



## Linear Integrated Circuit 3-Terminal 1.0A Positive Voltage Regulator

**TO-252W**

### Description

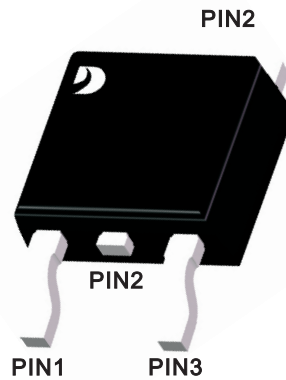
The 78XXD family is monolithic fixed voltage regulator integrated circuit. They are suitable for applications that required supply current up to 1.0A.

### Features

- Output current up to 1.0A
- Fixed output voltage of 5V available
- Thermal overload shutdown protection
- Output transistor SOA protection

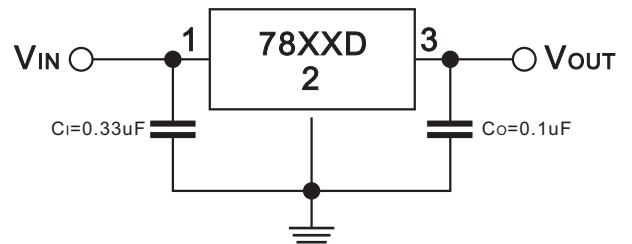
### Mechanical data

- Case: TO-252W
- Approx Weight: 0.329g ( 0.012oz)
- Lead free finish, RoHS compliant
- Case Material: "Green" molding compound, UL flammability classification 94V-0, "Halogen-free".



**RoHS**  
COMPLIANT

### APPLICATION CIRCUIT



### Packing Marking And Ordering Information

Device Package	Device	Marking	Packing Type	QTY Per Reel	Inner box	Per Carton
TO-252W	78XXD	78XXD	Reel	2,500 Pcs	5,000 Pcs	25,000 Pcs

### ■ 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)

For 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	$\Delta V_{OUT}$	$T_J=25^{\circ}C$ , $I_{OUT}=5mA \sim 1.0A$			50	mV
		$T_J=25^{\circ}C$ , $I_{OUT}=0.25A \sim 0.75A$			25	mV
Line regulation	$\Delta V_{OUT}$	$V_{IN}=7V \sim 25V$ , $T_J=25^{\circ}C$			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	$\Delta I_Q$	$V_{IN}=7.5V \sim 20V$			1.0	mA
		$I_{OUT}=5mA \sim 1.0A$			0.5	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		40		$\mu V$
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

For 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	$\Delta V_{OUT}$	$T_J=25^{\circ}C$ , $I_{OUT}=5mA \sim 1.0A$			60	mV
		$T_J=25^{\circ}C$ , $I_{OUT}=0.25A \sim 0.75A$			30	mV
Line regulation	$\Delta V_{OUT}$	$V_{IN}=8V \sim 25V$ , $T_J=25^{\circ}C$			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	$\Delta I_Q$	$V_{IN}=8.5V \sim 21V$			1.0	mA
		$I_{OUT}=5mA \sim 1.0A$			0.5	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		45		$\mu V$
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



For 7808D (VIN=14V)

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

For 7809D (VIN=15V)

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



For 7812D (VIN=19V)

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

For 7815D (VIN=23V)

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

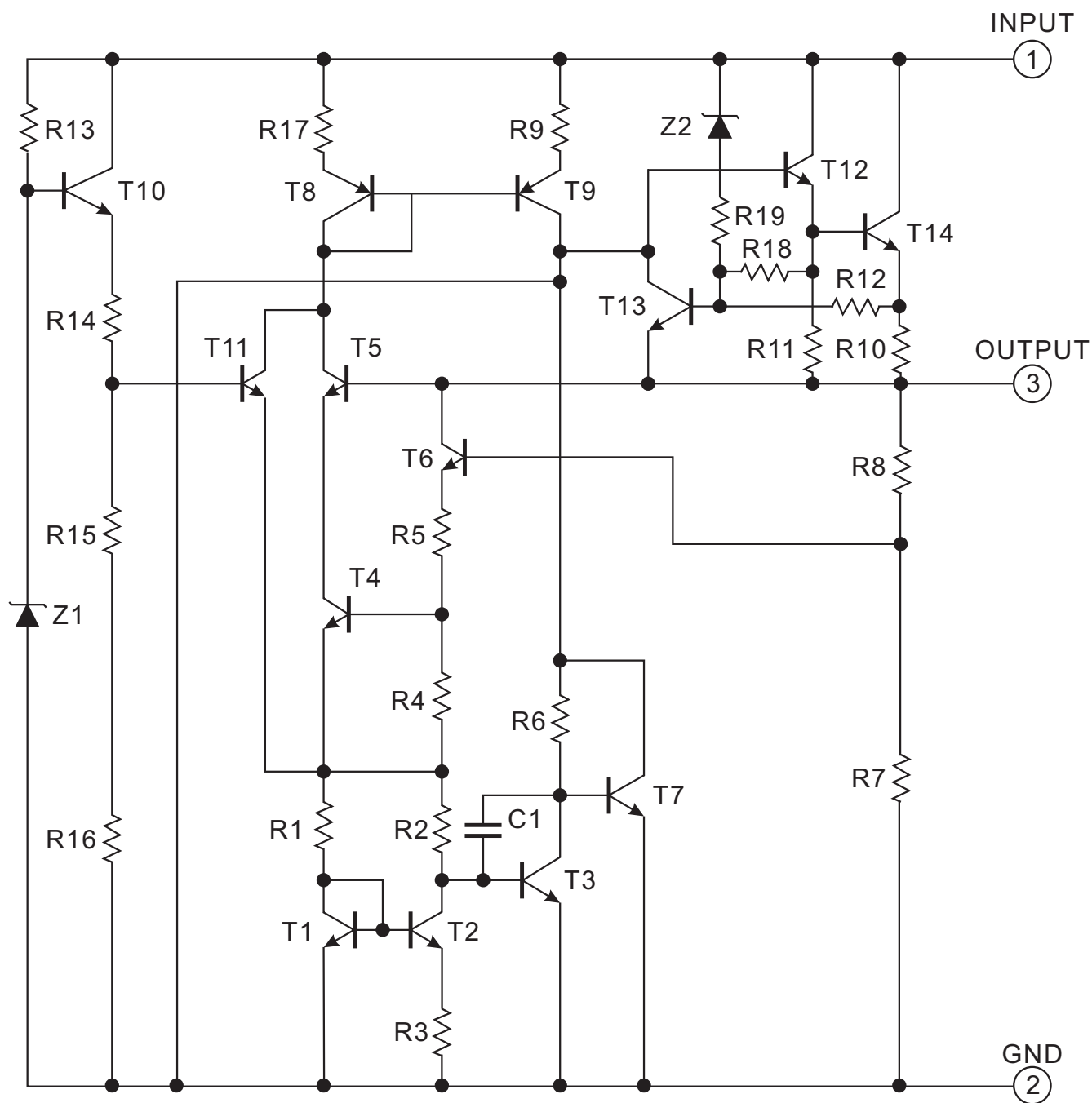
Notes:

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

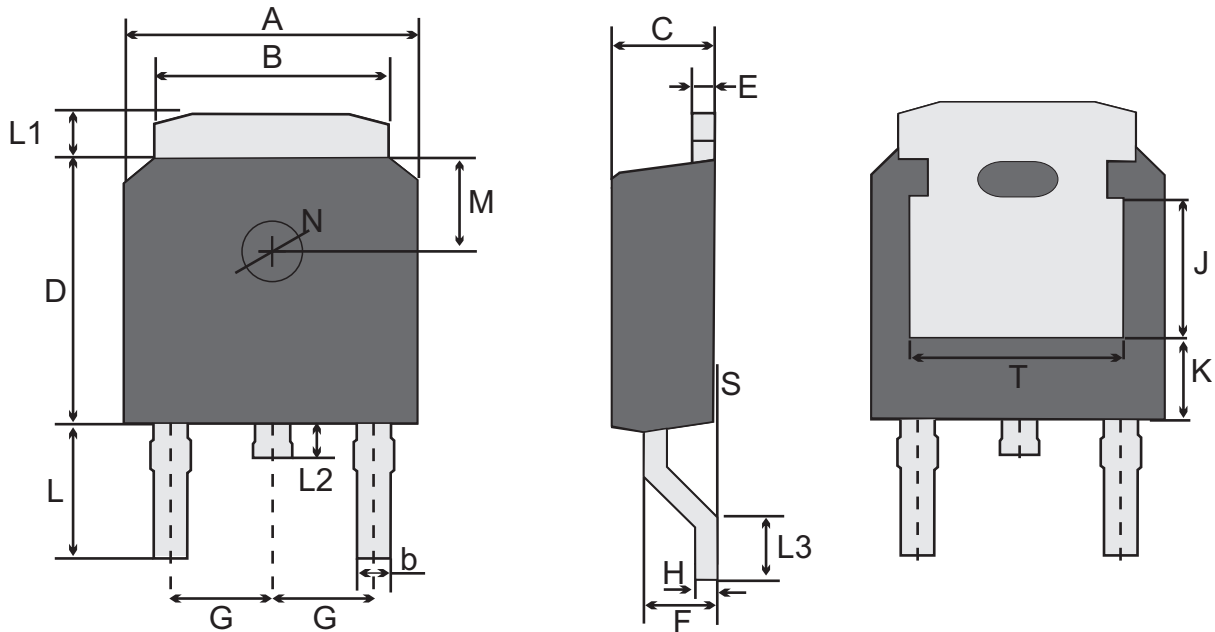


■ Test Circuits





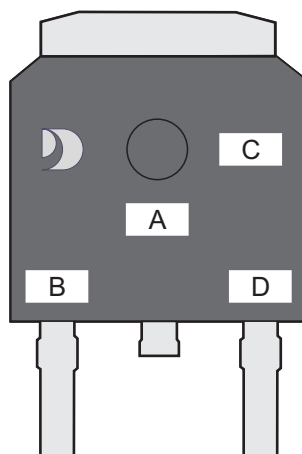
TO-252W(D-PAK) Package Outline Dimensions



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	3.0	1.2	1.0	1.75	0.10	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	2.8	1.0	0.8	1.30	0.08					
	min	6.3	5.13	0.66	2.1	5.9	0.41	1.27		0.45	2.6	0.8	0.6	1.0	/					
mil	max	264	218	34	98	248	24	74	91 typ.	22	118	47	39	69	4	71 typ.	51 typ.	126 ref.	190 ref.	71 ref.
	typ	260	210	30	91	240	20	62		20	110	39	31	51	3					
	min	248	202	26	83	232	16	50		18	102	31	24	39	/					

Marking Diagram



- Unmarkable Surfacea
- Marking Composition Field
- A: Marking Area
- B: Lot Code
- C: Additional Information
- D: Date Code (YWW)
- Y: Years(0~9)
- WW: Week



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