Ordering number : EN7691C

TND027MP

Excellent Power Device

Lowside Power Switch Lamp-, Solenoid-, and Motor-Driving, Single MP

ON Semiconductor®

http://onsemi.com

Features

- N-channel MOSFET built in
- Overheat protection. (Self recovery type)
- Overcurrent protection. (Self recovery type current limiting function)
- Overvoltage protection

Specifications

Absolute Maximum Ratings at Ta=25°C

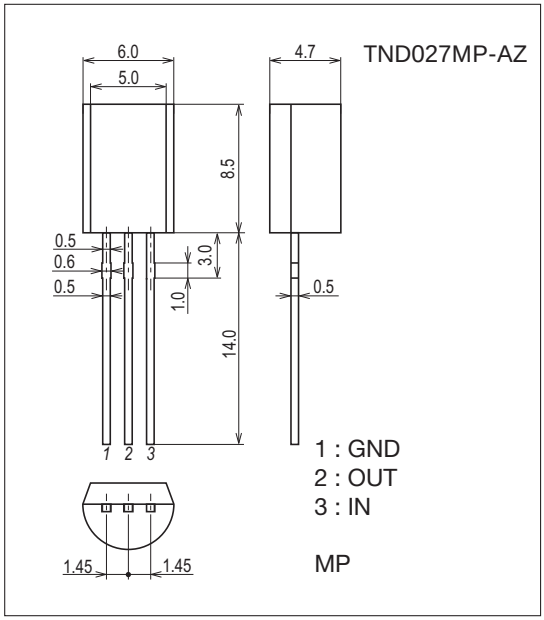
Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DS}		60	V
Output Current	I_O(DC)		1.5	A
Input Voltage	V_{IN}		-0.3 to +10	V
Allowable Power Dissipation	P_D		1.0	W
Operating Supply Voltage	V_{DS}(opr)		40	V
Operating Temperature	Topr		-40 to +85	°C
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		-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)

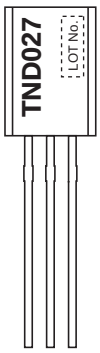
7520-003



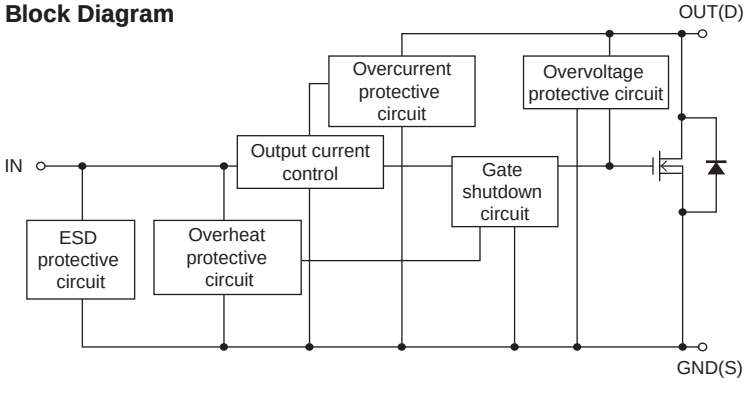
Product & Package Information

- Package : MP
- JEITA, JEDEC : SC-51, TO-92(1-WATT), TO-226AE
- Minimum Packing Quantity : 1,000 pcs./box

Marking



Block Diagram



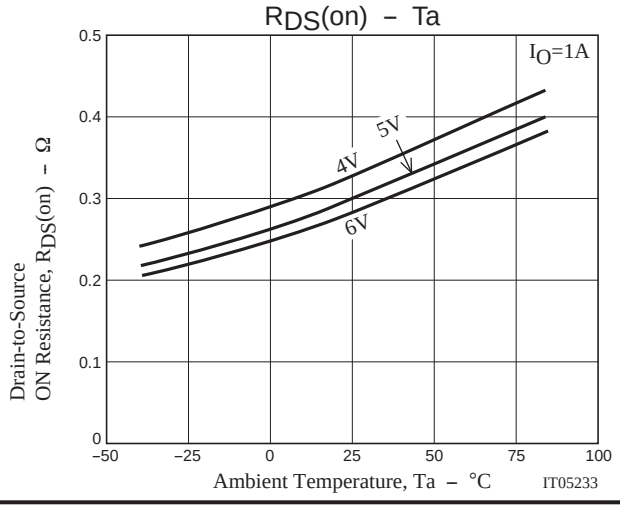
Electrical Characteristics at Ta=25°C

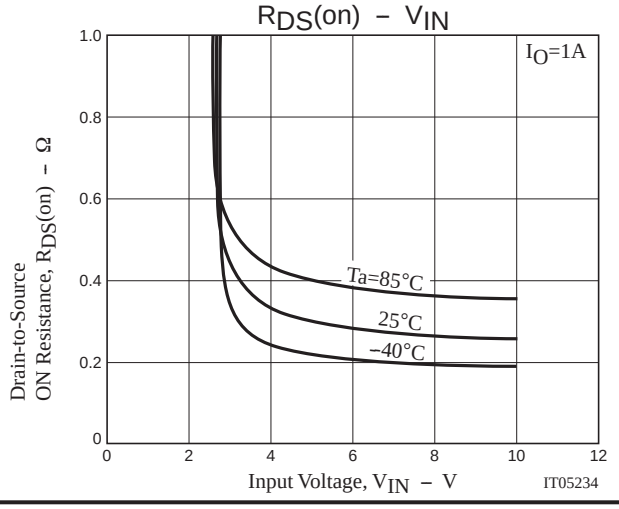
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Clamp Voltage	V_{DS}, clamp	V_{IN}=0V, I_O=1mA	60			V
Output-OFF Current	I_{DSS}(1)	V_{IN}=0V, V_{DS}=50V			10	μA
	I_{DSS}(2)	V_{IN}=0V, V_{DS}=12V			5	μA
Input Threshold Voltage	V_{IN}(th)	V_{DS}=5V, I_O=1mA	1.0	1.5	2.0	V
Protection 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			0.6	mA
Over-Heat Detecting Temperature	Tj(sd)	V_{IN}=5V, I_O=1A	120	150	190	°C
Over-Current Detecting Current	Is	V_{IN}=5V	3.0	6.0	9.0	A
Over-Current Limit (Peak)	I_{LMT}	V_{IN}=5V	3.0	6.0	9.0	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 turned off.

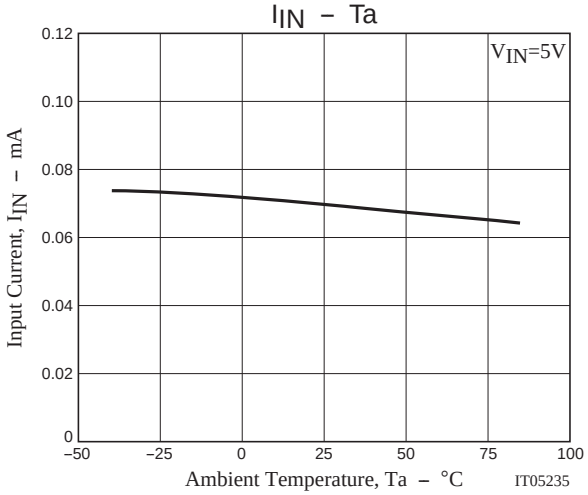
Ordering Information

Device	Package	Shipping	memo
TND027MP-AZ	MP	1,000pcs./box	Pb Free

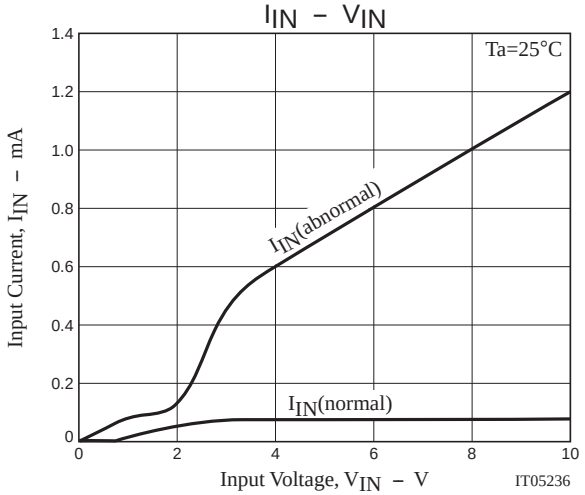




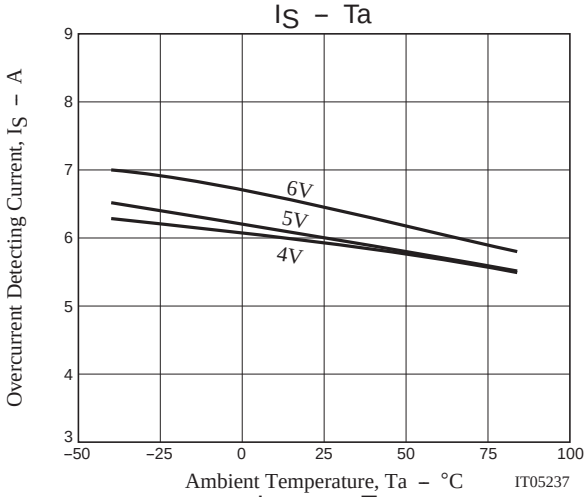
I_{IN} – Ta



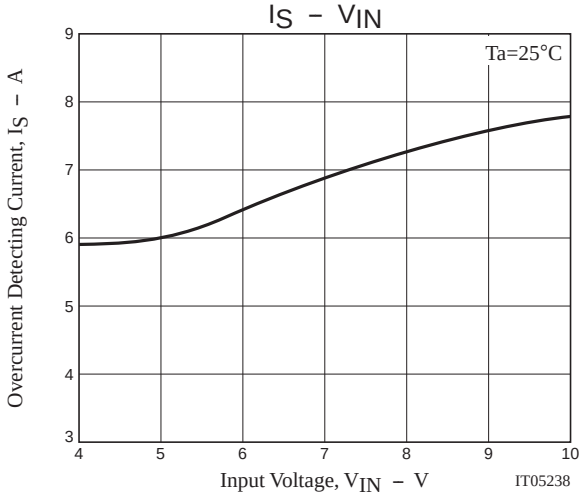
I_{IN} – V_{IN}



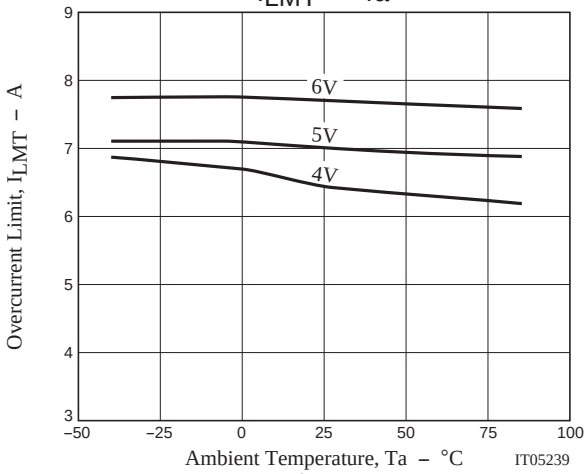
I_S – Ta



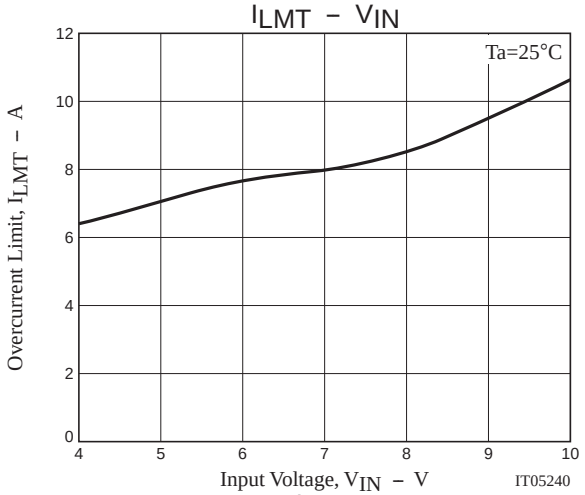
I_S – V_{IN}



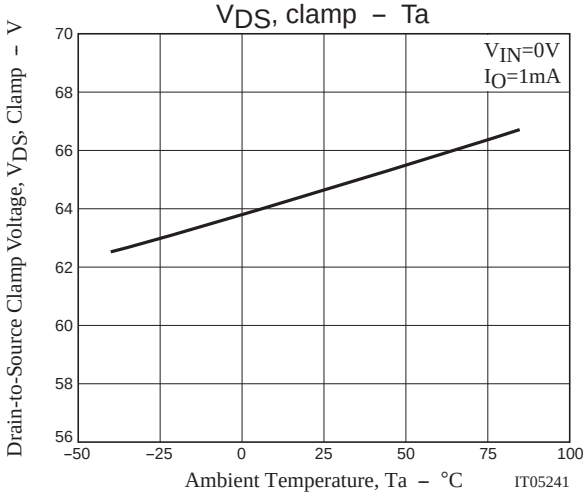
I_{LMT} – Ta



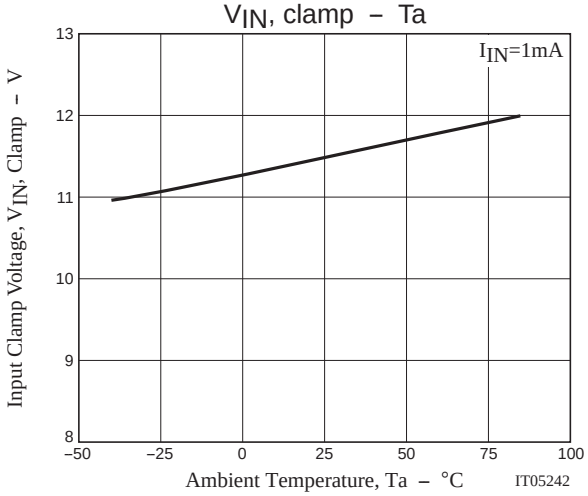
I_{LMT} – V_{IN}

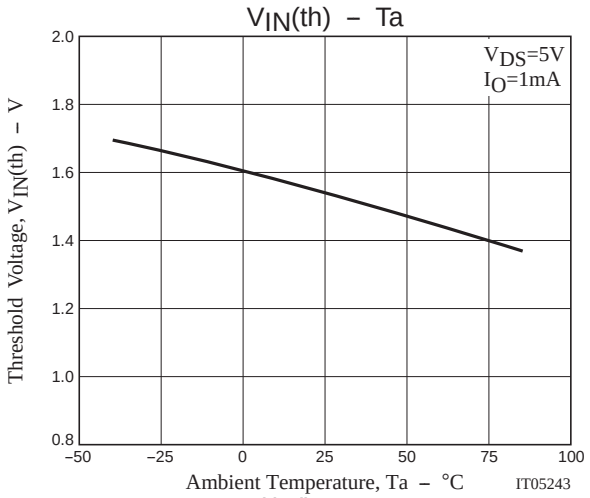


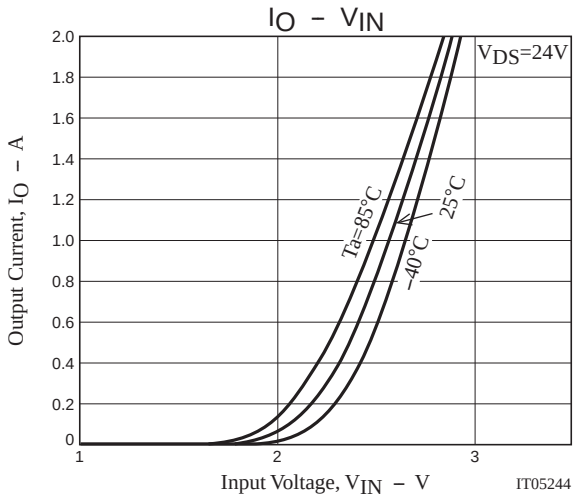
V_{DS}, clamp – Ta

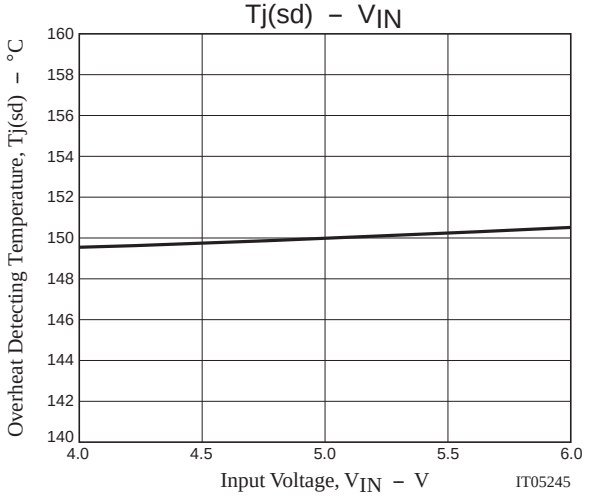


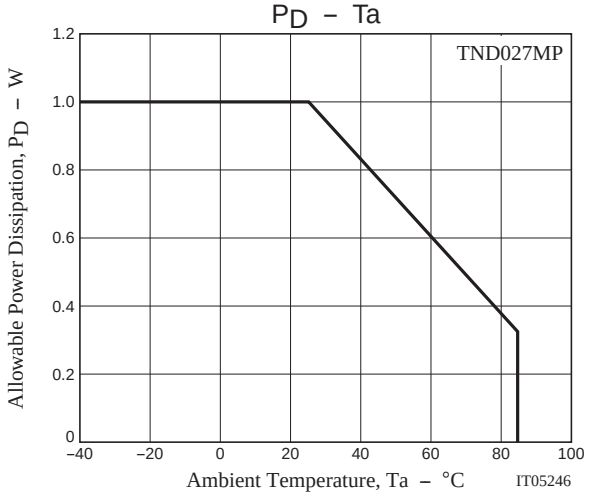
V_{IN}, clamp – Ta



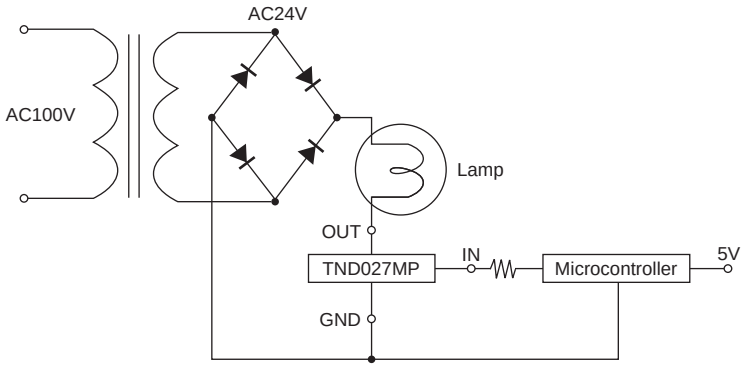




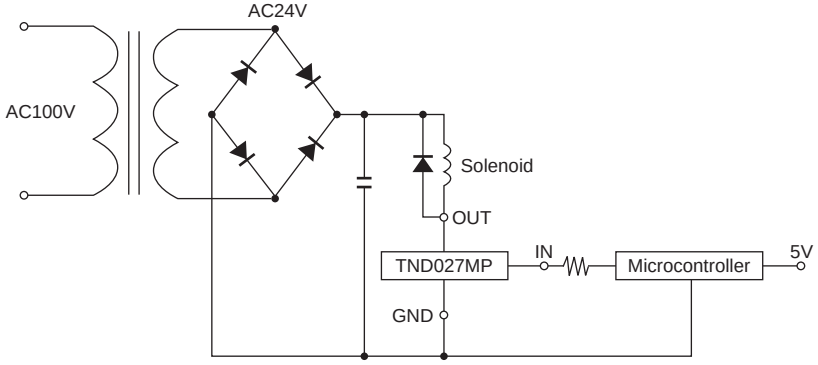




Sample Application Circuit



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 Tj comes to 150°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 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).

Taping Specification

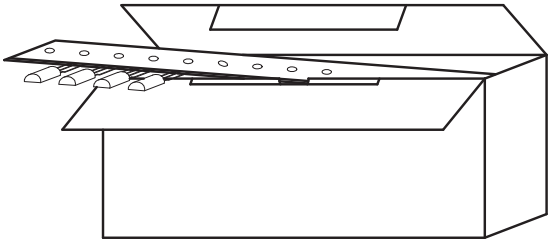
TND027MP-AZ

1. Packing Format

Package Name	Packing Type	Maximum Number of devices contained (pcs)		Packing format	
		Inner BOX	number of contained	Outer Box (C-14)	Outer Box (C-15)
MP	AE/AZ	C-3 Dimensions:mm (external) 330×45×125	1,000	16inner Box contained (16,000pcs) Dimensions:mm (external) 500×345×195	8inner Box contained (8,000pcs) Dimensions:mm (external) 345×260×195
	AJ	C-5 Dimensions:mm (external) 330×45×245	2,000	8inner Box contained (16,000pcs) Dimensions:mm (external) 500×345×195	4inner Box contained (8,000pcs) Dimensions:mm (external) 345×260×195

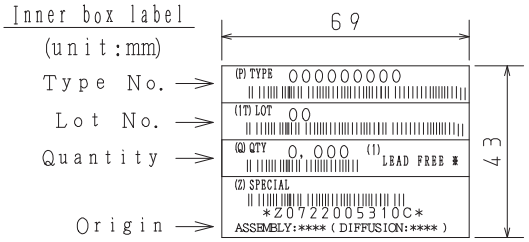
Packing method

Put zigzag folding in an inner box.



Inner box label

(unit:mm)

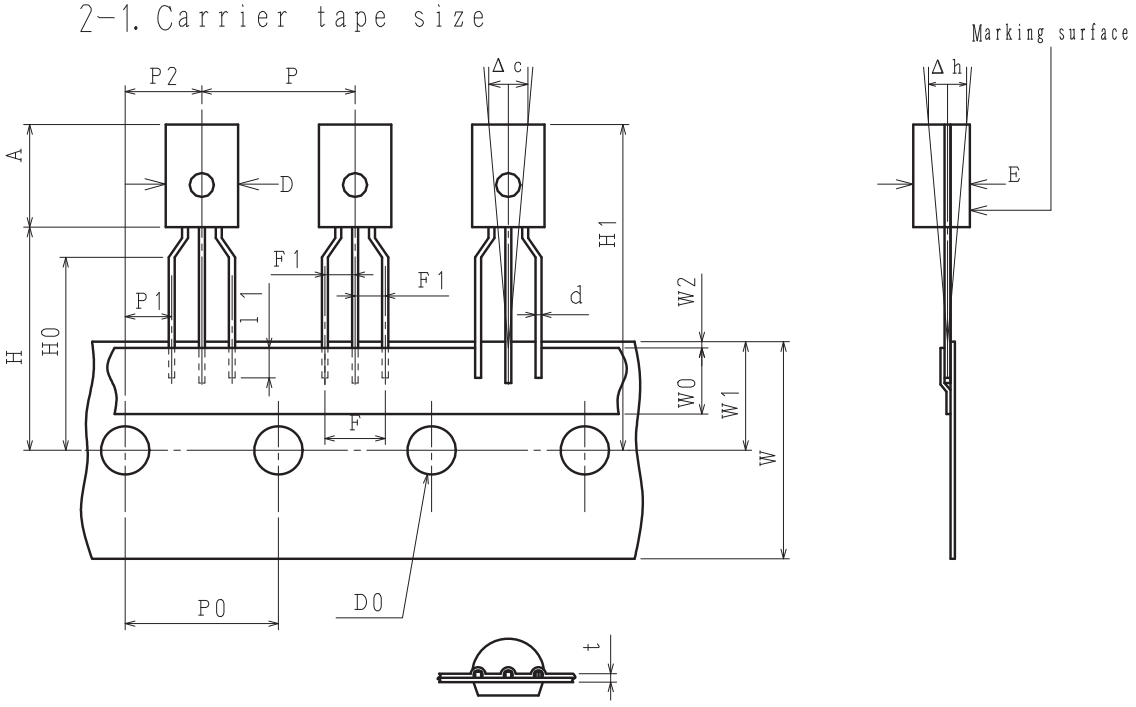


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping specifications

2-1. Carrier tape size



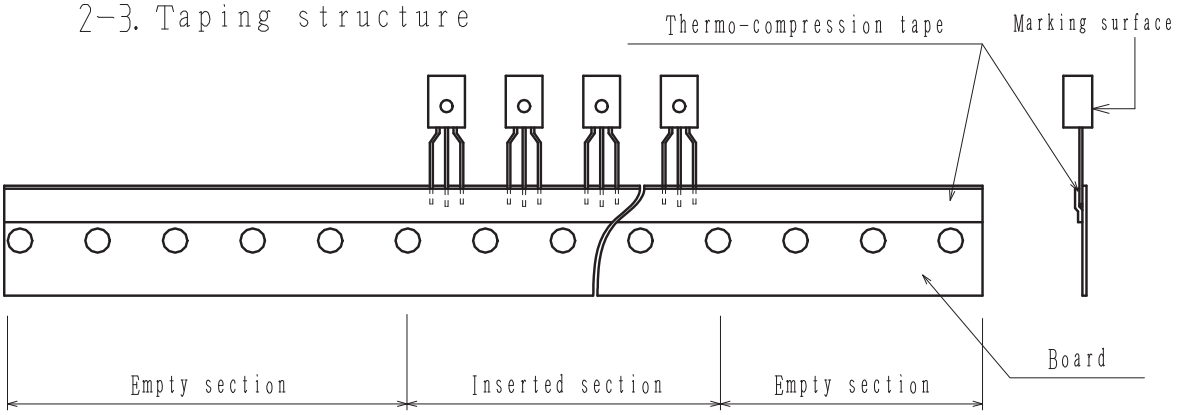
2-2. Taping size standard

unit:mm

Item	Symbol	Standard	Tolerance	
Work piece outside diameter	D	6.0	±0.2	
	E	4.7	±0.2	
Work piece height	A	8.5	±0.2	
Lead wire diameter	d	0.5×0.5t	±0.1	
Bonded lead wire	l1	2.5MIN		
Pitch between products	P	12.7	±1.0	
Pitch between perforations	P0	12.7	±0.2	
Accumulation Pitch	P0×20	254.0	±1.0	
Distance between lead wire	F	5.0	+0.8 −0.2	
Lead wire pitch distance	F1	2.5	+0.4 −0.1	
Product inclination	△h	0	±2.0	
Displacement of perforations	P1	3.85	±0.3	Measurement position is the bottom of the clinch
	P2	6.35	±0.3	
Displacement of tape	W2	0.5MAX		Not to be displaced to the outside of the board

Item	Symbol	Standard	Tolerance
Tape width	W	18.0	+1.0 −0.5
Adhesive tape	W0	6.0	±1.5
Displacement of perforations	W1	9.0	±0.5
Work piece bottom surface position	H	18.5	±1.0
Insert stopper position	H0	16.0	±0.5
Work piece upper limit position	H1	27.0	±1.5
Perforations diameter	D0	φ4.0	±0.2
Tape thickness	t	0.7	±0.2
Product inclination	△c	0	±1.5

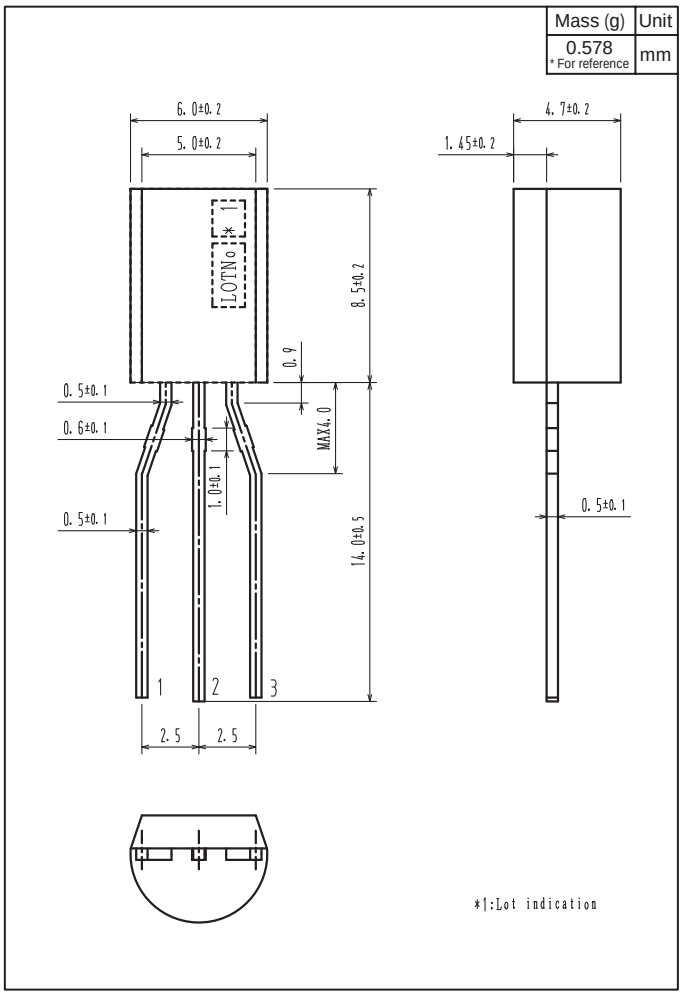
2-3. Taping structure



・Provide 3~5 empty sections in the leading and end portions of the tape.

Outline Drawing

TND027MP-AZ



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