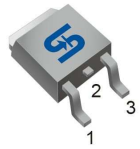
TS78M00 Series

3-Terminal 500mA Positive Voltage Regulator

TO-252 (DPAK)



Pin Definition:
1. Input
2. Ground (tab)
3. Output

General Description

The TS78M00 Series positive voltage regulators are identical to the popular TS7800 Series devices, except that they are specified for only half the output current. Like the TS7800 devices, the TS78M00 Series 3-Terminal regulators are intended for local, on-card voltage regulation. Internal current limiting, thermal shutdown circuitry and safe-area compensation for the internal pass transistor combine to make these devices remarkably rugged under most operating conditions. Maximum output current with adequate heatsink is 500mA

Features

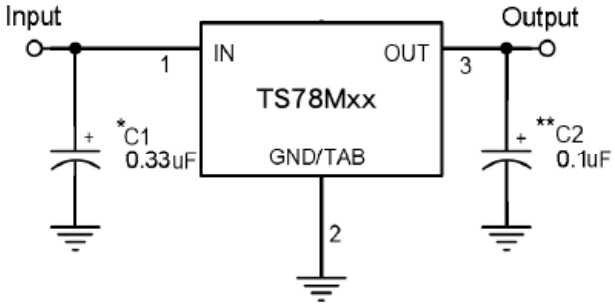
- Output Voltage Range 5V & 12V
- Output current up to 500mA
- No external components required
- Internal thermal overload protection
- Internal short-circuit current limiting
- Output transistor safe-area compensation
- Output voltage offered in 4% tolerance

Ordering Information

Part No.	Package	Packing
TS78M**xx**CP RO	TO-252	2.5kpcs / 13” Reel

Note: Where **xx** denote voltage option, available are:
05=5V, **12**=12V,

Standard Application Circuit



A common ground is required between the input and the output voltages. The input voltage must remain typically 2.0V above the output voltage even during the low point on the Input ripple voltage.
XX = these two digits of the type number indicate voltage.
* = Cin is required if regulator is located an appreciable distance from power supply filter.
** = Co is not needed for stability; however, it does improve transient response.

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Input Voltage	V_{IN}	35	V
Power Dissipation	P_D	Internal Limited	W
Operating Junction Temperature	T_J	0~+125	°C
Storage Temperature Range	T_{STG}	-65~+150	°C
Thermal Resistance - Junction to Case	$R_{\Theta JC}$	10	°C/W
Thermal Resistance - Junction to Ambient	$R_{\Theta JA}$	100	°C/W

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TS78M05 Electrical Characteristics

(V_{IN}=10V, I_{OUT}=350mA, 0°C≤T_J≤125°C, C_{IN}=0.33uF, C_{OUT}=0.1uF; unless otherwise specified.)

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
Output voltage	V_{OUT}	T_J=25°C		4.80	5	5.20	V
		7.5V≤Vin≤20V, 5mA≤Iout≤350mA		4.75	5	5.25	
Line Regulation	REG_{LINE}	T_J=25°C	7.5V≤Vin≤25V	--	3	100	mV
			8V≤Vin≤12V	--	1	50	
Load Regulation	REG_{LOAD}	T_J=25°C	5mA≤I_{OUT}≤500mA	--	15	100	
			5mA≤I_{OUT}≤200mA	--	5	50	
Quiescent Current	I_Q	I_{OUT}=0, T_J=25°C		--	3	6	mA
Quiescent Current Change	ΔI_Q	7.5V≤Vin≤25V		--	--	0.8	
		5mA≤I_{OUT}≤350mA		--	--	0.5	
Output Noise Voltage	V_n	10Hz≤f≤100KHz, T_J=25°C		--	40	--	μV
Ripple Rejection Ratio	RR	f=120Hz, 8V≤Vin≤18V		62	78	--	dB
Voltage Drop	V_{DROP}	I_{OUT}=500mA, T_J=25°C		--	2	--	V
Output Resistance	Rout	f=1KHz		--	17	--	mΩ
Output Short Circuit Current	I_{OS}	T_J=25°C		--	50	--	mA
Peak Output Current	Io peak	T_J=25°C		--	0.7	--	A
Temperature Coefficient of Output Voltage	$\Delta V_{OUT}/\Delta T_J$	I_{OUT}= 5mA, 0°C≤T_J≤125°C		--	-0.2	--	mV/°C

TS78M12 Electrical Characteristics

(V_{IN}=19V, I_{OUT}=350mA, 0°C≤T_J≤125°C, C_{IN}=0.33uF, C_{OUT}=0.1uF; unless otherwise specified.)

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
Output Voltage	V_{OUT}	T_J=25°C		11.53	12	12.48	V
		14.5V≤Vin≤27V, 5mA≤I_{OUT}≤350mA		11.42	12	12.60	
Line Regulation	REG_{LINE}	T_J=25°C	14.5V≤Vin≤30V	--	10	240	mV
			15V≤Vin≤19V	--	3	120	
Load Regulation	REG_{LOAD}	T_J=25°C	5mA≤I_{OUT}≤500mA	--	12	240	
			5mA≤I_{OUT}≤200mA	--	4	120	
Quiescent Current	I_Q	T_J=25°C, I_{OUT}=0		--	3	6	mA
Quiescent Current Change	ΔI_Q	14.5V≤Vin≤30V		--	--	0.8	
		5mA≤I_{OUT}≤500mA		--	--	0.5	
Output Noise Voltage	V_n	10Hz≤f≤100KHz, T_J=25°C		--	75	--	μV
Ripple Rejection Ratio	RR	f=120Hz, 15V≤Vin≤25V		55	80	--	dB
Voltage Drop	V_{DROP}	I_{OUT}=500mA, T_J=25°C		--	2	--	V
Output Resistance	Rout	f=1KHz		--	18	--	mΩ
Output Short Circuit Current	I_{OS}	T_J=25°C		--	50	--	mA
Peak Output Current	Io peak	T_J=25°C		--	0.7	--	A
Temperature Coefficient of Output Voltage	$\Delta V_{OUT}/\Delta T_J$	I_{OUT}=5mA, 0°C≤T_J≤125°C		--	-0.3	--	mV/°C

- Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately.
- This specification applies only for DC power dissipation permitted by absolute maximum ratings.

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Electrical Characteristics Curve

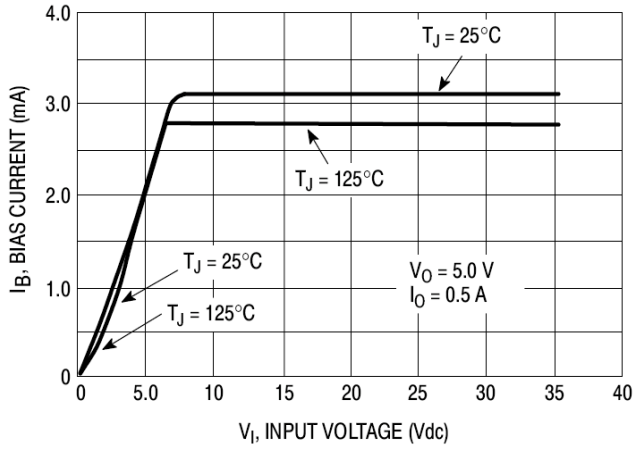

Figure 1. Bias Current vs. Input Voltage

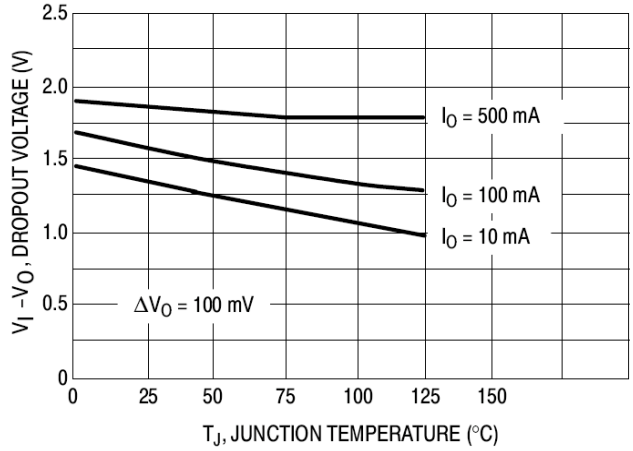

Figure 2. Dropout Voltage vs. Junction Temperature

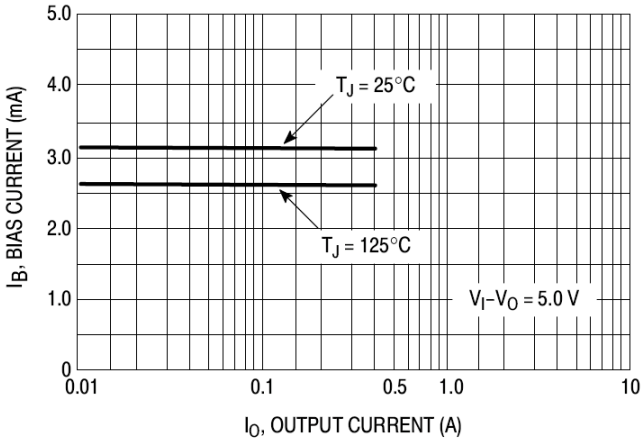

Figure 3. Bias Current vs. Output Current

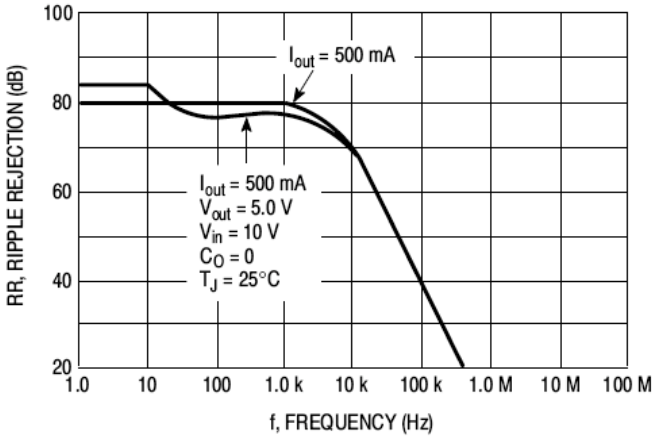

Figure 4. Ripple Rejection vs. Frequency

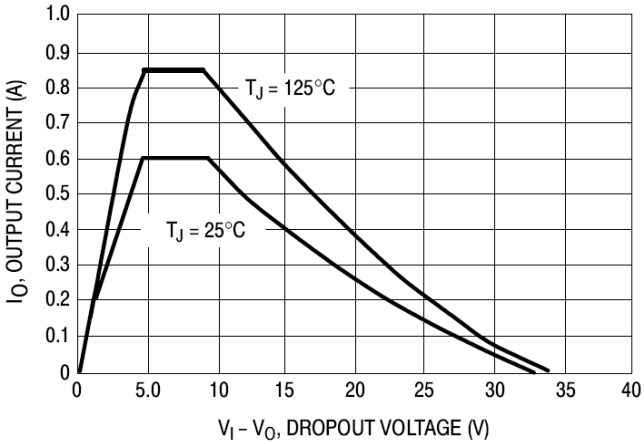

Figure 5. Peak Output Current vs. Dropout Voltage

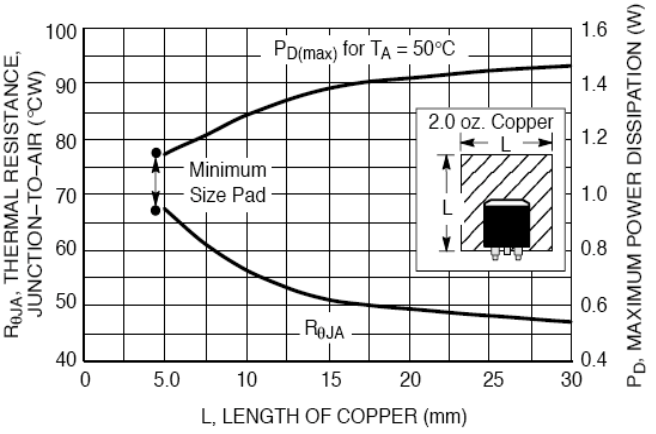

Figure 6. DPAK Thermal Resistance and Maximum Power Dissipation vs. P.C.B Copper Length

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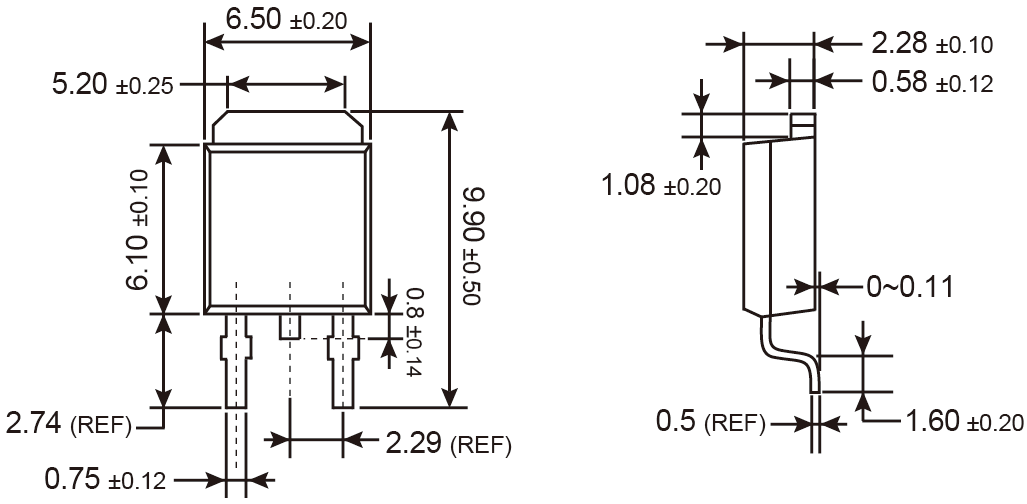
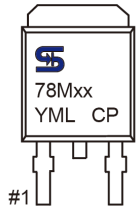
TO-252 Mechanical Drawing



Unit: Millimeters

Marking Diagram



XX = Output Voltage
(**05**=5V, 1**2**=12V)
Y = Year Code
M = Month Code
(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apl, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)
L = Lot Code
CP = Package Code

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