



JSR78L05

0.1A Linear Voltage Regulator

Description

The JSR78L05 is a voltage regulator with output current at 0.1A and output voltage at 5V.

The device is designed to suit wide range of applications where good voltage regulation, current limiting, and thermal overload protection are essential to reliable long-term operations. With adequate heat sink attached, the regulator delivers output current to the maximum value of 100mA.

Packages offered include SOT-89-3L, TO-92-3L.

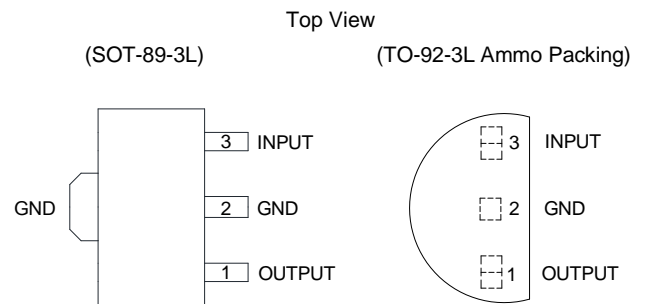
Applications

- Operating voltage supply to MCU and system ICs used in CE devices, industrial computing peripherals, network & communication systems
- Commonly adopted in e-Bike, 2/4-wheel scooters, toys, power adapters for computer peripherals / set-top boxes / routers, industrial machineries, test equipment

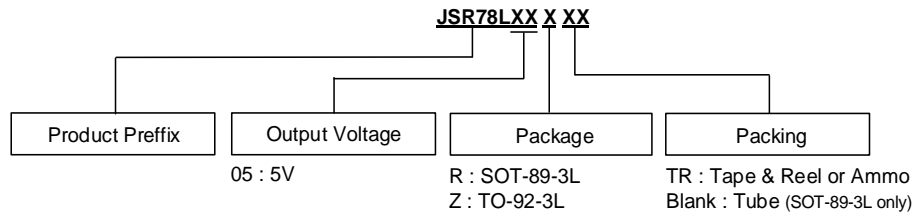
Features and Benefits

- Fixed output voltage at 5V
- Output current up to 100mA with foldback style current limiting
- Good immunization from input noise with PSRR at > 62dB typical
- Wide operating temperature range at $T_J = -40 \sim 125^\circ\text{C}$
- Built-in thermal shut-down to ensure reliable operation
- No external components needed for proper operation
- Lead-free package assembled with 'green' molding compound

Pin Assignment

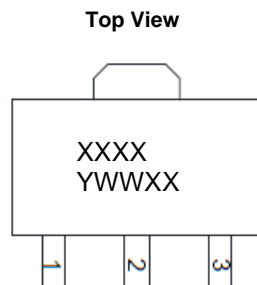


Ordering Information



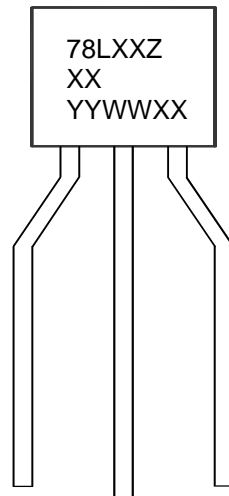
Product Name	Package	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JSR78L05RTR	SOT-89-3L	G78E	3	-40 ~ 125	7" T&R	1000
JSR78L05ZTR	TO-92-3L	G1	3	-40 ~ 125	Ammo	2000

Marking Information



First Line: Marking (see Ordering Information)
 Second Line: Date Code
 Y: Year (e.g. 3 for CY2023)
 WW: Work Week (≤ 51) of Molding
 XX: Code for Assembly & Test Site

Marking Information (continued)

Top View

First Line: 78LXXZ (XX = Output Voltage; e.g. '05' for 5V)

Second Line: Marking (see Ordering Information)

Third Line: Date Code

YY: Year (e.g. 23 for CY2023)

WW: Work Week (≤ 51) of Molding

XX: Code for Assembly & Test Site

Typical Application Circuit

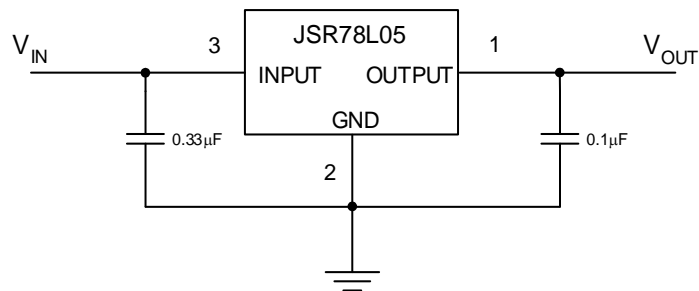


Fig. 1: Application Circuit



Diagram of Function Blocks

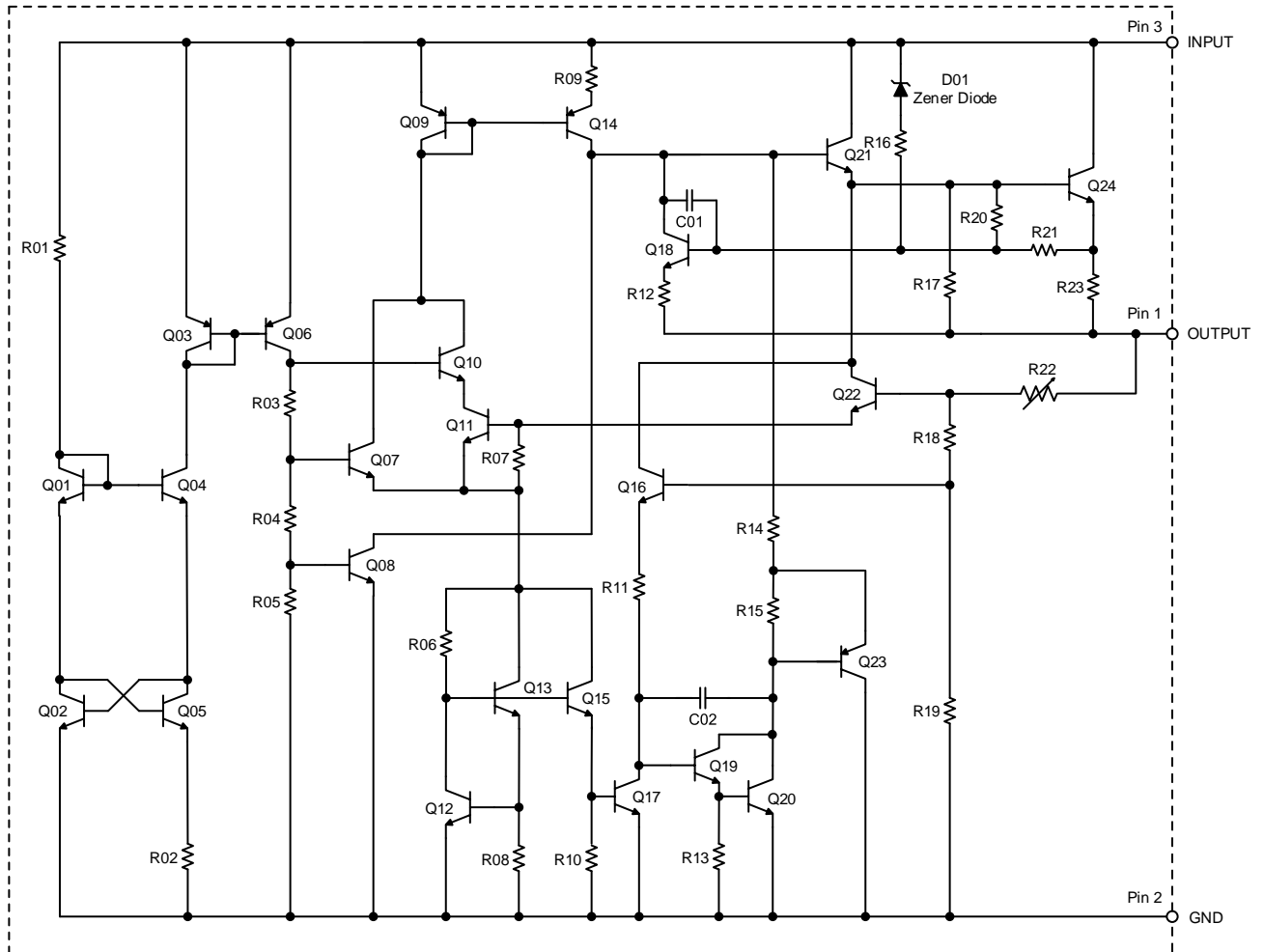


Fig. 2: Function Blocks

**Absolute Maximum Ratings *1**

Symbol	Parameter	Rating	Unit
V _{IN}	Input Voltage	36	V
T _J	Operating Junction Temperature	150	°C
T _{LEAD}	Lead Temperature (soldering, 10s)	260	°C
T _{STG}	Storage Temperature Range	-65 ~ 150	°C
θ _{JA}	Thermal Resistance for SOT-89-3L	165	°C / W
	Thermal Resistance for TO-92-3L	180	
HBM	ESD (Human Body Model)	2000	V
MM	ESD (Machine Model)	200	V

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

Recommended Operating Conditions

Symbol	Parameter	Min.	Max.	Unit
V _{IN}	Input Voltage	–	30	V
T _J	Operating Junction Temperature Range	-40	125	°C

Electrical Characteristics

V_{IN} = 10V, I_{OUT} = 40mA, C_{IN} = 0.33μF, C_{OUT} = 0.1μF, T_J = 25°C; *Italic & Bold typefaces applies over -40°C ≤ T_J ≤ 125°C unless otherwise specified*

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{OUT}	Output Voltage	–	4.8	5.0	5.2	V
		7V ≤ V _{IN} ≤ 20V, 1mA ≤ I _{OUT} ≤ 100mA, P _D ≤ 0.75W	4.75	–	5.25	
ΔV _{R_LINE}	Line Regulation	7V ≤ V _{IN} ≤ 20V	–	8	150	mV
ΔV _{R_LOAD}	Load Regulation	1mA ≤ I _{OUT} ≤ 100mA	–	10	60	mV
I _Q	Quiescent Current	–	–	3	5.5	mA
ΔI _Q	Quiescent Current Change	8V ≤ V _{IN} ≤ 20V	–	–	1.5	mA
		1mA ≤ I _{OUT} ≤ 40mA	–	–	0.1	
PSRR	Power Supply Rejection Ratio	Frequency = 120Hz, 8V ≤ V _{IN} ≤ 18V	47	62	–	dB
V _{DROP}	Drop-out Voltage	I _{OUT} = 40mA	–	1.7	2.0	V
		I _{OUT} = 100mA	–	1.8	2.3	
V _{NOISE}	Output Noise Voltage	10Hz ≤ Frequency ≤ 100kHz *2	–	40	–	μV
ΔV _{OUT} / ΔT	Output Voltage Temperature Coefficient	I _{OUT} = 5mA	–	0.42	–	mV / °C
θ _{JC}	Thermal Resistance	SOT-89-3L	–	28.3	–	°C / W

Note *2: For the purpose of minimizing high frequency noise in the application circuit, load capacitance at 0.01μF and above are recommended.



Performance Characteristics

Fig. 3: Output Voltage vs. Input Voltage

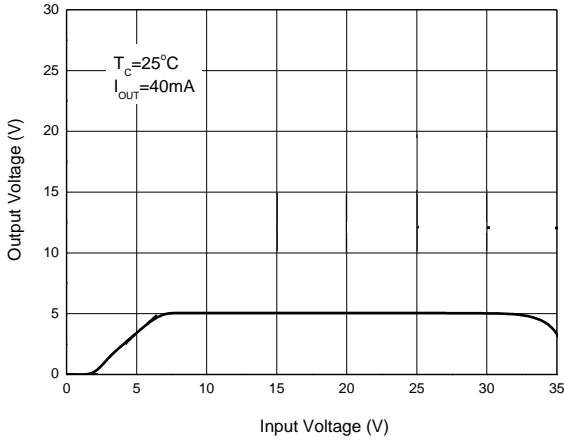


Fig. 4: Output Voltage vs. Case Temperature

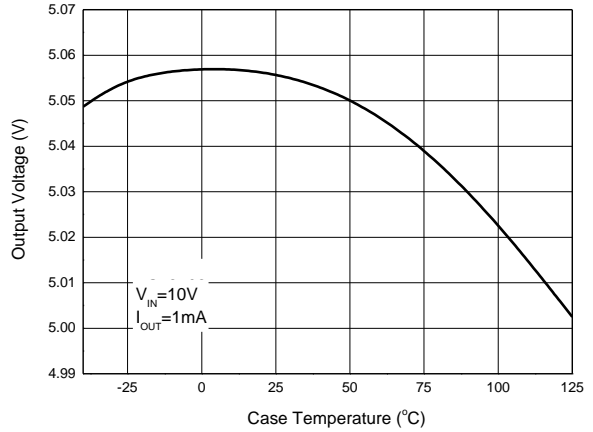


Fig. 5: Over Temperature Protection

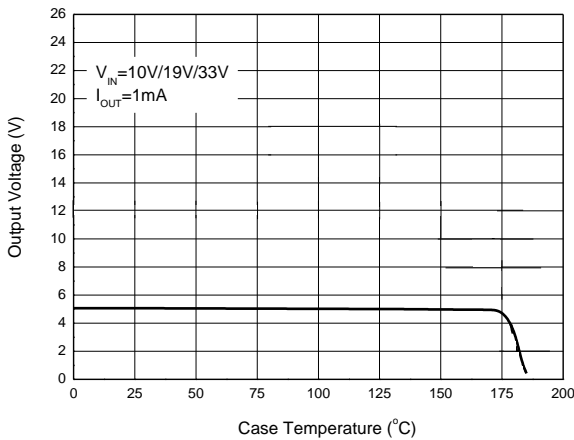


Fig. 6: Drop-out Voltage vs. Case Temperature

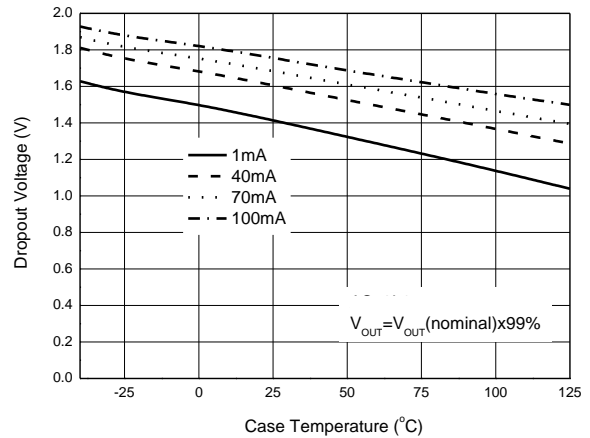


Fig. 7: Output Voltage vs. Output Current

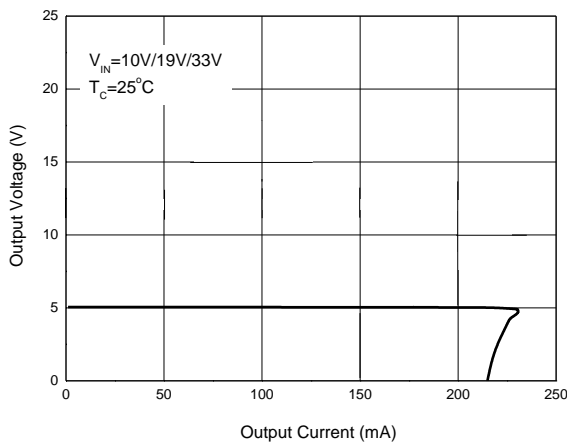
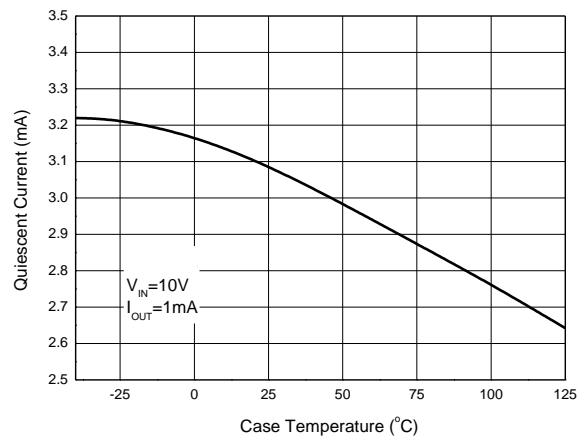


Fig. 8: Quiescent Current vs. Case Temperature





Performance Characteristics (continued)

Fig. 9: Power Dissipation vs. Case Temperature

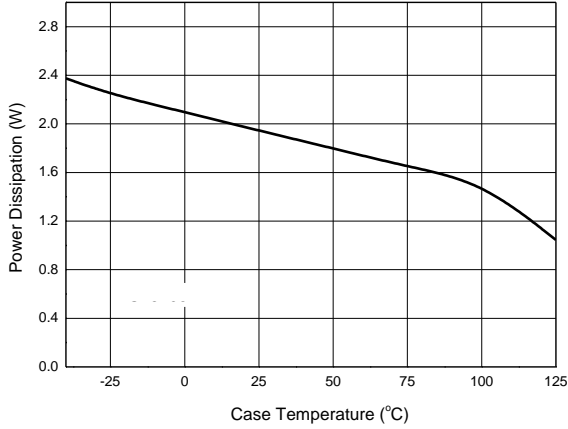


Fig. 10: PSRR vs. Frequency

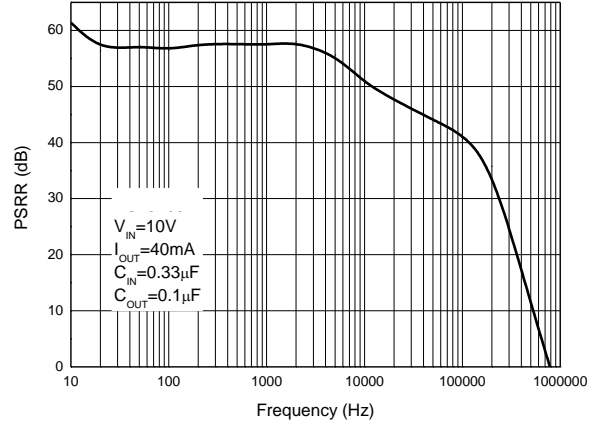


Fig. 11: Line Transient

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

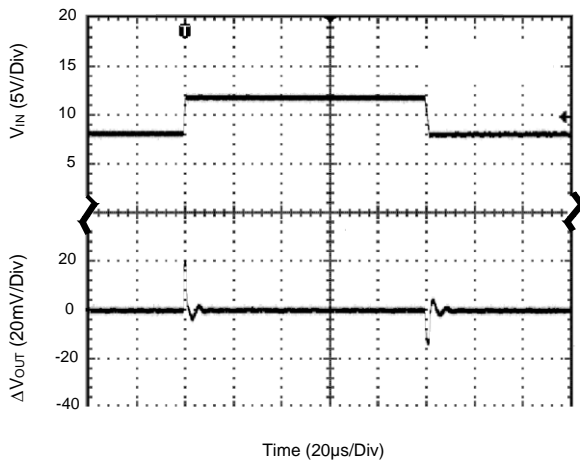
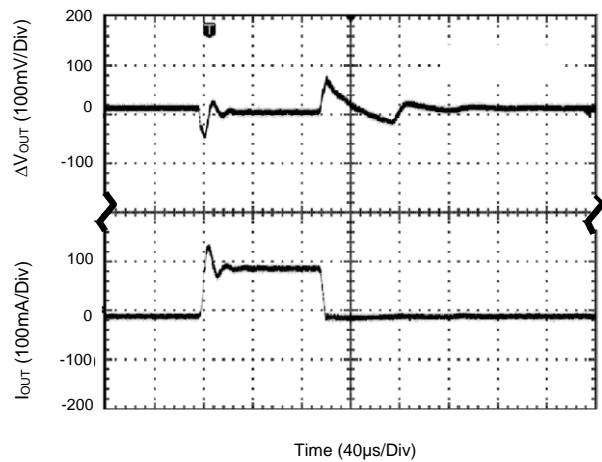


Fig. 12: Load Transient

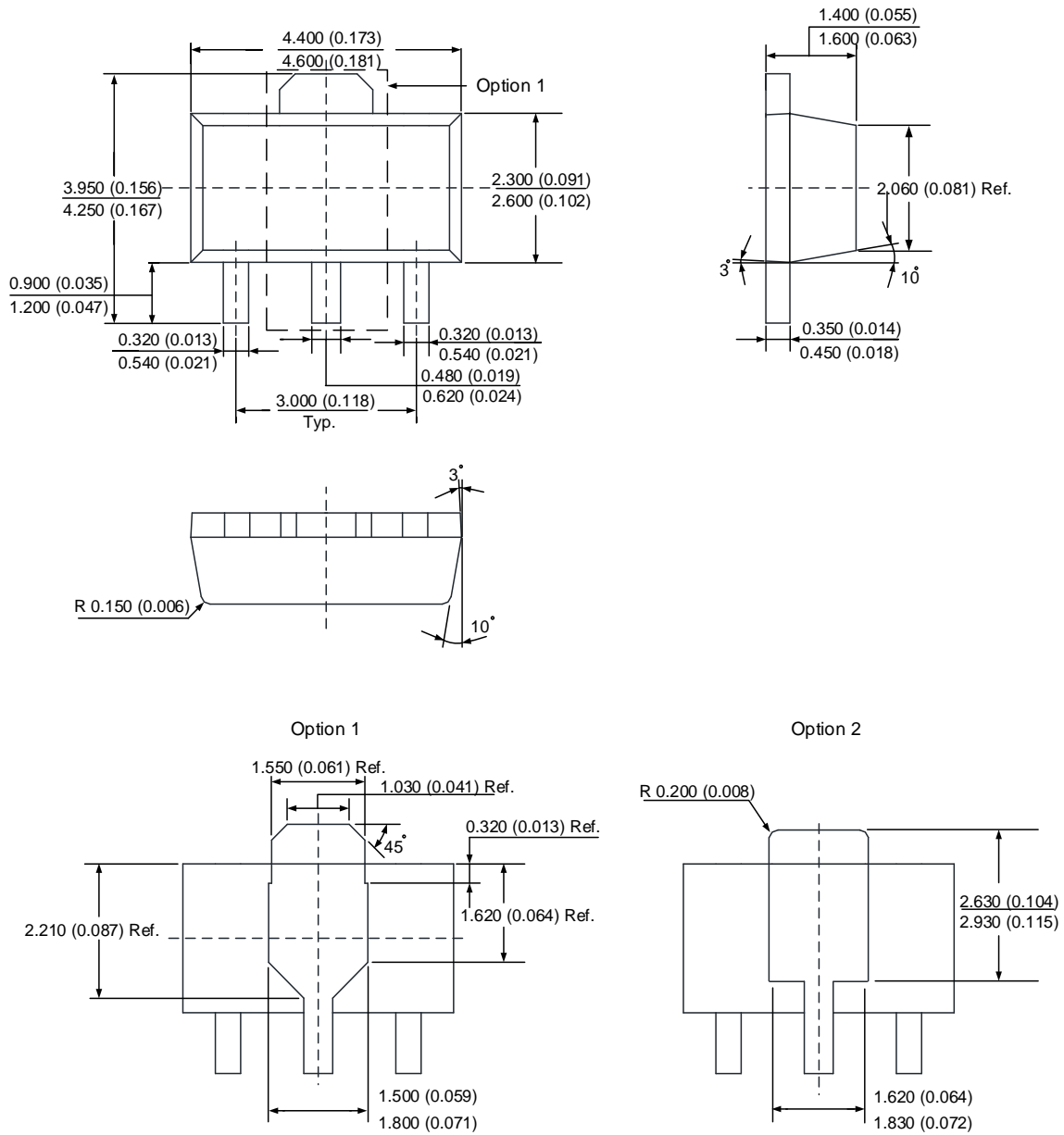
(Conditions: $V_{IN} = 10V$, $C_{IN} = 0.33\mu F$, $C_{OUT} = 0.1\mu F$)





Package Outline (all measurement in mm & inch)

1. Package Type: SOT-89-3L



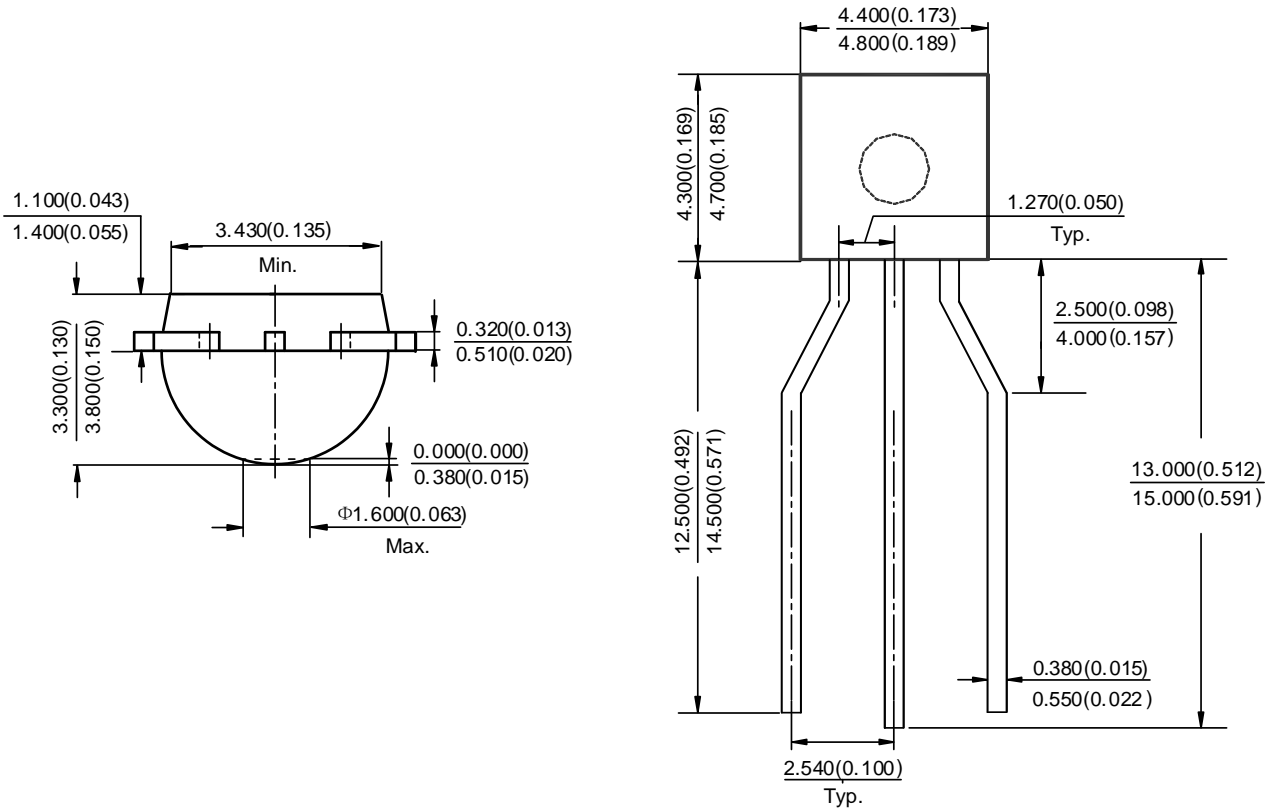


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Package Outline (all measurement in mm & inch)

2. Package Type: TO-92-3L (Ammo Packing)



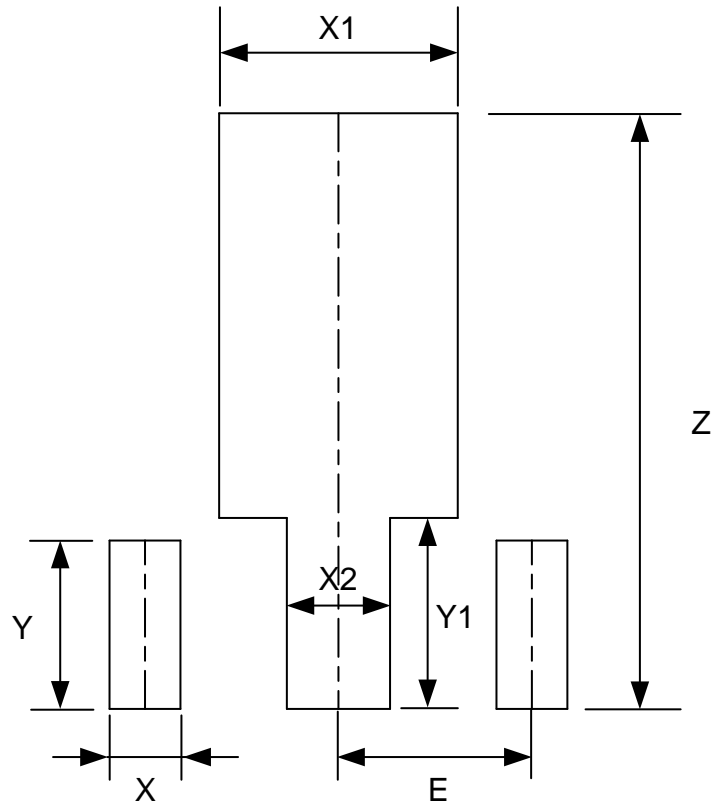


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Suggested Pad Layout (all measurement in mm & inch)

1. Package Type: SOT-89-3L



Measurement	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



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Revision History

Revision	Release Date	Description
1.0	February 24, 2023	First release of JSR78L05 Data Sheet.
1.0a	April 8, 2023	Cosmetic changes made to improve consistency.
1.0b	April 13, 2023	TO-92-3L package in Ammo Packing added.
1.0c	April 18, 2023	Marking information on TO-92-3L package revised to facilitate ease of tracking.
1.0d	April 22, 2023	Marking on packages updated after alignment with vendors
1.0e	April 27, 2023	θ_{JA} for TO-92-3L package added