UMW®

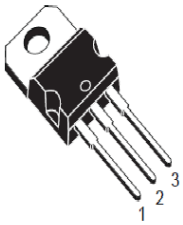
UMW L78xx

1.Features

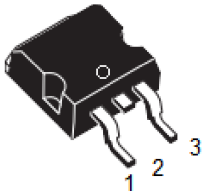
- Three-terminal positive voltage regulator
- Output current to 1.2A
- Output voltages of 5; 6; 8; 9; 12v; 15V; 24V
- Thermal overload protection
- Short circuit protection
- Output transition soa protection

2.Pinning information

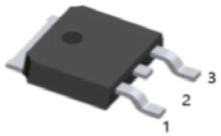
Pin	Symbol	Description
1	I	INPUT
2	G	GND
3	O	OUT



TO-220



TO-263



TO-252

3.Absolute Maximum Ratings(T_C=25°C)

Parameter		Symbol	Value	Units
Input Voltage	V_O=5 to 18V	V_I	35	V
	V_O=24V		40	V
Power Dissipation		P_D	Internally limited	
Operating Temperature Range		T_{OPR}	-40 to 125	°C
Storage Temperature Range		T_{STG}	-65 to 150	°C
Thermal Resistance Junction-case	TO-263	R_{thJC}	3	°C/W
	TO-252		8	
	TO-220		5	
Thermal Resistance Junction-ambient	TO-263	R_{thJA}	62.5	°C/W
	TO-252		100	
	TO-220		50	

4.1 Electrical Characteristics (7805)

(refer to the test circuits, T_J=-40 to 125°C, V_I=10V, I_O=500mA, C_I=0.33μF, C_O=0.1μF unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C		4.8	5	5.2	V
		I_O=5mA to 1A, P_O≤15W, V_I=8V to 20V		4.75	5	5.25	V
Line Regulation (Note1)	ΔV_O	T_J=25°C	V_I=7V to 25V			100	mV
			V_I=8V to 12V			50	mV
Load Regulation (Note1)	ΔV_O	T_J=25°C, I_O=5mA to 1.2A				100	mV
		T_J=25°C, I_O=250mA to 750mA				50	mV
Quiescent Current	I_Q	T_J=25°C				6	mA
Quiescent Current Change	ΔI_Q	I_O= 5mA to 1A				0.5	mA
		V_I=8V to 25V				0.8	mA
Quiescent Current Change	$\Delta V_O/\Delta T$	I_O= 5mA			0.6		mV/°C
Short Circuit Current	ISC	T_J=25°C, V_I=35V			0.75		A
Supply Voltage Rejection	SVR	V_I=8V to 18V, f=120Hz, I_O=500mA			68		dB

4.2 Electrical Characteristics (7806)

(refer to the test circuits, T_J=-40 to 125°C, V_I=11V, I_O=500mA, C_I=0.33μF, C_O=0.1μF unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C		5.75	6	6.25	V
		I_O=5mA to 1A, P_O≤15W, V_I=9V to 21V		5.7	6	6.3	V
Line Regulation (Note1)	ΔV_O	T_J=25°C	V_I=8V to 25V			120	mV
			V_I=9V to 13V			60	mV
Load Regulation (Note1)	ΔV_O	T_J=25°C, I_O=5mA to 1.2A				120	mV
		T_J=25°C, I_O=250mA to 750mA				60	mV
Quiescent Current	I_Q	T_J=25°C				6	mA
Quiescent Current Change	ΔI_Q	I_O= 5mA to 1A				0.5	mA
		V_I=9V to 25V				0.8	mA
Quiescent Current Change	$\Delta V_O/\Delta T$	I_O= 5mA			0.7		mV/°C
Short Circuit Current	ISC	T_J=25°C, V_I=35V			0.55		A
Supply Voltage Rejection	SVR	V_I=9V to 19V, f=120Hz, I_O=500mA			65		dB

4.3 Electrical Characteristics (7808)

(refer to the test circuits, T_J=-40 to 125°C, V_I=14V, I_O=500mA, C_I=0.33μF, C_O=0.1μF unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C		7.7	8	8.3	V
		I_O=5mA to 1A, P_O≤15W, V_I=11.5V to 23V		7.6	8	8.4	V
Line Regulation (Note1)	ΔV_O	T_J=25°C	V_I=10.5V to 25V			100	mV
			V_I=11V to 17V			80	mV
Load Regulation (Note1)	ΔV_O	T_J=25°C, I_O=5mA to 1.2A				160	mV
		T_J=25°C, I_O=250mA to 750mA				80	mV
Quiescent Current	I_Q	T_J=25°C				6	mA
Quiescent Current Change	ΔI_Q	I_O= 5mA to 1A				0.5	mA
		V_I=11.5V to 25V				1	mA
Quiescent Current Change	$\Delta V_O/\Delta T$	I_O= 5mA			1		mV/°C
Short Circuit Current	ISC	T_J=25°C, V_I=35V			0.45		A
Supply Voltage Rejection	SVR	V_I=11.5V to 21.5V, f=120Hz, I_O=500mA			62		dB

4.4 Electrical Characteristics (7809)

(refer to the test circuits, T_J=-40 to 125°C, V_I=15V, I_O=500mA, C_I=0.33μF, C_O=0.1μF unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C		8.64	9	9.36	V
		I_O=5mA to 1A, P_O≤15W, V_I=11.5V to 26V		8.55	9	9.45	V
Line Regulation (Note1)	ΔV_O	T_J=25°C	V_I=11.5V to 26V			180	mV
			V_I=12V to 18V			90	mV
Load Regulation (Note1)	ΔV_O	T_J=25°C, I_O=5mA to 1.2A				180	mV
		T_J=25°C, I_O=250mA to 750mA				90	mV
Quiescent Current	I_Q	T_J=25°C				6	mA
Quiescent Current Change	ΔI_Q	I_O= 5mA to 1A				0.5	mA
		V_I=11.5V to 26V				1	mA
Quiescent Current Change	$\Delta V_O/\Delta T$	I_O= 5mA			1		mV/°C
Short Circuit Current	ISC	T_J=25°C, V_I=35V			0.4		A
Supply Voltage Rejection	SVR	V_I=11.5V to 21.5V, f=120Hz, I_O=500mA			61		dB

4.5 Electrical Characteristics (7812)

(refer to the test circuits, T_J=-40 to 125°C, V_I=19V, I_O=500mA, C_I=0.33μF, C_O=0.1μF unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C		11.5	12	12.5	V
		I_O=5mA to 1A, P_O≤15W, V_I=15.5V to 27V		11.4	12	12.6	V
Line Regulation (Note1)	ΔV_O	T_J=25°C	V_I=14.5V to 30V			240	mV
			V_I=16V to 22V			120	mV
Load Regulation (Note1)	ΔV_O	T_J=25°C, I_O=5mA to 1.2A				240	mV
		T_J=25°C, I_O=250mA to 750mA				120	mV
Quiescent Current	I_Q	T_J=25°C				6	mA
Quiescent Current Change	ΔI_Q	I_O= 5mA to 1A				0.5	mA
		V_I=15V to 30V				1	mA
Quiescent Current Change	$\Delta V_O/\Delta T$	I_O= 5mA			1.5		mV/°C
Short Circuit Current	ISC	T_J=25°C, V_I=35V			0.35		A
Supply Voltage Rejection	SVR	V_I=15V to 25V, f=120Hz, I_O=500mA			60		dB

4.6 Electrical Characteristics (7815)

(refer to the test circuits, T_J=-40 to 125°C, V_I=19V, I_O=500mA, C_I=0.33μF, C_O=0.1μF unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C		14.4	15	15.6	V
		I_O=5mA to 1A, P_O≤15W, V_I=15.5V to 27V		14.25	15	15.75	V
Line Regulation (Note1)	ΔV_O	T_J=25°C	V_I=17.5V to 30V			300	mV
			V_I=18V to 22V			150	mV
Load Regulation (Note1)	ΔV_O	T_J=25°C, I_O=5mA to 1.2A				100	mV
		T_J=25°C, I_O=250mA to 750mA				150	mV
Quiescent Current	I_Q	T_J=25°C				6	mA
Quiescent Current Change	ΔI_Q	I_O= 5mA to 1A				0.5	mA
		V_I=17V to 30V				1	mA
Quiescent Current Change	$\Delta V_O/\Delta T$	I_O= 5mA			1.5		mV/°C
Short Circuit Current	ISC	T_J=25°C, V_I=35V			0.23		A
Supply Voltage Rejection	SVR	V_I=18.5V to 28.5V, f=120Hz, I_O=500mA			58		dB

4.7 Electrical Characteristics (7824)

(refer to the test circuits, T_J=-40 to 125°C, V_I=28V, I_O=500mA, C_I=0.33μF, C_O=0.1μF unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C		23.04	24	24.96	V
		I_O=5mA to 1A, P_O≤15W, V_I=17.5V to 35V		22.80	24	25.2	V
Line Regulation (Note1)	ΔV_O	T_J=25°C	V_I=27V to 35V			300	mV
			V_I=28V to 30V			150	mV
Load Regulation (Note1)	ΔV_O	T_J=25°C, I_O=5mA to 1.2A				100	mV
		T_J=25°C, I_O=250mA to 750mA				150	mV
Quiescent Current	I_Q	T_J=25°C				6	mA
Quiescent Current Change	ΔI_Q	I_O= 5mA to 1A				0.5	mA
		V_I=15V to 35V				1	mA
Quiescent Current Change	$\Delta V_O/\Delta T$	I_O= 5mA			1.5		mV/°C
Short Circuit Current	ISC	T_J=25°C, V_I=40V			0.23		A
Supply Voltage Rejection	SVR	V_I=28V to 38V, f=120Hz, I_O=500mA			54		dB

5.1 Typical characteristic

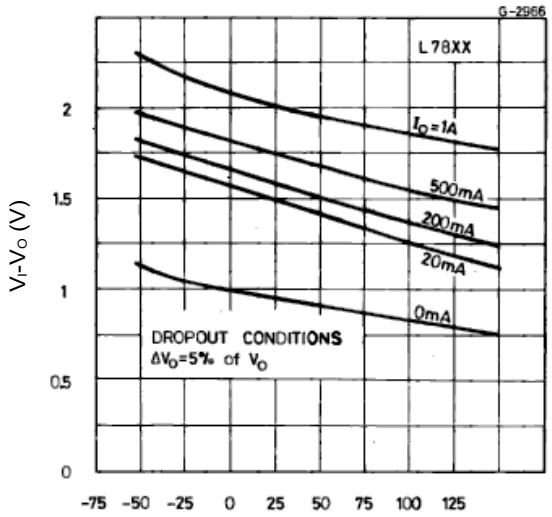


Figure 1: Dropout Voltage vs Junction Temperature

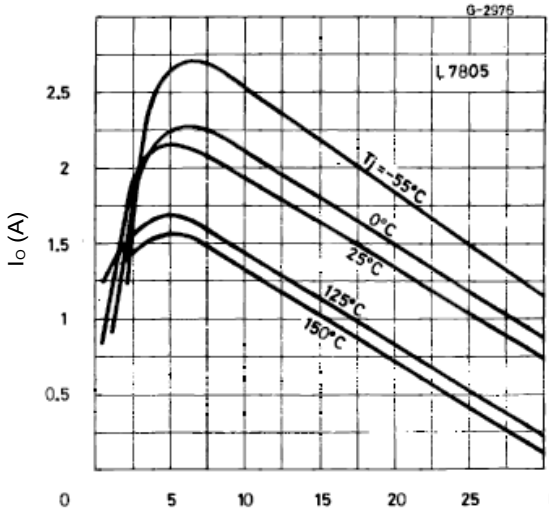


Figure 2: Peak Output Current vs Input/output Differential Voltage

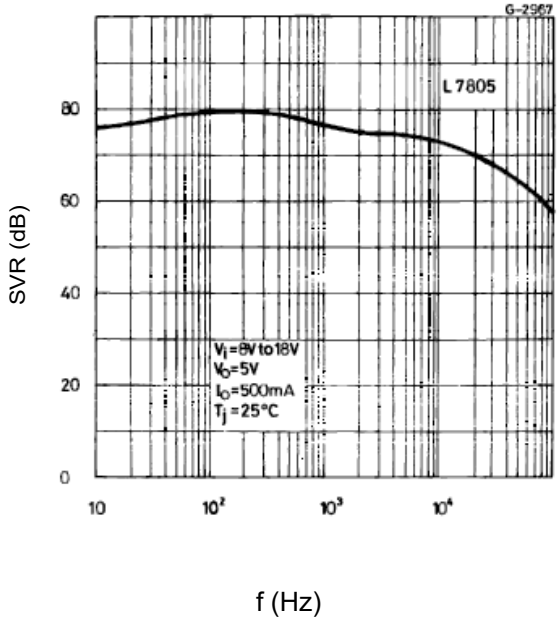


Figure 3: Supply Voltage Rejection vs Frequency Temperature

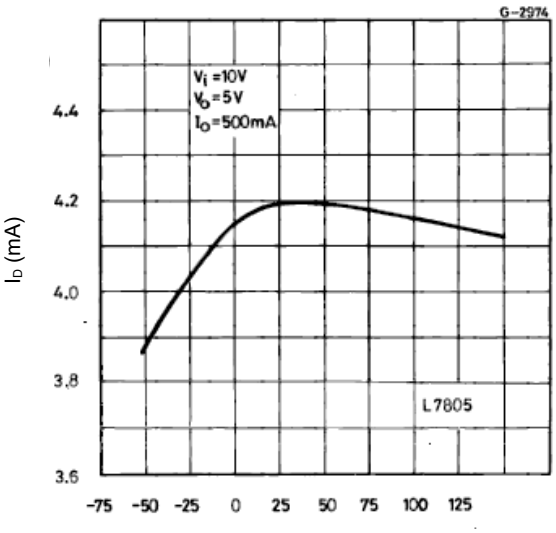


Figure 4: Quiescent Current vs Junction

5.2 Typical characteristic

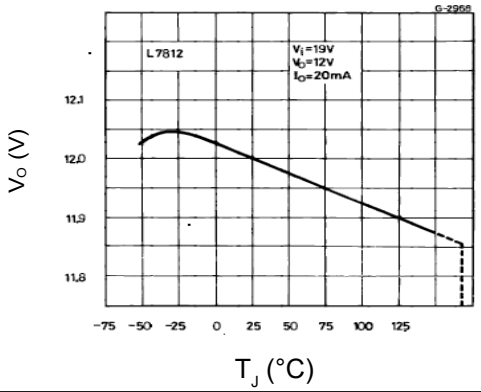


Figure 5: Output Voltage vs Junction Temperature

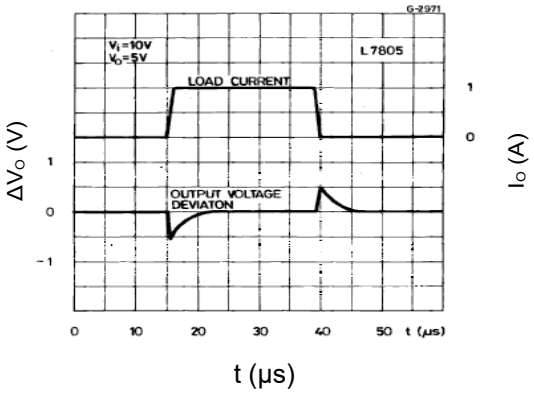


Figure 6: Load Transient Response

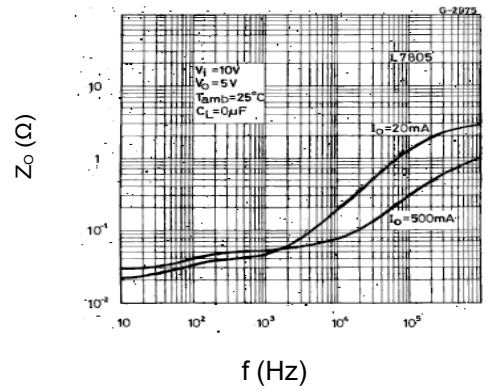


Figure 7: Output Impedance vs Frequency

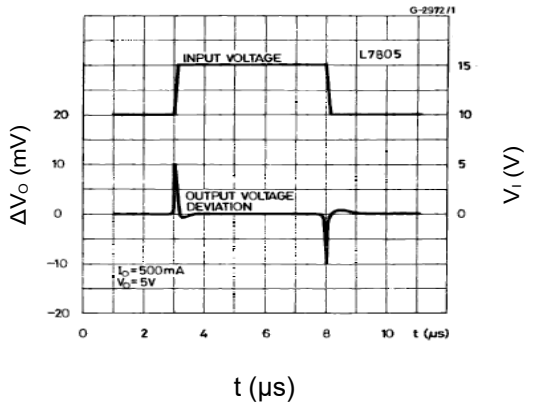


Figure 8: Line Transient Response

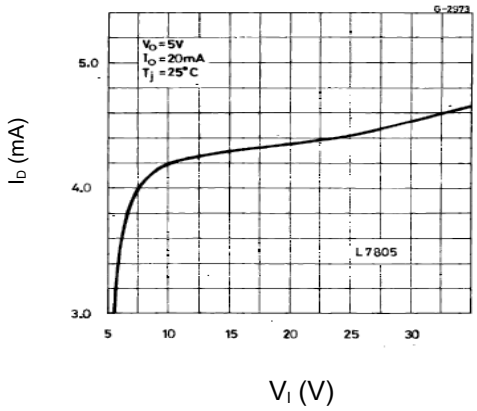
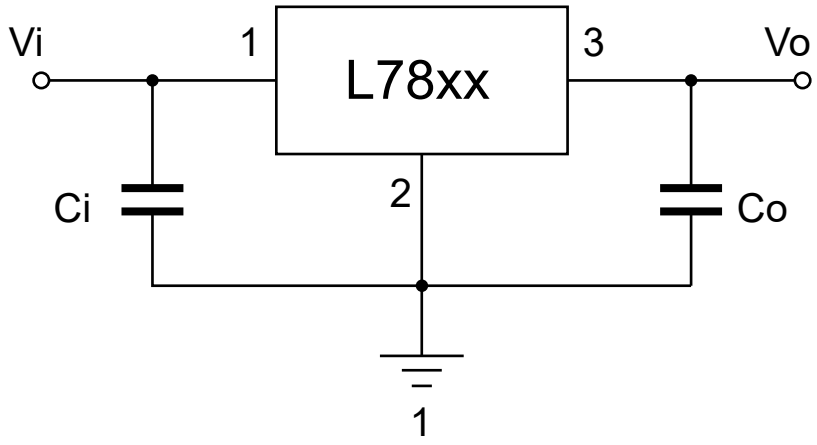
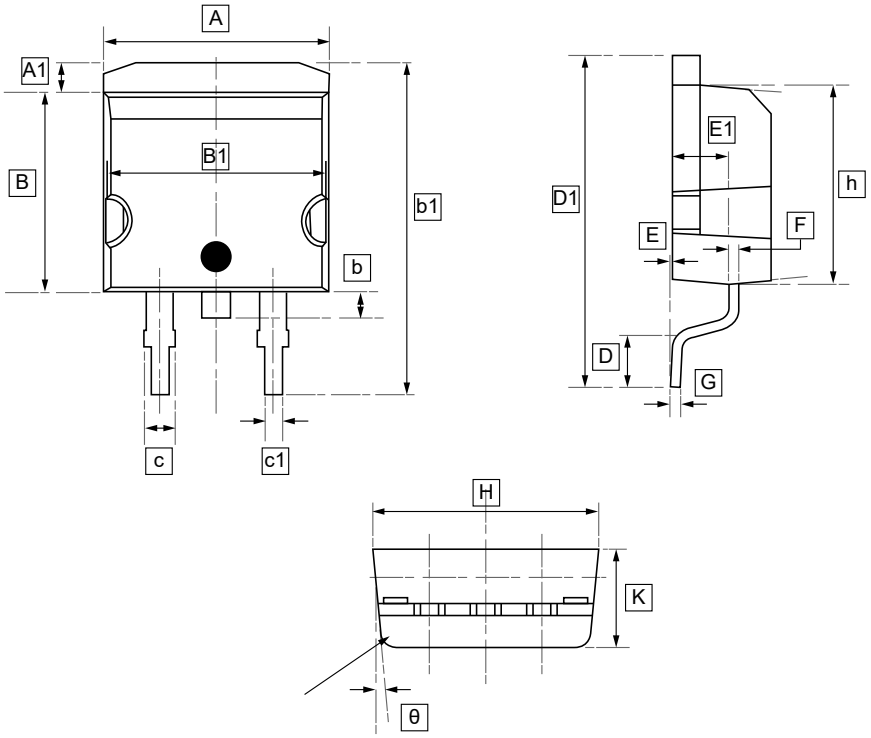


Figure 9: Quiescent Current vs Input Voltage

6.Typical Application



7.1 TO-263-3 Package Outline Dimensions

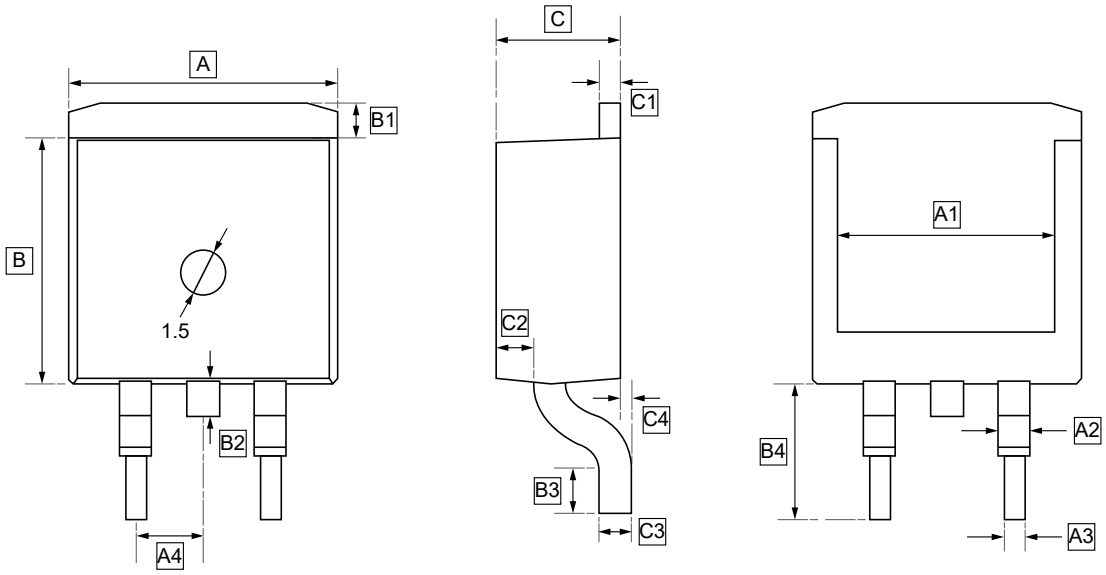


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	B	B1	c	c1	D	D1	E	E1	F	G
Min	10.2	1.35	9.05	10.0	1.27	0.8	2.5	15.2	0.0	2.6	0.45	0.25
Max			8.95		3X		2.1	14.8	0.2	2.5		

Symbol	h	H	K	θ
Min	9.05	10.15	4.5	5°
Max	8.95	10.05	4.4	

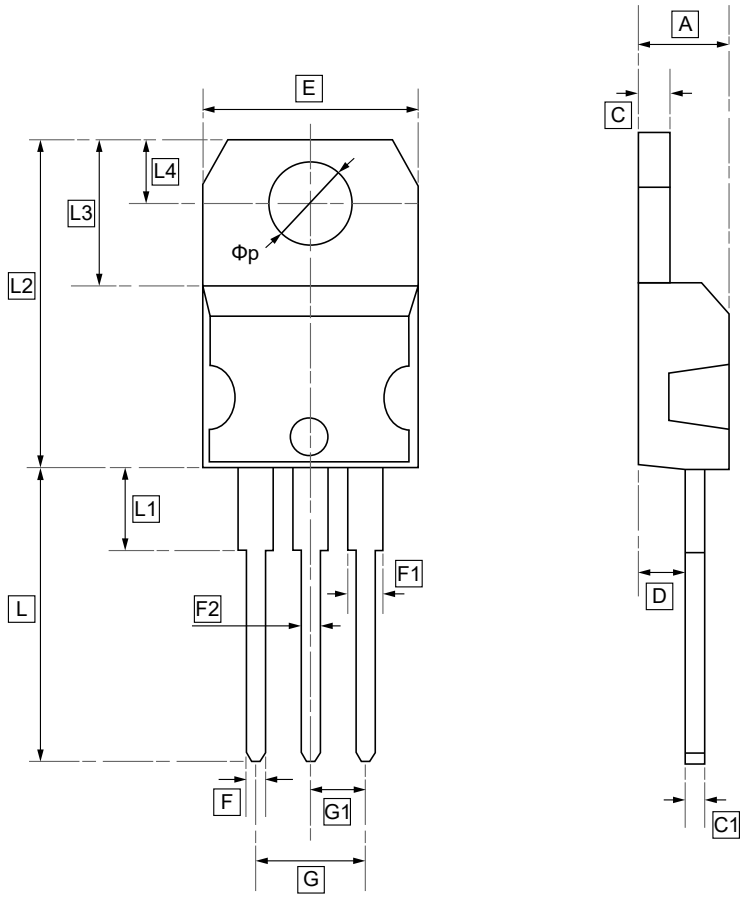
7.2 TO-263-3 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	A4	B	B1	B2	B3	B4	C	C1	C2	C3	C4
Min	9.78	7.02	1.22	0.77	2.5	8.7	1.07	1.4	2.0	5.03	4.42	1.27	1.55	0.48	0.01
Max	9.98	7.3	1.35	0.83	2.58	9.7	1.47	1.7	2.6	5.23	4.58	1.33	1.65	0.52	0.12

7.3 TO-220 Package Outline Dimensions

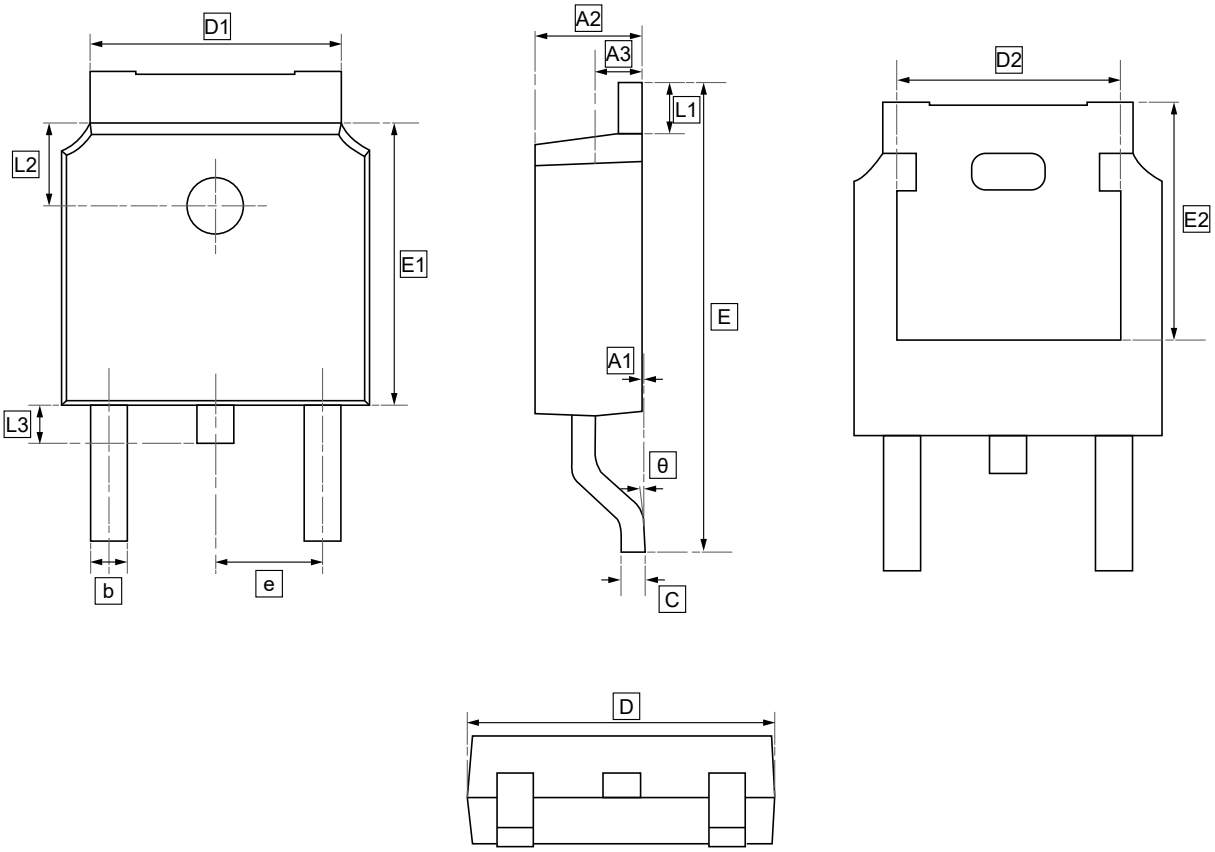


DIMENSIONS (mm are the original dimensions)

Symbol	A	C	C1	D	E	F	F1	F2	G	G1	L	L1
Min	4.4	1.2	0.38	2.4	9.85	0.6	1.22	1.22	4.93	2.39	13.1	3.75
Max	4.6	1.32	0.55	2.65	10.85	0.85	1.4	1.4	5.23	2.69	13.9	4.75

Symbol	L2	L3	L4	Φp
Min	15.25	6.25	2.65	3.75
Max	15.75	6.75	2.85	3.95

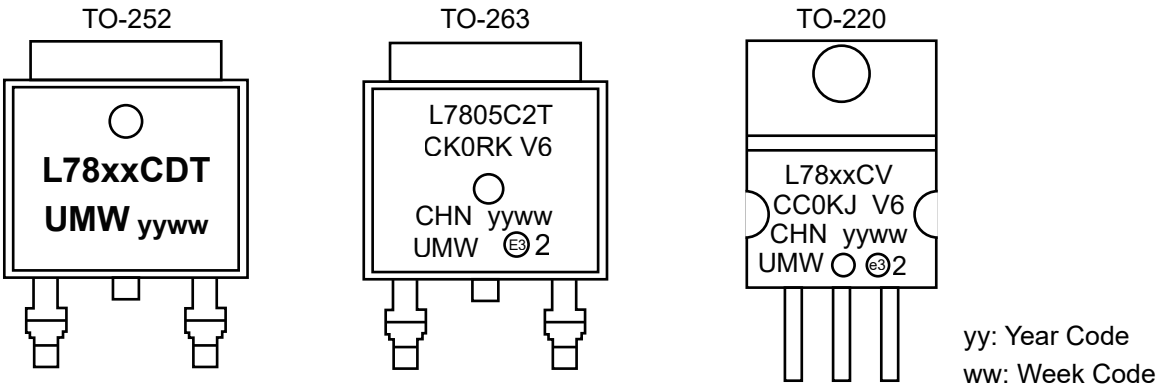
7.4 TO-252 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38	BSC	1.27	1.90	1.00	8.00

8.Ordering information



Order Code	Marking	Package	Base QTY	Delivery Mode
UMW L78xxCDT	L78xxCDT	TO-252	2500	Tape and reel
UMW L78xxCD2T	L78xxC2T	TO-263	1000	Tape and reel
UMW L78xxCV	L78xxCV	TO-220	1000	Tube and box

9.Disclaimer

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