Ordering number : ENA1353A

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

N-Channel Silicon MOSFET

MCH3478 — General-Purpose Switching Device Applications

Features

- Low ON-resistance
- 1.8V drive
- Protection diode in
- Ultrahigh speed switching
- Halogen free compliance

Specifications

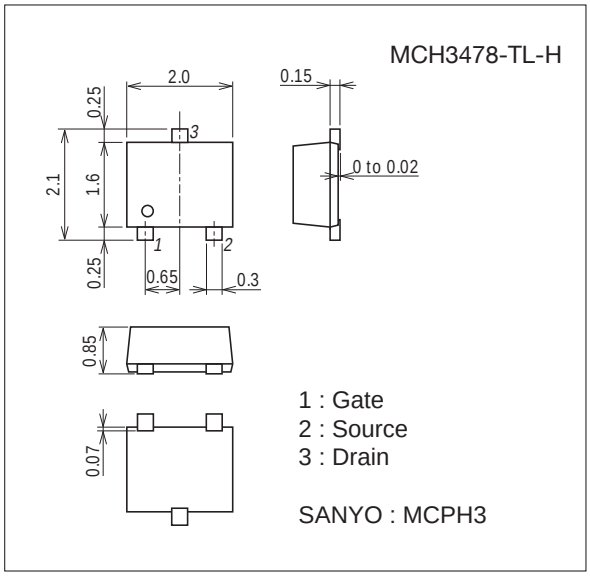
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		30	V
Gate-to-Source Voltage	V_{GSS}		±12	V
Drain Current (DC)	I_D		2	A
Drain Current (PW≤10s)	I_D	Duty cycle≤1%	2.5	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	8	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (900mm²×0.8mm)	0.8	W
		When mounted on ceramic substrate (900mm²×0.8mm), PW=10s	1.2	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C

Package Dimensions

unit : mm (typ)

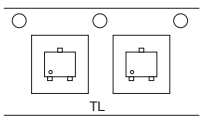
7019A-003



Product & Package Information

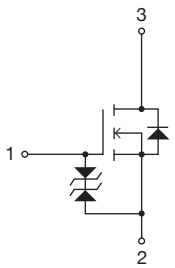
- Package : MCPH3
- JEITA, JEDEC : SC-70, SOT-323
- Minimum Packing Quantity : 3,000 pcs./reel

Packing Type : TL



Marking

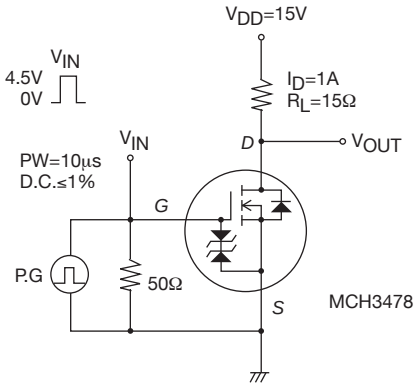
Electrical Connection



Electrical Characteristics at Ta=25°C

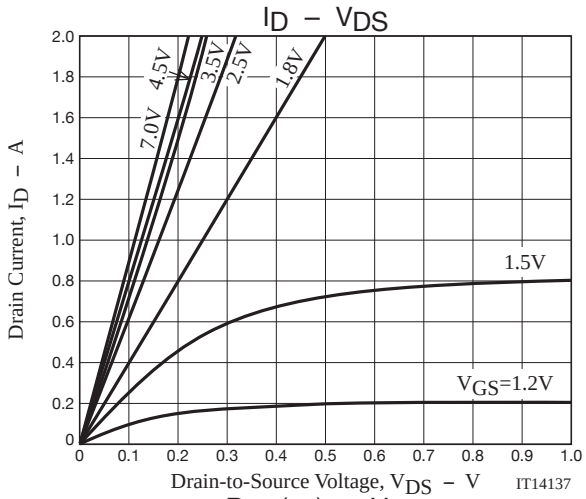
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	30			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	0.4		1.3	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=1A	1.2	2.0		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=1A, V_{GS}=4.5V		125	165	mΩ
	R_{DS}(on)2	I_D=0.5A, V_{GS}=2.5V		165	235	mΩ
	R_{DS}(on)3	I_D=0.3A, V_{GS}=1.8V		250	375	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		130		pF
Output Capacitance	Coss			21		pF
Reverse Transfer Capacitance	Crss			14		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		4.4		ns
Rise Time	t_r			8.7		ns
Turn-OFF Delay Time	t_d(off)			16		ns
Fall Time	t_f			12		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=4.5V, I_D=2A		1.7		nC
Gate-to-Source Charge	Qgs			0.25		nC
Gate-to-Drain “Miller” Charge	Qgd			0.38		nC
Diode Forward Voltage	V_{SD}	I_S=2A, V_{GS}=0V		0.85	1.2	V

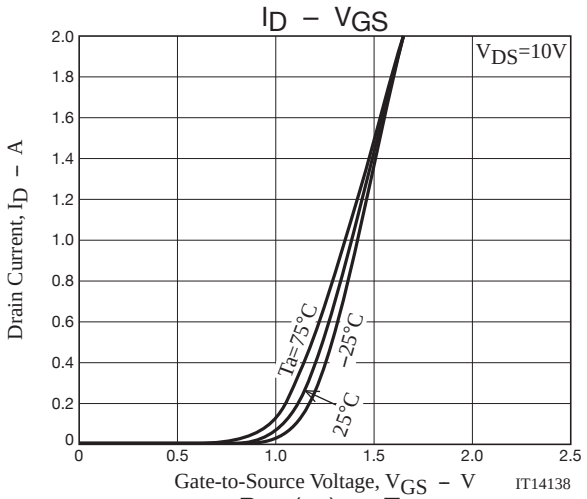
Switching Time Test Circuit

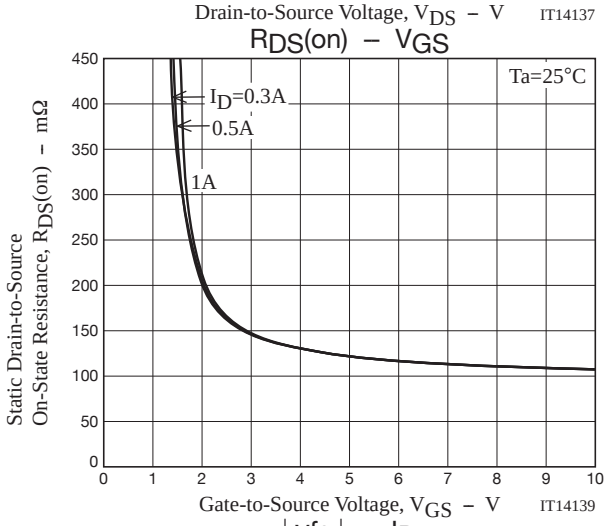


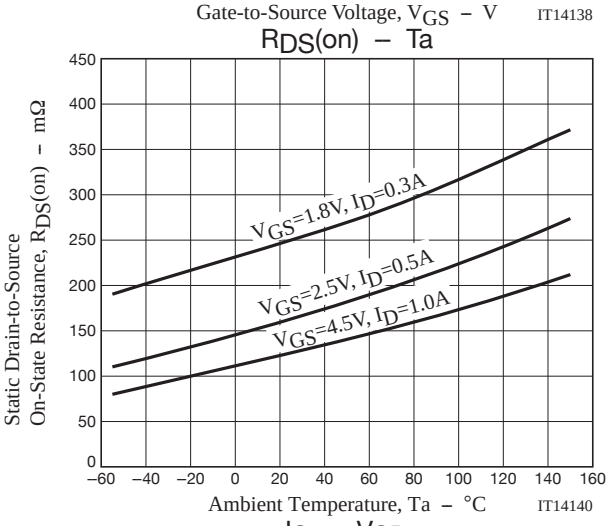
Ordering Information

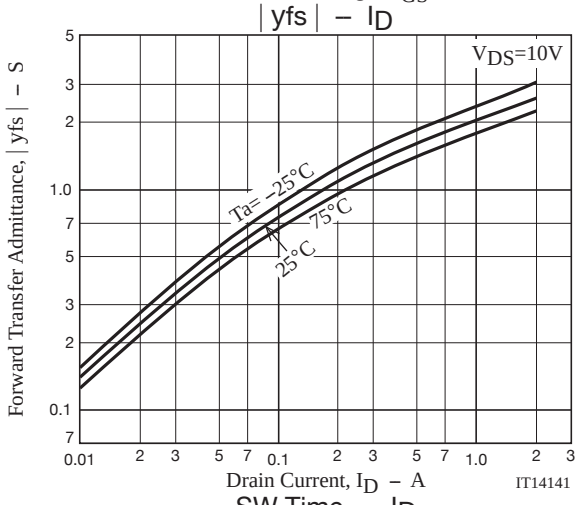
Device	Package	Shipping	memo
MCH3478-TL-H	MCPH3	3,000pcs./reel	Pb Free and Halogen Free

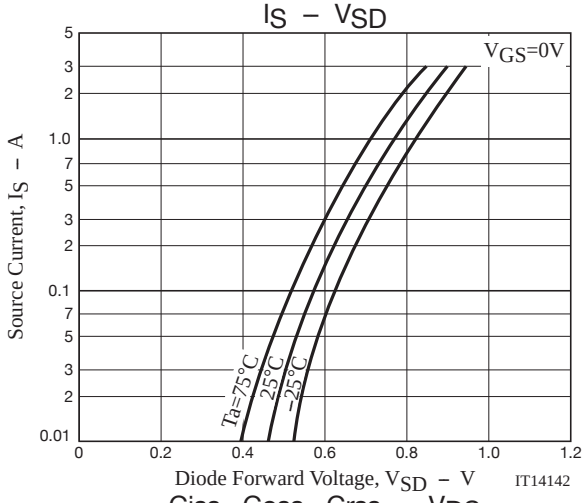

ID – VDS
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT14137
4.5V
3.5V
2.5V
1.8V
7.0V
1.5V
VGS=1.2V

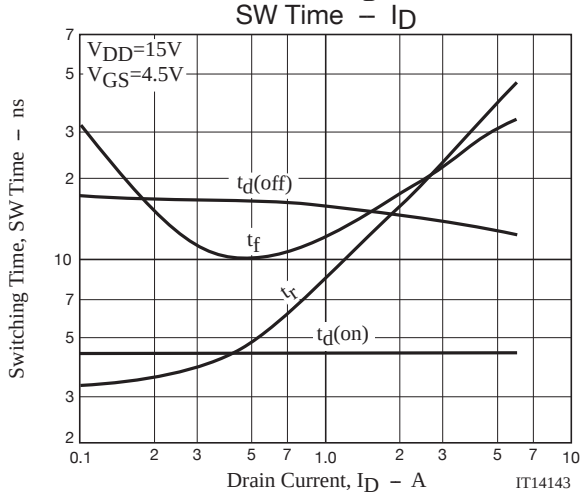

ID – VGS
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT14138
VDS=10V
Ta=75°C
–25°C
25°C

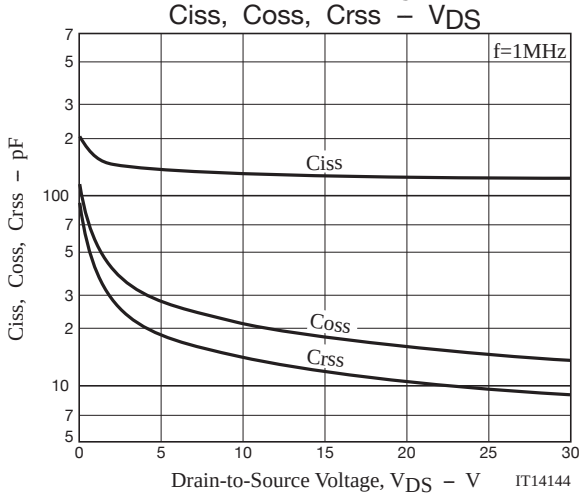

RDS(on) – VGS
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT14139
Ta=25°C
ID=0.3A
0.5A
1A

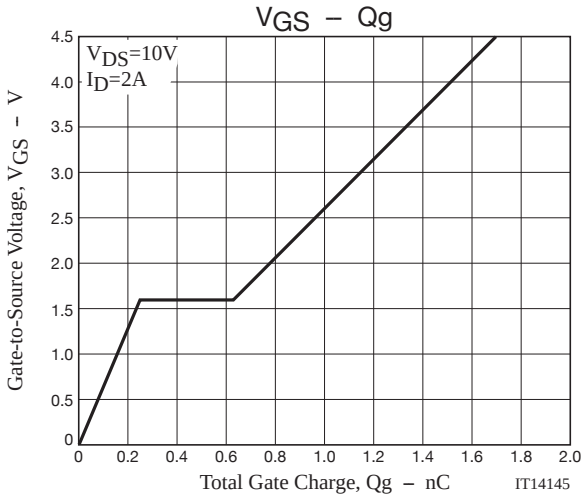

RDS(on) – Ta
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT14140
VGS=1.8V, ID=0.3A
VGS=2.5V, ID=0.5A
VGS=4.5V, ID=1.0A

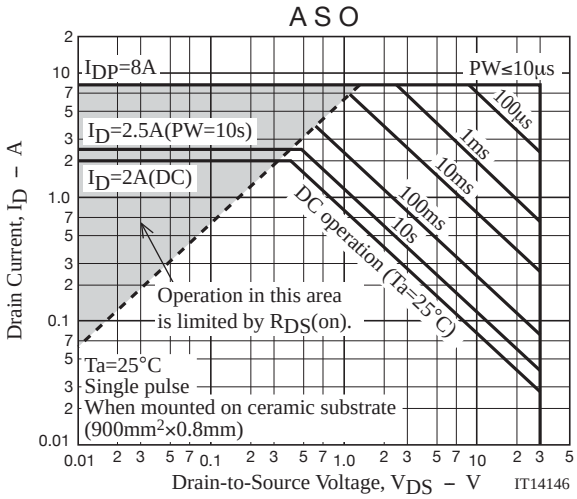

| yfs | – ID
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT14141
VDS=10V
Ta= –25°C
75°C
25°C

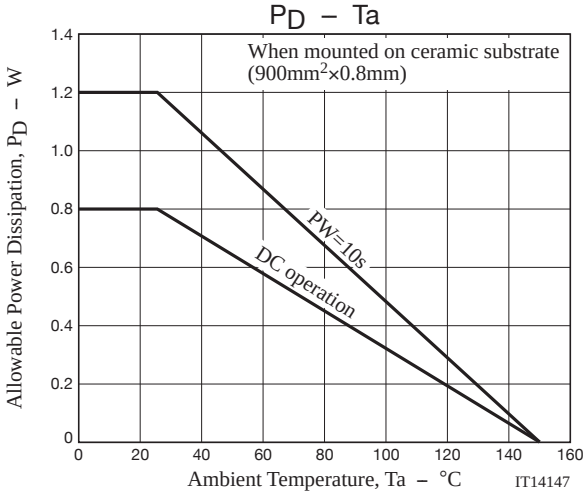

IS – VSD
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT14142
VGS=0V
Ta=75°C
25°C
–25°C


SW Time – ID
Switching Time, SW Time – ns
Drain Current, ID – A
IT14143
VDD=15V
VGS=4.5V
td(off)
tf
tr
td(on)


Ciss, Coss, Crss – VDS
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT14144
f=1MHz
Ciss
Coss
Crss


VGS – Qg
VDS=10V
ID=2A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT14145


A S O
IDP=8A
PW≤10μs
ID=2.5A(PW=10s)
ID=2A(DC)
100μs
1ms
10ms
100ms
10s
DC operation (Ta=25°C)
Operation in this area
is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate
(900mm2×0.8mm)
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT14146


PD – Ta
When mounted on ceramic substrate
(900mm2×0.8mm)
PW=10s
DC operation
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT14147

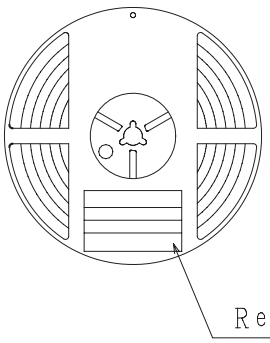
Taping Specification

MCH3478-TL-H

1. Packing Format

Package Name	Carrier Tape Type	Maximun Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
MCPH3	MCPH3	3,000	15,000	90,000	5 reels contained Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

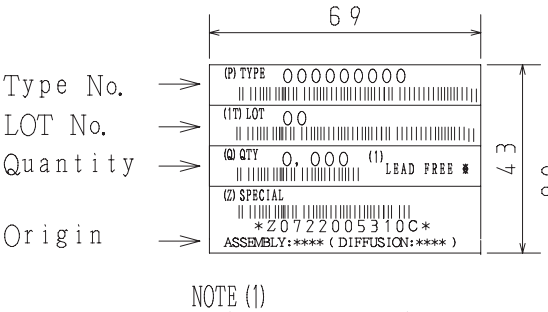
Packing method



Reel label

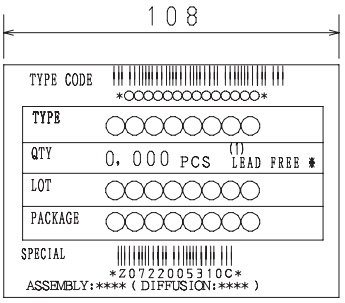
Reel label, Inner box label

(unit:mm)



Outer box label

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

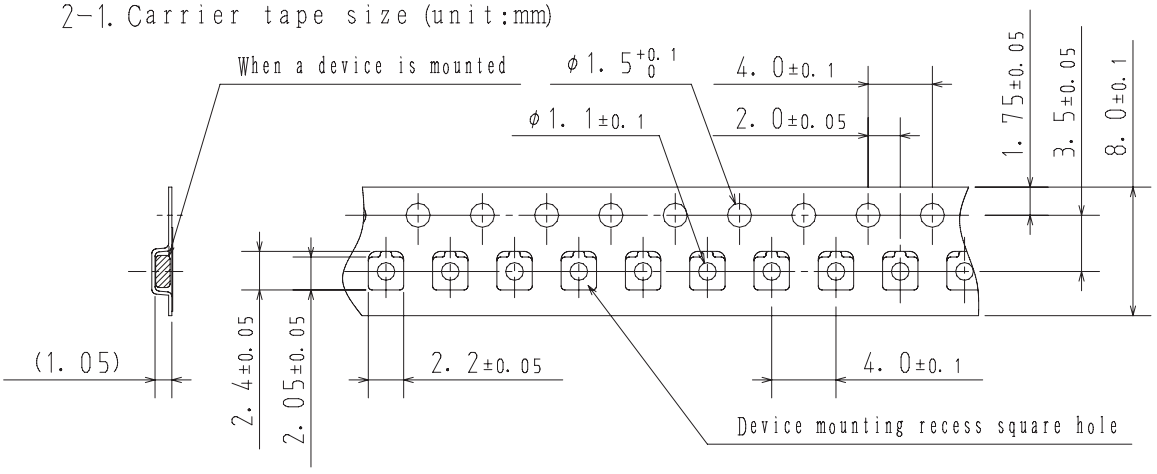


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

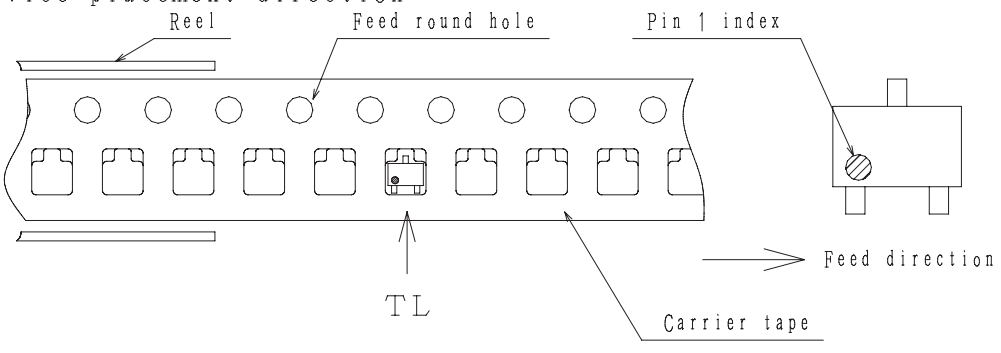
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



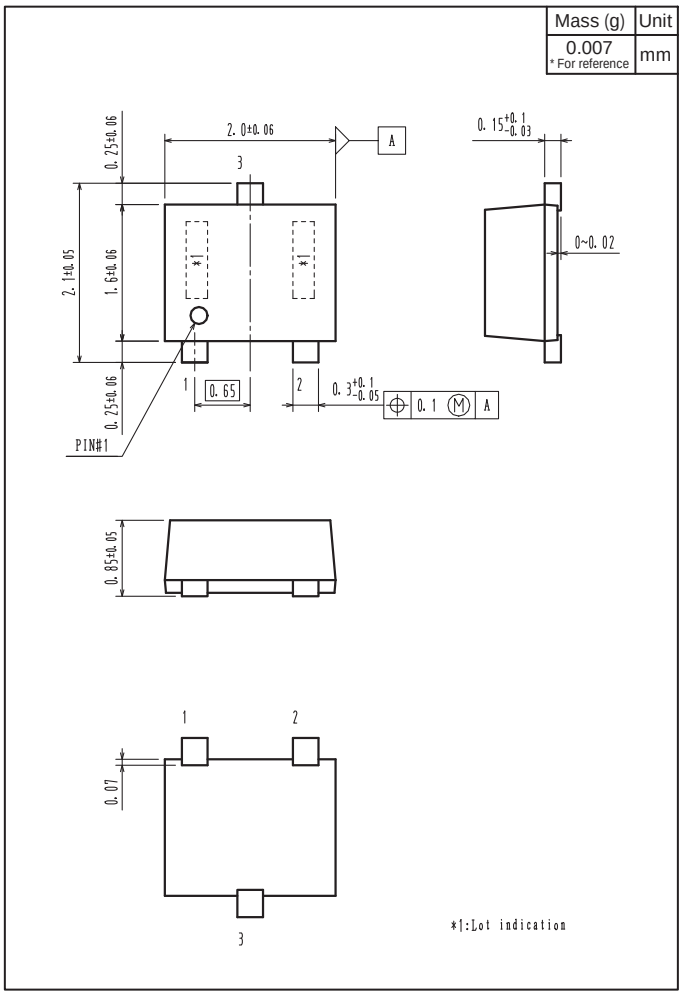
2-2. Device placement direction



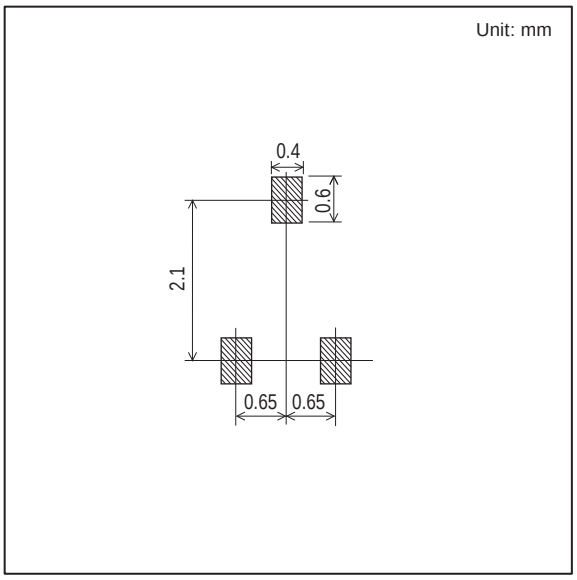
Those with pin 1 index on the feed hole side·····TL

Outline Drawing

MCH3478-TL-H



Land Pattern Example



Note on usage : Since the MCH3478 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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