



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}		± 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)

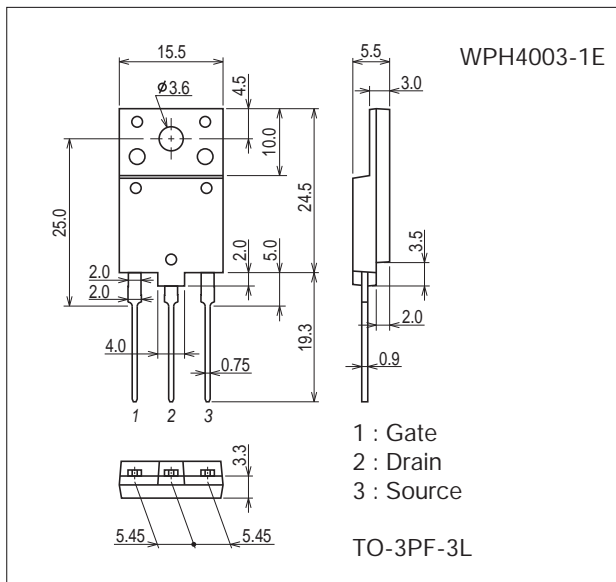
*5 $L \leq 10\text{mH}$, single pulse

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)

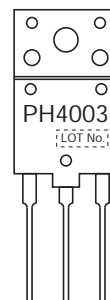
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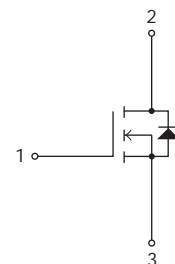
Product & Package Information

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

Marking



Electrical Connection



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}	$V_{GS}=\pm 30V, V_{DS}=0V$			± 100	nA	
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10V, I_D=1mA$	2		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	Ω	
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

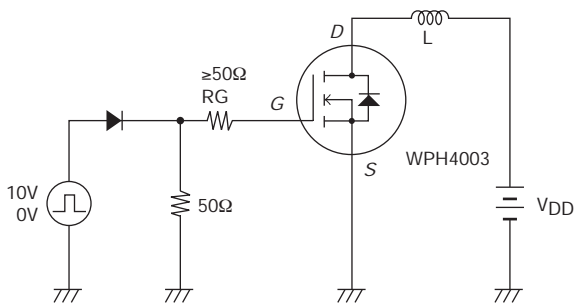


Fig.2 Switching Time Test Circuit

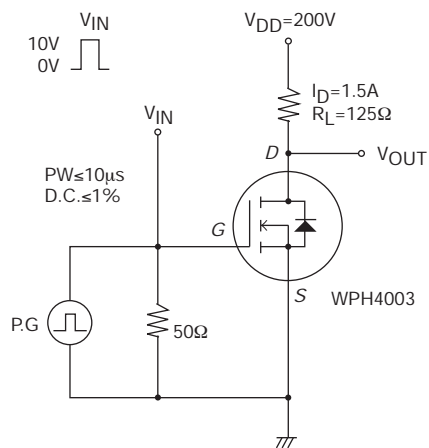
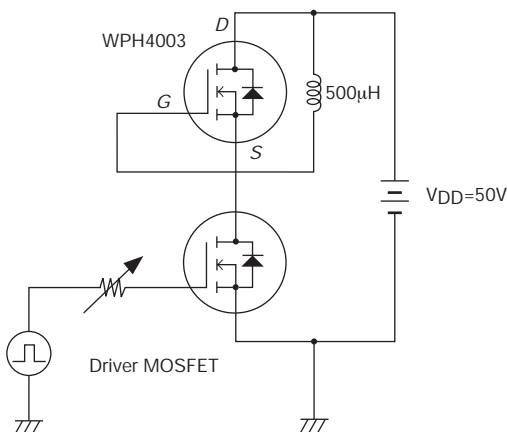
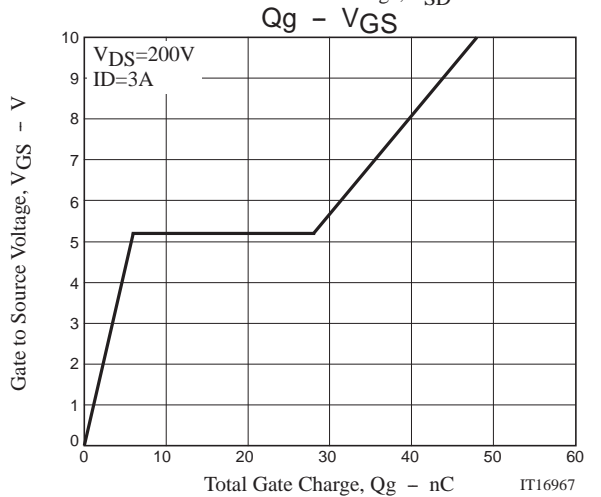
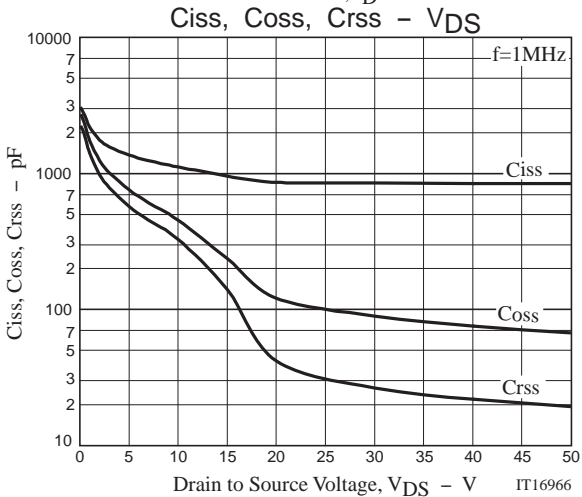
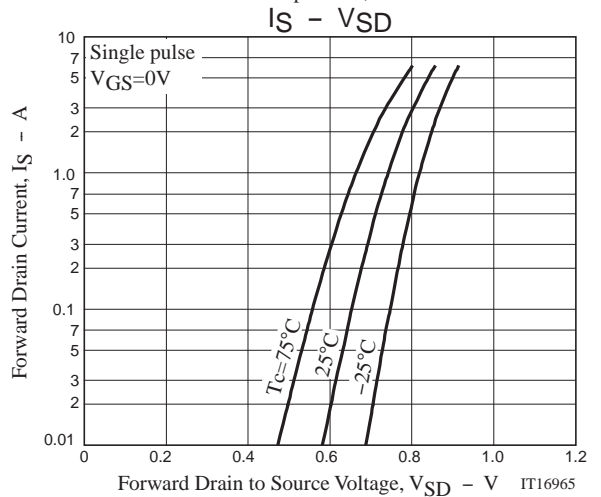
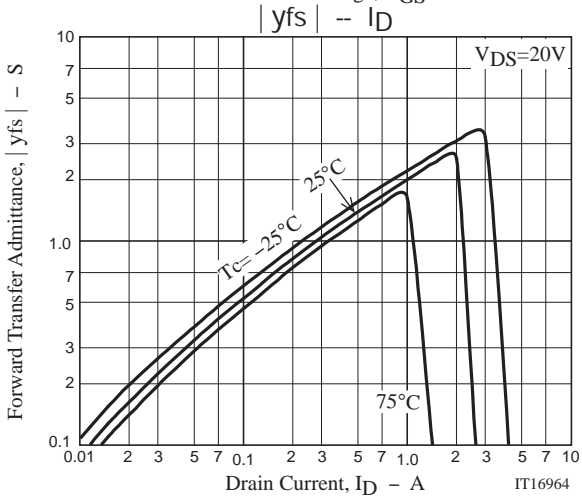
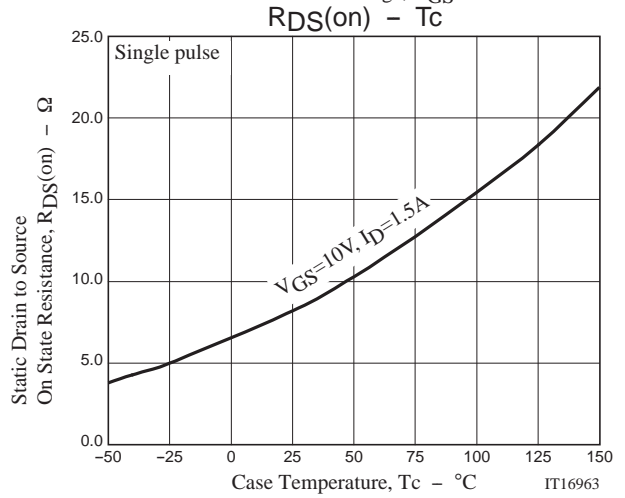
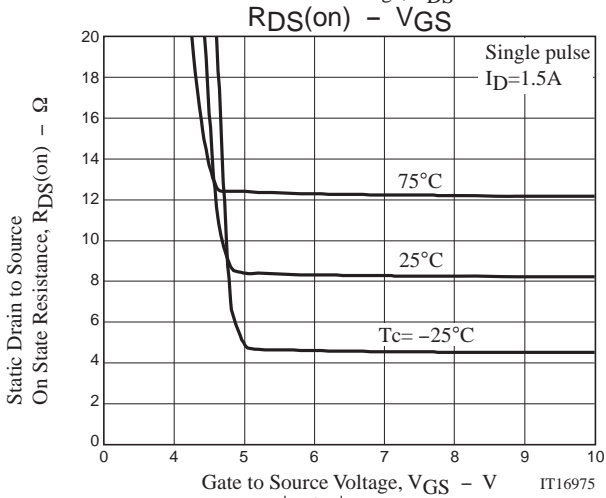
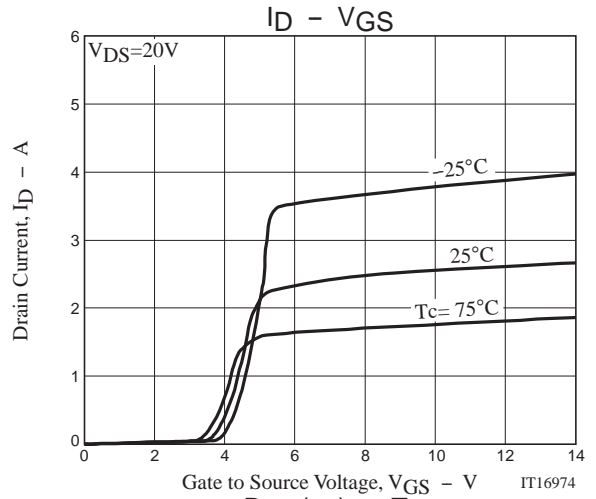
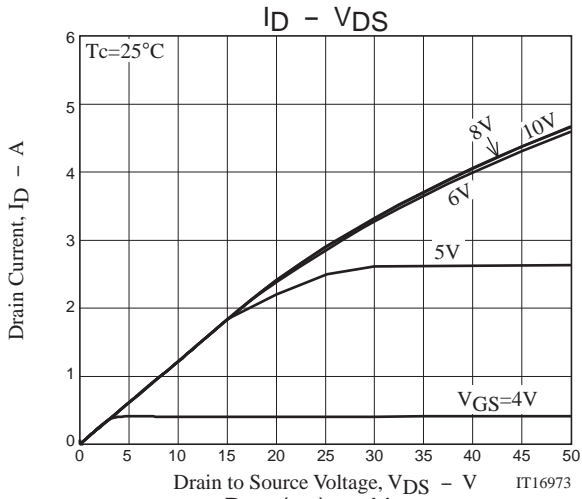


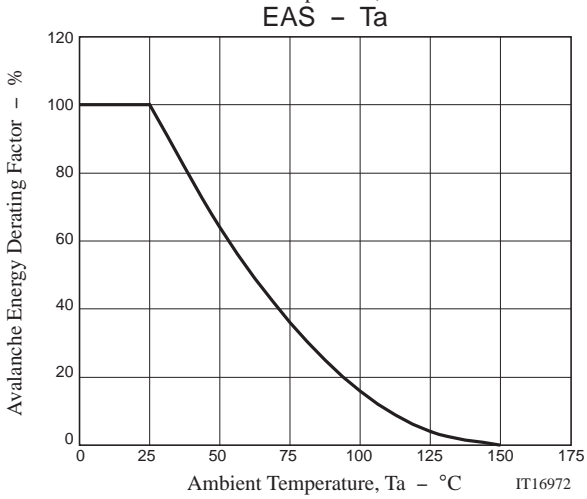
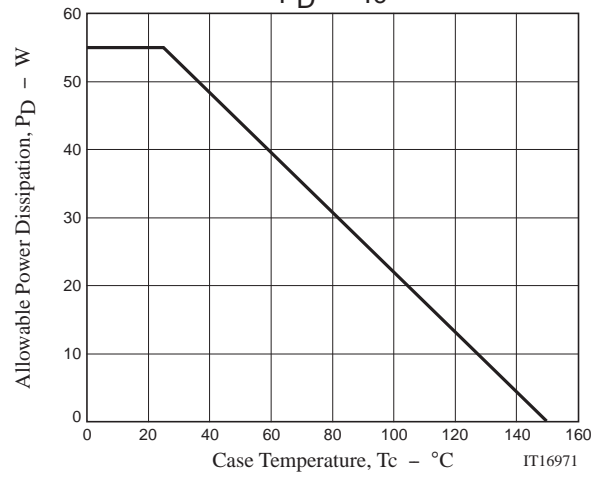
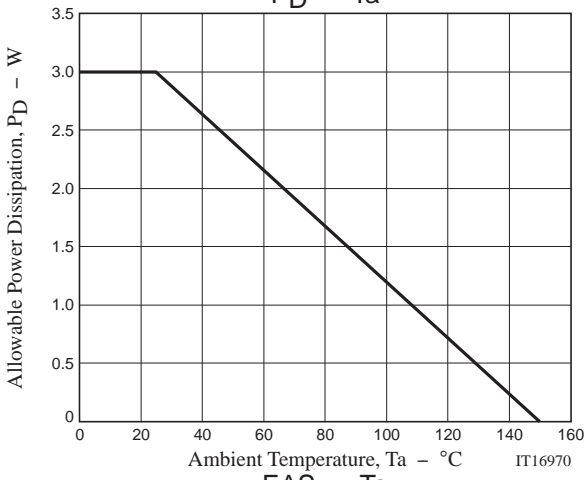
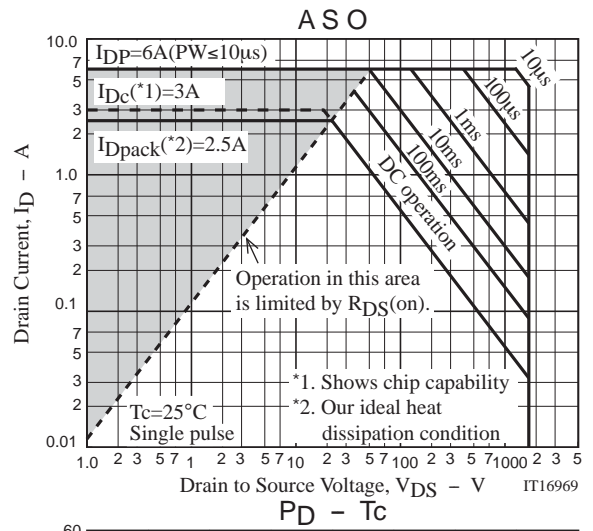
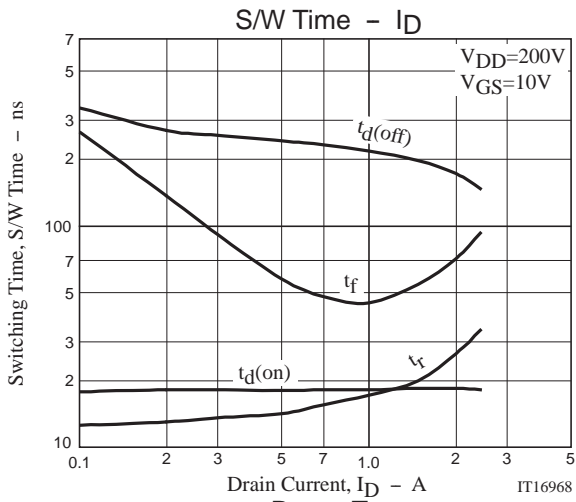
Fig.3 Reverse Recovery Time Test Circuit



Ordering Information

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





Magazine Specification

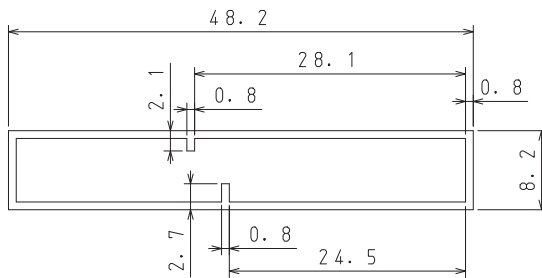
WPH4003-1E

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

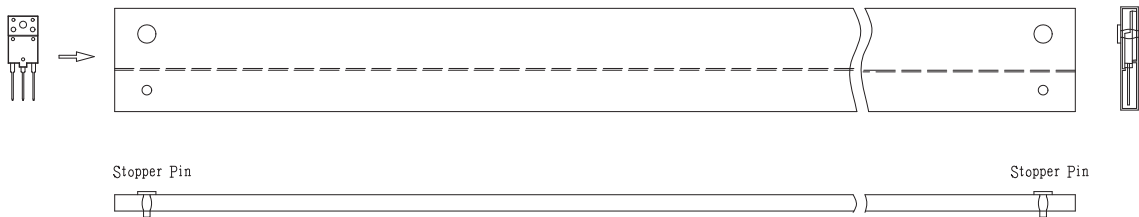
2. Magazine dimensions

(unit:mm)



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

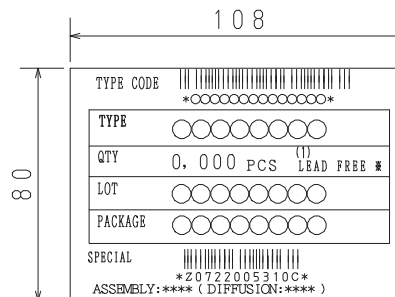
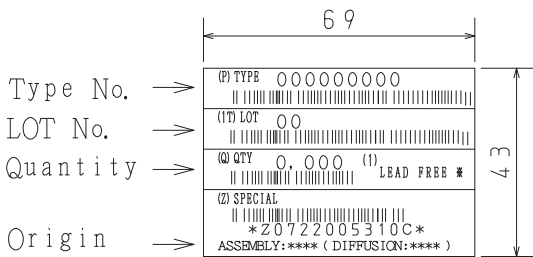
3. Storage method to magazine



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)

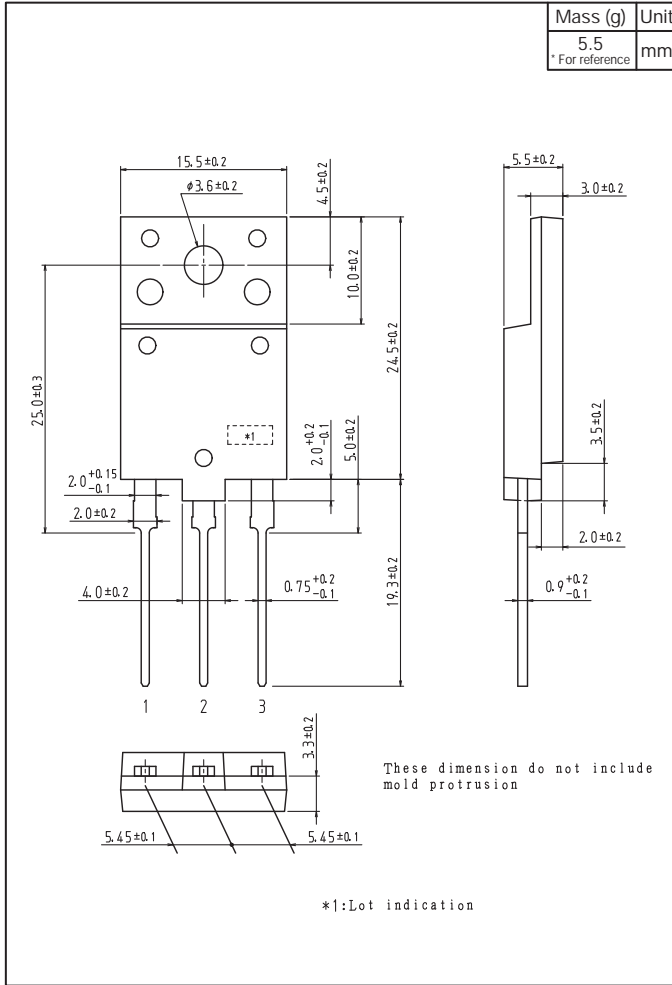
The LEAD FREE * description shows that the surface treatment of the terminal is lead free,

Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A

WPH4003

Outline Drawing

WPH4003-1E



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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