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3-Termal 500mA Negative Voltage Regulator

DESCRIPTION

The TS79M00 series of fixed output negative voltage regulators are intended as complements to the popular TS78M00 series device. These negative regulators are available in the same seven-voltage options as the TS7900 devices. In addition, one extra voltage option commonly employed in MECL systems is also available in the negative TS79M00 Series. Available in fixed output voltage options from -5.0 and -12 volts, these regulators employ current limiting, thermal shutdown, and safe-area compensation--making them remarkably rugged under most operating conditions. With adequate heat sinking they can deliver output currents in excess of 0.5 ampere.

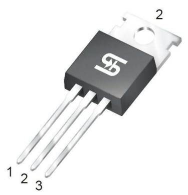
FEATURES

- Output Voltage: -5 & -12V
- Output current up to 0.5A
- No external components required
- Internal thermal overload protection
- Internal short-circuit current limiting
- Output transistor safe-area compensation
- Output voltage offered in 4% tolerance
- Compliant to RoHS Directive 2011/65/EU and WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

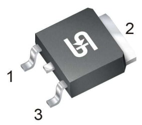
APPLICATION

- Switching power supply
- Home appliance

TO-220



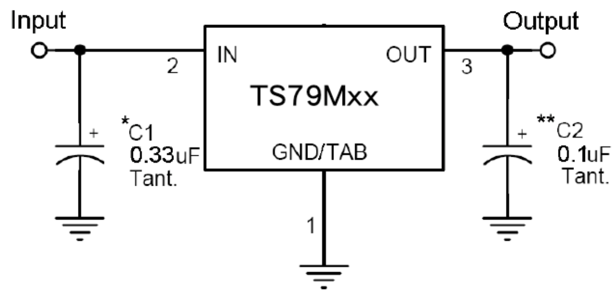
TO-252 (DPAK)



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

Notes: MSL 3 (Moisture Sensitivity Level) per J-STD-020

TYPICAL APPLICATION CIRCUIT



A common ground is required between the input and the output voltages. The input voltage must remain typically 2V above the output voltage even during the low point on the Input ripple voltage.
XX = these two digits of the type number indicate voltage.
* = C_{IN} is required if regulator is located an appreciable distance from power supply filter.
** = C_{OUT} is not needed for stability; however, it does improve transient response.

ABSOLUTE MAXIMUM RATINGS

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 PERFORMANCE

PARAMETER	SYMBOL	LIMIT		UNIT
		TO-220	TO-252	
Junction to Case Thermal Resistance	$R_{\Theta JC}$	5	6	°C/W
Junction to Ambient Thermal Resistance	$R_{\Theta JA}$	65	92	°C/W

Notes: $R_{\Theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. The case thermal reference is defined at the solder mounting surface of the drain pins. $R_{\Theta JA}$ is guaranteed by design while $R_{\Theta CA}$ is determined by the user's board design. $R_{\Theta JA}$ shown below for single device operation on FR-4 PCB in still air.

ELECTRICAL SPECIFICATIONS TS79M05

(V_{IN}=-10V, I_{OUT}=350mA, 0°C≤T_J≤125°C, C_{IN}=0.33μF, C_{OUT}=0.1μF, unless otherwise noted)

PARAMETER	CONDITIONS		SYMBOL	MIN	TYP	MAX	UNIT
Output voltage	T_J=25°C		V_{OUT}	-4.80	-5	-5.20	V
	-7.5V≤V_{IN}≤-20V, 5mA≤I_{OUT}≤500mA, P_D≤5W			-4.75	-5	-5.25	
Line Regulation	T_J=25°C	-7.5V≤V_{IN}≤-25V	REG_{LINE}	--	7	50	mV
		-8V≤V_{IN}≤-18V		--	2	30	
Load Regulation	T_J=25°C	5mA≤I_{OUT}≤500mA	REG_{LOAD}	--	20	100	
		5mA≤I_{OUT}≤200mA		--	10	50	
Quiescent Current	I_{OUT}=0, T_J=25°C		I_Q	--	4	8	mA
Quiescent Current Change	-7.5V≤V_{IN}≤-25V		ΔI_Q	--	--	1	
	5mA≤I_{OUT}≤500mA			--	--	0.5	
Output Noise Voltage	10Hz≤f≤100kHz, T_J=25°C		V_N	--	40	--	μV
Ripple Rejection Ratio	f=120Hz, -8V≤V_{IN}≤-18V		RR	54	66	--	dB
Voltage Drop	I_{OUT}=500mA, T_J=25°C		V_{DROP}	--	2	--	V
Peak Output Current	T_J=25°C		Io peak	--	2.1	--	A
Temperature Coefficient of Output Voltage	I_{OUT}=5mA, 0°C≤T_J≤125°C		ΔV_{OUT}/ ΔT_J	--	-0.1	--	mV/°C

ELECTRICAL SPECIFICATIONS TS79M12

(V_{IN}=-19V, I_{OUT}=350mA, 0°C≤T_J≤125°C, C_{IN}=0.33µF, C_{OUT}=0.1µF, unless otherwise noted)

PARAMETER	CONDITIONS		SYMBOL	MIN	TYP	MAX	UNIT
Output voltage	T_J=25°C		V_{OUT}	-11.53	-12	-12.48	V
	-14.5V≤V_{IN}≤-27V, 5mA≤I_{OUT}≤500mA, P_D≤5W			-11.42	-12	-12.60	
Line Regulation	T_J=25°C	-14.5V≤V_{IN}≤-30V	REG_{LINE}	--	10	240	mV
		-15V≤V_{IN}≤-19V		--	3	120	
Load Regulation	T_J=25°C	5mA≤I_{OUT}≤500mA	REG_{LOAD}	--	12	240	
		5mA≤I_{OUT}≤200mA		--	4	120	
Quiescent Current	I_{OUT}=0, T_J=25°C		I_Q	--	4.3	8	mA
Quiescent Current Change	-14.5V≤V_{IN}≤-30V		ΔI_Q	--	--	1	
	5mA≤I_{OUT}≤500mA			--	--	0.5	
Output Noise Voltage	10Hz≤f≤100kHz, T_J=25°C		V_N	--	75	--	µV
Ripple Rejection Ratio	f=120Hz, -15V≤V_{IN}≤-25V		RR	55	70	--	dB
Voltage Drop	I_{OUT}=500mA, T_J=25°C		V_{DROP}	--	2	--	V
Peak Output Current	T_J=25°C		Io peak	--	2.1	--	A
Temperature Coefficient of Output Voltage	I_{OUT}=5mA, 0°C≤T_J≤125°C		$\Delta V_{OUT}/\Delta T_J$	--	-1	--	mV/°C

Note:

1. 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
2. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

ORDERING INFORMATION

OUTPYT VOLTAGE	PART NO.	PACKAGE	PACKING
5V	TS79M05CZ C0G	TO-220	50pcs / Tube
	TS79M05CP ROG	TO-252	2,500pcs / 13" Reel
12V	TS79M12CP ROG	TO-252	2,500pcs / 13" Reel

CHARACTERISTICS CURVES

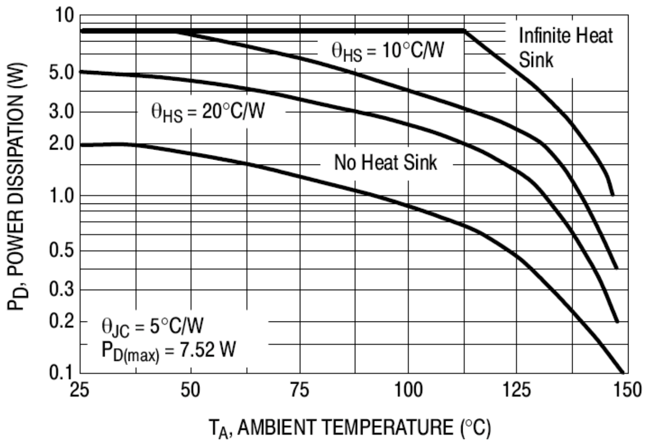


Figure 1. Worse Case Power Dissipation vs. Ambient Temperature (TO-220)

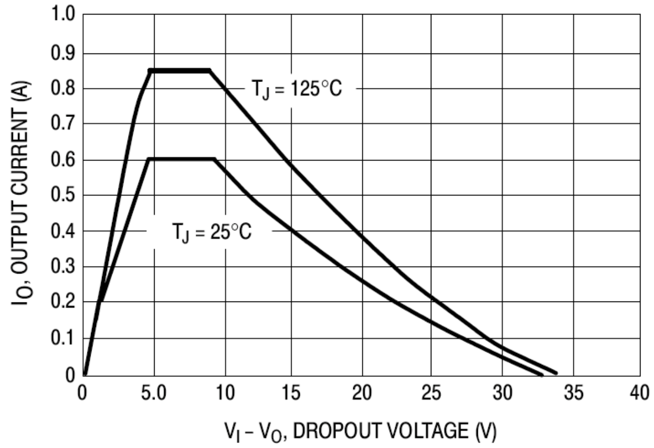


Figure 2. Peak Output Current as a Function of Input-Output Differential Voltage

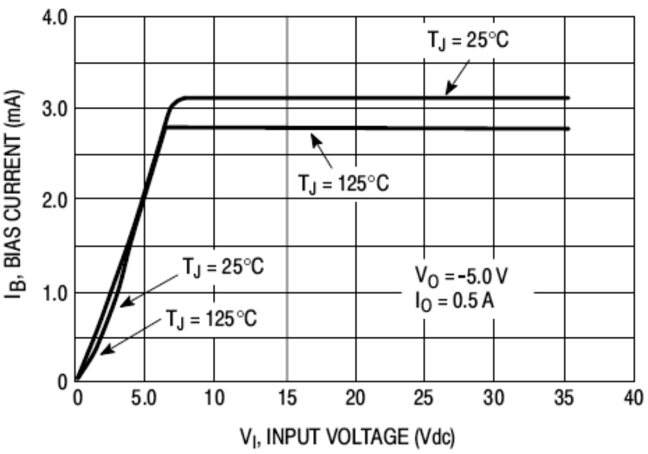


Figure 3. Bias Current vs. Input Voltage

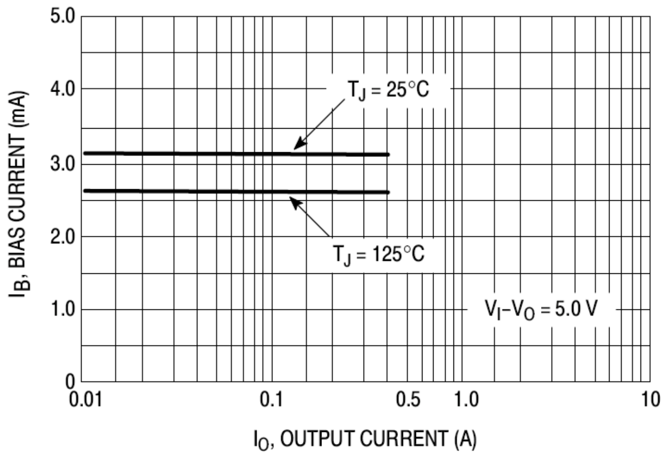


Figure 4. Bias Current vs. Output Current

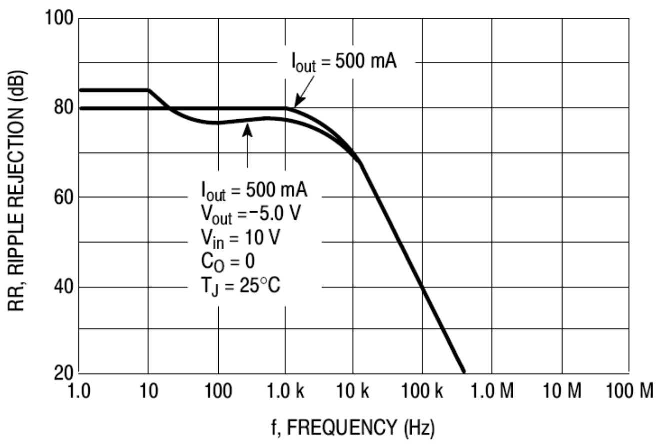


Figure 5. Ripple Rejection vs. Frequency

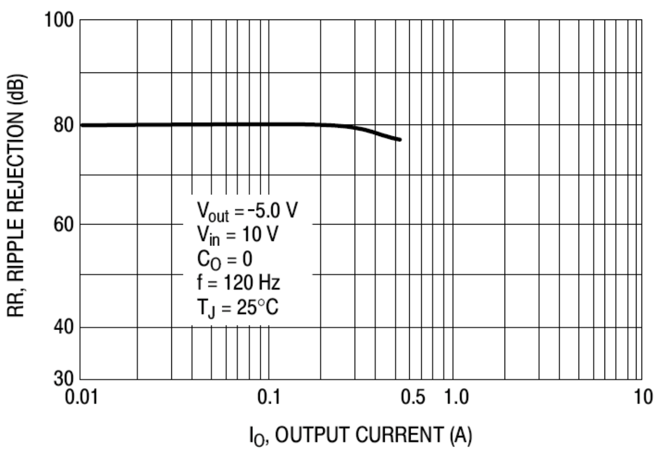


Figure 6. Ripple Rejection vs. Output Voltage

APPLICATION INFORMATION

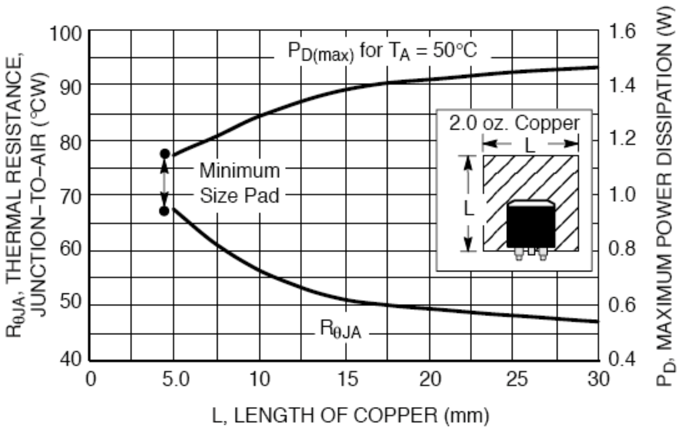
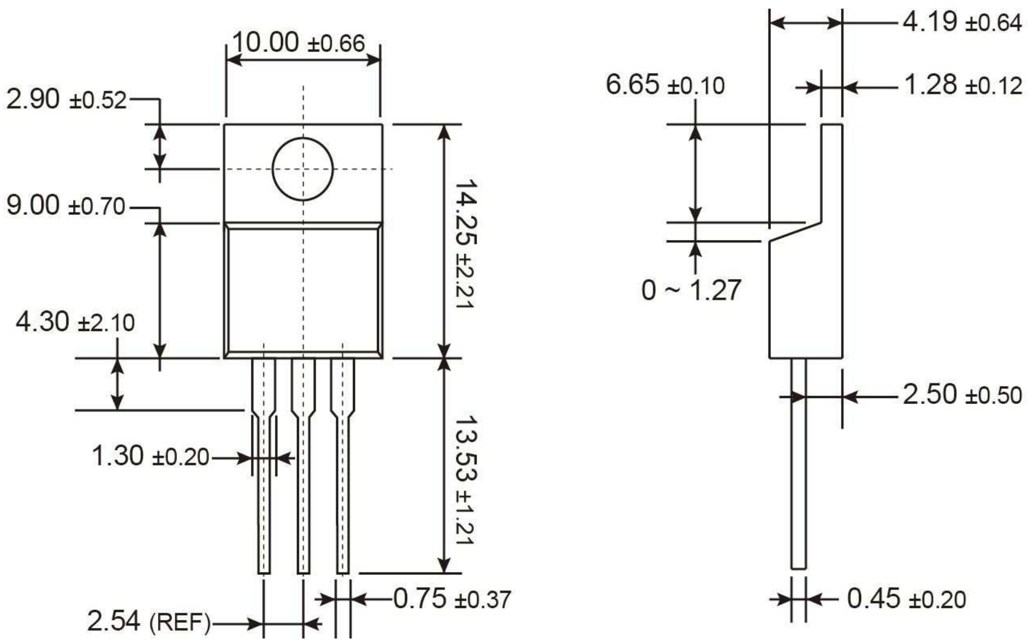


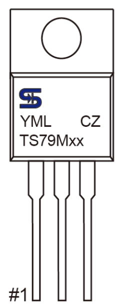
Figure 7. DPAK Thermal Resistance and Maximum Power Dissipation vs. P.C.B Copper Length

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-220



MARKING DIAGRAM



XX = Output Voltage

05 =-5V

Y = Year Code

M = Month Code for Halogen Free Product

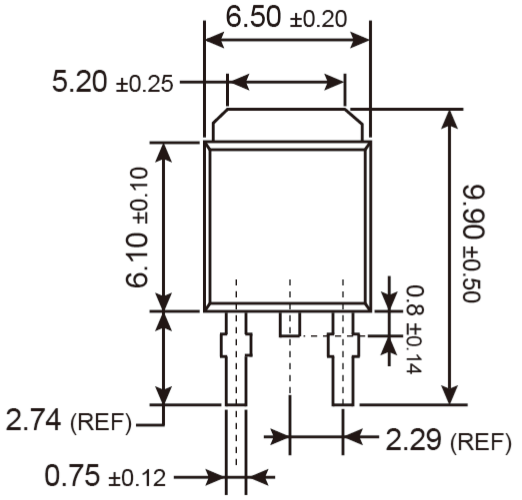
O	=Jan	**P**	=Feb	**Q**	=Mar	**R**	=Apr
S	=May	**T**	=Jun	**U**	=Jul	**V**	=Aug
W	=Sep	**X**	=Oct	**Y**	=Nov	**Z**	=Dec

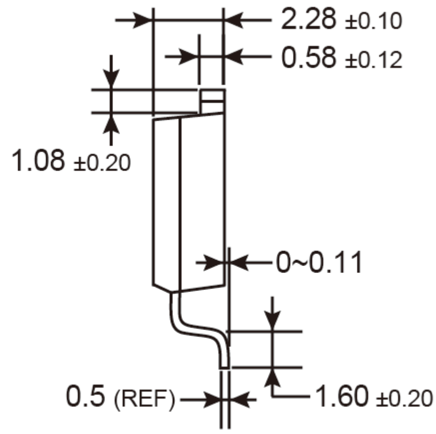
L = Lot Code

CZ = Package code

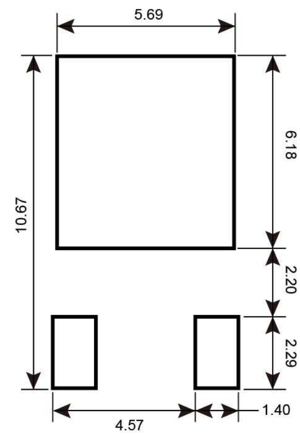
PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-252 (DPAK)

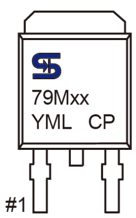




SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



XX = Output Voltage

05 =-5V **12** =-12V

Y = Year Code

M = Month Code for Halogen Free Product

O	=Jan	**P**	=Feb	**Q**	=Mar	**R**	=Apr
S	=May	**T**	=Jun	**U**	=Jul	**V**	=Aug
W	=Sep	**X**	=Oct	**Y**	=Nov	**Z**	=Dec

L = Lot Code

CP = Package code

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