SN78Mxxx

3 Terminal 0.5A Positive Voltage Regulator

KODENSHI AUK

Semiconductor

http:// www.auk.co.kr

TO-252-3L

TO-220F-3L

Description

The SN78Mxxx series are three-terminal positive regulators providing 0.5A output current with internal current limiting, thermal shutdown and safe area protection. These regulators are useful in a wide range of applications. Although they are just fixed voltage regulators, the SN78Mxxx series can be used with external components to obtain adjustable voltages and Currents.

Application

◈ Consumer and personal electronics

◈ SMPS post-regulator / dc-to-dc modules

◈ High-efficiency linear power supplies

Features and Benefits

◈ Output Current up to 0.5A

◈ Output Voltage : 5, 6, 8, 9, 10, 12, 15, 18, 24V

◈ Built in OVP, CLP circuit.

◈ Built in TSD Protection.

◈ Output Transistor Safe Area Protection.

◈ Ultra High level of ESD [Built in ESD Protection Cell]

MM : 500V / HBM 5KV ↑

ORDERING INFORMATION

Product	Marking	Package
SN78MxxD	SN78Mxx	TO-252-3L
SN78MxxPI	SN78Mxx	TO-220F-3L

▲ **Marking Detail Information**

[TO-220F-3L & TO-253-3L PKG Marking]

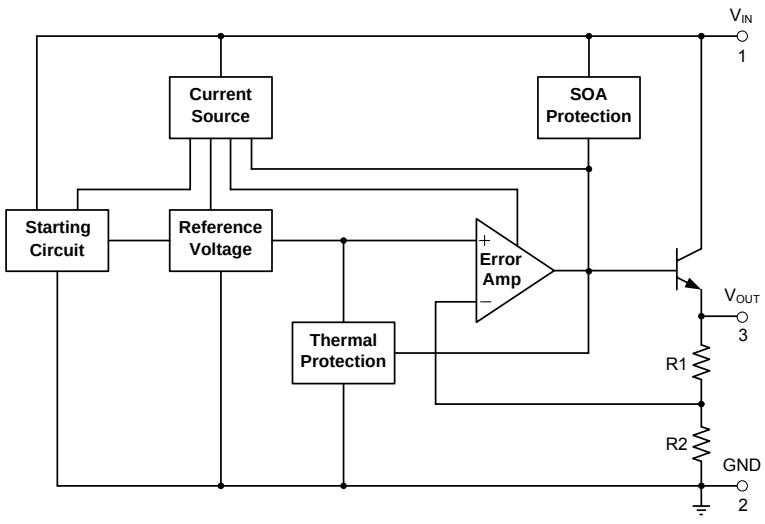
AUK(①)
G△YWD (②)
SN78Mxxx (③)

① AUK Logo

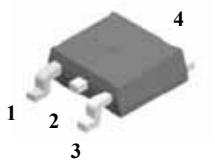
② Grade & M Code & Y/M/D Code

③ Device Code

Equivalent Circuit



◈ Pin Configuration



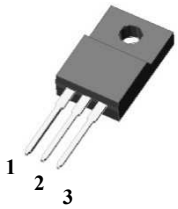
TO-252-3L

1: V_{IN}

2: GND

3: V_{OUT}

4: GND



TO-220F-3L

1: V_{IN}

2: GND

3: V_{OUT}

◈ Product Line-up

Product Name	V_{OUT}	Operating Temperature	Package
SN78M05D	5.0V	-40~125℃	TO-252-3L
SN78M06D	6.0V	-40~125℃	TO-252-3L
SN78M08D	8.0V	-40~125℃	TO-252-3L
SN78M09D	9.0V	-40~125℃	TO-252-3L
SN78M10D	10V	-40~125℃	TO-252-3L
SN78M12D	12V	-40~125℃	TO-252-3L
SN78M15D	15V	-40~125℃	TO-252-3L
SN78M18D	18V	-40~125℃	TO-252-3L
SN78M24D	24V	-40~125℃	TO-252-3L
SN78M05PI	5.0V	-40~125℃	TO-220F-3L
SN78M06PI	6.0V	-40~125℃	TO-220F-3L
SN78M08PI	8.0V	-40~125℃	TO-220F-3L
SN78M09PI	9.0V	-40~125℃	TO-220F-3L
SN78M10PI	10V	-40~125℃	TO-220F-3L
SN78M12PI	12V	-40~125℃	TO-220F-3L
SN78M15PI	15V	-40~125℃	TO-220F-3L
SN78M18PI	18V	-40~125℃	TO-220F-3L
SN78M24PI	24V	-40~125℃	TO-220F-3L

◈ Absolute Maximum Ratings (Ta = 25℃)

Parameter	Symbol	Limits		Unit
		TO-220F-3L	TO-252-3L	
Input Voltage	V_{IN}	40.0 (for V_O=24V)		V
		35.0 (for V_O=5 to 18V)		
Power Dissipation	P_d	2.0	1.3	W
Thermal Resistance Junction to Case	$R_{\Theta JC}$	5	5	°C/W
Thermal Resistance Junction to Air	$R_{\Theta JA}$	65	92	°C/W
Junction Temperature	T_J	150		℃
Operate Temperature Range	T_{opr}	-40 ~ +125		℃
Storage Temperature Range	T_{stg}	-55 ~ +150		℃

Absolute maximum ratings indicate limits beyond which damage to the component may occur. Electrical specifications do not apply when operating the device outside of its operating ratings. The maximum allowable power dissipation is a function of the maximum junction temperature, $T_{J(max)}$, the junction-to-ambient thermal resistance, θ_{JA}, and the ambient temperature, TA.
The maximum allowable power dissipation at any ambient temperature is calculated using:
$PD(max) = (T_{J(max)} - T_A) \div \theta_{JA}$. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown.

◈ Electrical characteristics

(V_{IN}=10V, C_{IN} = 0.33uF, C_{OUT} = 0.1uF, I_{OUT} = 350mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78M05x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		4.80	5.0	5.20	V
		7.0V ≤ V_{IN} ≤ 20.0V 5.0mA ≤ I_O ≤ 350mA		4.75	5.0	5.25	
Line Regulation	$\triangle V_{O(\triangle VI)}$	7.0V ≤ V_{IN} ≤ 25.0V, I_O=200mA	T_J =25℃	-	-	100	mV
		8.0V ≤ V_{IN} ≤ 25.0V, I_O=200mA		-	-	50	
Load Regulation	$\triangle V_{O(\triangle IL)}$	5.0mA ≤ I_O ≤ 500mA	T_J =25℃	-	-	100	mV
		5.0mA ≤ I_O ≤ 200mA		-	-	50	
Quiescent Current	I_{QC}	T_J =25℃		-	4.0	6.0	mA
Quiescent Current Change	ΔI_{QC}	8.0V ≤ V_{IN} ≤ 25V, IO=200mA		-	-	0.8	mA
		5.0mA ≤ I_O ≤ 350mA			-	0.5	
Ripple Rejection	RR	8.0V ≤ V_{IN} ≤ 18.0V, I_O=300 mA f=120Hz		62	-	-	dB
Dropout Voltage	V_{DROP}	I_O=500mA	T_J =25℃	-	2.0	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	40	-	uV/ V_O
Short Circuit Current	I_{SC}	V_I=35V	T_A =25℃	-	300	-	mA
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0mA		-	-0.5	-	mV/℃

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

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=11V, C_{IN} = 0.33uF, C_{OUT} = 0.1uF, I_{OUT} = 350mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78M06x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		5.75	6.0	6.25	V
		8.0V ≤ V_{IN} ≤ 21.0V 5.0mA ≤ I_O ≤ 350mA		5.70	6.0	6.3	
Line Regulation	$\triangle V_{O(\triangle VI)}$	8.0V ≤ V_{IN} ≤ 25.0V	T_J =25℃	-	-	100	mV
		9.0V ≤ V_{IN} ≤ 25.0V		-	-	50	
Load Regulation	$\triangle V_{O(\triangle IL)}$	5.0mA ≤ I_O ≤ 500mA	T_J =25℃	-	-	120	mV
		5mA ≤ I_O ≤ 500mA		-	-	60	
Quiescent Current	I_{QC}	T_J =25℃		-	4.0	6.0	mA
Quiescent Current Change	ΔI_{QC}	9.0V ≤ V_{IN} ≤ 25.0V, I_O=200mA		-	-	0.8	mA
		5.0mA ≤ I_O ≤ 350mA		-	-	0.5	
Ripple Rejection	RR	9.0V ≤ V_{IN} ≤ 19.0V f=120Hz		59	-	-	dB
Dropout Voltage	V_{DROP}	I_O=500mA	T_J =25℃	-	2.0	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	45	-	uV/ V_O
Short Circuit Current	I_{SC}	V_I=35V	T_A =25℃	-	300	-	mA
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0mA		-	-0.5	-	mV/℃

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

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=14V, C_{IN} = 0.33uF, C_{OUT} = 0.1uF, I_{OUT} = 350mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78M08x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		7.7	8.0	8.3	V
		10.5V ≤ V_{IN} ≤ 23.0V 5.0mA ≤ I_O ≤ 350mA		7.6	8.0	8.4	
Line Regulation	$\triangle V_{O(\triangle VI)}$	10.5V ≤ V_{IN} ≤ 25.0V, I_O=200mA	T_J =25℃	-	-	100	mV
		11.0V ≤ V_{IN} ≤ 25.0V, I_O=200mA		-	-	50	
Load Regulation	$\triangle V_{O(\triangle IL)}$	5.0mA ≤ I_O ≤ 500mA	T_J =25℃	-	-	160	mV
		5.0mA ≤ I_O ≤ 200mA		-	-	80	
Quiescent Current	I_{QC}	T_J =25℃		-	4.0	6.0	mA
Quiescent Current Change	ΔI_{QC}	10.5V ≤ V_{IN} ≤ 25.0V, I_O=200mA		-	-	0.8	mA
		5.0mA ≤ I_O ≤ 350mA		-	-	0.5	
Ripple Rejection	RR	11.5V ≤ V_{IN} ≤ 21.5V, I_O=300mA f=120Hz		56	-	-	dB
Dropout Voltage	V_{DROP}	I_O=500mA	T_J =25℃	-	2.0	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	52	-	uV/ V_O
Short Circuit Current	I_{SC}	V_I=35V	T_A =25℃	-	300	-	mA
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0mA		-	-0.5	-	mV/℃

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

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=15V, C_{IN} = 0.33uF, C_{OUT} = 0.1uF, I_{OUT} = 350mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78M09x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		8.65	9.0	9.35	V
		11.5V ≤ V_{IN} ≤ 24.0V 5.0mA ≤ I_O ≤ 350mA		8.55	9.0	9.45	
Line Regulation	$\triangle V_{O(\triangle VI)}$	11.5V ≤ V_{IN} ≤ 25.0V, I_O=200mA	T_J =25℃	-	-	100	mV
		12.0V ≤ V_{IN} ≤ 25.0V, I_O=200mA		-	-	50	
Load Regulation	$\triangle V_{O(\triangle IL)}$	5.0mA ≤ I_O ≤ 500mA	T_J =25℃	-	-	180	mV
		5.0mA ≤ I_O ≤ 200mA		-	-	90	
Quiescent Current	I_{QC}	T_J =25℃		-	4.0	6.0	mA
Quiescent Current Change	ΔI_{QC}	11.5V ≤ V_{IN} ≤ 25.0V		-	-	0.8	mA
		5.0mA ≤ I_O ≤ 350mA		-	-	0.5	
Ripple Rejection	RR	12.5V ≤ V_{IN} ≤ 23.0V, I_O=300mA f=120Hz		56	-	-	dB
Dropout Voltage	V_{DROP}	I_O=500mA	T_J =25℃	-	2.0	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	58	-	uV/ V_O
Short Circuit Current	I_{SC}	V_I=35V	T_A =25℃	-	250	-	mA
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0mA		-	-0.5	-	mV/℃

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

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=17V, C_{IN} = 0.33uF, C_{OUT} = 0.1uF, I_{OUT} = 350mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78M10x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		9.6	10.0	10.4	V
		12.5V ≤ V_{IN} ≤ 25.0V 5.0mA ≤ I_O ≤ 350mA		9.5	10.0	10.5	
Line Regulation	$\triangle V_{O(\triangle VI)}$	12.5V ≤ V_{IN} ≤ 25.0V, I_O=200mA	T_J =25℃	-	-	100	mV
		13.0V ≤ V_{IN} ≤ 25.0V, I_O=200mA		-	-	50	
Load Regulation	$\triangle V_{O(\triangle IL)}$	5.0mA ≤ I_O ≤ 500mA	T_J =25℃	-	-	200	mV
		5mA ≤ I_O ≤ 200mA		-	-	100	
Quiescent Current	I_{QC}	T_J =25℃		-	4.1	6.0	mA
Quiescent Current Change	ΔI_{QC}	12.5V ≤ V_{IN} ≤ 25V, I_O=200mA		-	-	0.8	mA
		5.0mA ≤ I_O ≤ 350mA		-	-	0.5	
Ripple Rejection	RR	13.0V ≤ V_{IN} ≤ 23.0V, I_O=300mA f=120Hz		55	-	-	dB
Dropout Voltage	V_{DROP}	I_O=500mA	T_J =25℃	-	2.0	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	65	-	uV/ V_O
Short Circuit Current	I_{SC}	V_I=35V	T_A =25℃	-	300	-	mA
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0mA		-	-0.5	-	mV/℃

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

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=19V, C_{IN} = 0.33uF, C_{OUT} = 0.1 uF, I_{OUT} = 350mA, T_j=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78M12x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		11.5	12.0	12.5	V
		14.5V ≤ V_{IN} ≤ 27.0V 5.0mA ≤ I_O ≤ 350mA		11.4	12.0	12.6	
Line Regulation	$\triangle V_{O(\triangle VI)}$	14.5V ≤ V_{IN} ≤ 30.0V, I_O=200mA	T_J =25℃	-	-	100	mV
		16.0V ≤ V_{IN} ≤ 30.0V, I_O=200mA		-	-	50	
Load Regulation	$\triangle V_{O(\triangle IL)}$	5.0mA ≤ I_O ≤ 500mA	T_J =25℃	-	-	240	mV
		5.0mA ≤ I_O ≤ 200mA		-	-	120	
Quiescent Current	I_{QC}	T_J =25℃		-	4.1	6.0	mA
Quiescent Current Change	ΔI_{QC}	14.5V ≤ V_{IN} ≤ 30.0V, I_O=200mA		-	-	0.8	mA
		5.0mA ≤ I_O ≤ 350mA		-	-	0.5	
Ripple Rejection	RR	15.0V ≤ V_{IN} ≤ 25.0V, I_O=300mA f=120Hz		55	-	-	dB
Dropout Voltage	V_{DROP}	I_O=500mA	T_J =25℃	-	2.0	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	75	-	uV/ V_O
Short Circuit Current	I_{SC}	V_I=35V	T_A =25℃	-	300	-	mA
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0mA		-	-0.5	-	mV/℃

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

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=23V, C_{IN} = 0.33uF, C_{OUT} = 0.1 uF, I_{OUT} = 350mA, T_j=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78M15x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		14.4	15.0	15.6	V
		17.5V ≤ V_{IN} ≤ 30.0V 5.0mA ≤ I_O ≤ 350mA		14.25	15.0	15.75	
Line Regulation	$\triangle V_{O(\triangle VI)}$	17.5V ≤ V_{IN} ≤ 30.0V, I_O=200mA	T_J =25℃	-	-	100	mV
		20.0V ≤ V_{IN} ≤ 30.0V, I_O=200mA		-	-	50	
Load Regulation	$\triangle V_{O(\triangle IL)}$	5.0mA ≤ I_O ≤ 500mA	T_J =25℃	-	-	300	mV
		5.0mA ≤ I_O ≤ 200mA		-	-	150	
Quiescent Current	I_{QC}	T_J =25℃		-	4.1	6.0	mA
Quiescent Current Change	ΔI_{QC}	17.5V ≤ V_{IN} ≤ 30.0V, I_O=200mA		-	-	0.8	mA
		5.0mA ≤ I_O ≤ 350mA		-	-	0.5	
Ripple Rejection	RR	18.5V ≤ V_{IN} ≤ 28.5V, I_O=300mA f=120Hz		54	-	-	dB
Dropout Voltage	V_{DROP}	I_O=500mA	T_J =25℃	-	2.0	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	100	-	uV/ V_O
Short Circuit Current	I_{SC}	V_I=35V	T_A =25℃	-	300	-	mA
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0mA		-	-1.0	-	mV/℃

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

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=26V, C_{IN} = 0.33uF, C_{OUT} = 0.1uF, I_{OUT} = 350mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78M18x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		17.3	18.0	18.7	V
		20.5V ≤ V_{IN} ≤ 33.0V 5.0mA ≤ I_O ≤ 350mA		17.1	18.0	18.9	
Line Regulation	$\triangle V_{O(\triangle VI)}$	21.0V ≤ V_{IN} ≤ 33.0V, I_O=200mA	T_J =25℃	-	-	100	mV
		24.0V ≤ V_{IN} ≤ 33.0V, I_O=200mA		-	-	50	
Load Regulation	$\triangle V_{O(\triangle IL)}$	5.0mA ≤ I_O ≤ 500mA	T_J =25℃	-	-	360	mV
		5.0mA ≤ I_O ≤ 200mA		-	-	180	
Quiescent Current	I_{QC}	T_J =25℃		-	4.2	6.0	mA
Quiescent Current Change	ΔI_{QC}	21.0V ≤ V_{IN} ≤ 33.0V, I_O=200mA		-	-	0.8	mA
		5.0mA ≤ I_O ≤ 350mA		-	-	0.5	
Ripple Rejection	RR	22.0V ≤ V_{IN} ≤ 32.0V, I_O=300mA f=120Hz		53	-	-	dB
Dropout Voltage	V_{DROP}	I_O=500mA	T_J =25℃	-	2.0	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	100	-	uV/ V_O
Short Circuit Current	I_{SC}	V_I=35V	T_A =25℃	-	300	-	mA
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0mA		-	-1.1	-	mV/℃

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

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=33V, C_{IN} = 0.33uF, C_{OUT} = 0.1uF, I_{OUT} = 350mA, T_J=0℃~125℃ ; unless otherwise specified)

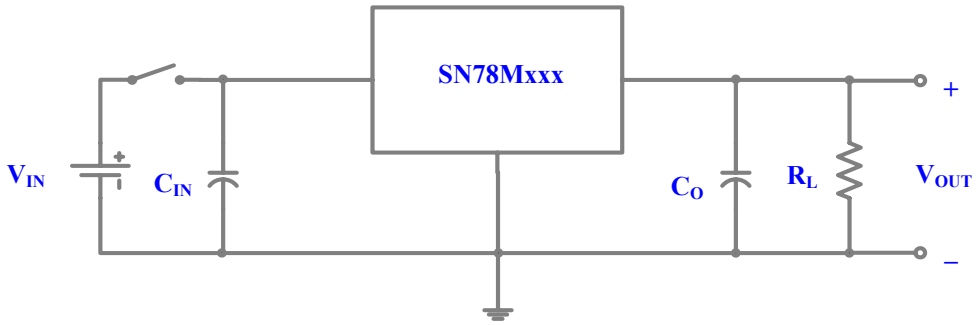
Characteristic	Symbol	Test Condition*		SN78M24x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		23.0	24.0	25.0	V
		27.0V ≤ V_{IN} ≤ 38.0V 5.0mA ≤ I_O ≤ 350mA		22.8	24.0	25.25	
Line Regulation	$\triangle V_{O(\triangle VI)}$	27.0V ≤ V_{IN} ≤ 38.0V, I_O=200mA	T_J =25℃	-	-	100	mV
		28.0V ≤ V_{IN} ≤ 38.0V, I_O=200mA		-	-	50	
Load Regulation	$\triangle V_{O(\triangle IL)}$	5.0mA ≤ I_O ≤ 500mA	T_J =25℃	-	-	480	mV
		5.0mA ≤ I_O ≤ 200mA		-	-	240	
Quiescent Current	I_{QC}	T_J =25℃		-	4.2	6.0	mA
Quiescent Current Change	ΔI_{QC}	27.0V ≤ V_{IN} ≤ 38.0V, I_O=200mA		-	-	0.8	mA
		5.0mA ≤ I_O ≤ 350mA		-	-	0.5	
Ripple Rejection	RR	28.0V ≤ V_{IN} ≤ 38.0V, I_O=300mA f=120Hz		50	-	-	dB
Dropout Voltage	V_{DROP}	I_O=500mA	T_J =25℃	-	2.0	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	170	-	uV/ V_O
Short Circuit Current	I_{SC}	V_I=35V,	T_A =25℃	-	300	-	mA
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0mA		-	-1.2	-	mV/℃

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

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

Typical Application

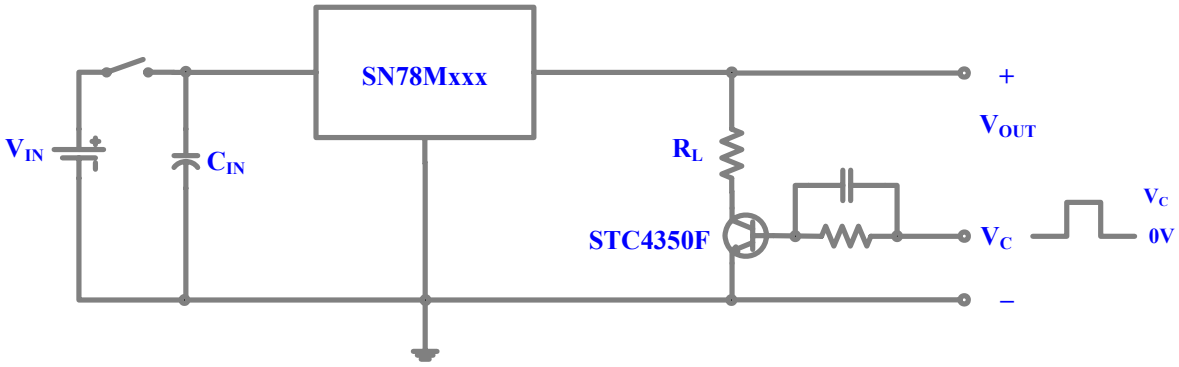
Fixed Output Regulator



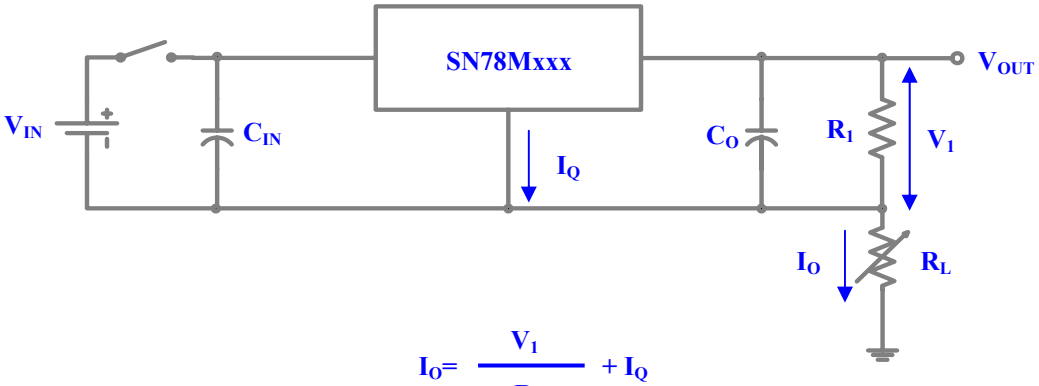
1) C_{IN} should be required if regulators are located far from power supply filter

2) C_O improves output stability and transient response

Load Regulation

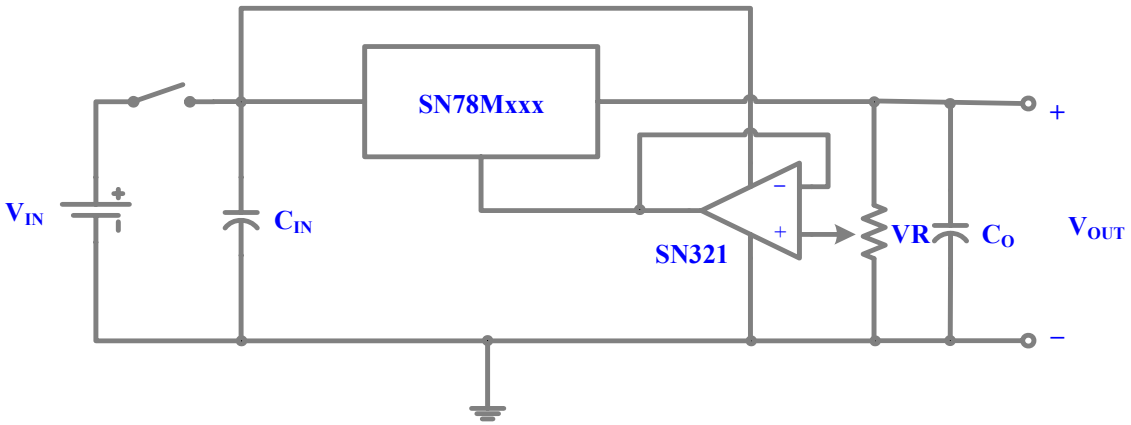


Constant Current Regulator

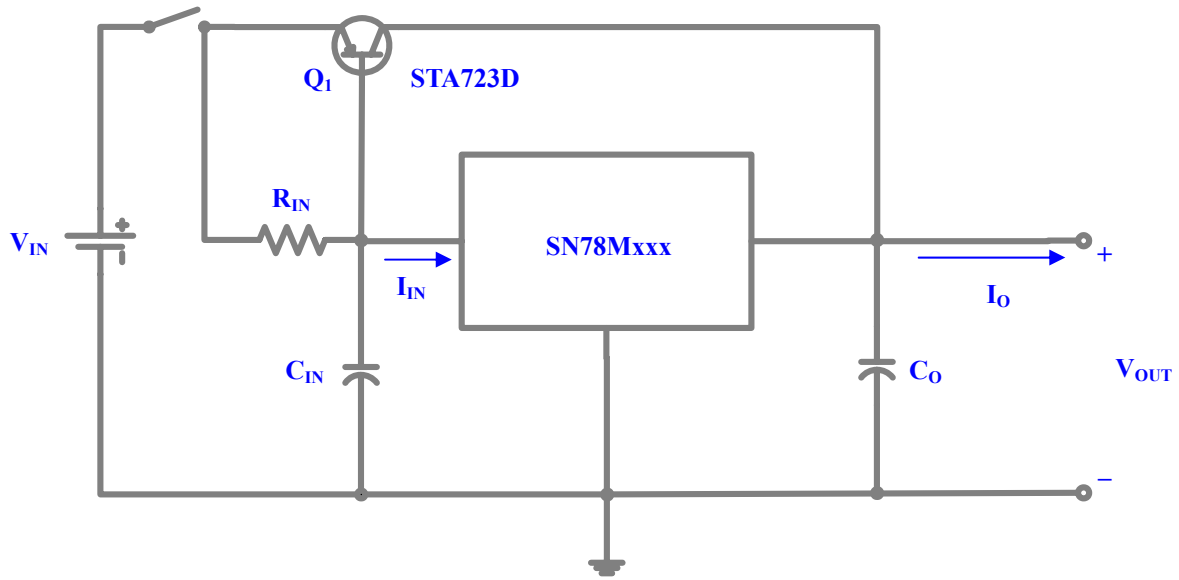


$$I_O = \frac{V_1}{R_1} + I_Q$$

Adjustable Output Regulator



High Current Voltage Regulator



$$I_O = I_{IN} + \beta_{Q1}(I_{IN} - V_{BEQ1} / R_{IN})$$

Fig.1 Quiescent Current vs. Junction Temperature

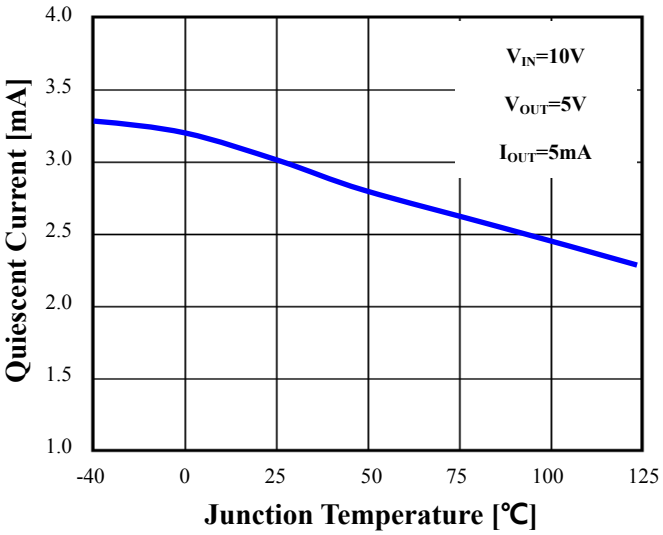


Fig.2 Output Peak Current vs. Input to Output Differential

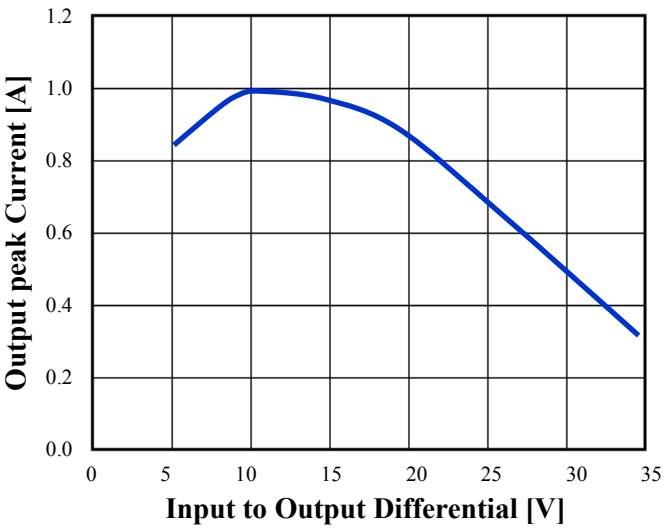


Fig.3 Output Voltage vs. Junction Temperature

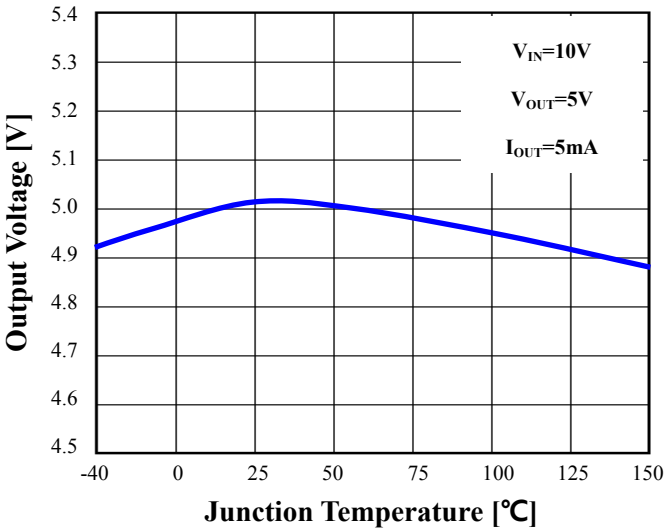


Fig.4 Dropout Voltage vs. Input Voltage

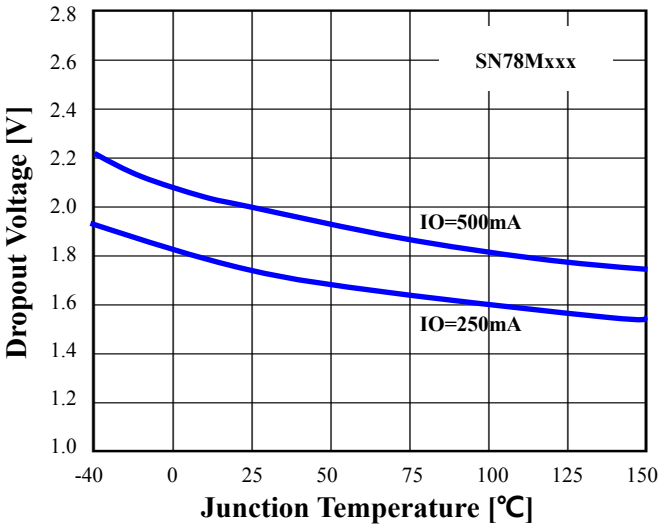


Fig.5 Line Transient Response

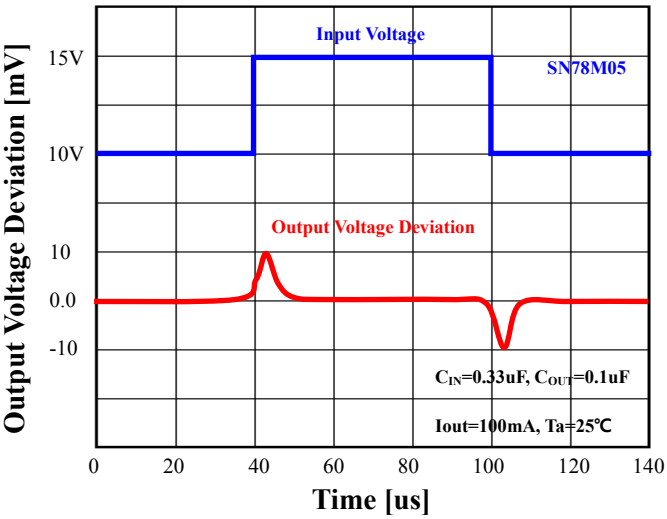
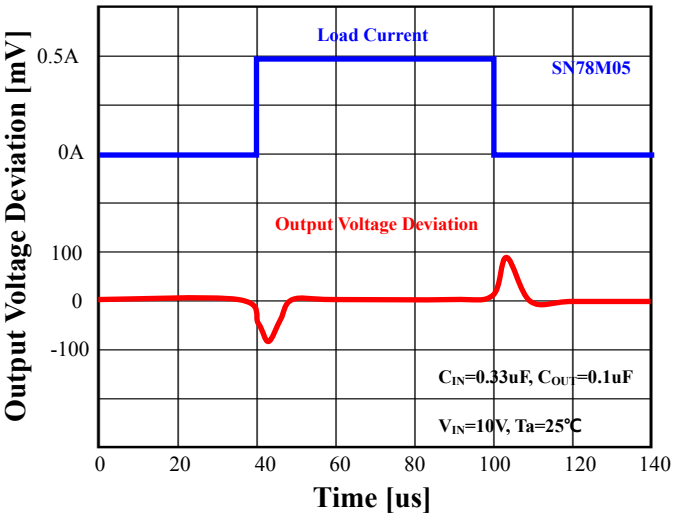
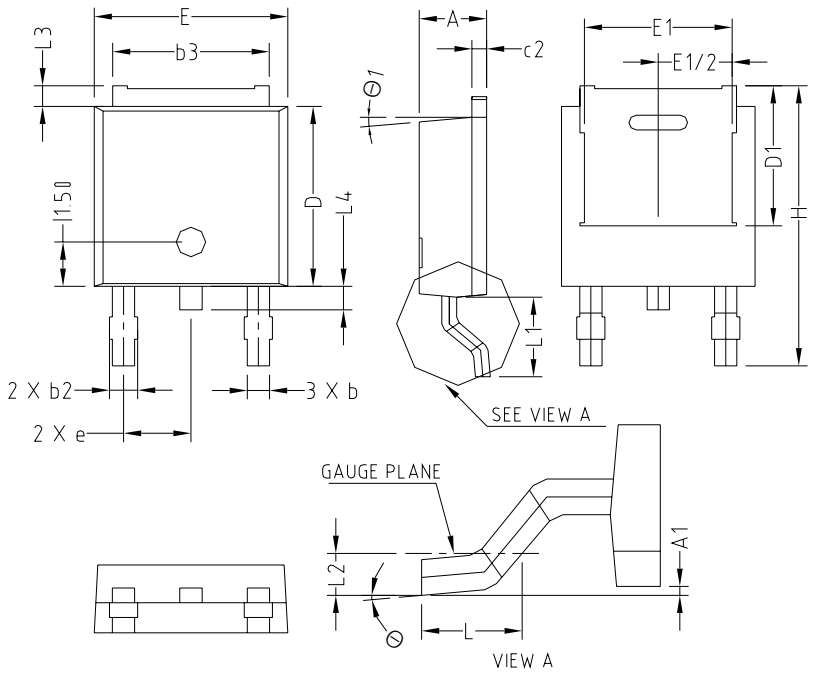


Fig.6 Load Transient Response

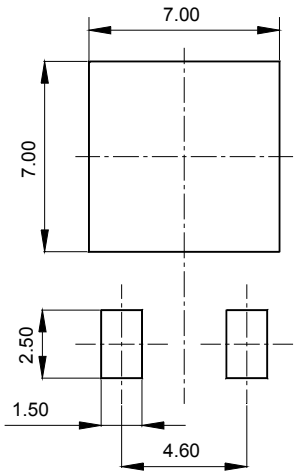


◈ TO-252-3L Outline Dimension (Unit : mm)

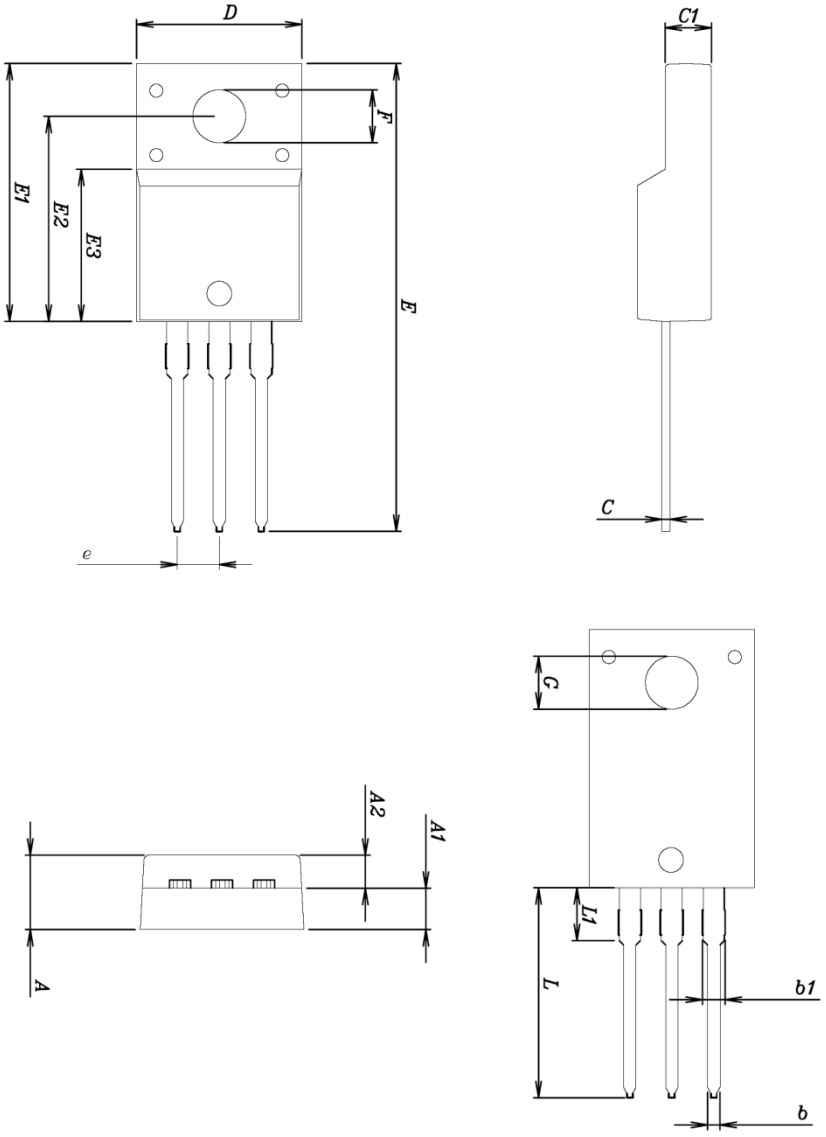


SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	2.20	2.30	2.40	
A1	0.00		0.127	
b	0.66	0.76	0.86	
b2	-	-	0.96	
b3	5.04	5.34	5.64	
c2	0.40	0.50	0.60	
D	5.90	6.10	6.30	
D1		4.75		
E	6.40	6.60	6.80	
E1		5.04		
e		2.30 BSC		
H	9.20	9.50	9.80	
L	1.27	1.47	1.67	
L1	2.50	2.70	2.90	
L2		0.508 BSC		
L3	0.50	0.70	0.90	
L4	0.60	0.80	1.00	
θ	0°	-	10°	
θ1		5°		

※ Recommend PCB solder land [Unit: mm]



◈ TO-220F-3L Outline Dimension (Unit : mm)



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	–	–	4.60	
A1	2.45	2.50	2.55	
A2	1.95	2.00	2.05	
b	0.65	0.75	0.85	
b1	1.07	1.27	1.47	
C	0.40	0.50	0.60	
C1	2.70	2.80	2.90	
D	9.90	10.00	10.10	
E	28.00	–	28.60	
E1	15.50	15.60	15.70	
E2	12.30	12.40	12.50	
E3	9.15	9.20	9.25	
F	3.10	3.20	3.30	
G	3.30	3.40	3.50	
e	2.54 BSC			
L	12.40	–	13.00	
L1	3.46 BSC			

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