

Description

SL78MXX is a fixed output linear three-terminal voltage regulator circuit with a wide input voltage range. Built-in reference voltage circuit, overvoltage protection, overcurrent protection, overtemperature protection, to achieve reliable operation of the circuit. The output stage has a low output impedance, and the output current can reach 1A. The chip has a low quiescent current. The package adopts TO-252-3.

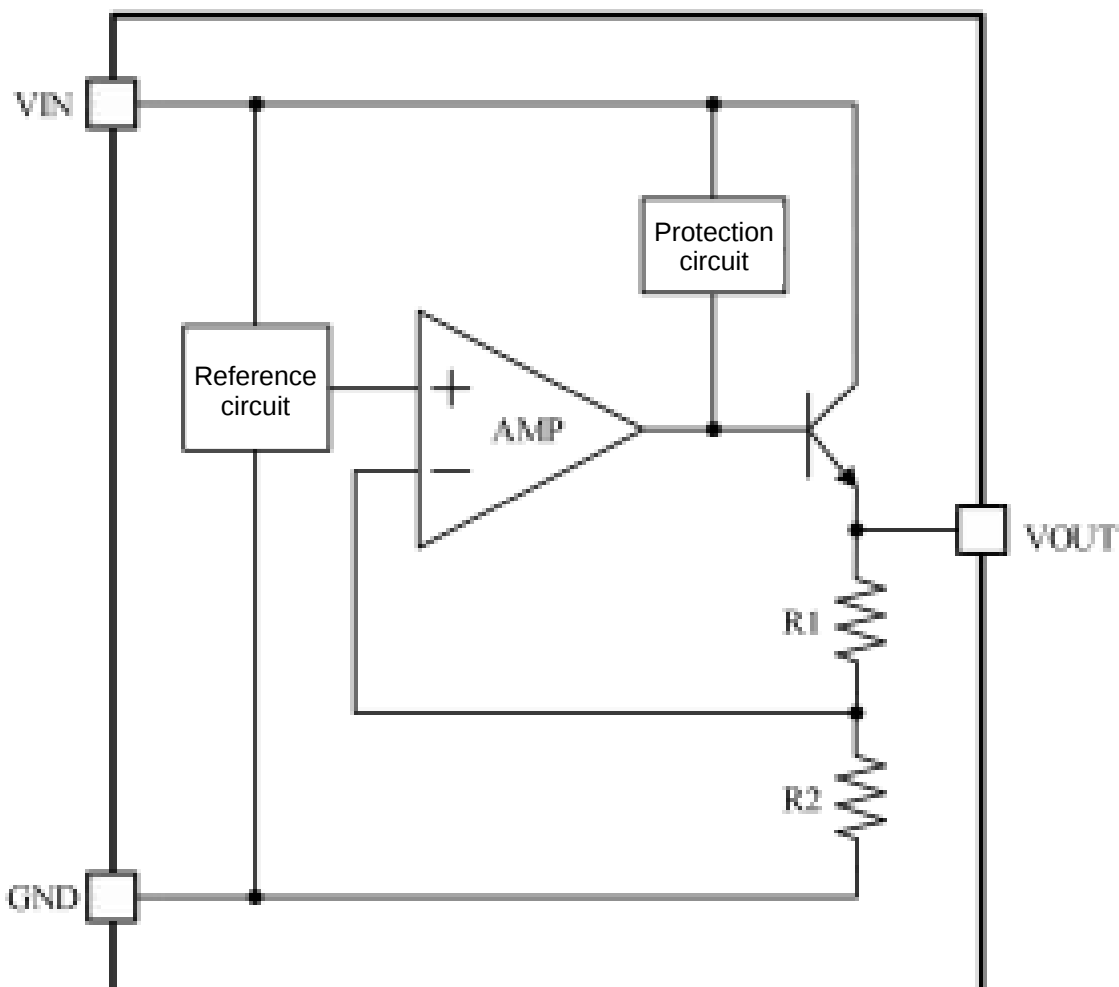
Key Features

- Manufactured using a 50V process platform
- Output voltage can be fixed at 5V, 9V, 12V, 15V
- Wide input voltage range: 7-40V input; withstand voltage 50V
- Low static operating current: typical 2.3mA@10V
- Output voltage redundancy range $\pm 5\%$ at full voltage, full current, and full temperature.
- Stable output current up to 1A
- Built-in over-temperature protection, over-voltage protection, over-current protection

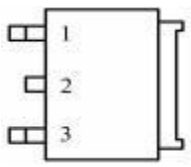
Application

- Instruments
- Motherboard power supply
- Multi-way power supply system
- Equipment power supply module

Internal module diagram



Shape and PIN

		TO-252-3	
VIN		1	
GND		2	
VOUT		3	

Limit parameters

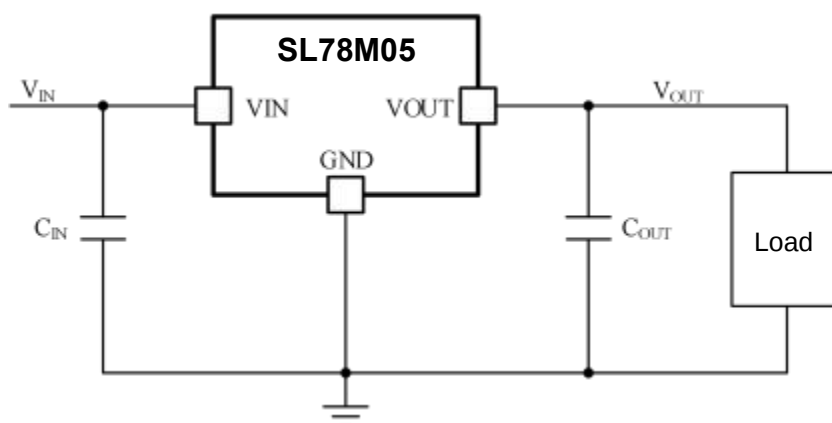
Description	Symbol		Value range	Unit
Input voltage range	V_{IN}		-0.3~40(Vout=5V 、 9V)	V
Input voltage range	V_{IN}		-0.3~40 (Vout= 12V 、 15V)	V
Maximum junction temperature	T_J		150	°C
Maximum power consumption	P_D	TO-252	1.25	W
Thermal resistance (junction to ambient)	$R_{\theta JA}$	TO-252	80	°C/W
Operating temperature range	T_A		-40 ~ 85	°C
Storage temperature range	T_{stg}		-55~ 150	°C

The parameters in the above table represent the limit range that the circuit can withstand. If the parameters are reached or exceeded, the circuit cannot work normally and is likely to be damaged. And long-term operation at critical limit parameters will also greatly increase the probability of damage.

Electrical parameters

(Unless otherwise specified, $T_J = +25^{\circ}\text{C}$, $C_{IN}=0.33\mu\text{F}$, $C_{OUT}=0.1\mu\text{F}$) **SL78M05**

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	V_O	$V_{IN}=10\text{V}$, $I_O=350\text{mA}$	4.85	5	5.15	V
		$7.5\text{V} < V_{IN} < 20\text{V}$, $5\text{mA} < I_O < 350\text{mA}$	4.75		5.25	
Line regulation	ΔV_O	$7\text{V} < V_{IN} < 25\text{V}$, $I_O=200\text{mA}$			100	mV
		$8\text{V} < V_{IN} < 25\text{V}$, $I_O=200\text{mA}$			50	
Load regulation	ΔV_O	$5\text{mA} < I_O < 500\text{mA}$			100	mV
Quiescent current	I_Q			2.3	5	mA
Quiescent current change	ΔI_Q	$8\text{V} < V_{IN} < 25\text{V}$, $I_O=200\text{mA}$			0.8	mA
		$5\text{mA} < I_O < 350\text{mA}$			0.5	
Output noise voltage	V_n	$f=10\text{Hz}$ to 100KHz		40		μV
Power supply rejection ratio	PSRR	$f=100\text{Hz}$, $I_O=300\text{mA}$	62	78		dB
Peak output current	I_{PK}			1.5		A
Voltage temperature coefficient	V_{TC}	$I_O=10\text{mA}$		0.5		$\text{mV}/^{\circ}\text{C}$
Low pressure drop	V_{Drop}	$I_O=500\text{mA}$		1.75	2	V
		$I_O=1\text{A}$		2.1	2.5	
Minimum input voltage	$V_{IN,MIN}$	$I_O=500\text{mA}$			7	V
Overvoltage protection threshold	$V_{IN,MAX}$	$I_O=10\text{mA}$		35		V

Typical applications


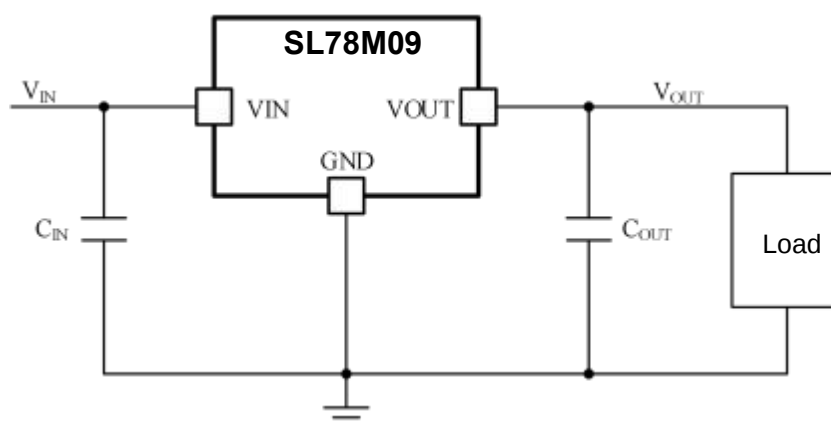
$C_{IN}=0.33\mu\text{F}$, $C_{OUT}=0.1\mu\text{F}$
Output 5V typical application circuit

Electrical parameters

(Unless otherwise specified, $T_J = +25^{\circ}\text{C}$, $C_{IN}=0.33\mu\text{F}$, $C_{OUT}=0.1\mu\text{F}$) SL78M09

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	V_O	$V_{IN}=14\text{V}$, $I_O=350\text{mA}$	8.73	9	9.27	V
		$11.5\text{V} < V_{IN} < 25\text{V}$, $5\text{mA} < I_O < 350\text{mA}$	8.55		9.45	
Line regulation	ΔV_O	$11.5\text{V} < V_{IN} < 25\text{V}$, $I_O=200\text{mA}$			100	mV
		$13\text{V} < V_{IN} < 25\text{V}$, $I_O=200\text{mA}$			50	
Load regulation	ΔV_O	$5\text{mA} < I_O < 500\text{mA}$			100	mV
Quiescent current	I_Q			2.3	5	mA
Quiescent current change	ΔI_Q	$12\text{V} < V_{IN} < 25\text{V}$, $I_O=200\text{mA}$			0.8	mA
		$5\text{mA} < I_O < 350\text{mA}$			0.5	
Output noise voltage	V_n	$f=10\text{Hz}$ to 100KHz		40		μV
Power supply rejection ratio	PSRR	$f=100\text{Hz}$, $I_O=300\text{mA}$	62	78		dB
Peak output current	I_{PK}			1.5		A
Voltage temperature coefficient	V_{TC}	$I_O = 10\text{mA}$		0.5		$\text{mV}/^{\circ}\text{C}$
Low pressure drop	V_{Drop}	$I_O = 500\text{mA}$		1.75	2	V
		$I_O = 1\text{A}$		2.1	2.5	
Minimum input voltage	$V_{IN,MIN}$	$I_O = 500\text{mA}$			11	V
Overshoot protection threshold	$V_{IN,MAX}$	$I_O = 10\text{mA}$		35		V

Typical applications

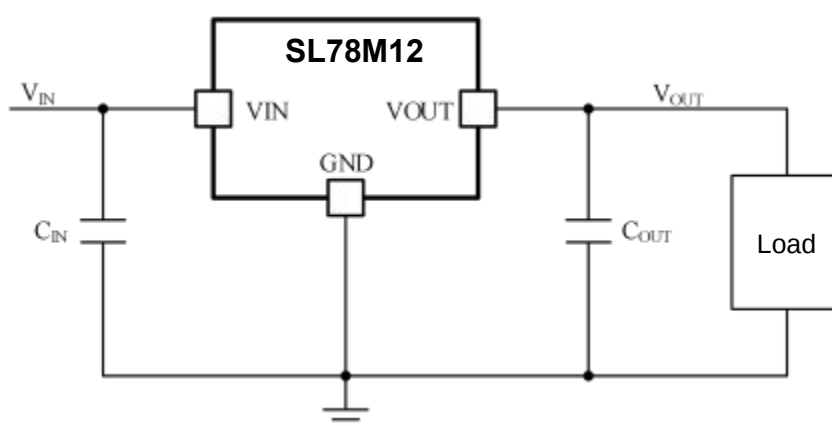


$C_{in}=0.33\mu\text{F}$, $C_{out}=0.1\mu\text{F}$
Output 9V Typical Application Circuit

SL78M12

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	V_O	$V_{IN}=17V$, $I_O=350mA$	11.64	12	12.36	V
		$14.5V < V_{IN} < 27V$ $5mA < I_O < 350mA$	11.4		12.6	
Line regulation	ΔV_O	$14.5V < V_{IN} < 32V$, $I_O=200mA$			100	mV
		$16V < V_{IN} < 32V$, $I_O=200mA$			50	
Load regulation	ΔV_O	$5mA < I_O < 500mA$			240	mV
Quiescent current	I_Q			2.3	5	mA
Quiescent current change	ΔI_Q	$14.5V < V_{IN} < 32V$, $I_O=200mA$			0.8	mA
		$5mA < I_O < 350mA$			0.5	
Output noise voltage	V_n	$f=10Hz$ to $100KHz$		75		μV
Power supply rejection ratio	PSRR	$f=100Hz$, $I_O=300mA$	55	78		dB
Peak output current	I_{PK}			1.5		A
Voltage temperature coefficient	V_{TC}	$I_O = 10mA$		1		$mV/^{\circ}C$
Low pressure drop	V_{Drop}	$I_O = 500mA$		1.75	2	V
		$I_O = 1A$		2.1	2.5	
Minimum input voltage	$V_{IN,MIN}$	$I_O = 500mA$			14	V
Overvoltage protection threshold	$V_{IN,MAX}$	$I_O = 10mA$		41		V

Typical applications

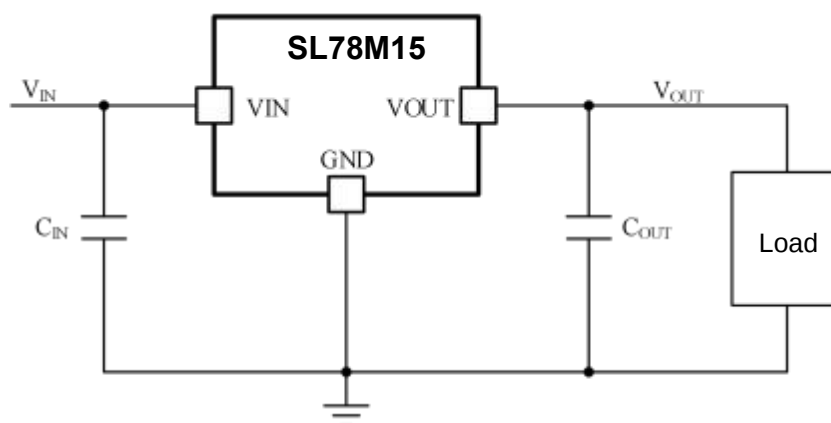


$C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$
Output 12V Typical Application Circuit

SL78M15

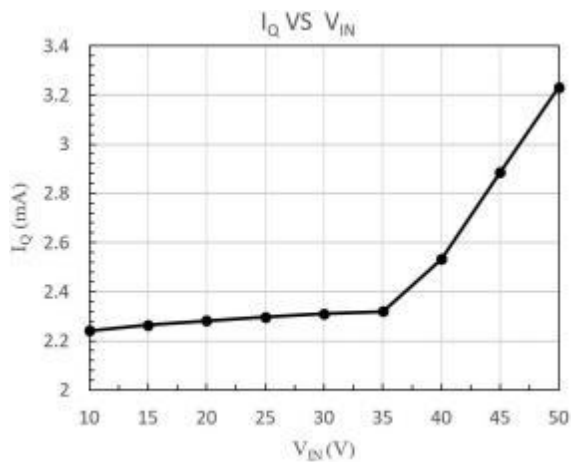
Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	V_O	$V_{IN}=20V$, $I_O=350mA$	14.55	15	15.45	V
		$17.5V < V_{IN} < 32V$ $5mA < I_O < 350mA$	14.25		15.75	
Line regulation	ΔV_O	$17.5V < V_{IN} < 32V$, $I_O = 200mA$			100	mV
		$20V < V_{IN} < 32V$, $I_O = 200mA$			50	
Load Regulation	ΔV_O	$5mA < I_O < 500mA$			240	mV
Quiescent current	I_Q			2.3	5	mA
Quiescent current change	ΔI_Q	$17.5V < V_{IN} < 32V$, $I_O=200mA$			0.8	mA
		$5mA < I_O < 350mA$			0.5	
Output noise voltage	V_n	$f=10Hz$ to $100KHz$		75		μV
Power Supply Rejection Ratio	PSRR	$f=100Hz$, $I_O = 300mA$	55	78		dB
Peak output current	I_{PK}			1.5		A
Voltage temperature coefficient	V_{TC}	$I_O = 10mA$		1		$mV/^{\circ}C$
Low pressure drop	V_{Drop}	$I_O = 500mA$		1.75	2	V
		$I_O = 1A$		2.1	2.5	
Minimum input voltage	$V_{IN,MIN}$	$I_O = 500mA$			17	V
Overvoltage protection threshold	$V_{IN,MAX}$	$I_O = 10mA$		41		V

Typical applications

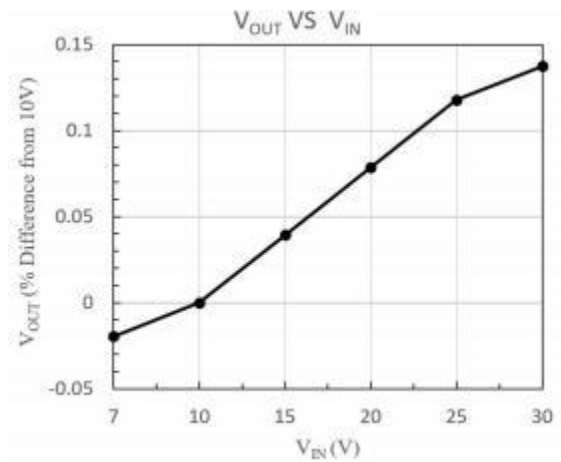


$C_{in}=0.33\mu F$, $C_{out}=0.1\mu F$
Output 15V Typical Application Circuit

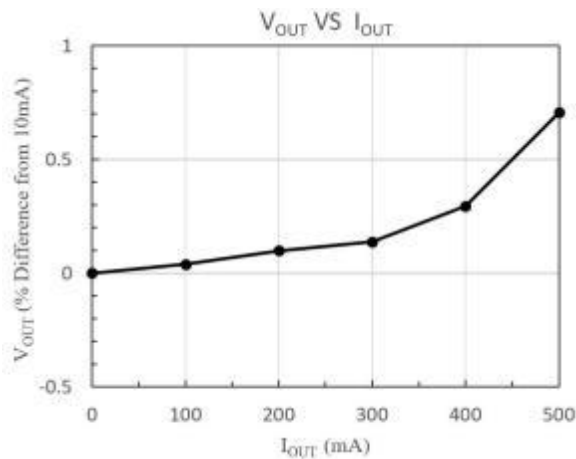
SL78M05 Typical properties($C_{IN}=330nF$, $C_{OUT}=100nF$)



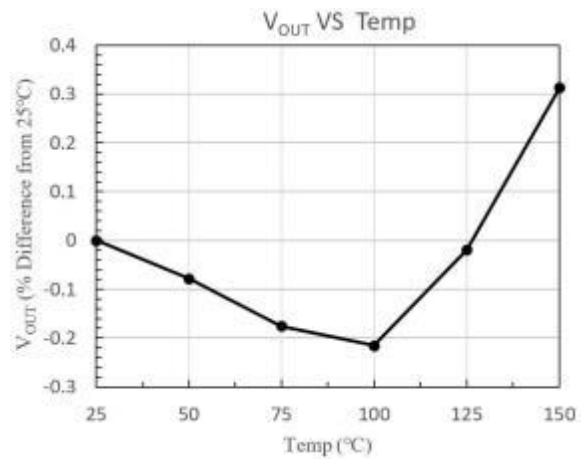
Picture 1 Quiescent current varies with input voltage



Picture 2 Output voltage varies with input voltage($I_O=10mA$)

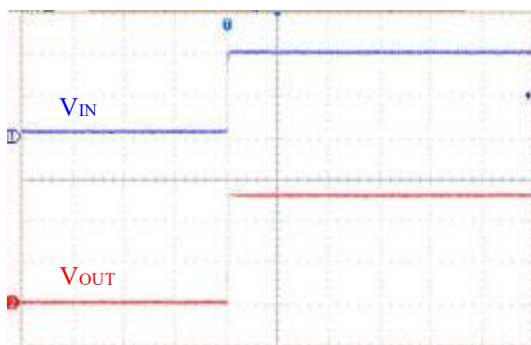


Picture 3 Output voltage varies with load current($V_{IN}=8V$)



Picture 4 Output voltage changes with temperature($V_{IN}=10V$, $I_{OUT}=10mA$)

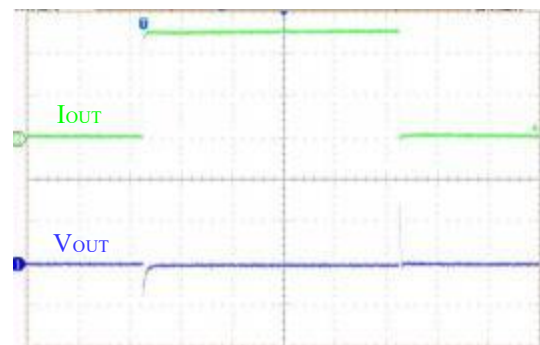
Power Up Response



CH1: VIN (5V/DIV) CH2: VOUT (2V/DIV) IOUT=10mA
VIN=0 ~ 10V power on

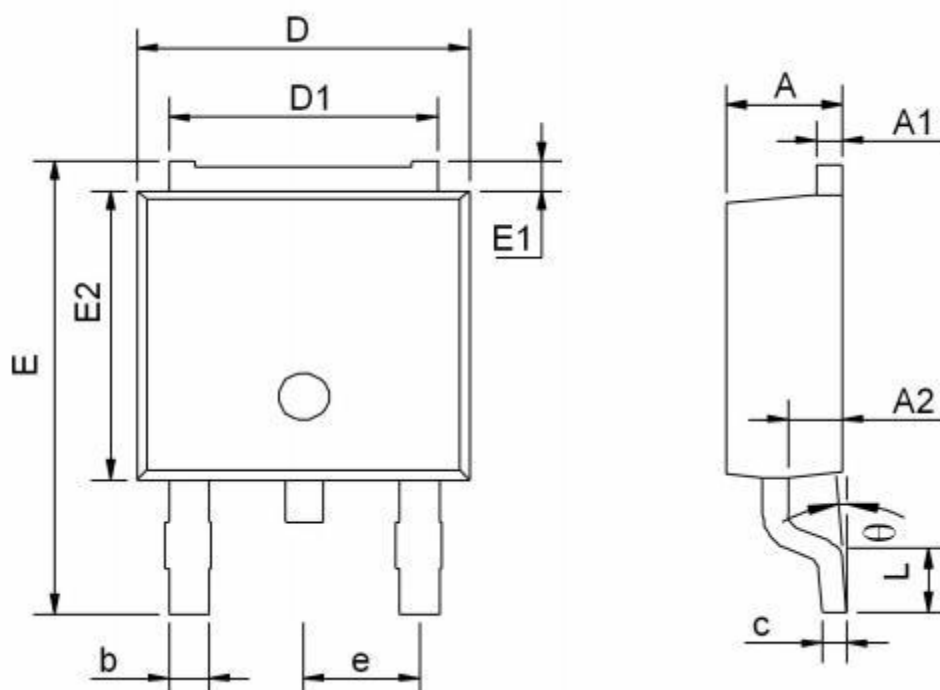
Picture 5 Power-on transient response

Load Transient Response



CH1: VOUT (500mV/DIV) CH3: IOUT (250mA/DIV)
VIN= 10V, IOUT= 10mA-500mA change

Picture 6 Load change transient response

Package dimensions
TO-252-3


SYMBOL	mm	
	min	max
A	2.20	2.40
A1	0.45	0.55
A2	0.97	1.07
b	0.75	0.84
c	0.49	0.57
D	6.50	6.70
D1	5.34REF	
E	9.62	9.82
E1	0.59	0.69
E2	6.10	6.30
e	2.29BSC	
L	1.40	1.60
θ	0	8°