## Description

The GM4275 series of fixed output, micro-power voltage regulators is designed for applications which require wide input voltage range up to 45V.

The GM4275 is an excellent choice for the use in automobile applications with the features of low quiescent current and low drop output voltage.

The GM4275 features the shutdown functions, such as over temperature protection for further power saving concerns.

A reset signal is generated for an output voltage VQ of typ.4.65 V. The delay time can be programmed by the external delay capacitor.

The GM4275 is in 5-Pin TO263 package. However, 5-Pin TO252 package is also available for better board area saving purpose.

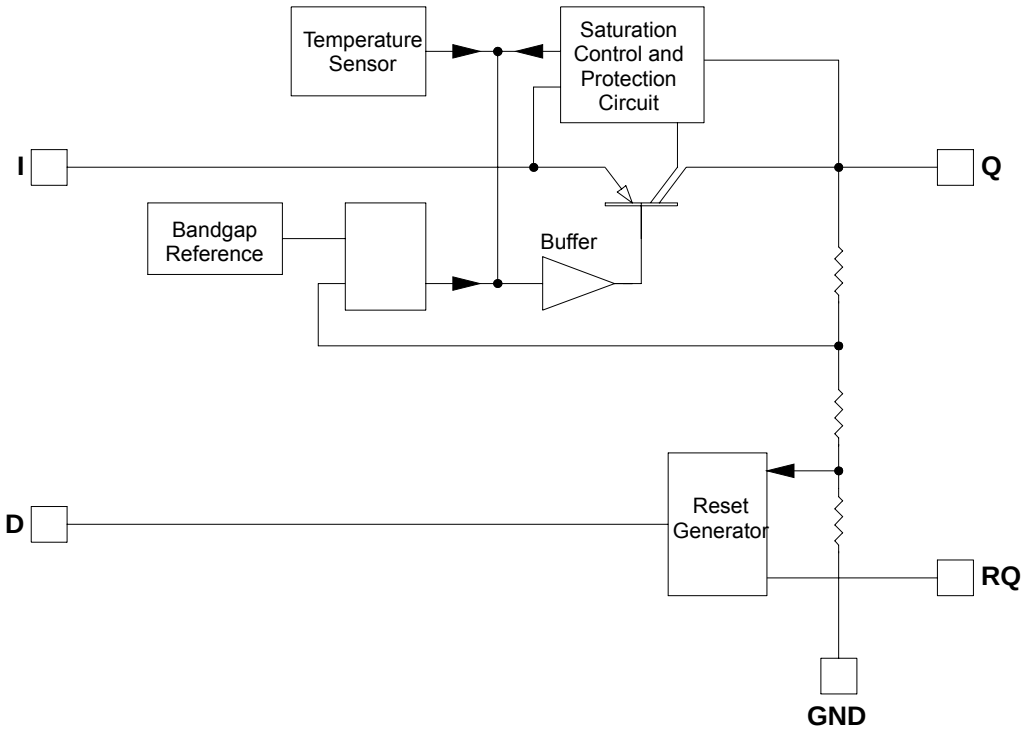
## Features

- **Output voltage: 5V±2%**
- **Very low current consumption**
- **Power on and under voltage reset**
- **Reset low down to VQ=1V**
- **Very low drop out voltage**
- **Short circuit protection**
- **Reverse polarity protection**
- **Suitable for automotive applications**

## Applications

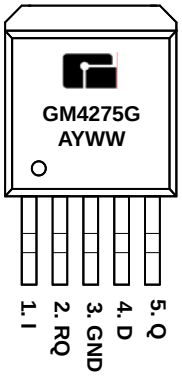
- **Automotive Electronics**
- **Switching Power Suppliers**

## Block Diagram

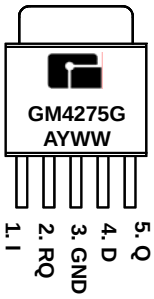


## Marking Information and Pin Configurations (Top View)

**TO-263-5**




**TO-252-5**




A: Assembly / Test site code
Y: Year
WW: Week

## Pin Descriptions

| Pin Number | Pin Name | Pin Function |
|---|---|---|
| 1 | I | Input; block to ground directly at the IC with a ceramic capacitor. |
| 2 | RQ | Reset Output; open collector output |
| 3 | GND | Ground; internally connected to heat sink |
| 4 | D | Reset Delay; connected capacitor to GND for setting delay time |
| 5 | $V_{OUT}$ | Output; block to ground with a ≥ 22μF, ESR < 5Ω at 10kHz |

## Ordering Information

| Ordering Number | Package | Shipping |
|---|---|---|
| GM4275TA5RG | TO-263-5 | 800 Units / Reel |
| GM4275TC5RG | TO-252-5 | 2,500 Units/Tube |

## Absolute Maximum Ratings

| PARAMETER | SYMBOL | RATINGS | | UNITS | Test Condition |
|---|---|---|---|---|---|
| | | Min | Max | | |
| Input Voltage | $V_I$ | -42 | 45 | V | - |
| Input Current | $I_I$ | - | - | - | Internally Limited |
| Output Voltage | $V_Q$ | -1.0 | 16 | V | - |
| Output Current | $I_Q$ | - | - | - | Internally Limited |
| Reset Output Voltage | $V_{RQ}$ | -0.3 | 25 | V | - |
| Reset Output Current | $I_{RQ}$ | -5 | 5 | mA | |
| Reset Delay Voltage | $V_D$ | -0.3 | 7 | V | |
| Reset Delay Current | $I_D$ | -2 | 2 | mA | |
| Junction Temperature | $T_J$ | - | 150 | °C | |
| Storage Temperature | $T_{stg}$ | -50 | 150 | °C | |

Note: Maximum ratings are absolute ratings, exceeding any one of these values may cause irreversible damage to the integrated circuit

## Recommended Operating Ratings

| PARAMETER | SYMBOL | LIMITS | | UNITS | Remark |
|---|---|---|---|---|---|
| | | Min | Max | | |
| Input Voltage | $V_I$ | 5.5 | 42 | V | - |
| Junction Temperature | $T_J$ | -40 | 150 | °C | - |

## Thermal Resistance

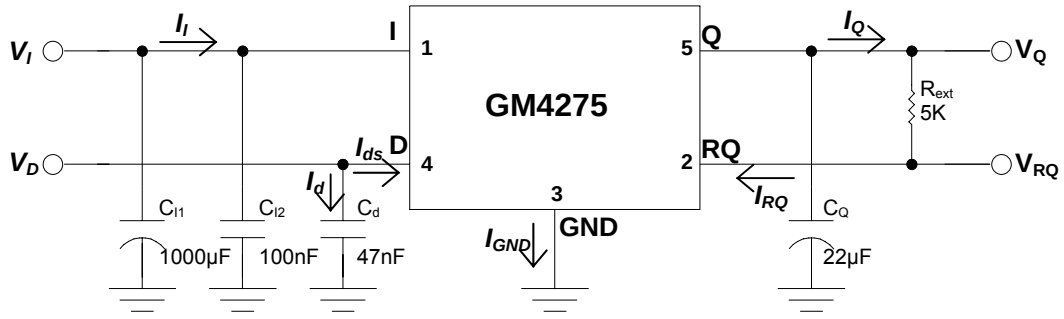
| PARAMETER | SYMBOL | LIMITS | | UNITS | Remark |
|---|---|---|---|---|---|
| | | Min | Max | | |
| Junction case | $\theta_{JC}$ | | 2 | °C/W | - |
| Junction Ambient | $\theta_{JA}$ | | 50 | °C /W | 5L TO263 |
| Junction Ambient | $\theta_{JA}$ | | 70 | °C /W | 5L TO252 |

## Electrical Characteristics ($T_J$ = -40°C to 150°C, $V_{IN}$=13.5V, unless otherwise noted)

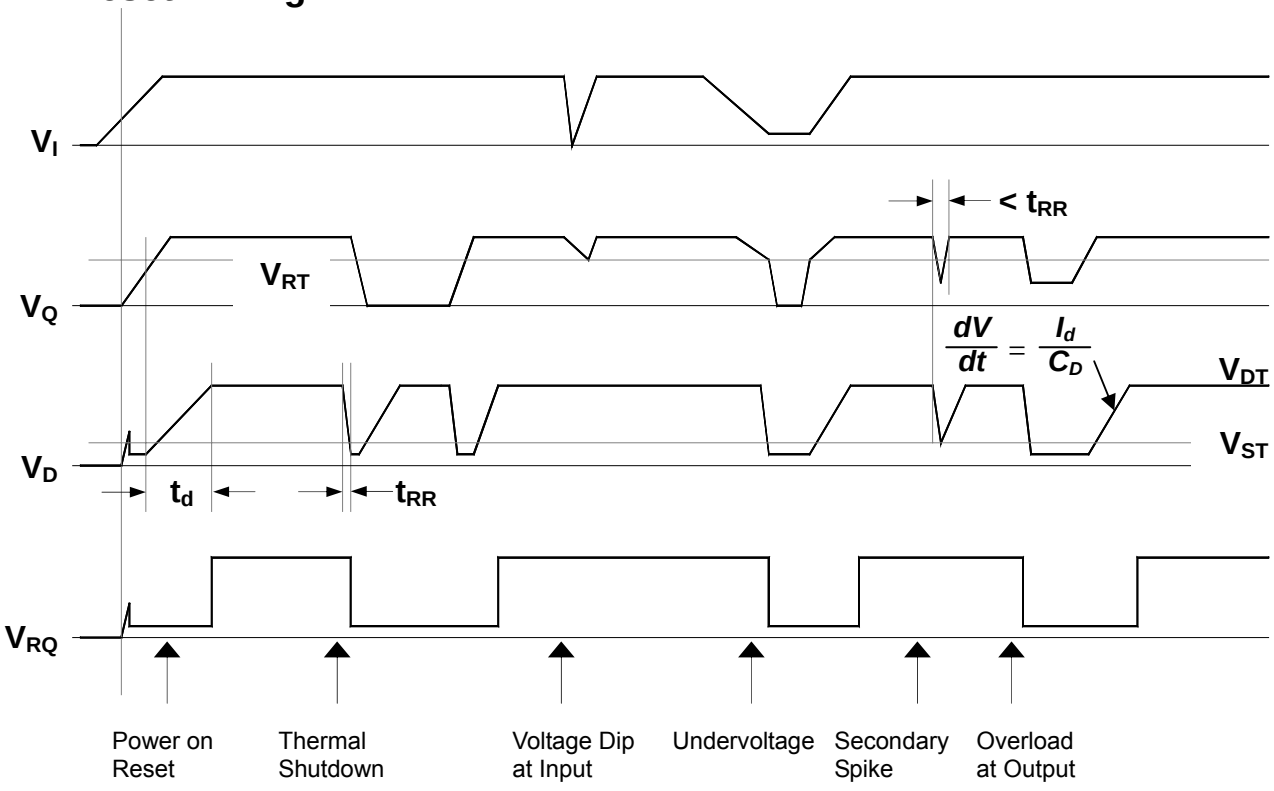
| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Output** | | | | | | |
| Output voltage | $V_Q$ | 5mA < $I_Q$ < 400mA<br>6V < $V_I$ < 40V | 4.9 | 5.0 | 5.1 | V |
| Output current limitation (Note 1) | $I_Q$ | - | 450 | 700 | - | mA |
| Current Consumption; $I_q$=$I_I$ - $I_Q$ | $I_{q1}$ | $I_Q$ = 1mA, $T_J$ = 25°C | - | 150 | 200 | µA |
| | $I_{q2}$ | $I_Q$ = 1mA, $T_J$ = 85°C | - | 150 | 220 | µA |
| | $I_{q3}$ | $I_Q$ = 250mA | - | 5 | 10 | mA |
| | $I_{q4}$ | $I_Q$ = 400mA | - | 12 | 22 | mA |
| Dropout Voltage | $V_{dr}$ | $I_Q$ = 300mA, $V_{dr}$ = $V_I$ - $V_Q$ | - | 250 | 500 | mV |
| Line Regulation | $\Delta V_{QI}$ | $V_I$ = 8V to 32V, $I_Q$ = 5mA | - | 15 | 30 | mV |
| Load Regulation | $\Delta V_{QL}$ | $I_Q$ = 5mA to 400mA | -15 | 5 | 15 | mV |
| Power supply ripple rejection | PSRR | $f_r$ = 100Hz, $V_r$ = 0.5$V_{PP}$ | - | 60 | - | dB |
| Temperature output voltage drift | $dV_Q/dT$ | | - | 0.5 | - | mV/K |
| **Reset Timing D and Output RQ** | | | | | | |
| Reset switching threshold | $V_{RT}$ | | 4.5 | 4.65 | 4.8 | V |
| Reset output low voltage | $V_{RQL}$ | $R_{EXT}$ ≥ 5K, $V_Q$ > 1V | - | 0.2 | 0.4 | V |
| Reset output leakage current | $I_{RQH}$ | $V_{RQH}$ > 4.5V | - | 0 | 2 | µA |
| Reset charging current | $I_d$ | $V_D$ = 1V | 3 | 6 | 9 | µA |
| Upper timing threshold | $V_{DU}$ | - | 1.5 | 1.8 | 2.2 | V |
| Lower timing threshold | $V_{DL}$ | - | 0.2 | 0.4 | 0.7 | V |
| Reset Delay time | $t_d$ | $C_D$ = 47nF | 10 | 16 | 22 | ms |
| Reset reaction time | $t_{RR}$ | $C_D$ = 47nF | - | 0.5 | 2 | µs |

Note 1. Measured when the output voltage $V_Q$ has dropped 100mV from the nominal value obtained at $V_I$ = 13.5V

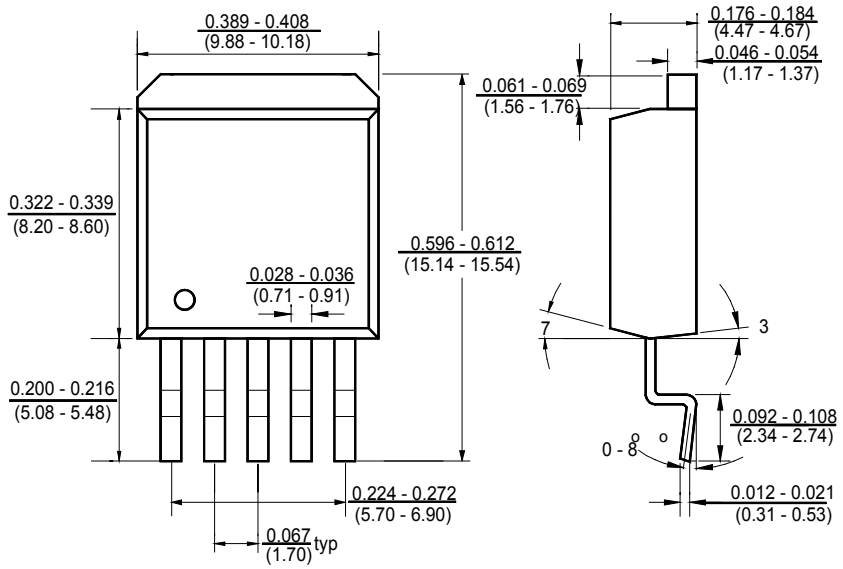
## Test Circuit



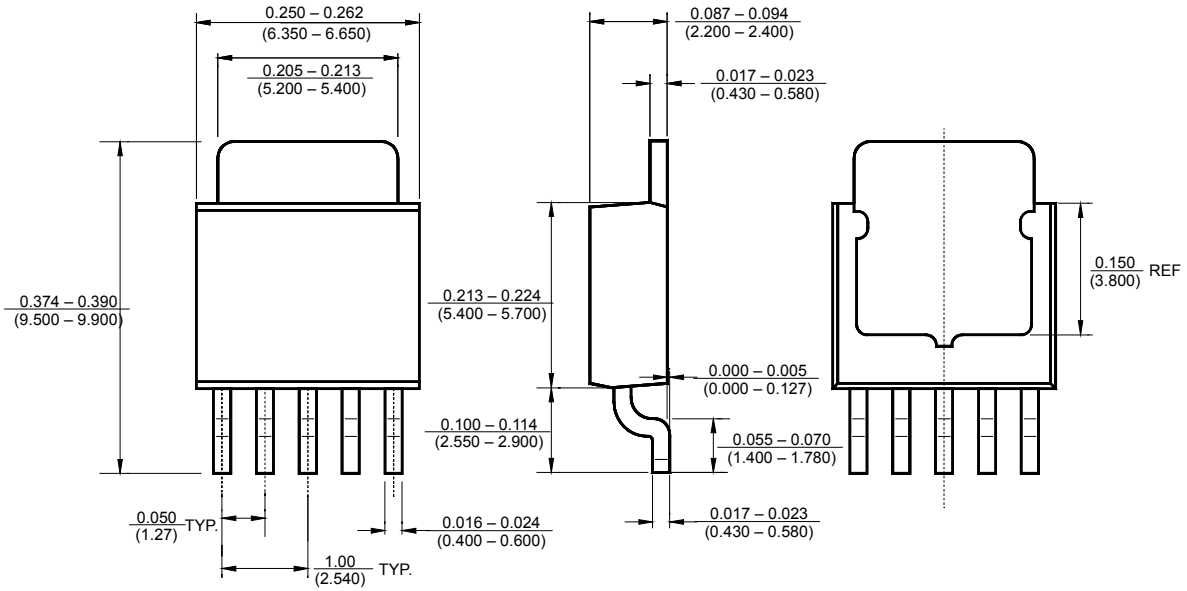

## Reset Timing



## Package Outline Dimensions – TO-263-5




## Package Outline Dimensions – TO-252-5



## Ordering Number

| GM | 4275 | TA5 | R | G |
|---|---|---|---|---|
| APM Gamma Micro | Circuit Type | Package Type<br><br>TA5: TO263-5<br>TC5: TO252-5 | Shipping Type<br><br>T: Tube<br>R: Tape & Reel | <br><br>Blank: Pb-free<br>G: Green |

Note:

**Pb-free products:**

- RoHS compliant and compatible with the current require-ments of IPC/JEDEC J-STD-020.
- Suitable for use in SnPb or Pb-free soldering processes with 100% matte tin (Sn) plating.

**Green products:**

- Lead-free (RoHS compliant)
- Halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight)