Ordering number : EN6481D

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

TND017MP
TND017SW

ExPD(Excellent Power Device)

Lowside Power Switch Lamp-, Solenoid-, and Motor-Driving Applications

Features

- N-channel MOSFET built in.
- Overheat protection.
- Overcurrent protection (Self recovery type current limiting function).
- Overvoltage protection.
- TND017SW incorporates two sets of circuit.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DS}		60	V
Output Current	I_O(DC)		1.5	A
Input Voltage	V_{IN}		-0.3 to +10	V
Allowable Power Dissipation	P_D	TND017MP	1.0	W
		TND017SW Mounted on a ceramic board (1200mm²X0.8mm) 1unit	1.7	W
		TND017SW Mounted on a ceramic board (1200mm²X0.8mm)	2.0	W
Operating Supply Voltage	V_{DS}(opr)		40	V
Operating Temperature	Topr		-40 to +85	°C
Junction Temperature	Tj		Internally Limited	°C
Storage Temperature	Tstg		-55 to +150	°C

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Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Clamp Voltage	V_{DS}, clamp	V_{IN}=0V, I_O=1mA	60			V
Output-OFF Current	$I_{DSS}1$	V_{IN}=0V, V_{DS}=50V			10	μA
	$I_{DSS}2$	V_{IN}=0V, V_{DS}=12V			5	μA
Input Threshold Voltage	V_{IN}(th)	V_{DS}=5V, I_O=1mA	1.0	1.5	2.0	V
Protection Circuit Operating Input Voltage	V_{IN}(opr)		4		10	V
Drain-to-Source ON Resistance	R_{DS}(on)	V_{IN}=5V, I_O=1A		0.3	0.4	Ω
Input Current (Output On)	I_{IN}	V_{IN}=5V		0.25	0.6	mA
Overheat Detecting Temperature	Tj(sd)	V_{IN}=5V, I_O=1A	120	150	190	°C
Overcurrent Detecting Current	Is	V_{IN}=5V	3.0	4.0	5.0	A
Overcurrent Limit (Peak)	I_{LMT}	V_{IN}=5V	3.5	4.5	5.5	A
Input Clamp Voltage	V_{IN}, clamp	I_{IN}=1mA	10			V

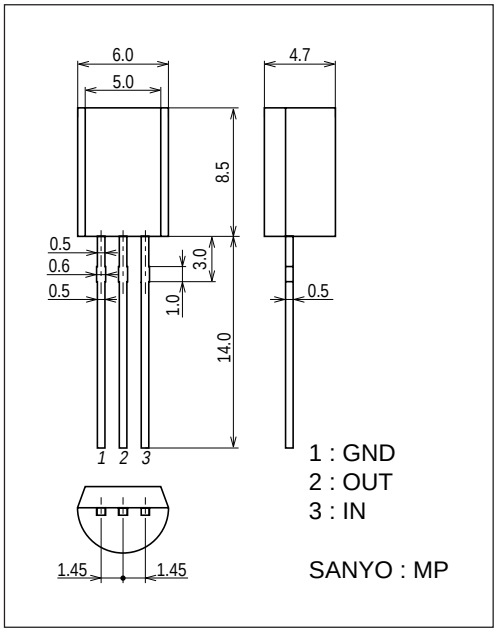
Notes : 1. Overcurrent protection circuit limits the output current to the range of overcurrent limit value.

2. During overheat protecting operation, output current is once turned off and then recovers after the input voltage falls to the reset voltage (1.0V) or below.

Package Dimensions

unit : mm (typ)

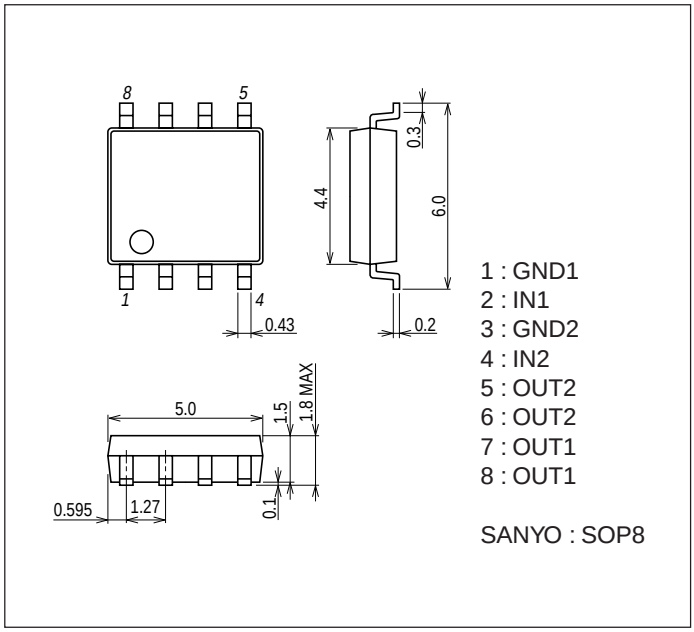
7520-003 [TND017MP]



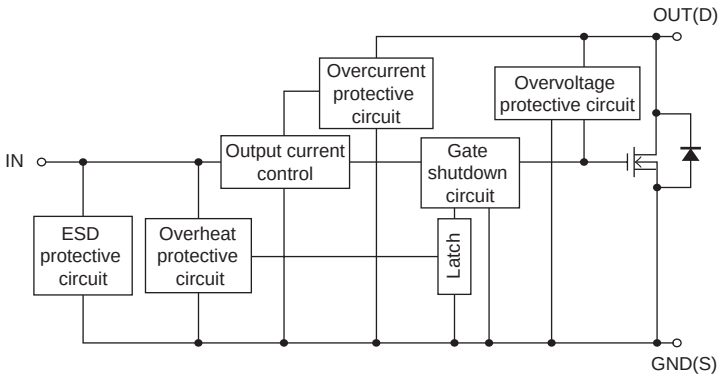
Package Dimensions

unit : mm (typ)

7005-005 [TND017SW]



Block Diagram



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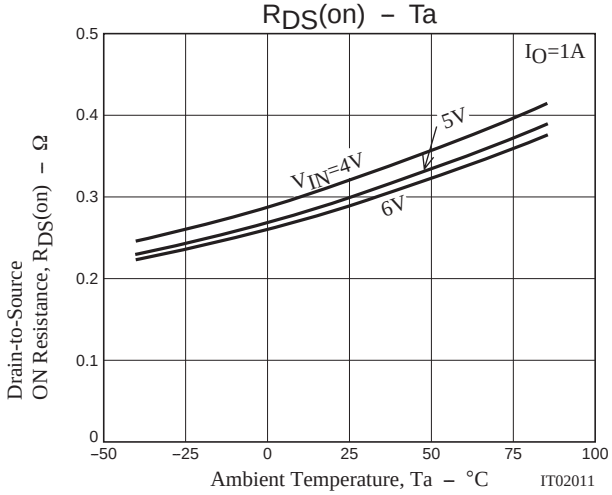
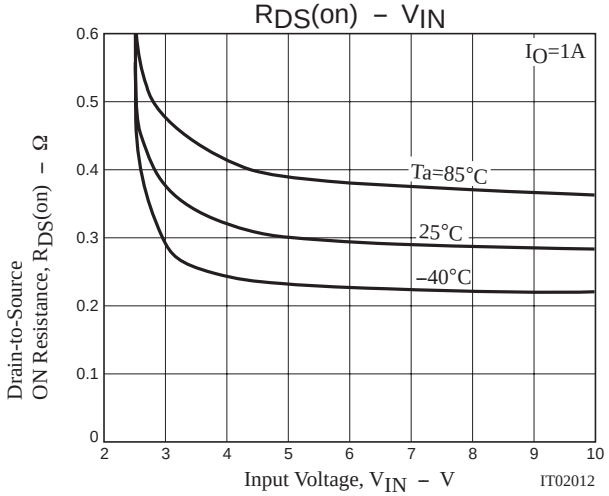
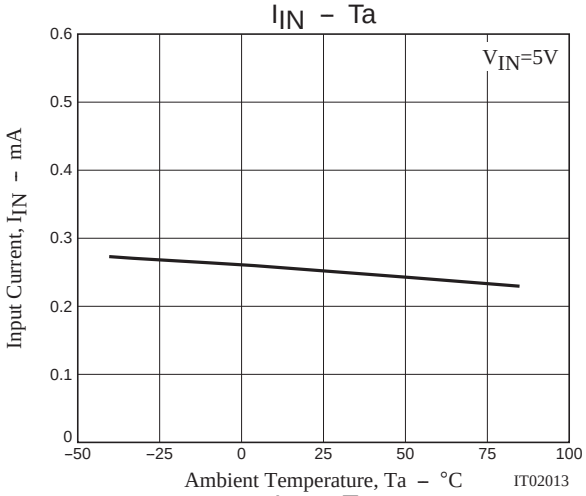
$R_{DS(on)}$ – Ta



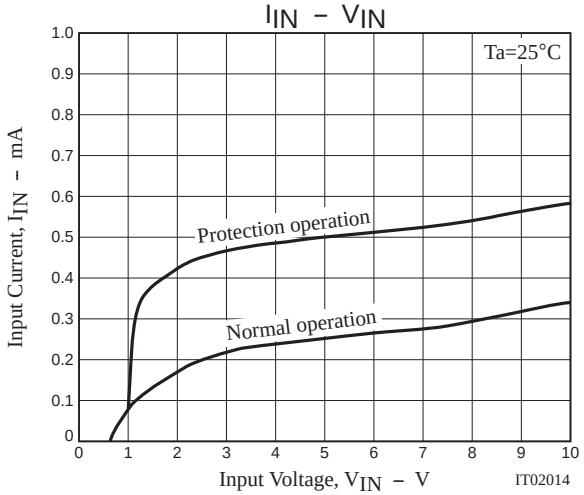
$R_{DS(on)}$ – V_{IN}



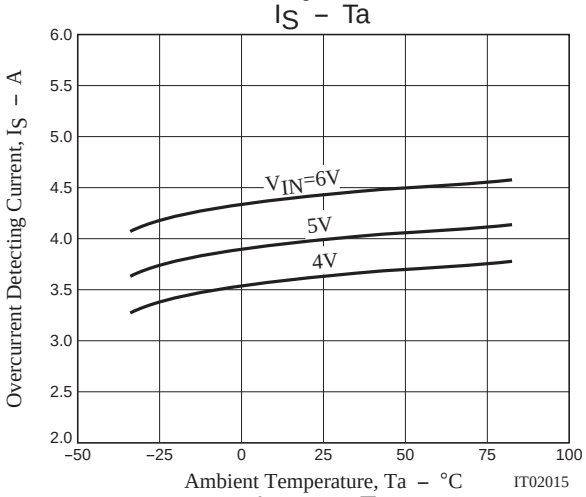
I_{IN} – Ta



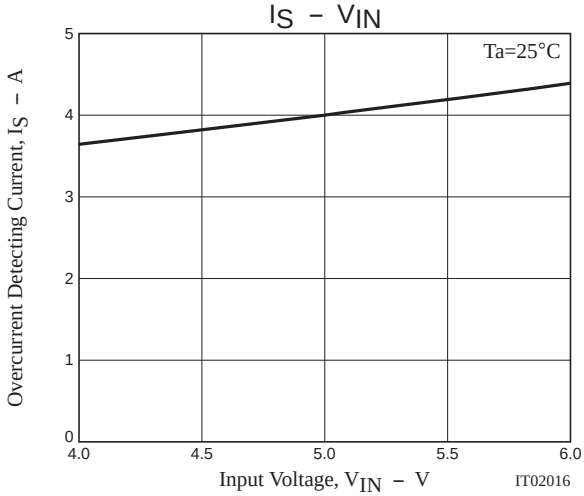
I_{IN} – V_{IN}



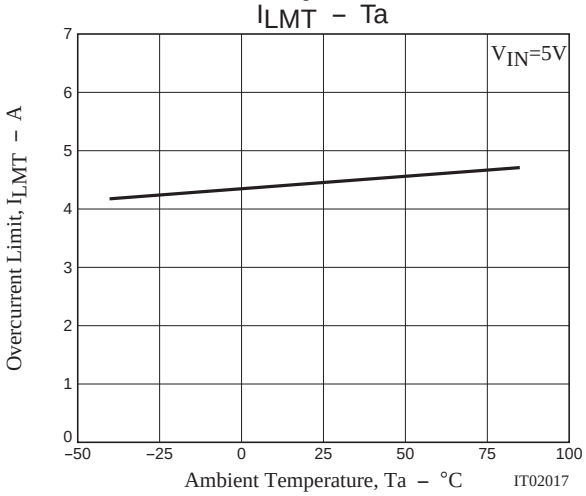
I_S – Ta



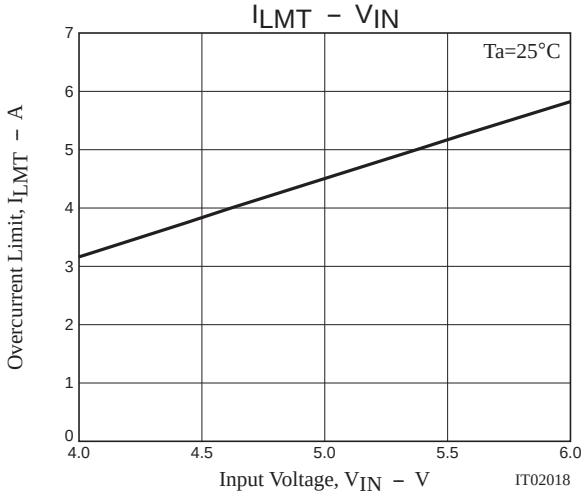
I_S – V_{IN}



I_{LMT} – Ta



I_{LMT} – V_{IN}



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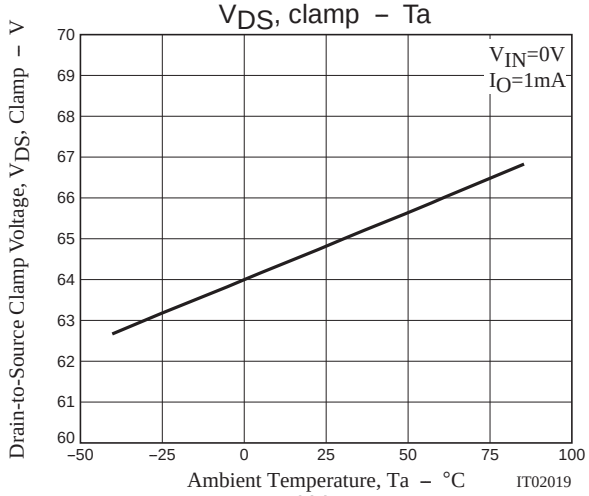
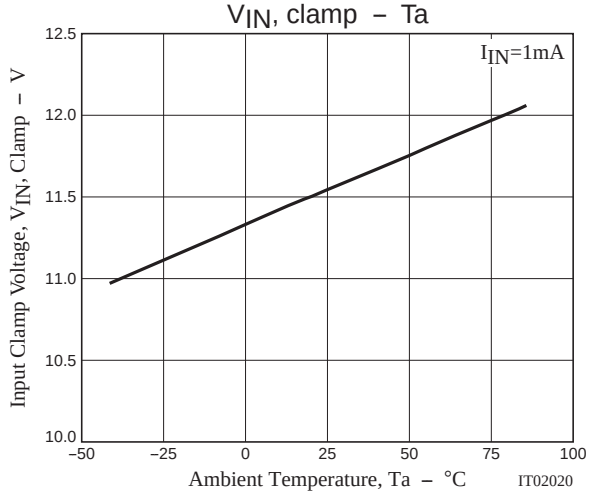
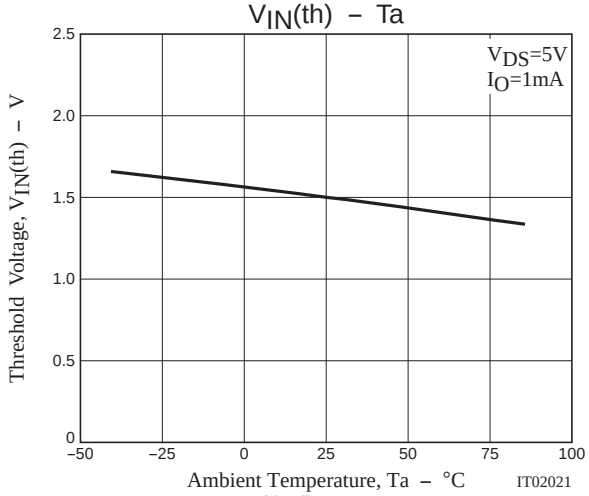
V_{DS}, clamp – Ta



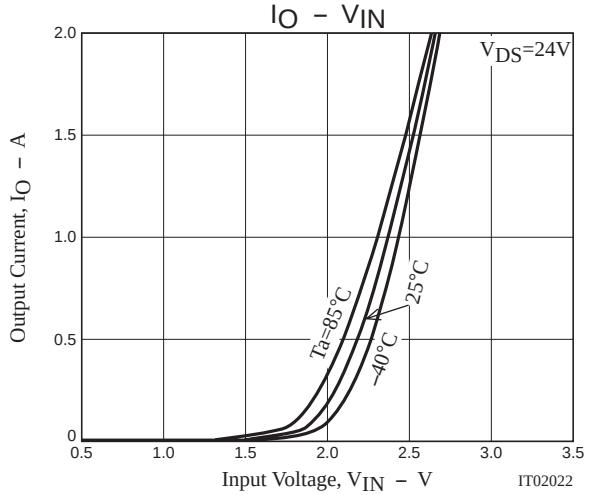
V_{IN}, clamp – Ta



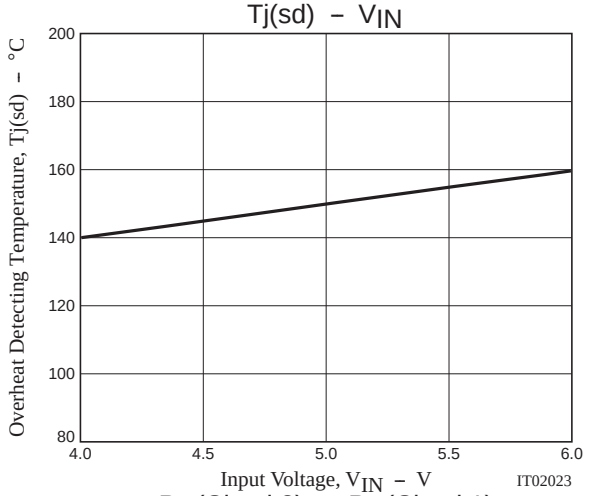
V_{IN}(th) – Ta



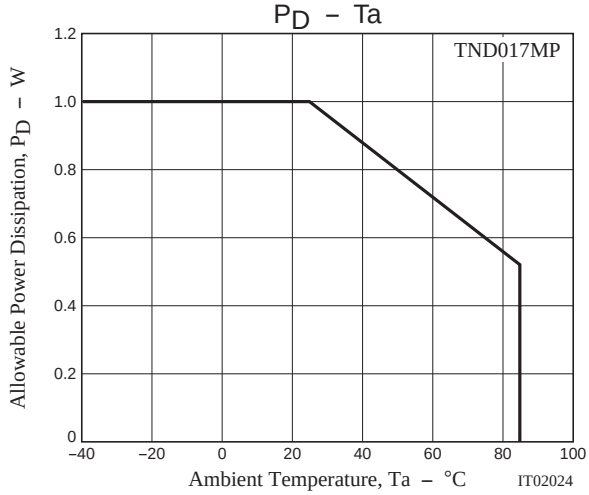
I_O – V_{IN}



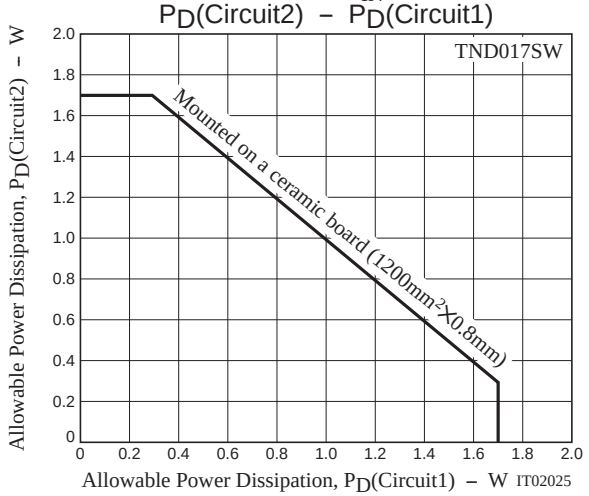
Tj(sd) – V_{IN}



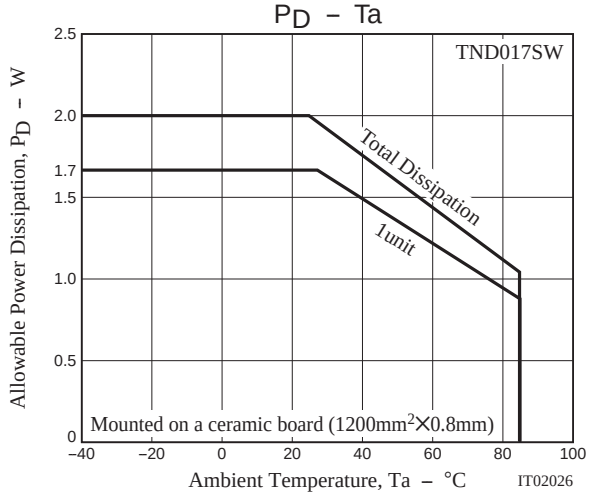
P_D – Ta



P_D(Circuit2) – P_D(Circuit1)



P_D – Ta



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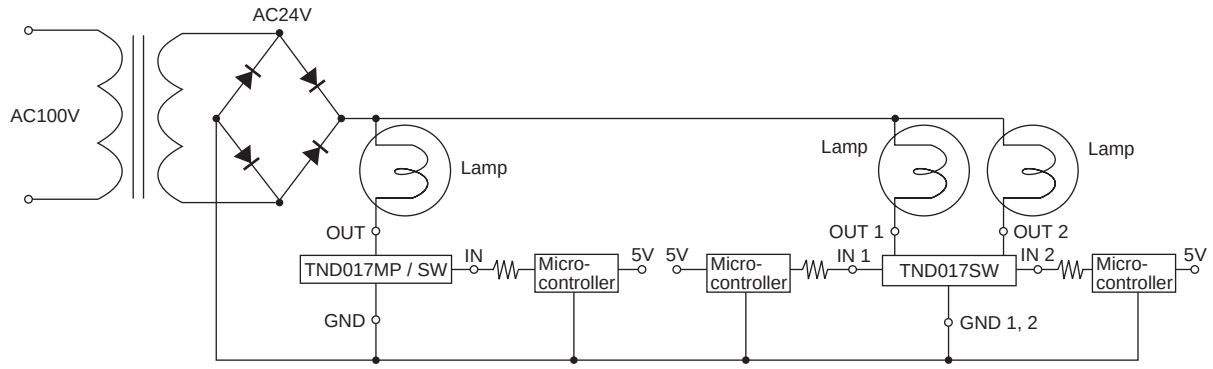
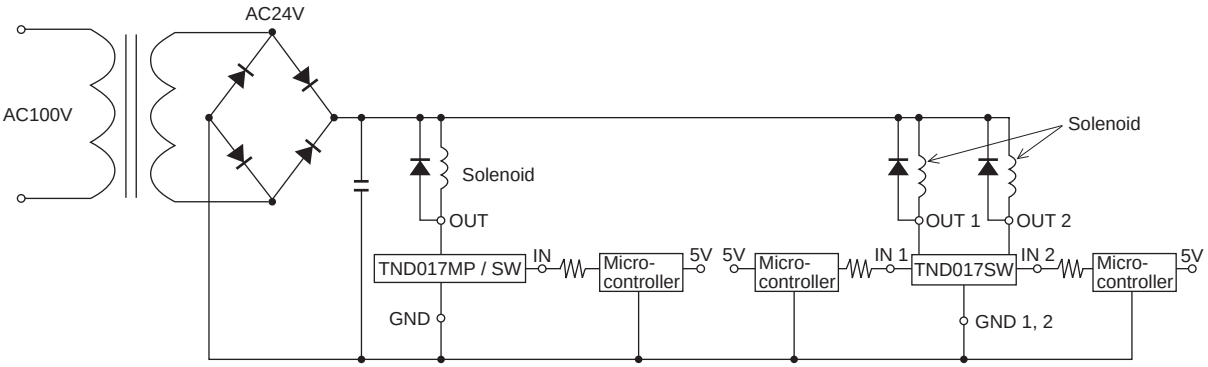
Sample Application Circuit



Another Sample Application Circuit (Solenoid drive)



Operation Description

- The output power MOSFET will be turned on when the input voltage exceeds the input threshold voltage (4 to 6V is recommended), and then the lamp will be turned on by the current flowing to the lamp. Conversely, the output power MOSFET will be turned off when the input voltage goes below the input threshold voltage, and the lamp will be turned off.
- The inrush current that occurs during normal lamp operation is limited to a preset value by the built-in overcurrent protecting circuit, which makes the lamp life longer.
- The internal overcurrent protection function limits the current of output power MOSFET when output current of at least the overcurrent detecting current value flows at load short. Besides, if the device temperature exceeds the allowable power dissipation, overheat protection function protects the power switch from being broken down by shutting down the MOSFET when Tj comes to 150°C (typical).
- Shutdown state will be kept after overheat protection operation and the system will be reset when the input voltage goes to or below the reset voltage (1V).
- As an example of application circuit, DC voltage can also be controlled as a solenoid drive.

Addition

- The diode between OUT and GND in the block diagram is parasitic diode of the MOSFET.
- Not apply a voltage on IN terminal during the period when OUT voltage is lower then GND voltage when driving a solenoid or a motor.
- Be sure connect a diode between OUT terminal and GND terminal when you want to apply a voltage on IN terminal under the above-stated state (that is, OUT Voltage < GND Voltage).

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