Ordering number : ENA1967A

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

N-Channel Silicon MOSFET

WPH4003 — General-Purpose Switching Device Applications

Features

- ON-resistance RDS (on) =8.2Ω (typ.)
- Input Capacitance Ciss=850pF (typ.)
- 10V drive

Specifications

Absolute Maximum Ratings at Ta=25°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 Tch=150°C	3	A
	I_{Dpack}*2	Tc=25°C (SANYO's ideal heat dissipation condition) *3	2.5	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	6	A
Allowable Power Dissipation	P_D		3.0	W
		Tc=25°C	55	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *4	E_{AS}		49	mJ
Avalanche Current *5	I_{AV}		3	A

Note :*1 Shows chip capability

*2 Package limited

*3 SANYO's 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.

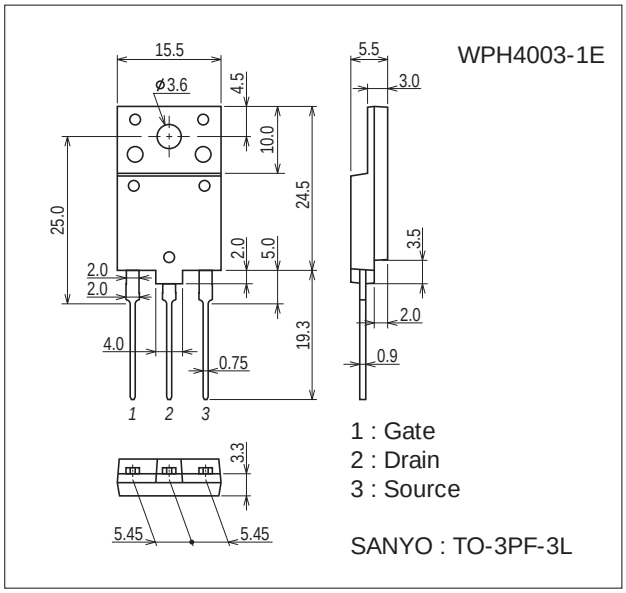
*4 V_{DD}=50V, L=10mH, I_{AV}=3A (Fig.1)

*5 L≤10mH, single pulse

Package Dimensions

unit : mm (typ)

7538A-002

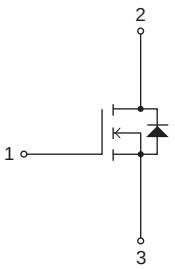


Product & Package Information

- 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}=±30V, V_{DS}=0V			±100	nA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	2		4	V
Forward Transfer Admittance	| yfs |	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	Ciss	V_{DS}=30V, f=1MHz		850		pF
Output Capacitance	Coss			90		pF
Reverse Transfer Capacitance	Crss			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	Qg	V_{DS}=200V, V_{GS}=10V, I_D=3A		48		nC
Gate-to-Source Charge	Qgs			6		nC
Gate-to-Drain “Miller” Charge	Qgd			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/μs		3000		nC

Fig.1 Unclamped Inductive Switching Test Circuit

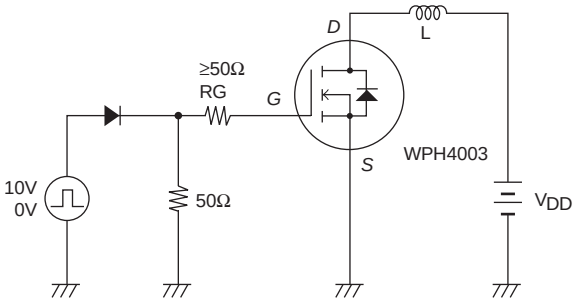


Fig.2 Switching Time Test Circuit

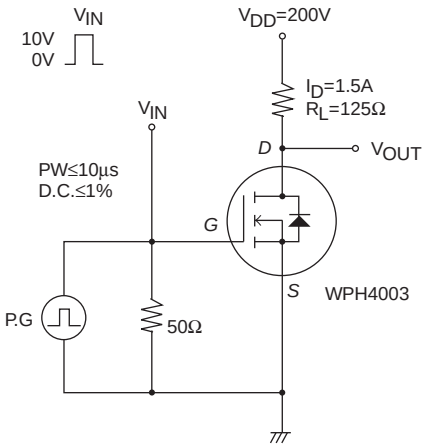
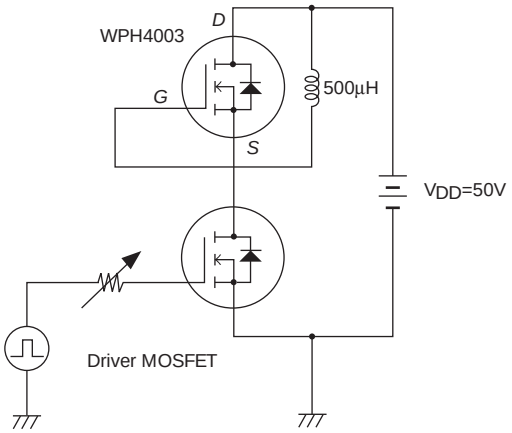
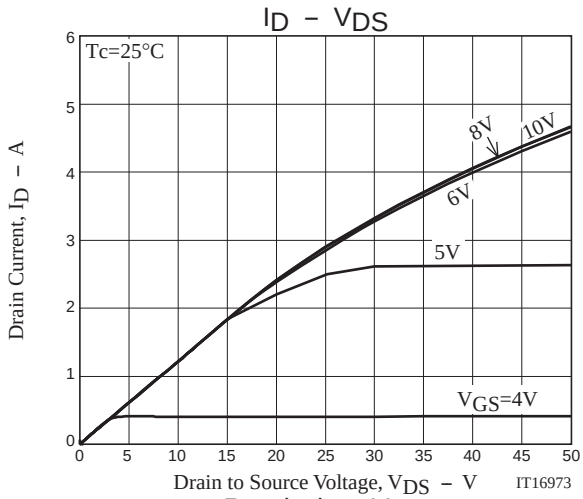


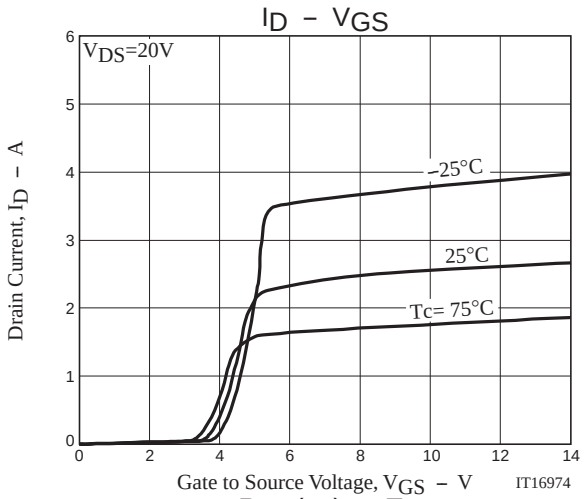
Fig.3 Reverse Recovery Time Test Circuit

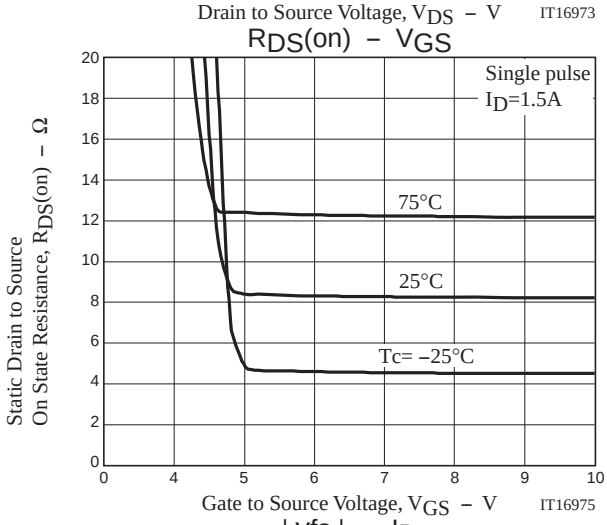


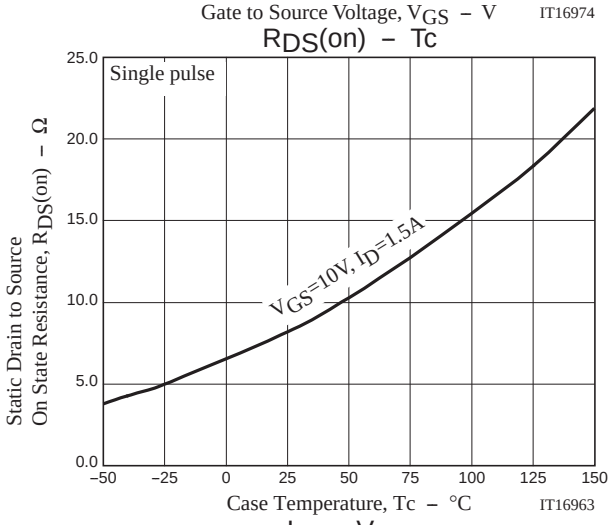
Ordering Information

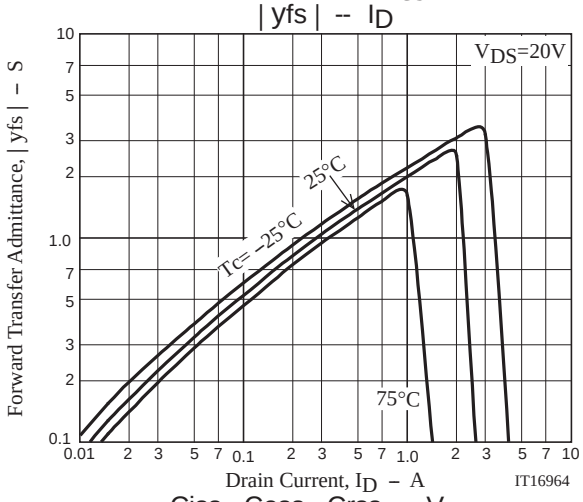
Device	Package	Shipping	memo
WPH4003-1E	TO-3PF-3L	30pcs./magazine	Pb Free

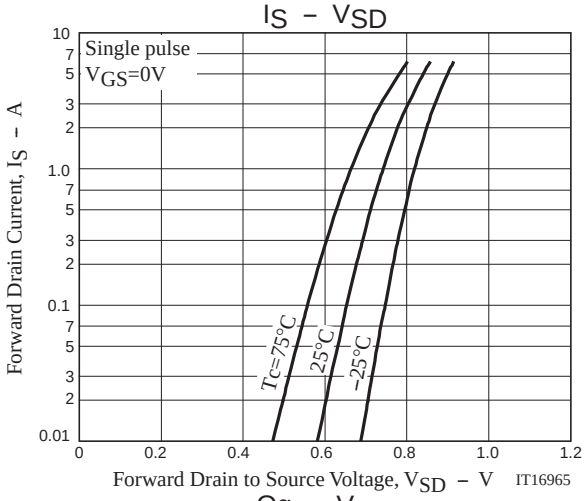

ID – VDS
Tc=25°C
8V
10V
6V
5V
VGS=4V
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT16973

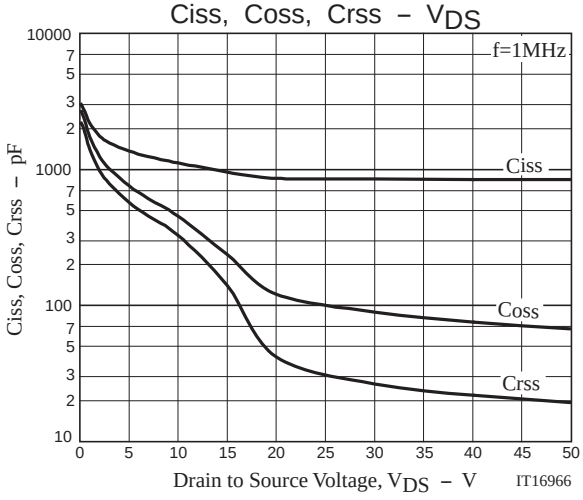

ID – VGS
VDS=20V
–25°C
25°C
Tc= 75°C
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT16974

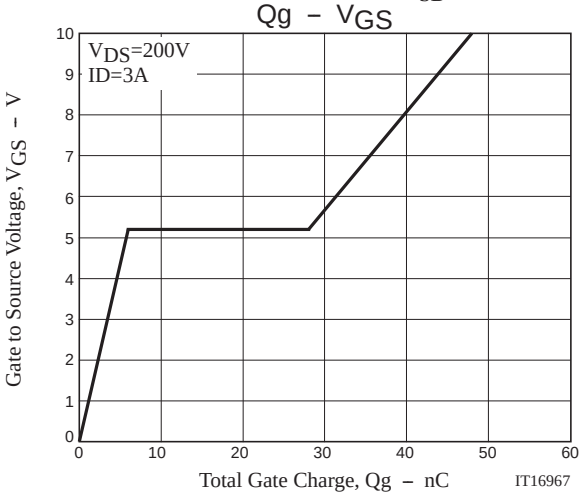

RDS(on) – VGS
Single pulse
ID=1.5A
75°C
25°C
Tc= –25°C
Static Drain to Source
On State Resistance, RDS(on) – Ω
Gate to Source Voltage, VGS – V
IT16975


RDS(on) – Tc
Single pulse
VGS=10V, ID=1.5A
Static Drain to Source
On State Resistance, RDS(on) – Ω
Case Temperature, Tc – °C
IT16963

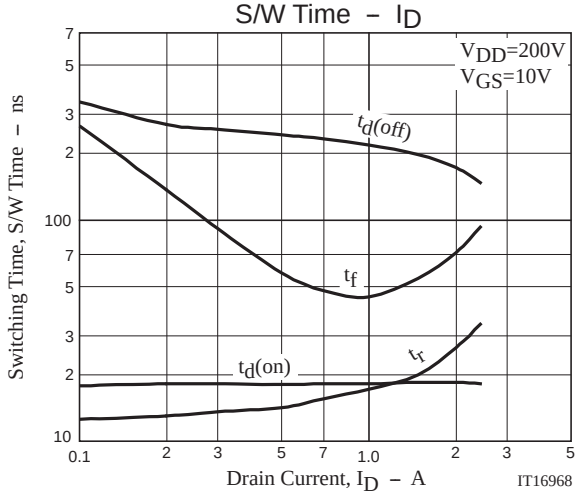

| yfs | -- ID
VDS=20V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT16964


IS – VSD
Single pulse
VGS=0V
Tc=75°C
25°C
–25°C
Forward Drain Current, IS – A
Forward Drain to Source Voltage, VSD – V
IT16965

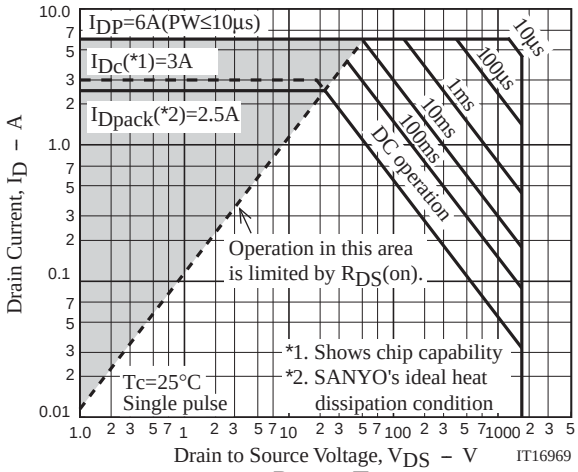

Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT16966


Qg – VGS
VDS=200V
ID=3A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT16967

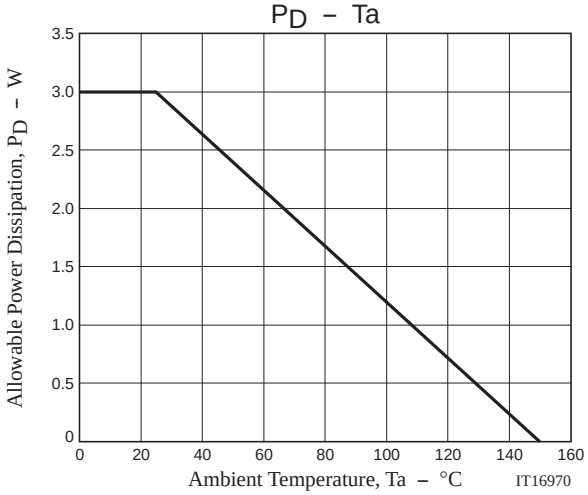
S/W Time – I_D



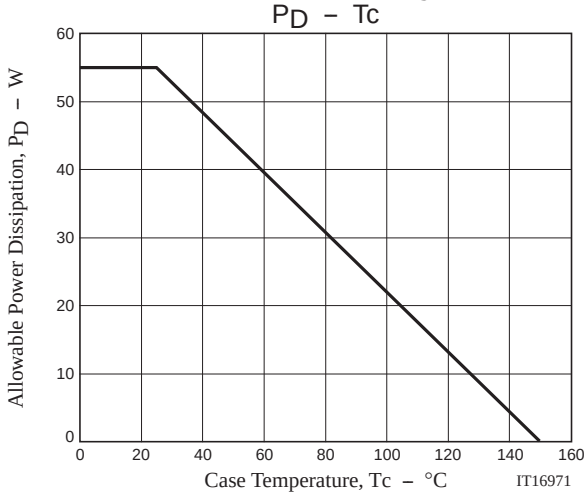
A S O



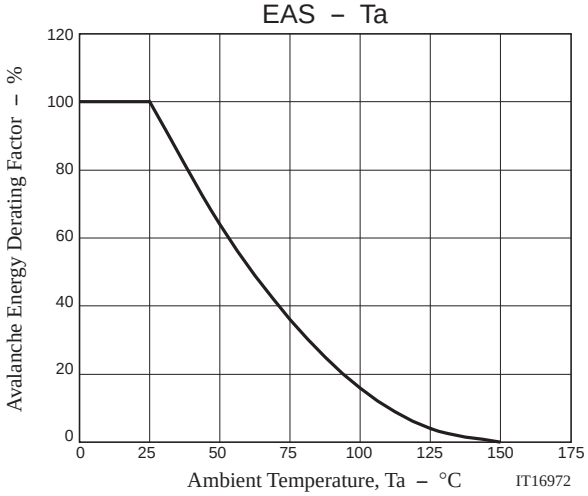
P_D – Ta



P_D – Tc



EAS – Ta



Magazine Specification

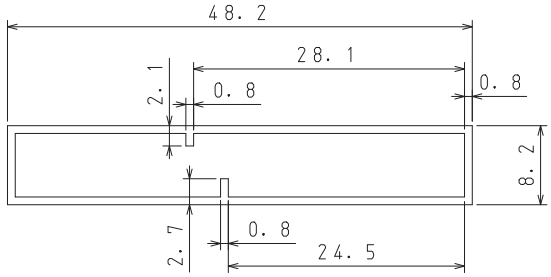
WPH4003-1E

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) 590x225x178

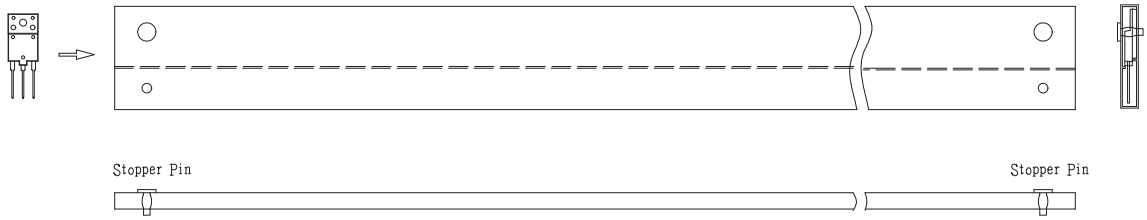
2. Magazine dimensions

(unit:mm)

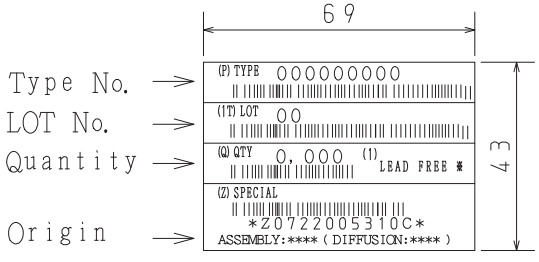


Tolerance=±0.2mm
Thickness=0.8±0.2mm
Length =508.0±1mm
Material =PVC or PET
(Antistatic treatment)

3. Storage method to magazine

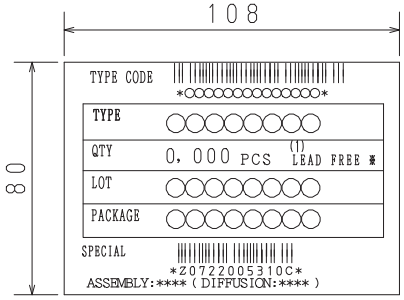


4. Inner box label (unit:mm)



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.

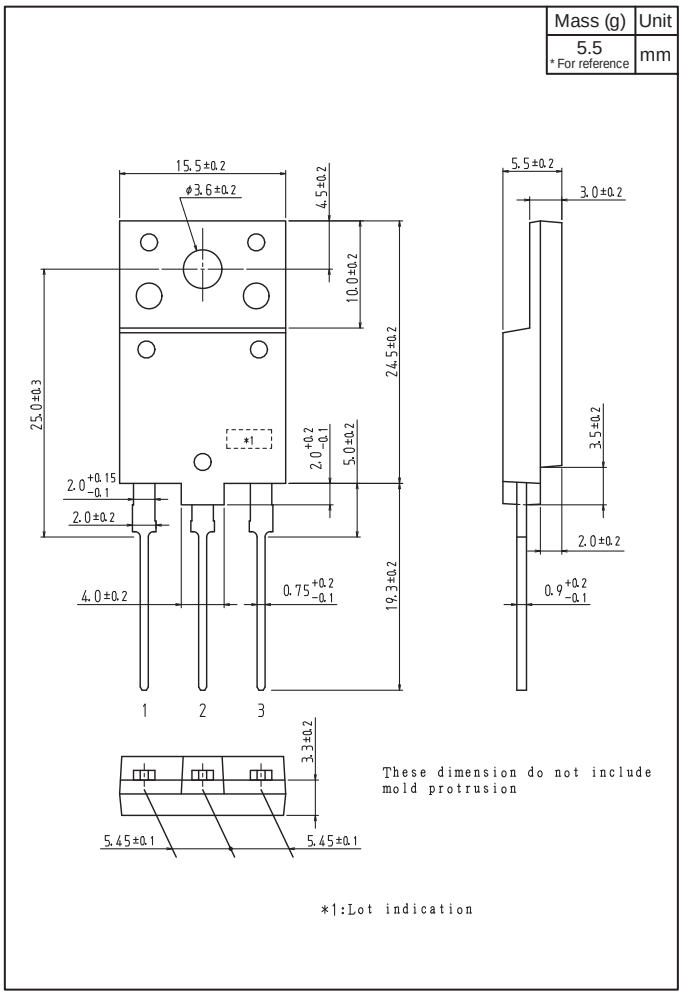


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A

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.

This catalog provides information as of November, 2012. Specifications and information herein are subject to change without notice.