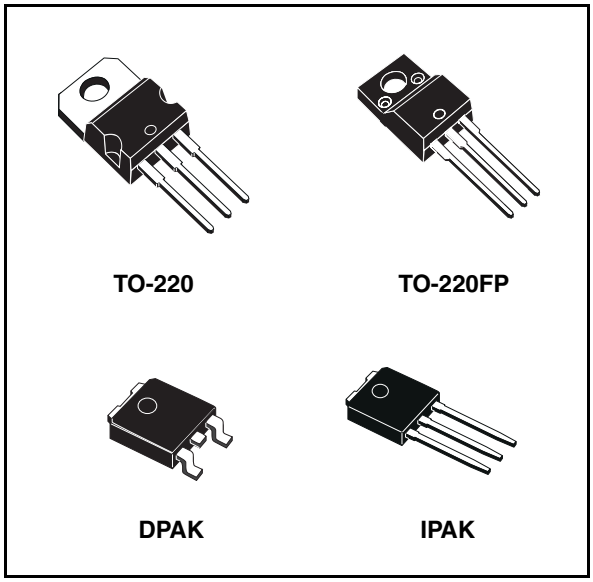
L78M00 series

Positive voltage regulators

Feature summary

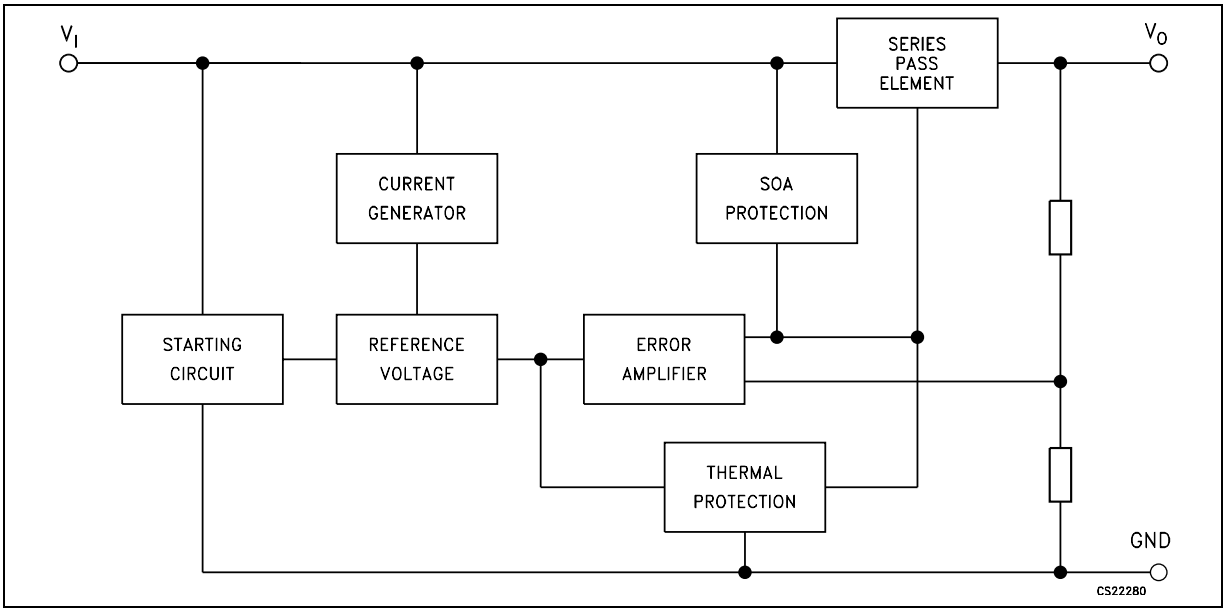
- Output current to 0.5A
- Output voltages of 5; 6; 8; 9; 10; 12; 15; 18; 20; 24V
- Thermal overload protection
- Short circuit protection
- Output transition SOA protection

The L78M00 series of three-terminal positive regulators is available in TO-220, TO-220FP, DPAK and IPAK 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 voltage and currents.

Schematic diagram



Contents

1 Pin configuration

Figure 1. Pin connections (top view)

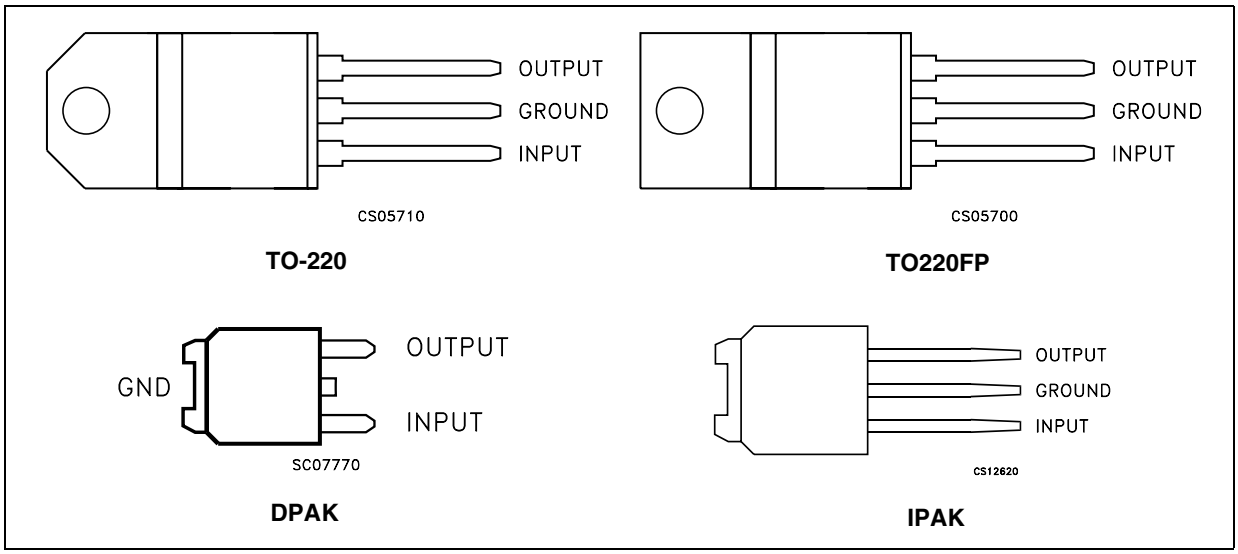
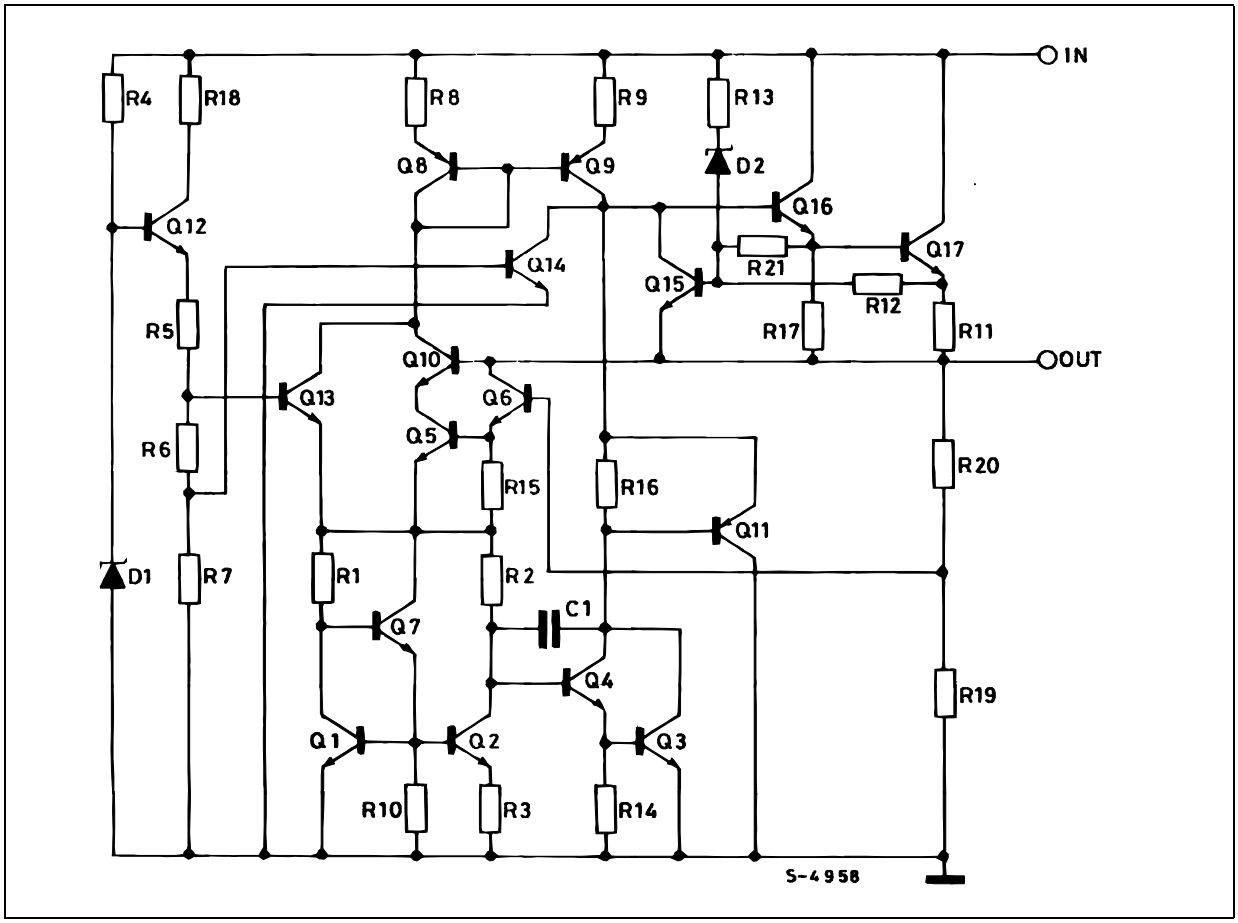


Figure 2. Schematic diagram



2 Maximum ratings

Table 1. Absolute maximum ratings

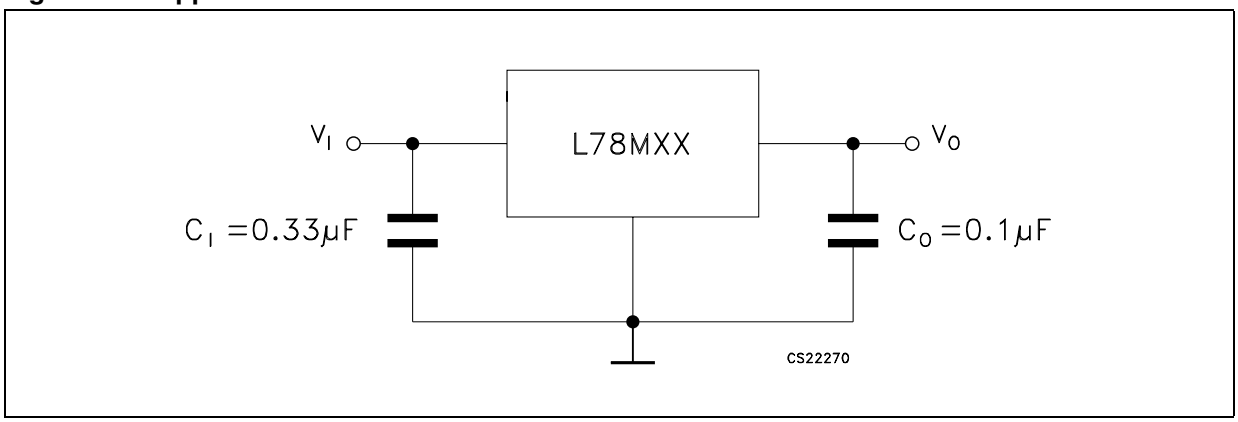
Symbol	Parameter		Value	Unit
V_I	DC Input voltage	for V_O= 5 to 18V	35	V
		for V_O= 20, 24V	40	
I_O	Output current		Internally Limited	mA
P_D	Power dissipation		Internally Limited	mW
T_{STG}	Storage temperature range		-65 to 150	°C
T_{OP}	Operating junction temperature range		0 to 150	°C

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

Table 2. Thermal data

Symbol	Parameter	TO-220	TO-220FP	DPAK	IPAK	Unit
R_{thJC}	Thermal resistance junction-case	3	5	8		°C/W
R_{thJA}	Thermal resistance junction-ambient	50	60	100		°C/W

Figure 3. Application circuits



3 Test circuits

Figure 4. DC Parameter

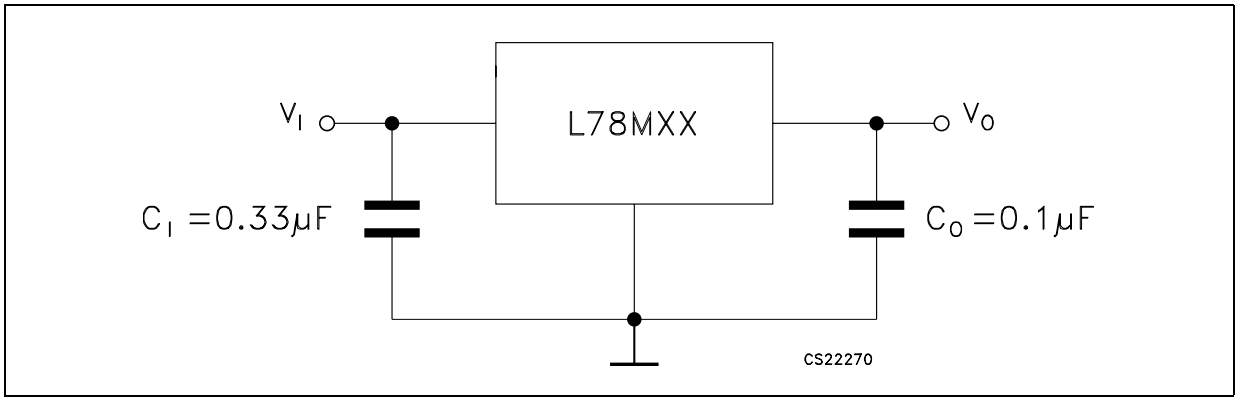


Figure 5. Load regulation

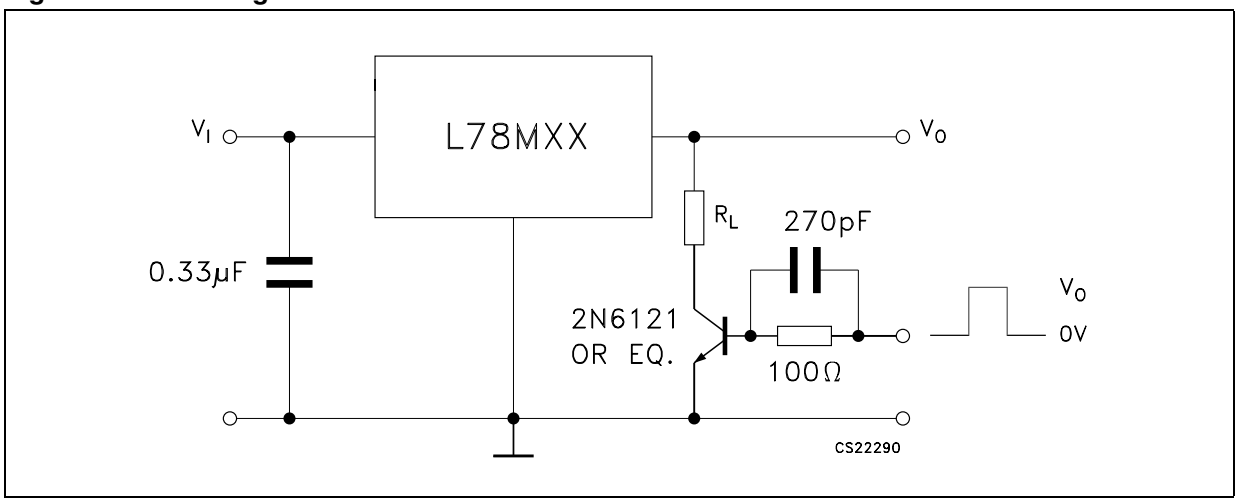
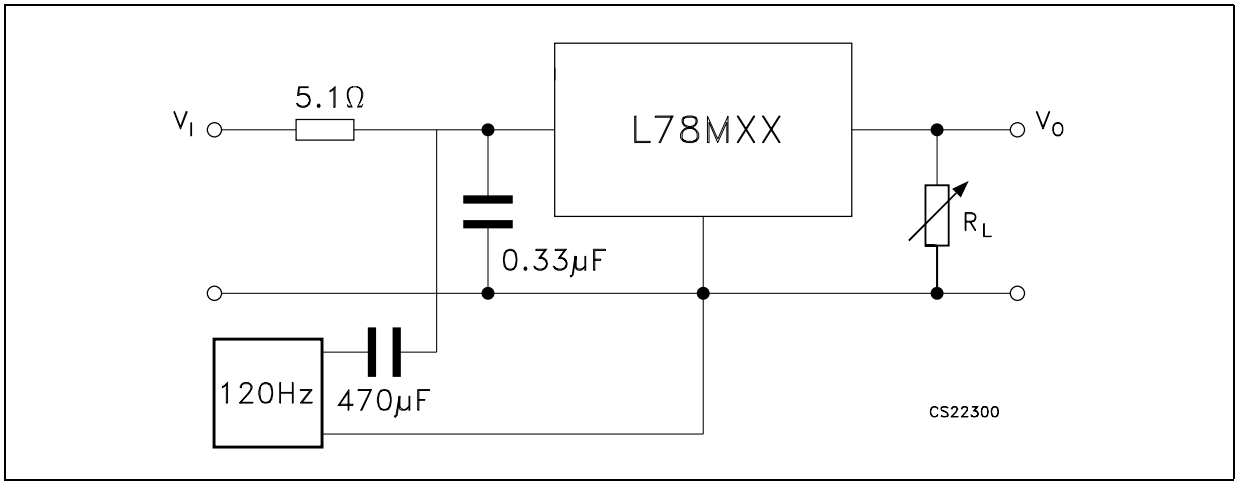


Figure 6. Ripple rejection



4 Electrical characteristics

Table 3. Electrical characteristics of L78M05C (refer to the test circuits, T_J = 25°C, V_I = 10V, I_O = 350 mA, C_I = 0.33 µF, C_O = 0.1 µF unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage		4.8	5	5.2	V
V_O	Output voltage	I_O = 5 to 350 mA, V_I = 7 to 20 V	4.75	5	5.25	V
ΔV_O	Line regulation	V_I = 7 to 25 V, I_O = 200 mA			100	mV
		V_I = 8 to 25 V, I_O = 200 mA			50	
ΔV_O	Load regulation	I_O = 5 to 500 mA, T_J = 25°C			100	mV
		I_O = 5 to 200 mA, T_J = 25°C			50	
I_d	Quiescent current				6	mA
ΔI_d	Quiescent current change	I_O = 5 to 350 mA			0.5	mA
		I_O = 200 mA, V_I = 8 to 25 V			0.8	
$\Delta V_O/\Delta T$	Output voltage drift	I_O = 5 mA, T_J = 0 to 125°C		-0.5		mV/°C
SVR	Supply voltage rejection	V_I = 8 to 18 V, f = 120Hz, I_O = 300mA	62			dB
eN	Output noise voltage	B =10Hz to 100KHz		40		µV
V_d	Dropout voltage			2		V
I_{sc}	Short circuit current	V_I = 35 V		300		mA

Table 4. Electrical characteristics of L78M06C (refer to the test circuits, T_J = 25°C, V_I = 11V, I_O = 350 mA, C_I = 0.33 µF, C_O = 0.1 µF unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage		5.75	6	6.25	V
V_O	Output voltage	I_O = 5 to 350 mA, V_I = 8 to 21 V	5.7	6	6.3	V
ΔV_O	Line regulation	V_I = 8 to 25 V, I_O = 200 mA			100	mV
		V_I = 9 to 25 V, I_O = 200 mA			50	
ΔV_O	Load regulation	I_O = 5 to 500 mA, T_J = 25°C			120	mV
		I_O = 5 to 200 mA, T_J = 25°C			60	
I_d	Quiescent current				6	mA
ΔI_d	Quiescent current change	I_O = 5 to 350 mA			0.5	mA
		I_O = 200 mA, V_I = 9 to 25 V			0.8	
$\Delta V_O/\Delta T$	Output voltage drift	I_O = 5 mA, T_J = 0 to 125°C		-0.5		mV/°C
SVR	Supply voltage rejection	V_I = 9 to 19 V, f = 120Hz, I_O = 300mA	59			dB
eN	Output noise voltage	B =10Hz to 100KHz		45		µV
V_d	Dropout voltage			2		V
I_{sc}	Short circuit current	V_I = 35 V		270		mA

Table 5. Electrical characteristics of L78M08C (refer to the test circuits, T_J = 25°C, V_I = 14V, I_O = 350 mA, C_I = 0.33 µF, C_O = 0.1 µF unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage		7.7	8	8.3	V
V_O	Output voltage	I_O = 5 to 350 mA, V_I = 10.5 to 23 V	7.6	8	8.4	V
ΔV_O	Line regulation	V_I = 10.5 to 25 V, I_O = 200 mA			100	mV
		V_I = 11 to 25 V, I_O = 200 mA			50	
ΔV_O	Load regulation	I_O = 5 to 500 mA, T_J = 25°C			160	mV
		I_O = 5 to 200 mA, T_J = 25°C			80	
I_d	Quiescent current				6	mA
ΔI_d	Quiescent current change	I_O = 5 to 350 mA			0.5	mA
		I_O = 200 mA, V_I = 10.5 to 25 V			0.8	
$\Delta V_O/\Delta T$	Output voltage drift	I_O = 5 mA, T_J = 0 to 125°C		-0.5		mV/°C
SVR	Supply voltage rejection	V_I = 11.5 to 21.5 V, f = 120Hz, I_O = 300mA	56			dB
eN	Output noise voltage	B =10Hz to 100KHz		52		µV
V_d	Dropout voltage			2		V
I_{sc}	Short circuit current	V_I = 35 V		250		mA

Table 6. Electrical characteristics of L78M09C (refer to the test circuits, T_J = 25°C, V_I = 15V, I_O = 350 mA, C_I = 0.33 µF, C_O = 0.1 µF unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage		8.65	9	9.35	V
V_O	Output voltage	I_O = 5 to 350 mA, V_I = 11.5 to 24 V	8.55	9	9.45	V
ΔV_O	Line regulation	V_I = 11.5 to 25 V, I_O = 200 mA			100	mV
		V_I = 12 to 25 V, I_O = 200 mA			50	
ΔV_O	Load regulation	I_O = 5 to 500 mA, T_J = 25°C			180	mV
		I_O = 5 to 200 mA, T_J = 25°C			90	
I_d	Quiescent current				6	mA
ΔI_d	Quiescent current change	I_O = 5 to 350 mA			0.5	mA
		I_O = 200 mA, V_I = 11.5 to 25 V			0.8	
$\Delta V_O/\Delta T$	Output voltage drift	I_O = 5 mA, T_J = 0 to 125°C		-0.5		mV/°C
SVR	Supply voltage rejection	V_I = 12.5 to 23 V, f = 120Hz, I_O = 300mA	56			dB
eN	Output noise voltage	B =10Hz to 100KHz		58		µV
V_d	Dropout voltage			2		V
I_{sc}	Short circuit current	V_I = 35 V		250		mA

Table 7. Electrical characteristics of L78M10C (refer to the test circuits, T_J = 25°C, V_I = 16V, I_O = 350 mA, C_I = 0.33 µF, C_O = 0.1 µF unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage		9.6	10	10.4	V
V_O	Output voltage	I_O = 5 to 350 mA, V_I = 12.5 to 25 V	9.5	10	10.5	V
ΔV_O	Line regulation	V_I = 12.5 to 30 V, I_O = 200 mA			100	mV
		V_I = 13 to 30 V, I_O = 200 mA			50	
ΔV_O	Load regulation	I_O = 5 to 500 mA, T_J = 25°C			200	mV
		I_O = 5 to 200 mA, T_J = 25°C			100	
I_d	Quiescent current				6	mA
ΔI_d	Quiescent current change	I_O = 5 to 350 mA			0.5	mA
		I_O = 200 mA, V_I = 12.5 to 30 V			0.8	
$\Delta V_O/\Delta T$	Output voltage drift	I_O = 5 mA, T_J = 0 to 125°C		-0.5		mV/°C
SVR	Supply voltage rejection	V_I = 13.5 to 24 V, f = 120Hz, I_O = 300mA	56			dB
eN	Output noise voltage	B =10Hz to 100KHz		64		µV
V_d	Dropout voltage			2		V
I_{sc}	Short circuit current	V_I = 35 V		245		mA

Table 8. Electrical characteristics of L78M12C (refer to the test circuits, T_J = 25°C, V_I = 19V, I_O = 350 mA, C_I = 0.33 µF, C_O = 0.1 µF unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage		11.5	12	12.5	V
V_O	Output voltage	I_O = 5 to 350 mA, V_I = 14.5 to 27 V	11.4	12	12.6	V
ΔV_O	Line regulation	V_I = 14.5 to 30 V, I_O = 200 mA			100	mV
		V_I = 16 to 30 V, I_O = 200 mA			50	
ΔV_O	Load regulation	I_O = 5 to 500 mA, T_J = 25°C			240	mV
		I_O = 5 to 200 mA, T_J = 25°C			120	
I_d	Quiescent current				6	mA
ΔI_d	Quiescent current change	I_O = 5 to 350 mA			0.5	mA
		I_O = 200 mA, V_I = 14.5 to 30 V			0.8	
$\Delta V_O/\Delta T$	Output voltage drift	I_O = 5 mA, T_J = 0 to 125°C		-1		mV/°C
SVR	Supply voltage rejection	V_I = 15 to 25 V, f = 120Hz, I_O = 300mA	55			dB
eN	Output noise voltage	B =10Hz to 100KHz		75		µV
V_d	Dropout voltage			2		V
I_{sc}	Short circuit current	V_I = 35 V		240		mA

Table 9. Electrical characteristics of L78M15C (refer to the test circuits, T_J = 25°C, V_I = 23V, I_O = 350 mA, C_I = 0.33 µF, C_O = 0.1 µF unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage		14.4	15	15.6	V
V_O	Output voltage	I_O = 5 to 350 mA, V_I = 17.5 to 30 V	14.25	15	15.75	V
ΔV_O	Line regulation	V_I = 17.5 to 30 V, I_O = 200 mA			100	mV
		V_I = 20 to 30 V, I_O = 200 mA			50	
ΔV_O	Load regulation	I_O = 5 to 500 mA, T_J = 25°C			300	mV
		I_O = 5 to 200 mA, T_J = 25°C			150	
I_d	Quiescent current				6	mA
ΔI_d	Quiescent current change	I_O = 5 to 350 mA			0.5	mA
		I_O = 200 mA, V_I = 17.5 to 30 V			0.8	
$\Delta V_O/\Delta T$	Output voltage drift	I_O = 5 mA, T_J = 0 to 125°C		-1		mV/°C
SVR	Supply voltage rejection	V_I = 18.5 to 28.5 V, f = 120Hz, I_O = 300mA	54			dB
eN	Output noise voltage	B =10Hz to 100KHz		90		µV
V_d	Dropout voltage			2		V
I_{sc}	Short circuit current	V_I = 35 V		240		mA

Table 10. Electrical characteristics of L78M18C (refer to the test circuits, T_J = 25°C, V_I = 26V, I_O = 350 mA, C_I = 0.33 µF, C_O = 0.1 µF unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage		17.3	18	18.7	V
V_O	Output voltage	I_O = 5 to 350 mA, V_I = 20.5 to 33 V	17.1	18	18.9	V
ΔV_O	Line regulation	V_I = 21 to 33 V, I_O = 200 mA			100	mV
		V_I = 24 to 33 V, I_O = 200 mA			50	
ΔV_O	Load regulation	I_O = 5 to 500 mA, T_J = 25°C			360	mV
		I_O = 5 to 200 mA, T_J = 25°C			180	
I_d	Quiescent current				6	mA
ΔI_d	Quiescent current change	I_O = 5 to 350 mA			0.5	mA
		I_O = 200 mA, V_I = 21 to 33 V			0.8	
$\Delta V_O/\Delta T$	Output voltage drift	I_O = 5 mA, T_J = 0 to 125°C		-1.1		mV/°C
SVR	Supply voltage rejection	V_I = 22 to 32 V, f = 120Hz, I_O = 300mA	53			dB
eN	Output noise voltage	B =10Hz to 100KHz		100		µV
V_d	Dropout voltage			2		V
I_{sc}	Short circuit current	V_I = 35 V		240		mA

Table 11. Electrical characteristics of L78M20C (refer to the test circuits, T_J = 25°C, V_I = 29V, I_O = 350 mA, C_I = 0.33 µF, C_O = 0.1 µF unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage		19.2	20	20.8	V
V_O	Output voltage	I_O = 5 to 350 mA, V_I = 23 to 35 V	19	20	21	V
ΔV_O	Line regulation	V_I = 23 to 35 V, I_O = 200 mA			100	mV
		V_I = 24 to 35 V, I_O = 200 mA			50	
ΔV_O	Load regulation	I_O = 5 to 500 mA, T_J = 25°C			400	mV
		I_O = 5 to 200 mA, T_J = 25°C			200	
I_d	Quiescent current				6	mA
ΔI_d	Quiescent current change	I_O = 5 to 350 mA			0.5	mA
		I_O = 200 mA, V_I = 23 to 35 V			0.8	
$\Delta V_O/\Delta T$	Output voltage drift	I_O = 5 mA, T_J = 0 to 125°C		-1.1		mV/°C
SVR	Supply voltage rejection	V_I = 24 to 34 V, f = 120Hz, I_O = 300mA	53			dB
eN	Output noise voltage	B =10Hz to 100KHz		110		µV
V_d	Dropout voltage			2		V
I_{sc}	Short circuit current	V_I = 35 V		240		mA

Table 12. Electrical characteristics of L78M24C (refer to the test circuits, T_J = 25°C, V_I = 23V, I_O = 350 mA, C_I = 0.33 µF, C_O = 0.1 µF unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage		23	24	25	V
V_O	Output voltage	I_O = 5 to 350 mA, V_I = 27 to 38 V	22.8	24	25.2	V
ΔV_O	Line regulation	V_I = 27 to 38 V, I_O = 200 mA			100	mV
		V_I = 28 to 38 V, I_O = 200 mA			50	
ΔV_O	Load regulation	I_O = 5 to 500 mA, T_J = 25°C			480	mV
		I_O = 5 to 200 mA, T_J = 25°C			240	
I_d	Quiescent current				6	mA
ΔI_d	Quiescent current change	I_O = 5 to 350 mA			0.5	mA
		I_O = 200 mA, V_I = 27 to 38 V			0.8	
$\Delta V_O/\Delta T$	Output voltage drift	I_O = 5 mA, T_J = 0 to 125°C		-1.2		mV/°C
SVR	Supply voltage rejection	V_I = 28 to 38 V, f = 120Hz, I_O = 300mA	50			dB
eN	Output noise voltage	B =10Hz to 100KHz		170		µV
V_d	Dropout voltage			2		V
I_{sc}	Short circuit current	V_I = 35 V		240		mA

5 Typical performance

Figure 7. Dropout voltage vs junction temperature

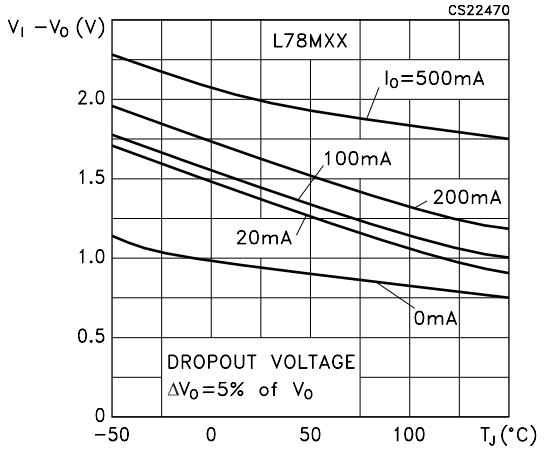


Figure 8. Dropout characteristics

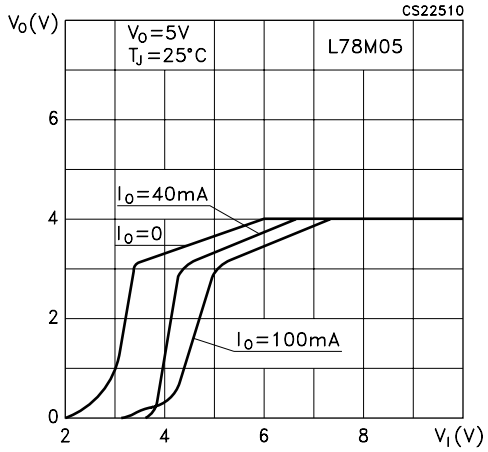


Figure 9. Peak output current vs input-output differential voltage

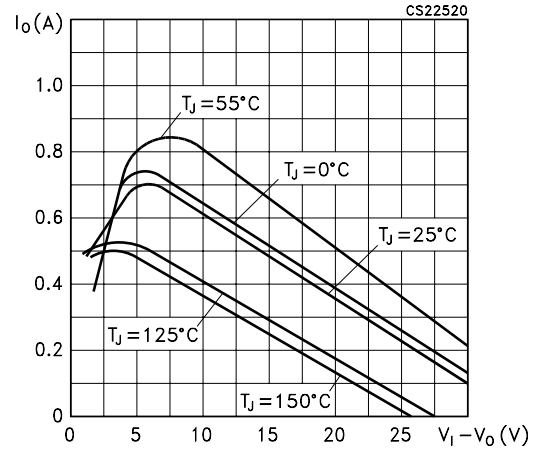


Figure 10. Output voltage vs junction temperature

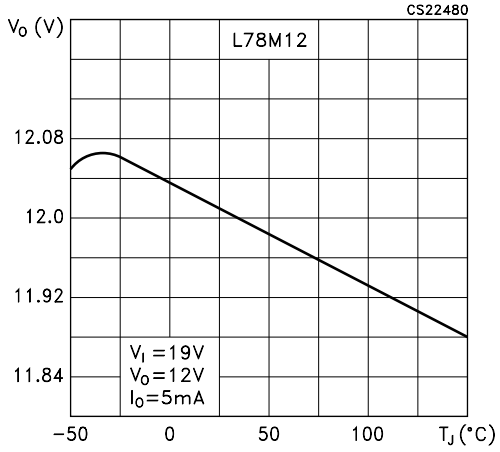


Figure 11. Supply voltage rejection vs frequency

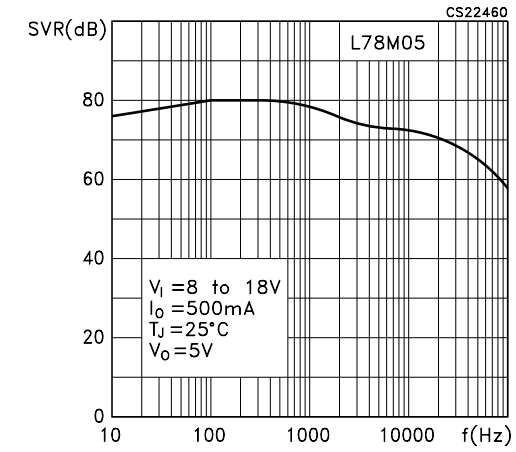


Figure 12. Quiescent current vs junction temperature

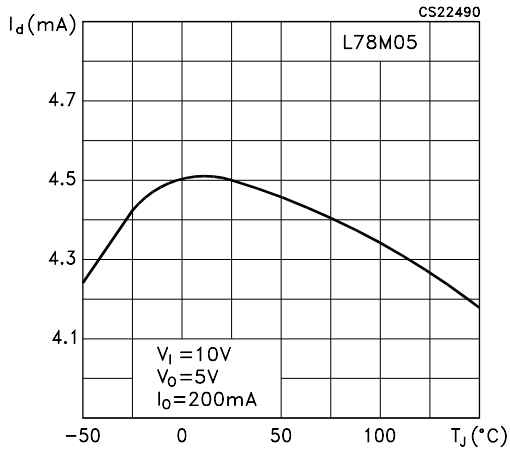


Figure 13. Load transient response

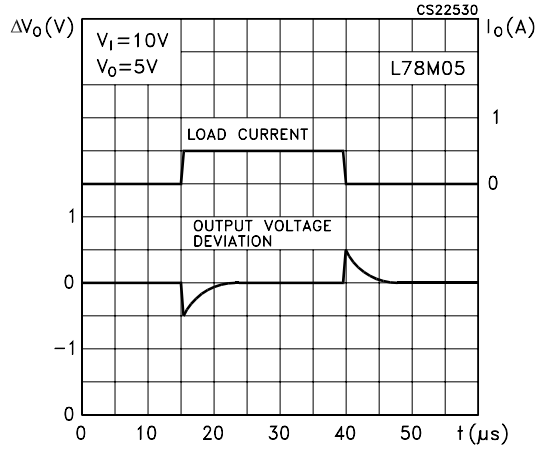


Figure 14. Line transient response

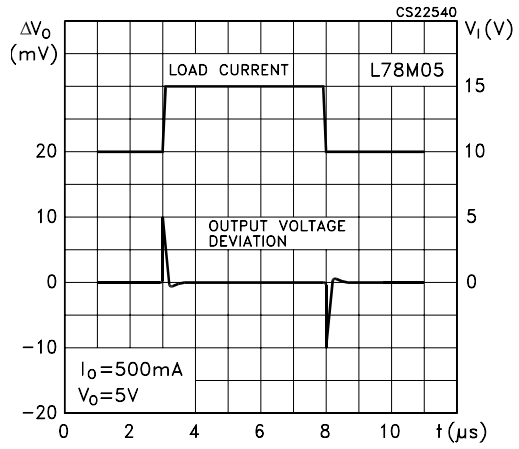


Figure 15. Quiescent current vs input voltage

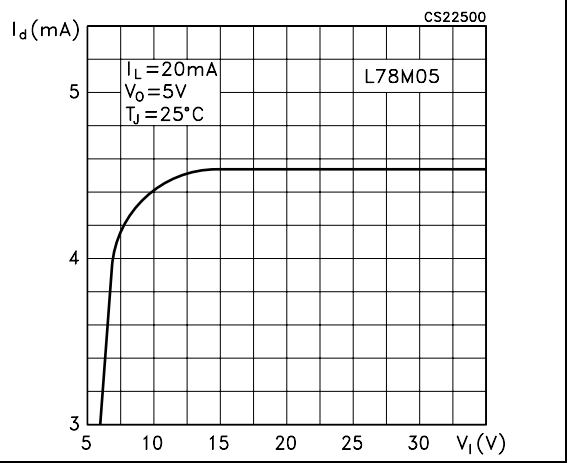
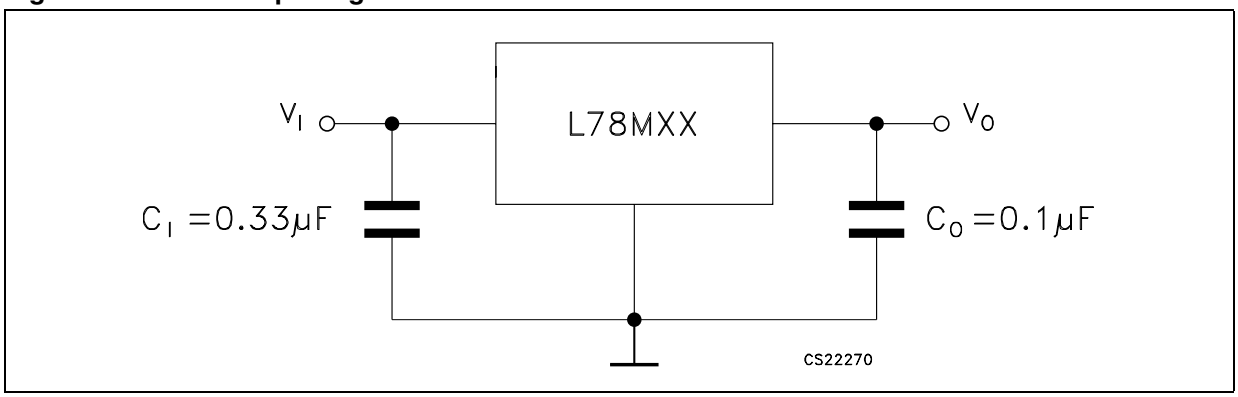


Figure 16. Fixed output regulator



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

Figure 17. Constant current regulator

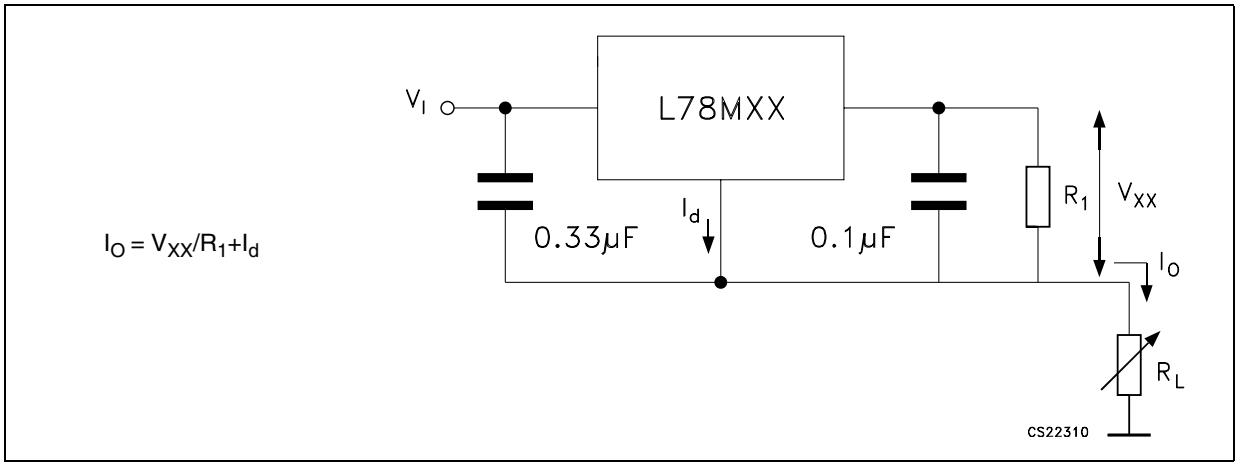


Figure 18. Circuit for increasing output voltage

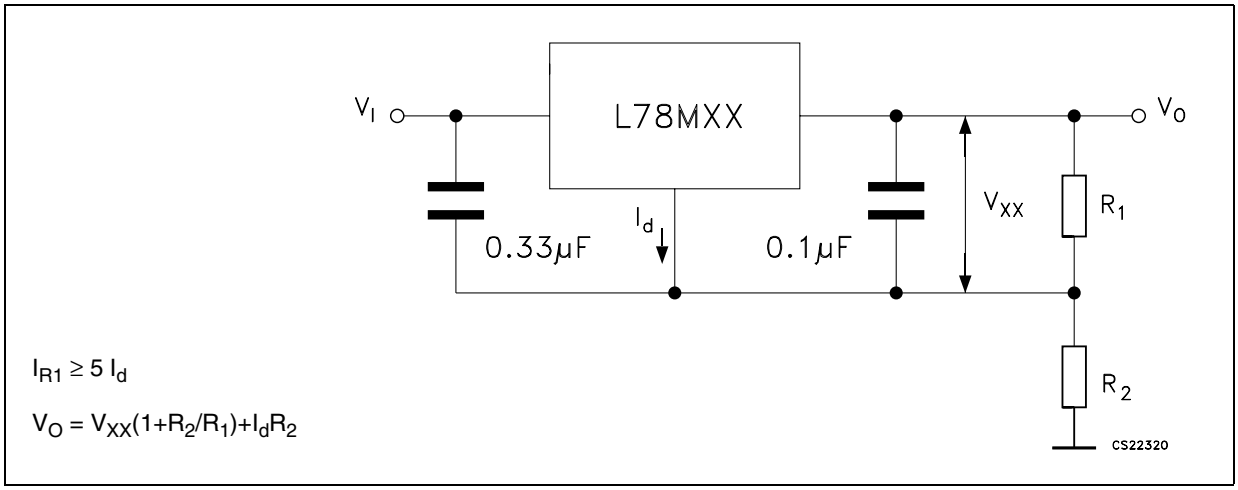


Figure 19. Adjustable output regulator (7 to 30V)

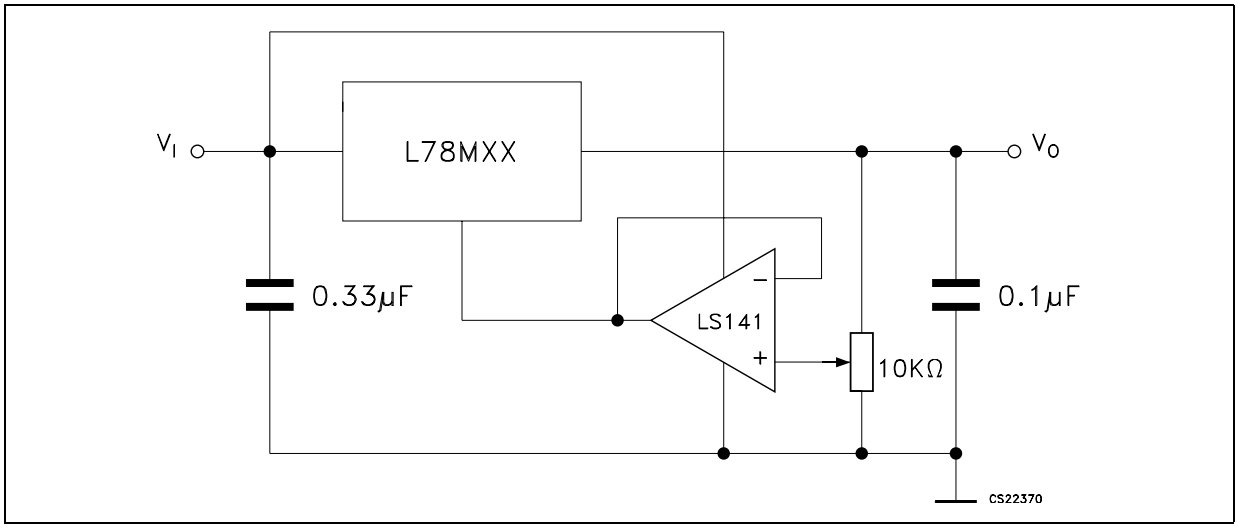


Figure 20. 0.5 to 10V Regulator

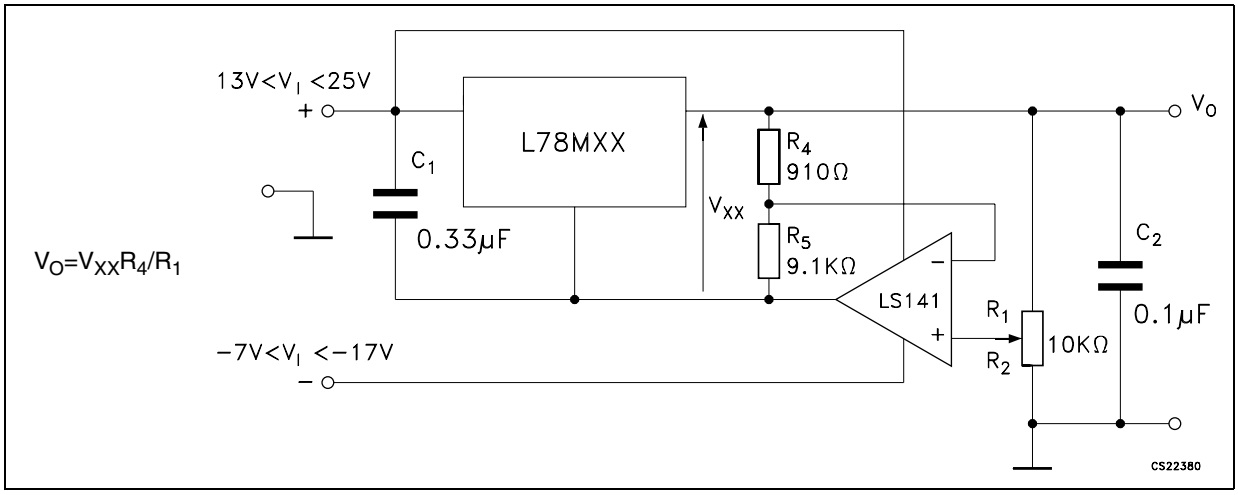
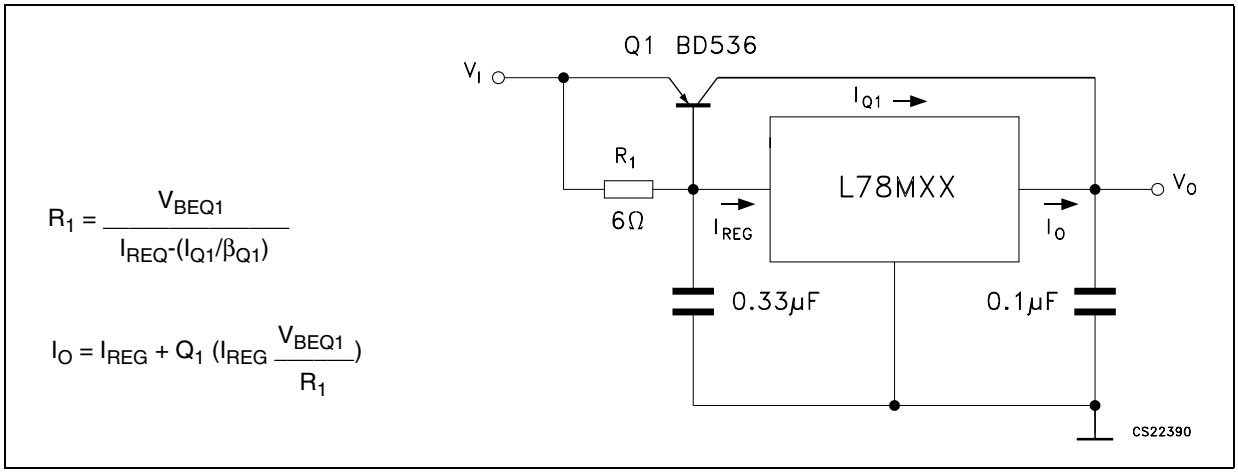


Figure 21. High current voltage regulator



$$R_1 = \frac{V_{BEQ1}}{I_{REQ}-(I_{Q1}/\beta_{Q1})}$$

$$I_O = I_{REG} + Q_1 \left(I_{REG} \frac{V_{BEQ1}}{R_1}\right)$$

Figure 22. High output current with short circuit protection

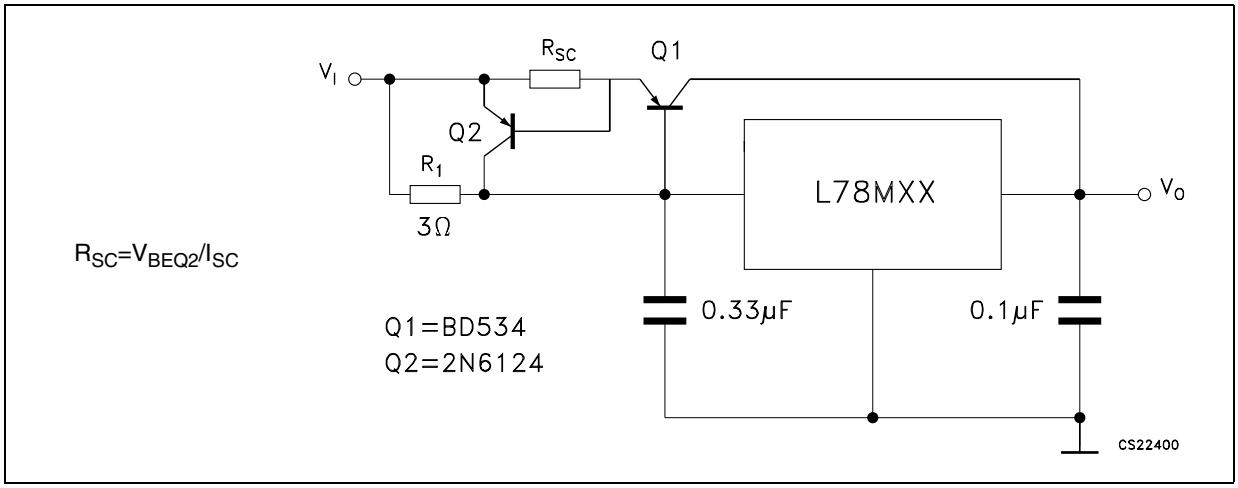


Figure 23. Tracking voltage regulator

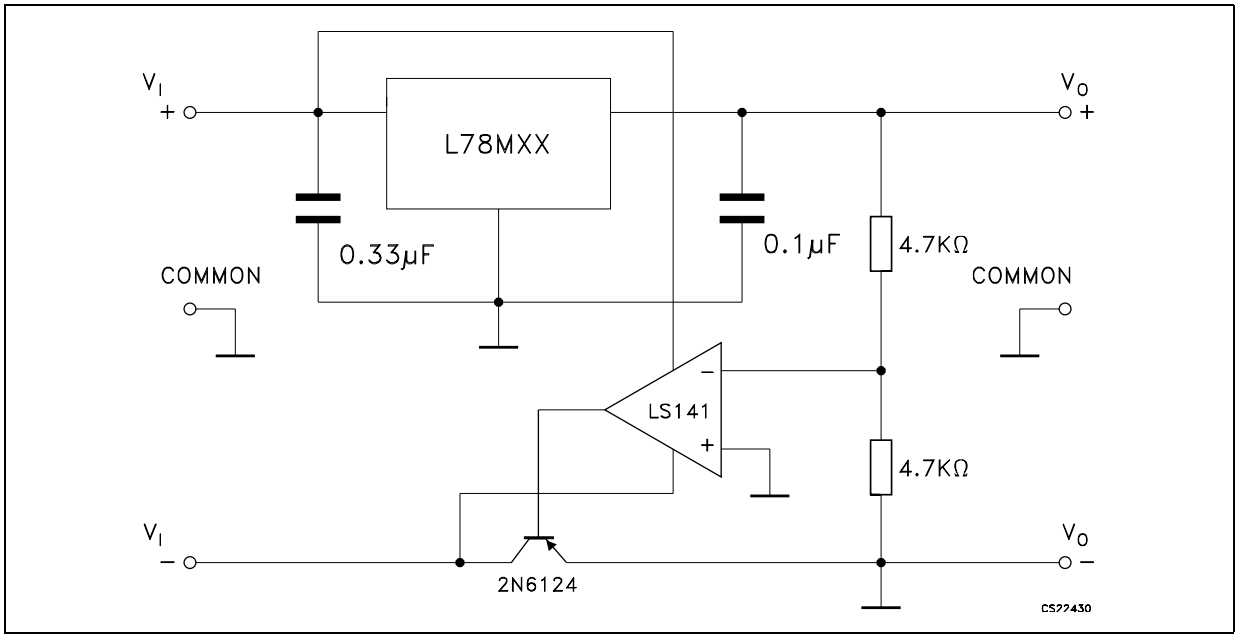


Figure 24. High input voltage circuit

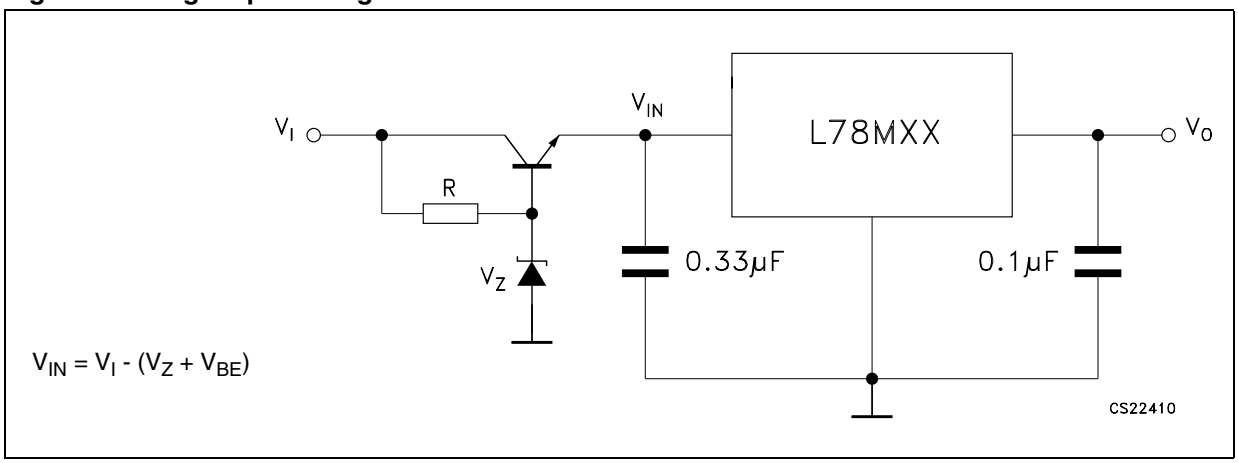


Figure 25. Reducing power dissipation with dropping resistor

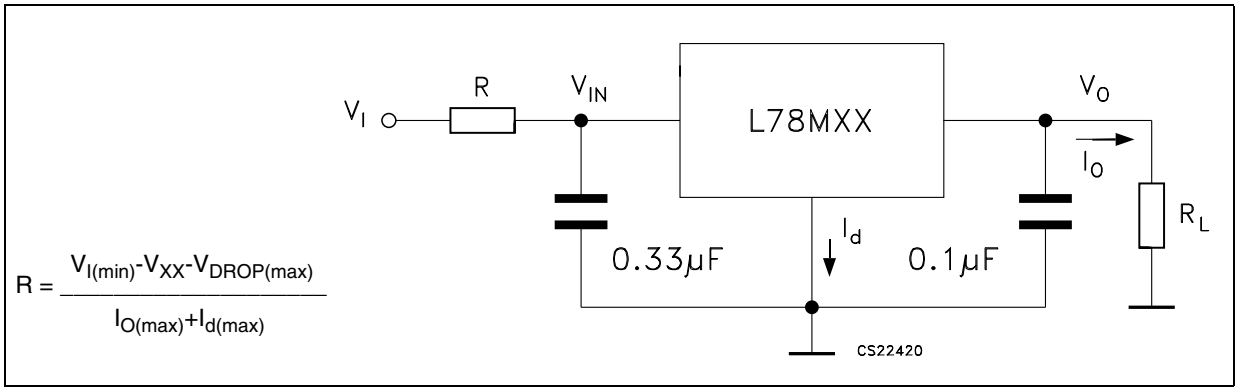
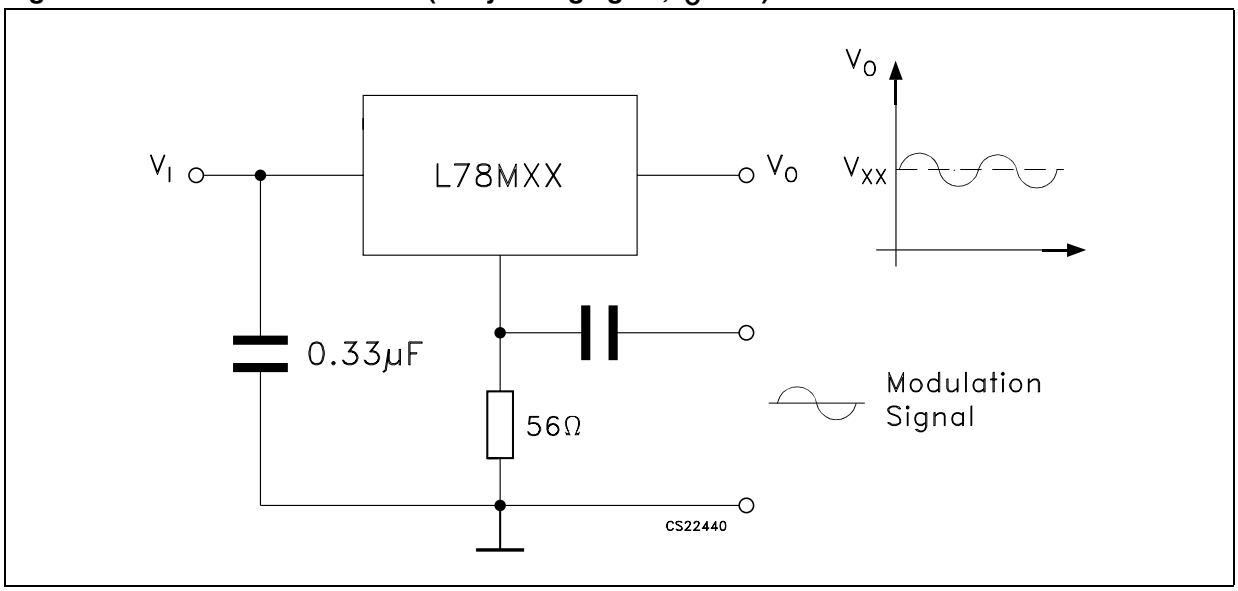
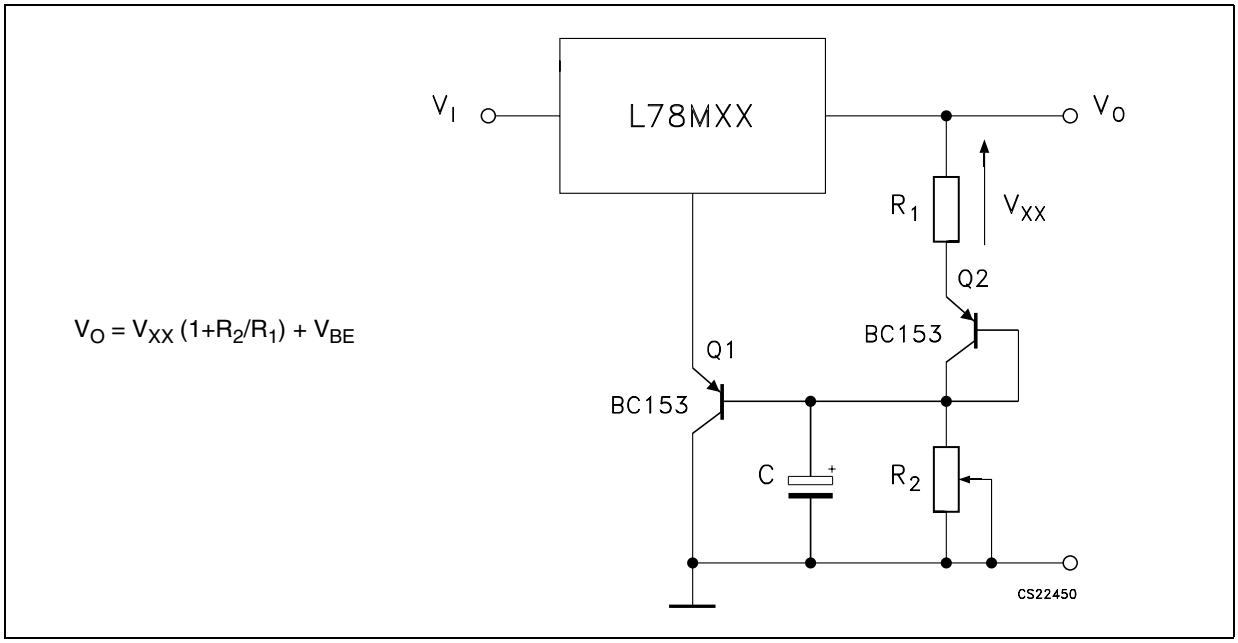


Figure 26. Power AM Modulator (unity voltage gain, $I_O \leq 0.5$)



Note: The circuit performs well up to 100 KHz.

Figure 27. Adjustable output voltage with temperature compensation



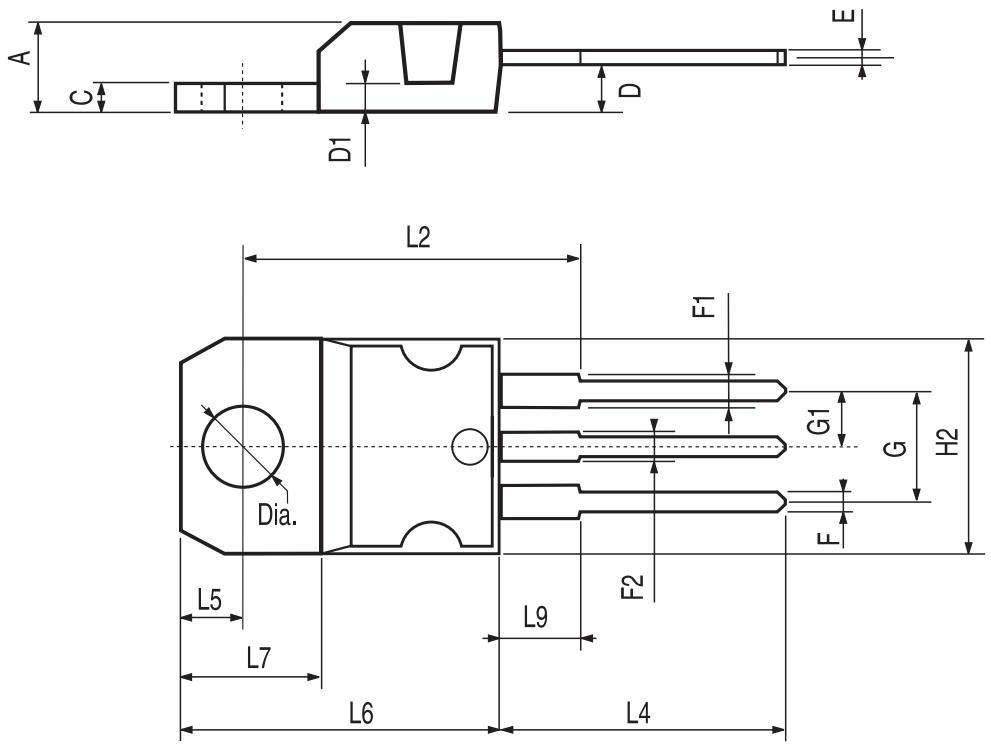
Note: Q_2 is connected as a diode in order to compensate the variation of the Q_1 V_{BE} with the temperature. C allows a slow rise time of the V_O.

6 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second Level Interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

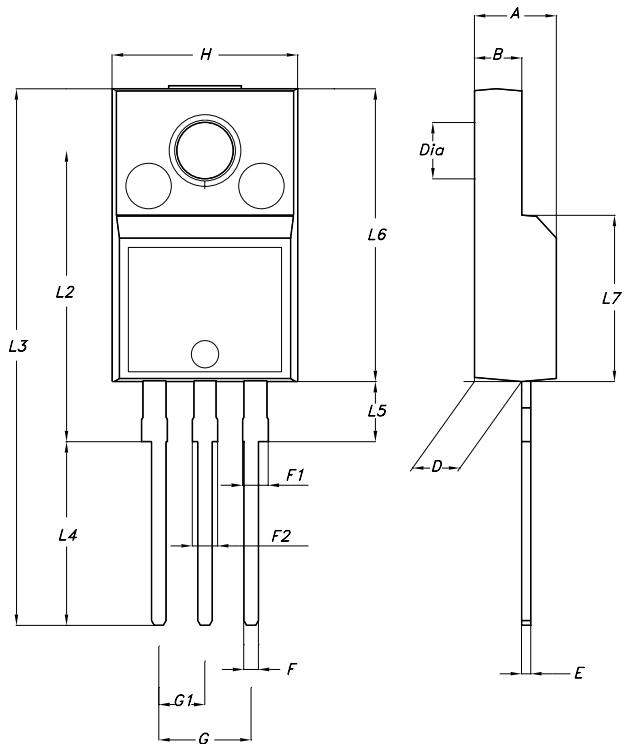
TO-220 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



TO-220FP MECHANICAL DATA

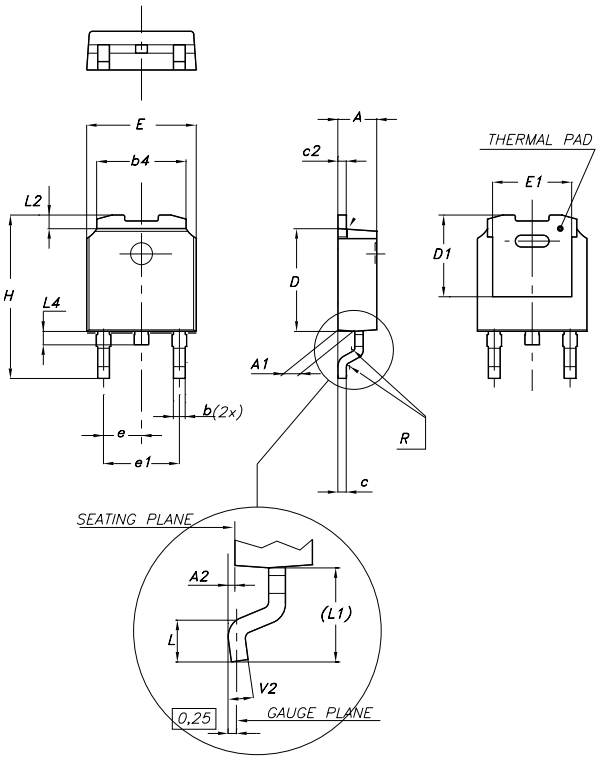
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.70	0.017		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.50	0.045		0.059
F2	1.15		1.50	0.045		0.059
G	4.95		5.2	0.194		0.204
G1	2.4		2.7	0.094		0.106
H	10.0		10.40	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L5	2.9		3.6	0.114		0.142
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
DIA.	3		3.2	0.118		0.126



7012510A-H

DPAK MECHANICAL DATA

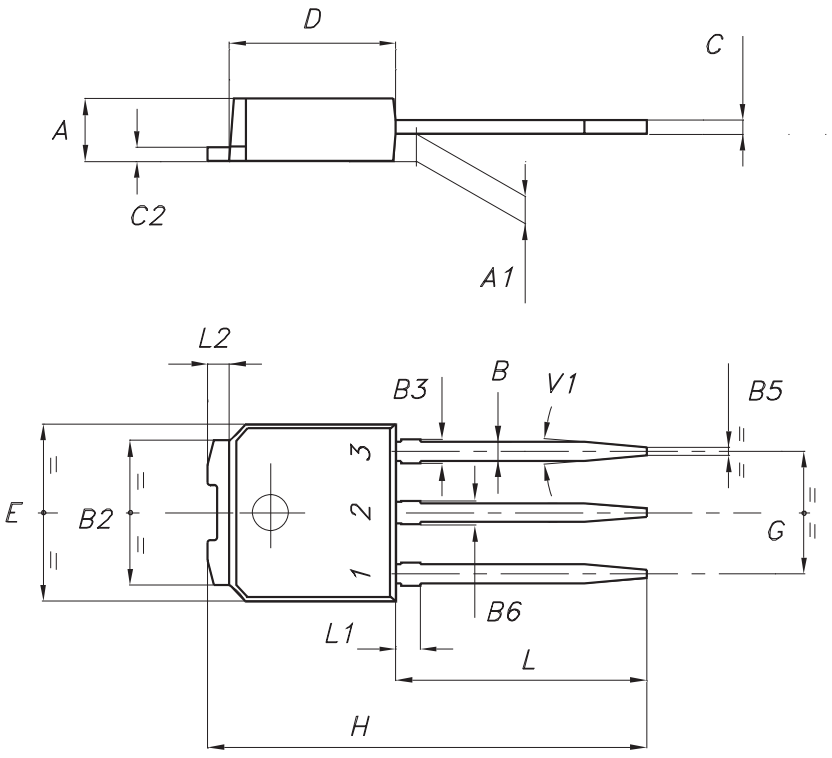
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.9	0.025		0.035
b4	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
D1		5.1			0.200	
E	6.4		6.6	0.252		0.260
E1		4.7			0.185	
e		2.28			0.090	
e1	4.4		4.6	0.173		0.181
H	9.35		10.1	0.368		0.397
L	1			0.039		
(L1)		2.8			0.110	
L2		0.8			0.031	
L4	0.6		1	0.023		0.039
R		0.2			0.008	
V2	0°		8°	0°		8°



0068772-F

IPAK MECHANICAL DATA

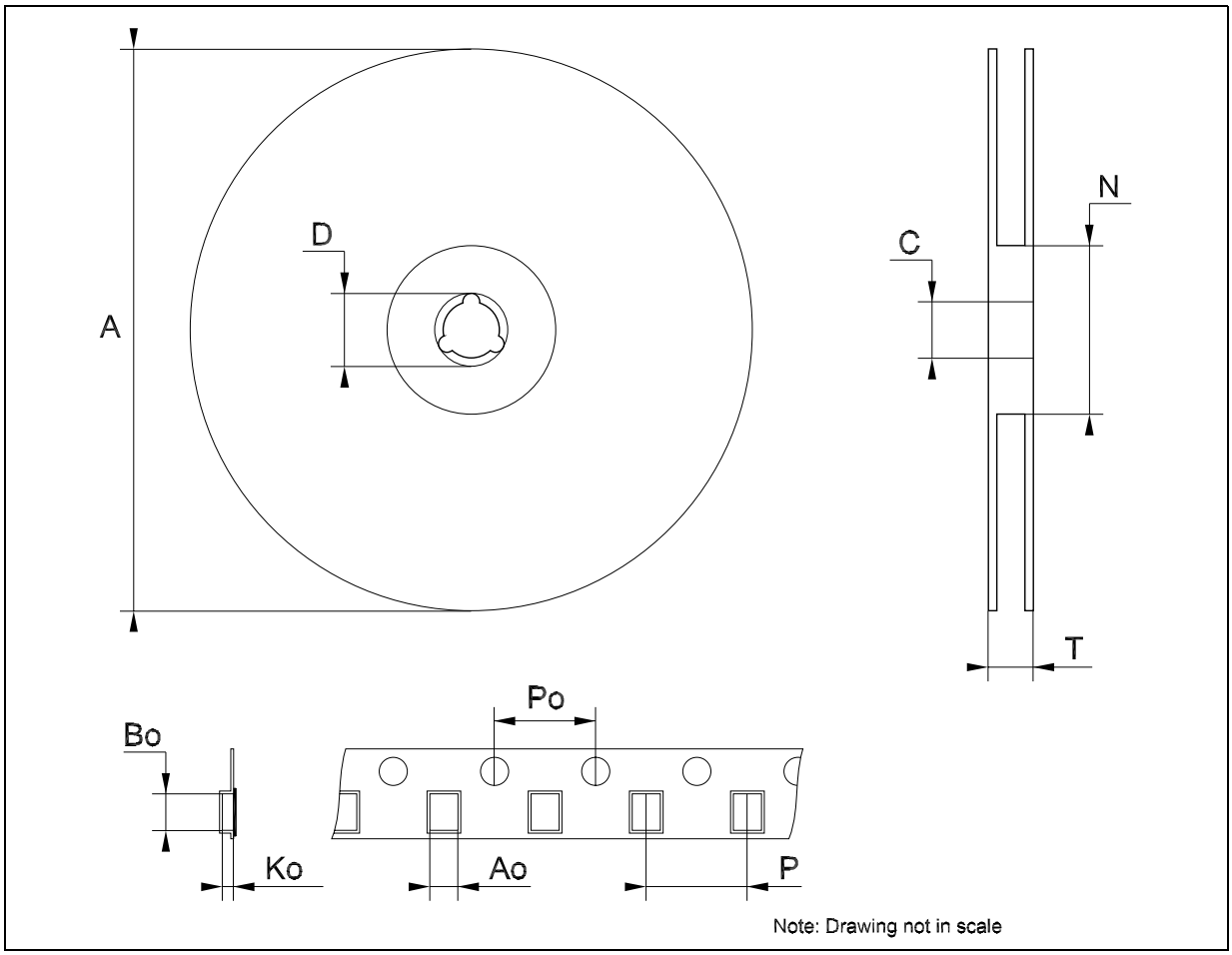
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
B	0.64		0.9	0.025		0.035
B2	5.2		5.4	0.204		0.212
B3			0.95			0.037
B5		0.3			0.012	
B6			0.95			0.037
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
E	6.4		6.6	0.252		0.260
G	4.4		4.6	0.173		0.181
H	15.9		16.3	0.626		0.641
L	9		9.4	0.354		0.370
L1	0.8		1.2	0.031		0.047
L2		0.8	1		0.031	0.039



0068771-F

Tape & Reel DPAK-PPAK MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			330			12.992
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	6.80	6.90	7.00	0.268	0.272	0.2.76
Bo	10.40	10.50	10.60	0.409	0.413	0.417
Ko	2.55	2.65	2.75	0.100	0.104	0.105
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	7.9	8.0	8.1	0.311	0.315	0.319



Note: Drawing not in scale

7 Order code

Table 13. Order code

Part numbers	Packaging				
	TO-220	TO-220FP	DPAK	IPAK	Output voltage
L78M05	L78M05CV	L78M05CP	L78M05CDT-TR	L78M05CDT-1	5 V
L78M06	L78M06CV	L78M06CP	L78M06CDT-TR	L78M06CDT-1 (1)	6 V
L78M08	L78M08CV	L78M08CP	L78M08CDT-TR	L78M08CDT-1 (1)	8 V
L78M09	L78M09CV	L78M09CP	L78M09CDT-TR	L78M09CDT-1 (1)	9 V
L78M10	L78M10CV	L78M10CP	L78M10CDT-TR	L78M10CDT-1 (1)	10 V
L78M12	L78M12CV	L78M12CP	L78M12CDT-TR	L78M12CDT-1	12 V
L78M15	L78M15CV	L78M15CP	L78M15CDT-TR	L78M15CDT-1	15 V
L78M18	L78M18CV	L78M18CP (1)	L78M18CDT-TR	L78M18CDT-1 (1)	18 V
L78M20	L78M20CV	L78M20CP (1)	L78M20CDT-TR (1)	L78M20CDT-1 (1)	20 V
L78M24	L78M24CV	L78M24CP (1)	L78M24CDT-TR	L78M24CDT-1 (1)	24 V

1. Available on request

8 Revision history

Table 14. Revision history

Date	Revision	Changes
21-Jun-2004	6	Document updating.
30-Aug-2006	7	Order Codes has been updated and new template.

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