



QNHCHIP

QN78Mxx

Product Specification

QN78Mxx

Positive-Voltage Regulator



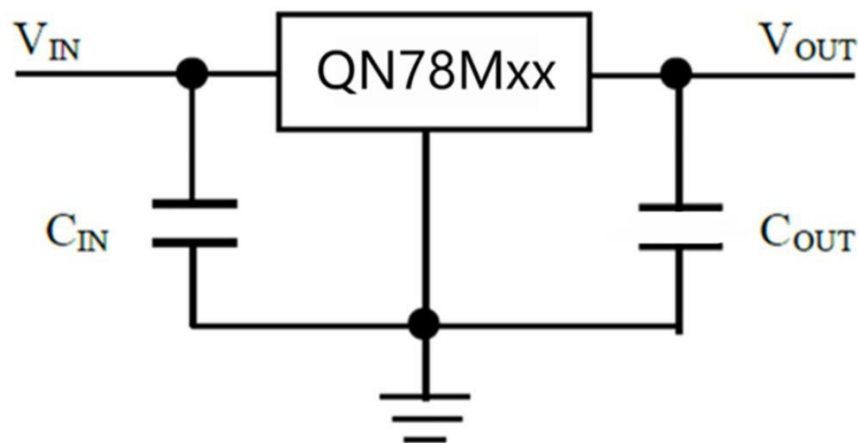
Description

The QN78Mxx series are fixed-voltage monolithic integrated circuit voltage regulators are designed for a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. In addition, they can be used with power-pass elements to make high-current voltage regulators. Each of these regulators can deliver up to 500mA of output current.

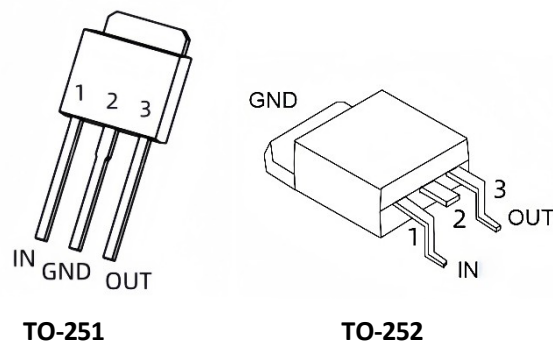
FEATURES

- Three Terminal Regulators.
- Output Current up to 500mA
- No External Components.
- Internal Thermal Overload Protection.
- Internal Short-Circuit Limiting.

Typical Application



Pin Description



Pin Number	Pin Name	Description
1	IN	Input
2	GND	Ground
3	OUT	Output



Absolute Maximum Ratings

Symbol	Parameter	Value		Unit
		QN78M05/ QN78M12	QN78M15	
V _{IN}	Input voltage	35	40	V
I _{OUT}	Output current	0.5		A
T _A	Operating ambient temperature	-40 ~ +125		°C
T _J	Operating junction temperature	0 ~ +150		°C
T _{STG}	Storage temperature	-65 ~ +150		°C
T _{LEAD}	Lead temperature 1.6mm from case for 10 seconds	260		°C

Thermal Characteristics

Symbol	Parameter	Package	Typical Value	Unit
θ_{JA}	Thermal Resistance From Junction to Ambient in Free Air. (Measured with the component mounted on a higheffective thermal conductivity test board in free air.)	TO-252	62.5	°C/W
		TO-251	100	

Recommended Operating Conditions

Symbol	Parameter		Min.	Max.	Unit
V _{IN}	Input voltage	QN78M05	7	25	V
		QN78M12	14.5	30	
		QN78M15	17.5	30	
I _{OUT}	Output current		-	0.5	A
T _J	Operating virtual junction temperature		-	125	°C



QN78M05 Electrical Characteristics

($T_A=25^{\circ}\text{C}$, $V_{IN}=10\text{V}$, $I_{OUT}=350\text{mA}$, unless otherwise noted.)

Symbol	Parameter	Test Conditions ⁽¹⁾		Min.	Typ.	Max.	Unit
V _{OUT} ⁽²⁾	Output voltage			4.8	5.0	5.2	V
		I _O =5mA~350mA V _{IN} =7V~20V	0~125℃	4.75	5.00	5.25	
Reg _{line}	Line regulation	V _{IN} =7V~25V	I _O =200mA	-	-	100	mV
		V _{IN} =8V~25V		-	-	50	
Reg _{load}	Load regulation	I _O =5mA~200mA		-	-	50	mV
		I _O =5mA~500mA		-	-	100	
PSRR	Ripple rejection	V _{IN} =8V~18V, f=120Hz		62	80	-	dB
V _n	Output noise voltage	F=10Hz~100Hz		-	40	-	uV
V _{DROPOUT}	Dropout voltage			-	2.0	-	V
I _Q	Bias current			-	4.8	8.0	mA
			125℃	-	-	7.5	
ΔI _Q	Bias current change	V _{IN} =7V~25V	0~125℃	-	-	1.0	mA
		I _O =5mA~350mA		-	-	0.5	

QN78M12 Electrical Characteristics

($T_A=25^{\circ}\text{C}$, $V_{IN}=19\text{V}$, $I_{OUT}=350\text{mA}$, unless otherwise noted.)

Symbol	Parameter	Test Conditions ⁽¹⁾		Min.	Typ.	Max.	Unit
V _{OUT} ⁽²⁾	Output voltage			11.5	12.0	12.5	V
		I _O =5Ma~350mA V _{IN} =14.5V~27V	0~125℃	11.4	12.0	12.6	
Reg _{line}	Line regulation	V _{IN} =14.5V~30V	I _O =200mA	-	-	150	mV
		V _{IN} =16V~30V		-	-	75	
Reg _{load}	Load regulation	I _O =5mA~200mA		-	-	120	mV
		I _O =5mA~500mA		-	-	240	
PSRR	Ripple rejection	V _{IN} =15V~25V, f=120Hz		62	80	-	dB
V _n	Output noise voltage	F=10Hz~100Hz		-	75	-	uV
V _{DROPOUT}	Dropout voltage			-	2.0	-	V
I _Q	Bias current			-	4.8	8.0	mA
			125℃	-	-	7.5	
ΔI _Q	Bias current change	V _{IN} =14.5V~30V	0~125℃	-	-	1.0	mA
		I _O =5mA~350mA		-	-	0.5	



QN78M15 Electrical Characteristics

($T_A=25^{\circ}\text{C}$, $V_{IN}=23\text{V}$, $I_{OUT}=350\text{mA}$, unless otherwise noted.)

Symbol	Parameter	Test Conditions ⁽¹⁾		Min.	Typ.	Max.	Unit
V _{OUT} ⁽²⁾	Output voltage			14.4	15.0	15.6	V
		I _O =5mA~350mA V _{IN} =17.5V~30V	0~125℃	14.25	15.0	15.75	
Reg _{line}	Line regulation	V _{IN} =17.5V~30V	I _O =200mA	-	-	150	mV
		V _{IN} =20V~30V		-	-	75	
Reg _{load}	Load regulation	I _O =5mA~200mA		-	-	150	mV
		I _O =5mA~500mA		-	-	300	
PSRR	Ripple rejection	V _{IN} =18.5V~28.5V, f=120Hz		60	70	-	dB
V _n	Output noise voltage	F=10Hz~100Hz		-	100	-	uV
V _{DROPOUT}	Dropout voltage			-	2.0	-	V
I _Q	Bias current			-	4.9	8.0	mA
			125℃	-	-	7.5	
ΔI _Q	Bias current change	V _{IN} =17.5V~30V	0~125℃	-	-	1.0	mA
		I _O =5mA~350mA		-	-	0.5	

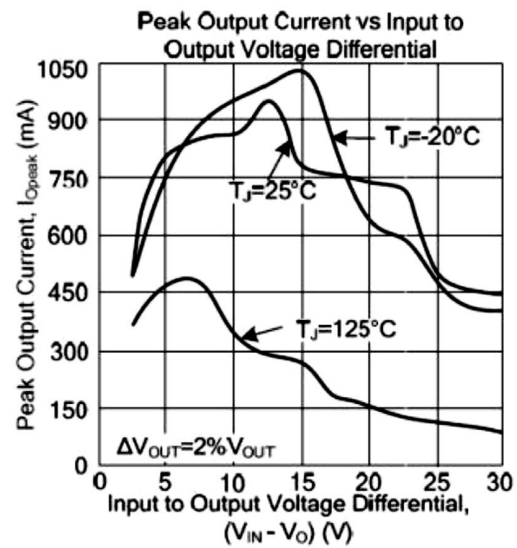
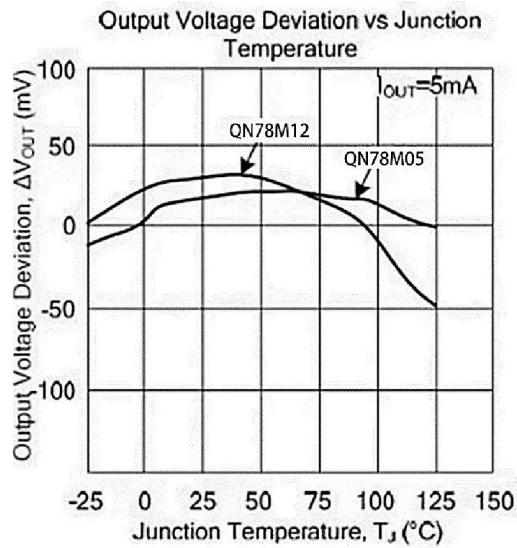
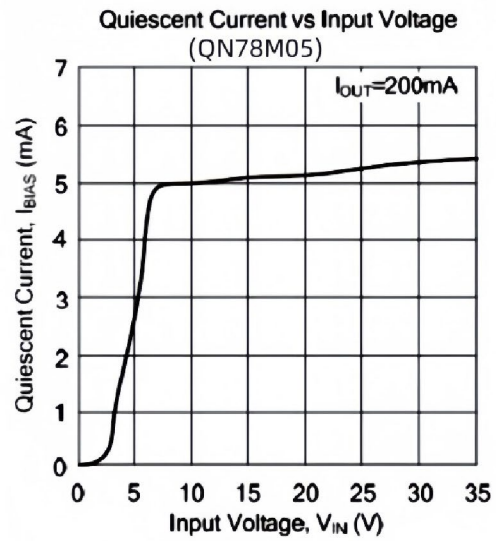
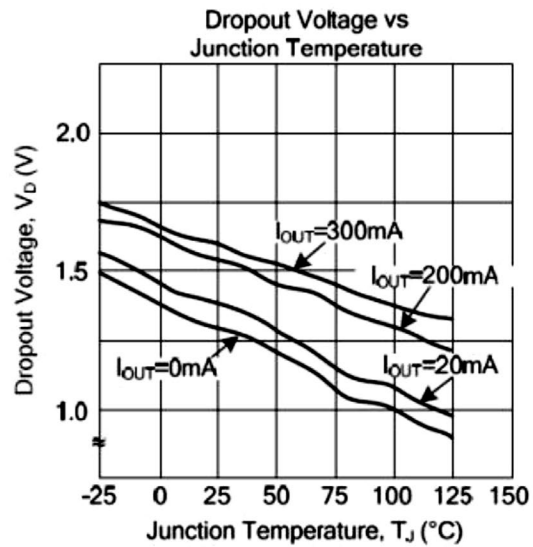
Note:

(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 μF capacitor across the input and a 0.1 μF capacitor across the output.

(2) The specification applies only for DC power dissipation permitted by absolute maximum rating.



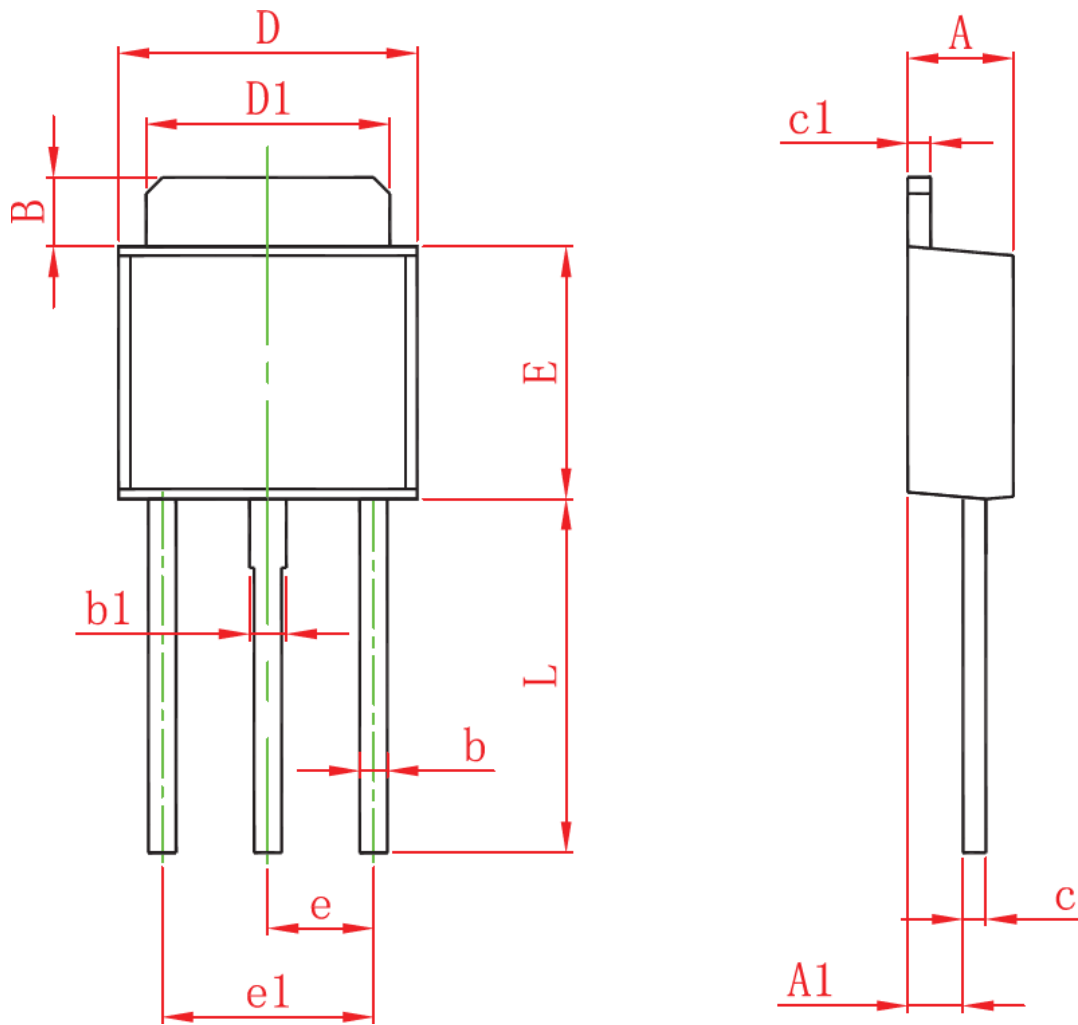
Typical Application Circuits





Package Information

T0-251

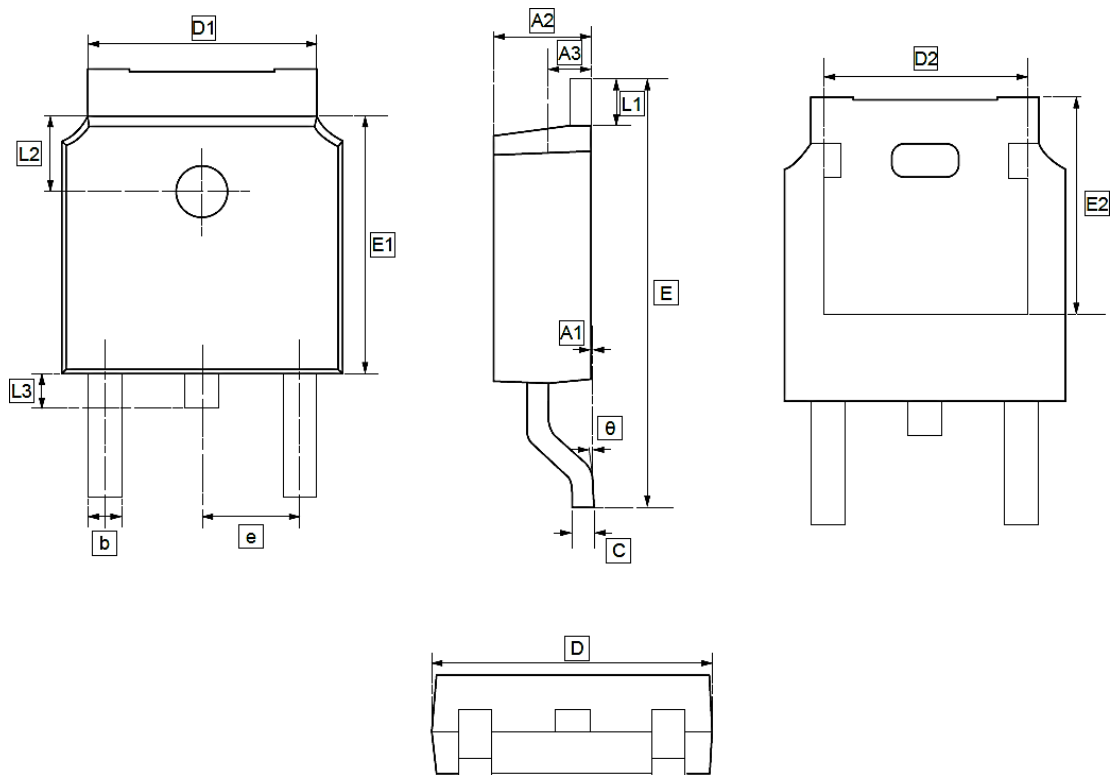


DIMENSIONS(mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	1.050	1.350	0.042	0.054
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	7.500	7.900	0.295	0.311



TO-252



DIMENSIONS(mm)

Symbol	Min.	Max.
A1	0.00	0.13
A2	2.18	2.39
A3	0.90	1.10
b	0.65	0.85
c	0.46	0.61
D	6.35	6.73
D1	4.95	5.46
D2	4.32	4.90
E	9.40	10.41
E1	5.97	6.22
E2	5.21	5.38
e	2.286 BSC	
L1	0.89	1.27
L2	1.70	1.90
L3	0.60	1.00
θ	0°	8°

Ordering information

Order Code	Marking	Package	current	V _{IN} (V)	PACKAGE OPTION
QN78M05A-T	78M05	TO-252	500mA	7 ~ 25	Tape and Reel
QN78M12A-T	78M12	TO-252	500mA	14.5 ~ 30	Tape and Reel
QN78M15A-T	78M15	TO-252	500mA	17.5 ~ 30	Tape and Reel