

78LXX

功能说明

78LXX 一款固定输出的线性三端稳压电路，具有宽的输入电压范围。内置基准电压电路、过压保护、过流保护、过温度保护，实现电路的可靠工作。输出级具有较低的输出阻抗，输出电流可达 100mA。芯片具有较低的静态电流。封装采用 SOT89-3L、SOT23-3L 或者 TO-92 形式封装。

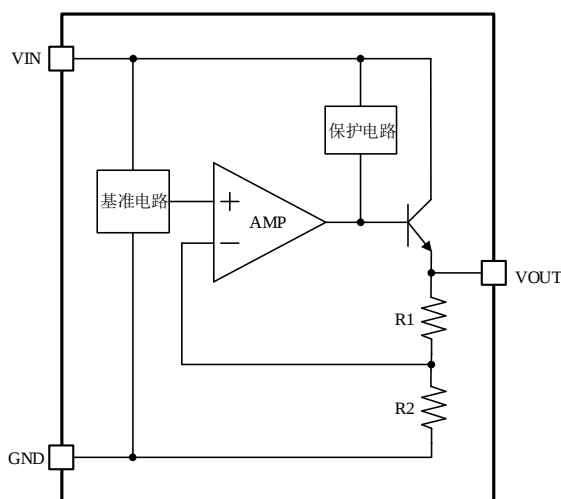
主要特性

- ✧ 采用 50V 工艺平台制造
- ✧ 输出电压可以是固定的 3.3V, 5V, 6V, 9V, 12V, 15V
- ✧ 宽输入电压范围：7-35V（40V）输入
- ✧ 低静态工作电流：典型值 2.3mA@10V
- ✧ 全电压、全电流、全温下输出电压冗余范围±5%。
- ✧ 稳定输出电流达 100mA
- ✧ 内建过温保护、过压保护、过流保护

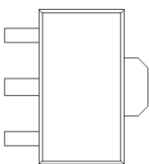
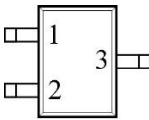
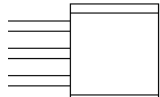
应用范围

- ✧ 仪器仪表
- ✧ 主板电源
- ✧ 多路电源系统
- ✧ 设备电源模块

内部模块图



外形及 PIN 脚

	SOT-89-3L			SOT-23-3L			TO-92	
VOUT			VOUT			VOUT		
GND					GND	GND		
VIN			IN			VIN		

极限参数

描述 (Description)	符号 (Symbol)		参数 (Value range)	单位 (Unit)
输入电压范围	V_{IN}		-0.3~35($V_{out} < 10V$)	V
输入电压范围	V_{IN}		-0.3~40($V_{out} > 10V$)	V
最大结温	T_J		150	°C
最大功耗	P_D	SOT89-3L	630	mW
		SOT23-3L	400	
		TO-92	630	
热阻(结到环境)	$R_{\theta JA}$	SOT89-3L	160	°C/W
		SOT23-3L	250	
		TO-92	160	
工作温度范围	T_A		-40 ~ 85	°C
存储温度范围	T_{stg}		-55~150	°C

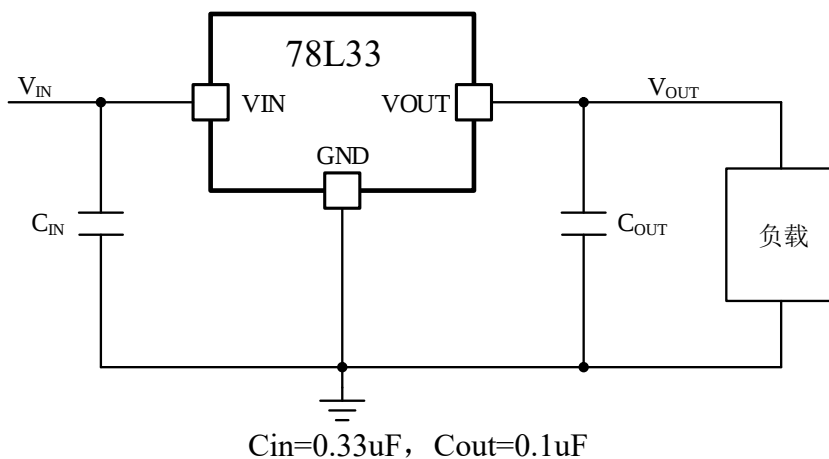
以上表格参数代表电路能够承受的极限范围。达到或者超过这个参数，电路不能正常工作，并且很大可能会损坏。并且长期工作在临界极限参数，也是会大大增加损坏的几率的。

电气参数 (除特别说明外, $T_J = +25^{\circ}\text{C}$)

78L33

特性 (Characteristic)	符号 (Symbol)	测试条件 (Test Conditions)	最小值 (Min.)	典型值 (Typ.)	最大值 (Max.)	单位 (Units)
输出电压	V_O	$V_{IN} = 10\text{V}, I_O = 40\text{mA}$	3.2	3.3	3.4	V
		$5.5\text{V} < V_{IN} < 25\text{V}$ $1\text{mA} < I_O < 40\text{mA}$	3.168		3.432	
		$1\text{mA} < I_O < 100\text{mA}$	3.135		3.465	
线性调整率	ΔV_O	$5.5\text{V} < V_{IN} < 25\text{V}, I_O = 10\text{mA}$		18	75	mV
		$7\text{V} < V_{IN} < 25\text{V}, I_O = 10\text{mA}$		10	55	
负载调整率	ΔV_O	$V_{IN} = 6.5\text{V}, 1\text{mA} < I_O < 100\text{mA}$		20	50	mV
		$V_{IN} = 6.5\text{V}, 1\text{mA} < I_O < 40\text{mA}$		5	30	
静态电流	I_Q	$V_{IN} = 6.5\text{V}, I_O = 0\text{mA}$		2.3	5	mA
静态电流变化	ΔI_Q	$6\text{V} < V_{IN} < 25\text{V}$		0.3	1.0	mA
		$1\text{mA} < I_O < 40\text{mA}$			1.0	
输出噪声电压	V_n	$f = 10\text{Hz to } 100\text{KHz}$		40		μV
电源抑制比	PSRR	$f = 100\text{Hz}, 6\text{V} < V_{IN} < 16\text{V}$	47	62		dB
峰值输出电流	I_{PK}	$V_{IN} = 6.5\text{V}$		300		mA
电压温度系数	V_{TC}	$I_O = 10\text{mA}$		0.4		$\text{mV}/^{\circ}\text{C}$
低压差	V_{Drop}	$I_O = 100\text{mA}$		1.75	2	V
		$I_O = 200\text{mA}$		1.95	2.1	
最小输入电压	$V_{IN,MIN}$	$I_O = 10\text{mA}$		5.5	6	V
过压保护阈值	$V_{IN,MAX}$	$I_O = 10\text{mA}$		36		V

典型应用



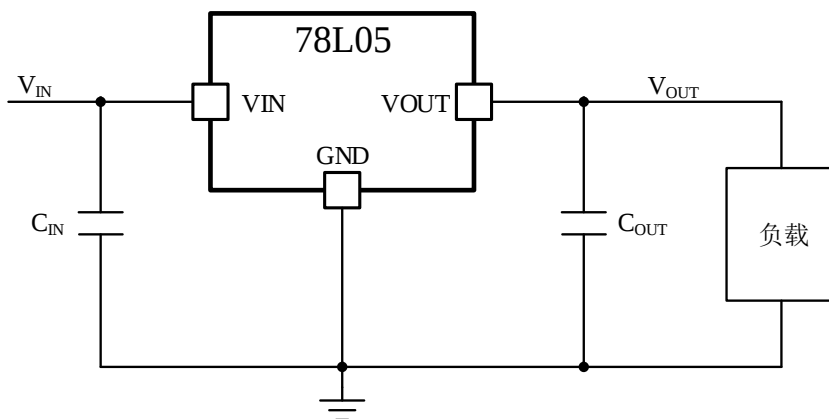
输出 3.3V 典型应用电路

电气参数 (除特别说明外, $T_J = +25^{\circ}\text{C}$)

78L05

特性 (Characteristic)	符号 (Symbol)	测试条件 (Test Conditions)	最小值 (Min.)	典型值 (Typ.)	最大值 (Max.)	单位 (Units)
输出电压	V_O	$V_{IN} = 10\text{V}, I_O = 40\text{mA}$	4.85	5.0	5.15	V
		$7\text{V} < V_{IN} < 25\text{V}$ $1\text{mA} < I_O < 40\text{mA}$	4.8		5.2	
		$1\text{mA} < I_O < 100\text{mA}$	4.75		5.25	
线性调整率	ΔV_O	$7\text{V} < V_{IN} < 25\text{V}, I_O = 10\text{mA}$		18	100	mV
		$8\text{V} < V_{IN} < 25\text{V}, I_O = 10\text{mA}$		10	70	
负载调整率	ΔV_O	$V_{IN} = 8\text{V}, 1\text{mA} < I_O < 100\text{mA}$		20	60	mV
		$V_{IN} = 8\text{V}, 1\text{mA} < I_O < 40\text{mA}$		5	30	
静态电流	I_Q	$V_{IN} = 7\text{V}, I_O = 0\text{mA}$		2.3	5	mA
静态电流变化	ΔI_Q	$8\text{V} < V_{IN} < 25\text{V}$		0.3	1.0	mA
		$1\text{mA} < I_O < 40\text{mA}$			1.0	
输出噪声电压	V_n	$f = 10\text{Hz to } 100\text{KHz}$		40		μV
电源抑制比	PSRR	$f = 100\text{Hz}, 8\text{V} < V_{IN} < 16\text{V}$	47	62		dB
峰值输出电流	I_{PK}	$V_{IN} = 8\text{V}$		300		mA
电压温度系数	V_{TC}	$I_O = 10\text{mA}$		0.5		$\text{mV}/^{\circ}\text{C}$
低压差	V_{Drop}	$I_O = 100\text{mA}$		1.75	2	V
		$I_O = 200\text{mA}$		1.95	2.1	
最小输入电压	$V_{IN,MIN}$	$I_O = 10\text{mA}$		6.8	7	V
过压保护阈值	$V_{IN,MAX}$	$I_O = 10\text{mA}$		38		V

典型应用



$C_{in} = 0.33\mu\text{F}$, $C_{out} = 0.1\mu\text{F}$

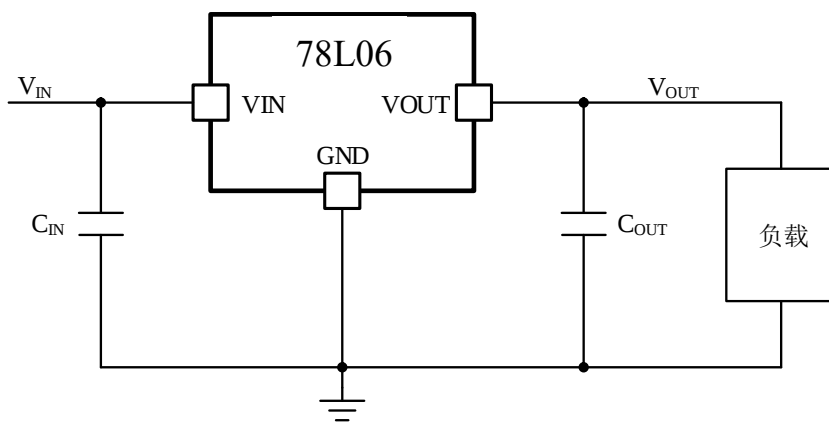
输出 5V 典型应用电路

电气参数 (除特别说明外, $T_J = +25^{\circ}\text{C}$)

78L06

特性 (Characteristic)	符号 (Symbol)	测试条件 (Test Conditions)	最小值 (Min.)	典型值 (Typ.)	最大值 (Max.)	单位 (Units)
输出电压	V_O	$V_{IN} = 10\text{V}, I_O = 40\text{mA}$	5.82	6.0	6.18	V
		$8\text{V} < V_{IN} < 25\text{V}$ $1\text{mA} < I_O < 40\text{mA}$	5.76		6.24	
		$1\text{mA} < I_O < 100\text{mA}$	5.7		6.3	
线性调整率	ΔV_O	$8\text{V} < V_{IN} < 25\text{V}, I_O = 10\text{mA}$		18	100	mV
		$9\text{V} < V_{IN} < 25\text{V}, I_O = 10\text{mA}$		10	70	
负载调整率	ΔV_O	$V_{IN} = 9\text{V}, 1\text{mA} < I_O < 100\text{mA}$		20	60	mV
		$V_{IN} = 9\text{V}, 1\text{mA} < I_O < 40\text{mA}$		5	30	
静态电流	I_Q	$V_{IN} = 8\text{V}, I_O = 0\text{mA}$		2.3	5	mA
静态电流变化	ΔI_Q	$9\text{V} < V_{IN} < 25\text{V}$		0.3	1.0	mA
		$1\text{mA} < I_O < 40\text{mA}$			1.0	
输出噪声电压	V_n	$f = 10\text{Hz to } 100\text{KHz}$		40		μV
电源抑制比	PSRR	$f = 100\text{Hz}, 9\text{V} < V_{IN} < 16\text{V}$	47	62		dB
峰值输出电流	I_{PK}	$V_{IN} = 9\text{V}$		300		mA
电压温度系数	V_{TC}	$I_O = 10\text{mA}$		0.5		$\text{mV}/^{\circ}\text{C}$
低压差	V_{Drop}	$I_O = 100\text{mA}$		1.75	2	V
		$I_O = 200\text{mA}$		1.95	2.1	
最小输入电压	$V_{IN,MIN}$	$I_O = 10\text{mA}$		7.8	8	V
过压保护阈值	$V_{IN,MAX}$	$I_O = 10\text{mA}$		39		V

典型应用



$C_{in} = 0.33\mu\text{F}$, $C_{out} = 0.1\mu\text{F}$

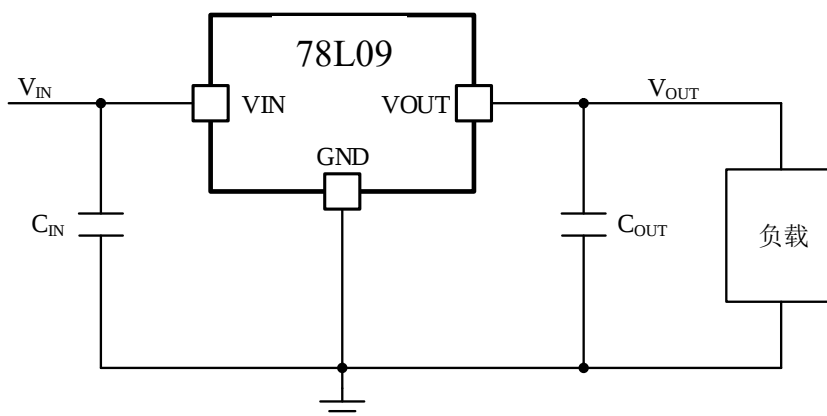
输出 6V 典型应用电路

电气参数 (除特别说明外, $T_J = +25^{\circ}\text{C}$)

78L09

特性 (Characteristic)	符号 (Symbol)	测试条件 (Test Conditions)	最小值 (Min.)	典型值 (Typ.)	最大值 (Max.)	单位 (Units)
输出电压	V_O	$V_{IN} = 12\text{V}, I_O = 40\text{mA}$	8.73	9.0	9.27	V
		$11\text{V} < V_{IN} < 25\text{V}$ $1\text{mA} < I_O < 40\text{mA}$	8.55		9.45	
		$1\text{mA} < I_O < 100\text{mA}$	8.55		9.45	
线性调整率	ΔV_O	$11\text{V} < V_{IN} < 25\text{V}, I_O = 10\text{mA}$		25	150	mV
		$12\text{V} < V_{IN} < 25\text{V}, I_O = 10\text{mA}$		15	100	
负载调整率	ΔV_O	$V_{IN} = 12\text{V}, 1\text{mA} < I_O < 100\text{mA}$		30	100	mV
		$V_{IN} = 12\text{V}, 1\text{mA} < I_O < 40\text{mA}$		8	50	
静态电流	I_Q	$V_{IN} = 11\text{V}, I_O = 0\text{mA}$		2.3	5	mA
静态电流变化	ΔI_Q	$12\text{V} < V_{IN} < 25\text{V}$		0.3	1.0	mA
		$1\text{mA} < I_O < 40\text{mA}$			1.0	
输出噪声电压	V_n	$f = 10\text{Hz to } 100\text{KHz}$		70		μV
电源抑制比	PSRR	$f = 100\text{Hz}, 15\text{V} < V_{IN} < 25\text{V}$	40	56		dB
峰值输出电流	I_{PK}	$V_{IN} = 12\text{V}$		300		mA
电压温度系数	V_{TC}	$I_O = 10\text{mA}$		0.8		$\text{mV}/^{\circ}\text{C}$
低压差	V_{Drop}	$I_O = 100\text{mA}$		1.75	2	V
		$I_O = 200\text{mA}$		1.95	2.1	
最小输入电压	$V_{IN,MIN}$	$I_O = 10\text{mA}$		10.8	11	V
过压保护阈值	$V_{IN,MAX}$	$I_O = 10\text{mA}$		42		V

典型应用



$C_{in} = 0.33\mu\text{F}$, $C_{out} = 0.1\mu\text{F}$

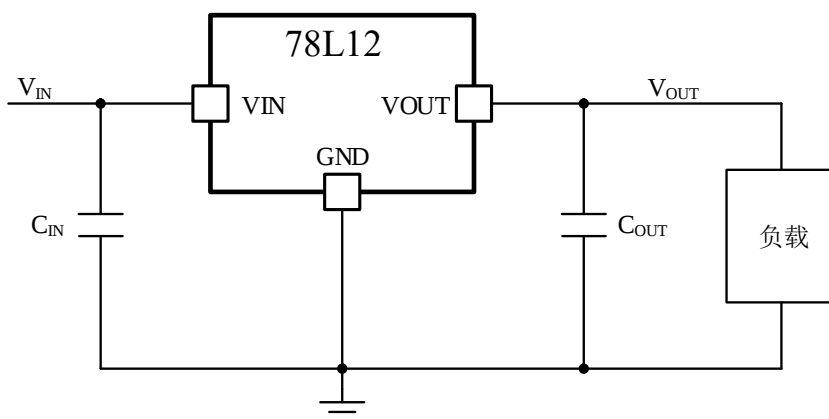
输出 9V 典型应用电路

电气参数 (除特别说明外, $T_J = +25^{\circ}\text{C}$)

78L12

特性 (Characteristic)	符号 (Symbol)	测试条件 (Test Conditions)	最小值 (Min.)	典型值 (Typ.)	最大值 (Max.)	单位 (Units)
输出电压	V_O	$V_{IN} = 15\text{V}, I_O = 40\text{mA}$	11.64	12.0	12.36	V
		$14\text{V} < V_{IN} < 27\text{V}$ $1\text{mA} < I_O < 40\text{mA}$	11.4		12.6	
		$1\text{mA} < I_O < 100\text{mA}$	11.4		12.6	
线性调整率	ΔV_O	$14\text{V} < V_{IN} < 27\text{V}, I_O = 10\text{mA}$		30	180	mV
		$15\text{V} < V_{IN} < 27\text{V}, I_O = 10\text{mA}$		20	110	
负载调整率	ΔV_O	$V_{IN} = 15\text{V}, 1\text{mA} < I_O < 100\text{mA}$		30	100	mV
		$V_{IN} = 15\text{V}, 1\text{mA} < I_O < 40\text{mA}$		10	50	
静态电流	I_Q	$V_{IN} = 14\text{V}, I_O = 0\text{mA}$		2.1	5	mA
静态电流变化	ΔI_Q	$15\text{V} < V_{IN} < 27\text{V}$		0.1	1.0	mA
		$1\text{mA} < I_O < 40\text{mA}$			1.0	
输出噪声电压	V_n	$f = 10\text{Hz to } 100\text{KHz}$		80		μV
电源抑制比	PSRR	$f = 100\text{Hz}, 15\text{V} < V_{IN} < 25\text{V}$	40	54		dB
峰值输出电流	I_{PK}	$V_{IN} = 15\text{V}$		300		mA
电压温度系数	V_{TC}	$I_O = 10\text{mA}$		1.0		$\text{mV}/^{\circ}\text{C}$
低压差	V_{Drop}	$I_O = 100\text{mA}$		1.75	2	V
		$I_O = 200\text{mA}$		1.95	2.1	
最小输入电压	$V_{IN,MIN}$	$V_{ILO} = 10\text{mA}$		13.8	14	V
过压保护阈值	$V_{IN,MAX}$	$I_O = 10\text{mA}$		43		V

典型应用



$C_{in} = 0.33\mu\text{F}$, $C_{out} = 0.1\mu\text{F}$

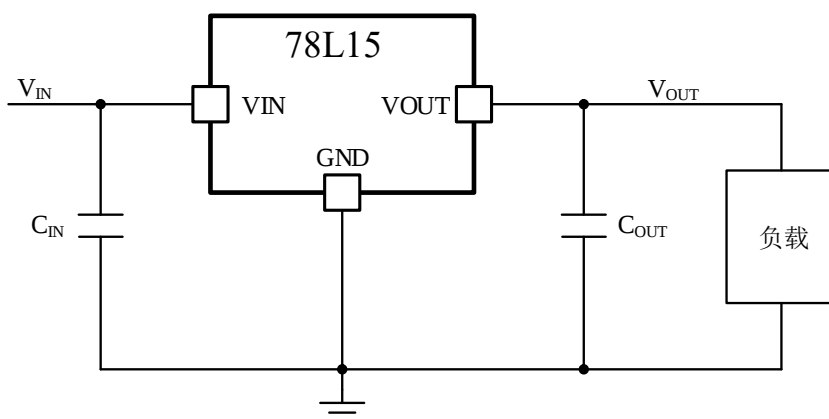
输出 12V 典型应用电路

电气参数 (除特别说明外, $T_J = +25^{\circ}\text{C}$)

78L15

特性 (Characteristic)	符号 (Symbol)	测试条件 (Test Conditions)	最小值 (Min.)	典型值 (Typ.)	最大值 (Max.)	单位 (Units)
输出电压	V_O	$V_{IN} = 18\text{V}, I_O = 40\text{mA}$	14.55	15.0	15.45	V
		$17\text{V} < V_{IN} < 30\text{V}$ $1\text{mA} < I_O < 40\text{mA}$	14.4		15.6	
		$1\text{mA} < I_O < 100\text{mA}$	14.25		15.75	
线性调整率	ΔV_O	$17\text{V} < V_{IN} < 30\text{V}, I_O = 10\text{mA}$		50	250	mV
		$18\text{V} < V_{IN} < 30\text{V}, I_O = 10\text{mA}$		35	180	
负载调整率	ΔV_O	$V_{IN} = 18\text{V}, 1\text{mA} < I_O < 100\text{mA}$		30	150	mV
		$V_{IN} = 18\text{V}, 1\text{mA} < I_O < 40\text{mA}$		15	75	
静态电流	I_Q	$V_{IN} = 17\text{V}, I_O = 0\text{mA}$		2.1	5	mA
静态电流变化	ΔI_Q	$18\text{V} < V_{IN} < 30\text{V}$		0.1	1.0	mA
		$1\text{mA} < I_O < 40\text{mA}$			1.0	
输出噪声电压	V_n	$f = 10\text{Hz to } 100\text{KHz}$		85		μV
电源抑制比	PSRR	$f = 100\text{Hz}, 18\text{V} < V_{IN} < 28\text{V}$	35	40		dB
峰值输出电流	I_{PK}	$V_{IN} = 18\text{V}$		300		mA
电压温度系数	V_{TC}	$I_O = 10\text{mA}$		1.2		$\text{mV}/^{\circ}\text{C}$
低压差	V_{Drop}	$I_O = 100\text{mA}$		1.75	2	V
		$I_O = 200\text{mA}$		1.95	2.1	
最小输入电压	$V_{IN,MIN}$	$I_O = 10\text{mA}$		16.8	17	V
过压保护阈值	$V_{IN,MAX}$	$I_O = 10\text{mA}$		43		V

典型应用



$C_{in} = 0.33\mu\text{F}$, $C_{out} = 0.1\mu\text{F}$

输出 12V 典型应用电路

78L05 典型特性 ($C_{IN}=220nF$, $C_{OUT}=100nF$)

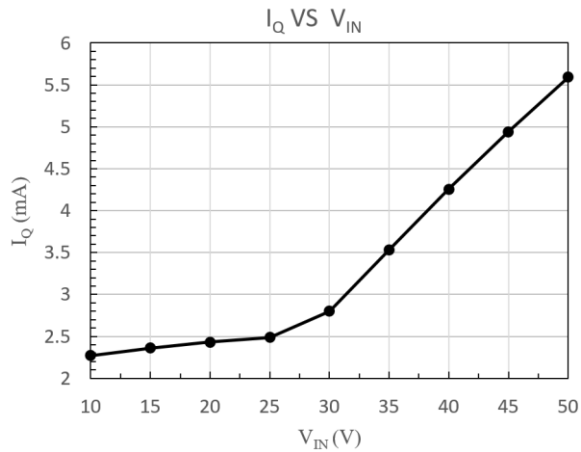


图 1 静态电流随输入电压变化

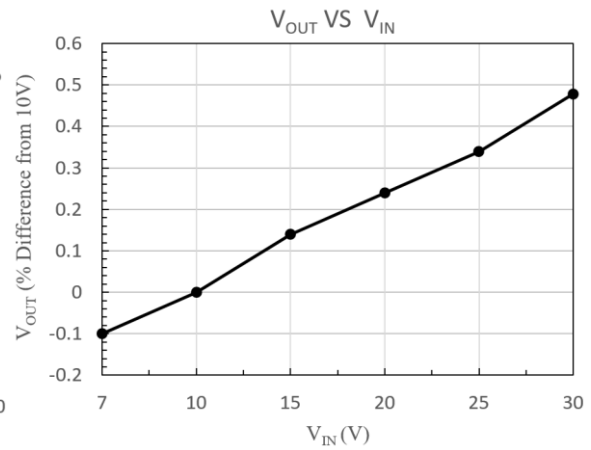


图 2 输出电压随输入电压变化($I_O=10mA$)

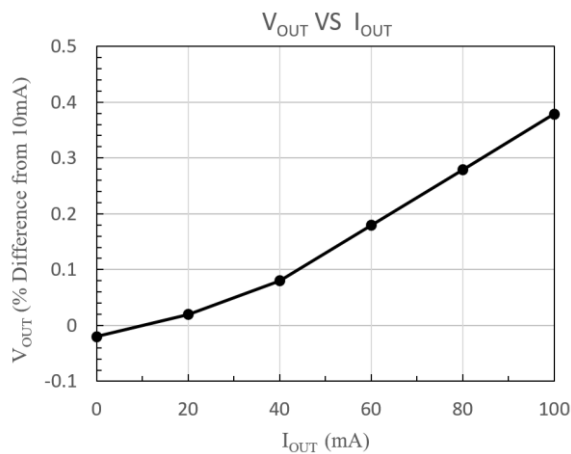


图 3 输出电压随负载电流变化($V_{IN}=8V$)

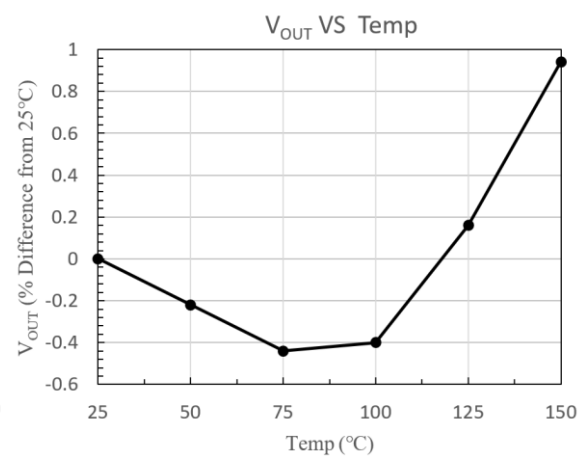
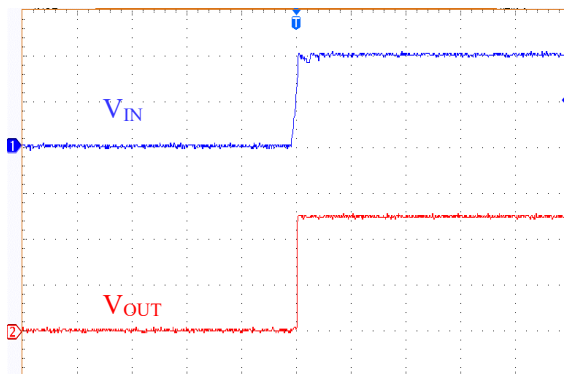


图 4 输出电压随温度变化($V_{IN}=10V$, $I_{OUT}=10mA$)

Power Up Response

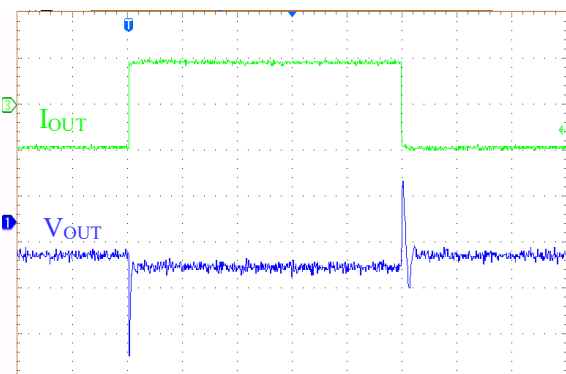


CH1: V_{IN} (5V/DIV) CH2: V_{OUT} (2V/DIV)

$I_{OUT}=10mA$, $V_{IN}=0V-10V$ 上电

图 5 电源上电瞬态响应

Load Transient Response



CH1: V_{OUT} (50mV/DIV) CH3: I_{OUT} (50mA/DIV)

$V_{IN}=10V$, $I_{OUT}=10mA-100mA$ 改变

图 6 负载变化瞬态响应

78L06 典型特性 ($C_{IN}=220nF$, $C_{OUT}=100nF$)

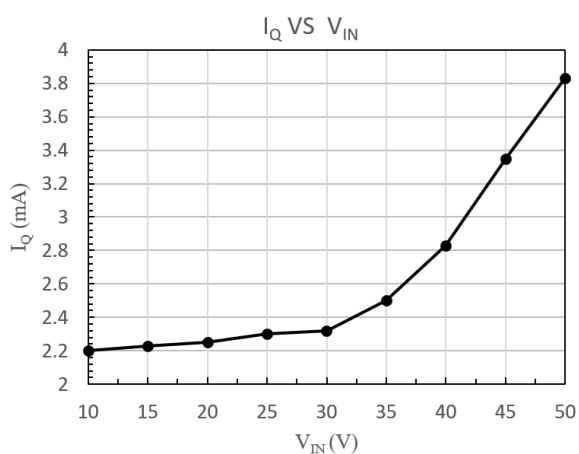


图 1 静态电流随输入电压变化

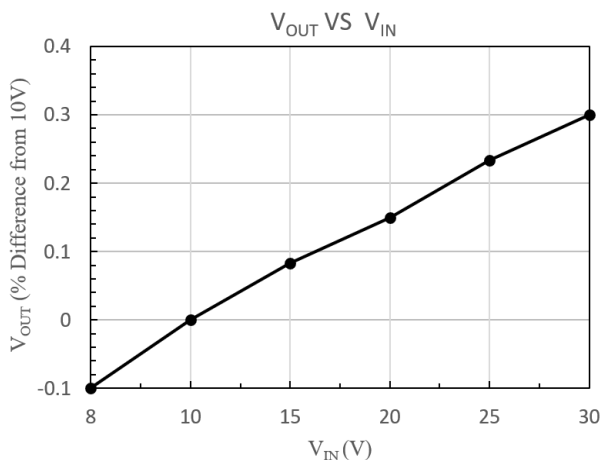


图 2 输出电压随输入电压变化($I_O=10mA$)

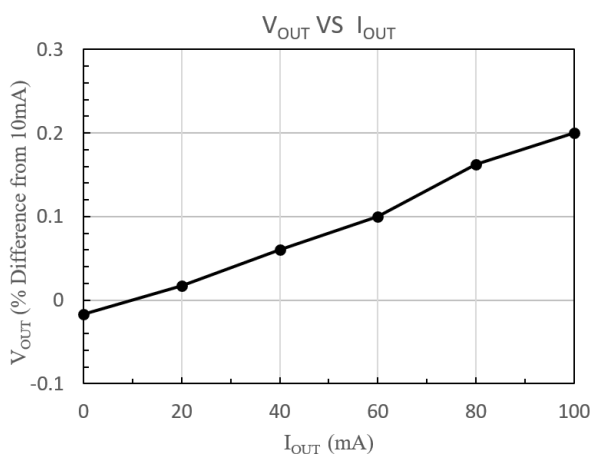


图 3 输出电压随负载电流变化($V_{IN}=9V$)

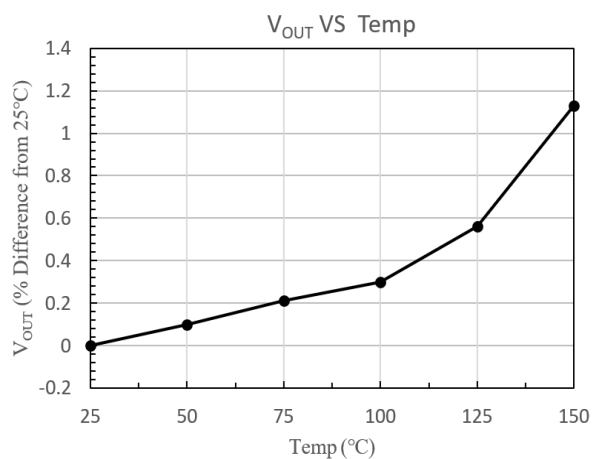


图 4 输出电压随温度变化($V_{IN}=10V$, $I_{OUT}=10mA$)

78L09 典型特性 ($C_{IN}=220nF$, $C_{OUT}=100nF$)

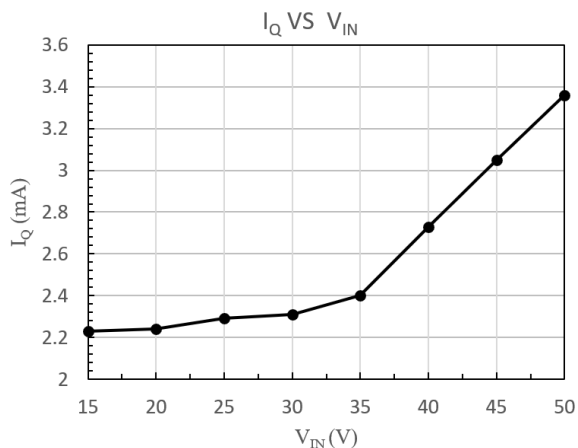


图 1 静态电流随输入电压变化

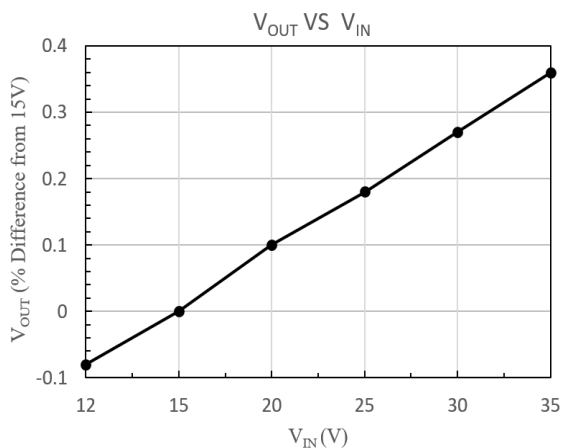


图 2 输出电压随输入电压变化($I_O=10mA$)

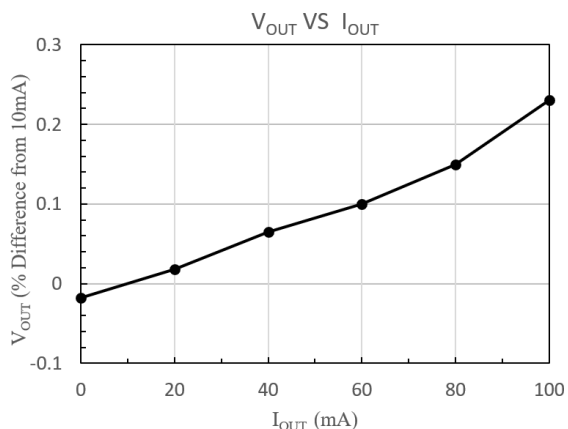


图 3 输出电压随负载电流变化($V_{IN}=12V$)

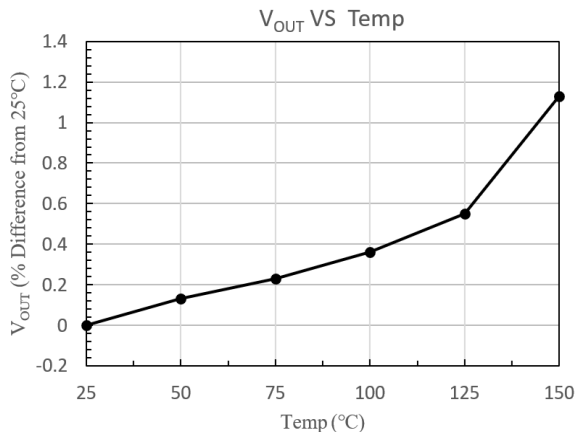


图 4 输出电压随温度变化($V_{IN}=12V$, $I_{OUT}=10mA$)

78L12 典型特性 ($C_{IN}=220nF$, $C_{OUT}=100nF$)

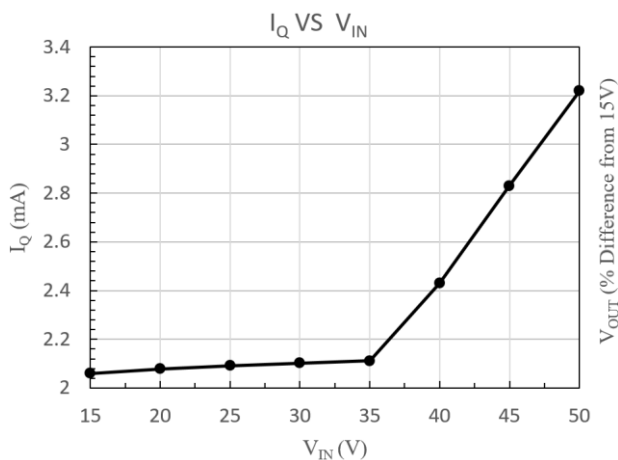


图 1 静态电流随输入电压变化

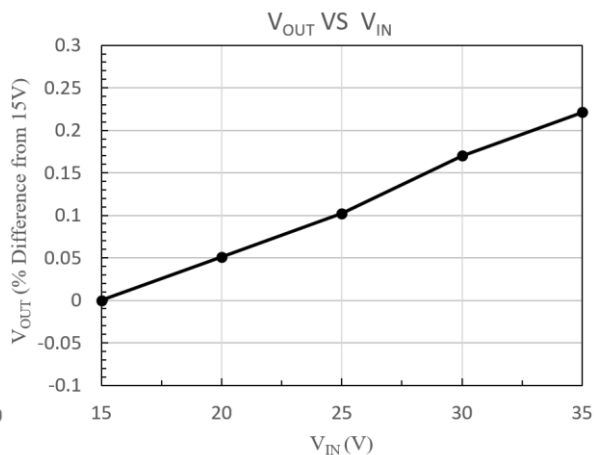


图 2 输出电压随输入电压变化($I_O=10mA$)

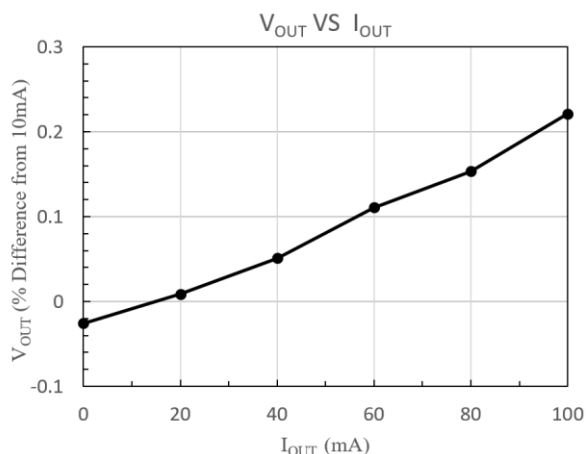


图 3 输出电压随负载电流变化($V_{IN}=15V$)

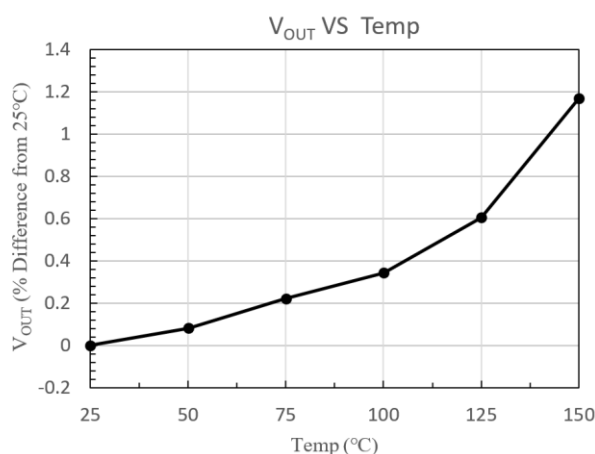
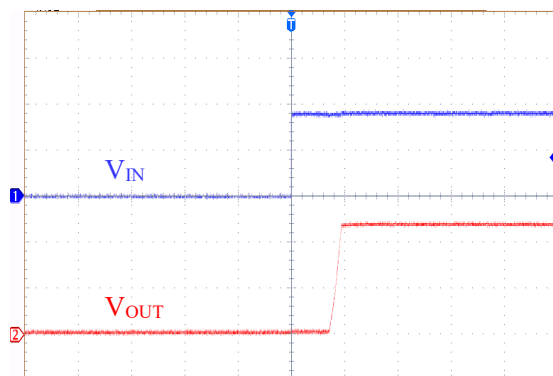


图 4 输出电压随温度变化($V_{IN}=15V$, $I_{OUT}=10mA$)

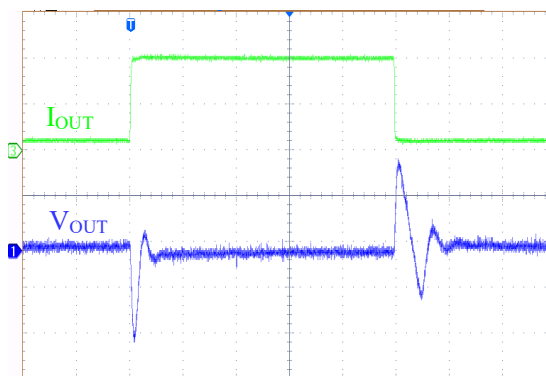
Power Up Response



CH1: V_{IN} (10V/DIV) CH2: V_{OUT} (5V/DIV)
 $I_{OUT}=10mA$, $V_{IN}=0V-18V$ 上电 t:(2ms/DIV)

图 5 电源上电瞬态响应

Load Transient Response

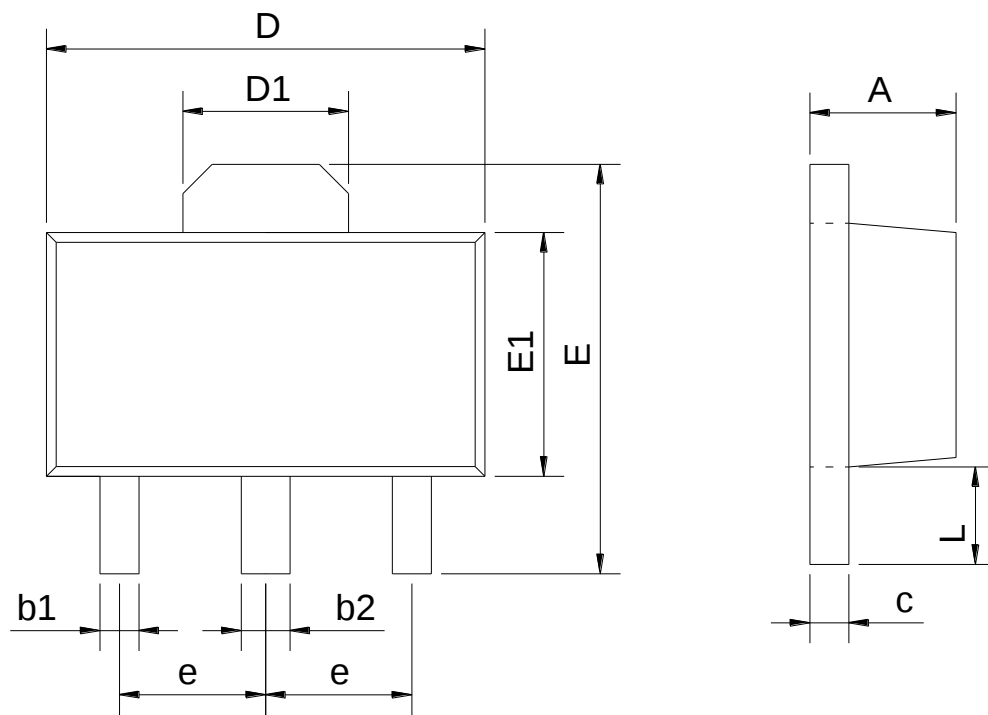


CH1: V_{OUT} (50mV/DIV) CH3: I_{OUT} (50mA/DIV)
 $V_{IN}=15V$, $I_{OUT}=10mA-100mA$ 改变 t:(20us/DIV)

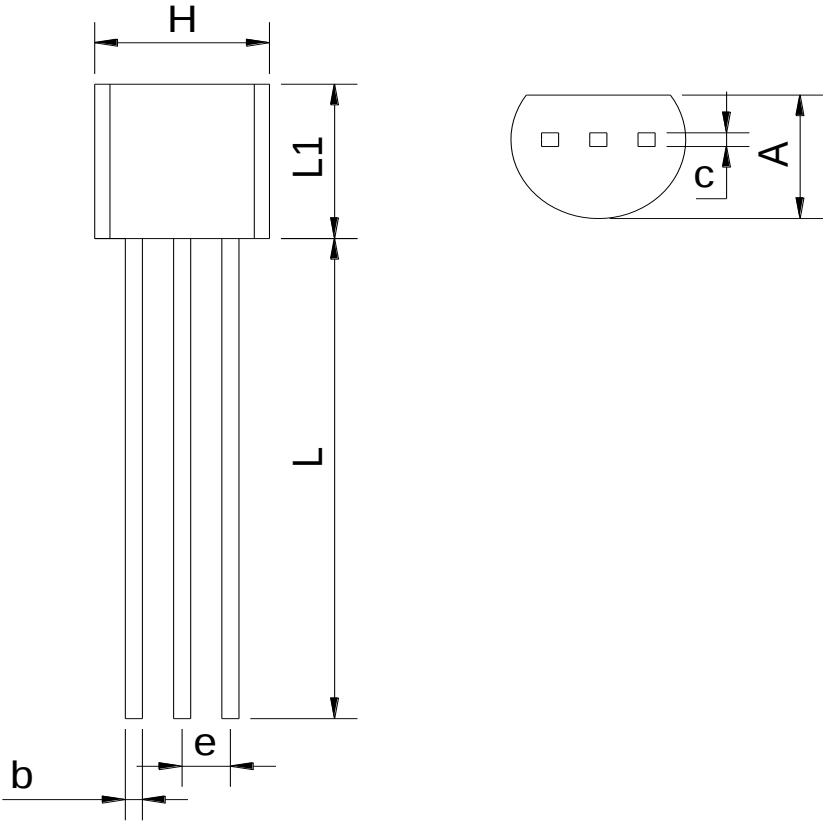
图 6 负载变化瞬态响应

封装外形尺寸图

SOT-89-3L

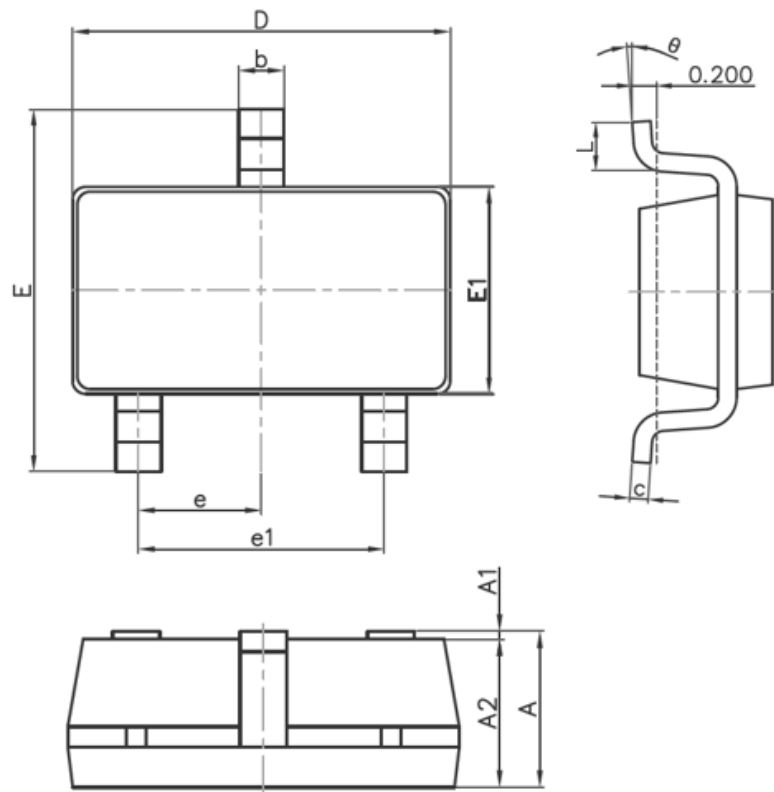


SYMBOL	mm	
	min	max
A	1.40	1.60
b1	0.32	0.52
b2	0.40	0.60
c	0.35	0.46
D	4.30	4.70
D1	1.40	1.80
E	4.00	4.40
E1	2.30	2.70
e	1.50BSC	
L	0.80	1.20



SYMBOL	mm	
	min	max
A	3.30	3.80
b	0.38	0.55
c	0.36	0.51
e	1.27BSC	
H	4.40	4.80
L	13.00	15.00
L1	4.30	4.70

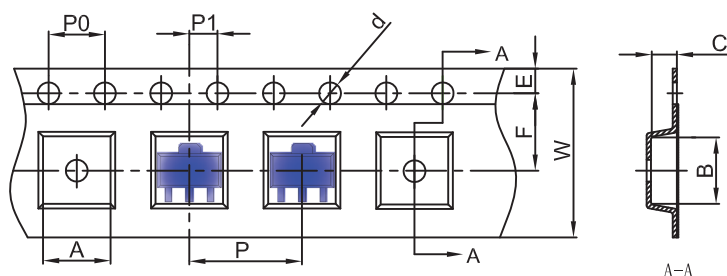
SOT-23-3L



SYMBOL	mm	
	min	max
A	1.05	1.25
A1	0.00	0.10
A2	1.05	1.15
b	0.3	0.5
c	0.1	0.2
D	2.82	3.02
E	2.65	2.95
E1	1.5	1.7
e	0.95BSC	
e1	1.8	2.0
L	0.30	0.60
θ	0	8°

SOT-89-3L Tape and reel

SOT-89-3L Embossed Carrier Tape



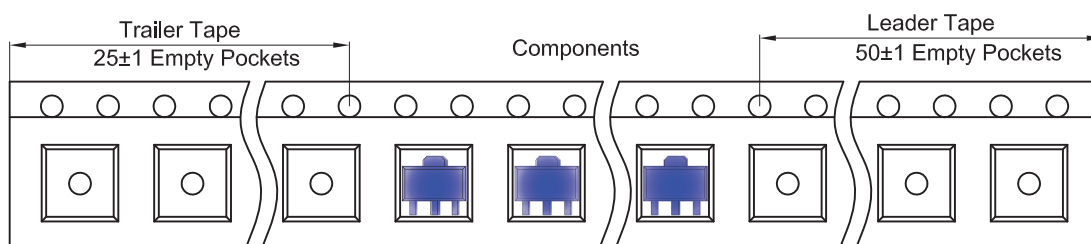
Packaging Description:

SOT-89-3L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 1,000 units per 7" or 18.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

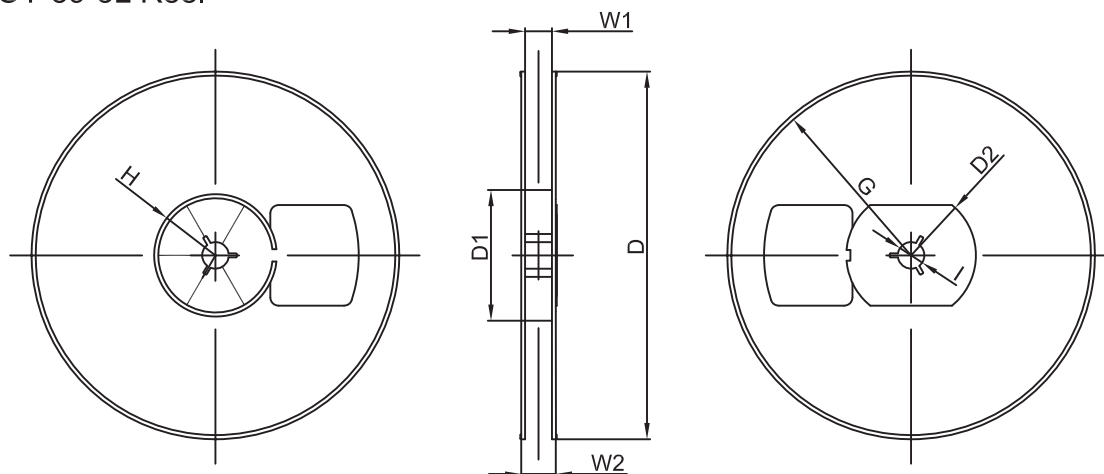
Dimensions are in millimeter

Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-89-3L	4.85	4.45	1.85	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

SOT-89-3L Tape Leader and Trailer



SOT-89-3L Reel



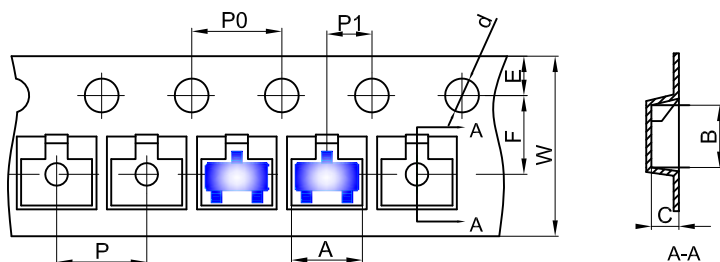
Dimensions are in millimeter

Reel Option	D	D1	D2	G	H	I	W1	W2
7"Dia	Ø180.00	60.00	R32.00	R86.50	R30.00	Ø13.00	13.20	16.50

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
1000 pcs	7 inch	10,000 pcs	203×203×195	40,000 pcs	438×438×220	

SOT-23-3L Tape and Reel

SOT-23-3L Embossed Carrier Tape

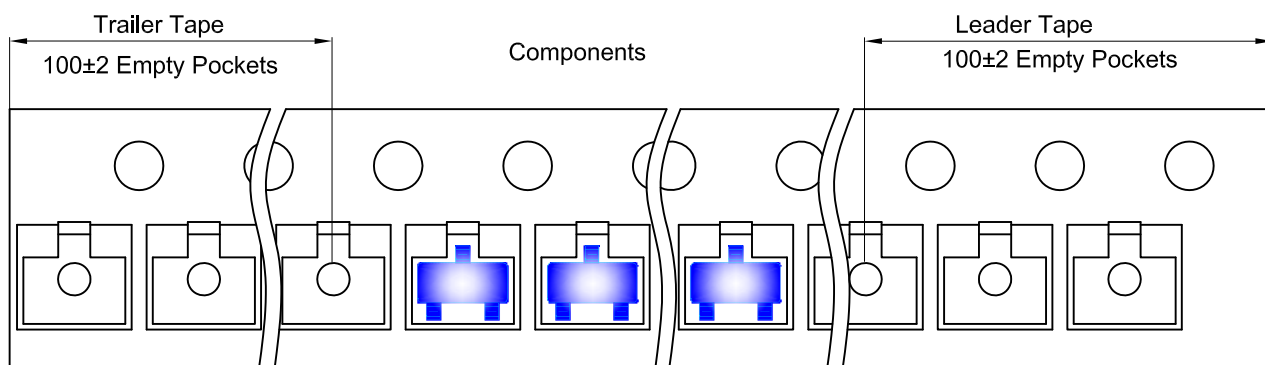


Packaging Description:

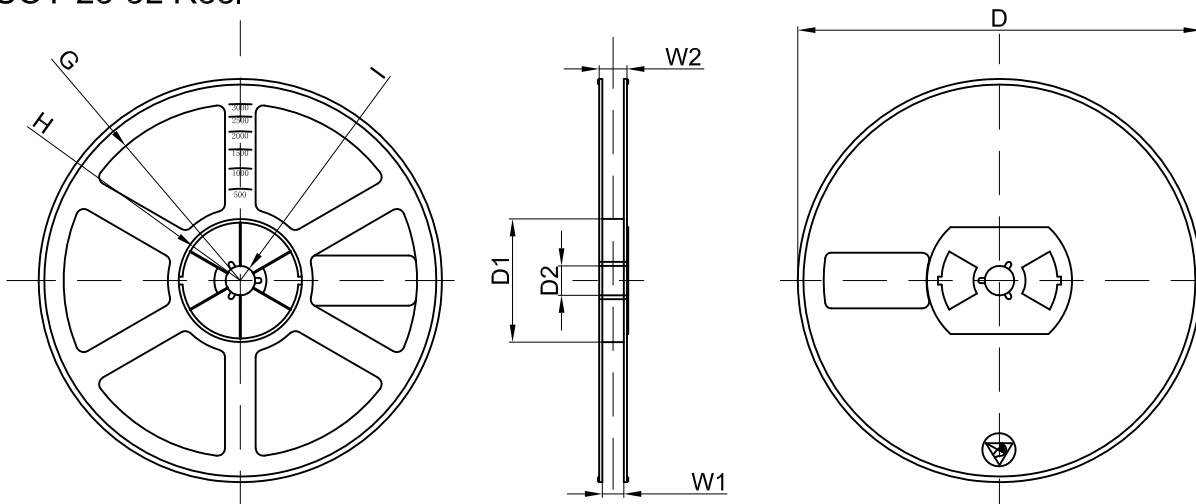
SOT-23-3L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 18.0cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-23-3L	3.18	3.28	1.32	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23-3L Tape Leader and Trailer



SOT-23-3L Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7"Dia	Ø180.00	60.00	13.00	R78.00	R25.60	R6.50	9.50	13.10

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3000 pcs	7 inch	30,000 pcs	203×203×195	120,000 pcs	438×438×220	