

# WPH4003-1E Datasheet



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DiGi Electronics Part Number	WPH4003-1E-DG
Manufacturer	<a href="#">onsemi</a>
Manufacturer Product Number	WPH4003-1E
Description	MOSFET N-CH 1700V 2.5A TO3PF
Detailed Description	N-Channel 1700 V 2.5A (Tc) 3W (Ta), 55W (Tc) Through Hole TO-3PF



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DiGi is a global authorized distributor of electronic components.

## Purchase and inquiry

Manufacturer Product Number:

WPH4003-1E

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

1700 V

Drive Voltage (Max Rds On, Min Rds On):

10V

Vgs(th) (Max) @ Id:

-

Vgs (Max):

±30V

FET Feature:

-

Operating Temperature:

150°C (TJ)

Supplier Device Package:

TO-3PF

Base Product Number:

WPH4003

Manufacturer:

onsemi

Product Status:

Obsolete

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

2.5A (Tc)

Rds On (Max) @ Id, Vgs:

10.50hm @ 1.5A, 10V

Gate Charge (Qg) (Max) @ Vgs:

48 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

850 pF @ 30 V

Power Dissipation (Max):

3W (Ta), 55W (Tc)

Mounting Type:

Through Hole

Package / Case:

TO-3P-3 Full Pack

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

Ordering number : ENA1967A



# WPH4003

## N-Channel Power MOSFET 1700V, 3A, 10.5Ω, TO-3PF-3L

ON Semiconductor®

<http://onsemi.com>

### Features

- ON-resistance  $R_{DS(on)} = 8.2\Omega$  (typ.)
- Input Capacitance  $C_{iss} = 850\text{pF}$  (typ.)
- 10V drive

### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DSS}$		1700	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 30$	V
Drain Current (DC)	$I_{DC}^{*1}$	Limited only maximum temperature $T_{ch} = 150^\circ\text{C}$	3	A
	$I_{Dpack}^{*2}$	$T_c = 25^\circ\text{C}$ (Our ideal heat dissipation condition) $^{*3}$	2.5	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	6	A
Allowable Power Dissipation	PD		3.0	W
		$T_c = 25^\circ\text{C}$	55	W
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$
Avalanche Energy (Single Pulse) $^{*4}$	EAS		49	mJ
Avalanche Current $^{*5}$	$I_{AV}$		3	A

Note :  $^{*1}$  Shows chip capability $^{*2}$  Package limited $^{*3}$  Our condition is radiation from backside.

The method is applying silicone grease to the backside of the device and attaching the device to water-cooled radiator made of aluminium.

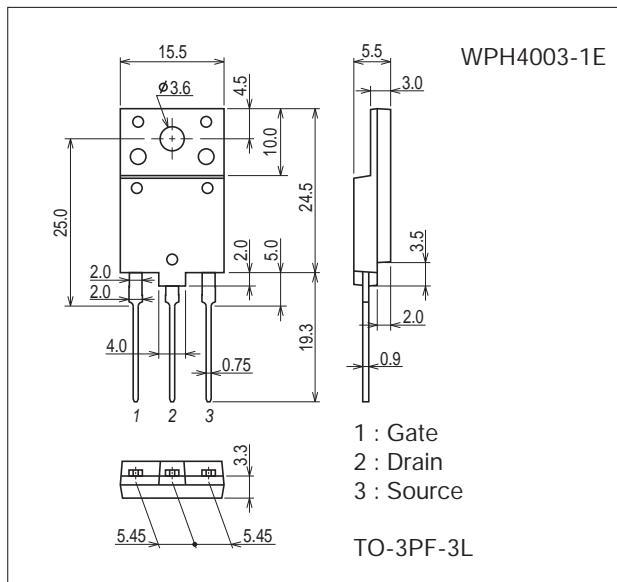
 $^{*4}$   $V_{DD} = 50\text{V}$ ,  $L = 10\text{mH}$ ,  $I_{AV} = 3\text{A}$  (Fig.1) $^{*5}$   $L \leq 10\text{mH}$ , single pulse

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)

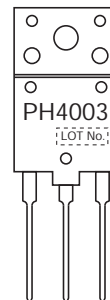
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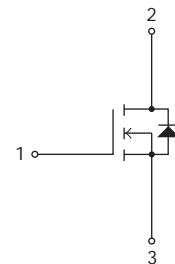
### Product & Package Information

- Package : TO-3PF-3L
- JEITA, JEDEC : SC-96
- Minimum Packing Quantity : 30 pcs./magazine

### Marking



### Electrical Connection



# WPH4003

## Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit	
			min	typ	max		
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=10mA, V_{GS}=0V$	1700			V	
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=1360V, V_{GS}=0V$			1	mA	
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 30V, V_{DS}=0V$			$\pm 100$	nA	
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10V, I_D=1mA$			4	V	
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=20V, I_D=1.5A$	1.2	2.4		S	
Static Drain-to-Source On-State Resistance	$R_{DS(on)}$	$I_D=1.5A, V_{GS}=10V$		8.2	10.5	$\Omega$	
Input Capacitance	$C_{iss}$	$V_{DS}=30V, f=1MHz$		850		pF	
Output Capacitance	$C_{oss}$				90		pF
Reverse Transfer Capacitance	$C_{rss}$				27		pF
Turn-ON Delay Time	$t_{d(on)}$	See Fig.2		19		ns	
Rise Time	$t_r$			21		ns	
Turn-OFF Delay Time	$t_{d(off)}$			200		ns	
Fall Time	$t_f$			55		ns	
Total Gate Charge	$Q_g$	$V_{DS}=200V, V_{GS}=10V, I_D=3A$		48		nC	
Gate-to-Source Charge	$Q_{gs}$			6		nC	
Gate-to-Drain "Miller" Charge	$Q_{gd}$			22		nC	
Diode Forward Voltage	$V_{SD}$	$I_S=3A, V_{GS}=0V$		0.8	1.5	V	
Reverse Recovery Time	$t_{rr}$	See Fig.3		410		ns	
Reverse Recovery Charge	$Q_{rr}$	$I_S=3A, V_{GS}=0V, di/dt=100A/\mu s$		3000		nC	

Fig.1 Unclamped Inductive Switching Test Circuit

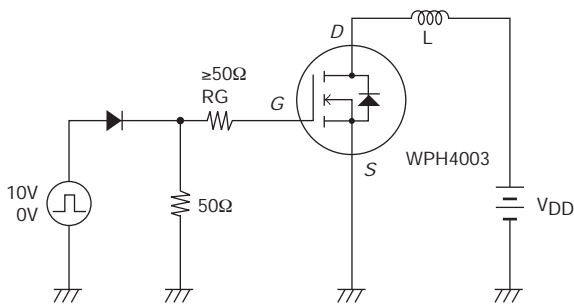


Fig.2 Switching Time Test Circuit

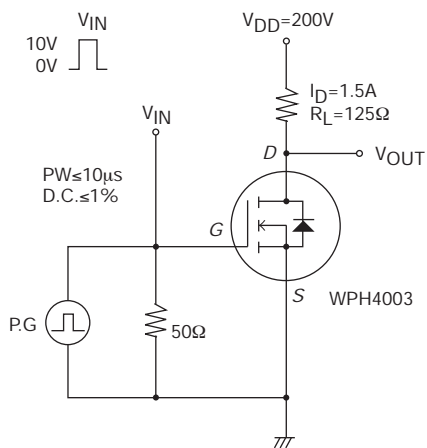
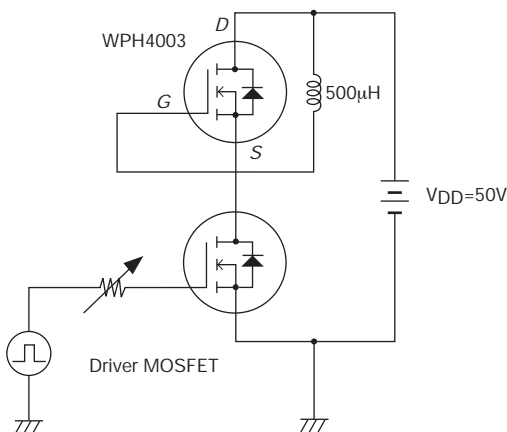


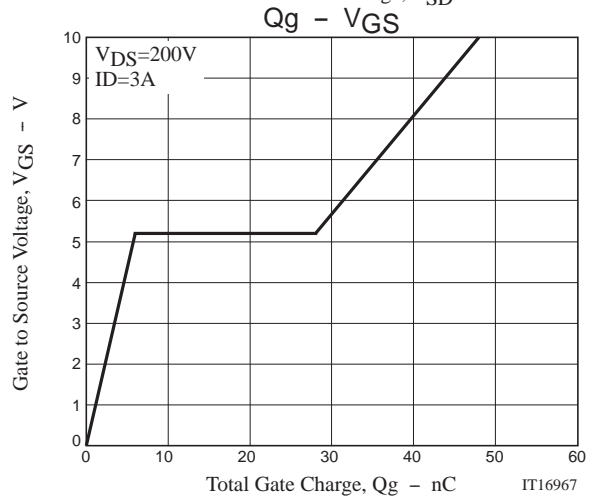
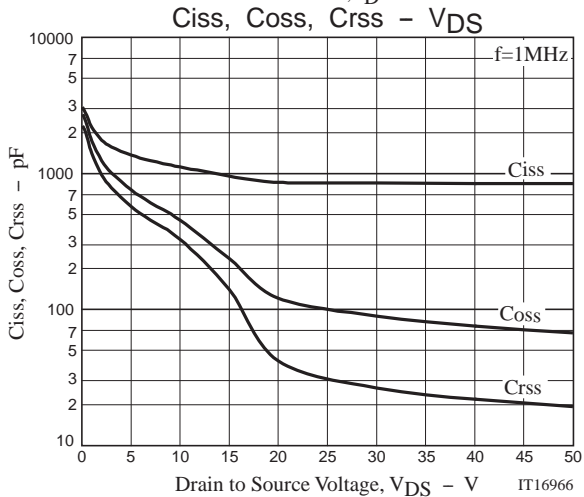
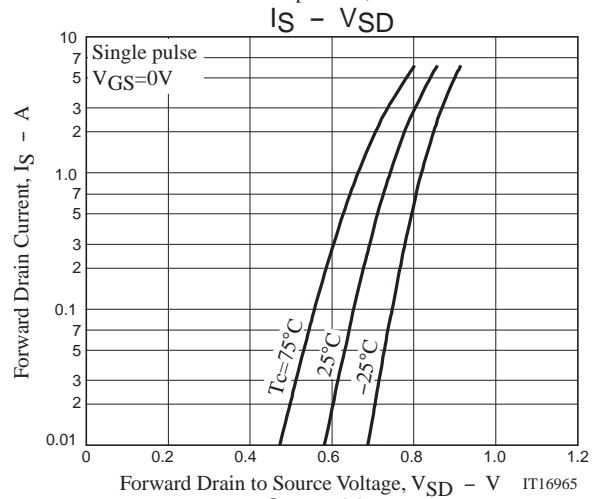
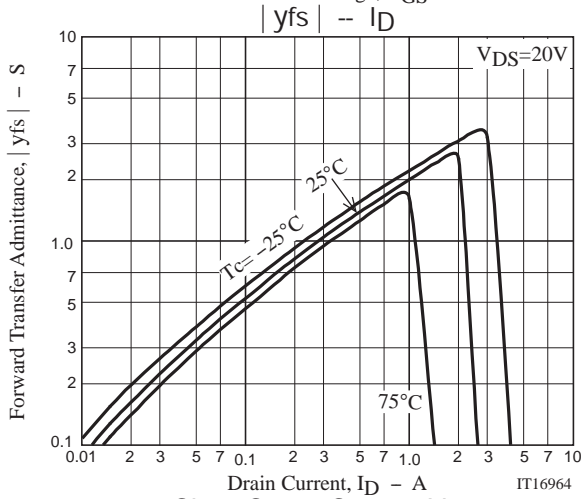
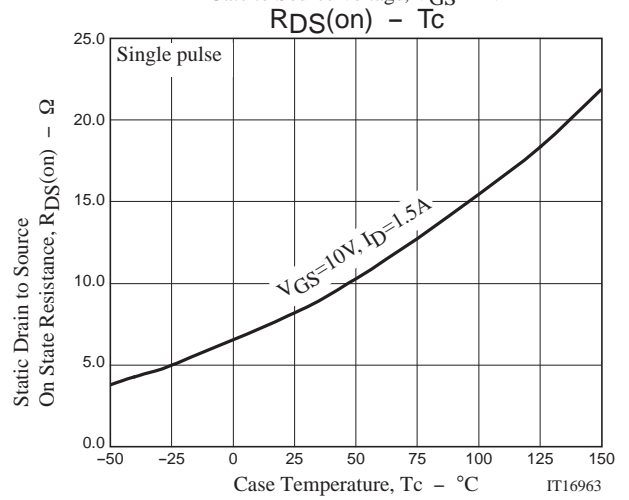
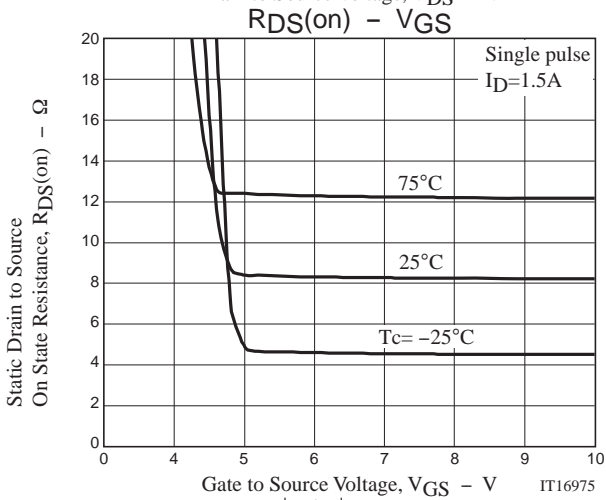
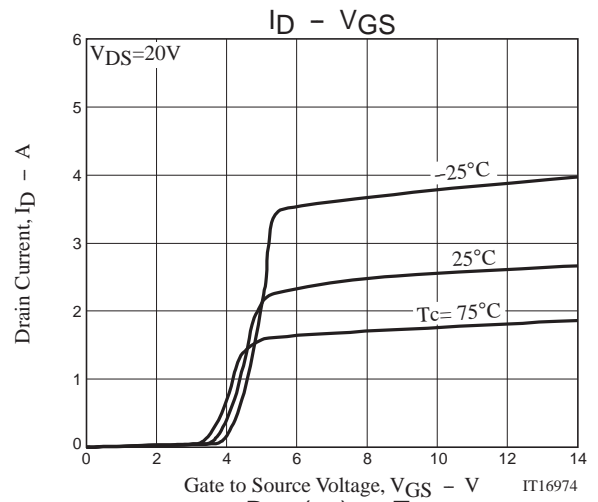
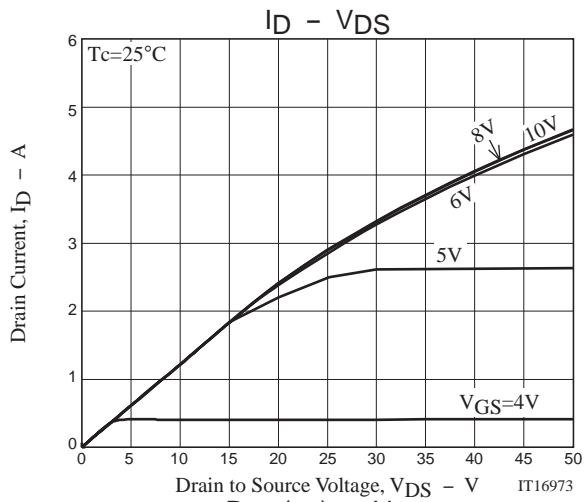
Fig.3 Reverse Recovery Time Test Circuit



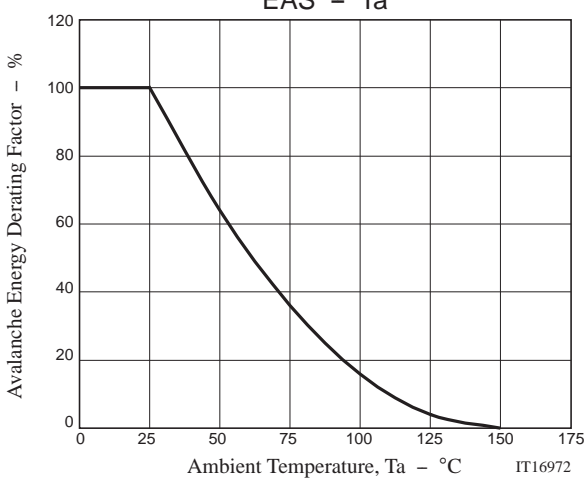
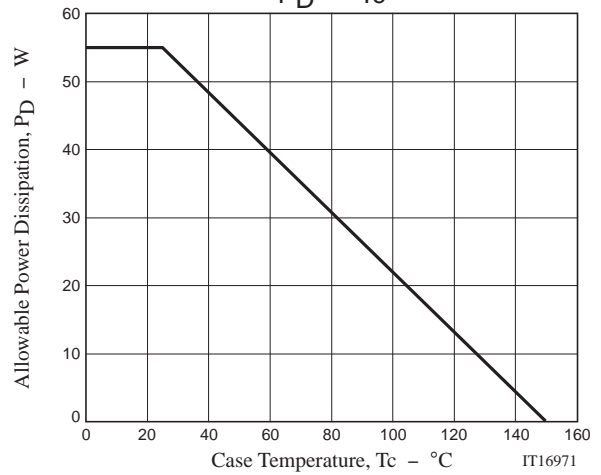
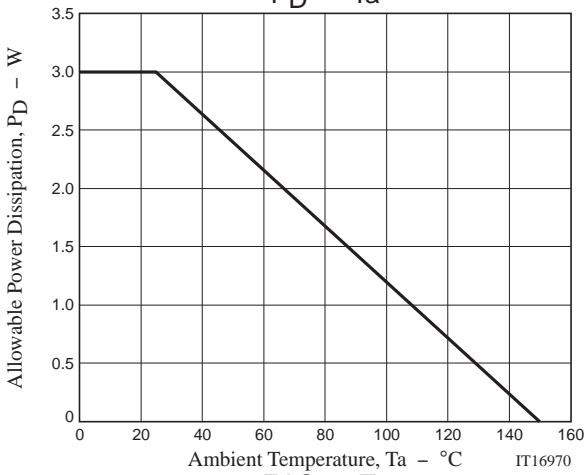
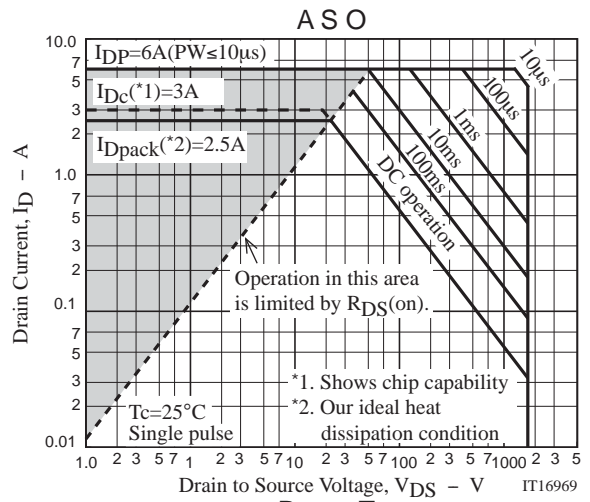
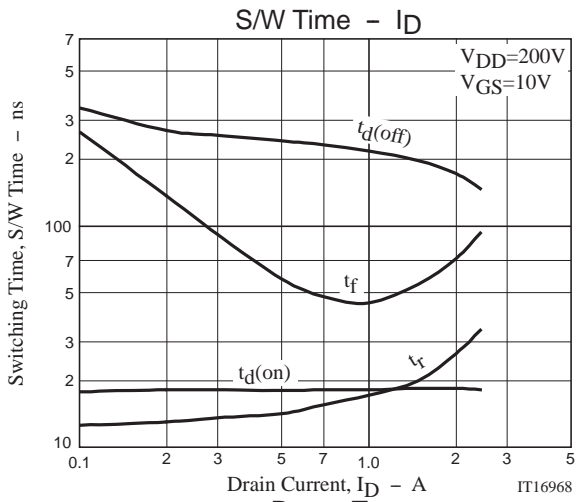
## Ordering Information

Device	Package	Shipping	memo
WPH4003-1E	TO-3PF-3L	30pcs./magazine	Pb Free

WPH4003



WPH4003



# WPH4003

## Magazine Specification

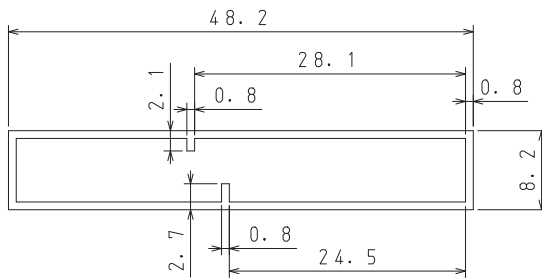
WPH4003-1E

### 1. Packing Format

Package Name	Maximum Number of devices contained (pcs)			Packing format	
	Magazine	Inner box	Outer box	Inner BOX	Outer BOX
TO-3PF-3L	30	360	1440	SPD-0V0001 12 magazines contained Dimensions:mm (external) 568×150×55	SPD-LV0010 4 inner boxes contained Dimensions:mm (external) 590×225×178

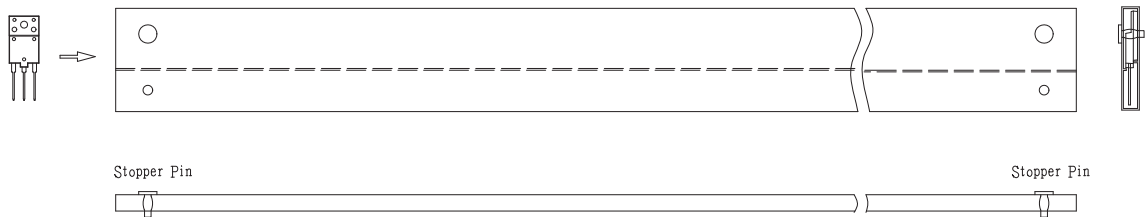
### 2. Magazine dimensions

(unit:mm)



Tolerance=±0.2mm  
 Thickness=0.8±0.2mm  
 Length =508.0±1mm  
 Material =PVC or PET  
 (Antistatic treatment)

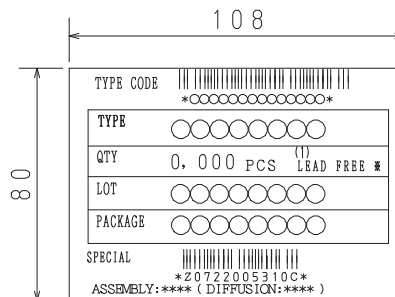
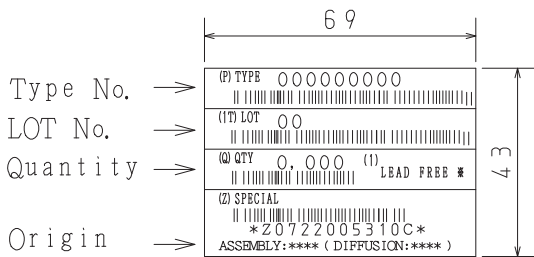
### 3. Storage method to magazine



### 4. Inner box label (unit:mm)

### 5. Outer box label (unit:mm)

It is a label at the time of factory shipments.  
 The form of a label may change in physical distribution process.



NOTE (1)

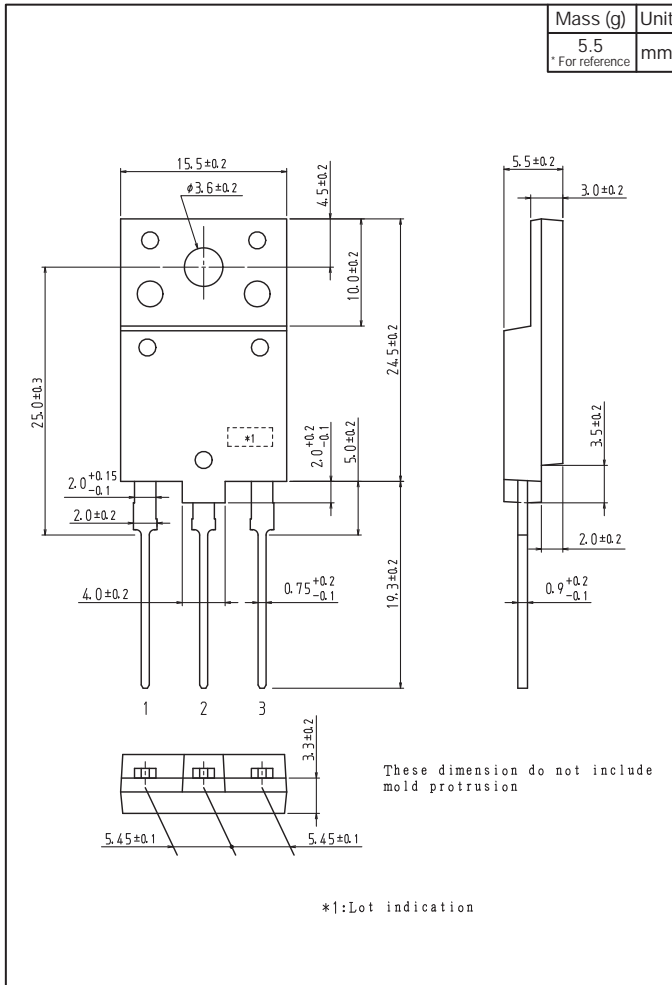
The LEAD FREE \* description shows that the surface treatment of the terminal is lead free,

Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A

WPH4003

Outline Drawing

WPH4003-1E





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**WPH4003**

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Note on usage : Since the WPH4003 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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