



LINEAR INTEGRATED CIRCUIT
3-TERMINAL 0.5A POSITIVE
VOLTAGE REGULATOR

TO-252W

Description

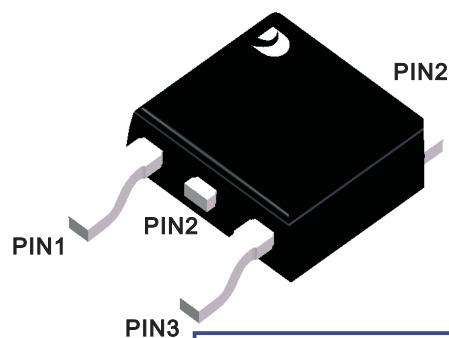
The 78MXXD family is monolithic fixed voltage regulator integrated circuit. They are suitable for applications that required supply current up to 0.5A.

Features

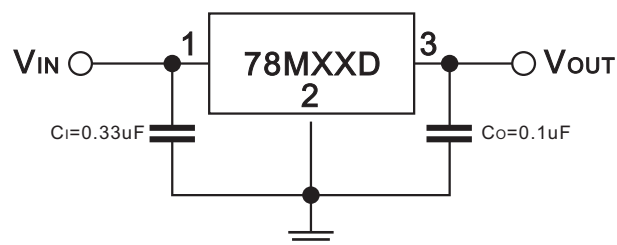
- Hireliability application and automotive grade AEC-Q100 qualified
- Output current up to 0.5A
- Fixed output voltage of 5V, 6V, 8V, 9V, 12V, 15V available
- Thermal overload shutdown protection
- Output transistor SOA protection

Mechanical data

- Case: TO-252W
- Approx. Weight: 0.33g (0.012oz)
- RoHS compliant
- Case Material: "Green" molding compound, UL flammability classification 94V-0, "Halogen-free".



APPLICATION CIRCUIT



ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

PARAMETER		SYMBOLS	RATINGS	UNIT
Drain-Source Voltage	$V_{OUT}=5\sim 15V$	V_{IN}	35	V
Output Current		I_{OUT}	0.5	A
Power Dissipation		P_D	15	W
Junction Temperature		T_J	+150	°C
Operating Temperature		T_{OPR}	-40 ~ +125	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Note: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. The maximum steady state usable output current are dependent on input voltage, heat sinking, lead length of the package and copper pattern of PCB. The data are showed as electrical characteristics table represents pulse test conditions with junction temperatures specified at the initiation of test.

THERMAL DATA

PARAMETER	SYMBOLS	RATINGS	UNIT
Junction to Ambient	R_{thJA}	65	°C/W
Junction to Case	R_{thJC}	5	°C/W



ELECTRICAL CHARACTERISTICS

(T_J=25°C, C_I=0.33uF, C_O=0.1uF, P_D≤15W, unless otherwise specified)

AT-78M05D(V_{IN}=10V,I_{OUT}=0.5A)

PARAMETER	SYMBOL	TEST CONDITIONS	Min	Typ	Max	UNIT
Output Voltage	V _{OUT}	V _{IN} =10V,I _{OUT} =350mA	4.8	5.00	5.2	V
		V _{IN} =7~20V, I _{OUT} =5mA~350mA	4.75		5.25	V
Load Regulation	Δ V _{OUT}	V _{IN} =10V,I _{OUT} =5mA~0.5A			100	mV
		V _{IN} =10V,I _{OUT} =5mA~0.2A			50	mV
Line Regulation	Δ V _{OUT}	V _{IN} =7~25V,I _{OUT} =200mA			100	mV
		V _{IN} =8~25V,I _{OUT} =200mA			50	mV
Quiescent Current	I _Q	I _{OUT} =350mA,V _i =10V			6.0	mA
Quiescent Current Change	Δ I _Q	V _{IN} =8~25V,I _o =200mA			0.8	mA
		I _{OUT} =5mA~350mA,V _i =10V			0.5	mA
Peak Output Current	I _{PEAK}	V _{IN} =10V		2.0		A
Short-Circuit Current	I _{sc}	V _{IN} =35V		200		mA
Dropout Voltage	V _D			2.0		V

AT-78M06D(V_{IN}=11V,I_{OUT}=0.5A)

PARAMETER	SYMBOL	TEST CONDITIONS	Min	Typ	Max	UNIT
Output Voltage	V _{OUT}	V _{IN} =11V,I _{OUT} =350mA	5.75	6.00	6.25	V
		V _{IN} =8~21V, I _{OUT} =5mA~350mA	5.7		6.3	V
Load Regulation	Δ V _{OUT}	V _{IN} =11V,I _{OUT} =5mA~0.5A			120	mV
		V _{IN} =11V,I _{OUT} =5mA~0.2A			60	mV
Line Regulation	Δ V _{OUT}	V _{IN} =8~25V,I _{OUT} =200mA			100	mV
		V _{IN} =9~20V,I _{OUT} =200mA			50	mV
Quiescent Current	I _Q	I _{OUT} =350mA,V _i =10V			6.0	mA
Quiescent Current Change	Δ I _Q	V _{IN} =9~25V,I _o =200mA			0.8	mA
		I _{OUT} =5mA~350mA,V _i =14V			0.5	mA
Peak Output Current	I _{PEAK}	V _{IN} =10V		2.0		A
Short-Circuit Current	I _{sc}	V _{IN} =35V		200		mA
Dropout Voltage	V _D			2.0		V



AT-78M08D(V_{IN}=14V,I_{OUT}=0.5A)

PARAMETER	SYMBOL	TEST CONDITIONS	Min	Typ	Max	UNIT
Output Voltage	V _{OUT}	V _{IN} =14V,I _{OUT} =350mA	7.7	8.00	8.3	V
		V _{IN} =10.5~23V, I _o =5mA~350mA	7.6		8.4	V
Load Regulation	Δ V _{OUT}	V _{IN} =14V,I _{OUT} =5mA~0.5A			160	mV
		V _{IN} =14V,I _{OUT} =5mA~0.2A			80	mV
Line Regulation	Δ V _{OUT}	V _{IN} =10.5~25V,I _{OUT} =200mA			100	mV
		V _{IN} =11~25V,I _{OUT} =200mA			50	mV
Quiescent Current	I _Q	I _{OUT} =350mA,V _i =14V			6.0	mA
Quiescent Current Change	Δ I _Q	V _{IN} =10.5~25V,I _o =200mA			0.8	mA
		I _{OUT} =5mA~350mA,V _i =14V			0.5	mA
Peak Output Current	I _{PEAK}	V _{IN} =10V		2.0		A
Short-Circuit Current	I _{sc}	V _{IN} =35V		200		mA
Dropout Voltage	V _D			2.0		V

AT-78M09D(V_{IN}=16V,I_{OUT}=0.5A)

PARAMETER	SYMBOL	TEST CONDITIONS	Min	Typ	Max	UNIT
Output Voltage	V _{OUT}	V _{IN} =16V,I _{OUT} =350mA	8.73	9.00	9.27	V
		V _{IN} =11.5~24V, I _o =5mA~350mA	8.55		9.45	V
Load Regulation	Δ V _{OUT}	V _{IN} =15V,I _{OUT} =5mA~0.5A			180	mV
		V _{IN} =15V,I _{OUT} =5mA~0.2A			90	mV
Line Regulation	Δ V _{OUT}	V _{IN} =11.5~25V,I _{OUT} =200mA			100	mV
		V _{IN} =12~25V,I _{OUT} =200mA			50	mV
Quiescent Current	I _Q	I _{OUT} =350mA,V _i =10V			6.0	mA
Quiescent Current Change	Δ I _Q	V _{IN} =11.5~25V,I _o =200mA			0.8	mA
		I _{OUT} =5mA~350mA,V _i =15V			0.5	mA
Peak Output Current	I _{PEAK}	V _{IN} =10V		2.0		A
Short-Circuit Current	I _{sc}	V _{IN} =35V		200		mA
Dropout Voltage	V _D			2.0		V



AT-78M12D(V_{IN}=19V,I_{OUT}=0.5A)

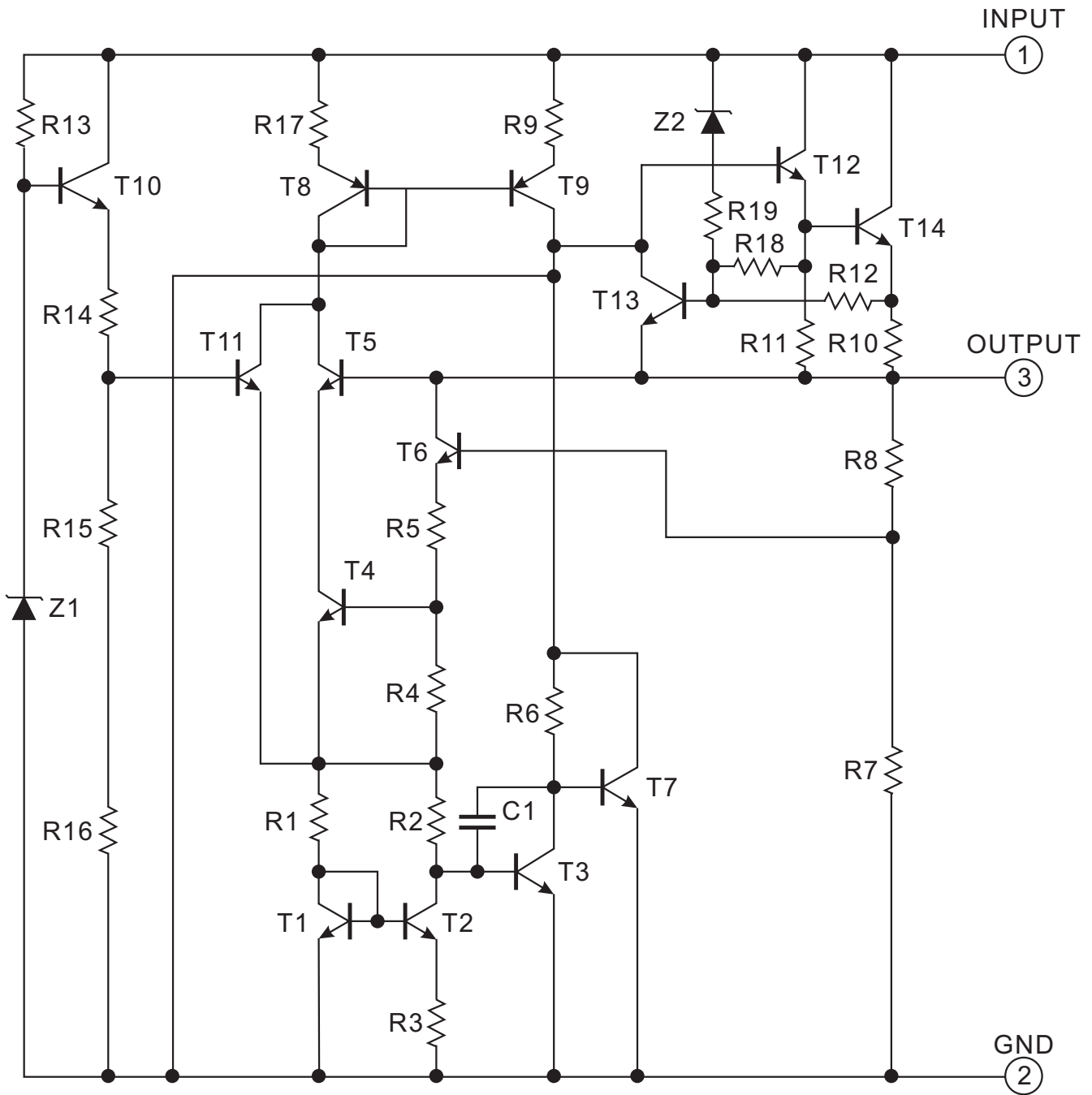
PARAMETER	SYMBOL	TEST CONDITIONS	Min	Typ	Max	UNIT
Output Voltage	V _{OUT}	V _{IN} =19V,I _{OUT} =350mA	11.5	12.0	12.5	V
		V _{IN} =14.5~27V, I _o =5mA~350mA	11.4		12.6	V
Load Regulation	Δ V _{OUT}	V _{IN} =19V,I _{OUT} =5mA~0.5A			240	mV
		V _{IN} =19V,I _{OUT} =5mA~0.2A			120	mV
Line Regulation	Δ V _{OUT}	V _{IN} =14.5~30V,I _{OUT} =200mA			100	mV
		V _{IN} =16~30V,I _{OUT} =200mA			50	mV
Quiescent Current	I _Q	I _{OUT} =350mA, V _i =19V			6.0	mA
Quiescent Current Change	Δ I _Q	V _{IN} =14.5~30V,I _o =200mA			0.8	mA
		I _{OUT} =5mA~350mA, V _i =19V			0.5	mA
Peak Output Current	I _{PEAK}	V _{IN} =10V		2.0		A
Short-Circuit Current	I _{SC}	V _{IN} =35V		200		mA
Dropout Voltage	V _D			2.0		V

AT-78M15D(V_{IN}=23V,I_{OUT}=0.5A)

PARAMETER	SYMBOL	TEST CONDITIONS	Min	Typ	Max	UNIT
Output Voltage	V _{OUT}	V _{IN} =23V,I _{OUT} =350mA	14.5	15.0	15.5	V
		V _{IN} =17.5~30V, I _o =5mA~350mA	14.4		15.6	V
Load Regulation	Δ V _{OUT}	V _{IN} =23V,I _{OUT} =5mA~0.5A			300	mV
		V _{IN} =23V,I _{OUT} =5mA~0.2A			150	mV
Line Regulation	Δ V _{OUT}	V _{IN} =17.5~30V,I _{OUT} =200mA			100	mV
		V _{IN} =20~30V,I _{OUT} =200mA			50	mV
Quiescent Current	I _Q	I _{OUT} =350mA, V _i =23V			6.0	mA
Quiescent Current Change	Δ I _Q	V _{IN} =17.5~30V,I _o =200mA			0.8	mA
		I _{OUT} =5mA~350mA, V _i =23V			0.5	mA
Peak Output Current	I _{PEAK}	V _{IN} =10V		2.0		A
Short-Circuit Current	I _{SC}	V _{IN} =35V		200		mA
Dropout Voltage	V _D			2.0		V

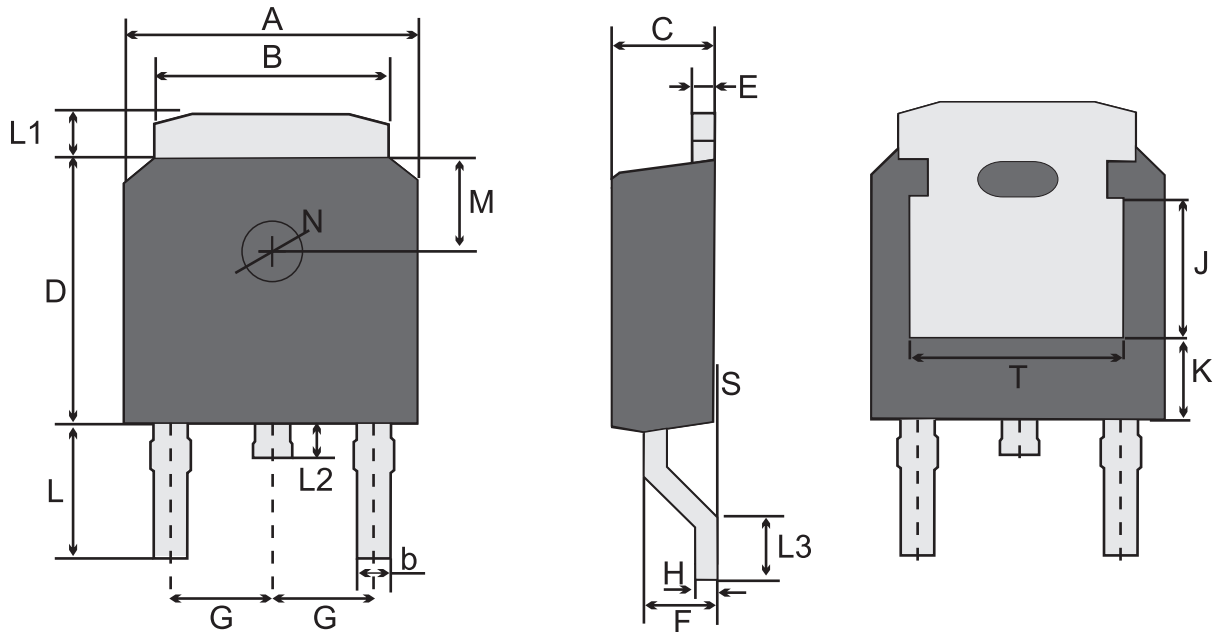


■ Test Circuits





TO-252W(D-PAK) Package Outline Dimensions



TO-252W(D-PAK) Mechanical data

UNIT		A	B	b	C	D	E	F	G	H	L	L1	L2	L3	S	M	N	J	T	K
mm	max	6.7	5.53	0.86	2.5	6.3	0.61	1.87	2.3 typ.	0.55	3.1	1.2	1.0	1.75	0.1	1.8 typ.	1.3 typ.	3.2 ref.	4.83 ref.	1.8 ref.
	typ	6.6	5.33	0.76	2.3	6.1	0.51	1.57		0.50	2.95	1.0	0.8	1.30	0.05					
	min	6.3	5.13	0.66	2.1	5.9	0.41	1.27		0.45	2.7	0.8	0.6	1.0	/					
mil	max	264	218	34	98	248	24	74	91 typ.	22	121	47	39	69	3.9	71 typ.	51 typ.	126 ref.	190 ref.	71 ref.
	typ	260	210	30	91	240	20	62		20	116	39	31	51	2					
	min	248	202	26	83	232	16	50		18	106	31	24	39	/					

Marking

Type number	Marking code
78MXXD	78MXXD



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