Ordering number:ENN6034A

ExPD (Excellent Power Device)

TND023F, TND023MP

Lamp-, solenoid-, and motor-driving Applications

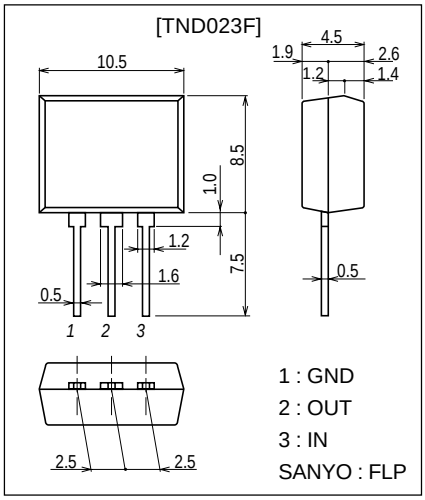
Features

- N-channel MOSFET built in.
- Overheat protection.
- Overcurrent protection.
- Overvoltage protection.

Package Dimensions

Unit:mm

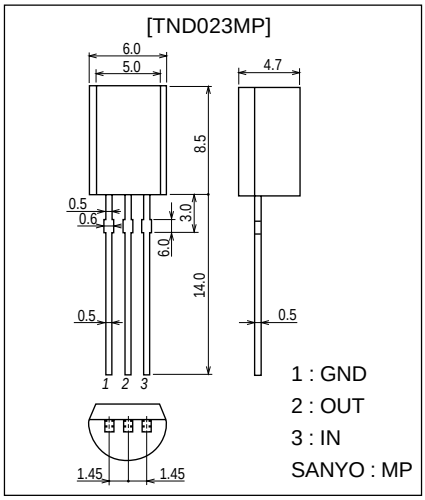
2154



Package Dimensions

Unit:mm

2145



Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DS}(DC)		60	V
Output Current (Average)	I_O(DC)	TND023F	2.5	A
	I_O(DC)	TND023MP	2.0	A
Input Voltage	V_{IN}		–0.3 to +10	V
Allowable Power Dissipation	P_D	TND023F	1.5	W
	P_D	TND023MP	1.0	W
Operating Temperature	Topr		–40 to +150	˚C
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Clamp Voltage	V_{DS} clamp	V_{IN}=0, I_O=1mA	60			V
Output-OFF Current	I_{DSS}(1)	V_{IN}=0, V_{DS}=50V			100	μA
	I_{DSS}(2)	V_{IN}=0, V_{DS}=12V			10	μA
Input Threshold Voltage	V_{IN}(th)	V_{DS}=5V, I_O=1mA	1.0		2.5	V
Drain-to-Source ON Resistance	R_{DS}(on)	V_{IN}=5V, I_O=1A			0.2	Ω

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SANYO Electric Co.,Ltd. Semiconductor Company

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Continued from preceding page.

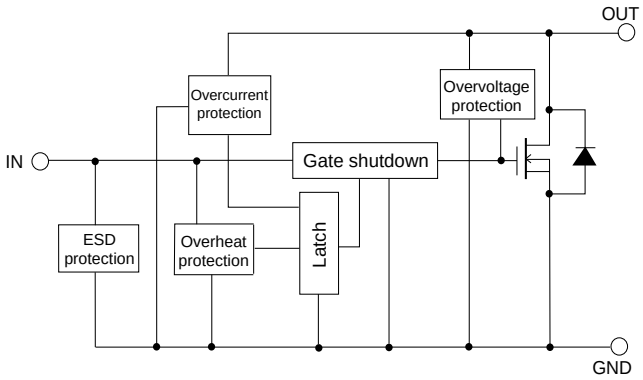
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output-ON Input current	I_{IN}	V_{IN}=5V		0.25	0.6	mA
Overheat Detecting Temperature	Tj(sd)	V_{IN}=5V, I_O=1A	155	165		˚C
Overcurrent Detecting Current	Is	V_{IN}=5V	3.75	5	6.25	A
Input Clamp Voltage	V_{IN} clamp	I_{IN}=5mA	10			V

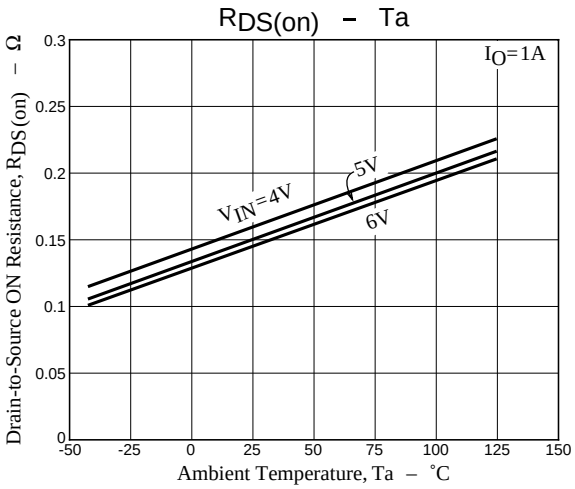
*Note:

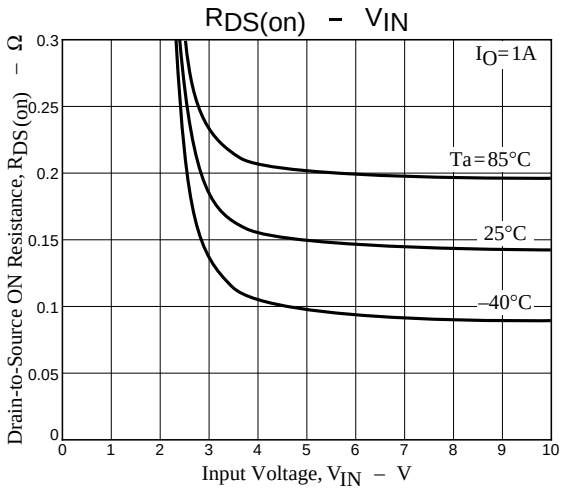
1.Shutdown state will be kept after overheat and overcurrent protections operation and the system will be reset when the input voltage goes to or below the reset voltage (1.0V).

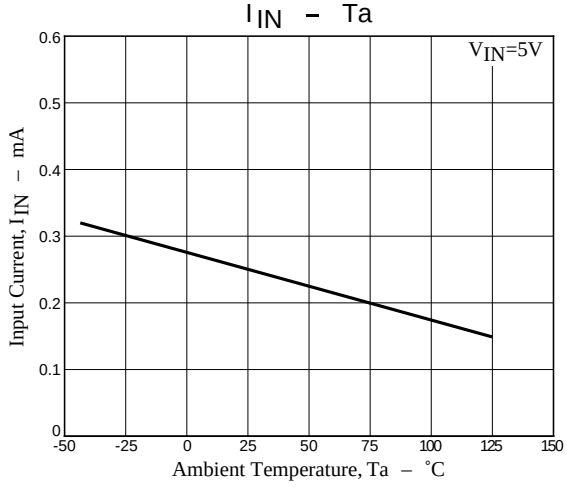
2.Overheat detecting temperature value is not a guarantee value but for reference only.

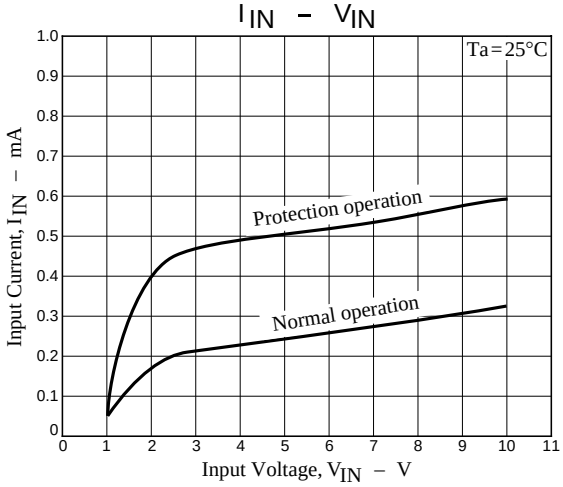
Block Diagram



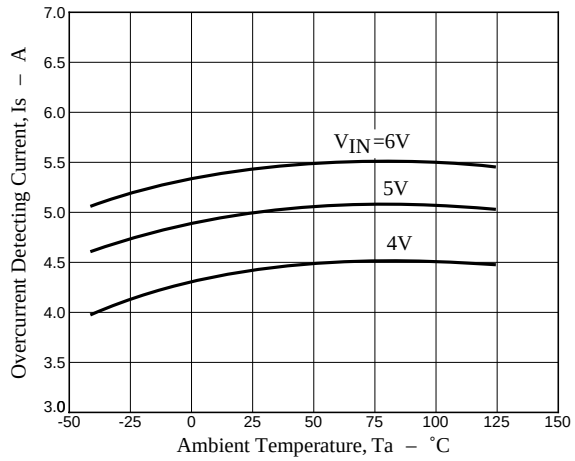




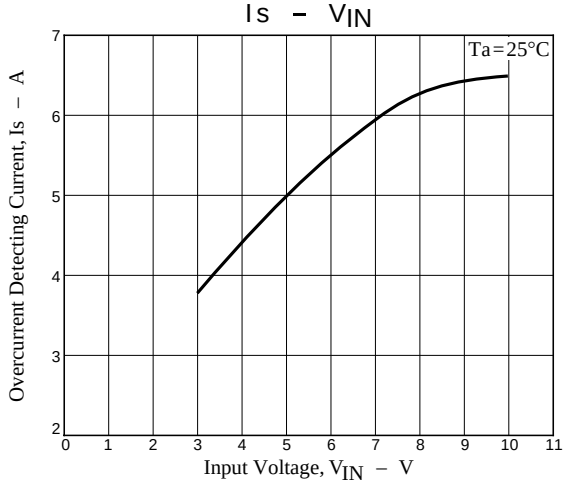




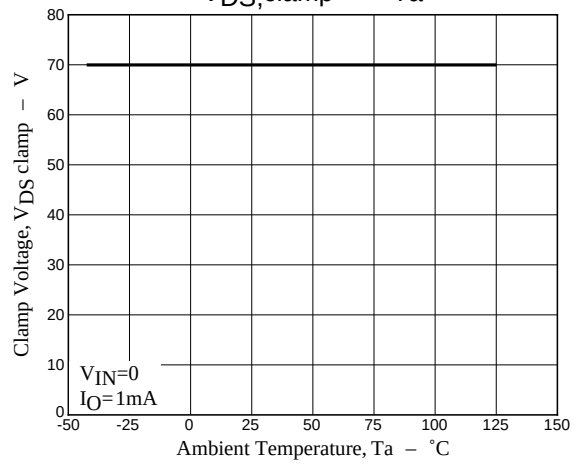
Is – Ta



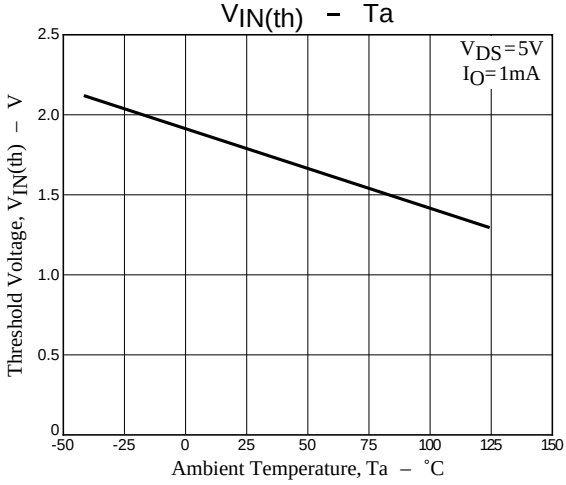
Is – VIN



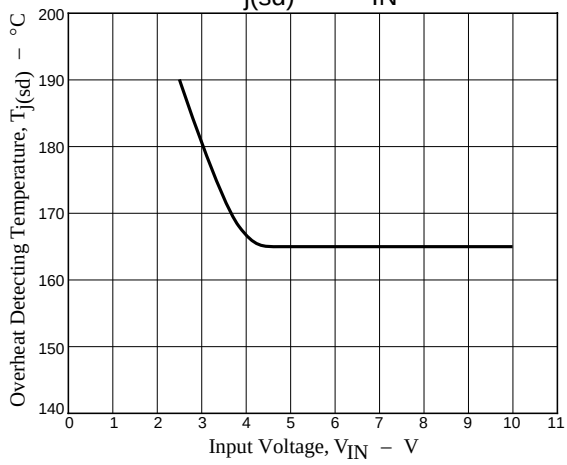
VDS,clamp – Ta



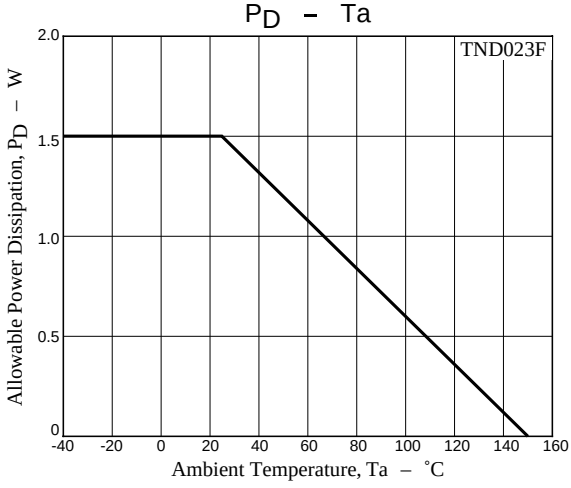
VIN(th) – Ta



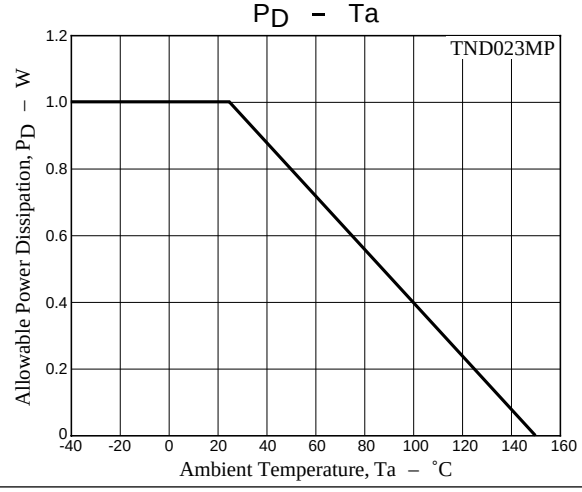
Tj(sd) – VIN



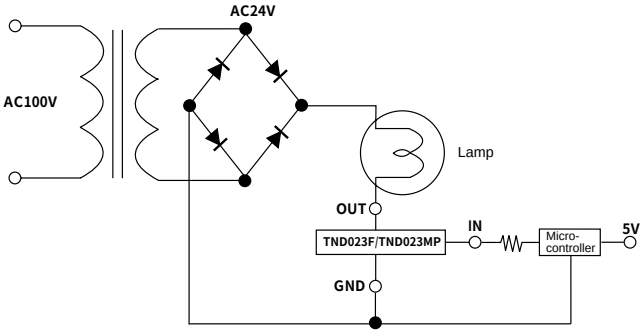
PD – Ta



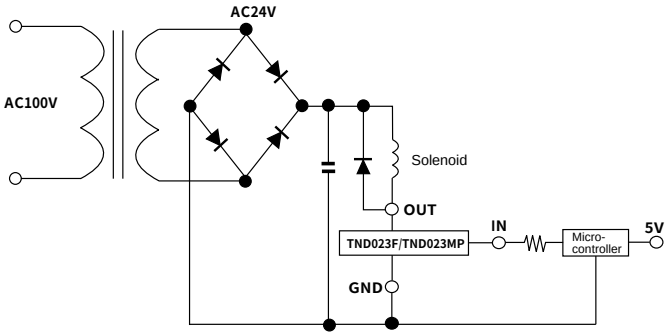
PD – Ta



Sample Application Circuit



Another Sample Application Circuit (solenoid drive)



Operation Description

1.The output power MOSFET will be turned on when the input voltage exceeds the input threshold voltage (5V 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 then the lamp will be turned off.
2.The internal overcurrent protection function shuts down the 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 165˚C (typical).
3.Shutdown state will be kept after overheat and overcurrent protections operation and the system will be reset when the input voltage goes to or below the reset voltage (1.0V).
4.As an example of application circuit, DC voltage can also be controlled as a solenoid drive.