

**ICs ILE4270G, ILE4270S OF POWER VOLTAGE REGULATOR  
5 V/550MA WITH LOW RESIDUAL VOLTAGE  
(FUNCTIONAL EQUIVALENT TLE4270G BY SIEMENS)**

ICs perform stabilizing of output voltage 5 V with 2% accuracy in the range of input voltages from 5.5 to 26 V, providing a load current not less 550 mA with residual voltage less than 0.7 V.

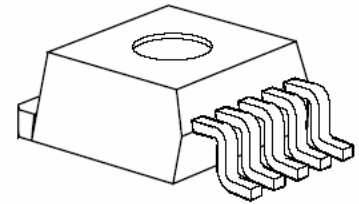
The spread of the output voltage is provided by adjustment of the reference voltage by means of fusion of diode jumpers on the crystal.

Maximum input voltage 42 V (65 V during the time  $t \leq 400$  ms).

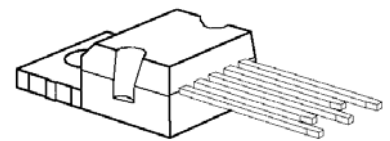
Maximum output current when a short circuit, more than 650 mA.

ICs are realized in 5-pin plastic packages of P-TO263-5-1 and P-TO220-5-12.

ICs are suitable for use in power supply in electronic equipment including automotive electronics.



**Fig. 1 – View of IC in P-TO263-5-1 package**



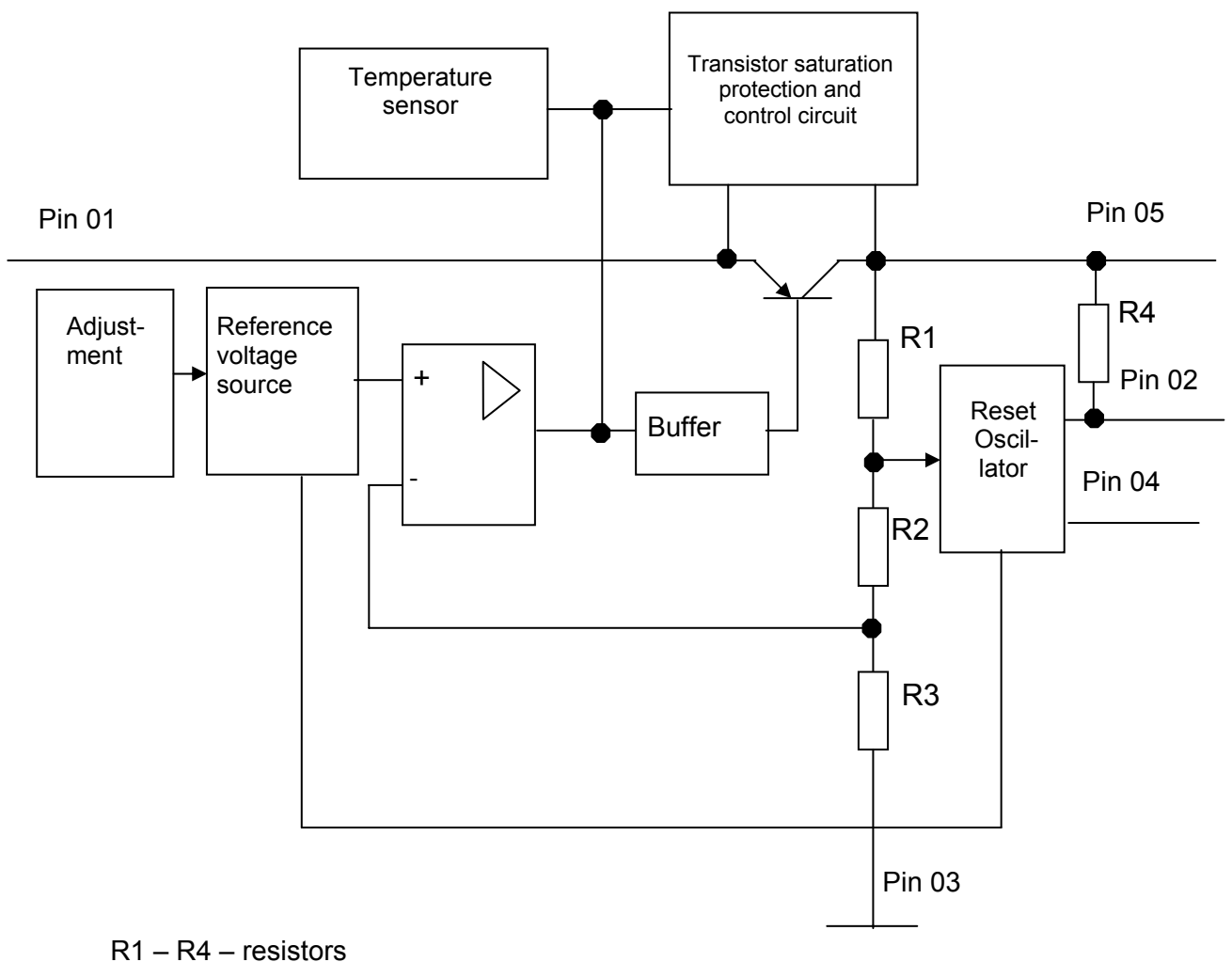
**Fig. 2 – View of IC in P-TO220-5-12 package**

**Features:**

- High precision of output voltage  $5V \pm 2\%$ ;
- Low residual voltage;
- Imbedded overtemperature protection;
- Reverse polarity protection ;
- Very low consumption current;
- Input voltage up to 42V;
- Overvoltage protection up to 65V ( $\leq 400$ mc);
- Short-circuit proof;
- Suitable for use in automotive electronics;
- - ESD protection up to 2000 V;
- Adjustable reset time
- Junction temperature range from minus 40 to +125°C;

**Table 1 Pin description table**

| Pin number | Pad number    | Symbol | Description                  |
|------------|---------------|--------|------------------------------|
| 01         | 01            | I      | Input                        |
| 02         | 07            | RO     | Reset oscillator output      |
| 03         | 09            | GND    | Common                       |
| 04         | 10            | D      | Output of reset signal delay |
| 05         | 12, 13        | Q      | Output                       |
| -          | 02-06, 08, 11 | -      | Not bonded                   |



**Fig.3 Block diagramm**

# ILE4270G

**Table 2 Absolute maximum ratings**

| Symbol           | Parameter                           | Norm |                    | Unit |
|------------------|-------------------------------------|------|--------------------|------|
|                  |                                     | Min  | Max                |      |
| U <sub>I</sub>   | Input voltage                       | -42  | 46                 | V    |
|                  |                                     | -    | 65*                |      |
| I <sub>I</sub>   | Input current                       | -    | Internally limited | mA   |
| U <sub>Q</sub>   | Output voltage                      | -1.0 | 16                 | V    |
| I <sub>Q</sub>   | Output current                      | -    | Internally limited | mA   |
| I <sub>GND</sub> | GND pin current                     | -0.5 | -                  | A    |
| U <sub>R</sub>   | RO pin voltage                      | -0.3 | 7.0                | V    |
| I <sub>R</sub>   | RO pin current                      | -    | Internally limited | A    |
| U <sub>D</sub>   | D pin voltage                       | -0.3 | 7.0                | V    |
| I <sub>D</sub>   | D pin current                       | -    | Internally limited | A    |
| T <sub>j</sub>   | Junction temperature                | -    | 150                | °C   |
| T <sub>stg</sub> | Storage temperature (ambient)       | -50  | 150                | °C   |
| R <sub>TJC</sub> | Thermal resistance junction-case    | -    | 6.0                | °C/W |
| R <sub>TJA</sub> | Thermal resistance junction-ambient | -    | 70                 | °C/W |

\* Effect time  $t \leq 400$  mc

**Table 3 Recommended operation mode**

| Symbol           | Parameter   | Norm                   |                    | Unit |
|------------------|---|------------------------|--------------------|------|
|                  |   | Min                    | Max                |      |
| U <sub>I</sub>   | Input voltage   | U <sub>Q</sub> + 0.7 B | 46                 | V    |
| I <sub>I</sub>   | Input current   | -5.0                   | Internally limited | mA   |
| U <sub>Q</sub>   | Output voltage  | 4.9                    | 5.1                | V    |
| I <sub>Q</sub>   | Output current  | -5.0                   | Internally limited | mA   |
| U <sub>R</sub>   | RO pin voltage  | 0                      | -                  | V    |
| I <sub>R</sub>   | RO pin current  | -                      | Internally limited | A    |
| I <sub>D</sub>   | D pin current   | -                      | Internally limited | A    |
| T <sub>j</sub>   | Junction temperature                                    | -40*                   | 125                | °C   |
| R <sub>TJC</sub> | Thermal resistance junction-case                        | -                      | 6.0                | °C/W |
| R <sub>TJA</sub> | Thermal resistance junction-ambient (without heat sink) | -                      | 70                 | °C/W |



## ILE4270G

**Table 3 continued**

Note – Absolute maximum power  $P_{tot}$ , mW, dissipated by IC at the ambient temperature  $T_A$ , is to be determined as

$$P_{tot} = (125 - T_A) / R_{TJA} \quad (1)$$

where 125 – junction absolute maximum operating temperature, °C

\*  $R_{TJA}$  - thermal resistance “junction – ambient” (for IC without additional external heat sink), °C /W.

For IC with additional external heat sink

$$R_{TJA} = R_{TJC} + R_{TJCA}, \quad (2)$$

where  $R_{TJC}$  – IC thermal resistance “junction-case”, °C /W.

Thermal resistance “case-ambient”  $R_{th\ ca}$  of the designed IC is determined by the design of heat sink and specified by IC consumer.

Used heat sink, application mode (consumed power) and ambient temperature have to ensure junction temperature not more than  $T_J \leq +125$  °C.

\* Ambient temperature is indicated

**Table 4 – Electric parameters - 40 °C \* ≤  $T_J$  ≤ 125 °C (unless otherwise specified)**

| Symbol                      | Parameter  | Mode   | Norm |     | Unit |
|-----------------------------|--|--|------|-----|------|
|                             |  |  | Min  | Max |      |
| U <sub>Q</sub>              | Output voltage   | 6.0 V ≤ U <sub>I</sub> ≤ 26 v<br>-5.0 mA ≤ I <sub>Q</sub> ≤ - 550 mA | 4.9  | 5.1 | V    |
|                             |  | 26 V ≤ U <sub>I</sub> ≤ 36 V<br>I <sub>Q</sub> ≤ - 300 mA            | 4.9  | 5.1 |      |
| I <sub>Qmax</sub>           | Maximum output current   | U <sub>Q</sub> = 0 V<br>U <sub>I</sub> = 13.5 V                      | 650  | -   | mA   |
| I <sub>q</sub>              | Consumption current<br>(I <sub>q</sub> = I <sub>I</sub> - I <sub>Q</sub> ) | U <sub>I</sub> = 13.5 V,<br>I <sub>Q</sub> = -5.0 mA                 | -    | 1.5 | mA   |
|                             |  | U <sub>I</sub> = 13.5 V,<br>I <sub>Q</sub> = -550 mA                 | -    | 75  |      |
|                             |  | U <sub>I</sub> = 5.0 V,<br>I <sub>Q</sub> = -550 mA                  | -    | 90  |      |
| U <sub>dr</sub>             | Drop voltage   | U <sub>I</sub> = 13.5 V, I <sub>Q</sub> = -550 mA                    | -    | 700 | mV   |
| ΔU <sub>Q(I)</sub>          | Load current regulation of output voltage                                  | U <sub>I</sub> = 6.0 V<br>-5.0 mA ≤ I <sub>Q</sub> ≤ -550mA          | -    | 50  | mV   |
| ΔU <sub>Q(U)</sub>          | Supply (input) voltage regulation of output voltage                        | 6.0 V ≤ U <sub>I</sub> ≤ 26 V<br>I <sub>Q</sub> = -5.0 mA            | -    | 25  | mV   |
| Reset oscillator parameters |  |  |      |     |      |
| U <sub>RT</sub>             | Switching reset threshold voltage (pin 05)                                 | I <sub>Q</sub> = -5.0 mA   | 4.5  | 4.8 | V    |
| U <sub>ROH</sub>            | High level reset output voltage  | U <sub>I</sub> = 13.5 V,<br>I <sub>Q</sub> = -5.0 mA                 | 4.5  | -   | V    |



# ILE4270G

**Table 4 continued**

| Symbol                        | Parameter   | Mode  | Norm |     | Unit          |
|-------------------------------|---|---|------|-----|---------------|
|                               |   |   | Min  | Max |               |
| $U_{ROL}$                     | Low level reset output voltage                        | $U_Q = 4.4 \text{ V}$ , $U_I = 4.4 \text{ V}$<br>$I_R = 3.0 \text{ mA}$ | -    | 400 | mV            |
| R                             | Circuit resistance                                    | Connection directly to Q  | 18   | 46  | k $\Omega$    |
| $U_{DRL}$                     | Switching threshold of "Reset" output into low level  | $U_Q < U_{RT}$  | 0.2  | 0.8 | V             |
| $U_{DU}$                      | Switching threshold of "Reset" output into high level | -   | 1.4  | 2.3 | V             |
| $I_d$                         | Charge current  | $U_D = 1.5 \text{ V}$   | 8.0  | 25  | $\mu\text{A}$ |
| $t_{RR}$                      | "Reset" output actuating time                         | $C_D = 100 \text{ nF}$  | -    | 3.0 | $\mu\text{s}$ |
| <b>Overvoltage protection</b> |   |   |      |     |               |
| $U_{I,OV}$                    | Switching OFF voltage                                 |   | 42   | 46  | V             |

**Notes**

1. Parameters specified in the table are guaranteed for the constant junction temperature  $T_j$ . Measurement of parameters should be conducted by means of pulse technique.

2. Minus sign before current value indicates current direction only (drain current). The absolute value of the measured current was adopted as value of current.

3. Measurement of electrical parameters is carried out with connection of input capacitors  $C_1 = 1000 \mu\text{F}$ ,  $C_2 = 470 \text{ nF}$  and output capacitor  $C_Q = 22 \mu\text{F}$ .

4 "Reset" output is in low level state at  $1.0 \text{ V} < U_Q < U_{RT}$

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\* Ambient temperature is indicated

**Table 5 Typical electrical parameters**  
( $-40 \text{ }^\circ\text{C} \leq T_J \leq 125 \text{ }^\circ\text{C}$ , unless otherwise specified)

| Parameter, unit            | Symbol    | Measurement mode  | Typical value |
|----------------------------|-----------|---|---------------|
| Switching delay time, mc   | $t_d$     | $C_d = 100 \text{ nF}$  | 13            |
| Low reset voltage, mV      | $U_{ROL}$ | $R_{\text{intern}} = 30 \text{ k}\Omega$<br>$1.0 \text{ V} \leq U_Q \leq 4.5 \text{ V}$ | 60            |
| Ripple rejection ratio, dB | PSRR      | $f_r = 100 \text{ Hz}$ ,<br>$U_r = 0.5 U_{SS}$  | 54            |

Notes: Testing of electrical characteristics is carried out in compliance with connection circuit given in Annex A

# ILE4270G

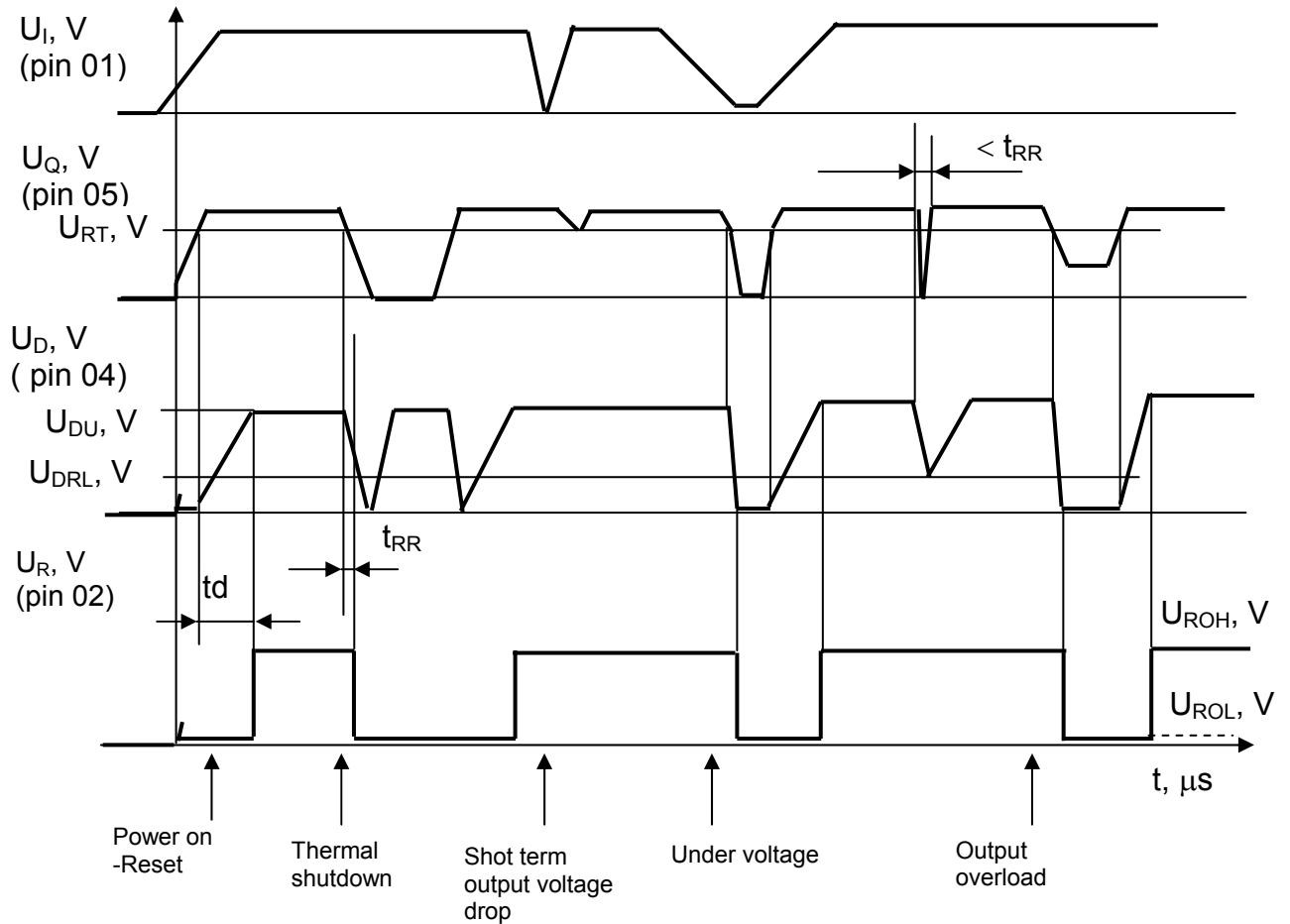
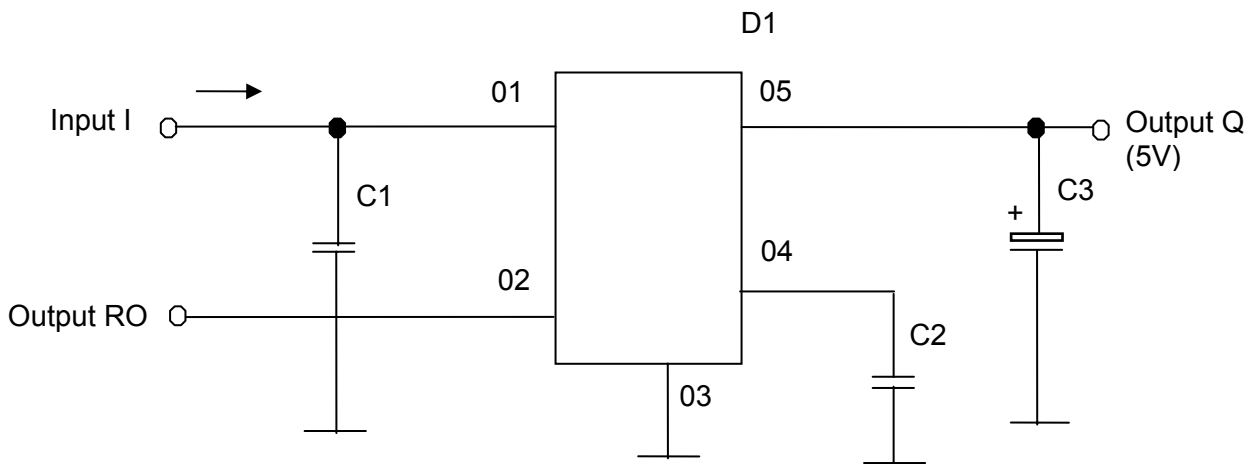


Fig. 4 – Operation time diagram of ILE4270G, ILE4270S



- C1 – Capacitor 470 nF  $\pm$  20 %
- C2 – Capacitor 100 nF  $\pm$  20 %
- C3 – Electrolytic capacitor 22  $\mu$ F  $\pm$  20 %
- D1 - IC

Fig.5 – Application diagramm ILE4270G, ILE4270S

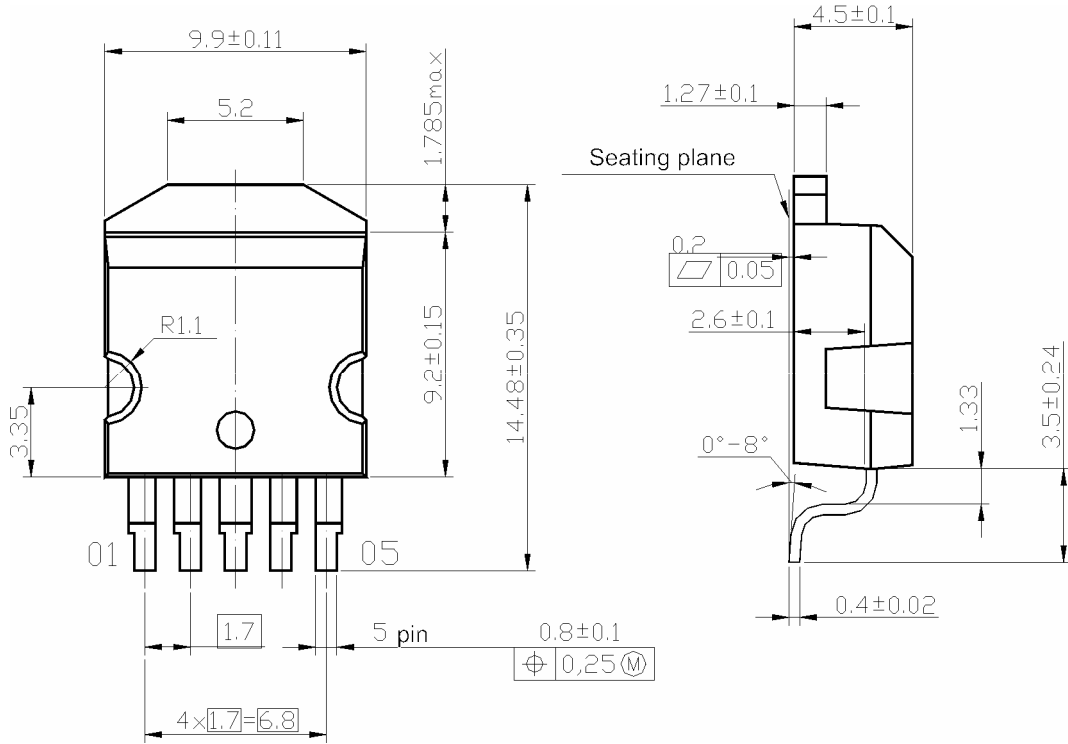


Fig 5 – P-T0263-5-1 package outline

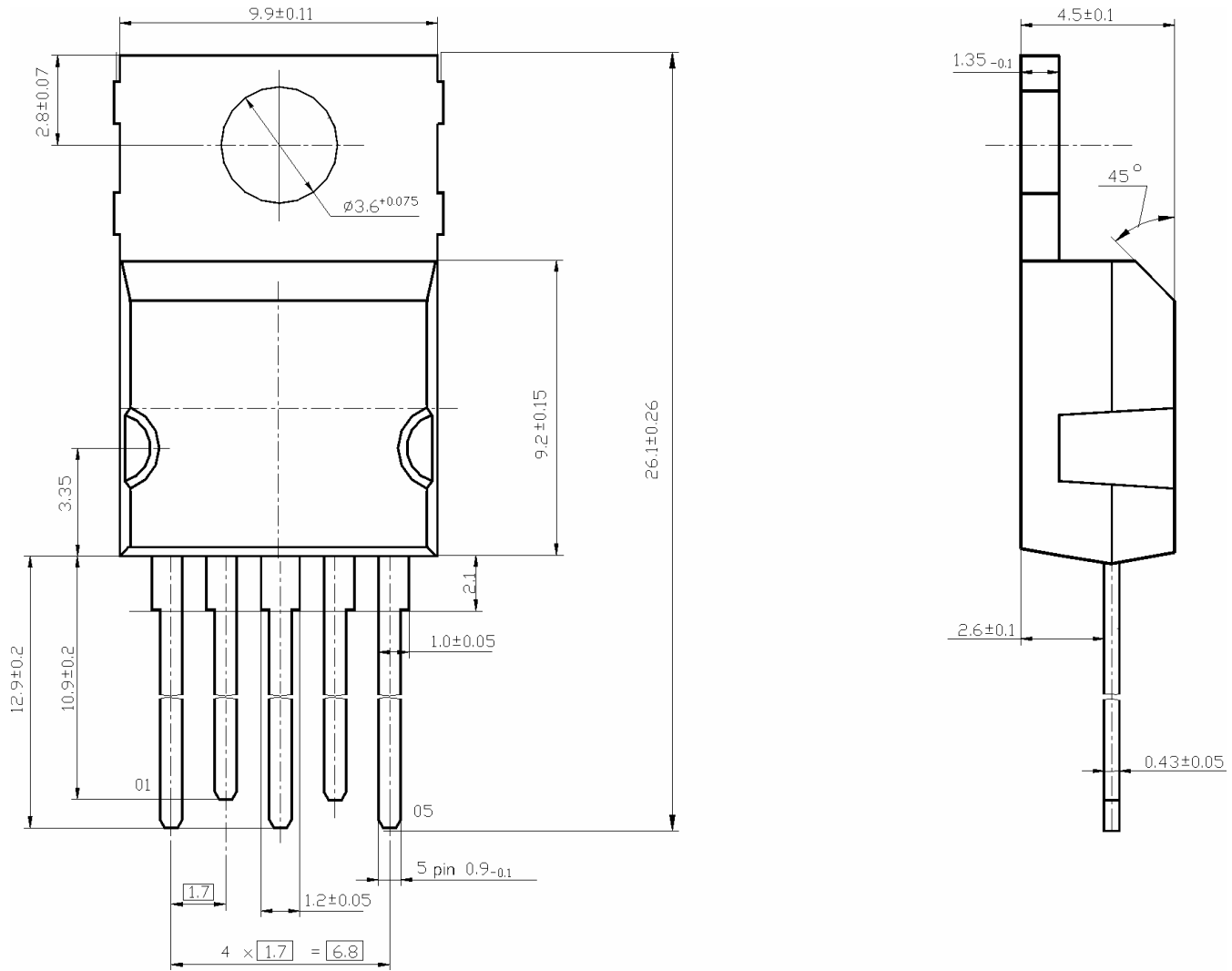
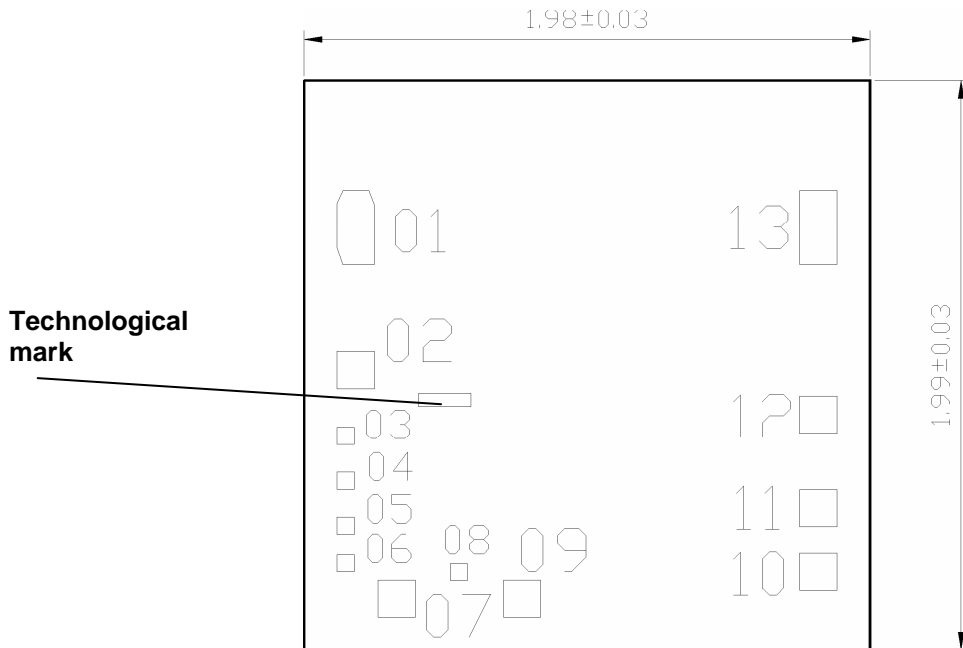


Fig. 6 – P-TO220-5-12 package outline



# ILE4270G



Technological mark on chip «4270.» has coordinates, mm: left bottom corner  
 $x = 0,290$  ,  $y = 0,817$ .

Chip thickness is  $0,35 \pm 0,02$ .

## Chip outline drawing

**Table 6 Contact pad location table**

| Contact pad number | Coordinates (Left bottom corner), mm |        |
|--------------------|--------------------------------------|--------|
|                    | X                                    | Y      |
| 01                 | 0,1155                               | 1,3465 |
| 02                 | 0,1155                               | 0,9135 |
| 03                 | 0,1155                               | 0,7175 |
| 04                 | 0,1155                               | 0,560  |
| 05                 | 0,1155                               | 0,4025 |
| 06                 | 0,1155                               | 0,2725 |
| 07                 | 0,2595                               | 0,1135 |
| 08                 | 0,512                                | 0,2415 |
| 09                 | 0,6975                               | 0,1135 |
| 10                 | 1,7345                               | 0,2075 |
| 11                 | 1,7345                               | 0,4285 |
| 12                 | 1,7345                               | 0,7575 |
| 13                 | 1,7345                               | 1,3465 |

### Notes

1. Coordinates and size of the contact pads are given by the layer «Passivation»

2 Sizes of contact pads are

- pads 03-06, 08 - 0,060 x 0,060 mm,
- pads 02, 07, 09 -12 - 0,130 x 0,130 mm.
- pads 01, 13 - 0,130 x 0,260 mm

3 Bevel of three corners of the first contact pad is  $(24 \pm 2) \mu\text{m}$