

## GENERAL DESCRIPTION

This series of fixed -voltage monolithic integrated circuit voltage regulators is designed for a wide range of applications. These applications include on - card regulation or elimination of noise and distribution problems associated with single-point regulation. In addition, they can be used with power - pass elements to make high-current voltage regulators. Each of these regulators can deliver up to 100mA of output current. The internal limiting and thermal shutdown features of these regulators make them essentially immune to overload.

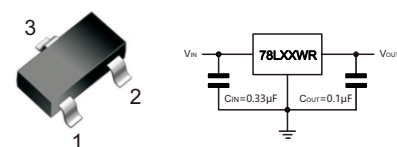
When used as a replacement for a Zener diode - resistor combination, an effective improvement in output impedance can be obtained together with lower-bias current.

## FEATURES

- 3-Terminal Regulators
- Output Current Up to 100mA
- No External Components
- Internal Thermal Overload Protection
- Internal Short-Circuit Limiting
- Totally Lead-Free & Fully RoHS Compliant (Note 1)
- Halogen and Antimony Free."Green" Device (Note 2)

## PINNING

PIN	DESCRIPTION
1	OUT
2	IN
3	GND

Simplified outline SOT-23-3 and symbol

## Mechanical Data

- Case: SOT-23-3
- Case Material: Molded Plastic.  
UL Flammability Classification Rating 94V-0

ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

Parameter	78L05WD/78L09WD	78L12WD	78L15WD	Unit
Input Voltage	30	35	40	V
Operating Junction Temperature Range	-40~125	-40~125	-40~125	°C
Storage Temperature Range	-65~+150	-65~+150	-65~+150	°C
Lead temperature 1.6mm (1/16 inch) from case for 10s	260	260	260	°C

Recommended operating conditions

Parameter		MIN	MAX	Unit
Input Voltage	78L05WD	7	20	V
	78L09WD	11.5	24	
	78L12WD	14.5	27	
	78L15WD	17.5	30	
Output Current	ALL		100	mA
Operating Junction Temperature Range	ALL	0	125	°C

Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS3).compliant.  
2. Halogen-and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br +Cl) and <1000ppm antimony compounds.



78L05WR ELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JUNCTION TEMPERATURE

(VI=10V, Io=40mA, Ci=0.33uF, Co=0.1uF, unless otherwise specified)

Parameter	Symbol	Test conditions		MIN	TYP	MAX	UNIT
Output voltage	Vo	Io=40mA	25°C	4.8	5	5.2	V
		7V≤Vi≤20V, Io=1mA-40mA	0-125°C	4.75	5	5.25	V
		Io=1mA-70mA		4.75	5	5.25	V
Line regulation	ΔVo	7V≤Vi≤20V	25°C		32	150	mV
		8V≤Vi≤20V			26	100	mV
Load Regulation		Io=1mA-100mA			15	60	mV
		Io=1mA-40mA			8	30	mV
Quiescent Current	Iq	Io=0mA	25°C		1.9	6	mA
			125°C			5.5	mA
Quiescent Current Change	ΔIq	8V≤Vi≤20V	0-125°C			1.5	mA
		1mA≤Io≤40mA				0.1	mA
Output Noise Voltage	VN	10Hz≤f≤100KHz	25°C		42		uV
Ripple Rejection	RR	8V≤Vi≤18V, f=120Hz	25°C	41	49		dB
Dropout Voltage	Vd		25°C		1.7		V

78L09WR ELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JUNCTION TEMPERATURE

(VI=16V, Io=40mA, Ci=0.33uF, Co=0.1uF, unless otherwise specified)

Parameter	Symbol	Test conditions		MIN	TYP	MAX	UNIT
Output voltage	Vo	Io=40mA	25°C	8.6	9	9.4	V
		12V≤Vi≤24V, Io=1mA-40mA	0-125°C	8.55	9	9.45	V
		Io=1mA-70mA		8.55	9	9.45	V
Line regulation	ΔVo	12V≤Vi≤24V	25°C		45	175	mV
		13V≤Vi≤24V			40	125	mV
Load Regulation		Io=1mA-100mA			19	90	mV
		Io=1mA-40mA			11	40	mV
Quiescent Current	Iq	Io=0mA	25°C		2.2	6	mA
			125°C			5.5	mA
Quiescent Current Change	ΔIq	13V≤Vi≤24V	0-125°C			1.5	mA
		1mA≤Io≤40mA				0.1	mA
Output Noise Voltage	VN	10Hz≤f≤100KHz	25°C		58		uV
Ripple Rejection	RR	15V≤Vi≤25V, f=120Hz	25°C	38	45		dB
Dropout Voltage	Vd		25°C		1.7		V



78L12WRELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JINCTION TEMPERATURE

(VI=19V, Io=40mA, Ci=0.33uF,Co=0.1uF, unless otherwise specified)

Parameter	Symbol	Test conditions		MIN	TYP	MAX	UNIT
Output voltage	Vo	Io=40mA	25°C	11.5	12	12.5	V
		14V≤Vi≤27V, Io=1mA-40mA	0-125°C	11.4	12	12.6	V
		Io=1mA-70mA		11.4	12	12.6	V
Line regulation	ΔVo	14V≤Vi≤27V	25°C		55	250	mV
		16V≤Vi≤27V			49	200	mV
Load Regulation		Io=1mA-100mA			22	100	mV
		Io=1mA-40mA			13	50	mV
Quiescent Current	Iq	Io=0mA	25°C		2.5	6.5	mA
			125°C			6	mA
Quiescent Current Change	ΔIq	16V≤Vi≤27V	0-125°C			1.5	mA
		1mA≤Io≤40mA				0.1	mA
Output Noise Voltage	VN	10Hz≤f≤100KHz	25°C		70		uV
Ripple Rejection	RR	15V≤Vi≤25V,f=120Hz	25°C	37	42		dB
Dropout Voltage	Vd		25°C		1.7		V

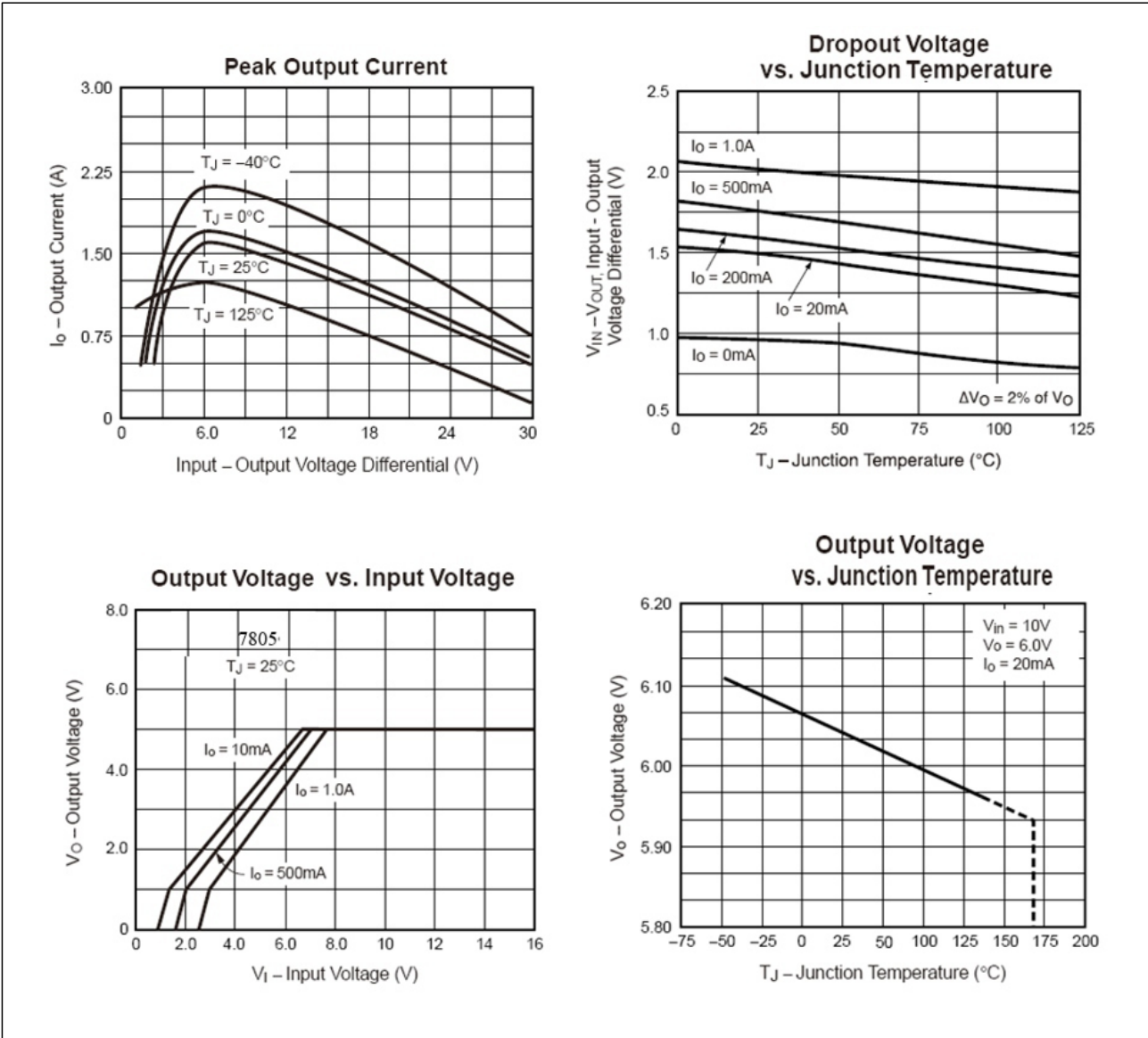
78L15WRELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JINCTION TEMPERATURE

(VI=23V, Io=40mA, Ci=0.33uF,Co=0.1uF, unless otherwise specified)

Parameter	Symbol	Test conditions		MIN	TYP	MAX	UNIT
Output voltage	Vo	Io=40mA	25°C	14.4	15	15.6	V
		17.5V≤Vi≤30V, Io=1mA-40mA	0-125°C	14.25	15	15.75	V
		Io=1mA-70mA		14.25	15	15.75	V
Line regulation	ΔVo	17.5V≤Vi≤30V	25°C		65	300	mV
		19V≤Vi≤30V			58	250	mV
Load Regulation		Io=1mA-100mA			25	150	mV
		Io=1mA-40mA			15	75	mV
Quiescent Current	Iq	Io=0mA	25°C		2.6	6.5	mA
			125°C			6	mA
Quiescent Current Change	ΔIq	19V≤Vi≤30V	0-125°C			1.5	mA
		1mA≤Io≤40mA				0.1	mA
Output Noise Voltage	VN	10Hz≤f≤100KHz	25°C		82		uV
Ripple Rejection	RR	18.5V≤Vi≤28.5V,f=120Hz	25°C	34	39		dB
Dropout Voltage	Vd		25°C		1.7		V

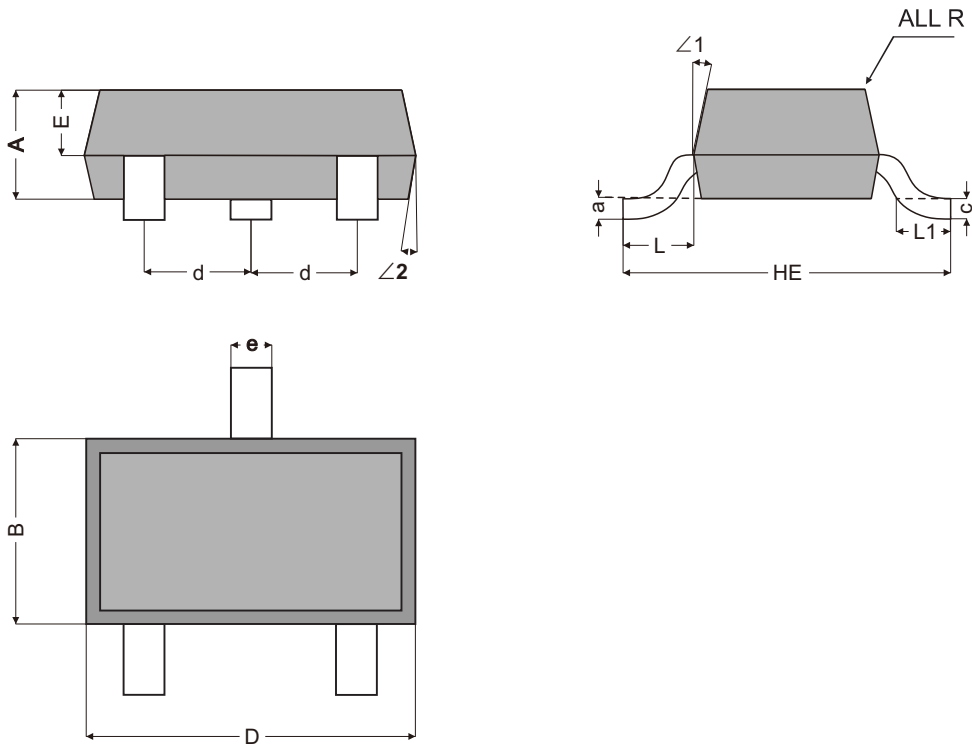


### Typical Performance Characteristics



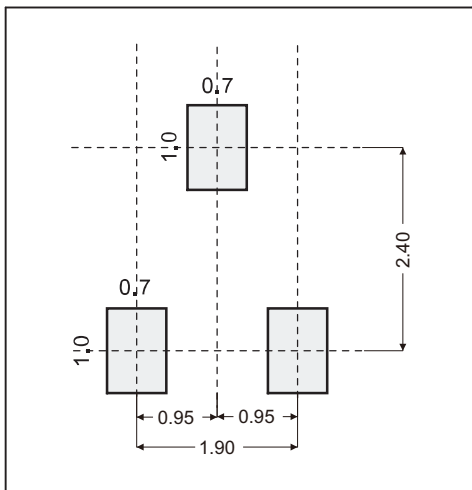


SOT23-3 Package Outline Dimensions



Unit		A	B	C	HE	D	d	E	e	L	L1	a	R	∠1	∠2
mm	max	1.05	1.80	0.20	2.90	3.12	1.00	0.65	0.40	0.70	0.60	0.2 (ref)	R0.1 (ref)	12°	10°
	typ	0.95	1.60	0.15	2.80	2.92	0.95	0.55	0.35	0.60	/				
	min	0.85	1.40	0.10	2.70	2.72	0.90	0.45	0.30	0.50	0.20				
mil	max	41	71	8	114	123	39	26	16	28	24	8 (ref)	R4 (ref)	12°	10°
	typ	37	63	6	110	115	37	22	14	24	/				
	min	33	55	4	106	107	35	18	12	20	8				

The recommended mounting pad size



Marking

Type number	Marking code
78L05WR	78L05
78L09WR	78L09
78L12WR	78L12
78L15WR	78L15



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