i = 17.5 to 30 V V_i = 20 to 30 V			 100 30	 mV mV
ΔV_o	Load Regulation	I_o = 5 to 500 mA T_j = 25 °C I_o = 5 to 200 mA T_j = 25 °C			300 150	mV mV
I_d	Quiescent Current	T_j = 25 °C			6	mA
ΔI_d	Quiescent Current Change	I_o = 5 to 350 mA			0.5	mA
ΔI_d	Quiescent Current Change	Io = 200 mA V_i = 17.5 to 30 V			0.8	mA
$\frac{\Delta V_o}{\Delta T}$	Output Voltage Drift	I_o = 5 mA		-1		mV/°C
e_N	Output Noise Voltage	B = 10Hz to 100KHz T_j = 25 °C		90		µV
SVR	Supply Voltage Rejection	Io = 300 mA f = 120 Hz T_j = 25 °C V_i = 18.5 to 28.5 V	54			dB
V_d	Dropout Voltage	T_j = 25 °C		2		V
I_{sc}	Short Circuit Current	T_j = 25 °C V_i = 35 V		240		mA
I_{scp}	Short Circuit Peack Current	T_j = 25 °C		700		mA

ELECTRICAL CHARACTERISTICS FOR L78M18XX (refer to the test circuits, V_i = 26V, I_o = 350 mA, C_i = 0.33 µF, C_o = 0.1 µF, T_j = -40 to 125 °C (AB), T_j = 0 to 125 °C (AC) unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	T_j = 25 °C	17.64	18	18.36	V
V_o	Output Voltage	I_o = 5 mA to 350 mA V_i = 20.5 to 33 V	17.3	18	18.7	V
ΔV_o	Line Regulation	I_o = 200 mA T_j = 25 °C V_i = 21 to 33 V V_i = 24 to 33 V			 100 30	 mV mV
ΔV_o	Load Regulation	I_o = 5 to 500 mA T_j = 25 °C I_o = 5 to 200 mA T_j = 25 °C			360 180	mV mV
I_d	Quiescent Current	T_j = 25 °C			6	mA
ΔI_d	Quiescent Current Change	I_o = 5 to 350 mA			0.5	mA
ΔI_d	Quiescent Current Change	Io = 200 mA V_i = 21 to 33 V			0.8	mA
$\frac{\Delta V_o}{\Delta T}$	Output Voltage Drift	I_o = 5 mA		-1.1		mV/°C
e_N	Output Noise Voltage	B = 10Hz to 100KHz T_j = 25 °C		100		µV
SVR	Supply Voltage Rejection	Io = 300 mA f = 120 Hz T_j = 25 °C V_i = 22 to 32 V	53			dB
V_d	Dropout Voltage	T_j = 25 °C		2		V
I_{sc}	Short Circuit Current	T_j = 25 °C V_i = 35 V		240		mA
I_{scp}	Short Circuit Peack Current	T_j = 25 °C		700		mA

ELECTRICAL CHARACTERISTICS FOR L78M20XX (refer to the test circuits, V_i = 29V, I_o = 350 mA, C_i = 0.33 µF, C_o = 0.1 µF, T_j = -40 to 125 °C (AB), T_j = 0 to 125 °C (AC) unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	T_j = 25 °C	19.6	20	20.4	V
V_o	Output Voltage	I_o = 5 mA to 350 mA V_i = 23 to 35 V	19.2	20	20.8	V
ΔV_o	Line Regulation	I_o = 200 mA T_j = 25 °C V_i = 23 to 35 V V_i = 24 to 35 V			 100 30	 mV mV
ΔV_o	Load Regulation	I_o = 5 to 500 mA T_j = 25 °C I_o = 5 to 200 mA T_j = 25 °C			400 200	mV mV
I_d	Quiescent Current	T_j = 25 °C			6	mA
ΔI_d	Quiescent Current Change	I_o = 5 to 350 mA			0.5	mA
ΔI_d	Quiescent Current Change	Io = 200 mA V_i = 23 to 35 V			0.8	mA
$\frac{\Delta V_o}{\Delta T}$	Output Voltage Drift	I_o = 5 mA		-1.1		mV/°C
e_N	Output Noise Voltage	B = 10Hz to 100KHz T_j = 25 °C		110		µV
SVR	Supply Voltage Rejection	Io = 300 mA f = 120 Hz T_j = 25 °C V_i = 24 to 34 V	53			dB
V_d	Dropout Voltage	T_j = 25 °C		2		V
I_{sc}	Short Circuit Current	T_j = 25 °C V_i = 35 V		240		mA
I_{scp}	Short Circuit Peack Current	T_j = 25 °C		700		mA

ELECTRICAL CHARACTERISTICS FOR L78M24XX (refer to the test circuits, V_i = 33V, I_o = 350 mA, C_i = 0.33 µF, C_o = 0.1 µF, T_j = -40 to 125 °C (AB), T_j = 0 to 125 °C (AC) unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	T_j = 25 °C	23.5	24	24.5	V
V_o	Output Voltage	I_o = 5 mA to 350 mA V_i = 27 to 38 V	23	24	25	V
ΔV_o	Line Regulation	I_o = 200 mA T_j = 25 °C V_i = 27 to 38 V V_i = 28 to 38 V			 100 30	 mV mV
ΔV_o	Load Regulation	I_o = 5 to 500 mA T_j = 25 °C I_o = 5 to 200 mA T_j = 25 °C			480 240	mV mV
I_d	Quiescent Current	T_j = 25 °C			6	mA
ΔI_d	Quiescent Current Change	I_o = 5 to 350 mA			0.5	mA
ΔI_d	Quiescent Current Change	Io = 200 mA V_i = 27 to 38 V			0.8	mA
$\frac{\Delta V_o}{\Delta T}$	Output Voltage Drift	I_o = 5 mA		-1.2		mV/°C
e_N	Output Noise Voltage	B = 10Hz to 100KHz T_j = 25 °C		170		µV
SVR	Supply Voltage Rejection	Io = 300 mA f = 120 Hz T_j = 25 °C V_i = 28 to 38 V	50			dB
V_d	Dropout Voltage	T_j = 25 °C		2		V
I_{sc}	Short Circuit Current	T_j = 25 °C V_i = 35 V		240		mA
I_{scp}	Short Circuit Peack Current	T_j = 25 °C		700		mA

Figure 4 : Dropout Voltage vs. Junction Temperature.

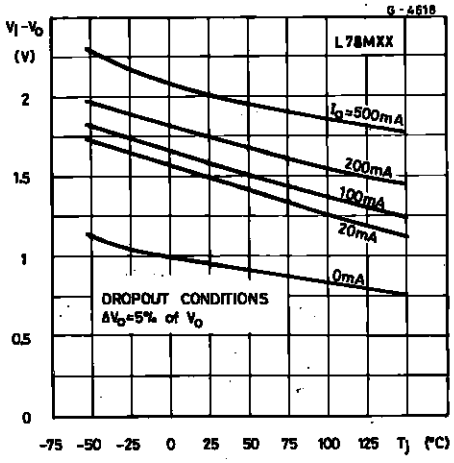


Figure 5 : Dropout Characteristics.

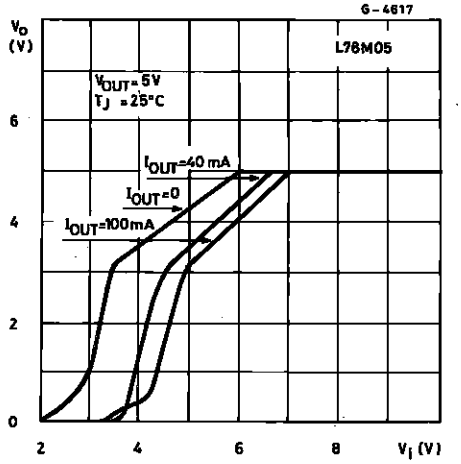


Figure 6 : Peak Output Current vs. Input-Output Differential Voltage.

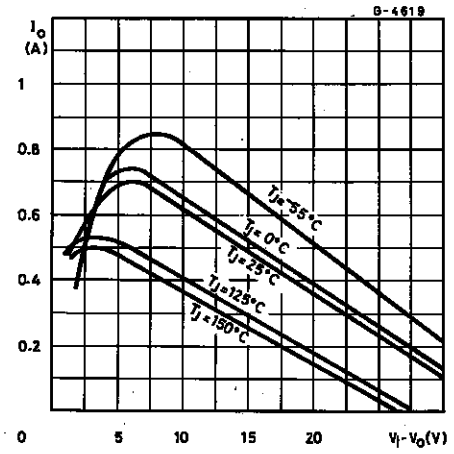


Figure 7 : Output Voltage vs. Junction Temperature.

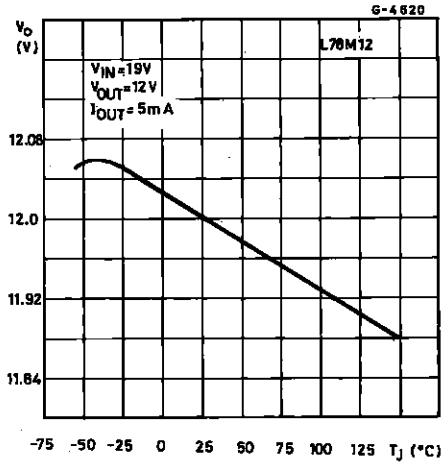


Figure 8 : Supply Voltage Rejection vs. Frequency.

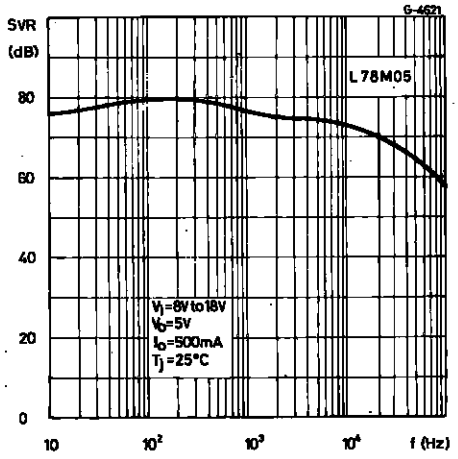


Figure 9 : Quiescent Current vs. Junction Temperature.

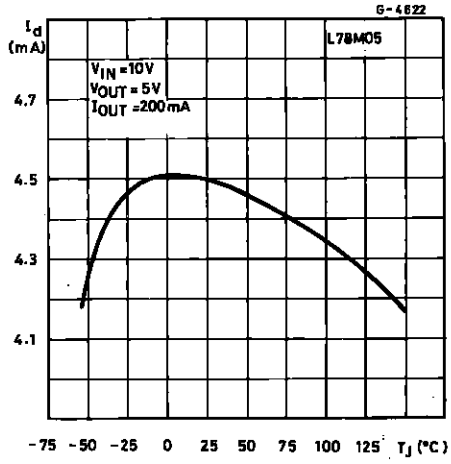


Figure 10 : Load Transient Response.

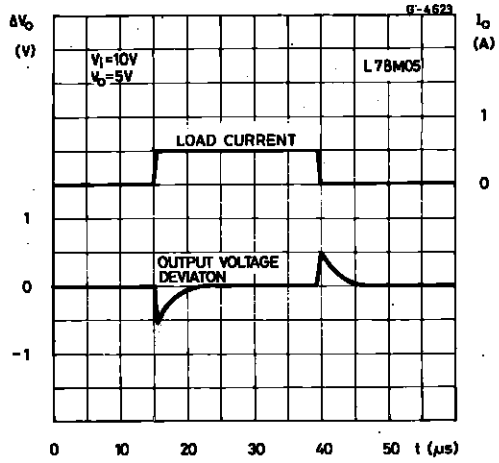


Figure 11 : Line Transient Response.

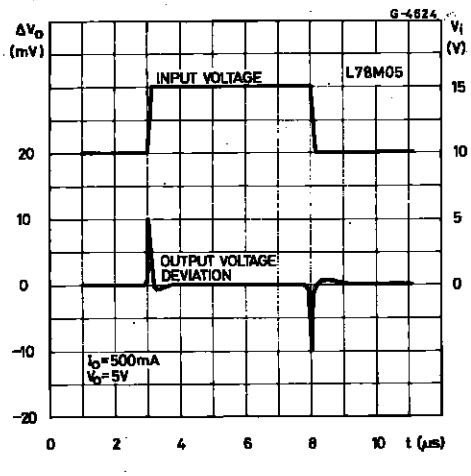
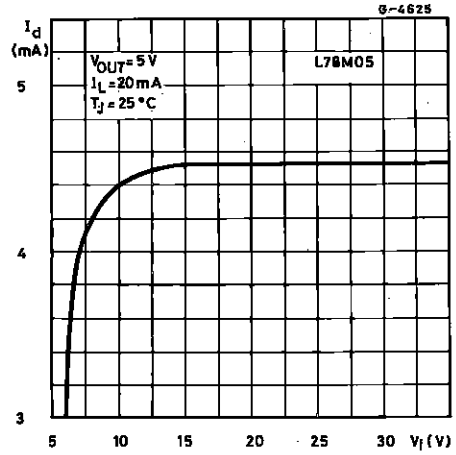


Figure 12 : Quiescent Current vs. Input Voltage.



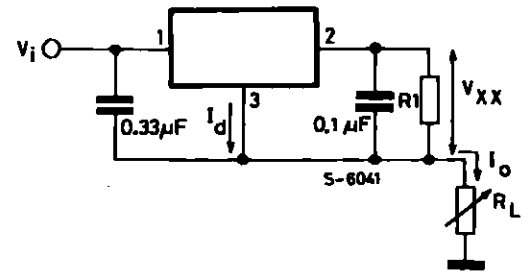
APPLICATIONS INFORMATION

DESIGN CONSIDERATIONS

The L78M00AB 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 as the voltage across the pass transistor is increased.

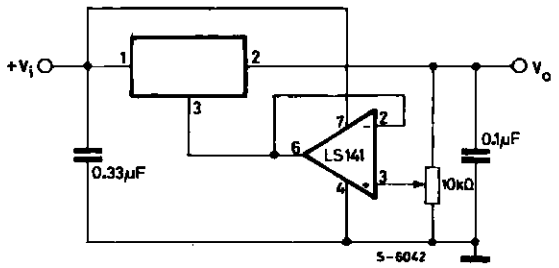
In many low current applications, compensation capacitors are not required. However, it is recommended that the regulator input be bypassed with a capacitor if the regulator is connected to the power supply filter with long wire lengths, or if the output load capacitance is large. An input bypass capacitor should be selected to provide good high-frequency characteristics to insure stable operation under all load conditions. A 0.33µF 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.

Figure 13 : Current Regulator.



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

Figure 14 : Adjustable Output Regulator.

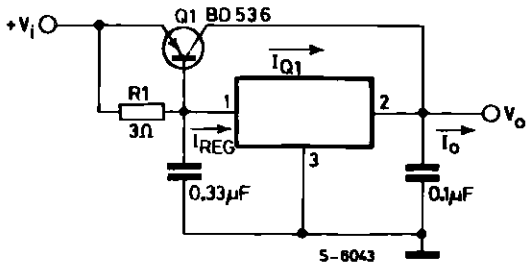


V_O, 7.0V to 20V

$V_i - V_O \geq 2.0V$

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 2.0V greater than the regulator voltage.

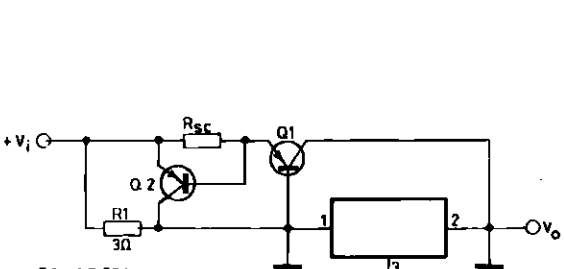
Figure 15 : Current Boost Regulator.



$$R_1 = \frac{V_{BEQ_1}}{I_{REQ} - \frac{I_{Q1}}{\beta_{Q_1}}}$$

$$I_O = I_{REG} + Q_1 \left[I_{REG} - \frac{V_{BEQ_1}}{R_1} \right]$$

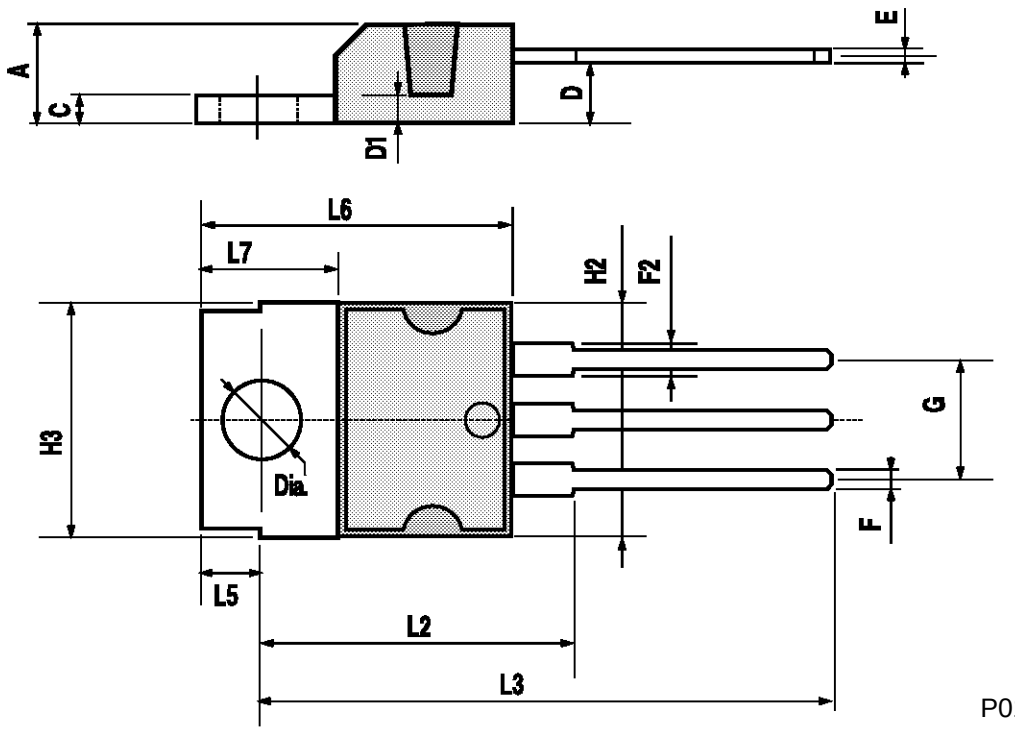
Figure 16 : Short-circuit Protection.



The circuit of figure 6 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.

TO-220 MECHANICAL DATA

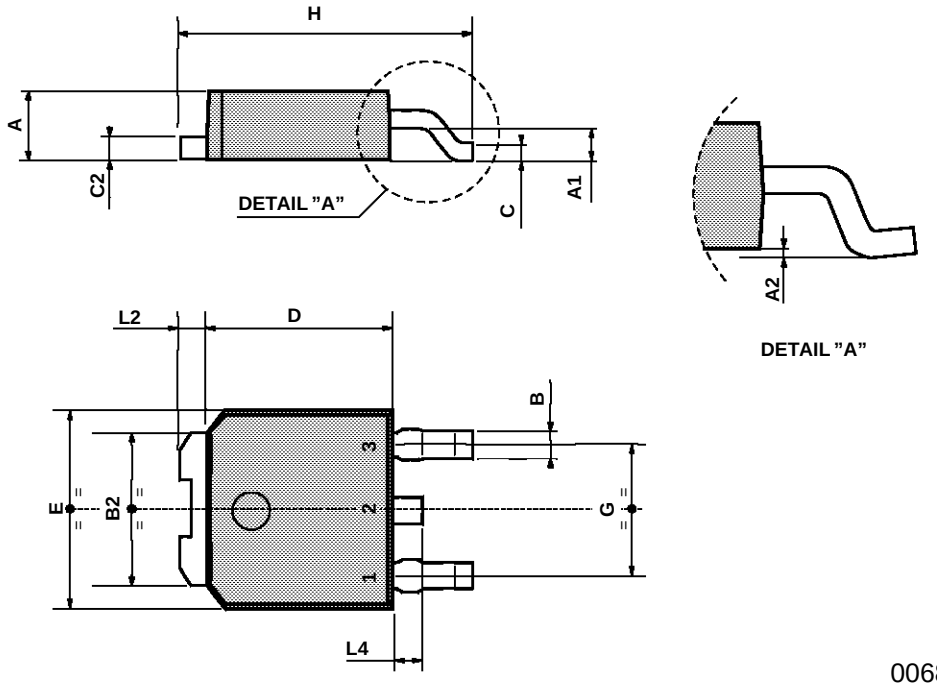
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			4.8			0.189
C			1.37			0.054
D	2.4		2.8	0.094		0.110
D1	1.2		1.35	0.047		0.053
E	0.35		0.55	0.014		0.022
F	0.8		1.05	0.031		0.041
F2	1.15		1.4	0.045		0.055
G	4.95	5.08	5.21	0.195	0.200	0.205
H2			10.4			0.409
H3	10.05		10.4	0.396		0.409
L2		16.2			0.638	
L3	26.3	26.7	27.1	1.035	1.051	1.067
L5	2.6		3	0.102		0.118
L6	15.1		15.8	0.594		0.622
L7	6		6.6	0.236		0.260
Dia.	3.65		3.85	0.144		0.152



P011D

TO-252 (DPAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.9	0.025		0.035
B2	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
E	6.4		6.6	0.252		0.260
G	4.4		4.6	0.173		0.181
H	9.35		10.1	0.368		0.397
L2		0.8			0.031	
L4	0.6		1	0.023		0.039



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