

# MB78L05

## 100mA POSITIVE VOLTAGE REGULATOR



**CBC Microelectronics**  
<http://www.cbcv.net>

### General Description

The MB78L05 series 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 are provided, these regulators can deliver output currents up to 100mA.

The MB78L05 series are available in TO-92 (bulk or ammo packing), SOP-8, SOT-89 packages.

### Features

- Output Current up to 100mA
- Fixed Output Voltages of 5V
- Output Voltage Accuracy of 1% over the Full Temperature Range
- Internal Short Circuit Current Limiting
- Internal Thermal Overload Protection
- No External Components
- Output Transistor Safe-area Protection

### Applications

- Consumer Electronics
- Microprocessor Power Supply
- Mother Board



TO-92(Bulk Packing)



TO-92(Ammo Packing)



SOT-89



SOP-8

Figure 1. Typical Application of MB78L05

# MB78L05

## Pin Configuration

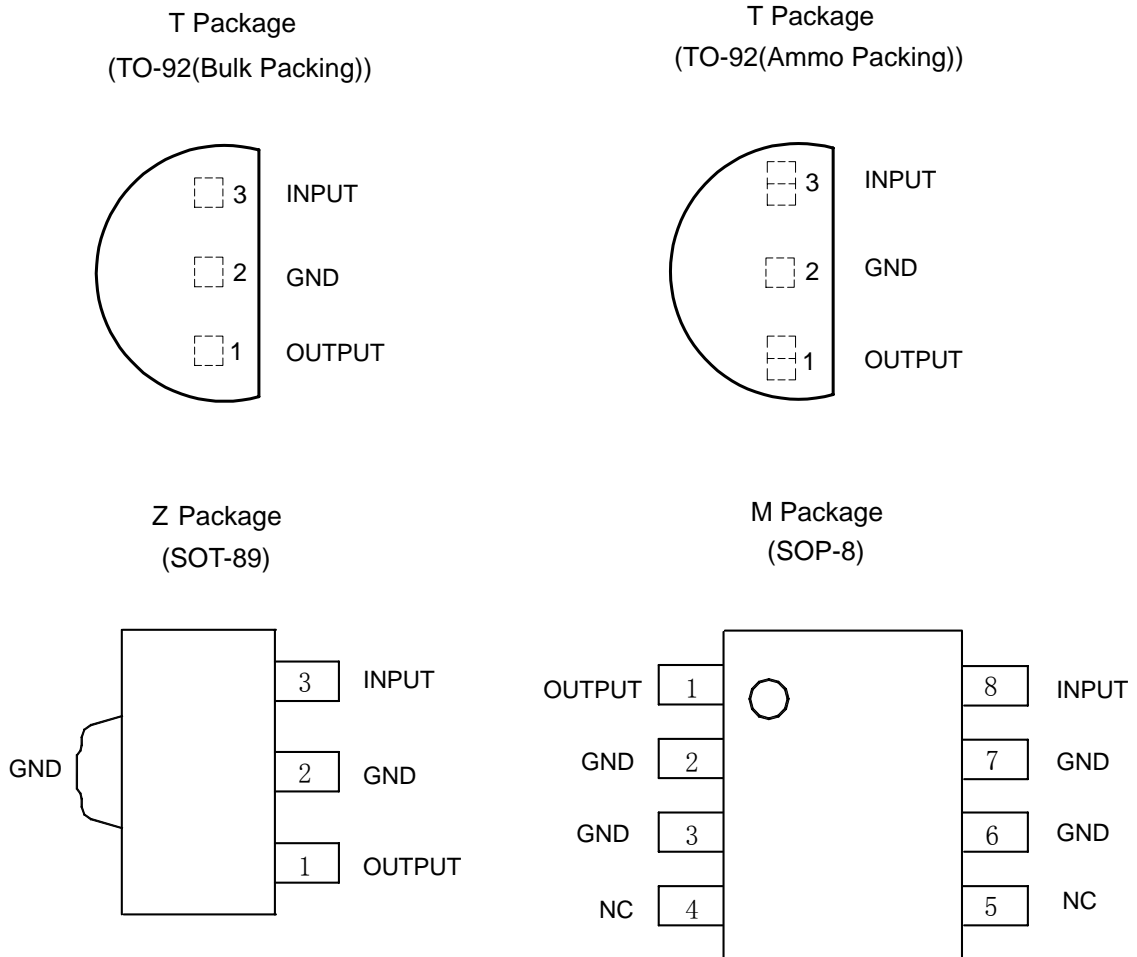
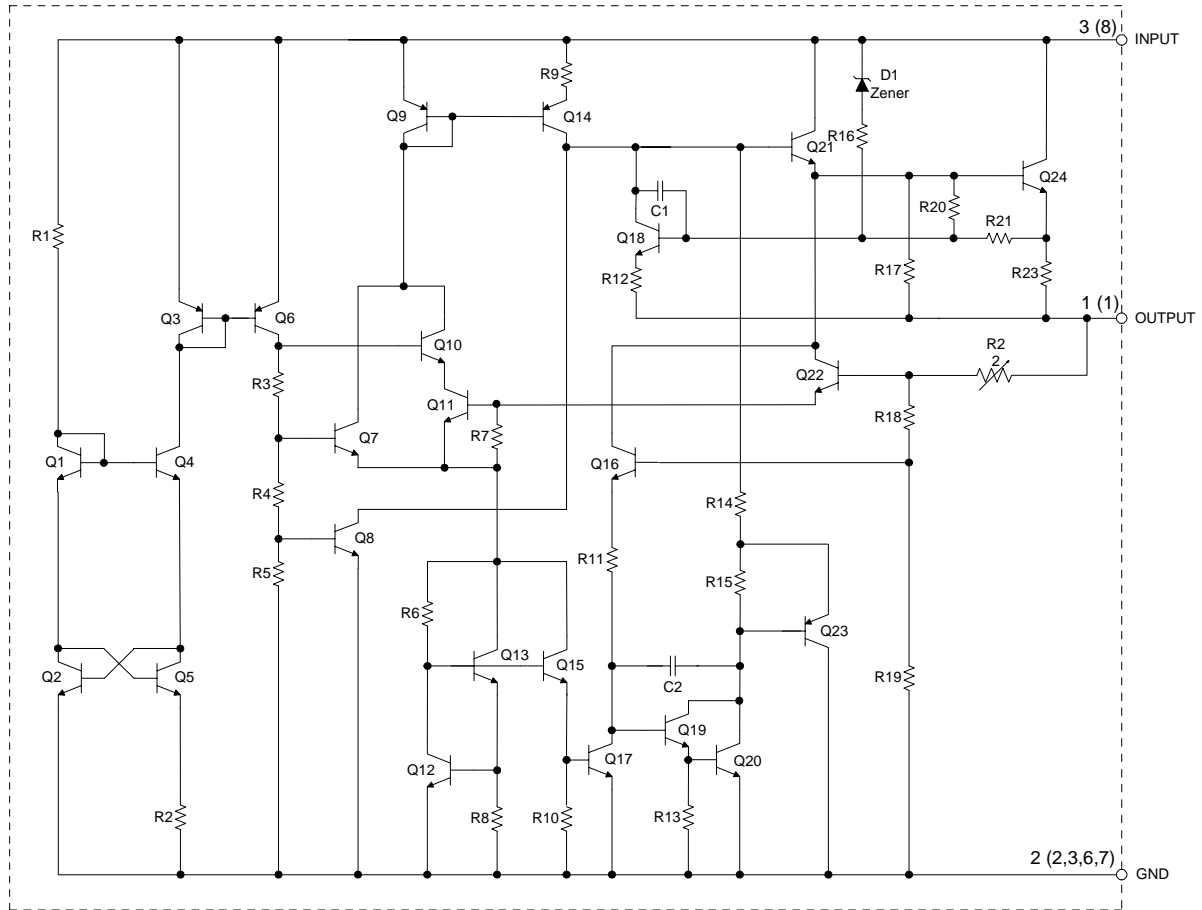


Figure 2. Pin Configuration of MB78L05 (Top View)

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## Functional Block Diagram

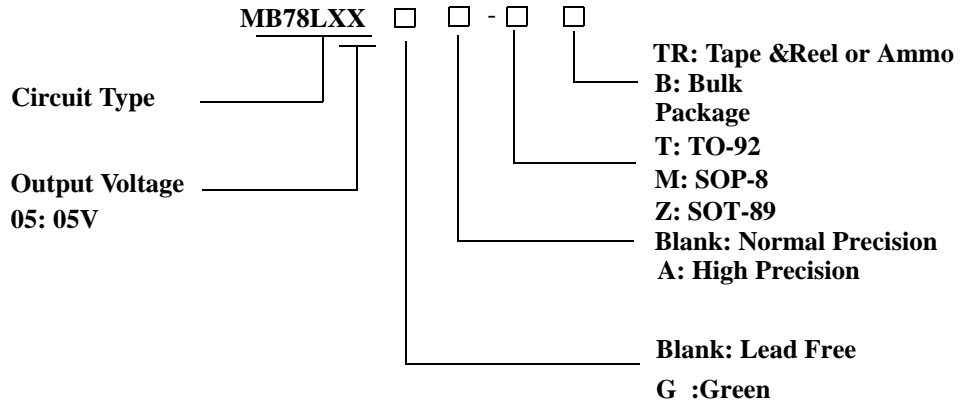


A (B)  
 A for 3-pin    B for 8-pin

Figure 3. Functional Block Diagram of MB78L05

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## Ordering Information



Package	Part Number		Marking ID		Packing Type
	Pb-free	Halogen-Free	Pb-free	Halogen-Free	
TO-92	MB78L05T	MB78L05GT	MB78L05T	MB78L05GT	Bulk
	MB78L05TTR	MB78L05GTTR	MB78L05T	MB78L05GT	Ammo
SOP-8	MB78L05M	MB78L05GM	78L05M	78L05GM	Tube
	MB78L05MTR	MB78L05GMTR	78L05M	78L05GM	Tape&Reel
SOT-89	MB78L05Z	MB78L05GZ	MB78L05	MB78L05	Tube
	MB78L05ZTR-A	MB78L05GZTR-A	MB78L05	MB78L05	Tape&Reel

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## Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value		Unit
Input Voltage	$V_{IN}$	36		V
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	$\theta_{JA}$	TO-92	180	°C/W
ESD (Human Body Model)	ESD	2000		V
ESD (Machine Model)	ESD	200		V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

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## Electrical Characteristics

**MB78L05** ( $V_{IN}=10V$ ,  $I_{OUT}=40mA$ ,  $C_{IN}=0.33\mu F$ ,  $C_{OUT}=0.1\mu F$ ,  $T_J=25^\circ C$ , **Bold** typeface applies over  $-40^\circ C \leq T_J \leq 125^\circ C$ , unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	$V_{OUT}$		4.94		5.05	V
Line Regulation	$V_{RLINE}$	$7V \leq V_{IN} \leq 20V$		8	150	mV
Load Regulation	$V_{RLOAD}$	$1mA \leq I_{OUT} \leq 100mA$		10	60	mV
Quiescent Current	$I_Q$			3	5.5	mA
Quiescent Current Change	$\Delta I_Q$	$8V \leq V_{IN} \leq 20V$			<b>1.5</b>	mA
		$1mA \leq I_{OUT} \leq 40mA$			<b>0.1</b>	
Ripple Rejection	PSRR	$f=120Hz$ , $8V \leq V_{IN} \leq 18V$	47	62		dB
Dropout Voltage	$V_{DROP}$	$I_{OUT}=40mA$		1.7		V
		$I_{OUT}=100mA$		1.8		
Output Noise Voltage	$N_O$	$10Hz \leq f \leq 100kHz$ (Note 2)		40		$\mu V$
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		0.42		mV/ $^\circ C$
	$(\Delta V_{OUT}/V_{OUT})/\Delta T$			84		ppm/ $^\circ C$
Thermal Resistance	$\theta_{JC}$	TO-92		200		$^\circ C/W$
		SOT-89		165		
		SOP-8		180		

Note 2: 0.01 $\mu F$  minimum load capacitance is recommended to limit high frequency noise.

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## Typical Performance Characteristics

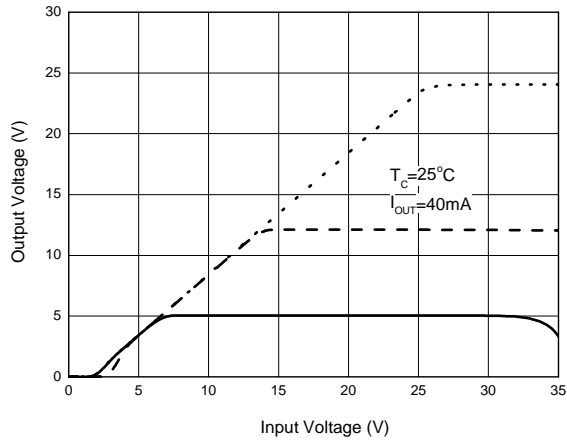


Figure 4. Output Voltage vs. Input Voltage

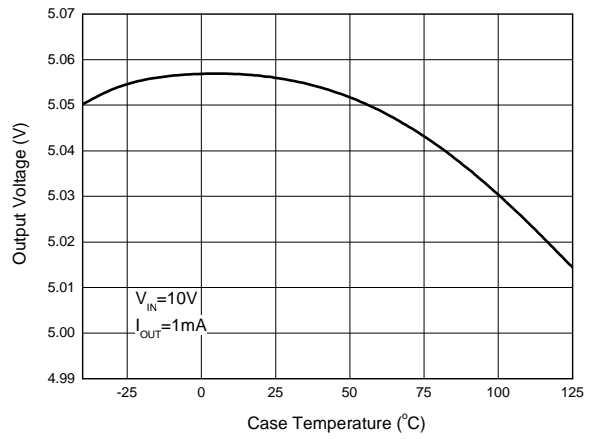


Figure 5. Output Voltage vs. Case Temperature

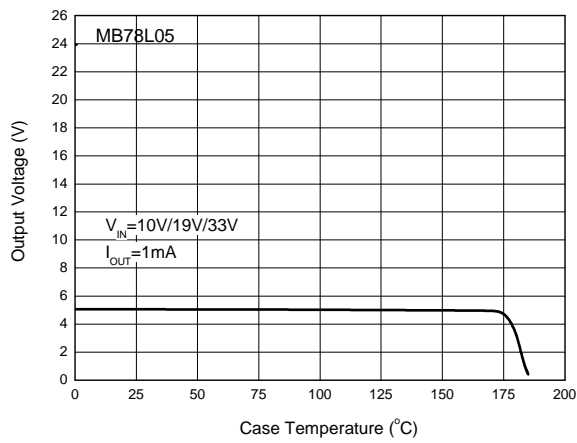


Figure 6. Over Temperature Protection

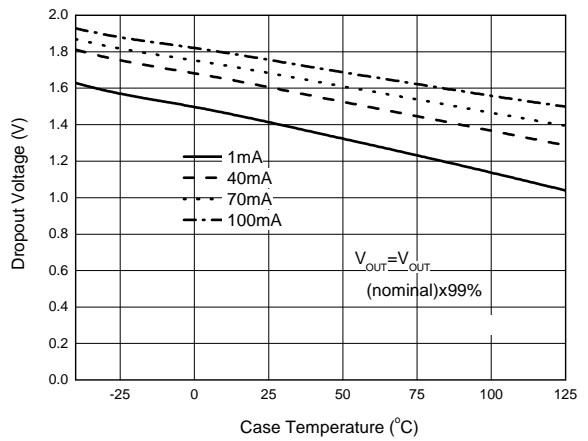


Figure 7. Dropout Voltage vs. Case Temperature

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## Typical Performance Characteristics (Cont'd)

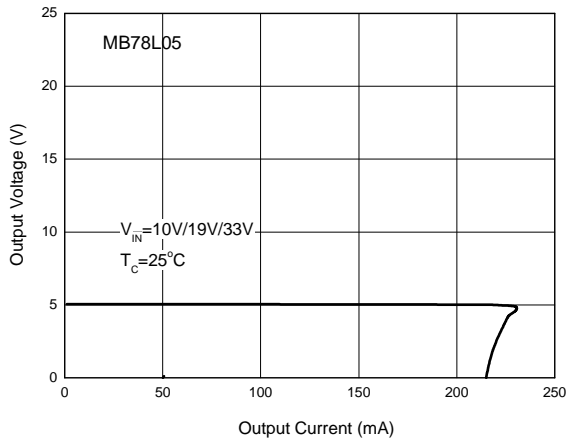


Figure 8. Output Voltage vs. Output Current

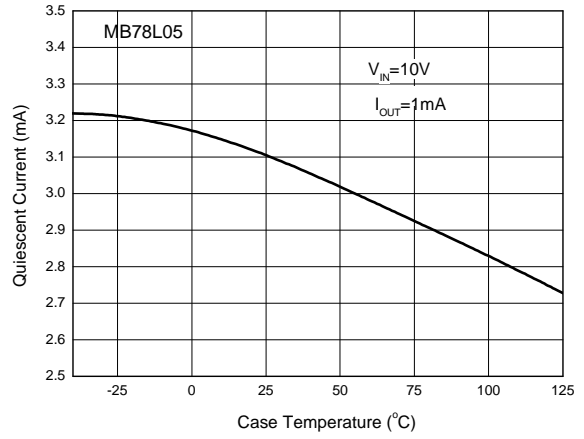


Figure 9. Quiescent Current vs. Case Temperature

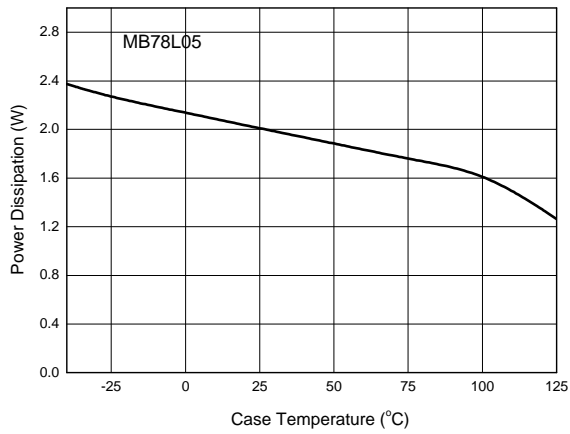


Figure 10. Power Dissipation vs. Case Temperature

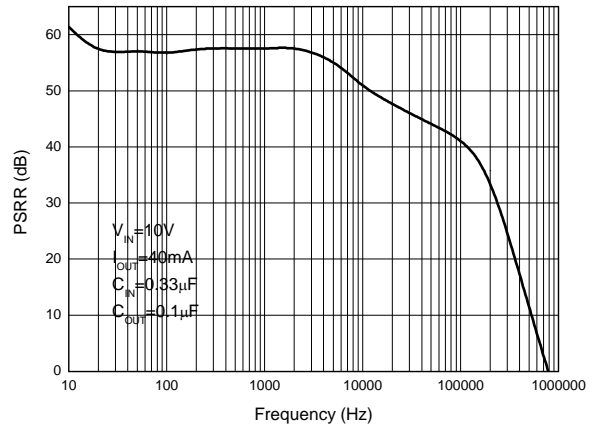
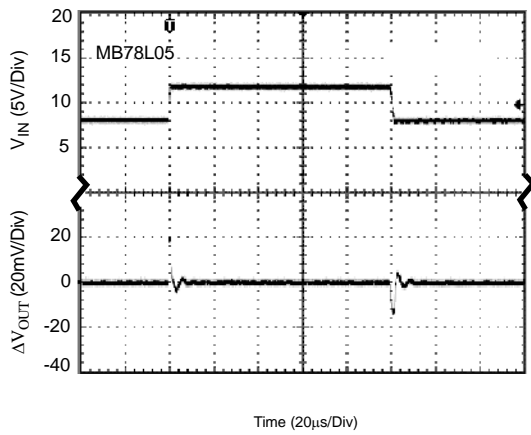


Figure 11. PSRR vs. Frequency



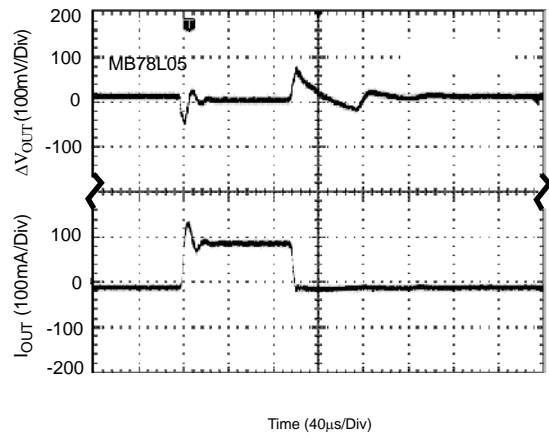
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## Typical Performance Characteristics (Cont'd)



**Figure 12. Line Transient**

(Conditions:  $I_{OUT}=40\text{mA}$ ,  $C_{IN}=0.33\mu\text{F}$ ,  $C_{OUT}=0.1\mu\text{F}$ )



**Figure 13. Load Transient**

(Conditions:  $V_{IN}=10\text{V}$ ,  $C_{IN}=0.33\mu\text{F}$ ,  $C_{OUT}=0.1\mu\text{F}$ )

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## Typical Application

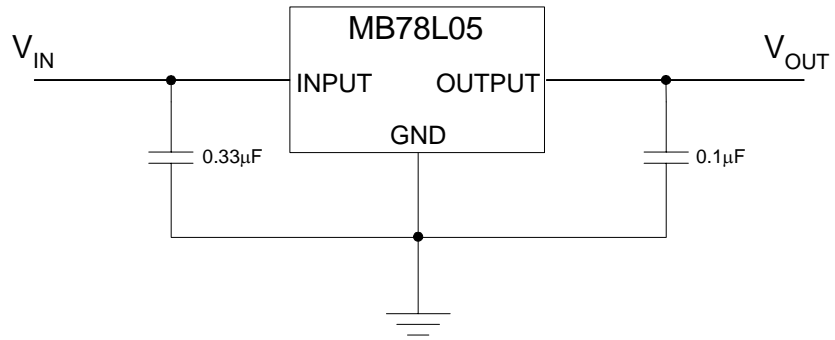


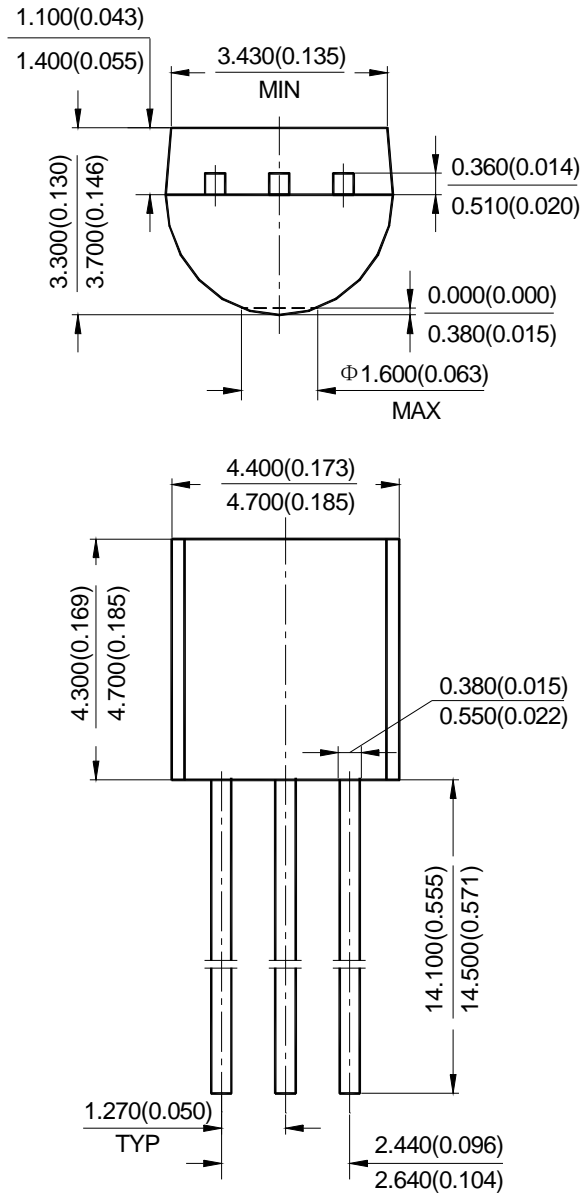
Figure 14. Typical Application of MB78L05

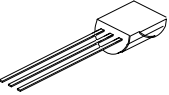
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## Mechanical Dimensions

### TO-92(Bulk Packing)

Unit: mm(inch)



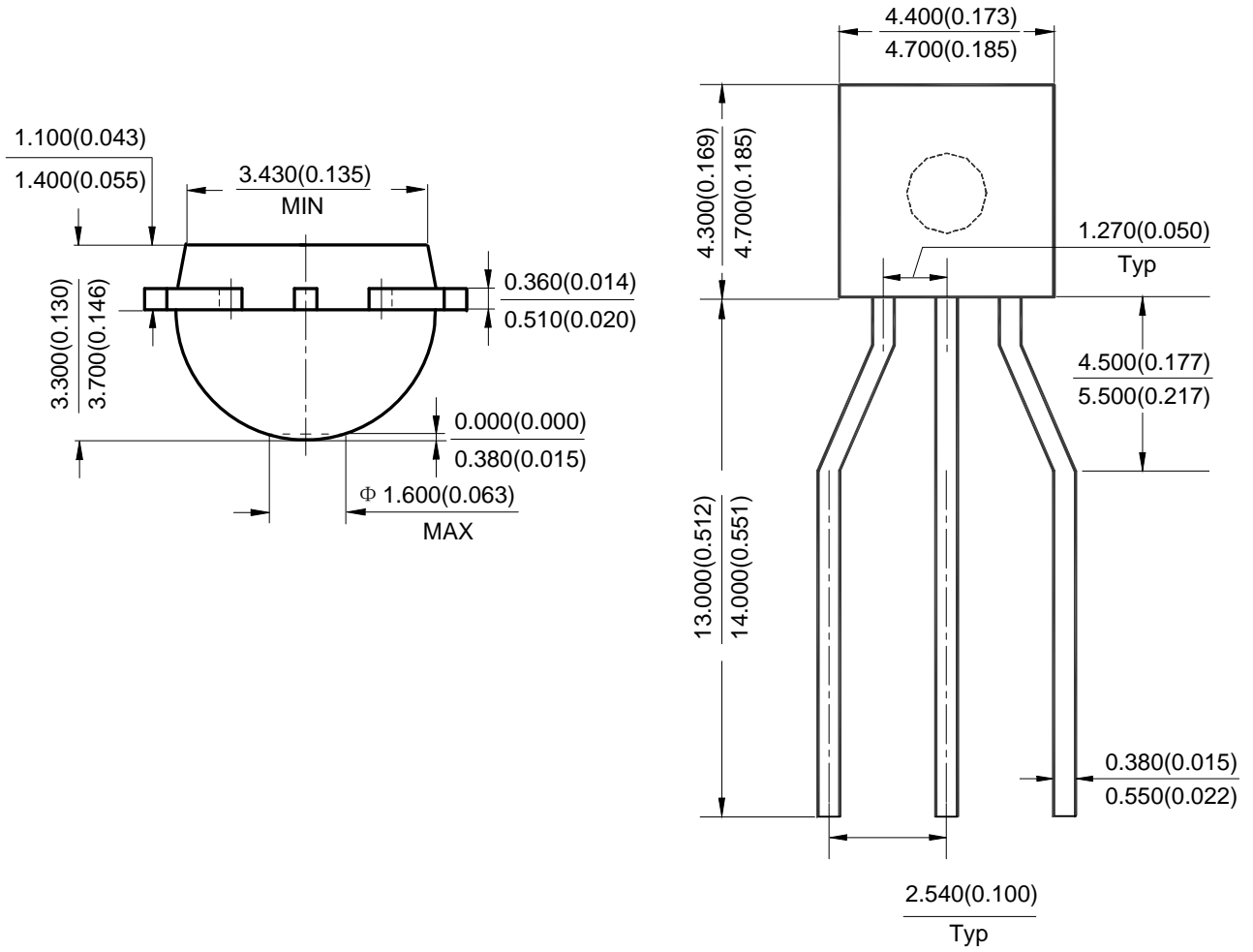
	Part no. suffixed = 1,000 devices on reel
	Part no. suffixed = 10,000 devices per folded box

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## Mechanical Dimensions (Cont'd)

TO-92(Ammo Packing)

Unit: mm(inch)



## Tape and reel information

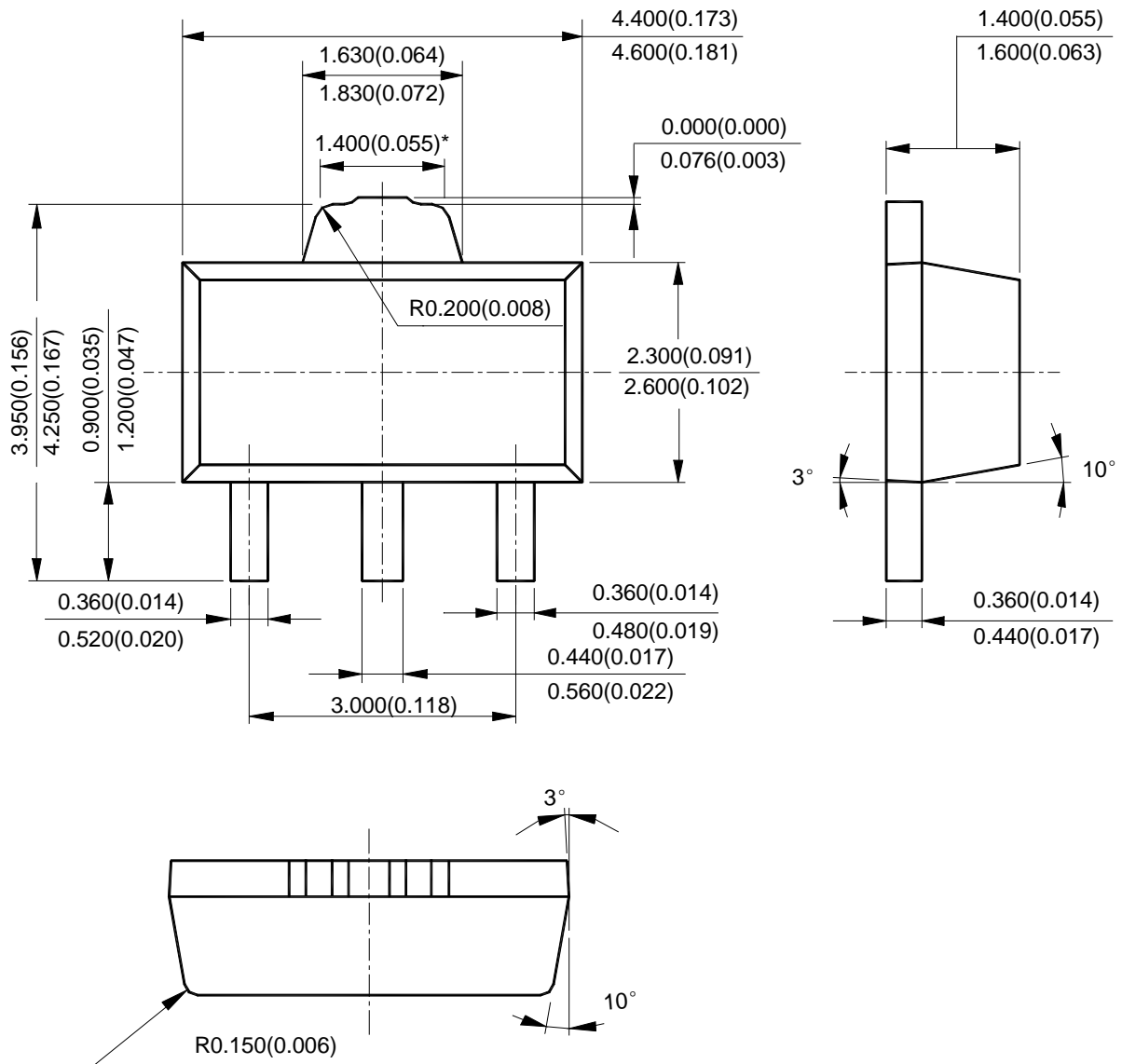
<p>Flat Face Rounded Face Option A Option B</p>	<p>Part no. suffixed TR = 2,000 devices on reel</p> <p>Part no. suffixed TR = 20,000 devices per folded box</p>
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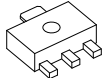
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## Mechanical Dimensions (Cont'd)

SOT-89

Unit: mm(inch)



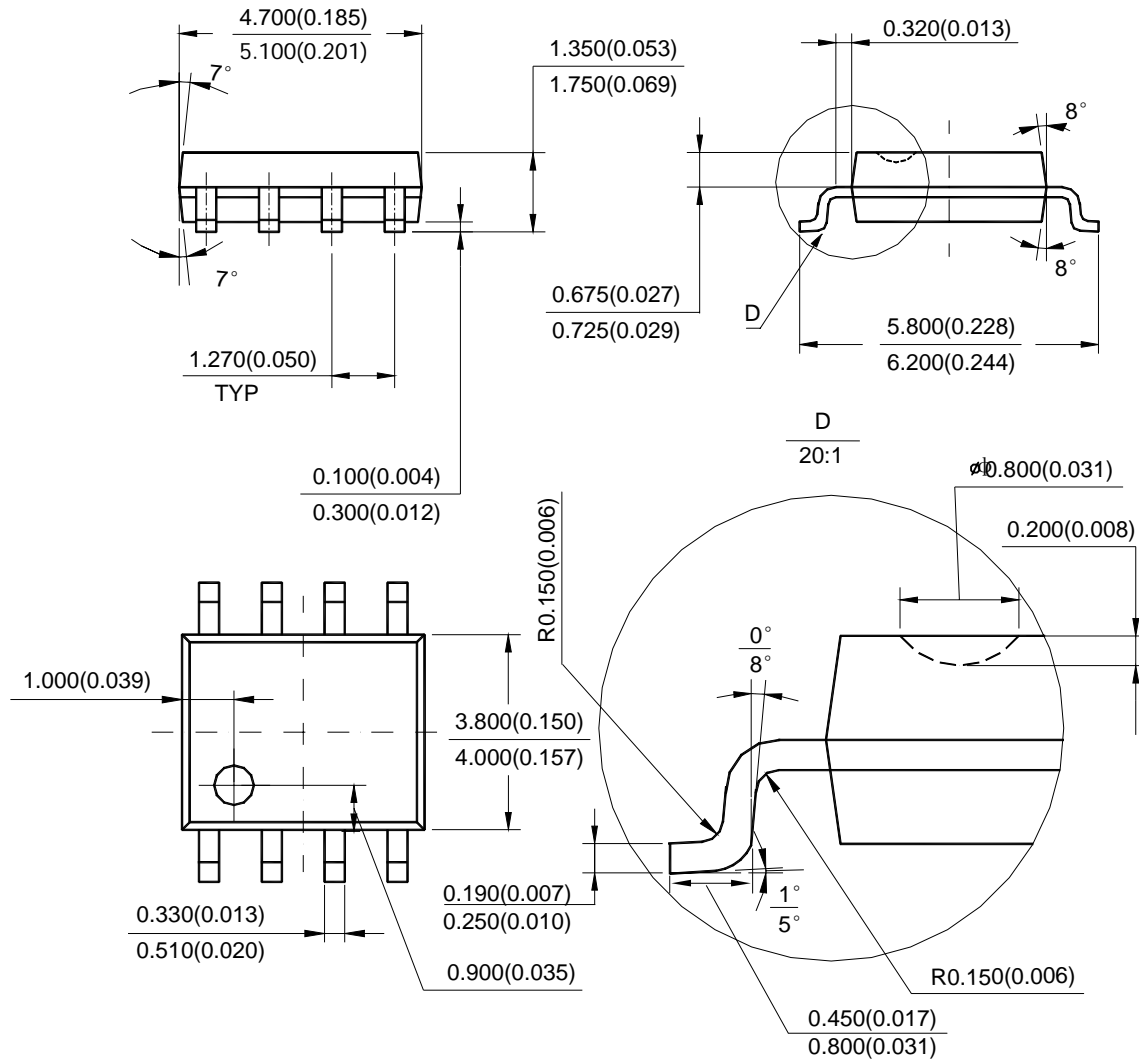
	Part no. suffixed TR = 1,000 devices on reel
	Part no. suffixed TR = 10,000 devices per folded box

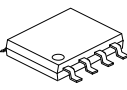
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## Mechanical Dimensions (Cont'd)

SOP-8

Unit: mm(inch)



	Part no. suffixed = 1,00 devices on Tube Part no. suffixed TR = 40,00 devices on Reel
	Part no. suffixed = 1,000 devices per folded box Part no. suffixed TR = 6,400 devices per folded box

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