

# 150mA Fixed Output Voltage Linear Regulator

## 1 Features

- Maximum Output Current: 150mA
- Fixed Output Voltage: 5V
- Output Voltage Accuracy:  $\pm 1\%$
- Low Quiescent Current: 1.5mA
- Low Dropout Voltage: 1.6V at 40mA
- Current Limiting: 270mA
- Internal Thermal Overload Protection
- Output Transistor Safe-Area Protection
- OTP Threshold: 160°C

## 2 Applications

- Industry Applications
- Microprocessor Power Supplies
- Mother Board

## 3 Description

The GD30LD2407 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 GD30LD2407 output voltage is offered in voltage tolerance:1%.The GD30LD2407 series are available in TO-92 (bulk or ammo packing) and SOT-89 packages.

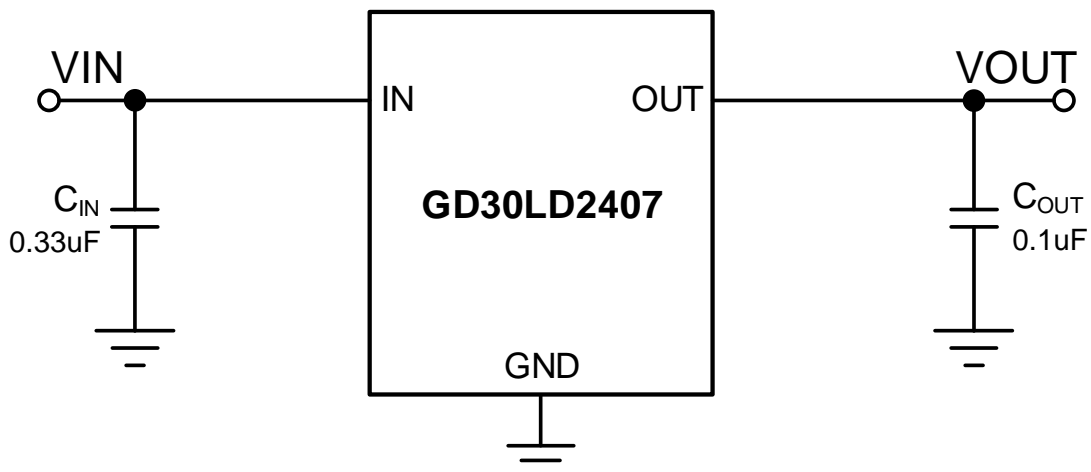
The GD30LD2407 are characterized for operation from  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ .

Device Information<sup>1</sup>

PART NUMBER	PACKAGE	BODY SIZE (NOM)
GD30LD2407	SOT89	4.50 mm x 2.45 mm
	TO-92	4.60 mm x 4.50 mm

1. For all available packages, see the [Package Information](#) and [Ordering Information](#) at the end of data sheet.

## Simplified Application Schematic

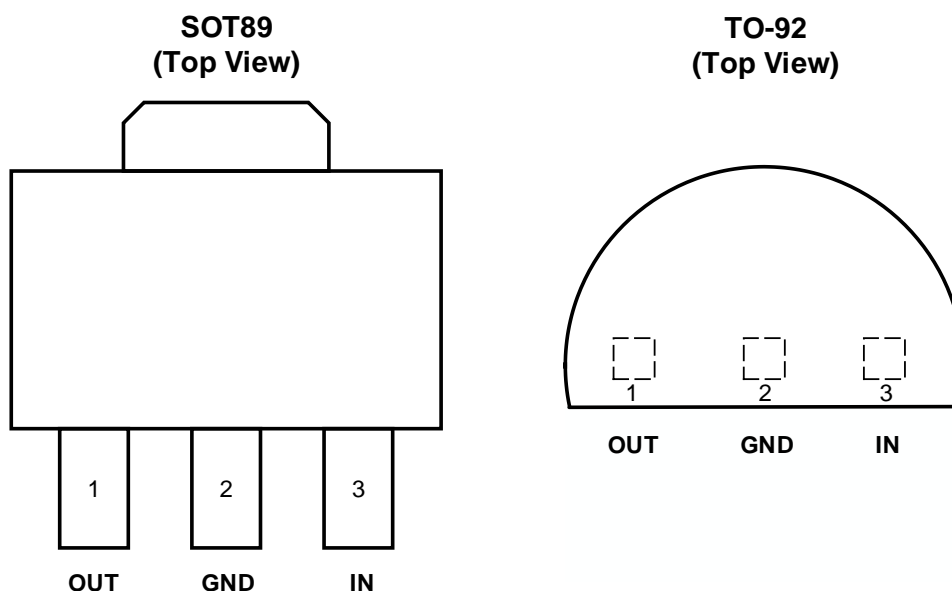


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## 4 Device Overview

### 4.1 Pinout and Pin Assignment



### 4.2 Pin Description

PIN NUMBER			PIN TYPE <sup>1</sup>	FUNCTION
NAME	SOT89	TO-92		
GND	2	2	G	Ground pin.
IN	3	3	P	Power supply input pin.
OUT	1	1	P	Output pin.

1. I = Input, P = Power, G = Ground.

## 5 Parameter Information

### 5.1 Absolute Maximum Ratings

Exceeding the operating temperature range(unless otherwise noted)<sup>1</sup>

SYMBOL	PARAMETER	MIN	MAX	UNIT
V <sub>IN</sub>	Input Voltage		36	V
I <sub>O</sub>	Output Current		270	mA
T <sub>J</sub>	Operating Junction Temperature		150	°C
T <sub>LEAD</sub>	Lead Temperature (Soldering, 10sec)		260	°C
T <sub>STG</sub>	Storage Temperature Range	-65	150	°C
P <sub>D</sub>	Power Dissipation		750	mW

1. The maximum ratings are the limits to which the device can be subjected without permanently damaging the device. Note that the device is not guaranteed to operate properly at the maximum ratings. Exposure to the absolute maximum rating conditions for extended periods may affect device reliability.

### 5.2 Recommended Operation Conditions

SYMBOL <sup>1</sup>	PARAMETER	MIN	TYP	MAX	UNIT
V <sub>IN</sub>	Input supply voltage range			30	V
T <sub>J</sub>	Operating junction temperature	-40		125	°C

1. The device is not guaranteed to function outside of its operating conditions.

### 5.3 Electrical Sensitivity

SYMBOL	CONDITIONS	VALUE	UNIT
V <sub>ESD(HBM)</sub>	Human-body model (HBM), ANSI/ESDA/JEDEC JS-001-2017 <sup>1</sup>	±2000	V
V <sub>ESD(CDM)</sub>	Charge-device model (CDM), ANSI/ESDA/JEDEC JS-002-2022 <sup>2</sup>	±500	V

1. JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
2. JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

### 5.4 Thermal Resistance

SYMBOL <sup>1</sup>	CONDITIONS	PACKAGE	VALUE	UNIT
Θ <sub>JA</sub>	Junction-to-ambient thermal resistance	SOT89	55	°C/W
		TO-92	150	
Θ <sub>JC</sub>	Junction-to-case thermal resistance	SOT89	28.3	°C/W
		TO-92	40	

1. Thermal characteristics are based on simulation, and meet JEDEC document JESD51-7.

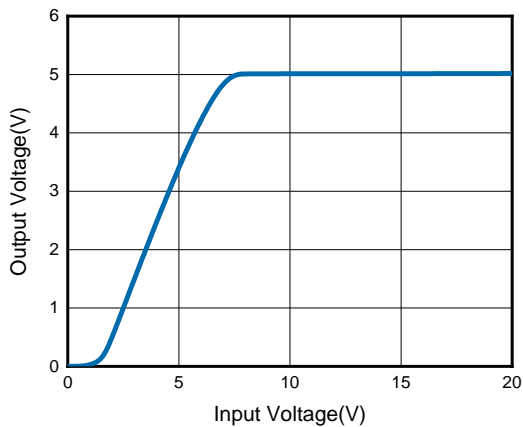
## 5.5 Electrical Characteristics

$V_{IN} = V_{OUT} + 2V$ ,  $C_{IN} = C_{OUT} = 1\mu F$ ,  $T_A = 25^\circ C$ , unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
$V_{IN}$	Output Voltage				30	V
$V_{OUT}$	Output voltage Accuracy		5.0	5.05	5.1	V
$V_{RLINE}$	Line Regulation	$7V \leq V_{IN} \leq 20V$		8	150	mV
$V_{RLOAD}$	Load Regulation	$1mA \leq I_{OUT} \leq 150mA$		10	60	mV
$I_Q$	Quiescent Current			1.3	3	mA
$\Delta I_Q$	Quiescent Current Change	$8V \leq V_{IN} \leq 20V$		0.2	1.5	mA
		$1mA \leq I_{OUT} \leq 40mA$		0.05	0.1	mV
PSRR	Ripple Rejection	$F = 120Hz, 8V \leq V_{IN} \leq 18V$	47	62		dB
$V_{DROP}$	Dropout Voltage	$I_{OUT} = 40mA$		1.6		V
		$I_{OUT} = 150mA$		1.8		V
No	Output Noise Voltage	$10Hz \leq f \leq 100kHz^1$		40		$\mu V$
$\Delta V_o / \Delta T$	Output Voltage Temperature Coefficient	$I_{OUT} = 5mA$		0.42		mV/ $^\circ C$
OTP	Over temperature Protection	$V_{IN} = 15V$	160	180		$^\circ C$

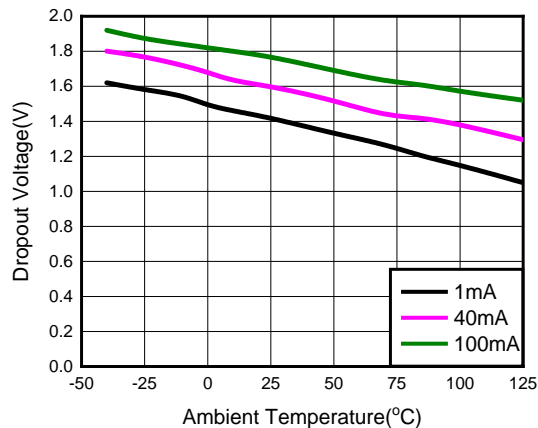
1. 0.01 $\mu F$  minimum load capacitance is recommended to limit high frequency noise.

## 5.6 Typical Characteristics

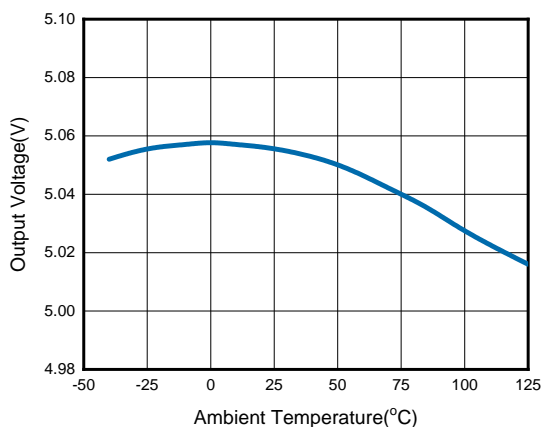


$I_{OUT} = 40mA$

**Figure 1. Output Voltage vs. Input Voltage**

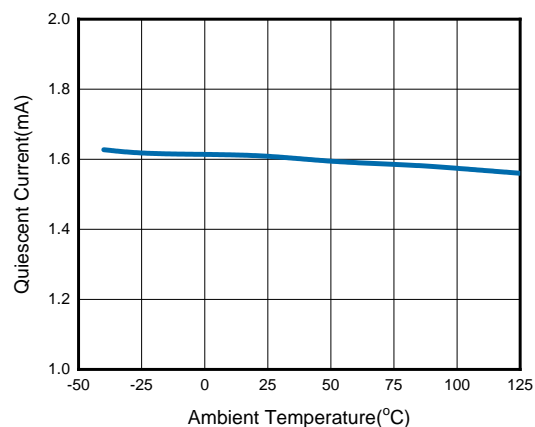


**Figure 2. Dropout Voltage vs. Temperature**



$V_{IN} = 10V, I_{OUT} = 1mA$

**Figure 3. Output Voltage vs. Temperature**



$V_{IN} = 10V, I_{OUT} = 1mA$

**Figure 4. Quiescent Current vs. Temperature**

## 6 Functional Description

### 6.1 Block Diagram

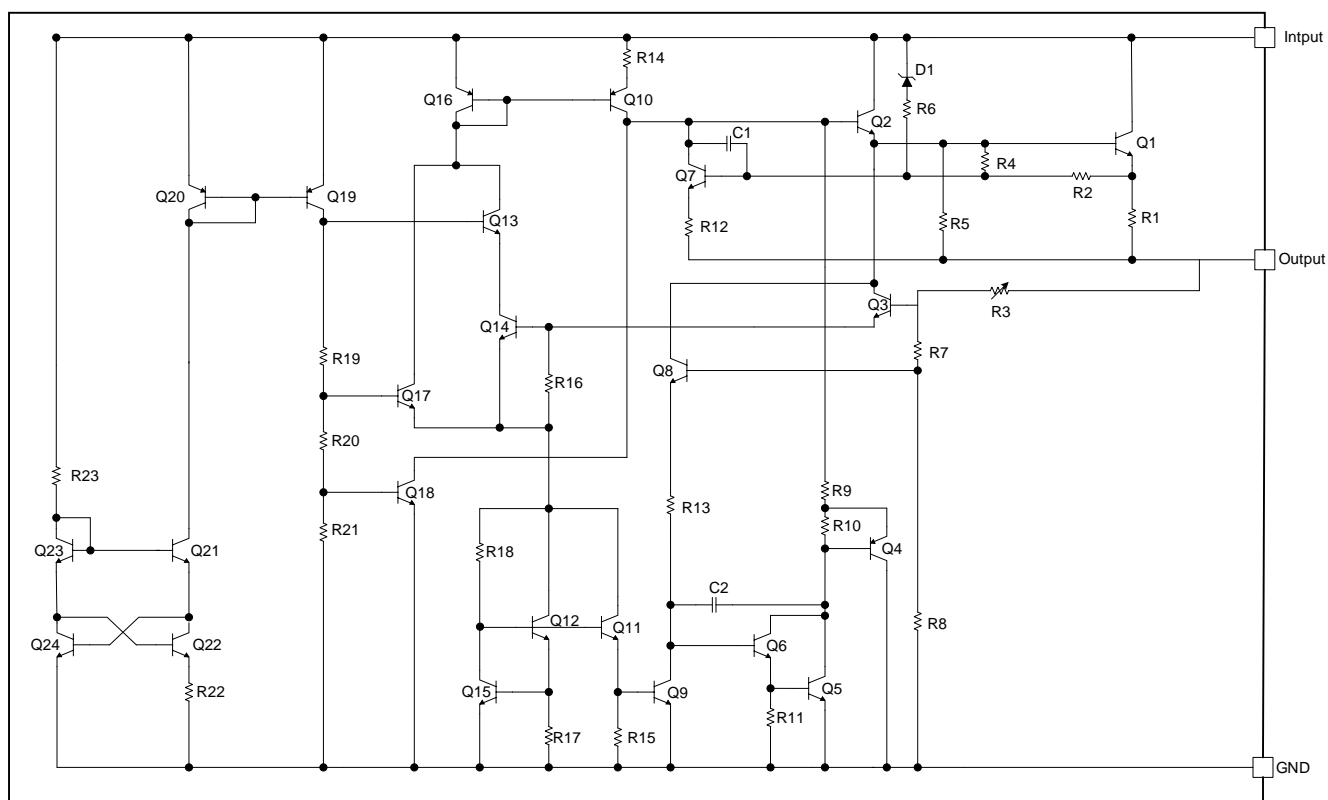


Figure 5. GD30LD2407 Functional Block Diagram

## 7 Application Information

### 7.1 Typical Application Circuit

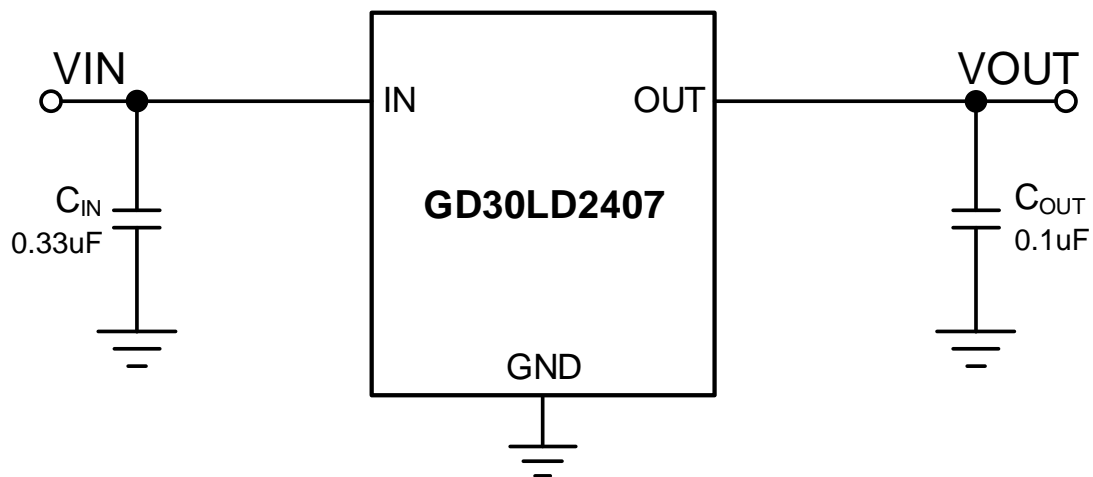


Figure 6. Reference Design Schematic



## 8 Layout Guidelines and Example

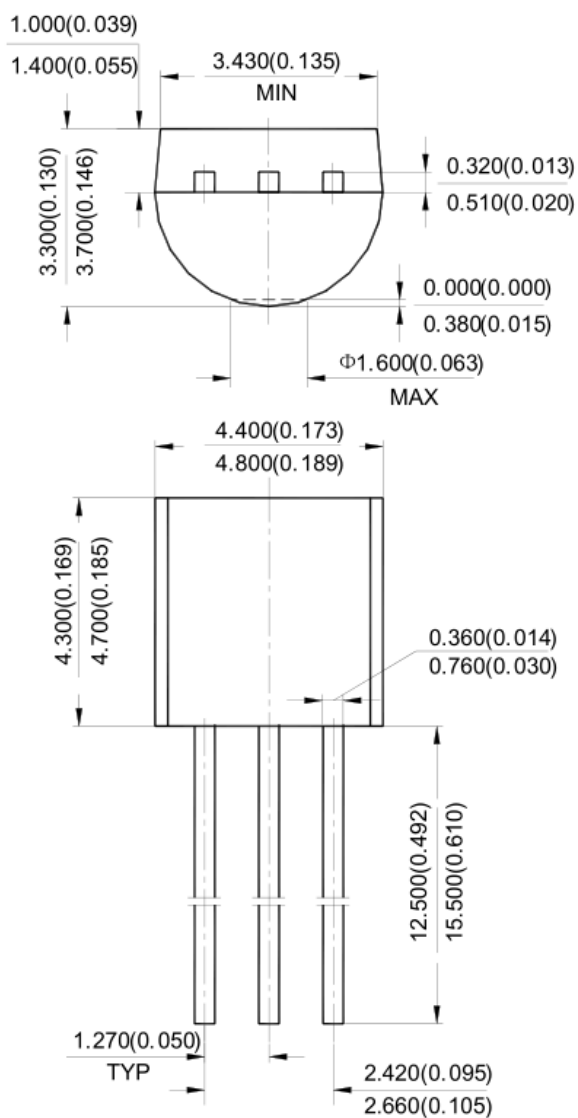
By placing input and output capacitors on the same side of the PCB as the LDO, and placing them as close as is practical to the package can achieve the best performance. The ground connections for input and output capacitors must be back to the GD30LD2407 ground pin using as wide and as short of a copper trace as is practical.

Connections using long trace lengths, narrow trace widths, and/or connections through via must be avoided. These add parasitic inductances and resistance that results in worse performance especially during transient conditions.

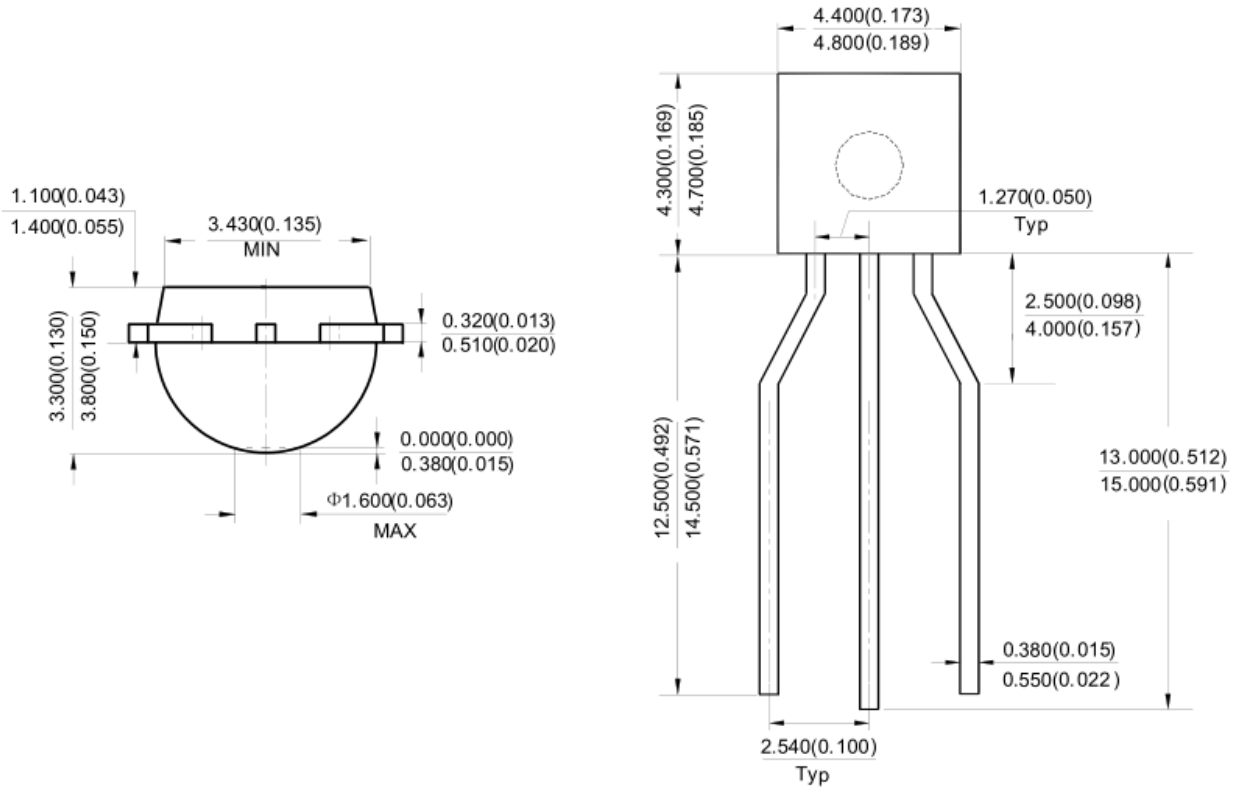
## 9 Package Information

### 9.1 Outline Dimensions

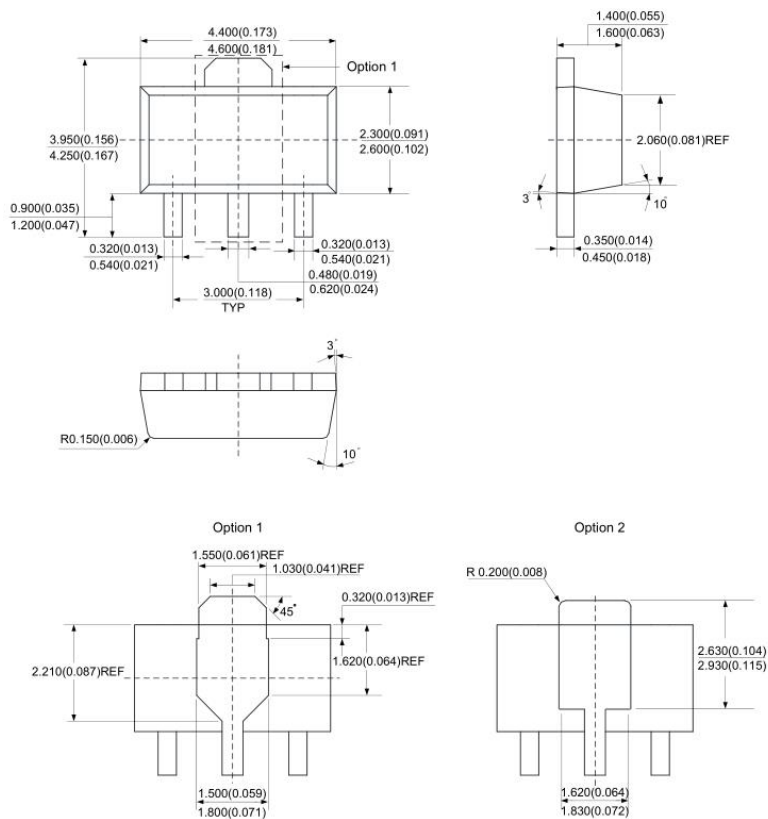
#### TO-92(Bulk Packing)



## TO-92(Ammo Packing)



## SOT-89



### NOTES:

1. All dimensions are in millimeters.
2. Package dimensions does not include mold flash, protrusions, or gate burrs.

## 10 Ordering Information

Ordering Code	Package Type	ECO Plan	Packing Type	MOQ	OP Temp(°C)
GD30LD2407BWTR-I	SOT-89	Green	Tape & Reel	1000	-40°C to +125°C
GD30LD2407B9TR-I	TO-92	Green	Tape & Reel	2000	-40°C to +125°C

## 11 Revision History

REVISION NUMBER	DESCRIPTION	DATE
1.0	Initial release and device details	2024

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