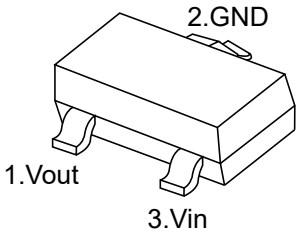
1.Description

The 78Lxx series of fixed voltage monolithic integrated circuit voltage regulators are suitable for applications that required supply up to 150mA.

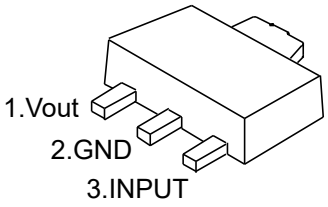
2.Features

- Maximum output current of 150mA
- Output voltage of 3.3V,5V,6V,8V,9V,10V 12V,15V and 24V
- Thermal overload protection
- Short circuit current limiting
- Output voltage accuracy： 1%

3.Pinning information

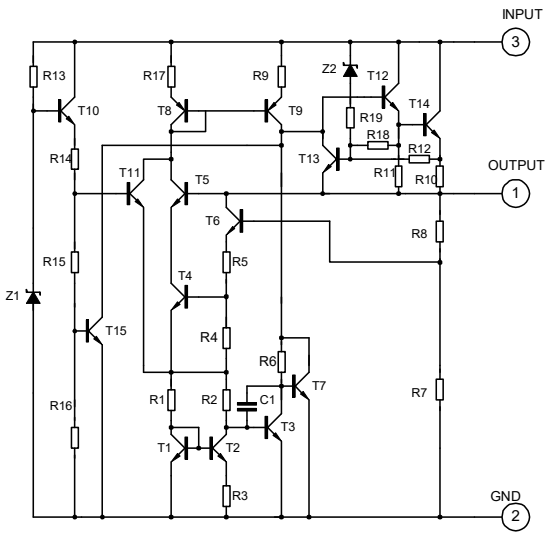


SOT-23



SOT-89

4.Block Diagram



5.Absolute Maximum Ratings

Characteristics	Symbol	Value	Units
Input voltage (for V_O=5,8V)	V_I	30	V
(for V_O=12,15V)		35	V
High power dissipation	P_D	700	mW
Junction Temperature Range	T_{OPR}	-20 to 120	°C
Storage Temperature Range	T_{STG}	-55 to 150	°C

6.1Electrical Characteristics (78L33)

(V_I=8.3V, I_O=80mA, 0<T_J<125°C, C1=0.33μF, C_O=0.1μF, unless otherwise specified) (Note 1)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C	3.168	3.3	3.432	V
Output Voltage (note 2)		T_J=25°C	3.168		3.432	V
Load Regulation	ΔV_O	T_J=25°C, I_O=1mA~200mA		10	60	mV
		T_J=25°C, I_O=1mA~80mA		7	30	mV
Line regulation	ΔV_O	5.3V≤V_I≤20V, T_J=25°C		7	150	mV
		6.3V≤V_I≤20V, T_J=25°C		4	100	mV
Quiescent Current	I_q	T_J=25°C		2	5.5	mA
Quiescent Current Change	ΔI_q	6.3V≤V_I≤20V			1.5	mA
	ΔI_q	1mA≤I_O≤80mA			0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz, T_J=25°C		40		μV
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	I_O=5mA		0.45		mV/°C
Ripple Rejection	RR	6.3V ≤V_I≤16.3V, f=120Hz, T_J=25°C	40	49		dB
Dropout Voltage	V_d	T_J=25°C		1.7		V

6.2Electrical Characteristics (78L05)

(V_I=10V, I_O=40mA, 0<T_J<125°C, C1=0.33μF, C_O=0.1μF, unless otherwise specified) (Note 1)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C	4.95	5	5.05	V
Output Voltage (note 2)		T_J=25°C	4.95	5	5.05	V
Load Regulation	ΔV_O	T_J=25°C, I_O=1mA~130mA		11	60	mV
		T_J=25°C, I_O=1mA~40mA		5	30	mV
Line regulation	ΔV_O	7V≤V_I≤20V, T_J=25°C		8	150	mV
		8V≤V_I≤20V, T_J=25°C		6	100	mV
Quiescent Current	I_q			2	5.5	mA
Quiescent Current Change	ΔI_q	8V≤V_I≤20V			1.5	mA
	ΔI_q	1mA≤V_I≤40mA			0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz		40		μV
Temperature coefficient of V_O	ΔV_O/ ΔT	I_O=5mA		0.65		mV/°C
Ripple Rejection	RR	8V ≤V_I≤20V, f=120Hz, T_J=25°C	40	49		dB
Dropout Voltage	V_d	T_J=25°C		1.7		V

6.3Electrical Characteristics (78L06)

(V_I=12V, I_O=40mA, 0<T_J<125°C, C1=0.33μF, C_O=0.1μF, unless otherwise specified) (Note 1)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C	5.94	6	6.06	V
Output Voltage (note 2)		T_J=25°C	5.94	6	6.06	V
Load Regulation	ΔV_O	T_J=25°C, I_O=1mA~130mA		12.8	80	mV
		T_J=25°C, I_O=1mA~70mA		5.8	40	mV
Line regulation	ΔV_O	8.5V≤V_I≤20V, T_J=25°C		64	175	mV
		9V≤V_I≤20V, T_J=25°C		54	125	mV
Quiescent Current	I_q			2	5.5	mA
Quiescent Current Change	ΔI_q	9V≤V_I≤20V			1.5	mA
	ΔI_q	1mA≤V_I≤40mA			0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz		49		μV
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	I_O=5mA		0.75		mV/°C
Ripple Rejection	RR	10V≤V_I≤20V, f=120Hz, T_J=25°C	38	46		dB
Dropout Voltage	V_d	T_J=25°C		1.7		V

6.4Electrical Characteristics (78L08)

(V_I=14V, I_O=40mA, 0<T_J<125°C, C1=0.33μF, C_O=0.1μF, unless otherwise specified) (Note 1)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C	7.92	8	8.08	V
Output Voltage (note 2)		T_J=25°C	7.92	8	8.08	V
Load Regulation	ΔV_O	T_J=25°C, I_O=1mA~130mA		15	80	mV
		T_J=25°C, I_O=1mA~70mA		8	40	mV
Line regulation	ΔV_O	10.5V≤V_I≤23V, T_J=25°C		10	175	mV
		11V≤V_I≤23V, T_J=25°C		8	125	mV
Quiescent Current	I_q			2	5.5	mA
Quiescent Current Change	ΔI_q	11V≤V_I≤23V			1.5	mA
	ΔI_q	1mA≤V_I≤40mA			0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz		49		μV
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	I_O=5mA		0.75		mV/°C
Ripple Rejection	RR	11V≤V_I≤23V, f=120Hz, T_J=25°C	36	45		dB
Dropout Voltage	V_d	T_J=25°C		1.7		V

6.5Electrical Characteristics (78L09)

(V_I=15V, I_O=40mA, 0<T_J<125°C, C1=0.33μF, C_O=0.1μF, unless otherwise specified) (Note 1)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C	8.91	9	9.09	V
Output Voltage (note 2)		T_J=25°C	8.91	9	9.09	V
Load Regulation	ΔV_O	T_J=25°C, I_O=1mA~130mA		20	90	mV
		T_J=25°C, I_O=1mA~40mA		10	45	mV
Line regulation	ΔV_O	11.5V≤V_I≤24V, T_J=25°C		90	200	mV
		13V≤V_I≤24V, T_J=25°C		100	150	mV
Quiescent Current	I_q			2	5.5	mA
Quiescent Current Change	ΔI_q	13V≤V_I≤24V			1.5	mA
	ΔI_q	1mA≤V_I≤40mA			0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz		49		μV
Temperature coefficient of V_O	ΔV_O/ ΔT	I_O=5mA		0.75		mV/°C
Ripple Rejection	RR	12V≤V_I≤23V, f=120Hz, T_J=25°C	36	44		dB
Dropout Voltage	V_d	T_J=25°C		1.7		V

6.6Electrical Characteristics (78L12)

(V_I=19V, I_O=40mA, 0<T_J<125°C, C1=0.33μF, C_O=0.1μF, unless otherwise specified) (Note 1)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C	11.88	12	12.12	V
Output Voltage (note 2)		T_J=25°C	11.88	12	12.12	V
Load Regulation	ΔV_O	T_J=25°C, I_O=1mA~130mA		25	150	mV
		T_J=25°C, I_O=1mA~40mA		12	75	mV
Line regulation	ΔV_O	14.5V≤V_I≤27V, T_J=25°C		25	300	mV
		16V≤V_I≤27V, T_J=25°C		20	250	mV
Quiescent Current	I_q			2	5.5	mA
Quiescent Current Change	ΔI_q	16V≤V_I≤27V			1.5	mA
	ΔI_q	1mA≤V_I≤40mA			0.1	mA
Output Noise Voltage	V_N	10Hz ≤f≤100kHz		80		μV
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	I_O=5mA		1		mV/°C
Ripple Rejection	RR	15V≤V_I≤25V, f=120Hz, T_J=25°C	36	42		dB
Dropout Voltage	V_d	T_J=25°C		1.7		V

6.7Electrical Characteristics (78L15)

(V_I=23V, I_O=40mA, 0<T_J<125°C, C1=0.33μF, C_O=0.1μF, unless otherwise specified) (Note 1)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C	14.85	15	15.15	V
Output Voltage (note 2)		T_J=25°C	14.85	15	15.15	V
Load Regulation	ΔV_O	T_J=25°C, I_O=1mA~130mA		20	150	mV
		T_J=25°C, I_O=1mA~70mA		25	150	mV
Line regulation	ΔV_O	17.5V≤V_I≤30V, T_J=25°C		25	150	mV
		20V≤V_I≤30V, T_J=25°C		15	75	mV
Quiescent Current	I_q			2.2	6	mA
Quiescent Current Change	ΔI_q	20V≤V_I≤30V			1.5	mA
	ΔI_q	1mA≤V_I≤40mA			0.1	mA
Output Noise Voltage	V_N	10Hz ≤f≤100kHz		90		μV
Temperature coefficient of V_O	ΔV_O/ ΔT	I_O=5mA		1.3		mV/°C
Ripple Rejection	RR	18.5V≤V_I≤28.5V, f=120Hz,T_J=25°C	33	39		dB
Dropout Voltage	V_d	T_J=25°C		1.7		V

6.8Electrical Characteristics (78L18)

(V_I=27V, I_O=40mA, 0<T_J<125°C, C1=0.33μF, C_O=0.1μF, unless otherwise specified) (Note 1)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C	17.82	18	18.18	V
Output Voltage (note 2)		T_J=25°C	17.82	18	18.18	V
Load Regulation	ΔV_O	T_J=25°C, I_O=1mA~130mA		30	170	mV
		T_J=25°C, I_O=1mA~40mA		15	85	mV
Line regulation	ΔV_O	21V≤V_I≤33V, T_J=25°C		145	300	mV
		22V≤V_I≤33V, T_J=25°C		135	250	mV
Quiescent Current	I_q			2.2	6	mA
Quiescent Current Change	ΔI_q	21V≤V_I≤33V			1.5	mA
	ΔI_q	1mA≤V_I≤40mA			0.1	mA
Output Noise Voltage	V_N	10Hz ≤f≤100kHz		150		μV
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	I_O=5mA		1.8		mV/°C
Ripple Rejection	RR	23V≤V_I≤33V, f=120Hz, T_J=25°C	32	38		dB
Dropout Voltage	V_d	T_J=25°C		1.7		V

6.9Electrical Characteristics (78L24)

(V_I=33V, I_O=40mA, 0<T_J<125°C, C1=0.33μF, C_O=0.1μF, unless otherwise specified) (Note 1)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_O	T_J=25°C	23.76	24	24.24	V
Output Voltage (note 2)		T_J=25°C	23.76	24	24.24	V
Load Regulation	ΔV_O	T_J=25°C, I_O=1mA~130mA		40	200	mV
		T_J=25°C, I_O=1mA~40mA		20	100	mV
Line regulation	ΔV_O	27V≤V_I≤38V, T_J=25°C		160	300	mV
		28V≤V_I≤38V, T_J=25°C		150	250	mV
Quiescent Current	I_q			2.2	6	mA
Quiescent Current Change	ΔI_q	21V≤V_I≤38V			1.5	mA
	ΔI_q	1mA≤V_I≤40mA			0.1	mA
Output Noise Voltage	V_N	10Hz ≤f≤100kHz		200		μV
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	I_O=5mA		2		mV/°C
Ripple Rejection	RR	27V≤V_I≤38V, f=120Hz, T_J=25°C	30	37		dB
Dropout Voltage	V_d	T_J=25°C		1.7		V

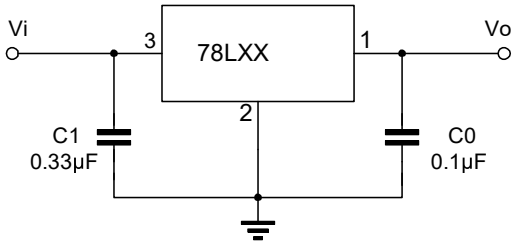
Notes

1: The Maximum steady state usable output current and input voltage are very dependent on the heating sinking and/or lead temperature length of the package.The date above respresent pulse test conditions with junction temperatures as indicated at the initiation of test.

Note 2:Power dissipation<0.75W.

Note 3:Output voltage of 78Lxx.

7.Typical Application



Note 1: To specify an output voltage,substitue voltage value for "XX".

Note 2: Bypass capacitors are recommended for optimum stability and transient response and should be located as close as possible to the regulators

8.Typical characteristic

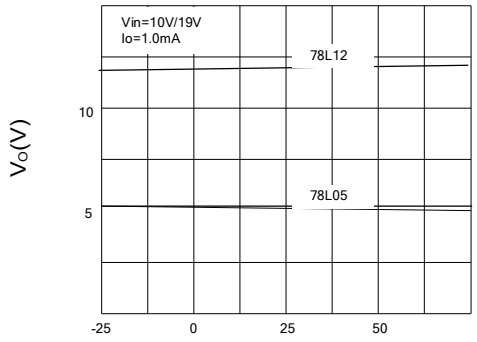


Figure 1: 78L05/12 Output Voltage vs Ambient Temperature

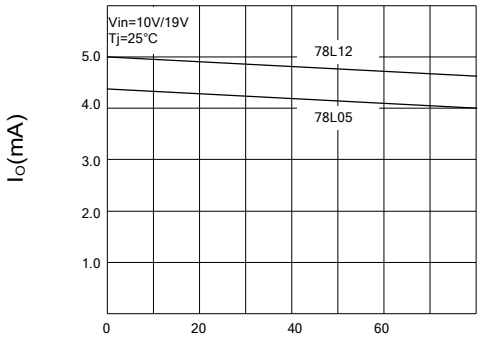


Figure 2: 78L05/12 Quiescent Curent vs Output Current

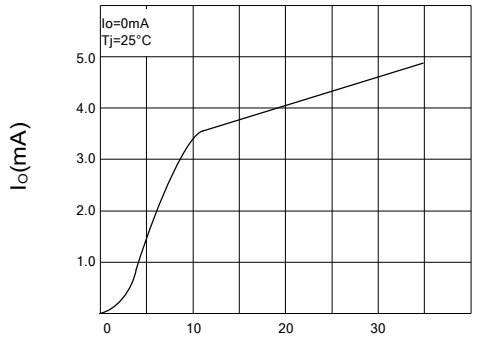


Figure 3: 78L05 Quiescent Current vs Input

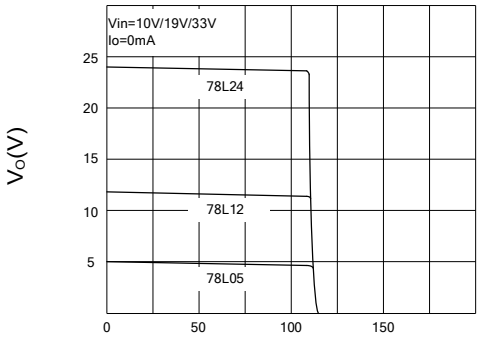


Figure 4: 78 L05/12/24 Thermal Shutdown

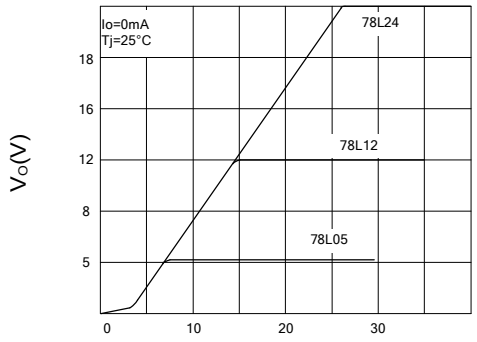


Figure 5: 78 L05/12/24 Output Characteristics

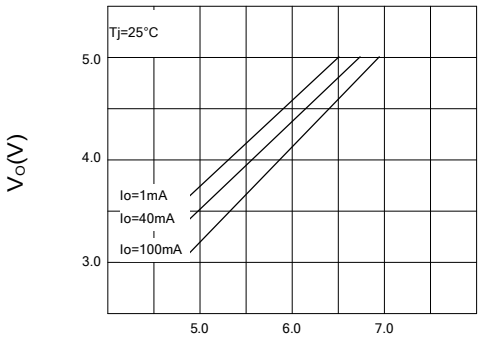
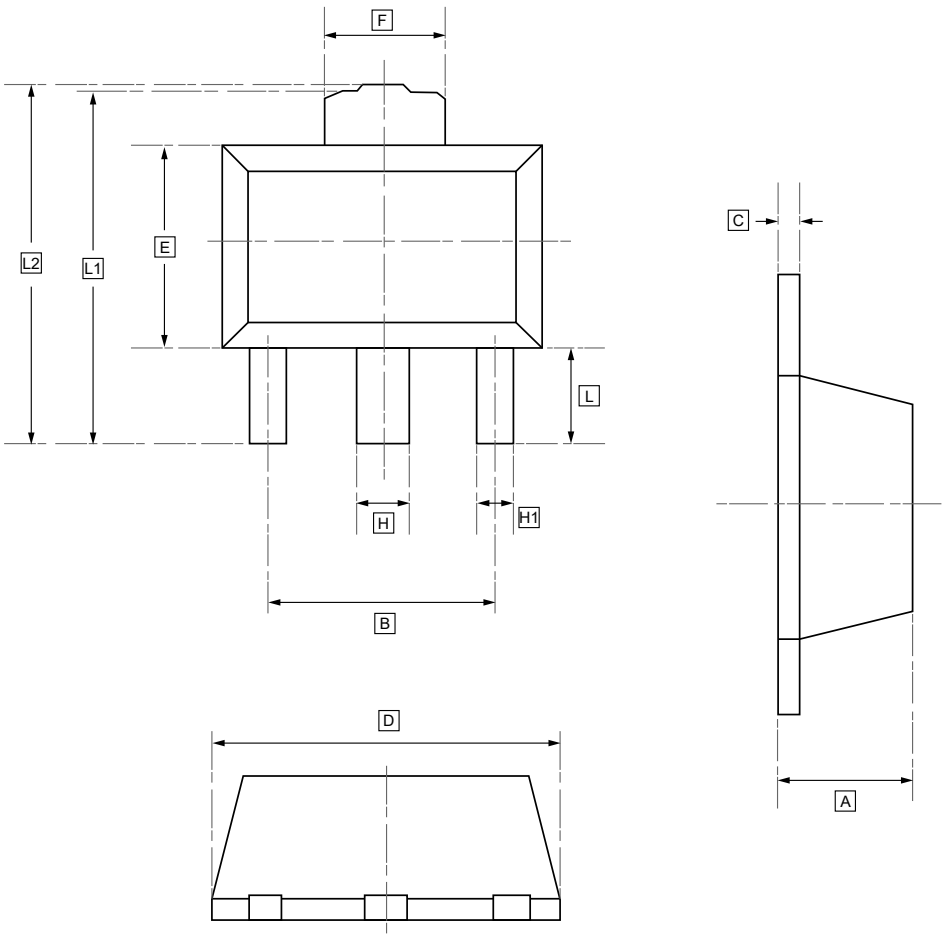


Figure 6: 78 L05 Dropout Characteristics

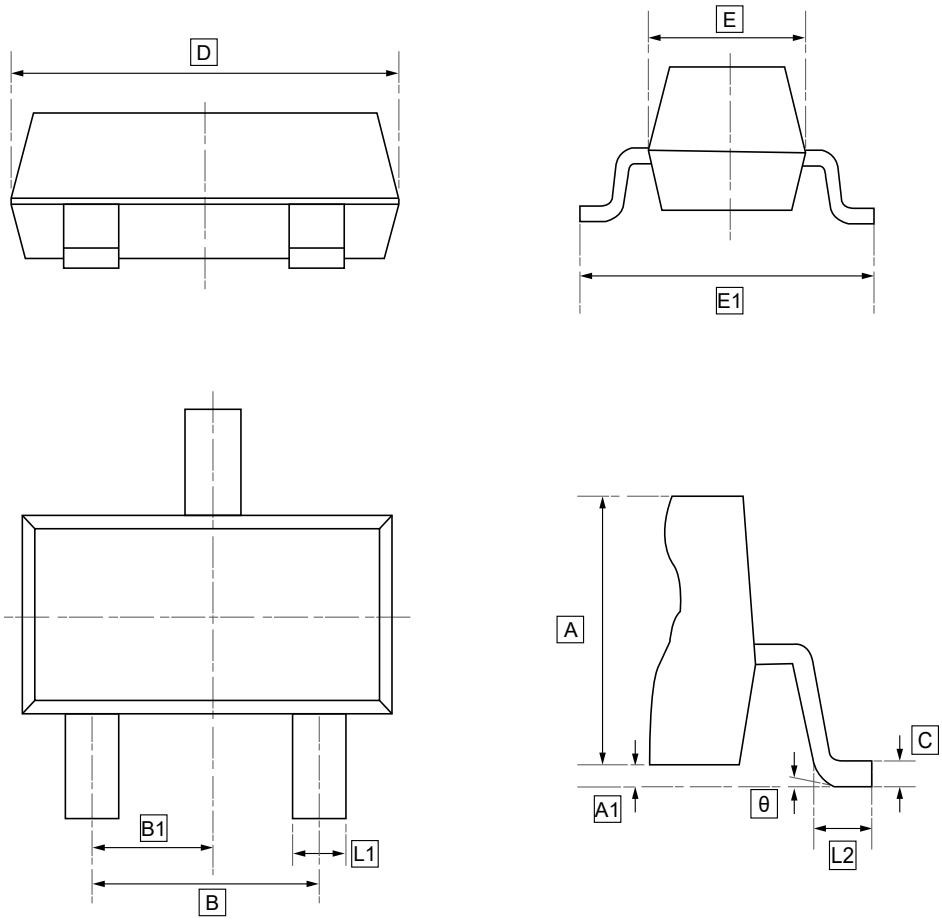
9.1 SOT-89 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	D	E	F	H	H1	L	L1	L2
Min	1.450	2.950	0.330	4.450	2.450	1.650	0.450	0.370	0.900	4.100	4.100
Max	1.550	3.050	0.430	4.550	2.550	1.750	0.580	0.480	1.000	4.300	4.350

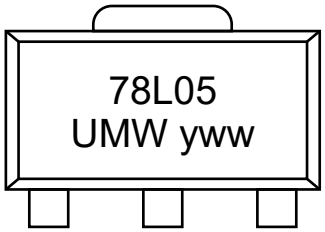
9.2.SOT-23 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	L1	L2	C	D	E	E1	B	B1	θ
Min	1.050	0.000	0.300	0.350	0.100	2.820	1.500	2.700	1.800	0.950	0°
Max	1.150	0.100	0.500	0.550	0.200	3.020	1.700	2.900	2.000	TYP	8°

10.Ordering Information



yww: Batch Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW78L33-150	78L33	SOT-89	1000	Tape and reel
UMW 78L05-150	78L05	SOT-89	1000	Tape and reel
UMW 78L06-150	78L06	SOT-89	1000	Tape and reel
UMW 78L08-150	78L08	SOT-89	1000	Tape and reel
UMW 78L09-150	78L09	SOT-89	1000	Tape and reel
UMW78L12-150	78L12	SOT-89	1000	Tape and reel
UMW78L15-150	78L15	SOT-89	1000	Tape and reel
UMW78L18-150	78L18	SOT-89	1000	Tape and reel
UMW78L24-150	78L24	SOT-89	1000	Tape and reel
UMW 78L05S-150	L05	SOT-23	3000	Tape and reel

11.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.