General Description:

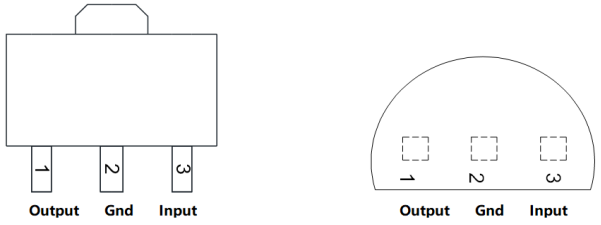
The uP78L05 are three terminal positive regulators designed for a wide variety of applications including local, on-card regulation.
This series of regulators are complete with internal current limiting, thermal shutdown protection, and safe-area compensation which make them virtually immune from output overload. If adequate heat sinking is provided, these regulators can deliver output currents up to 150mA.
The µP78L05 output voltage is offered in two kinds of voltage tolerance: C: 1% and D:5%.
The uP78L05 series are available in TO-92 (bulk or ammo packing) and SOT-89 packages.
The uP78L05 are characterized for operation from –40°C to 125°C.

Features:

- Output Current up to 150mA
- Fixed Output Voltages of 5V
- Output Voltage Accuracy: ±1% and 5%
- Internal Short Circuit Current Limiting
- Internal Thermal Overload Protection
- No External Components
- Output Transistor Safe-Area Protection

Applications:

- Consumer Electronics
- Microprocessor Power Supplies
- Mother Boards



150mA Applications

Figure 1. Package types of µP78L05

Ordering Information

Device Name	Package	Mark ID	Voltage Tolerance	Operating Free-Air Temperature (TA)
µP78L05CR	SOT89	G76	1%	-40°C to 125°C
µP78L05DR	SOT89	G78	5%	
µP78L05CZ	TO-92	78L05C	1%	
µP78L05DZ	TO-92	78L05	5%	

Typical Applications

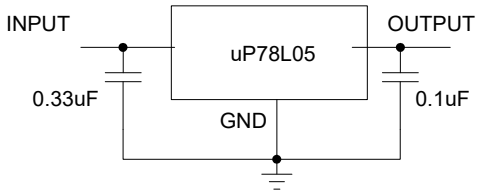


Figure 2. Typical Application Circuit

Functional Block Diagram:

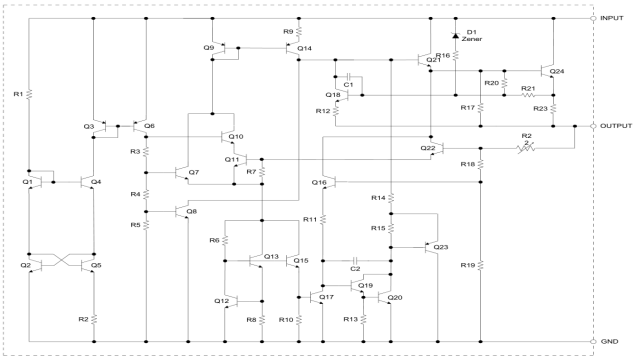


Figure 3. Functional Block Diagram of µP78L05

Absolute Maximum Ratings(Note1)

(Operation temperature range applies unless otherwise specified.)

Parameter	Symbol	Range	Unit
Input Voltage	V_{IN}	36	V
Output Current	I_O	150	mA
Operating Junction Temperature	T_J	150	°C
Lead Temperature (Soldering, 10sec)	T_{LEAD}	260	°C
Power Dissipation	P_D	750	mW
Storage Temperature Range	T_{STG}	-65 to 150	°C
Thermal resistance, SOT89	θ_{JA}	55	°C/W
Thermal resistance, TO-92	θ_{JA}	150	°C/W
ESD rating, human body mode	HBM	2000	V
ESD rating, machine mode	MM	200	V

Note: 1. Absolute maximum ratings indicate stresses beyond which may cause permanent damage to the device.

Recommended Operation Ratings:

Parameter	Symbol	Min.	Max.	Unit
Input voltage	V_{IN}		30	V
Operating junction Temperature	T_J	-40	125	^oC

Electrical Characteristics:

(Test conditions: V_{IN}= 10V, I_O=40mA, C_{IN}= 0.33uF, C_{out}= 0.1uF, T_J=25°C unless otherwise noted.)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	C(1%)	V_O		5	5.05	5.1	V
	D(5%)			4.75	5	5.25	V
Line Regulation		V_{Rline}	7V ≤V_{IN}≤ 20V		8	150	mV
Load Regulation		V_{Rload}	1mA≤I_O≤100mA		10	60	mV
Quiescent Current		I_Q			2.8	4.2	mA
Quiescent Current Change		ΔI_Q	8V ≤V_{IN}≤ 20V		0.2	1.5	mA
			1mA≤I_O≤40mA		0.05	0.1	mA
Ripple Rejection		PSRR	f=120Hz,8V ≤V_{IN}≤ 18V	47	62		dB
Dropout Voltage		V_{DROP}	I_O=40mA		1.7		V
			I_O=100mA		1.8		V
Output Noise Voltage		N_O	10Hz ≤f≤ 100kHz (Note 2)		40		μV
Output Voltage Temperature Coefficient		Δ Vo/ Δ T	I_O=5mA		0.42		mV/ °C
Thermal Resistance		θ_{JC}	SOT89		28.3		°C/W
			TO-92		40		

Note 2, 0.01μF minimum load capacitance is recommended to limit high frequency noise.

150mA Applications

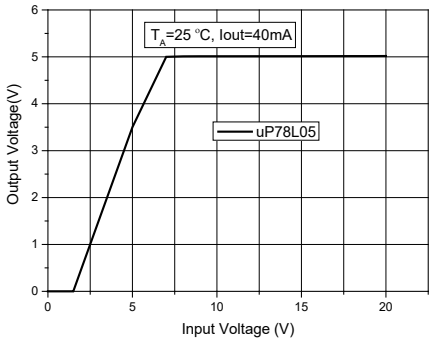


Figure 4. Output Voltage vs Input Voltage

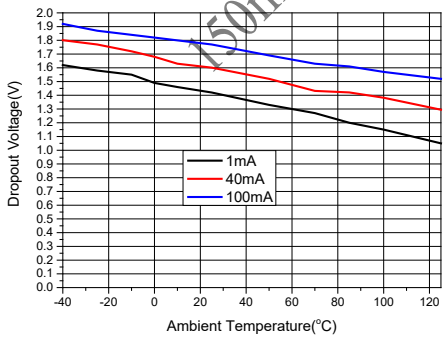


Figure 5. Dropout Voltage vs Ambient Temperature

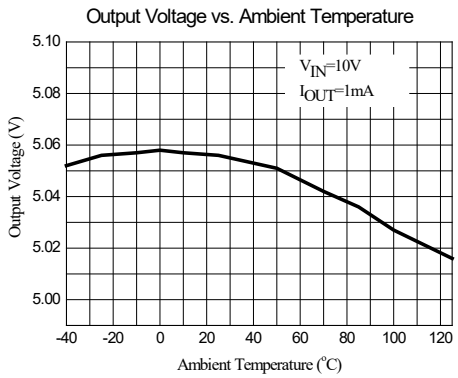


Figure 6. Output Voltage vs Ambient Temperature

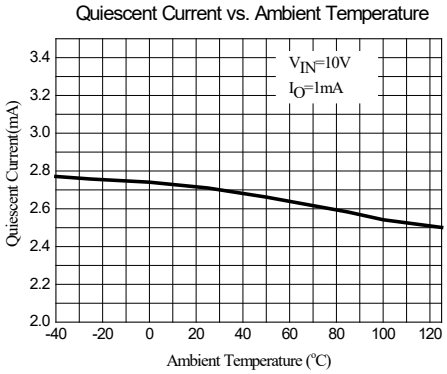
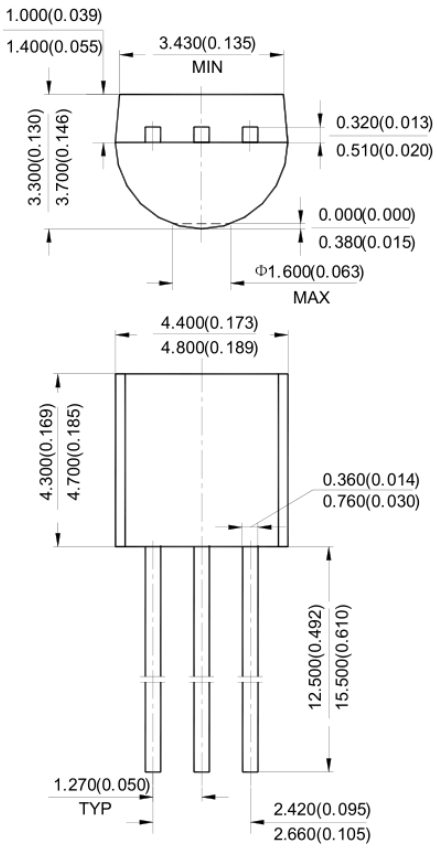


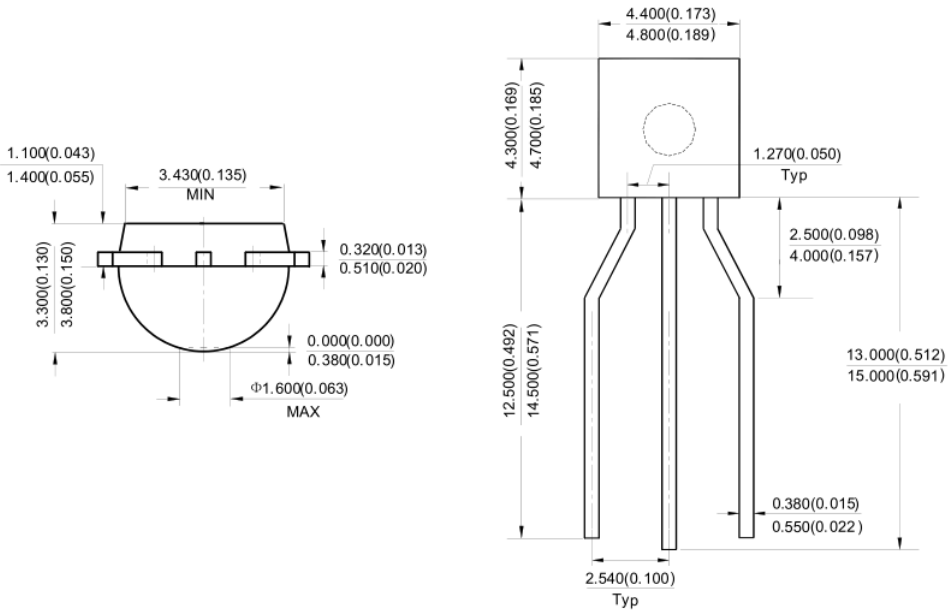
Figure 7. Quiescent Current vs Ambient Temperature

TO-92 (Bulk Packing)



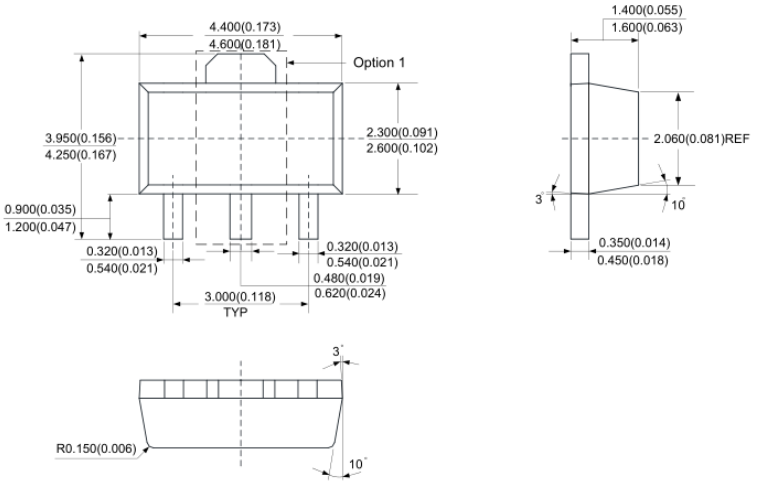
150mA Applications

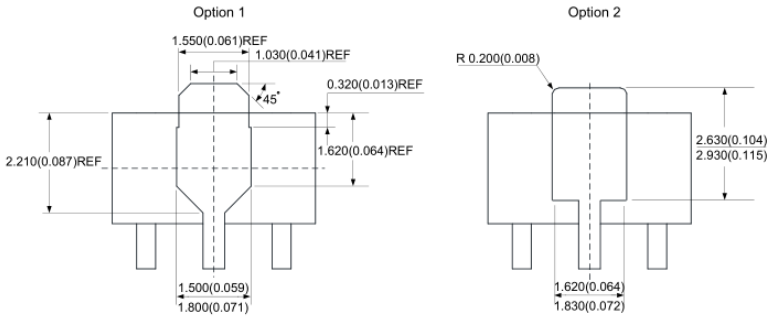
TO-92 (Ammo Packing)



150mA Applications

SOT-89





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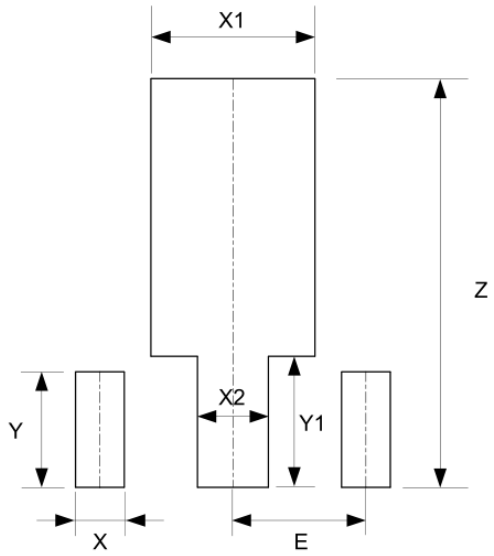
SOT-89



Dimensions	Z (mm)/(inch)	X (mm)/(inch)	X1 (mm)/(inch)	X2 (mm)/(inch)	Y (mm)/(inch)	Y1 (mm)/(inch)	E (mm)/(inch)
Value	4.600/0.181	0.550/0.022	1.850/0.073	0.800/0.031	1.300/0.051	1.475/0.058	1.500/0.059