



## 2.5V 500mA Low Dropout Regulator

### Features

- Dropout voltage typically 0.45V @  $I_o = 500\text{mA}$
- Output current in 500mA
- Output voltage accuracy  $\pm 2\%$
- Quiescent current, typically 0.6mA
- Internal short circuit current limit
- Internal over temperature protection

### Application

- CD-R/W
- DVD-ROM
- DVD player
- LAN Switch
- Broadband access

### General Description

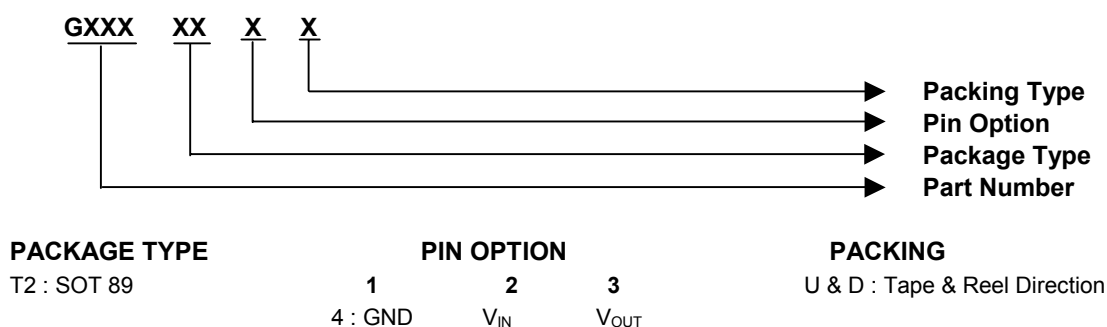
The G905 positive 2.5V voltage regulator features the ability to source 500mA of output current with a dropout voltage of typically 0.45V. A low quiescent current is provided. The typical quiescent current is 0.6mA.

Familiar regulator features such as over temperature and over current protection circuits are provided to prevent it from being damaged by abnormal operating conditions.

### Ordering Information

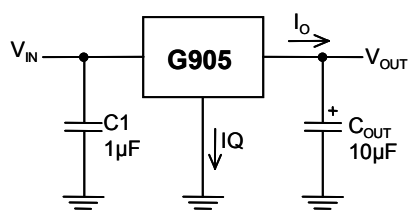
| ORDER NUMBER | PACKAGE TYPE | PIN OPTION |          |           |
|--------------|--------------|------------|----------|-----------|
|              |              | 1          | 2        | 3         |
| G905T24U     | SOT 89       | GND        | $V_{IN}$ | $V_{OUT}$ |

### Order Number Identification

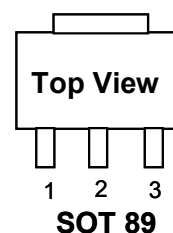


### Typical Application

[Note 4] : Type of  $C_{OUT}$



### Package Type



**Absolute Maximum Ratings** (Note 1)

Input Voltage.....7V  
 Power Dissipation Internally Limited.....(Note2)  
 Maximum Junction Temperature.....150°C  
 Storage Temperature Range.....-65°C ≤ T<sub>J</sub> ≤ +150°C  
 Lead Temperature, Time for Wave Soldering  
 SOT-89 Package.....260°C, 10s  
 Continuous Power Dissipation (T<sub>A</sub>=+25°C)  
 SOT-89 <sup>(1)</sup> .....0.5W

**Operating Conditions** (Note 1)

Input Voltage.....2.7V ~ 6V  
 Temperature Range.....0°C ≤ T<sub>J</sub> ≤ 125°C

Note (1): See Recommended Minimum Footprint

**Electrical Characteristics**

V<sub>IN</sub> = 5V, I<sub>O</sub> = 500mA, C<sub>IN</sub> = 1μF, C<sub>OUT</sub> = 10μF. All specifications apply for T<sub>A</sub> = T<sub>J</sub> = 25°C. [Note 3]

| PARAMETER             | CONDITIONS                                                                                                                     | MIN               | TYP  | MAX  | UNITS |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------|------|------|-------|
| Output Voltage        | 10mA ≤ I <sub>O</sub> ≤ 500mA                                                                                                  | 2.45              | 2.5  | 2.55 | V     |
| Line Regulation       | 3.3V ≤ V <sub>IN</sub> ≤ 6.5V, I <sub>O</sub> = 10mA                                                                           |                   | 1    | 50   | mV    |
| Load Regulation       | 10mA ≤ I <sub>O</sub> ≤ 500mA                                                                                                  |                   | 20   | 60   | mV    |
| Output Impedance      | 200mA DC and 100mA AC, f <sub>O</sub> = 120Hz                                                                                  |                   | 80   |      | mΩ    |
| Quiescent Current     | V <sub>IN</sub> = 5V                                                                                                           |                   | 0.6  |      | mA    |
| Ripple Rejection      | f <sub>i</sub> = 120Hz, V <sub>ripple</sub> = 2V <sub>P-P</sub> , I <sub>O</sub> = 100mA                                       |                   | 46   |      | dB    |
| Dropout Voltage       | I <sub>O</sub> = 500mA                                                                                                         |                   | 450  |      | mV    |
|                       | I <sub>O</sub> = 100mA                                                                                                         |                   | 220  |      |       |
| Output Current        | Continuous Test, V <sub>IN</sub> = 3.3V<br>T <sub>A</sub> = 25°C, T <sub>J</sub> < 125°C, V <sub>OUT</sub> within ±2% (Note 3) | Minimum footprint | 500  |      | mA    |
| Short Circuit Current |                                                                                                                                |                   | 0.77 |      | A     |
| Over Temperature      |                                                                                                                                |                   | 150  |      | °C    |

**Note 1:** Absolute Maximum Ratings are limits beyond which damage to the device may occur. Operating Conditions are conditions under which the device functions but the specifications might not be guaranteed. For guaranteed specifications and test conditions see the Electrical Characteristics.

**Note2:** The maximum power dissipation is a function of the maximum junction temperature, T<sub>Jmax</sub>; total thermal resistance, θ<sub>JA</sub>, and ambient temperature T<sub>A</sub>. The maximum allowable power dissipation at any ambient temperature is T<sub>Jmax</sub> - T<sub>A</sub> / θ<sub>JA</sub>. If this dissipation is exceeded, the die temperature will rise above 150°C and IC will go into thermal shutdown. For the G905 in SOT-89 (T2) package, θ<sub>JA</sub> is 250°C/W (See recommend minimum footprint). The safe operation in SOT-89 package, it can see "Typical Performance Characteristics" (Safe Operating Area).

**Note3:** Low duty pulse techniques are used during test to maintain junction temperature as close to ambient as possible.

**Note4:** The type of output capacitor should be tantalum or aluminum.

**Definitions**
**Dropout Voltage**

The input/output Voltage differential at which the regulator output no longer maintains regulation against further reductions in input voltage. Measured when the output drops 100mV below its nominal value, dropout voltage is affected by junction temperature, load current and minimum input supply requirements.

**Line Regulation**

The change in output voltage for a change in input voltage. The measurement is made under conditions of low dissipation or by using pulse techniques such that average chip temperature is not significantly affected.

**Load Regulation**

The change in output voltage for a change in load current at constant chip temperature. The measurement is made under conditions of low dissipation or by using pulse techniques such that average chip temperature is not significantly affected.

**Maximum Power Dissipation**

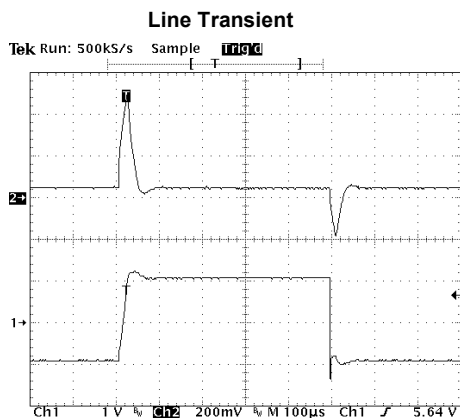
The maximum total device dissipation for which the regulator will operate within specifications.

**Quiescent Bias Current**

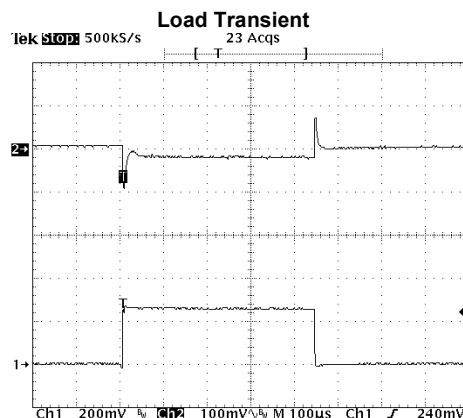
Current which is used to operate the regulator chip and is not delivered to the load.

## Typical Performance Characteristics

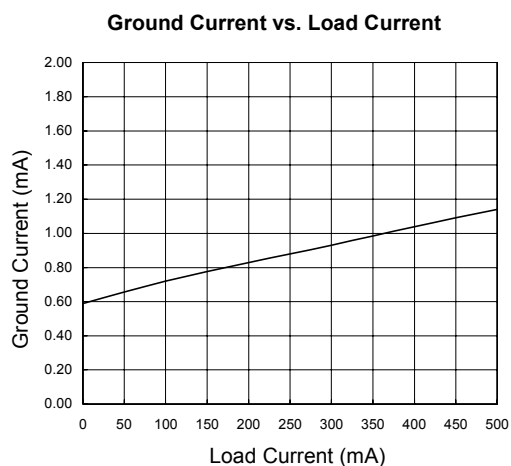
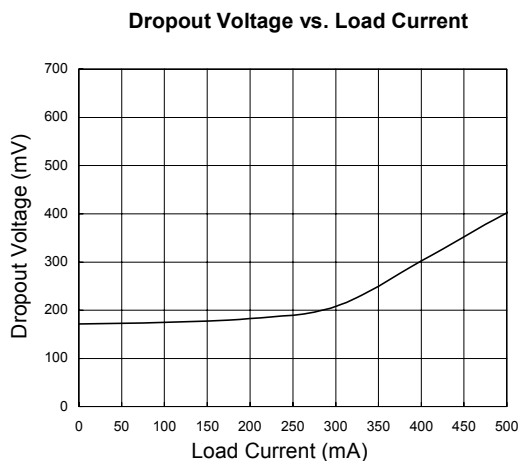
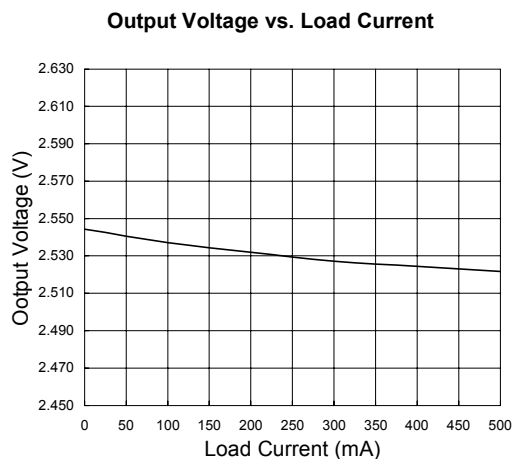
( $V_{IN} = +5V$ ,  $C_{IN} = 1\mu F$ ,  $C_{OUT} = 10\mu F$ ,  $T_A = 25^\circ C$ , unless otherwise noted.)



Ch1:  $V_{in}$  (offset=5.0V)  
 Ch2:  $V_{out}$  (offset=2.50V)  
 $C_{IN} = 1\mu F$   
 $I_{out} = 100mA$



Ch1:  $I_{out}$  (400mA/div)  
 Ch2:  $V_{out}$  is AC coupled

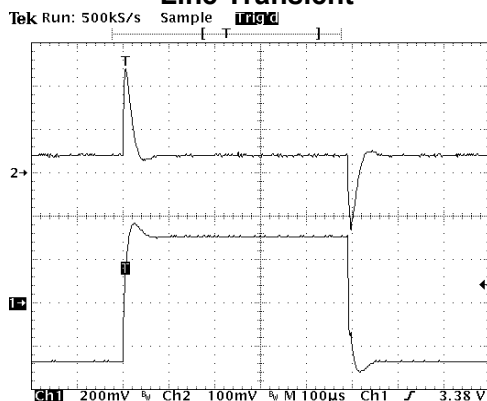




## Typical Performance Characteristics

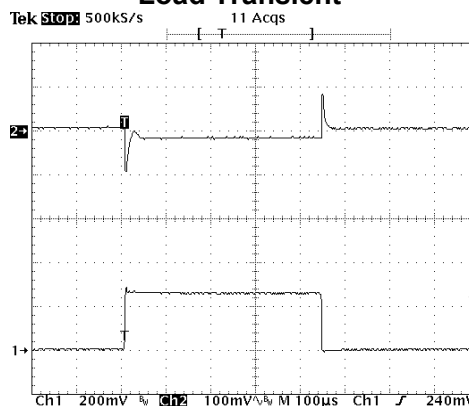
(V<sub>IN</sub>= +3.3V, C<sub>IN</sub>=1μF, C<sub>OUT</sub>=10μF, T<sub>A</sub>=25°C, unless otherwise noted.)

Line Transient



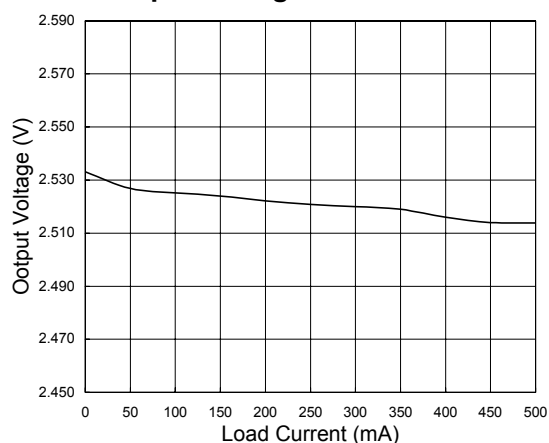
Ch1: Vin (offset=3.3V)  
Ch2: Vout (offset=2.50V)  
C<sub>IN</sub> = 1μF  
I<sub>out</sub>=100mA

Load Transient

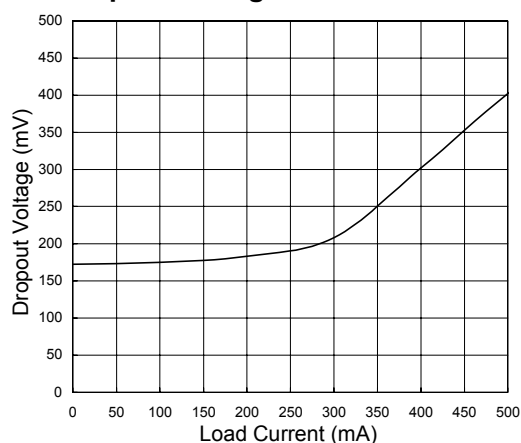


Ch1: Iout (400mA/div)  
Ch2: Vout is AC coupled

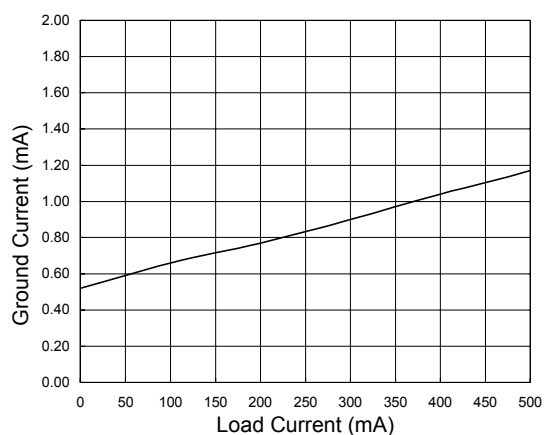
Output Voltage vs. Load Current



Dropout Voltage vs. Load Current



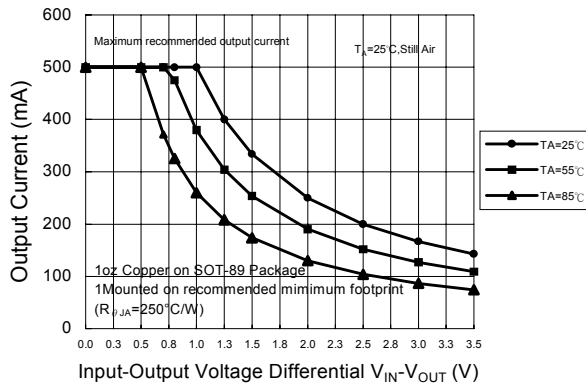
Ground Current vs. Load Current



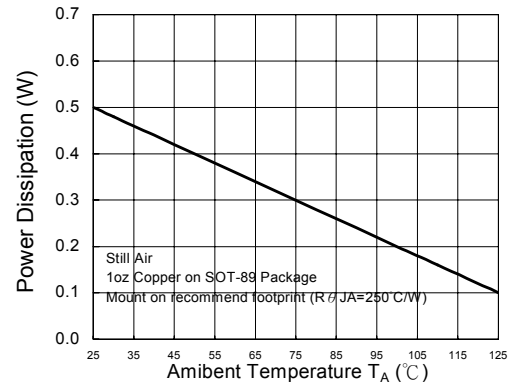
## Typical Performance Characteristics

( $V_{IN} = +5V$ ,  $C_{IN} = 1\mu F$ ,  $C_{OUT} = 10\mu F$ ,  $T_A = 25^\circ C$ , unless otherwise noted.)

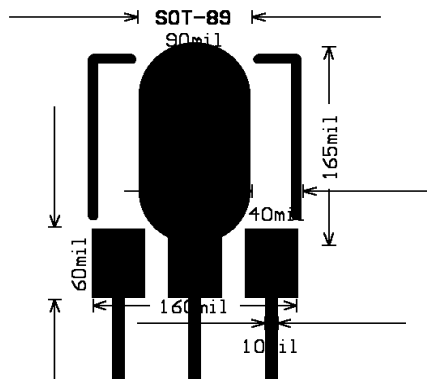
**Safe Operating of SOT-89**



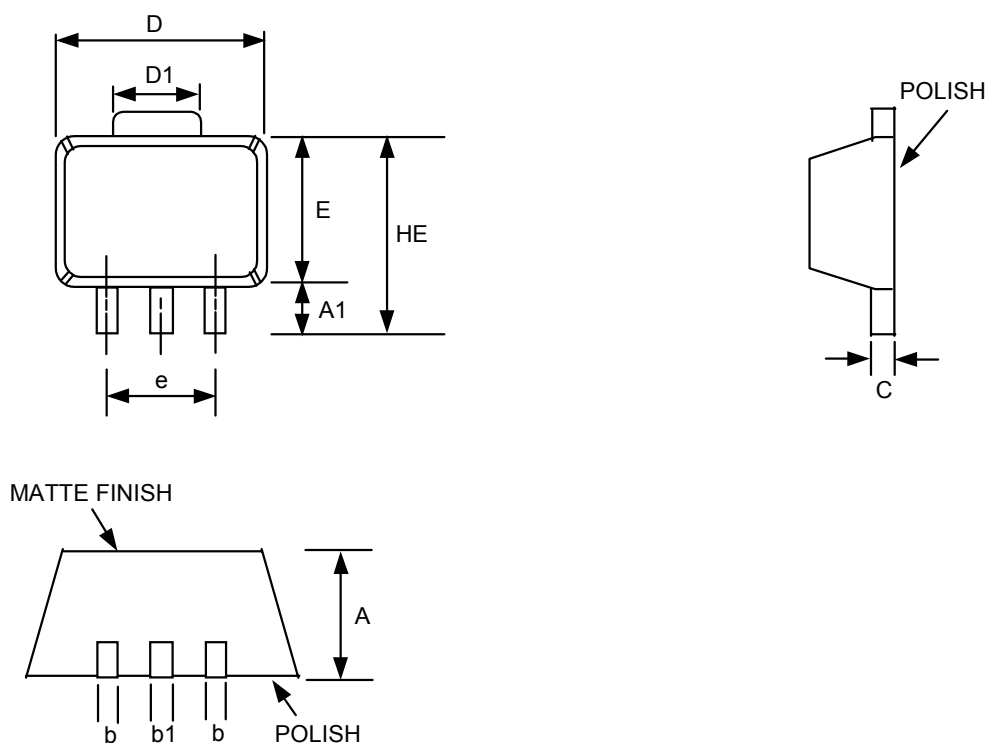
**Maximum Power Dissipation of SOT-89**



**Recommend Minimum Footprint**



## Package Information



**SOT- 89 (T2) Package**

| SYMBOLS | DIMENSIONS IN MILLIMETERS |       |       | DIMENSIONS IN INCHES |       |       |
|---------|---------------------------|-------|-------|----------------------|-------|-------|
|         | MIN                       | NOM   | MAX   | MIN                  | NOM   | MAX   |
| A       | 1.40                      | 1.50  | 1.60  | 0.055                | 0.059 | 0.063 |
| A1      | 0.80                      | 1.04  | ----- | 0.031                | 0.041 | ----- |
| b       | 0.36                      | 0.42  | 0.48  | 0.014                | 0.016 | 0.048 |
| b1      | 0.41                      | 0.47  | 0.53  | 0.016                | 0.018 | 0.020 |
| C       | 0.38                      | 0.40  | 0.43  | 0.014                | 0.015 | 0.017 |
| D       | 4.40                      | 4.50  | 4.60  | 0.173                | 0.177 | 0.181 |
| D1      | 1.40                      | 1.60  | 1.75  | 0.055                | 0.062 | 0.069 |
| HE      | -----                     | ----- | 4.25  | -----                | ----- | 0.167 |
| E       | 2.40                      | 2.50  | 2.60  | 0.094                | 0.098 | 0.102 |
| e       | 2.90                      | 3.00  | 3.10  | 0.114                | 0.118 | 0.122 |

## Package Orientation

