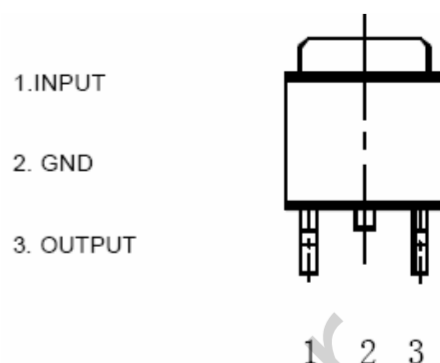


■ DESCRIPTION

The L78MxxCDT family is monolithic fixed voltage regulator integrated circuit. They are suitable for applications requiring supply current up to 500mA.

■ FEATURES

- Output Current up to 500mA
- Fixed Output Voltage of 5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V, 24V
- Thermal Overload Shutdown Protection
- Short Circuit Current Limiting



■ ABSOLUTE MAXIMUM RATING

(Operating temperature range applies unless otherwise specified.) (Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	30	V
Output Current	I_{OUT}	500	mA
Power Dissipation	P_D	500	mW
Operating Temperature (Note 2)	T_{OPR}	-40~+150	°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. It is guarantee by design, not 100% be tested.

■ ELECTRICAL CHARACTERISTICS

(0°C< T_J <125°C, C1=0.33uF, Co=0.1uF, unless otherwise specified) (Note 1)

For L78M05CDT-TR ($V_{IN}=10V$, $I_{OUT}=40mA$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	4.80	5.0	5.20	V
		$7V \leq V_{IN} \leq V_{MAX}$	4.75		5.25	V (Note 2)
		$I_{OUT}=1mA-500mA$				
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=1mA - 500mA$		11	60	mV
		$T_J=25^{\circ}C, I_{OUT}=1mA - 40mA$		5.0	30	mV
Line Regulation	ΔV_{OUT}	$7V \leq V_{IN} \leq 20V, T_J=25^{\circ}C$		8	150	mV
		$8V \leq V_{IN} \leq 20V, T_J=25^{\circ}C$		6	100	mV
Quiescent Current	I_Q			2.0	5.5	mA
Quiescent Current Change	ΔI_Q	$8V \leq V_{IN} \leq 20V$			1.5	mA
		$1mA \leq V_{IN} \leq 40mA$			0.1	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		40		uV
Temperature Coefficient of V_{OUT}	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-0.65		mV/°C
Ripple Rejection	RR	$8V \leq V_{IN} \leq 20V, f=120Hz, T_J=25^{\circ}C$	41	80		dB
Dropout Voltage	V_D	$T_J=25^{\circ}C$		1.7		V

For L78M06CDT-TR ($V_{IN}=12V, I_{OUT}=40mA$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	5.76	6.0	6.24	V
		$8.5V \leq V_{IN} \leq V_{MAX},$ $I_{OUT}=1mA - 500mA$	5.7		6.3	V (note 2)
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=1mA - 500mA$		12.8	80	mV
		$T_J=25^{\circ}C, I_{OUT}=1mA - 40mA$		5.8	40	mV
Line Regulation	ΔV_{OUT}	$8.5V \leq V_{IN} \leq 20V, T_J=25^{\circ}C$		64	175	mV
		$9V \leq V_{IN} \leq 20V, T_J=25^{\circ}C$		54	125	mV
Quiescent Current	I_Q			2.0	5.5	mA
Quiescent Current Change	ΔI_Q	$9V \leq V_{IN} \leq 20V$			1.5	mA
		$1mA \leq V_{IN} \leq 40mA$			0.1	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		49		μV
Temperature Coefficient of V_{OUT}	$\Delta V_O/\Delta T$	$I_{OUT}=5mA$		0.75		mV/ $^{\circ}C$
Ripple Rejection	RR	$10V \leq V_{IN} \leq 20V, f=120Hz, T_J=25^{\circ}C$	40	46		dB
Dropout Voltage	V_D	$T_J=25^{\circ}C$		1.7		V

■ ELECTRICAL CHARACTERISTICS (Cont.)

For L78M08CDT-TR ($V_{IN}=14V, I_{OUT}=40mA$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	7.68	8.0	8.32	V
		$10.5V \leq V_{IN} \leq V_{MAX},$ $I_{OUT}=1mA - 500mA$	7.60		8.40	V (note 2)
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=1mA - 500mA$		15	80	mV
		$T_J=25^{\circ}C, I_{OUT}=1mA - 40mA$		8.0	40	mV
Line Regulation	ΔV_{OUT}	$10.5V \leq V_{IN} \leq 23V, T_J=25^{\circ}C$		10	175	mV
		$11V \leq V_{IN} \leq 23V, T_J=25^{\circ}C$		8	125	mV
Quiescent Current	I_Q			2.0	5.5	mA
Quiescent Current Change	ΔI_Q	$11V \leq V_{IN} \leq 23V$			1.5	mA
		$1mA \leq V_{IN} \leq 40mA$			0.1	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		49		μV
Temperature Coefficient of V_{OUT}	$\Delta V_O/\Delta T$	$I_{OUT}=5mA$		0.75		mV/ $^{\circ}C$
Ripple Rejection	RR	$11V \leq V_{IN} \leq 23V, f=120Hz, T_J=25^{\circ}C$	39	70		dB
Dropout Voltage	V_D	$T_J=25^{\circ}C$		1.7		V

For L78M09CDT-TR ($V_{IN}=15V, I_{OUT}=40mA$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	8.64	9.0	9.36	V
		$12.5V \leq V_{IN} \leq V_{MAX},$ $I_{OUT}=1mA - 500mA$	8.55		9.45	V (note 2)
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=1mA - 500mA$		12.8	80	mV
		$T_J=25^{\circ}C, I_{OUT}=1mA - 40mA$		5.8	40	mV
Line Regulation	ΔV_{OUT}	$12.5V \leq V_{IN} \leq 24V, T_J=25^{\circ}C$		64	175	mV
		$12.5V \leq V_{IN} \leq 24V, T_J=25^{\circ}C$		54	125	mV
Quiescent Current	I_Q			2.0	5.5	mA
Quiescent Current Change	ΔI_Q	$12.5V \leq V_{IN} \leq 24V$			1.5	mA
		$1mA \leq V_{IN} \leq 40mA$			0.1	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		49		μV
Temperature Coefficient of V_{OUT}	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		0.75		mV/ $^{\circ}C$
Ripple Rejection	RR	$12V \leq V_{IN} \leq 24V, f=120Hz, T_J=25^{\circ}C$	40	46		dB
Dropout Voltage	V_D	$T_J=25^{\circ}C$		1.7		V

■ ELECTRICAL CHARACTERISTICS (Cont.)

For L78M10CDT-TR ($V_{IN}=16V, I_{OUT}=40mA$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	9.60	10.0	10.40	V
		$14.5V \leq V_{IN} \leq V_{MAX},$ $I_{OUT}=1mA - 500mA$	9.50		10.50	V (note 2)
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=1mA - 500mA$		15	80	mV
		$T_J=25^{\circ}C, I_{OUT}=1mA - 40mA$		8.0	40	mV
Line Regulation	ΔV_{OUT}	$14.5V \leq V_{IN} \leq 25V, T_J=25^{\circ}C$		10	175	mV
		$11V \leq V_{IN} \leq 25V, T_J=25^{\circ}C$		8	125	mV
Quiescent Current	I_Q			2.0	5.5	mA
Quiescent Current Change	ΔI_Q	$11V \leq V_{IN} \leq 25V$			1.5	mA
		$1mA \leq V_{IN} \leq 40mA$			0.1	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		49		μV
Temperature Coefficient of V_{OUT}	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		0.75		mV/ $^{\circ}C$
Ripple Rejection	RR	$13V \leq V_{IN} \leq 25V, f=120Hz, T_J=25^{\circ}C$	39	70		dB
Dropout Voltage	V_D	$T_J=25^{\circ}C$		1.7		V

For L78M12CDT-TR ($V_{IN}=19V, I_{OUT}=40mA$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	11.52	12.0	12.48	V
		$14.5V \leq V_{IN} \leq V_{MAX},$ $I_{OUT}=1mA - 500mA$	11.4		12.6	V (note 2)
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=1mA - 500mA$		12.8	80	mV
		$T_J=25^{\circ}C, I_{OUT}=1mA - 40mA$		5.8	40	mV
Line Regulation	ΔV_{OUT}	$14.5V \leq V_{IN} \leq 29V, T_J=25^{\circ}C$		64	175	mV
		$14.5V \leq V_{IN} \leq 29V, T_J=25^{\circ}C$		54	125	mV
Quiescent Current	I_Q			2.0	5.5	mA
Quiescent Current Change	ΔI_Q	$14.5V \leq V_{IN} \leq 29V$			1.5	mA
		$1mA \leq V_{IN} \leq 40mA$			0.1	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		49		μV
Temperature Coefficient of V_{OUT}	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		0.75		mV/ $^{\circ}C$
Ripple Rejection	RR	$15V \leq V_{IN} \leq 29V, f=120Hz, T_J=25^{\circ}C$	40	46		dB
Dropout Voltage	V_D	$T_J=25^{\circ}C$		1.7		V

■ ELECTRICAL CHARACTERISTICS (Cont.)

For L78M15CDT-TR ($V_{IN}=23V, I_{OUT}=40mA$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	14.40	15.0	15.60	V
		$18.5V \leq V_{IN} \leq V_{MAX},$ $I_{OUT}=1mA - 500mA$	14.25		15.75	V (note 2)
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=1mA - 500mA$		15	80	mV
		$T_J=25^{\circ}C, I_{OUT}=1mA - 40mA$		8.0	40	mV
Line Regulation	ΔV_{OUT}	$18.5V \leq V_{IN} \leq 30V, T_J=25^{\circ}C$		10	175	mV
		$18.5V \leq V_{IN} \leq 30V, T_J=25^{\circ}C$		8	125	mV
Quiescent Current	I_Q			2.0	5.5	mA
Quiescent Current Change	ΔI_Q	$18.5V \leq V_{IN} \leq 30V$			1.5	mA
		$1mA \leq V_{IN} \leq 40mA$			0.1	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		49		μV
Temperature Coefficient of V_{OUT}	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		0.75		mV/ $^{\circ}C$
Ripple Rejection	RR	$18V \leq V_{IN} \leq 30V, f=120Hz, T_J=25^{\circ}C$	39	70		dB
Dropout Voltage	V_D	$T_J=25^{\circ}C$		1.7		V

For L78M18CDT-TR ($V_{IN}=27V, I_{OUT}=40mA$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	17.28	18.0	18.72	V
		$21V \leq V_{IN} \leq V_{MAX},$ $I_{OUT}=1mA - 500mA$	17.10		18.90	V (note 2)
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=1mA - 500mA$		12.8	80	mV
		$T_J=25^{\circ}C, I_{OUT}=1mA - 40mA$		5.8	40	mV
Line Regulation	ΔV_{OUT}	$21V \leq V_{IN} \leq 32V, T_J=25^{\circ}C$		64	175	mV
		$21V \leq V_{IN} \leq 32V, T_J=25^{\circ}C$		54	125	mV
Quiescent Current	I_Q			2.0	5.5	mA
Quiescent Current Change	ΔI_Q	$21V \leq V_{IN} \leq 32V$			1.5	mA
		$1mA \leq V_{IN} \leq 40mA$			0.1	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		49		μV
Temperature Coefficient of V_{OUT}	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		0.75		mV/ $^{\circ}C$
Ripple Rejection	RR	$20V \leq V_{IN} \leq 32V, f=120Hz, T_J=25^{\circ}C$	40	46		dB
Dropout Voltage	V_D	$T_J=25^{\circ}C$		1.7		V

■ ELECTRICAL CHARACTERISTICS (Cont.)

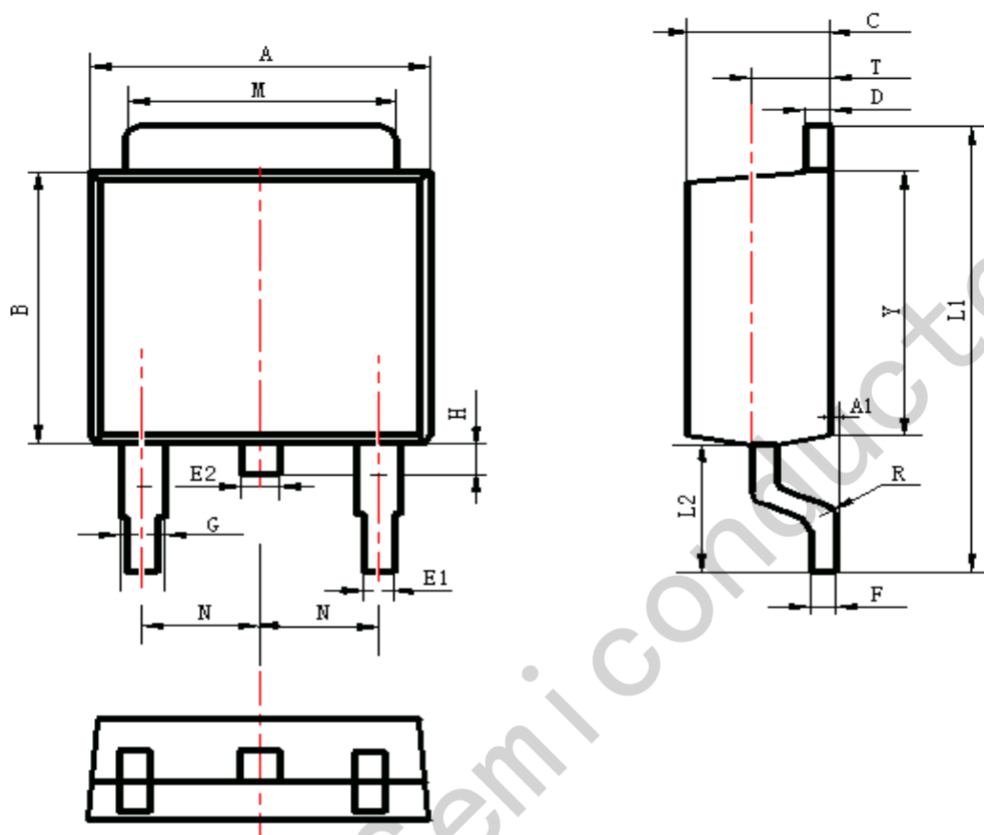
For L78M24CDT-TR ($V_{IN}=32V, I_{OUT}=40mA$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	23.04	24.0	24.96	V
		$27V \leq V_{IN} \leq V_{MAX},$ $I_{OUT}=1mA - 500mA$	22.80		25.20	V (note 2)
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=1mA - 500mA$		15	80	mV
		$T_J=25^{\circ}C, I_{OUT}=1mA - 40mA$		8.0	40	mV
Line Regulation	ΔV_{OUT}	$27V \leq V_{IN} \leq 38V, T_J=25^{\circ}C$		10	175	mV
		$27V \leq V_{IN} \leq 38V, T_J=25^{\circ}C$		8	125	mV
Quiescent Current	I_Q			2.0	5.5	mA
Quiescent Current Change	ΔI_Q	$27V \leq V_{IN} \leq 38V$			1.5	mA
		$1mA \leq V_{IN} \leq 40mA$			0.1	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		49		μV
Temperature Coefficient of V_{OUT}	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		0.75		mV/ $^{\circ}C$
Ripple Rejection	RR	$28V \leq V_{IN} \leq 38V, f=120Hz, T_J=25^{\circ}C$	39	70		dB
Dropout Voltage	V_D	$T_J=25^{\circ}C$		1.7		V

- 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 represent pulse test conditions with junction temperatures specified at the initiation of test.
2. Power dissipation<0.5W

Package Information

TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	6.30	6.90	0.248	0.272
A1	0.00	0.16	0.000	0.006
B	5.70	6.30	0.224	0.248
C	2.10	2.50	0.083	0.098
D	0.30	0.70	0.012	0.028
E1	0.60	0.90	0.024	0.035
E2	0.70	1.00	0.028	0.039
F	0.30	0.60	0.012	0.024
G	0.70	1.20	0.028	0.047
L1	9.60	10.50	0.378	0.413
L2	2.70	3.10	0.106	0.122
H	0.40	1.00	0.016	0.039
M	5.10	5.50	0.201	0.217
N	2.09	2.49	0.082	0.098
R	0.30		0.012	
T	1.40	1.60	0.055	0.063
Y	5.10	6.30	0.201	0.248