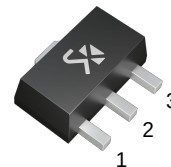


3-Terminal Positive Voltage Regulator

FEATURE

- Maximum output current of 100mA
- Output voltage of 4.4V/5V/6V/8V/9V/10V/12V/15V/18V
- Thermal overload protection
- Short circuit current limiting



1: OUT 2: GND 3: IN

SOT-89 PLASTIC PACKAGE

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

Characteristic		Symbol	Value	Unit
Input voltage	$V_{OUT}=4.4\sim10V$	V_{IN}	30	V
	$V_{OUT}=12\sim18V$		35	
Output Current		I_{OUT}	100	mA
Junction Temperature		T_J	+125	°C
Operating Temperature		T_{OPR}	-40~+125	°C
Storage Temperature Range		T_{STG}	-40~+150	°C

78L44K Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 10\text{ V}$, $I_O = 40\text{ mA}$, $C_1 = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J=25^\circ\text{C}$	4.22	4.4	4.58	V
		$6.4V \leq V_I \leq 19.4V, I_O=1\text{mA} \sim 40\text{mA}$	4.18		4.62	V
		$I_O=1\text{mA} \sim 70\text{mA}$	4.18		4.62	V (Note 1)
Load Regulation	ΔV_O	$T_J=25^\circ\text{C}, I_O=1\text{mA} \sim 100\text{mA}$		15	60	mV
		$T_J=25^\circ\text{C}, I_O=1\text{mA} \sim 40\text{mA}$		10	30	mV
Line regulation	ΔV_O	$7V \leq V_I \leq 20V, T_J=25^\circ\text{C}$		10	150	mV
		$8V \leq V_I \leq 20V, T_J=25^\circ\text{C}$		5	100	mV
Quiescent Current	I_q	$T_J=25^\circ\text{C}$		2.0	5.5	mA
Quiescent Current Change	ΔI_q	$8V \leq V_I \leq 20V$			1.5	mA
		$1\text{mA} \leq I_O \leq 40\text{mA}$			0.1	mA
Output Noise Voltage	V_N	$10\text{Hz} \leq f \leq 100\text{kHz}, T_J=25^\circ\text{C}$		40		μV
Temperature coefficient of V_O	$\Delta V_O / \Delta T$	$I_O=5\text{mA}$		0.65		mV/°C
Ripple Rejection	RR	$8V \leq V_I \leq 18V, f=120\text{Hz}, T_J=25^\circ\text{C}$	40	49		dB
Dropout Voltage	V_d			1.7		V

78L44K THRU 78L18K

78L05K Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 10\text{ V}$, $I_O = 40\text{ mA}$, $C_1 = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	4.8	5.0	5.2	V
		$7\text{ V} \leq V_I \leq 20\text{ V}, I_O = 1\text{ mA} \sim 40\text{ mA}$	4.75		5.25	V
		$I_O = 1\text{ mA} \sim 70\text{ mA}$	4.75		5.25	V (Note 1)
Load Regulation	ΔV_O	$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 100\text{ mA}$		15	60	mV
		$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 40\text{ mA}$		10	30	mV
Line regulation	ΔV_O	$7\text{ V} \leq V_I \leq 20\text{ V}, T_J = 25^\circ\text{C}$		10	150	mV
		$8\text{ V} \leq V_I \leq 20\text{ V}, T_J = 25^\circ\text{C}$		5	100	mV
Quiescent Current	I_q	$T_J = 25^\circ\text{C}$		2.0	5.5	mA
Quiescent Current Change	ΔI_q	$8\text{ V} \leq V_I \leq 20\text{ V}$			1.5	mA
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$			0.1	mA
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ kHz}, T_J = 25^\circ\text{C}$		40		μV
Temperature coefficient of V_O	$\Delta V_O / \Delta T$	$I_O = 5\text{ mA}$		0.65		$\text{mV}/^\circ\text{C}$
Ripple Rejection	RR	$8\text{ V} \leq V_I \leq 18\text{ V}, f = 120\text{ Hz}, T_J = 25^\circ\text{C}$	40	49		dB
Dropout Voltage	V_d			1.7		V

78L06K Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 12\text{ V}$, $I_O = 40\text{ mA}$, $C_1 = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	5.75	6.0	6.25	V
		$8\text{ V} \leq V_I \leq 21\text{ V}, I_O = 1\text{ mA} \sim 40\text{ mA}$	5.7		6.3	V
		$I_O = 1\text{ mA} \sim 70\text{ mA}$	5.7		6.3	V (Note 1)
Load Regulation	ΔV_O	$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 100\text{ mA}$		18	60	mV
		$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 40\text{ mA}$		12	30	mV
Line regulation	ΔV_O	$8.5\text{ V} \leq V_I \leq 20\text{ V}, T_J = 25^\circ\text{C}$		12	150	mV
		$9\text{ V} \leq V_I \leq 20\text{ V}, T_J = 25^\circ\text{C}$		6	100	mV
Quiescent Current	I_q	$T_J = 25^\circ\text{C}$		2.0	5.5	mA
Quiescent Current Change	ΔI_q	$9\text{ V} \leq V_I \leq 20\text{ V}$			1.5	mA
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$			0.1	mA
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ kHz}, T_J = 25^\circ\text{C}$		50		μV
Temperature coefficient of V_O	$\Delta V_O / \Delta T$	$I_O = 5\text{ mA}$		0.75		$\text{mV}/^\circ\text{C}$
Ripple Rejection	RR	$9\text{ V} \leq V_I \leq 20\text{ V}, f = 120\text{ Hz}, T_J = 25^\circ\text{C}$	38	46		dB
Dropout Voltage	V_d			1.7		V

78L44K THRU 78L18K

78L08K Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 14\text{ V}$, $I_O = 40\text{ mA}$, $C_1 = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	7.7	8.0	8.3	V
		$10\text{ V} \leq V_I \leq 23\text{ V}, I_O = 1\text{ mA} \sim 40\text{ mA}$	7.6		8.4	V
		$I_O = 1\text{ mA} \sim 70\text{ mA}$	7.6		8.4	V (Note 1)
Load Regulation	ΔV_O	$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 100\text{ mA}$		24	80	mV
		$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 40\text{ mA}$		16	40	mV
Line regulation	ΔV_O	$10.5\text{ V} \leq V_I \leq 23\text{ V}, T_J = 25^\circ\text{C}$		16	175	mV
		$11\text{ V} \leq V_I \leq 23\text{ V}, T_J = 25^\circ\text{C}$		8	125	mV
Quiescent Current	I_q	$T_J = 25^\circ\text{C}$		2.0	5.5	mA
Quiescent Current Change	ΔI_q	$11\text{ V} \leq V_I \leq 23\text{ V}$			1.5	mA
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$			0.1	mA
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ kHz}, T_J = 25^\circ\text{C}$		60		μV
Temperature coefficient of V_O	$\Delta V_O / \Delta T$	$I_O = 5\text{ mA}$		0.8		$\text{mV}/^\circ\text{C}$
Ripple Rejection	RR	$12\text{ V} \leq V_I \leq 23\text{ V}, f = 120\text{ Hz}, T_J = 25^\circ\text{C}$	36	45		dB
Dropout Voltage	V_d			1.7		V

78L09K Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 15\text{ V}$, $I_O = 40\text{ mA}$, $C_1 = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	8.64	9.0	9.36	V
		$11\text{ V} \leq V_I \leq 24\text{ V}, I_O = 1\text{ mA} \sim 40\text{ mA}$	8.55		9.45	V
		$I_O = 1\text{ mA} \sim 70\text{ mA}$	8.55		9.45	V (Note 1)
Load Regulation	ΔV_O	$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 100\text{ mA}$		27	80	mV
		$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 40\text{ mA}$		18	40	mV
Line regulation	ΔV_O	$11.5\text{ V} \leq V_I \leq 23\text{ V}, T_J = 25^\circ\text{C}$		18	225	mV
		$12\text{ V} \leq V_I \leq 23\text{ V}, T_J = 25^\circ\text{C}$		9	150	mV
Quiescent Current	I_q	$T_J = 25^\circ\text{C}$		2.0	5.5	mA
Quiescent Current Change	ΔI_q	$12\text{ V} \leq V_I \leq 23\text{ V}$			1.5	mA
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$			0.1	mA
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ kHz}, T_J = 25^\circ\text{C}$		70		μV
Temperature coefficient of V_O	$\Delta V_O / \Delta T$	$I_O = 5\text{ mA}$		0.85		$\text{mV}/^\circ\text{C}$
Ripple Rejection	RR	$12\text{ V} \leq V_I \leq 23\text{ V}, f = 120\text{ Hz}, T_J = 25^\circ\text{C}$	36	44		dB
Dropout Voltage	V_d			1.7		V

78L44K THRU 78L18K

78L10K Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 16\text{ V}$, $I_O = 40\text{ mA}$, $C_1 = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	9.6	10.0	10.4	V
		$12\text{ V} \leq V_I \leq 25\text{ V}, I_O = 1\text{ mA} \sim 40\text{ mA}$	9.5		10.5	V
		$I_O = 1\text{ mA} \sim 70\text{ mA}$	9.5		10.5	V (Note 1)
Load Regulation	ΔV_O	$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 100\text{ mA}$		30	90	mV
		$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 40\text{ mA}$		20	45	mV
Line regulation	ΔV_O	$12.5\text{ V} \leq V_I \leq 23\text{ V}, T_J = 25^\circ\text{C}$		20	230	mV
		$13\text{ V} \leq V_I \leq 23\text{ V}, T_J = 25^\circ\text{C}$		10	170	mV
Quiescent Current	I_q	$T_J = 25^\circ\text{C}$		2.0	5.5	mA
Quiescent Current Change	ΔI_q	$13\text{ V} \leq V_I \leq 23\text{ V}$			1.5	mA
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$			0.1	mA
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ kHz}, T_J = 25^\circ\text{C}$		60		μV
Temperature coefficient of V_O	$\Delta V_O / \Delta T$	$I_O = 5\text{ mA}$		0.9		$\text{mV}/^\circ\text{C}$
Ripple Rejection	RR	$14\text{ V} \leq V_I \leq 23\text{ V}, f = 120\text{ Hz}, T_J = 25^\circ\text{C}$	36	45		dB
Dropout Voltage	V_d			1.7		V

78L12K Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 19\text{ V}$, $I_O = 40\text{ mA}$, $C_1 = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	11.5	12	12.6	V
		$14\text{ V} \leq V_I \leq 27\text{ V}, I_O = 1\text{ mA} \sim 40\text{ mA}$	11.4		12.6	V
		$I_O = 1\text{ mA} \sim 70\text{ mA}$	11.4		12.6	V (Note 1)
Load Regulation	ΔV_O	$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 100\text{ mA}$		36	100	mV
		$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 40\text{ mA}$		24	50	mV
Line regulation	ΔV_O	$14.5\text{ V} \leq V_I \leq 27\text{ V}, T_J = 25^\circ\text{C}$		24	250	mV
		$16\text{ V} \leq V_I \leq 27\text{ V}, T_J = 25^\circ\text{C}$		12	200	mV
Quiescent Current	I_q	$T_J = 25^\circ\text{C}$		2.0	5.5	mA
Quiescent Current Change	ΔI_q	$16\text{ V} \leq V_I \leq 27\text{ V}$			1.5	mA
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$			0.1	mA
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ kHz}, T_J = 25^\circ\text{C}$		80		μV
Temperature coefficient of V_O	$\Delta V_O / \Delta T$	$I_O = 5\text{ mA}$		1.0		$\text{mV}/^\circ\text{C}$
Ripple Rejection	RR	$15\text{ V} \leq V_I \leq 25\text{ V}, f = 120\text{ Hz}, T_J = 25^\circ\text{C}$	36	42		dB
Dropout Voltage	V_d			1.7		V

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78L15K Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 23\text{ V}$, $I_O = 40\text{ mA}$, $C_1 = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

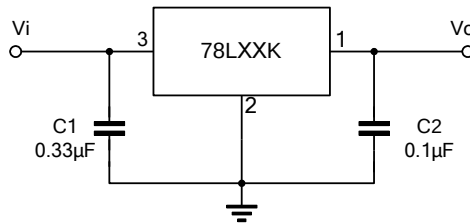
Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	14.4	15	15.6	V
		$17\text{ V} \leq V_I \leq 30\text{ V}, I_O = 1\text{ mA} \sim 40\text{ mA}$	14.25		15.75	V
		$I_O = 1\text{ mA} \sim 70\text{ mA}$	14.25		15.75	V (Note 1)
Load Regulation	ΔV_O	$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 100\text{ mA}$		45	150	mV
		$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 40\text{ mA}$		30	75	mV
Line regulation	ΔV_O	$17.5\text{ V} \leq V_I \leq 30\text{ V}, T_J = 25^\circ\text{C}$		30	300	mV
		$20\text{ V} \leq V_I \leq 30\text{ V}, T_J = 25^\circ\text{C}$		15	250	mV
Quiescent Current	I_q	$T_J = 25^\circ\text{C}$		2.2	6.0	mA
Quiescent Current Change	ΔI_q	$20\text{ V} \leq V_I \leq 30\text{ V}$			1.5	mA
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$			0.1	mA
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ kHz}, T_J = 25^\circ\text{C}$		90		μV
Temperature coefficient of V_O	$\Delta V_O / \Delta T$	$I_O = 5\text{ mA}$		1.3		$\text{mV}/^\circ\text{C}$
Ripple Rejection	RR	$18.5\text{ V} \leq V_I \leq 28.5\text{ V}, f = 120\text{ Hz}, T_J = 25^\circ\text{C}$	33	39		dB
Dropout Voltage	V_d			1.7		V

78L18K Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 26\text{ V}$, $I_O = 40\text{ mA}$, $C_1 = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

Characteristic	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	17.3	18	18.7	V
		$20\text{ V} \leq V_I \leq 33\text{ V}, I_O = 1\text{ mA} \sim 40\text{ mA}$	17.1		18.9	V
		$I_O = 1\text{ mA} \sim 70\text{ mA}$	17.1		18.9	V (Note 1)
Load Regulation	ΔV_O	$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 100\text{ mA}$		27	180	mV
		$T_J = 25^\circ\text{C}, I_O = 1\text{ mA} \sim 40\text{ mA}$		19	90	mV
Line regulation	ΔV_O	$20.5\text{ V} \leq V_I \leq 33\text{ V}, T_J = 25^\circ\text{C}$		70	360	mV
		$22\text{ V} \leq V_I \leq 33\text{ V}, T_J = 25^\circ\text{C}$		64	300	mV
Quiescent Current	I_q	$T_J = 25^\circ\text{C}$		4.7	6.5	mA
Quiescent Current Change	ΔI_q	$22\text{ V} \leq V_I \leq 33\text{ V}$			1.5	mA
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$			0.1	mA
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ kHz}, T_J = 25^\circ\text{C}$		90		μV
Temperature coefficient of V_O	$\Delta V_O / \Delta T$	$I_O = 5\text{ mA}$		1.3		$\text{mV}/^\circ\text{C}$
Ripple Rejection	RR	$21.5\text{ V} \leq V_I \leq 31.5\text{ V}, f = 120\text{ Hz}, T_J = 25^\circ\text{C}$	32	36		dB
Dropout Voltage	V_d			1.7		V

Note 1: Power dissipation $< 0.75\text{ W}$.

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.

TYPICAL PERFORMANCE CHARACTERISTICS

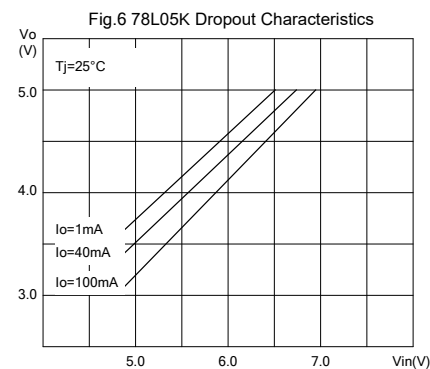
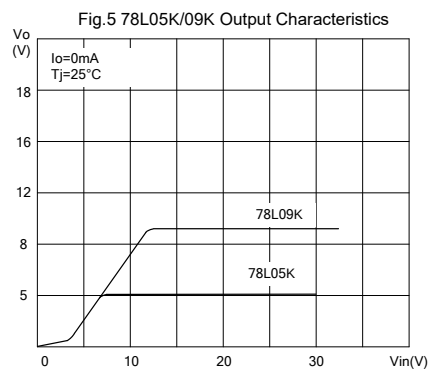
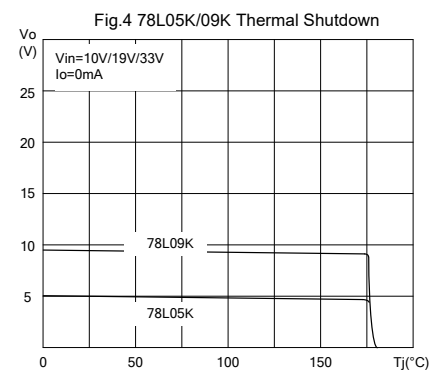
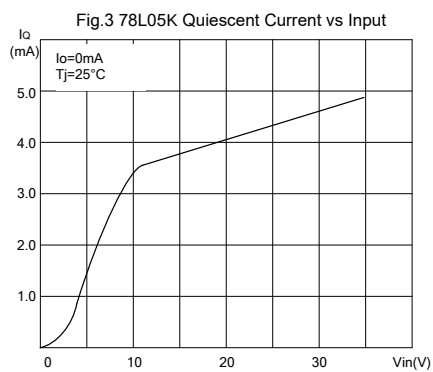
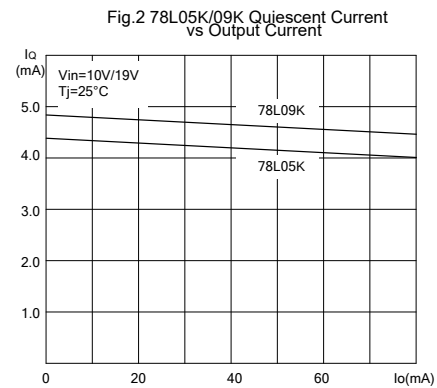
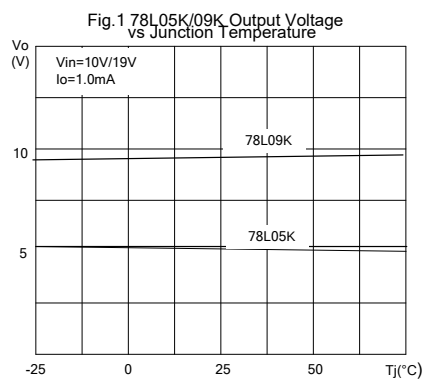


Fig.7 Dropout Characteristics

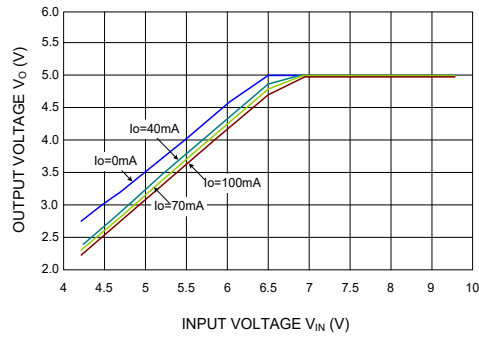
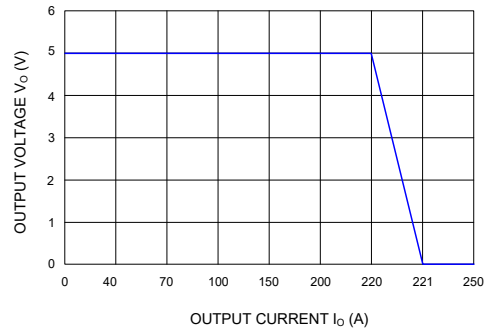


Fig.8 Current Cut-off Grid Voltage



SOT-89 PACKAGE OUTLINE

Unit: mm

