Ordering number:EN5475

# TND002

## Intelligent Power Device for Use in Lamp Driver and Low-side Power Switch Applications

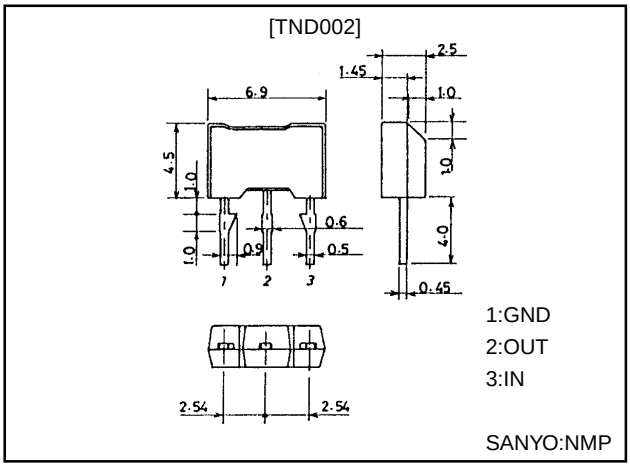
## Features

- Monolithic N-channel MOSFET built in.
- Overcurrent protection built in.
- Overvoltage protection built in.
- Reset function built in.

## Package Dimensions

unit:mm

2135




## Specifications

### Absolute Maximum Ratings at Ta = 25˚C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Drain-to-Source Voltage | $V_{DS}$(DC) | | 40 | V |
| Output Current | $I_O$(DC) | | 1.5 | A |
| Peak Output Current | $I_{OP}$ | | 5 | A |
| Input Voltage | $V_{IN}$ | | –0.5 to +6 | V |
| Input Current | $I_{IN}$ | | ±10 | mA |
| Allowable Power Dissipation | $P_D$ | | 1 | W |
| Operating Temperature | Topr | | –40 to +85 | ˚C |
| Junction Temperature | Tj | | 150 | ˚C |
| Storage Temperature | Tstg | | –55 to +150 | ˚C |

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Drain-to-Source Breakdown Voltage | $V_{DSS}$ | $V_{IN}$=0, $I_O$=3mA | 40 | | | V |
| Output Off Current (1) | $I_{DSS}1$ | $V_{IN}$=0, $V_{DS}$=40V | | | 3 | mA |
| Output Off Current (2) | $I_{DSS}2$ | $V_{IN}$=0, $V_{DS}$=25V | | | 1.5 | mA |
| Input Voltage | $V_{IH}$ | $V_{DD}$=24V(AC), $I_O$=1.5A | 4.5 | 5 | 6 | V |
| Input Voltage | $V_{IL}$ | $V_{DD}$=24V(AC), $I_O$=5mA | | | 0.8 | V |
| On Voltage | $V_{DS}$(ON) | $V_{IN}$=5V, $I_O$=1.5A | | 0.5 | 0.75 | V |
| On Resistance | $R_{DS}$(ON) | $V_{IN}$=5V, $I_O$=1.5A | | | 0.5 | Ω |
| Internal Current Limit | $I_S$ | $V_{IN}$=5V | | 5 | | A |
| Input Current | $I_{IN}$ | $V_{IN}$=5V, $V_{DS}$(ON)≤1V | | | 1 | mA |
| Protection Reset Voltage * | $V_{RESET}$ | $V_{IN}$=5V | | 4.6 | | V |

* : Output is turned off regardless of input when power supply voltage is higher than $V_{RESET}$.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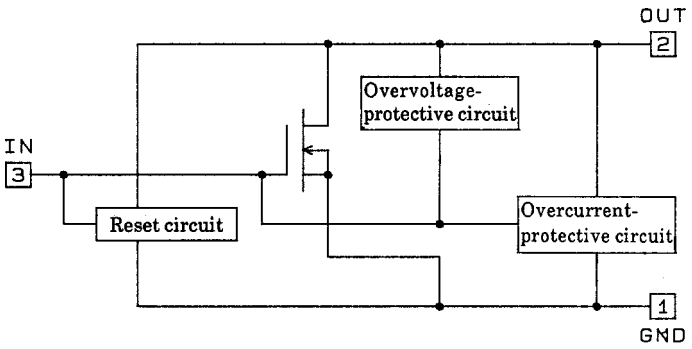
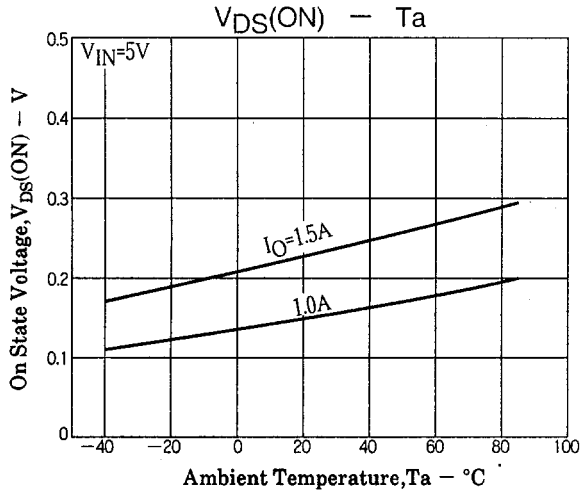
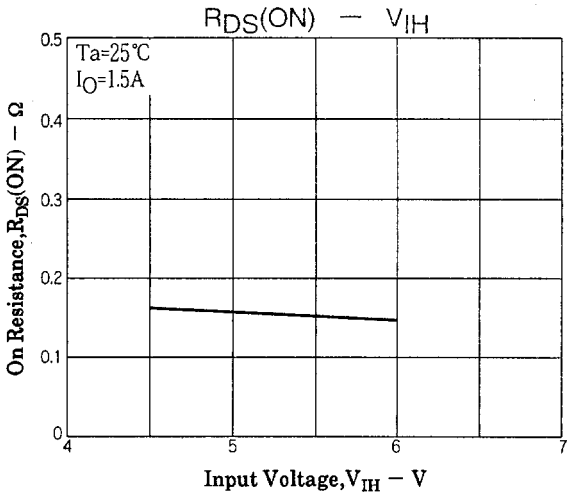
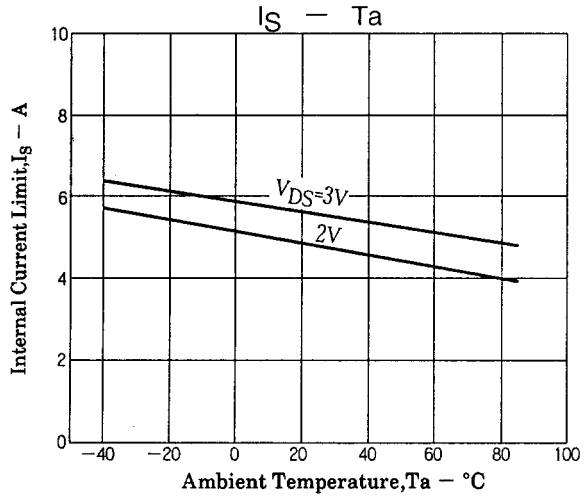
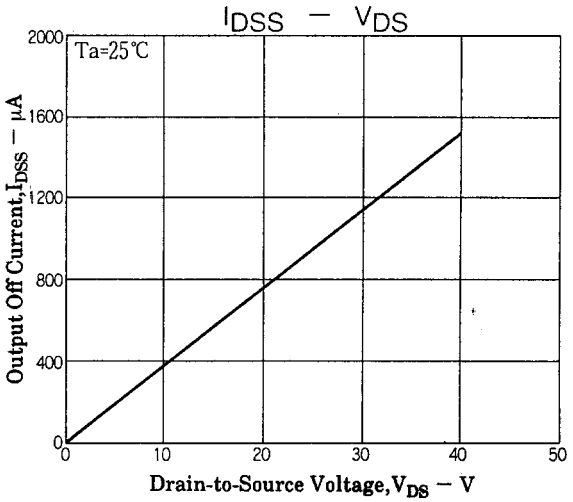
## Circuit

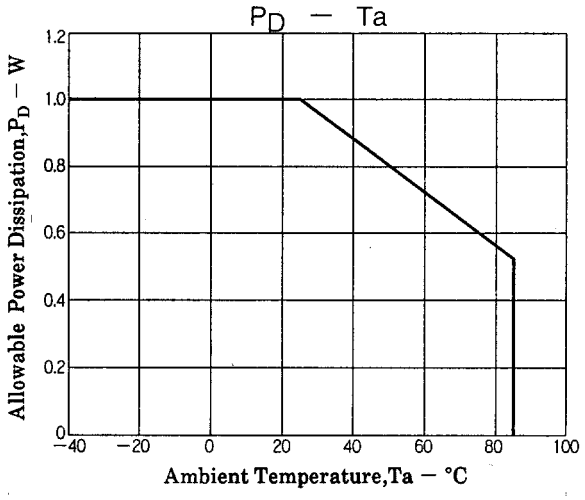

OUT
2
Overvoltage-
protective circuit
IN
3
Reset circuit
Overcurrent-
protective circuit
1
GND


VDS(ON) — Ta
VIN=5V
IO=1.5A
1.0A
On State Voltage,VDS(ON) — V
Ambient Temperature,Ta — °C

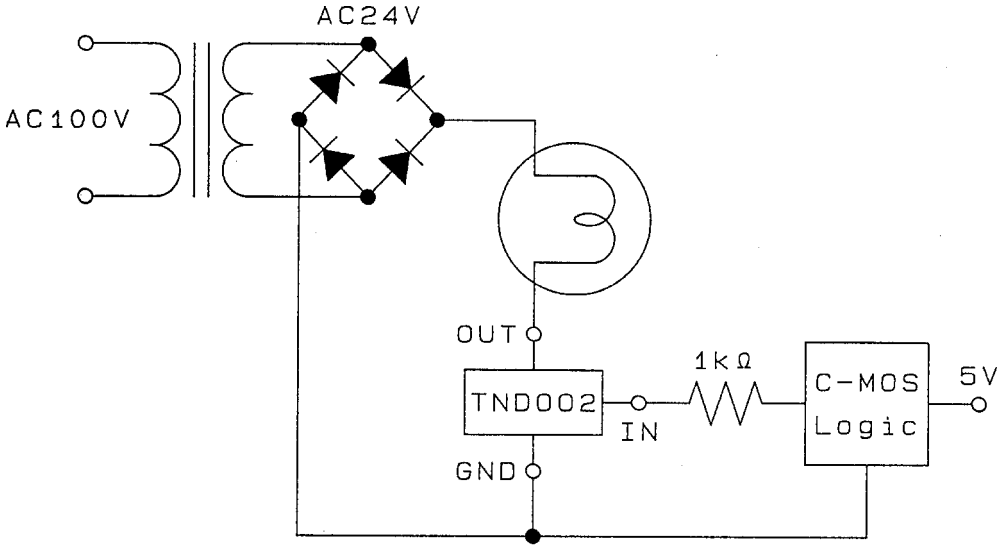

RDS(ON) — VIH
Ta=25°C
IO=1.5A
On Resistance,RDS(ON) — Ω
Input Voltage,VIH — V


IS — Ta
VDS=3V
2V
Internal Current Limit,IS — A
Ambient Temperature,Ta — °C


IDSS — VDS
Ta=25°C
Output Off Current,IDSS — μA
Drain-to-Source Voltage,VDS — V


PD — Ta
Allowable Power Dissipation,PD — W
Ambient Temperature,Ta — °C

## Sample Applications Circuit




## Operation

· When the input voltage exceeds 4.5V, the output power MOSFET is turned on to cause current to flow throufh the lamp and turn it on. At this time, if a rush current flows through the lamp, the current will be limited to about 5A by the built-in overcurrent protection circuit. When the input voltage drops below 0.8V, the output power MOSFET is turned off and the lamp is turned off.

· When the lamp load is short-circuited, output voltage becomes equal to the power supply voltage. Therefore, the reset circuit operates to turn off the output power MOSFET, protecting the power switch from destruction.