



Linear Integrated Circuit 3-Terminal 1.0A Positive Voltage Regulator

Description

The 78XXD family is monolithic fixed voltage regulator integrated circuit. They are suitable for applications that required supply current up to 1.0A.

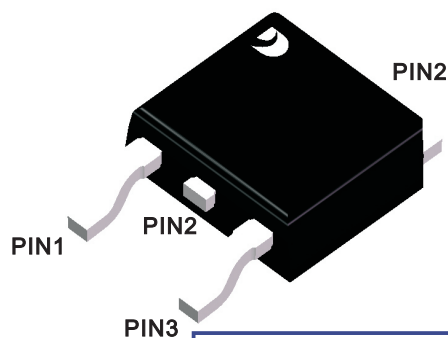
Features

- Hireliability application and automotive grade AEC-Q100 qualified
- Output current up to 1A
- 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: 0.329g (0.012oz)
- RoHS compliant
- Case Material: "Green" molding compound, UL flammability classification 94V-0, "Halogen-free".

TO-252W

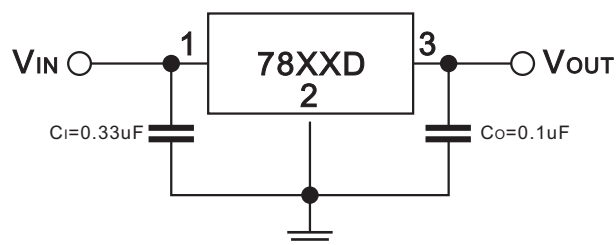


RoHS
COMPLIANT



Automotive Grade

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}	1	A
Power Dissipation		P_D	Internally Limited	W
Junction Temperature		T_J	+150	°C
Operating Temperature		T_{OPR}	-40 ~ +125	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Note: 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.

■ THERMAL DATA

PARAMETER	SYMBOLS	RATINGS	UNIT
Junction to Ambient	R_{thJA}	61.5	°C/W
Junction to Case	R_{thJC}	7.5	°C/W



■ELECTRICAL CHARACTERISTICS ($I_{OUT}=1.0A$, $T_J=0^{\circ}C\sim 125^{\circ}C$, $C_I=0.33\mu F$, $C_O=0.1\mu F$, unless otherwise specified)
(Note 1)

AT-7805D ($V_{IN}=10V$)

PARAMETER	SYMBOLS	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA \sim 1.0A$	4.8	5.0	5.2	V
		$V_{IN}=7.5V \sim 20V$, $I_{OUT}=5mA \sim 1.0A, P_D \leq 15W$	4.75		5.25	V
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA \sim 1.0A$			50	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A \sim 0.75A$			25	mV
Line regulation	ΔV_{OUT}	$V_{IN}=7V \sim 25V$, $T_J=25^{\circ}C$			50	mV
		$V_{IN}=7.5V \sim 20V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			50	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT} \leq 1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=7.5V \sim 20V$			1.0	mA
		$I_{OUT}=5mA \sim 1.0A$			0.5	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		40		μV
Ripple Rejection	RR	$V_{IN}=8V \sim 18V, f=120Hz$, $T_J=25^{\circ}C$	59	80		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A

AT-7806D ($V_{IN}=11V$)

PARAMETER	SYMBOLS	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA \sim 1.0A$	5.76	6.0	6.24	V
		$V_{IN}=8.5V \sim 21V$, $I_{OUT}=5mA \sim 1.0A, P_D \leq 15W$	5.70		6.30	V
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA \sim 1.0A$			60	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A \sim 0.75A$			30	mV
Line regulation	ΔV_{OUT}	$V_{IN}=8V \sim 25V$, $T_J=25^{\circ}C$			60	mV
		$V_{IN}=8.5V \sim 21V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			60	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT} \leq 1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=8.5V \sim 21V$			1.0	mA
		$I_{OUT}=5mA \sim 1.0A$			0.5	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		45		μV
Ripple Rejection	RR	$V_{IN}=9V \sim 19V, f=120Hz$, $T_J=25^{\circ}C$	56	75		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A



AT-7808D (VIN=14V)

PARAMETER	SYMBOLS	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V _{OUT}	T _J =25°C, I _{OUT} =5mA ~ 1.0A	7.68	8.0	8.32	V
		V _{IN} =10.5V ~ 23V, I _{OUT} =5mA ~ 1.0A, P _D ≤15W	7.60		8.40	V
Dropout Voltage	V _D	T _J =25°C		2.0		V
Load Regulation	ΔV _{OUT}	T _J =25°C, I _{OUT} =5mA ~ 1.0A			80	mV
		T _J =25°C, I _{OUT} =0.25A ~ 0.75A			40	mV
Line regulation	ΔV _{OUT}	V _{IN} =10.5V ~ 25V, T _J =25°C			80	mV
		V _{IN} =10.5V ~ 23V, T _J =25°C, I _{OUT} =1.0A			80	mV
Quiescent Current	I _Q	T _J =25°C, I _{OUT} ≤1.0A			8.0	mA
Quiescent Current Change	ΔI _Q	V _{IN} =10.5V ~ 23V			1.0	mA
		I _{OUT} =5mA ~ 1.0A			0.5	mA
Output Noise Voltage	e _N	10Hz ≤ f ≤ 100kHz		58		uV
Ripple Rejection	RR	V _{IN} =11.5V ~ 21.5V, f=120Hz, T _J =25°C	53	72		dB
Peak Output Current	I _{PEAK}	T _J =25°C		1.8		A

AT-7809D (VIN=15V)

PARAMETER	SYMBOLS	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V _{OUT}	T _J =25°C, I _{OUT} =5mA ~ 1.0A	8.64	9.0	9.36	V
		V _{IN} =11.5V ~ 24V, I _{OUT} =5mA ~ 1.0A, P _D ≤15W	8.55		9.45	V
Dropout Voltage	V _D	T _J =25°C		2.0		V
Load Regulation	ΔV _{OUT}	T _J =25°C, I _{OUT} =5mA ~ 1.0A			90	mV
		T _J =25°C, I _{OUT} =0.25A ~ 0.75A			45	mV
Line regulation	ΔV _{OUT}	V _{IN} =11.5V ~ 25V, T _J =25°C			90	mV
		V _{IN} =11.5V ~ 24V, T _J =25°C, I _{OUT} =1.0A			90	mV
Quiescent Current	I _Q	T _J =25°C, I _{OUT} ≤1.0A			8.0	mA
Quiescent Current Change	ΔI _Q	V _{IN} =11.5V ~ 24V			1.0	mA
		I _{OUT} =5mA ~ 1.0A			0.5	mA
Output Noise Voltage	e _N	10Hz ≤ f ≤ 100kHz		58		uV
Ripple Rejection	RR	V _{IN} =12.5V ~ 22.5V, f=120Hz, T _J =25°C	53	72		dB
Peak Output Current	I _{PEAK}	T _J =25°C		1.8		A



AT-7812D (VIN=19V)

PARAMETER	SYMBOLS	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V _{OUT}	T _J =25°C, I _{OUT} =5mA ~ 1.0A	11.52	12	12.48	V
		V _{IN} =14.5V ~ 27V, I _{OUT} =5mA ~ 1.0A, P _D ≤15W	11.4		12.6	V
Dropout Voltage	V _D	T _J =25°C		2.0		V
Load Regulation	ΔV _{OUT}	T _J =25°C, I _{OUT} =5mA ~ 1.0A			120	mV
		T _J =25°C, I _{OUT} =0.25A ~ 0.75A			60	mV
Line regulation	ΔV _{OUT}	V _{IN} =14.5V ~ 30V, T _J =25°C			120	mV
		V _{IN} =14.5V ~ 27V, T _J =25°C, I _{OUT} =1.0A			120	mV
Quiescent Current	I _Q	T _J =25°C, I _{OUT} ≤1.0A			8.0	mA
Quiescent Current Change	ΔI _Q	V _{IN} =14.6V ~ 30V			1.0	mA
		I _{OUT} =5mA ~ 1.0A			0.5	mA
Output Noise Voltage	e _N	10Hz ≤ f ≤ 100kHz		75		μV
Ripple Rejection	RR	V _{IN} =15V ~ 25V, f=120Hz, T _J =25°C	52	72		dB
Peak Output Current	I _{PEAK}	T _J =25°C		1.8		A

AT-7815D (VIN=23V)

PARAMETER	SYMBOLS	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V _{OUT}	T _J =25°C, I _{OUT} =5mA ~ 1.0A	14.4	15.0	15.6	V
		V _{IN} =17.5V ~ 30V, I _{OUT} =5mA ~ 1.0A, P _D ≤15W	14.25		15.75	V
Dropout Voltage	V _D	T _J =25°C		2.0		V
Load Regulation	ΔV _{OUT}	T _J =25°C, I _{OUT} =5mA ~ 1.0A			150	mV
		T _J =25°C, I _{OUT} =0.25A ~ 0.75A			75	mV
Line regulation	ΔV _{OUT}	V _{IN} =18.5V ~ 30V, T _J =25°C			150	mV
		V _{IN} =17.7V ~ 30V, T _J =25°C, I _{OUT} =1.0A			150	mV
Quiescent Current	I _Q	T _J =25°C, I _{OUT} ≤1.0A			8.0	mA
Quiescent Current Change	ΔI _Q	V _{IN} =17.5V ~ 30V			1.0	mA
		I _{OUT} =5mA ~ 1.0A			0.5	mA
Output Noise Voltage	e _N	10Hz ≤ f ≤ 100kHz		90		μV
Ripple Rejection	RR	V _{IN} =18.5V ~ 28.5V, f=120Hz, T _J =25°C	51	70		dB
Peak Output Current	I _{PEAK}	T _J =25°C		1.8		A

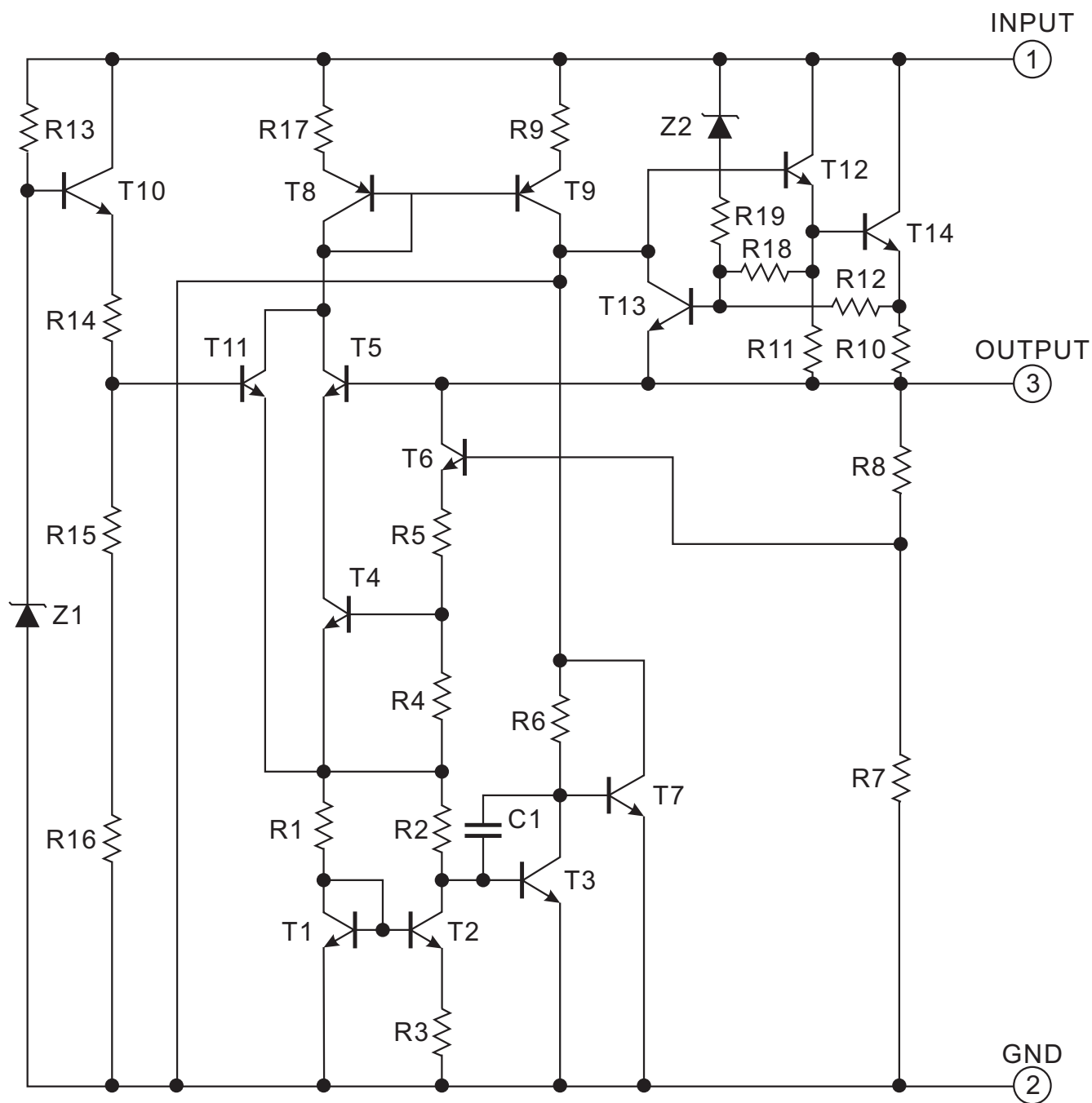
Notes:

1. 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 above represents pulse test conditions with junction temperatures specified at the initiation of test.

2. Power dissipation<0.5W

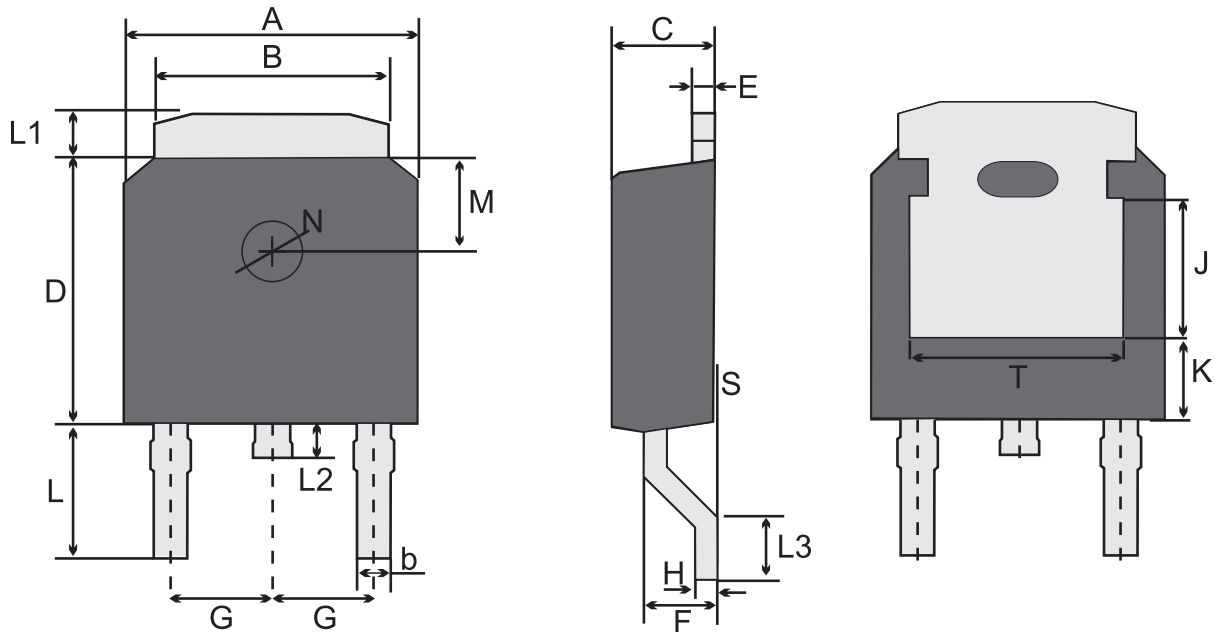


■ Test Circuits





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
78XXD	78XXD



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