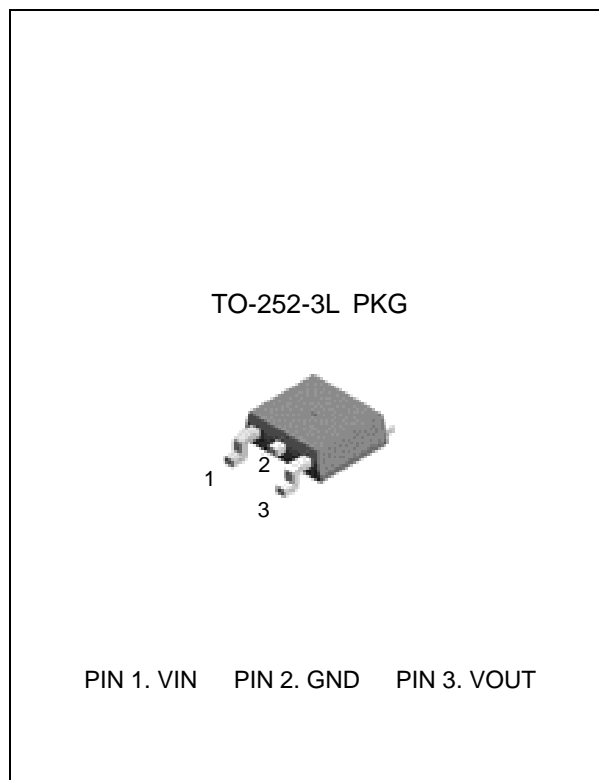


FEATURES

- Output current in excess of 0.5A
- No external components required
- Internal short circuit current limiting
- Output Voltage of 5V, 6V, 8V, 9V, 12V, 15V, 18V, 24V
- Internal thermal overload protection
- Output transistor safe-area compensation

DESCRIPTION

The LM78MXX series of three terminal positive regulators are available in the TO-252 package and with several fixed output voltages making them useful in a wide range of applications.



ORDERING INFORMATION

Device	Package
LM78MXXRS	TO-252-3L

X.X : Output Voltage = 05, 06, 08, 09, 12, 15, 18, 24

Absolute Maximum Ratings

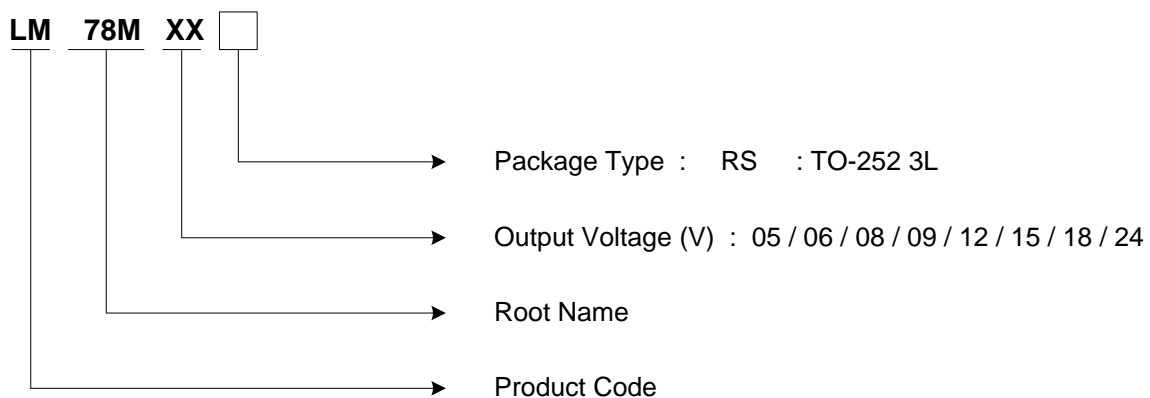
CHARACTERISTIC		SYMBOL	MIN.	MAX.	UNIT
Input Voltage	LM78M05 ~ 18	V_{IN}	-	35	V
	LM78M24	V_{IN}	-	40	
Storage Temperature Range		T_{STG}	-65	150	°C
Operating Junction Temperature Range		T_{JOPR}	-40	125	°C

3-TERMINAL POSITIVE VOLTAGE REGULATOR

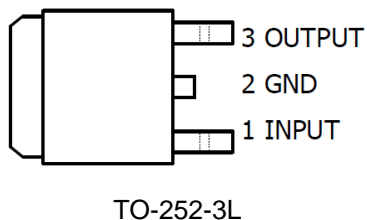
LM78MXX

Ordering Information

V _{OUT}	Package	Order No.	Description	Supplied As	Status
5.0V	TO-252-3L	LM78M05RS	0.5A, Positive	Reel	Active
6.0V	TO-252-3L	LM78M06RS	0.5A, Positive	Reel	Contact us
8.0V	TO-252-3L	LM78M08RS	0.5A, Positive	Reel	Contact us
9.0V	TO-252-3L	LM78M09RS	0.5A, Positive	Reel	Contact us
12V	TO-252-3L	LM78M12RS	0.5A, Positive	Reel	Contact us
15V	TO-252-3L	LM78M15RS	0.5A, Positive	Reel	Active
18V	TO-252-3L	LM78M18RS	0.5A, Positive	Reel	Contact us
24V	TO-252-3L	LM78M24RS	0.5A, Positive	Reel	Contact us



PIN CONFIGURATION

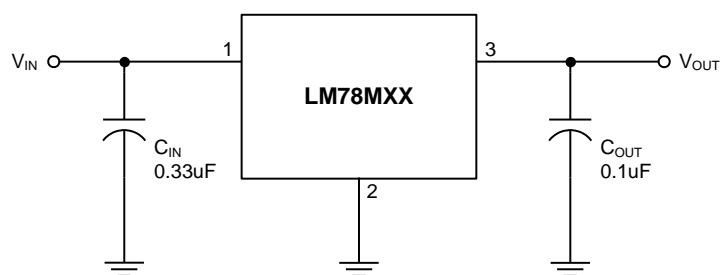


PIN DESCRIPTION

Pin No.	TO-252-3L PKG	
	Name	Function
1	VIN	Input Voltage
2	GND	Ground
3	VOUT	Output Voltage

* Heatsink surface connected to Pin 2.

Typical Applications



Note)

1. To specify an output voltage, substitute voltage for "XX".
2. C_{OUT} improves stability and transient response.

ELECTRICAL CHARACTERISTICS

LM78M05 ($V_{in}=10V$, $I_o=0.5A$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_A = +25^\circ C$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION ^(Note 1)	MIN.	TYP.	MAX.	UNIT
Output Voltage ^(Note 2)	V_{OUT}	$I_o=500mA$	4.9	5.0	5.1	V
		$5mA \leq I_o \leq 350mA$ $7V \leq V_{IN} \leq 20V$	4.8	5.0	5.2	
Line Regulation	ΔV_{LINE}	$7V \leq V_{IN} \leq 25V$, $I_o=200mA$	-	-	100	mV
		$8V \leq V_{IN} \leq 25V$, $I_o=350mA$	-	-	50	
Load Regulation	ΔV_{LOAD}	$5mA \leq I_o \leq 500mA$	-	-	100	mV
		$5mA \leq I_o \leq 200mA$	-	-	50	
Quiescent Current	I_Q		-	-	6.0	mA
Quiescent Current Change	ΔI_Q	$8V \leq V_{IN} \leq 25V$, $I_o=200mA$	-	-	0.8	mA
		$5mA \leq I_o \leq 500mA$	-	-	0.5	
Dropout Voltage	V_D	$0 \leq I_o \leq 350mA$	-	2.0	2.2	V

LM78M06 ($V_{in}=11V$, $I_o=0.5A$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_A = +25^\circ C$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION ^(Note 1)	MIN.	TYP.	MAX.	UNIT
Output Voltage ^(Note 2)	V_{OUT}	$I_o=500mA$	5.88	6.0	6.12	V
		$5mA \leq I_o \leq 350mA$ $8V \leq V_{IN} \leq 21V$	5.76	6.0	6.24	
Line Regulation	ΔV_{LINE}	$8V \leq V_{IN} \leq 25V$, $I_o=200mA$	-	-	100	mV
		$9V \leq V_{IN} \leq 25V$, $I_o=350mA$	-	-	50	
Load Regulation	ΔV_{LOAD}	$5mA \leq I_o \leq 500mA$	-	-	120	mV
		$5mA \leq I_o \leq 200mA$	-	-	50	
Quiescent Current	I_Q		-	-	6.0	mA
Quiescent Current Change	ΔI_Q	$9V \leq V_{IN} \leq 25V$, $I_o=200mA$	-	-	0.8	mA
		$5mA \leq I_o \leq 500mA$	-	-	0.5	
Dropout Voltage	V_D	$0 \leq I_o \leq 350mA$	-	2.0	2.2	V

3-TERMINAL POSITIVE VOLTAGE REGULATOR

LM78MXX

LM78M08 ($V_{IN}=14V$, $I_O=0.5A$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_A = +25^\circ C$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION ^(Note 1)	MIN.	TYP.	MAX.	UNIT
Output Voltage ^(Note 2)	V_{OUT}	$I_O=500mA$	7.84	8.0	8.16	V
		$5mA \leq I_O \leq 350mA$ $10.5V \leq V_{IN} \leq 23V$	7.68	8.0	8.32	
Line Regulation	ΔV_{LINE}	$10.5V \leq V_{IN} \leq 25V$, $I_O=200mA$	-	-	100	mV
		$11V \leq V_{IN} \leq 25V$, $I_O=350mA$	-	-	50	
Load Regulation	ΔV_{LOAD}	$5mA \leq I_O \leq 500mA$	-	-	160	mV
		$5mA \leq I_O \leq 200mA$	-	-	80	
Quiescent Current	I_Q		-	-	6.0	mA
Quiescent Current Change	ΔI_Q	$10.5V \leq V_{IN} \leq 25V$, $I_O=200mA$	-	-	0.8	mA
		$5mA \leq I_O \leq 500mA$	-	-	0.5	
Dropout Voltage	V_D	$0 \leq I_O \leq 350mA$	-	2.0	2.2	V

LM78M09 ($V_{IN}=16V$, $I_O=0.5A$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_A = +25^\circ C$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION ^(Note 1)	MIN.	TYP.	MAX.	UNIT
Output Voltage ^(Note 2)	V_{OUT}	$I_O=500mA$	8.82	9.0	9.18	V
		$5mA \leq I_O \leq 350mA$ $11.5V \leq V_{IN} \leq 24V$	8.64	9.0	9.36	
Line Regulation	ΔV_{LINE}	$11.5V \leq V_{IN} \leq 26V$, $I_O=200mA$	-	-	100	mV
		$12V \leq V_{IN} \leq 26V$, $I_O=350mA$	-	-	50	
Load Regulation	ΔV_{LOAD}	$5mA \leq I_O \leq 500mA$	-	-	180	mV
		$5mA \leq I_O \leq 200mA$	-	-	90	
Quiescent Current	I_Q		-	-	6.0	mA
Quiescent Current Change	ΔI_Q	$11.5V \leq V_{IN} \leq 26V$, $I_O=200mA$	-	-	0.8	mA
		$5mA \leq I_O \leq 500mA$	-	-	0.5	
Dropout Voltage	V_D	$0 \leq I_O \leq 350mA$	-	2.0	2.2	V

3-TERMINAL POSITIVE VOLTAGE REGULATOR

LM78MXX

LM78M12 ($V_{IN}=19V$, $I_O=0.5A$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_A = +25^\circ C$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION ^(Note 1)	MIN.	TYP.	MAX.	UNIT
Output Voltage ^(Note 2)	V_{OUT}	$I_O=500mA$	11.76	12.0	12.24	V
		$5mA \leq I_O \leq 350mA$ $14.5V \leq V_{IN} \leq 27V$	11.52	12.0	12.48	
Line Regulation	ΔV_{LINE}	$14.5V \leq V_{IN} \leq 30V$, $I_O=200mA$	-	-	100	mV
		$16V \leq V_{IN} \leq 30V$, $I_O=350mA$	-	-	50	
Load Regulation	ΔV_{LOAD}	$5mA \leq I_O \leq 500mA$	-	-	240	mV
		$5mA \leq I_O \leq 200mA$	-	-	120	
Quiescent Current	I_Q		-	-	6.0	mA
Quiescent Current Change	ΔI_Q	$14.5V \leq V_{IN} \leq 30V$, $I_O=200mA$	-	-	0.8	mA
		$5mA \leq I_O \leq 500mA$	-	-	0.5	
Dropout Voltage	V_D	$0 \leq I_O \leq 350mA$	-	2.0	2.2	V

LM78M15 ($V_{IN}=23V$, $I_O=0.5A$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_A = +25^\circ C$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION ^(Note 1)	MIN.	TYP.	MAX.	UNIT
Output Voltage ^(Note 2)	V_{OUT}	$I_O=500mA$	14.7	15.0	15.3	V
		$5mA \leq I_O \leq 350mA$ $17.5V \leq V_{IN} \leq 30V$	14.4	15.0	15.6	
Line Regulation	ΔV_{LINE}	$17.5V \leq V_{IN} \leq 30V$, $I_O=200mA$	-	-	100	mV
		$20V \leq V_{IN} \leq 30V$, $I_O=350mA$	-	-	50	
Load Regulation	ΔV_{LOAD}	$5mA \leq I_O \leq 500mA$	-	-	300	mV
		$5mA \leq I_O \leq 200mA$	-	-	150	
Quiescent Current	I_Q		-	-	6.0	mA
Quiescent Current Change	ΔI_Q	$17.5V \leq V_{IN} \leq 30V$, $I_O=200mA$	-	-	0.8	mA
		$5mA \leq I_O \leq 500mA$	-	-	0.5	
Dropout Voltage	V_D	$0 \leq I_O \leq 350mA$	-	2.0	2.2	V

3-TERMINAL POSITIVE VOLTAGE REGULATOR

LM78MXX

LM78M18 ($V_{IN}=26V$, $I_O=0.5A$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_A = +25^\circ C$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION ^(Note 1)	MIN.	TYP.	MAX.	UNIT
Output Voltage ^(Note 2)	V_{OUT}	$I_O=500mA$	17.64	18.0	18.36	V
		$5mA \leq I_O \leq 350mA$ $20.5V \leq V_{IN} \leq 33V$	17.28	18.0	18.72	
Line Regulation	ΔV_{LINE}	$21V \leq V_{IN} \leq 33V$, $I_O=200mA$	-	-	100	mV
		$24V \leq V_{IN} \leq 30V$, $I_O=350mA$	-	-	50	
Load Regulation	ΔV_{LOAD}	$5mA \leq I_O \leq 500mA$	-	-	360	mV
		$5mA \leq I_O \leq 200mA$	-	-	180	
Quiescent Current	I_Q		-	-	6.0	mA
Quiescent Current Change	ΔI_Q	$21V \leq V_{IN} \leq 33V$, $I_O=200mA$	-	-	0.8	mA
		$5mA \leq I_O \leq 500mA$	-	-	0.5	
Dropout Voltage	V_D	$0 \leq I_O \leq 350mA$	-	2.0	2.2	V

LM78M24 ($V_{IN}=33V$, $I_O=0.5A$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_A = +25^\circ C$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION ^(Note 1)	MIN.	TYP.	MAX.	UNIT
Output Voltage ^(Note 2)	V_{OUT}	$I_O=500mA$	23.52	24.0	24.48	V
		$5mA \leq I_O \leq 350mA$ $27V \leq V_{IN} \leq 38V$	23.04	24.0	24.96	
Line Regulation	ΔV_{LINE}	$27V \leq V_{IN} \leq 38V$, $I_O=200mA$	-	-	100	mV
		$28V \leq V_{IN} \leq 38V$, $I_O=350mA$	-	-	50	
Load Regulation	ΔV_{LOAD}	$5mA \leq I_O \leq 500mA$	-	-	480	mV
		$5mA \leq I_O \leq 200mA$	-	-	240	
Quiescent Current	I_Q		-	-	6.0	mA
Quiescent Current Change	ΔI_Q	$27V \leq V_{IN} \leq 38V$, $I_O=200mA$	-	-	0.8	mA
		$5mA \leq I_O \leq 500mA$	-	-	0.5	
Dropout Voltage	V_D	$0 \leq I_O \leq 350mA$	-	2.0	2.2	V

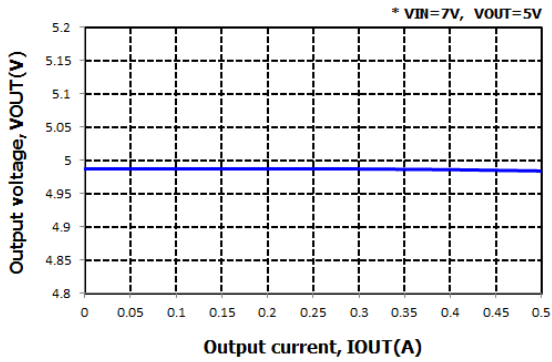
Note 1. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

All characteristics are measured with a 0.33 μ F capacitor across the input and a 0.1 μ F capacitor across the output.

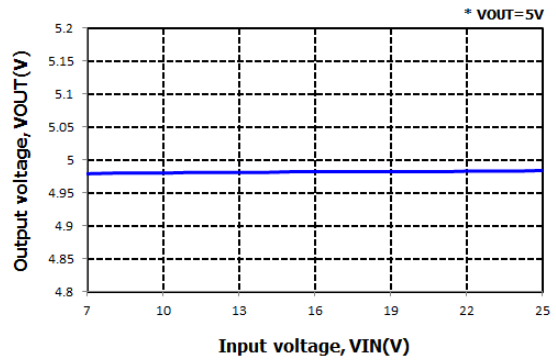
Note 2. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

TYPICAL OPERATING CHARACTERISTICS

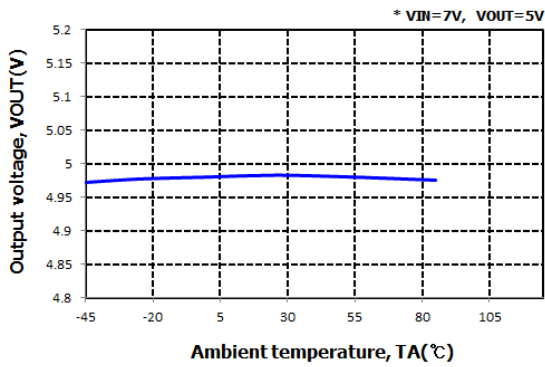
- VOUT vs. IOU_T



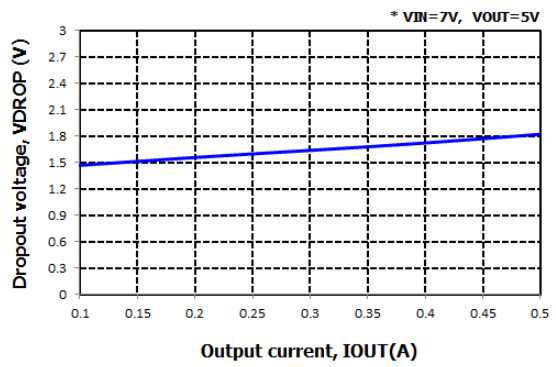
- VOUT vs. VIN



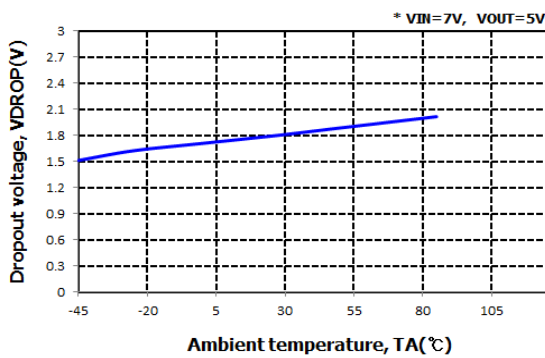
- VOUT vs. TA



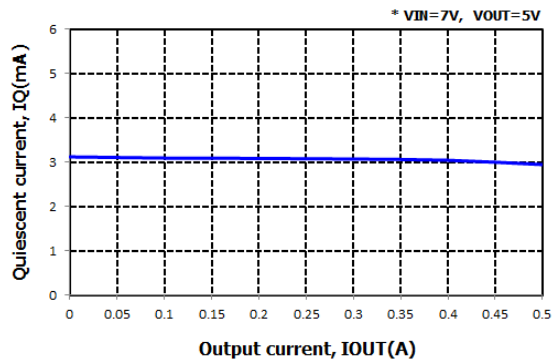
- VDROP vs. IOU_T



- VDROP vs. TA

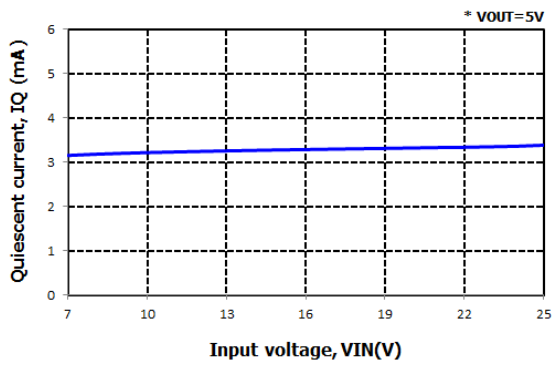


- IQ vs. IOU_T

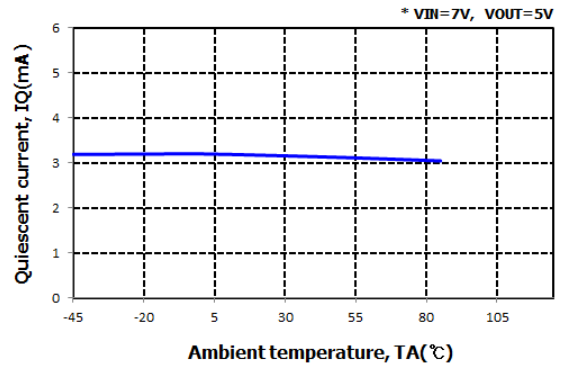


TYPICAL OPERATING CHARACTERISTICS (Continued)

- IQ vs. VIN



- IQ vs. TA



REVISION NOTICE

The description in this datasheet can be revised without any notice to describe its electrical characteristics properly.