

Pb Free Plating Product

LM78H05K/LM78H12K/LM78H15K



THINKISEMI 1.0 AMPERE POSITIVE THREE TERMINAL REGULATOR

Features

- ※ Output current to 1.0A
- ※ Thermal overload protection
- ※ Short circuit protection
- ※ Output transition SOA protection

Application

- ※ Switching Regulators and Amplifiers
- ※ AC and DC Motor Controls
- ※ Inverters, Solenoid and Relay Drivers

Mechanical Data

- ※ Case: TO-3 metal package
- ※ Operating Temperature Range -65 to + 300 °C
- ※ Terminals: Solderable per MIL-STD-202 method 208
- ※ Polarity: As per configuration
- ※ Mounting position: Any
- ※ Weight: 6.0 gram approximately

TO-3/TO-204AE outline

**Electrical Characteristics LM78HxxK**0°C ≤ T_j ≤ 125°C unless otherwise noted.

0°C ≤ T _j ≤ 125°C unless otherwise noted.			LM78H05K			LM78H12K			LM78H15K			Units
Output Voltage			5V			12V			15V			
Input Voltage (unless otherwise noted)			10V			19V			23V			
Symbol	Parameter	Conditions	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
	Short-Circuit Current	T _j = 25°C	2.1			1.5			1.2			A
	Peak Output Current	T _j = 25°C	2.4			2.4			2.4			A
	Average TC of V _{OUT}	0°C ≤ T _j ≤ +125°C, I _O = 5 mA	0.6			1.5			1.8			mV/°C
V _{IN}	Input Voltage Required to Maintain Line Regulation	T _j = 25°C, I _O ≤ 1A	7.5			14.6			17.7			V

Absolute Maximum Ratings

Input Voltage

(V_O = 5V, 12V and 15V)

35V

Internal Power Dissipation (Note 1)

Internally Limited

Operating Temperature Range (T_A)

0°C to +70°C

Maximum Junction Temperature

(TO-3 Package)

150°C

(TO-220 Package)

150°C

Storage Temperature Range

-65°C to +150°C

Lead Temperature (Soldering, 10 sec.)

TO-3 Package

300°C

TO-220 Package

230°C

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Output Voltage				5V			12V			15V			
Input Voltage (unless otherwise noted)				10V			19V			23V			
Symbol	Parameter	Conditions		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V _O	Output Voltage	T _J = 25°C, 5 mA ≤ I _O ≤ 1A		4.8	5	5.2	11.5	12	12.5	14.4	15	15.6	V
		P _D ≤ 15W, 5 mA ≤ I _O ≤ 1A		4.75		5.25	11.4		12.6	14.25		15.75	V
		V _{MIN} ≤ V _{IN} ≤ V _{MAX}		(7.5 ≤ V _{IN} ≤ 20)			(14.5 ≤ V _{IN} ≤ 27)			(17.5 ≤ V _{IN} ≤ 30)			V
ΔV _O	Line Regulation	I _O = 500 mA	T _J = 25°C	3 50			4 120			4 150			mV
			ΔV _{IN}	(7 ≤ V _{IN} ≤ 25)			14.5 ≤ V _{IN} ≤ 30)			(17.5 ≤ V _{IN} ≤ 30)			V
		I _O ≤ 1A	0°C ≤ T _J ≤ +125°C	50			120			150			mV
			ΔV _{IN}	(8 ≤ V _{IN} ≤ 20)			(15 ≤ V _{IN} ≤ 27)			(18.5 ≤ V _{IN} ≤ 30)			V
			T _J = 25°C	50			120			150			mV
			ΔV _{IN}	(7.5 ≤ V _{IN} ≤ 20)			(14.6 ≤ V _{IN} ≤ 27)			(17.7 ≤ V _{IN} ≤ 30)			V
ΔV _O	Load Regulation	T _J = 25°C	5 mA ≤ I _O ≤ 1.5A	10 50			12 120			12 150			mV
			250 mA ≤ I _O ≤ 750 mA	25			60			75			mV
		5 mA ≤ I _O ≤ 1A, 0°C ≤ T _J ≤ +125°C		50			120			150			mV
		I _Q	Quiescent Current	I _O ≤ 1A	T _J = 25°C	8			8			8	
0°C ≤ T _J ≤ +125°C	8.5				8.5			8.5			mA		
ΔI _Q	Quiescent Current Change	5 mA ≤ I _O ≤ 1A		0.5			0.5			0.5			mA
		T _J = 25°C, I _O ≤ 1A		1.0			1.0			1.0			mA
		V _{MIN} ≤ V _{IN} ≤ V _{MAX}		(7.5 ≤ V _{IN} ≤ 20)			(14.8 ≤ V _{IN} ≤ 27)			(17.9 ≤ V _{IN} ≤ 30)			V
		I _O ≤ 500 mA, 0°C ≤ T _J ≤ +125°C		1.0			1.0			1.0			mA
$\frac{\Delta V_{IN}}{\Delta V_{OUT}}$	Ripple Rejection	f = 120 Hz	I _O ≤ 1A, T _J = 25°C or I _O ≤ 500 mA	62 80			55 72			54 70			dB
			0°C ≤ T _J ≤ +125°C	62			55			54			dB
			V _{MIN} ≤ V _{IN} ≤ V _{MAX}		(8 ≤ V _{IN} ≤ 18)			(15 ≤ V _{IN} ≤ 25)			(18.5 ≤ V _{IN} ≤ 28.5)		
R _O	Dropout Voltage	T _J = 25°C, I _{OUT} = 1A		2.0			2.0			2.0			V
		f = 1 kHz		8			18			19			mΩ

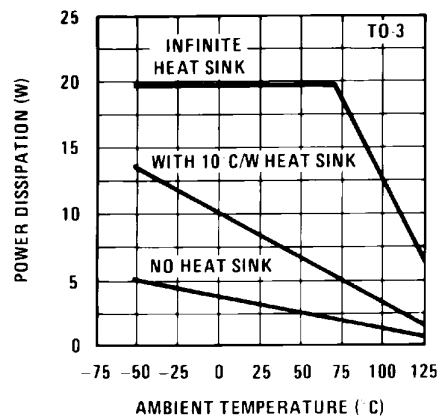
Note 1: Thermal resistance of the TO-3 package (K, KC) is typically 4°C/W junction to case and 35°C/W case to ambient. Thermal resistance of the TO-220 package (T) is typically 4°C/W junction to case and 50°C/W case to ambient.

Note 2: All characteristics are measured with capacitor across the input of 0.22 μF, and a capacitor across the output of 0.1 μF. All characteristics except noise voltage and ripple rejection ratio are measured using pulse techniques (t_w ≤ 10 ms, duty cycle ≤ 5%). Output voltage changes due to changes in internal temperature must be taken into account separately.

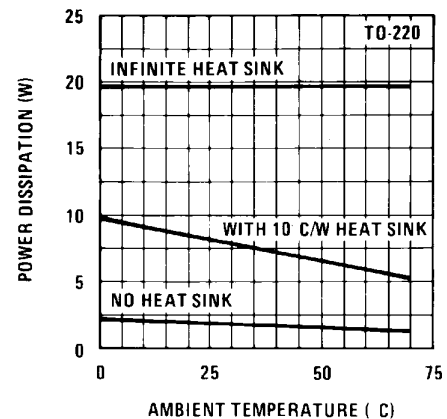
Note 3: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. For guaranteed specifications and the test conditions, see Electrical Characteristics.

Typical Performance Characteristics

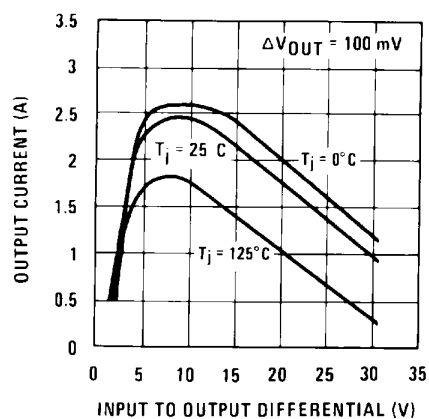
Maximum Average Power Dissipation



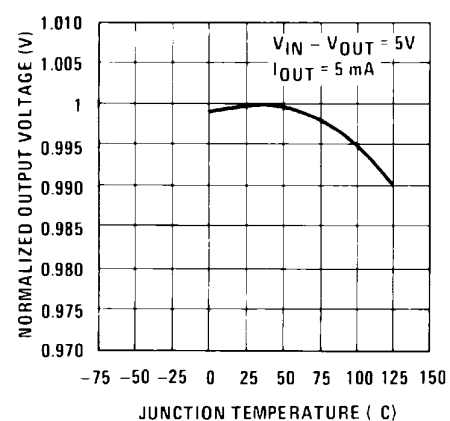
Maximum Average Power Dissipation



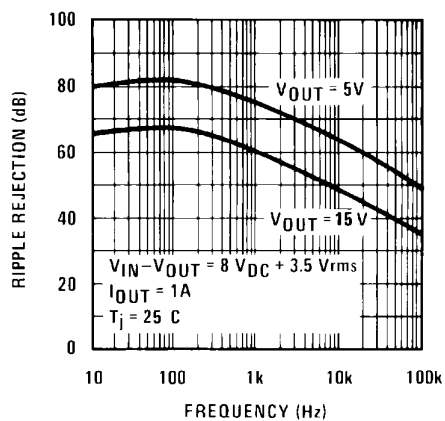
Peak Output Current



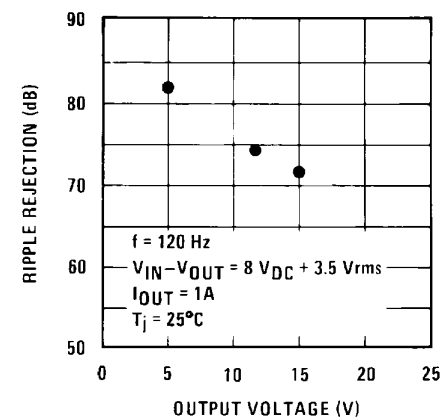
Output Voltage (Normalized to 1V at $T_j = 25^\circ\text{C}$)



Ripple Rejection

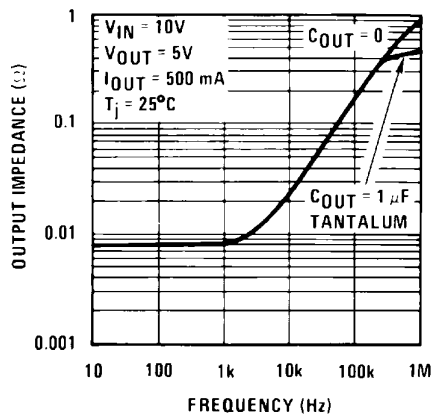


Ripple Rejection

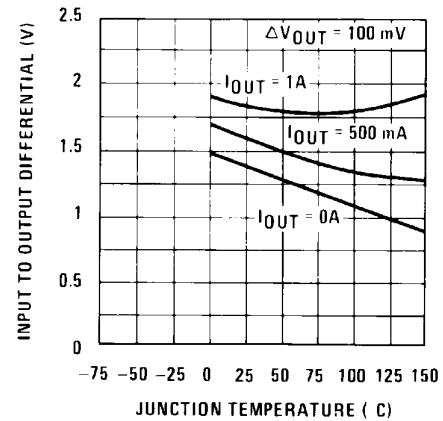


Typical Performance Characteristics (Continued)

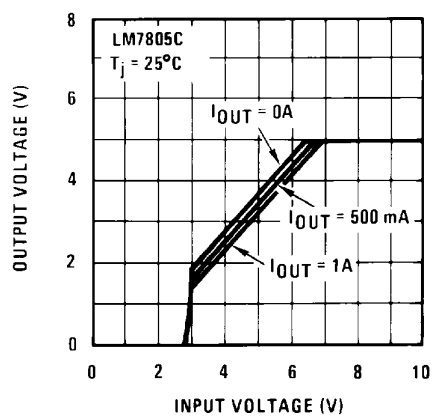
Output Impedance



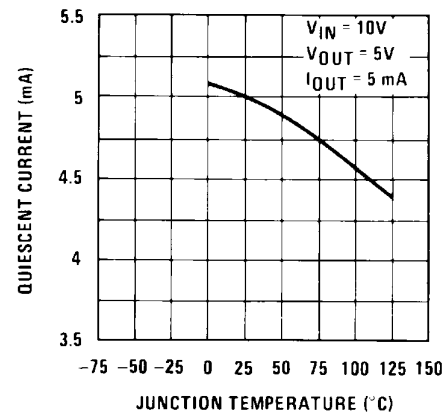
Dropout Voltage



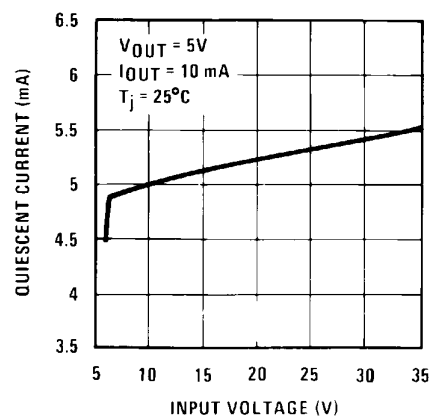
Dropout Characteristics



Quiescent Current



Quiescent Current



THINKI TO-3 Package Dimensions

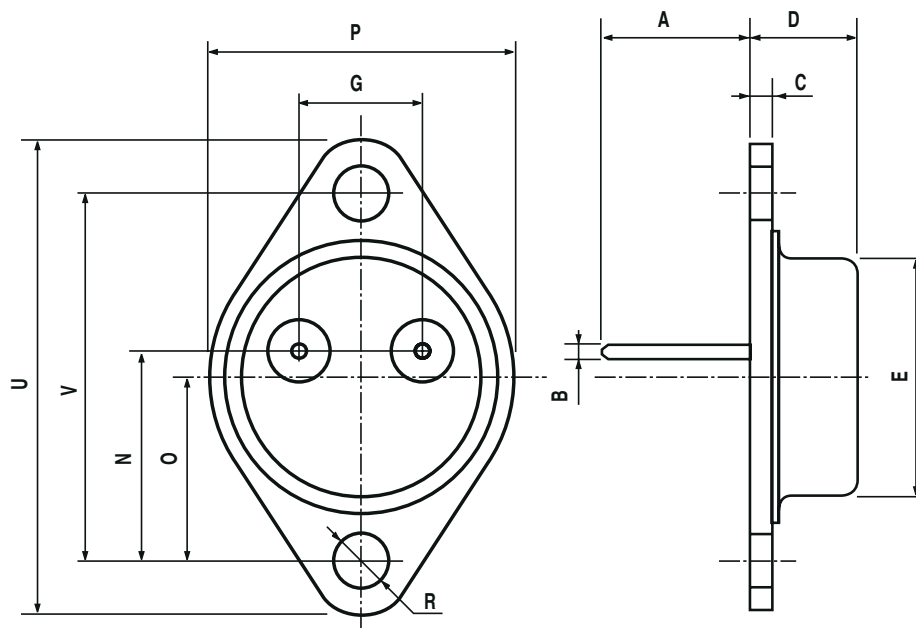


Table 26. TO-3 mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		11.85			0.466	
B	0.96	1.05	1.10	0.037	0.041	0.043
C			1.70			0.066
D			8.7			0.342
E			20.0			0.787
G		10.9			0.429	
N		16.9			0.665	
P			26.2			1.031
R	3.88		4.09	0.152		0.161
U			39.5			1.555
V		30.10			1.185	