

# TND027SW

## Excellent Power Device

Lowside Power Switch Lamp-, Solenoid-, and Motor-Driving, Dual SOIC8



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### Features

- N-channel MOSFET built in
- Overheat protection (Self recovery type)
- Overcurrent protection (Self recovery type current limiting function)
- Overvoltage protection
- Incorporates two sets of circuit
- Halogen free compliance

### Specifications

Absolute Maximum Ratings at  $T_a=25^\circ\text{C}$

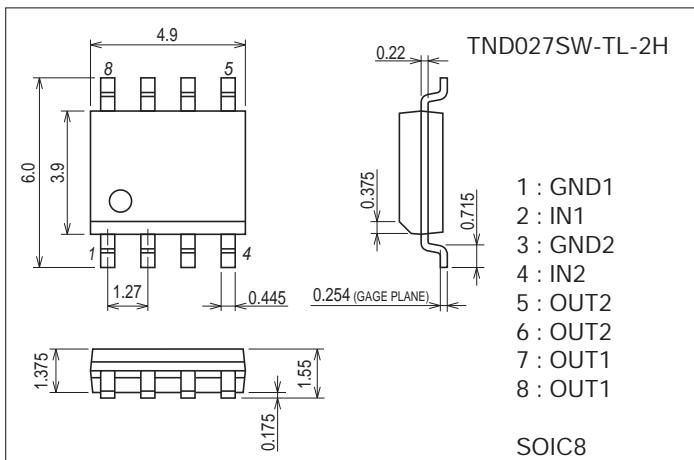
Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DS}$		60	V
Output Current	$I_O(\text{DC})$		1.5	A
Input Voltage	$V_{IN}$		-0.3 to +10	V
Allowable Power Dissipation	PD	When mounted on ceramic substrate (1200mm <sup>2</sup> x 0.8mm) 1 unit	1.3	W
		When mounted on ceramic substrate (1200mm <sup>2</sup> x 0.8mm)	1.7	W
Operating Supply Voltage	$V_{DS(\text{opr})}$		40	V
Operating Temperature	$T_{OPR}$		-40 to +85	°C
Junction Temperature	$T_J$		150	°C
Storage Temperature	$T_{STG}$		-55 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### Package Dimensions

unit : mm (typ)

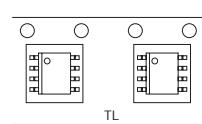
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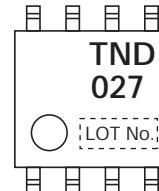
### Product & Package Information

- Package : SOIC8
- JEITA, JEDEC : SC-87, SOT-96
- Minimum Packing Quantity : 2,500 pcs./reel

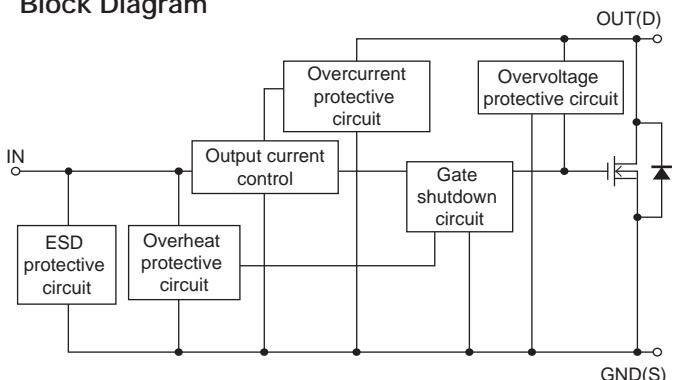
### Packing Type: TL



### Marking



### Block Diagram



Electrical Characteristics at  $T_a=25^\circ\text{C}$ 

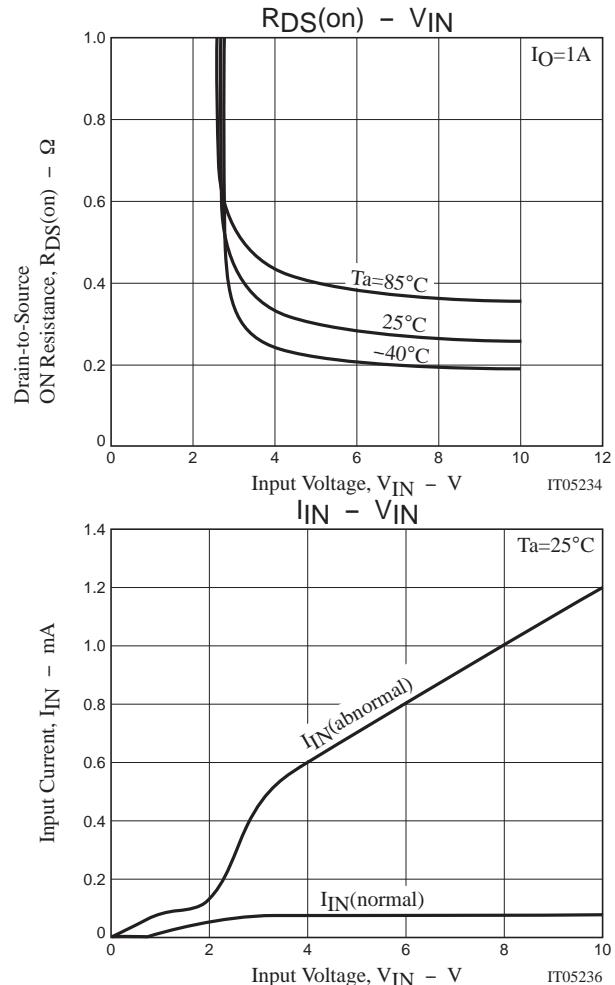
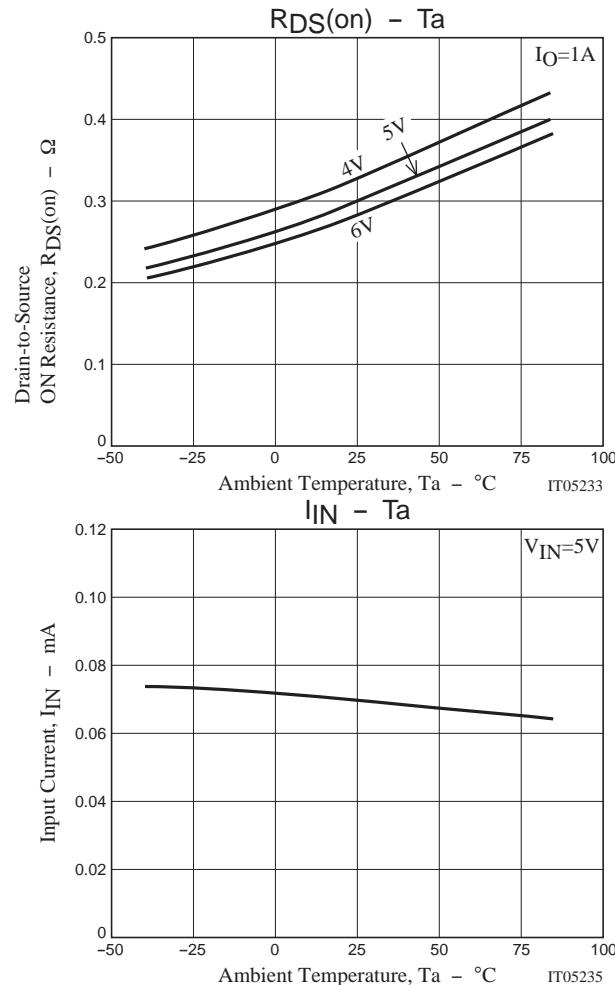
Parameter	Symbol	Conditions	Ratings			Unit
			min.	typ.	max.	
Drain-to-Source Clamp Voltage	$V_{DS, \text{clamp}}$	$V_{IN}=0\text{V}, I_O=1\text{mA}$	60			V
Output-OFF Current	$I_{DSS1}$	$V_{IN}=0\text{V}, V_{DS}=50\text{V}$			10	$\mu\text{A}$
	$I_{DSS2}$	$V_{IN}=0\text{V}, V_{DS}=12\text{V}$			5	$\mu\text{A}$
Input Threshold Voltage	$V_{IN(\text{th})}$	$V_{DS}=5\text{V}, I_O=1\text{mA}$	1.0	1.5	2.0	V
Protection Circuit Operating Input Voltage	$V_{IN(\text{opr})}$		4		10	V
Drain-to-Source ON Resistance	$R_{DS(\text{on})}$	$V_{IN}=5\text{V}, I_O=1\text{A}$		0.3	0.4	$\Omega$
Input Current (Output On)	$I_{IN}$	$V_{IN}=5\text{V}$			0.6	mA
Over-Heat Detecting Temperature	$T_j(\text{sd})$	$V_{IN}=5\text{V}, I_O=1\text{A}$	120	150	190	$^\circ\text{C}$
Over-Current Detecting Current	$I_s$	$V_{IN}=5\text{V}$	3.0	6.0	9.0	A
Over-Current Limit (Peak)	$I_{LMT}$	$V_{IN}=5\text{V}$	3.0	6.0	9.0	A
Input Clamp Voltage	$V_{IN, \text{clamp}}$	$I_{IN}=1\text{mA}$	10			V

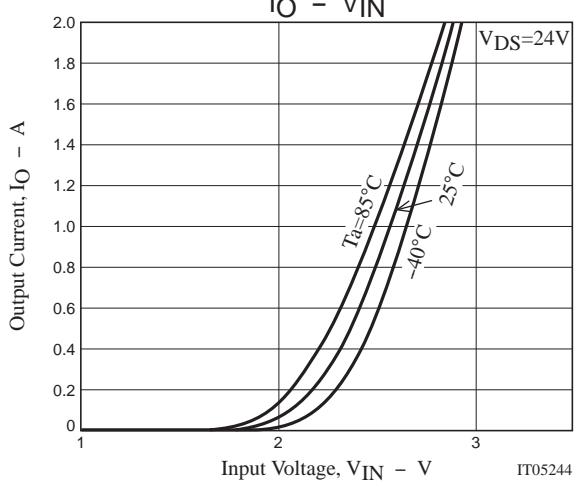
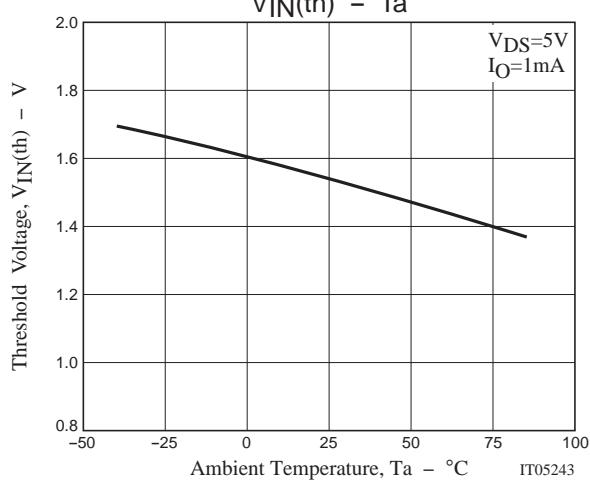
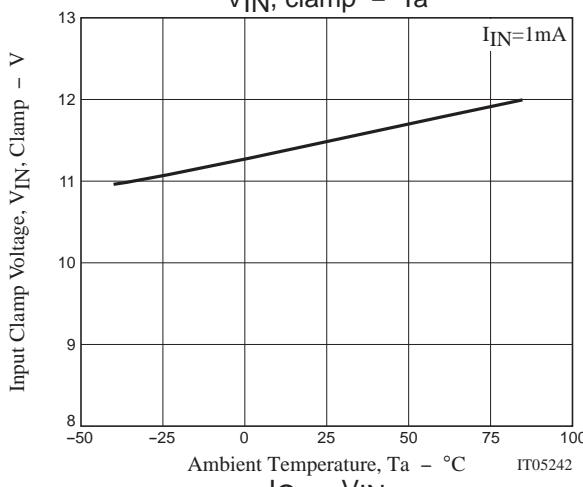
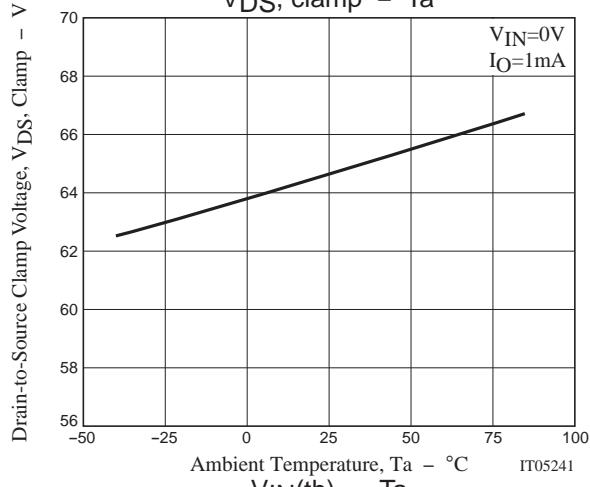
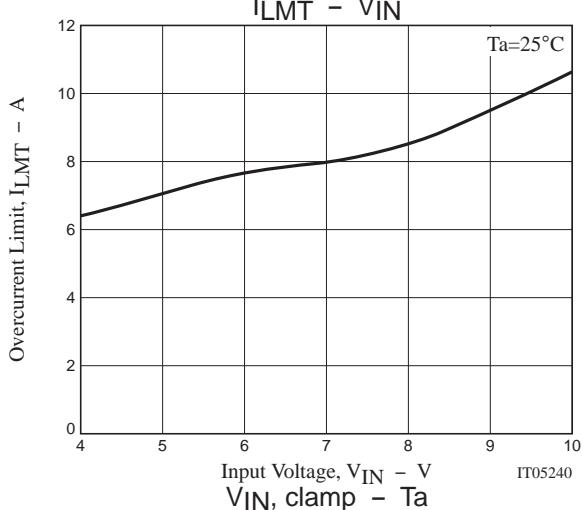
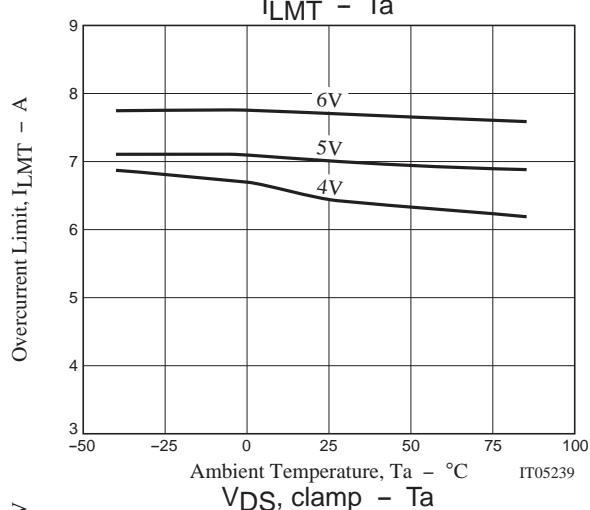
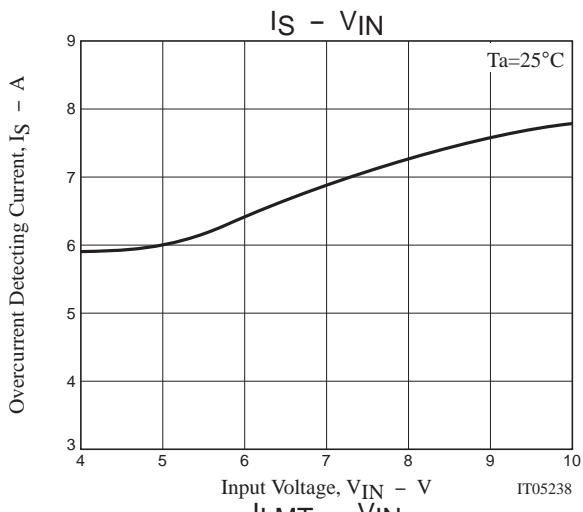
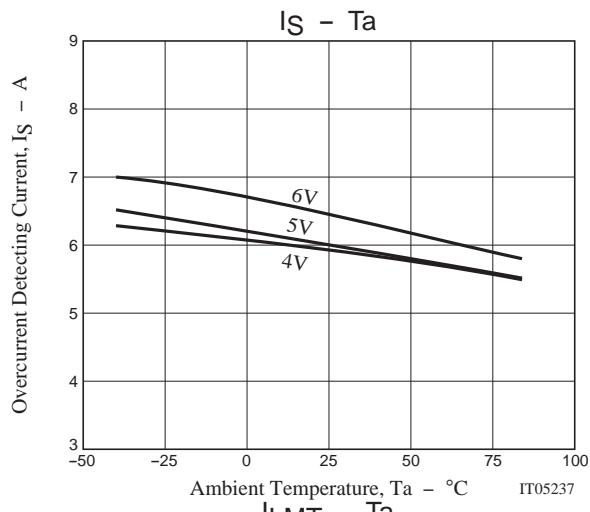
Notes : 1. Overcurrent protection circuit limits the output current to the range of overcurrent limit value.

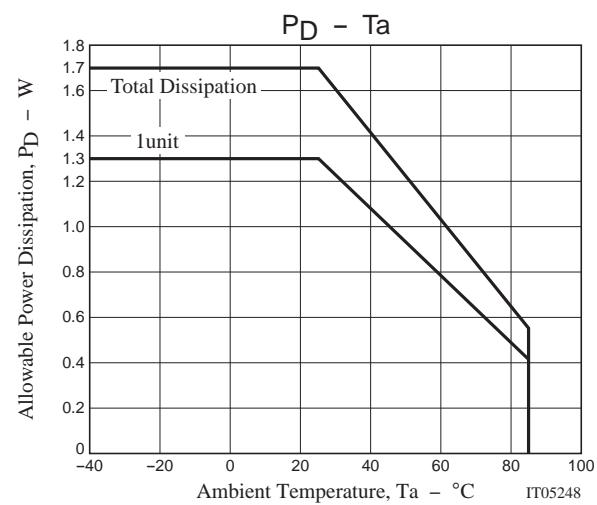
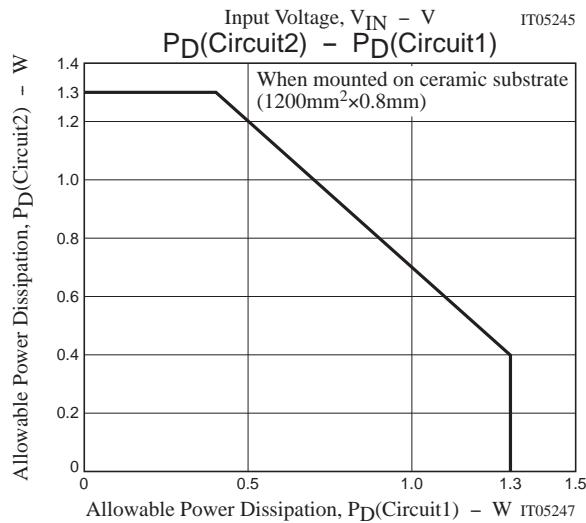
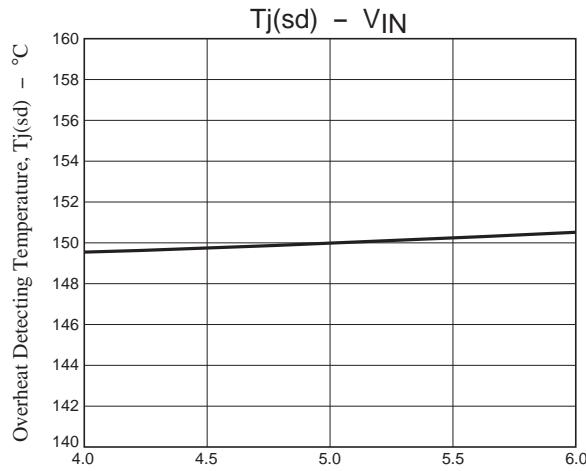
2. During overheat protecting operation, output current is turned off.

## Ordering Information

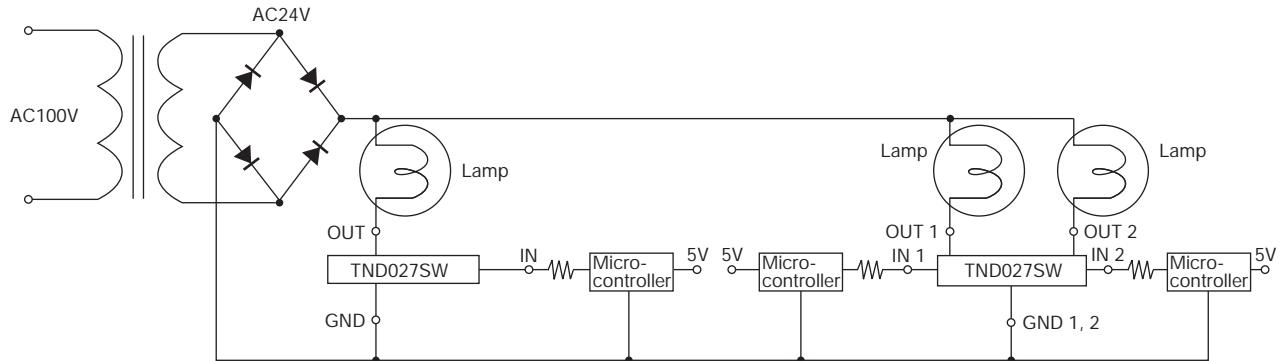
Devices	Package	Shipping	memo
TND027SW-TL-2H	SOIC8	2,500pcs./reel	Pb Free and Halogen Free



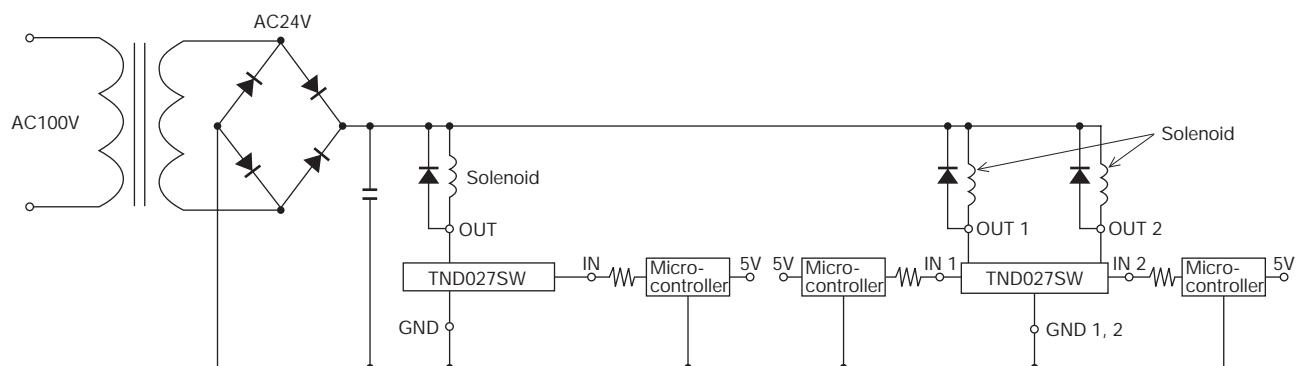




## Sample Application Circuit



## 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 turning off the current of output power MOSFET when  $T_j$  comes to  $150^{\circ}\text{C}$  (typical).
- As an example of application circuit, DC voltage can also be controlled as a solenoid drive.

## Addition

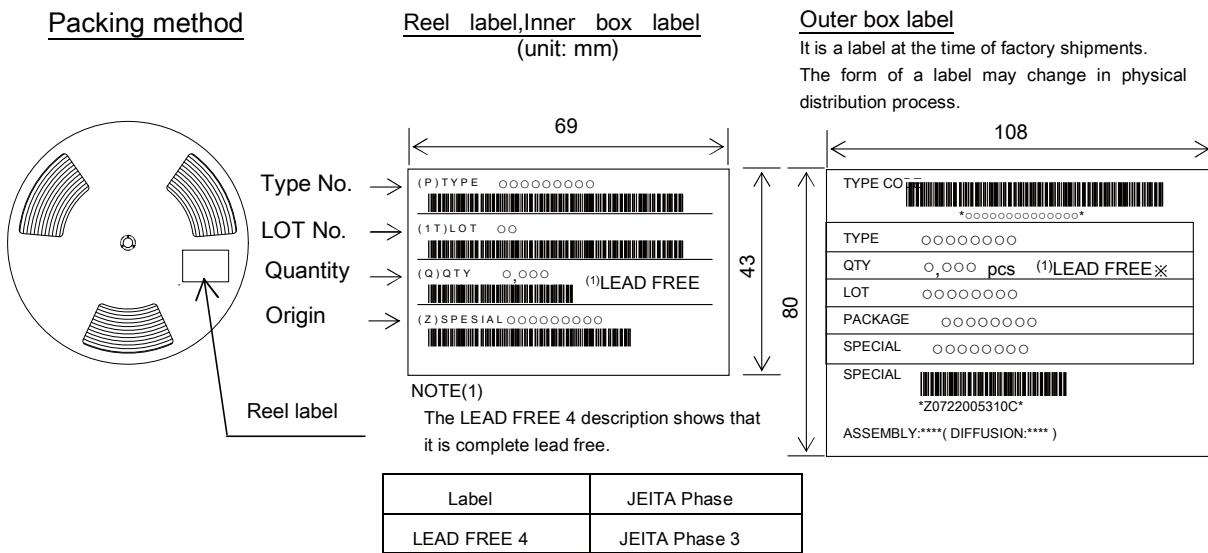
- The diode between OUT and GND in the block diagram is parasitic diode of the MOSFET.
- Not apply a voltage on IN terminal during the period when OUT voltage is lower than GND voltage when driving a solenoid or a motor.
- Be sure to connect a diode between OUT terminal and GND terminal when you want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

## Taping Specification

TND027SW-TL-2H

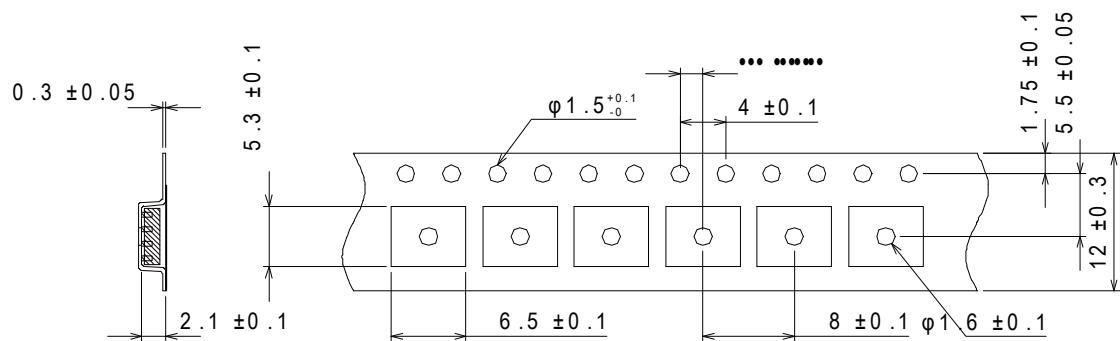
## 1. Packing Format

Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX W206-112	Outer BOX W207-124
SOIC8	B202-101	2,500	12,500	25,000	5 reels contained Dimensions :mm(external) 340×95×340	2 inner boxes contained Dimensions :mm(external) 360×210×375

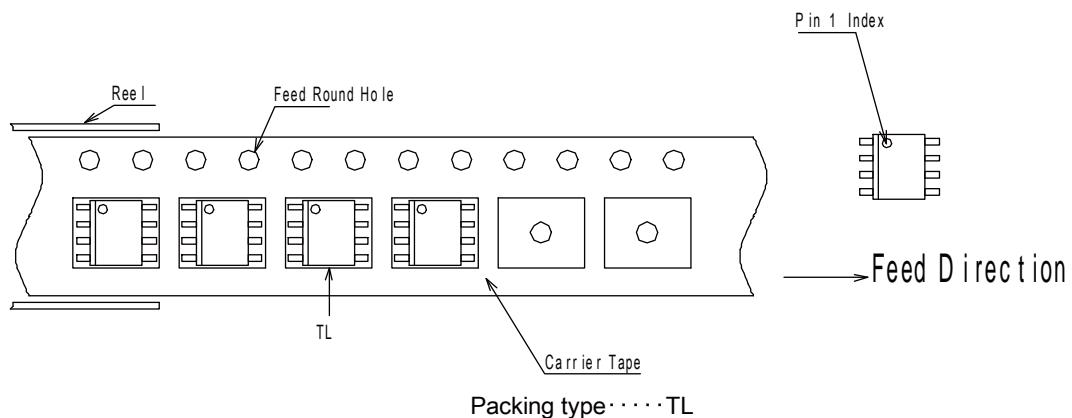


## 2. Taping configuration

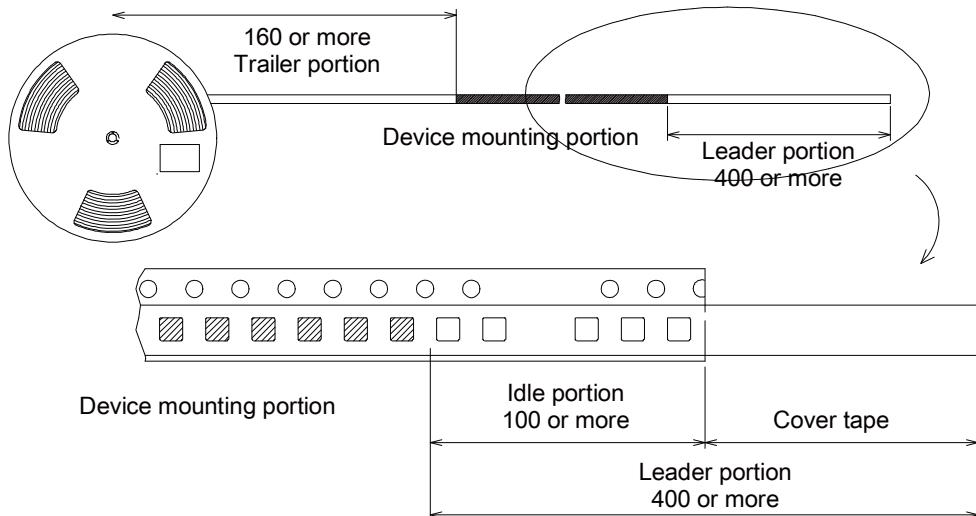
## 2-1. Carrier tape size (unit: mm)



## 2-2. Device placement direction

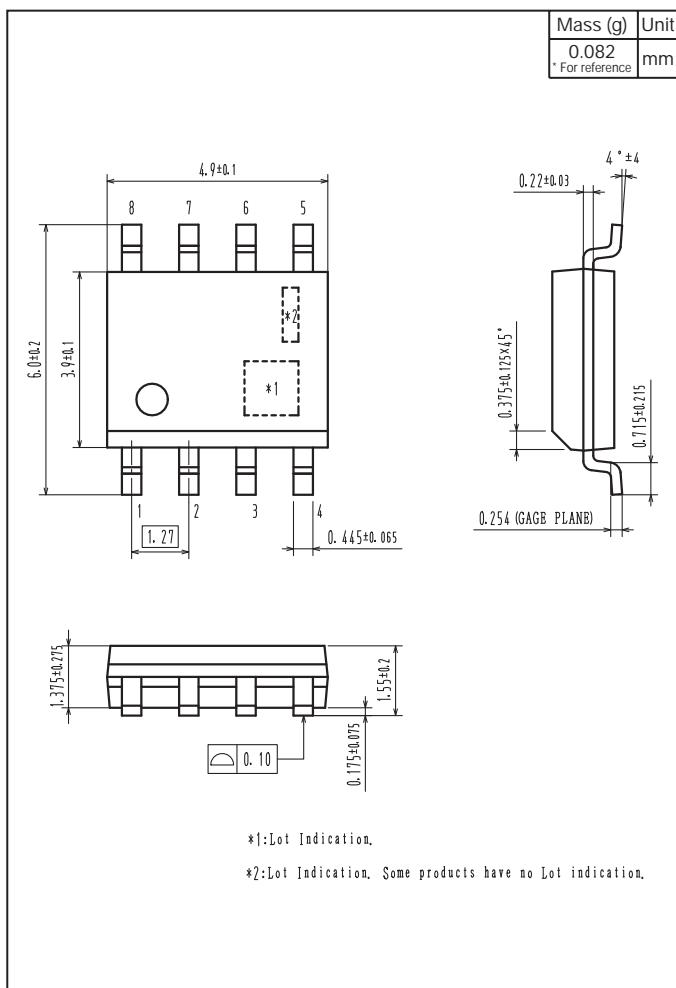


## 2-3. Leader portion and trailer portion (unit: mm)

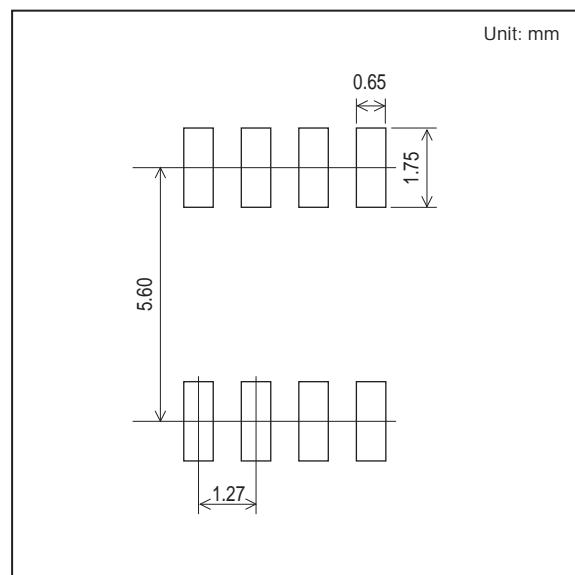


## Outline Drawing

TND027SW-TL-2H



## Land Pattern Example



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