



LINEAR INTEGRATED CIRCUIT

78LXX

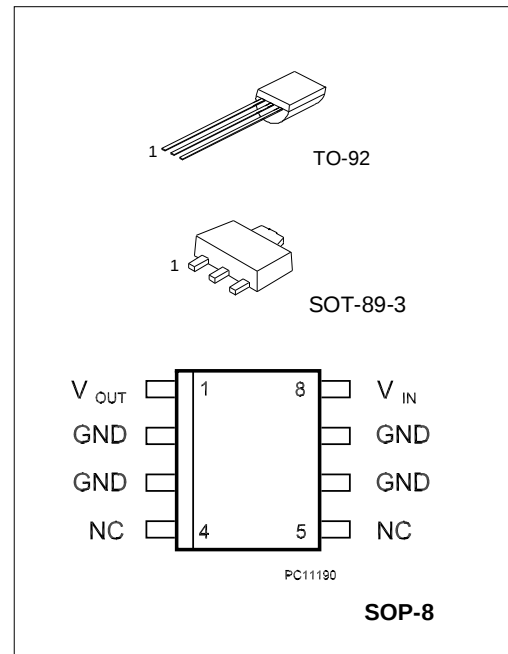
3-TERMINAL 0.1A POSITIVE VOLTAGE REGULATORS

DESCRIPTION

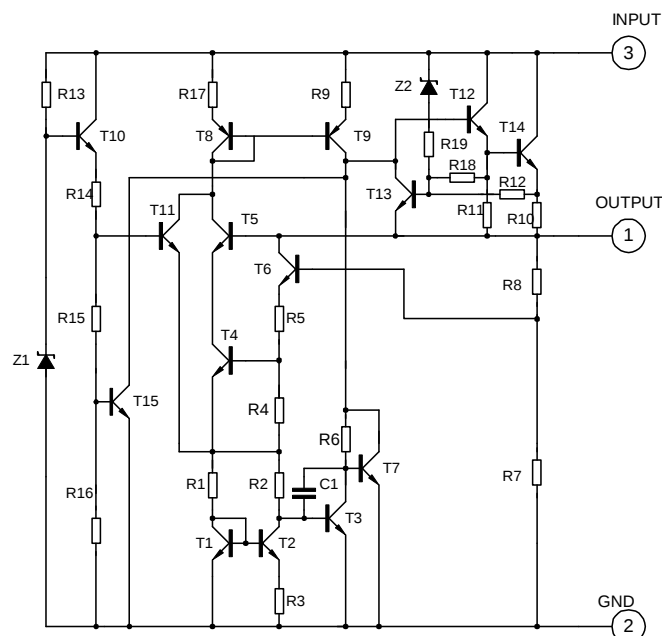
The 78LXX series of fixed voltage monolithic integrated circuit voltage regulators are suitable for applications that required supply up to 100mA.

FEATURE

- *Maximum output current of 100mA
- *Output voltage of 5V,6V,8V,9V,10V,12V,15V and 24V
- *Thermal overload protection
- *Short circuit current limiting



BLOCK DIAGRAM





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

CHARACTERISTICS	SYMBOL	VALUE	UNITS
Input voltage(for $V_o=5,8V$)	V_i	30	V
(for $V_o=12,15V$)	V_i	35	V
High power dissipation	P_d	700	mW
Operating Junction Temperature Range	T_{OPR}	-20~+120	°C
Storage Temperature Range	T_{STG}	-55~+150	°C

78L05 ELECTRICAL CHARACTERISTICS

(VI=10V, Io=40mA, 0<Tj<125°C, C1=0.33μF, Co=0.1μF, unless otherwise specified)(Note 1)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j=25^{\circ}C$	4.8	5.0	5.2	V
		$7V \leq V_i \leq 20V, I_o=1mA \sim 40mA$	4.75		5.25	V
		$7V \leq V_i \leq V_{MAX}, I_o=1mA \sim 70mA$	4.75		5.25	V (note 2)
Output Voltage(note 3)	V_o	$T_j=25^{\circ}C$	4.9	5.0	5.1	V
		$7V \leq V_i \leq 20V, I_o=1mA \sim 40mA$	4.85		5.15	V
		$7V \leq V_i \leq V_{MAX}, I_o=1mA \sim 70mA$	4.85		5.15	V (note 2)
Load Regulation	ΔV_o	$T_j=25^{\circ}C, I_o=1mA \sim 100mA$		11	60	mV
		$T_j=25^{\circ}C, I_o=1mA \sim 40mA$		5.0	30	mV
Line regulation	ΔV_o	$7V \leq V_i \leq 20V, T_j=25^{\circ}C$		8	150	mV
		$8V \leq V_i \leq 20V, T_j=25^{\circ}C$		6	100	mV
Quiescent Current	I_q			3.0	5.5	mA
Quiescent Current Change	ΔI_q	$8V \leq V_i \leq 20V$			1.5	mA
	ΔI_q	$1mA \leq V_i \leq 40mA$			0.1	mA
Output Noise Voltage	V_N	$10Hz \leq f \leq 100kHz$		40		μV
Temperature coefficient of V_o	$\Delta V_o / \Delta T$	$I_o=5mA$		0.65		mV/°C
Ripple Rejection	RR	$8V \leq V_i \leq 20V, f=120Hz, T_j=25^{\circ}C$	40	49		dB
Dropout Voltage	V_d	$T_j=25^{\circ}C$		1.7		V



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78L06 ELECTRICAL CHARACTERISTICS

($V_I=12V$, $I_O=40mA$, $0<T_J<125^{\circ}C$, $C_1=0.33\mu F$, $C_O=0.1\mu F$, unless otherwise specified)(Note 1)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J=25^{\circ}C$	5.75	6.0	6.25	V
		$8.5V \leq V_I \leq 20V$, $I_O=1mA \sim 40mA$	5.7		6.3	V
		$8.5V \leq V_I \leq V_{MAX}$, $I_O=1mA \sim 70mA$	5.7		6.3	V (note 2)
Output Voltage(note 3)	V_O	$T_J=25^{\circ}C$	5.88	6.0	6.12	V
		$8.5V \leq V_I \leq 20V$, $I_O=1mA \sim 40mA$	5.82		6.18	V
		$8.5V \leq V_I \leq V_{MAX}$, $I_O=1mA \sim 70mA$	5.82		6.18	V (note 2)
Load Regulation	ΔV_O	$T_J=25^{\circ}C$, $I_O=1mA \sim 100mA$		12.8	80	mV
		$T_J=25^{\circ}C$, $I_O=1mA \sim 70mA$		5.8	40	mV
Line regulation	ΔV_O	$8.5V \leq V_I \leq 20V$, $T_J=25^{\circ}C$		64	175	mV
		$9V \leq V_I \leq 20V$, $T_J=25^{\circ}C$		54	125	mV
Quiescent Current	I_q			3.0	5.5	mA
Quiescent Current Change	ΔI_q	$9V \leq V_I \leq 20V$			1.5	mA
	ΔI_q	$1mA \leq V_I \leq 40mA$			0.1	mA
Output Noise Voltage	V_N	$10Hz \leq f \leq 100kHz$		49		μV
Temperature coefficient of V_O	$\Delta V_O / \Delta T$	$I_O=5mA$		0.75		mV/ $^{\circ}C$
Ripple Rejection	RR	$10V \leq V_I \leq 20V$, $f=120Hz$, $T_J=25^{\circ}C$	38	46		dB
Dropout Voltage	V_d	$T_J=25^{\circ}C$		1.7		V



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78L08 ELECTRICAL CHARACTERISTICS

(VI=14V, IO=40mA, 0<Tj<125°C, C1=0.33μF, Co=0.1μF, unless otherwise specified)(Note 1)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	Vo	Tj=25°C	7.7	8.0	8.3	V
		10.5V≤Vi≤23V, Io=1mA~40mA	7.6		8.4	V
		10.5V≤Vi≤VMAX, Io=1mA~70mA	7.6		8.4	V (note 2)
Output Voltage(note 3)	Vo	Tj=25°C	7.84	8.0	8.16	V
		10.5V≤Vi≤23V, Io=1mA~40mA	7.76		8.24	V
		10.5V≤Vi≤VMAX, Io=1mA~70mA	7.76		8.24	V (note 2)
Load Regulation	ΔVo	Tj=25°C, Io=1mA~100mA		15	80	mV
Line regulation	ΔVo	Tj=25°C, Io=1mA~70mA		8.0	40	mV
		10.5V≤Vi≤23V, Tj=25°C		10	175	mV
		11V≤Vi≤23V, Tj=25°C		8	125	mV
Quiescent Current	Iq			3.0	5.5	mA
Quiescent Current Change	ΔIq	11V≤Vi≤23V			1.5	mA
	ΔIq	1mA≤Vi≤40mA			0.1	mA
Output Noise Voltage	VN	10Hz≤f≤100kHz		49		μV
Temperature coefficient of Vo	ΔVo/ΔT	Io=5mA		0.75		mV/°C
Ripple Rejection	RR	11V≤Vi≤23V, f=120Hz, Tj=25°C	36	45		dB
Dropout Voltage	Vd	Tj=25°C		1.7		V



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78L09 ELECTRICAL CHARACTERISTICS

(VI=15V, Io=40mA, 0<Tj<125°C, C1=0.33μF, Co=0.1μF, unless otherwise specified)(Note 1)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	Vo	Tj=25°C	8.64	9.0	9.36	V
		11.5V≤Vi≤24V, Io=1mA~40mA	8.55		9.45	V
		11.5V≤Vi≤VMAX, Io=1mA~70mA	8.55		9.45	V (note 2)
Output Voltage(note 3)	Vo	Tj=25°C	8.82	9.0	9.18	V
		11.5V≤Vi≤24V, Io=1mA~40mA	8.73		9.27	V
		11.5V≤Vi≤VMAX, Io=1mA~70mA	8.73		9.27	V (note 2)
Load Regulation	ΔVo	Tj=25°C, Io=1mA~100mA		20	90	mV
		Tj=25°C, Io=1mA~40mA		10	45	mV
Line regulation	ΔVo	11.5V≤Vi≤24V, Tj=25°C		90	200	mV
		13V≤Vi≤24V, Tj=25°C		100	150	mV
Quiescent Current	Iq			3.0	5.5	mA
Quiescent Current Change	ΔIq	13V≤Vi≤24V			1.5	mA
	ΔIq	1mA≤Vi≤40mA			0.1	mA
Output Noise Voltage	VN	10Hz≤f≤100kHz		49		μV
Temperature coefficient of Vo	ΔVo/ΔT	Io=5mA		0.75		mV/°C
Ripple Rejection	RR	12V≤Vi≤23V, f=120Hz, Tj=25°C	36	44		dB
Dropout Voltage	Vd	Tj=25°C		1.7		V



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78L12 ELECTRICAL CHARACTERISTICS

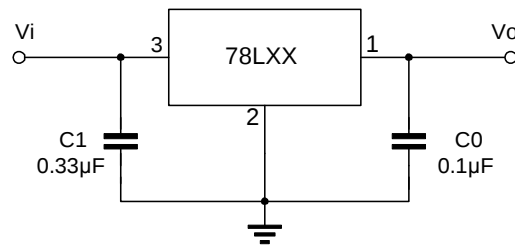
(VI=19V, IO=40mA, 0<Tj<125°C, C1=0.33μF, Co=0.1μF, unless otherwise specified)(Note 1)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	Vo	Tj=25°C	11.5	12	12.6	V
		14.5V≤Vi≤27V, Io=1mA~40mA	11.4		12.6	V
		14.5V≤Vi≤VMAX, Io=1mA~70mA	11.4		12.6	V (note 2)
Output Voltage(note 3)	Vo	Tj=25°C	11.76	12.0	12.24	V
		14.5V≤Vi≤27V, Io=1mA~40mA	11.64		12.36	V
		14.5V≤Vi≤VMAX, Io=1mA~70mA	11.64		12.36	V (note 2)
Load Regulation	ΔVo	Tj=25°C, Io=1mA~100mA		25	150	mV
		Tj=25°C, Io=1mA~40mA		12	75	mV
Line regulation	ΔVo	14.5V≤Vi≤27V, Tj=25°C		25	300	mV
		16V≤Vi≤27V, Tj=25°C		20	250	mV
Quiescent Current	Iq			3.0	5.5	mA
Quiescent Current Change	ΔIq	16V≤Vi≤27V			1.5	mA
	ΔIq	1mA≤Vi≤40mA			0.1	mA
Output Noise Voltage	VN	10Hz≤f≤100kHz		80		μV
Temperature coefficient of Vo	ΔVo/ΔT	Io=5mA		1.0		mV/°C
Ripple Rejection	RR	15V≤Vi≤25V, f=120Hz, Tj=25°C	36	42		dB
Dropout Voltage	Vd	Tj=25°C		1.7		V



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TYPICAL APPLICATION



Note 1: To specify an output voltage, substitute 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.



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Fig .1 78L05/12 Output Voltage vs Ambient Temperature

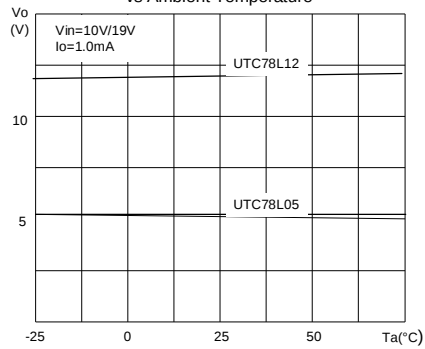


Fig 2 78L05/12 Quiescent Current vs Output Current

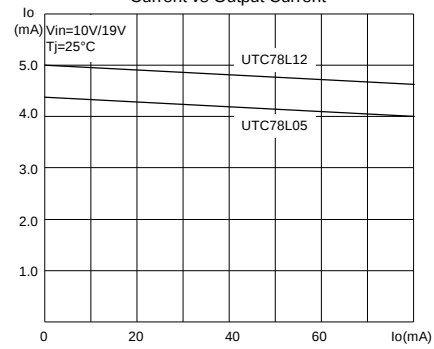


Fig.3 78L05 Quiescent Current vs Input

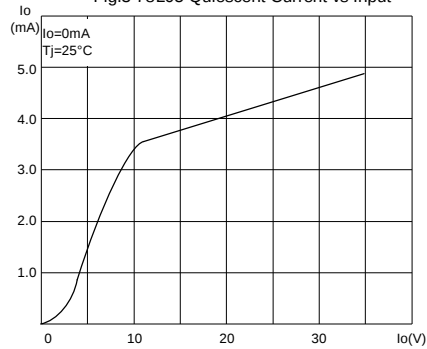


Fig.4 78L05/12/24 Thermal Shutdown

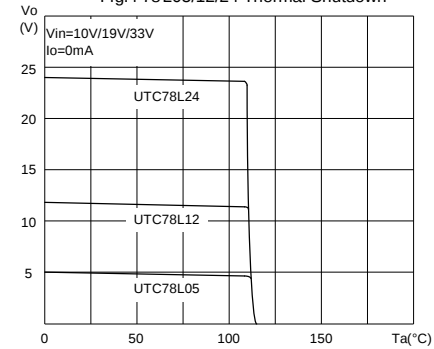


Fig.5 78 L05/12/24 Output Characteristics

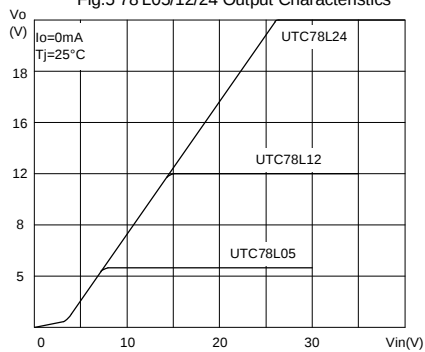
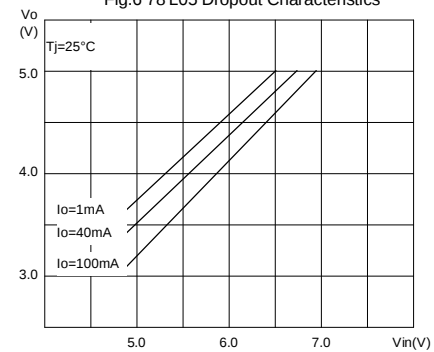


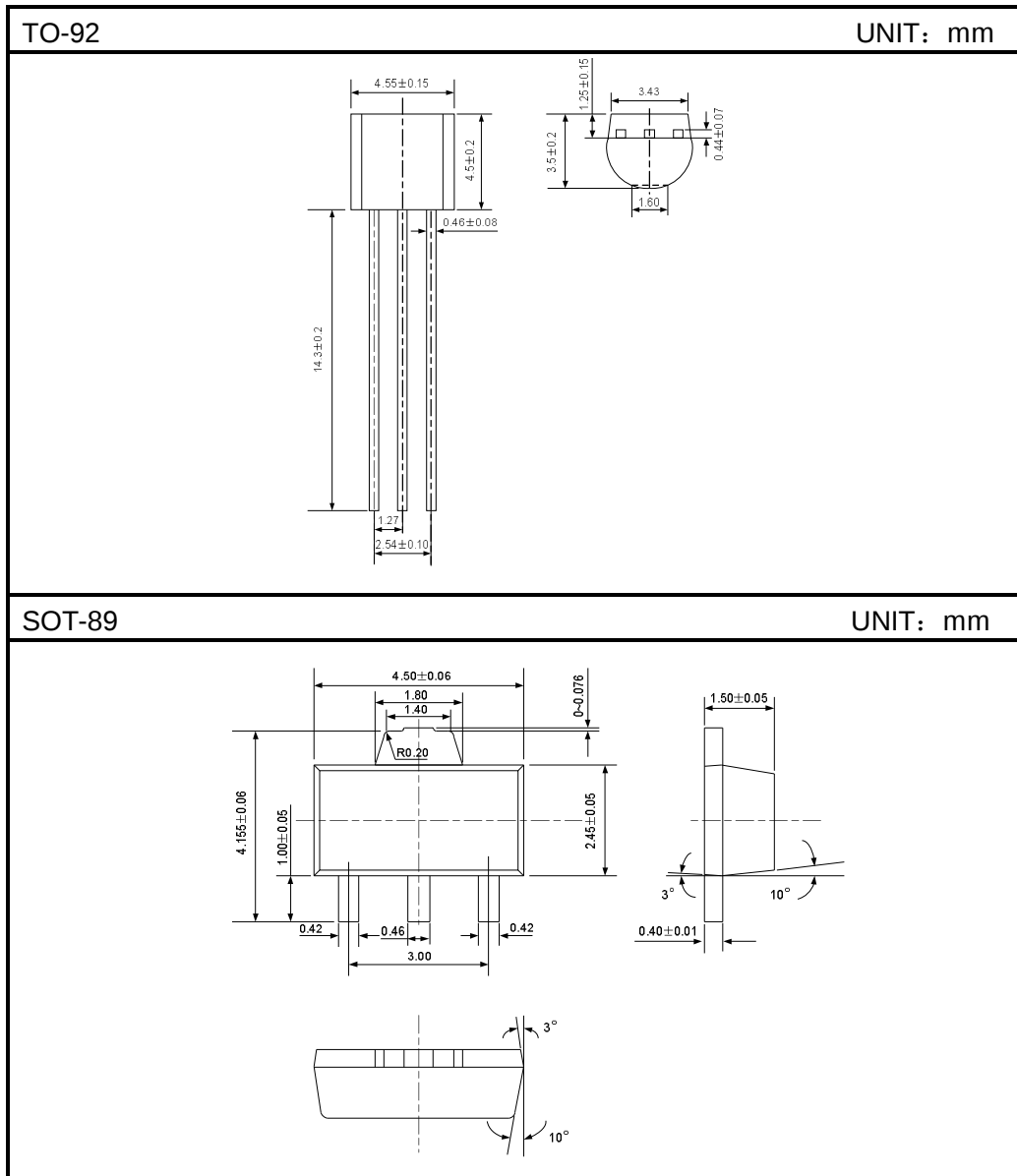
Fig.6 78 L05 Dropout Characteristics



PACKAGE OUTLINE



78LXX





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SOP-8

UNIT mm

