

MIP512 (Tentative)

Silicon MOSFET type Integrated Circuit

■ Features

- Built-in five protection functions (over-current, over-voltage, load-short-circuit, over heat, ESD)
- Both DC and AC power supply are available

■ Applications

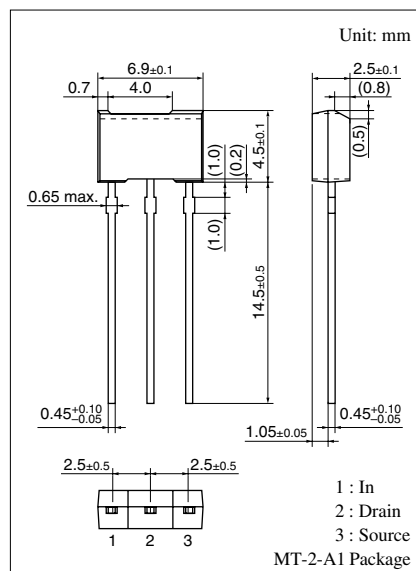
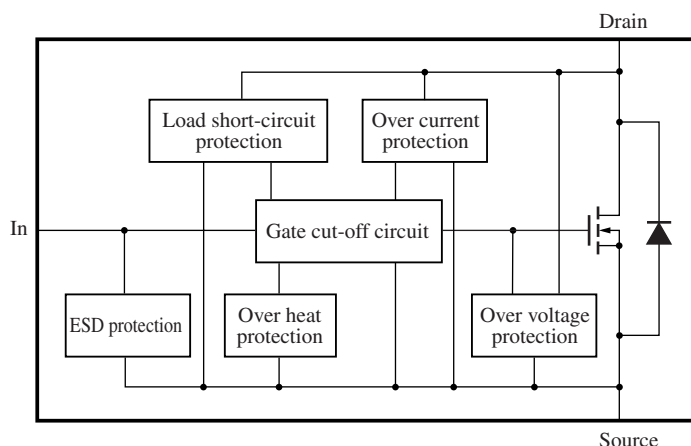
- Lamp · solenoid, and LED drive for Amusement machine
- Motor, Relay drive for Factory Automation

■ Absolute Maximum Ratings $T_C = 25^\circ\text{C} \pm 3^\circ\text{C}$

| Parameter | Symbol | Rating | Unit |
|-------------------------------|-----------|--------------|------------------|
| Drain-source voltage | V_{DS} | 45 | V |
| Output current | I_O | 2.0 | A |
| Input voltage | V_{IN} | -0.5 to +6.0 | V |
| Input current | I_{IN} | ± 10 | mA |
| Power dissipation * | P_D | 1.0 | W |
| Operating ambient temperature | T_{opr} | -40 to +85 | $^\circ\text{C}$ |
| Channel temperature | T_{ch} | 150 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

Note) * : The value at mounting on the Printed circuit board
(glass epoxy board: 100 mm × 100 mm). ($T_a = 25^\circ\text{C}$)

■ Block Diagram



Marking Symbol: MIP512

■ Electrical Characteristics $T_C = 25^\circ\text{C} \pm 3^\circ\text{C}$

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|--------------------------------------|----------------|---|-----|------|------|---------------|
| Drain-source on resistance | $R_{DS(ON)}$ | $V_{IN} = 5\text{ V}, I_{DS} = 1\text{ A}$ | | 0.30 | 0.45 | Ω |
| Drain-source voltage | $V_{DS(ON)}$ | $V_{IN} = 5\text{ V}, I_{DS} = 1\text{ A}$ | | 0.30 | 0.45 | V |
| Drain clamp voltage | $V_{DS(CLIP)}$ | $V_{IN} = 0\text{ V}, I_{DS} = 3\text{ mA}$ | 45 | 52 | | V |
| Drain off current 1 | $I_{DS(OFF)1}$ | $V_{IN} = 0\text{ V}, V_{DS} = 12\text{ V}$ | | 5 | 20 | μA |
| Drain off current 2 | $I_{DS(OFF)2}$ | $V_{IN} = 0\text{ V}, V_{DS} = 25\text{ V}$ | | 21 | 50 | μA |
| Drain off current 3 | $I_{DS(OFF)3}$ | $V_{IN} = 0\text{ V}, V_{DS} = 40\text{ V}$ | | 55 | 120 | μA |
| High level input voltage | $V_{IN(H)}$ | $I_{DS} = 1\text{ A}$ | 4 | | | V |
| Low level input voltage | $V_{IN(L)}$ | $I_{DS} = 1\text{ mA}$ | | | 0.8 | V |
| Input current (normal state) | $I_{IN(ON)}$ | $V_{IN} = 5\text{ V}, V_{DS} = 0\text{ V}$ | | 0.2 | 0.5 | mA |
| Input current (protecting state) * | $I_{IN(PROT)}$ | $V_{IN} = 5\text{ V}$ | | 0.45 | 1.00 | mA |
| Over current limit value | I_{OCP} | $V_{IN} = 5\text{ V}$ | 3.5 | 5.0 | | A |
| Load short-circuit detection voltage | $V_{DS(SHT)}$ | $V_{IN} = 5\text{ V}$ | 2 | 4 | | V |

Note) 1. When the drain voltage is more than load short-circuited detection voltage at the output on state, output current oscillates.

2. When a drain voltage rises above a drain clamp voltage (over-voltage protection operating voltage), the output MOS turns on and the drain voltage is clamped before breaking down between drain and source.

*: The current value at the time when the load short-circuit protection and the over-heat protection are operating (for guarantee on design).

■ Electrical Characteristics (Reference Value)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---------------------------------|-----------|-----------------------|-----|-----|-----|------------------|
| Cut-off temperature at overheat | T_{SHD} | $V_{IN} = 5\text{ V}$ | | 140 | | $^\circ\text{C}$ |

Note) 1. The above characteristic is for the reference and is not guarantee value.

2. When the chip surface temperature rise above the shutdown temperature at the over-heat, the output is shut down. When the chip surface temperature falls, operation starts again.

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