Ordering number : ENA1430A

SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

P-Channel Silicon MOSFET

# ECH8310 — General-Purpose Switching Device Applications

## Features

- 4V drive
- Halogen free compliance
- Protection diode in

## Specifications

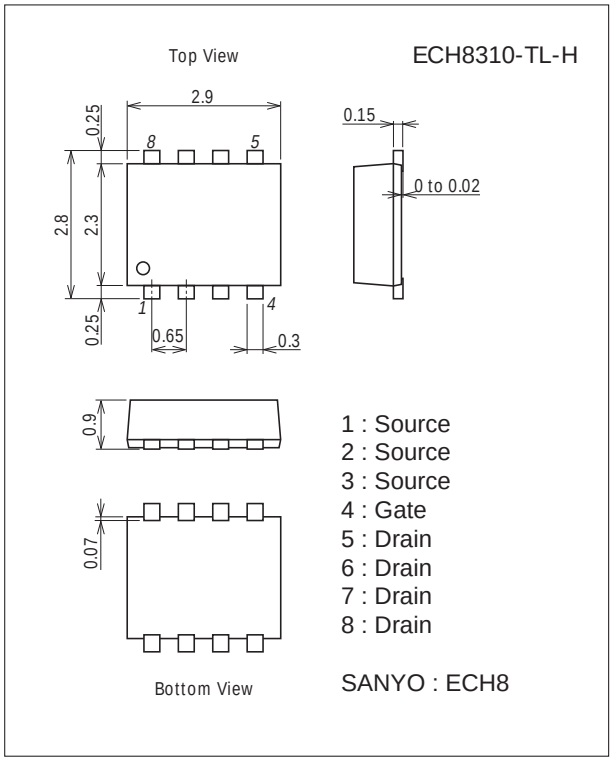
### Absolute Maximum Ratings at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Drain-to-Source Voltage | $V_{DSS}$ | | −30 | V |
| Gate-to-Source Voltage | $V_{GSS}$ | | ±20 | V |
| Drain Current (DC) | $I_D$ | | −9 | A |
| Drain Current (Pulse) | $I_{DP}$ | PW≤10μs, duty cycle≤1% | −60 | A |
| Allowable Power Dissipation | $P_D$ | When mounted on ceramic substrate (900mm²×0.8mm) | 1.5 | W |
| Channel Temperature | Tch | | 150 | ℃ |
| Storage Temperature | Tstg | | −55 to +150 | ℃ |

### Package Dimensions

unit : mm (typ)

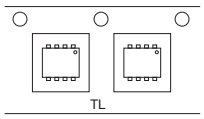
7011A-002



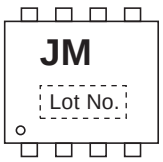

### Product & Package Information

- Package : ECH8
- JEITA, JEDEC : -
- Minimum Packing Quantity : 3,000 pcs./reel

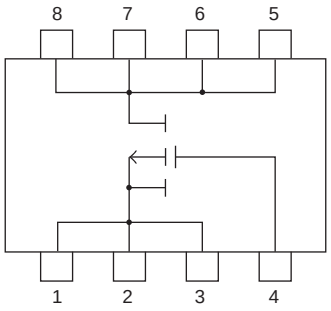
### Packing Type : TL




### Marking



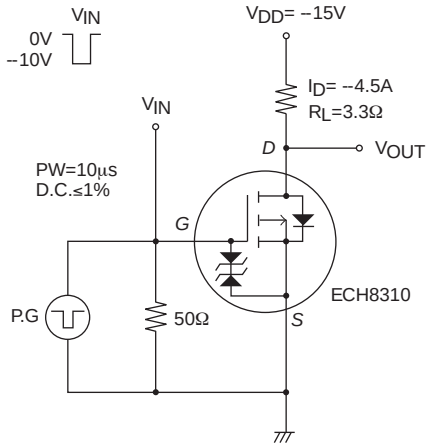

### Electrical Connection



## Electrical Characteristics at Ta=25°C

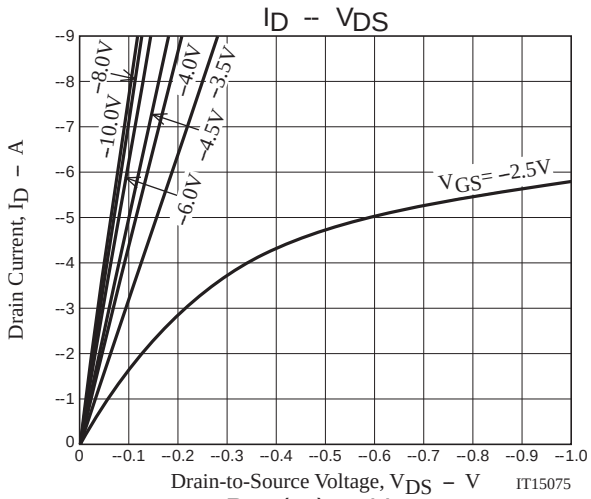
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$=−1mA, $V_{GS}$=0V | −30 | | | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=−30V, $V_{GS}$=0V | | | −1 | μA |
| Gate-to-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±16V, $V_{DS}$=0V | | | ±10 | μA |
| Cutoff Voltage | $V_{GS}$(off) | $V_{DS}$=−10V, $I_D$=−1mA | −1.2 | | −2.6 | V |
| Forward Transfer Admittance | \| yfs \| | $V_{DS}$=−10V, $I_D$=−4.5A | | 12 | | S |
| Static Drain-to-Source On-State Resistance | $R_{DS}$(on)1 | $I_D$=−4.5A, $V_{GS}$=−10V | 9 | 13 | 17 | mΩ |
| | $R_{DS}$(on)2 | $I_D$=−2A, $V_{GS}$=−4.5V | 12 | 20 | 28 | mΩ |
| | $R_{DS}$(on)3 | $I_D$=−2A, $V_{GS}$=−4.0V | 13.5 | 23 | 32.5 | mΩ |
| Input Capacitance | Ciss | $V_{DS}$=−10V, f=1MHz | | 1400 | | pF |
| Output Capacitance | Coss | | | 350 | | pF |
| Reverse Transfer Capacitance | Crss | | | 250 | | pF |
| Turn-ON Delay Time | $t_d$(on) | See specified Test Circuit. | | 10 | | ns |
| Rise Time | $t_r$ | | | 45 | | ns |
| Turn-OFF Delay Time | $t_d$(off) | | | 134 | | ns |
| Fall Time | $t_f$ | | | 87 | | ns |
| Total Gate Charge | Qg | $V_{DS}$=−15V, $V_{GS}$=−10V, $I_D$=−9A | | 28 | | nC |
| Gate-to-Source Charge | Qgs | | | 4 | | nC |
| Gate-to-Drain “Miller” Charge | Qgd | | | 6 | | nC |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=−9A, $V_{GS}$=0V | | −0.8 | −1.2 | V |

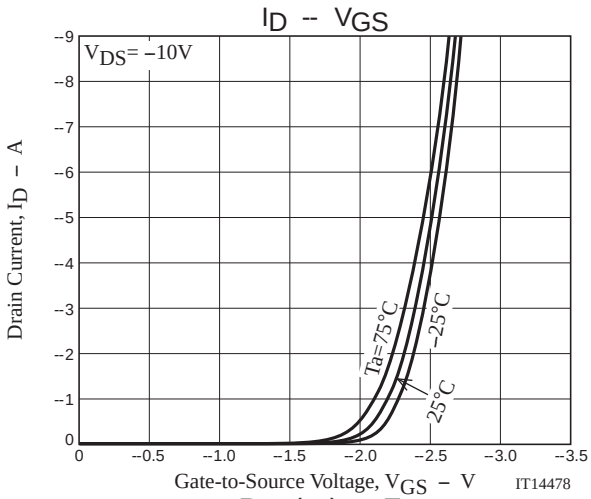
## Switching Time Test Circuit

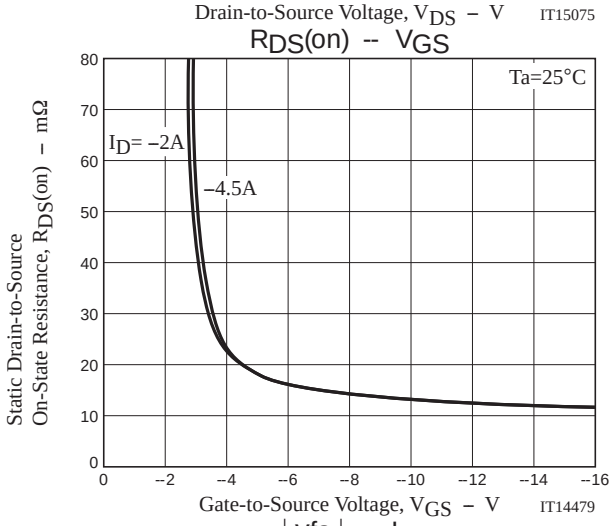


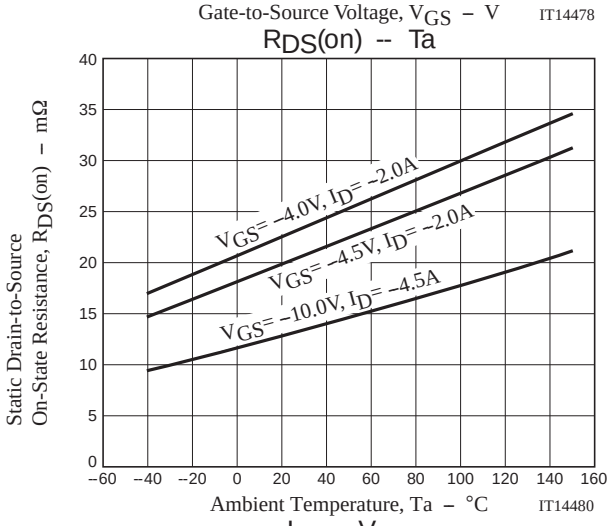

## Ordering Information

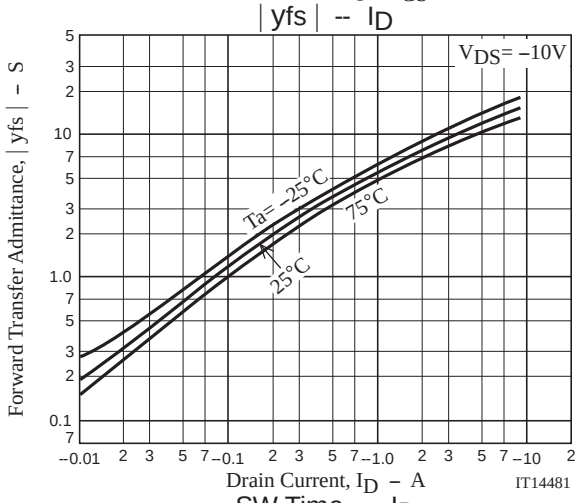
| Device | Package | Shipping | memo |
|---|---|---|---|
| ECH8310-TL-H | ECH8 | 3,000pcs./reel | Pb Free and Halogen Free |

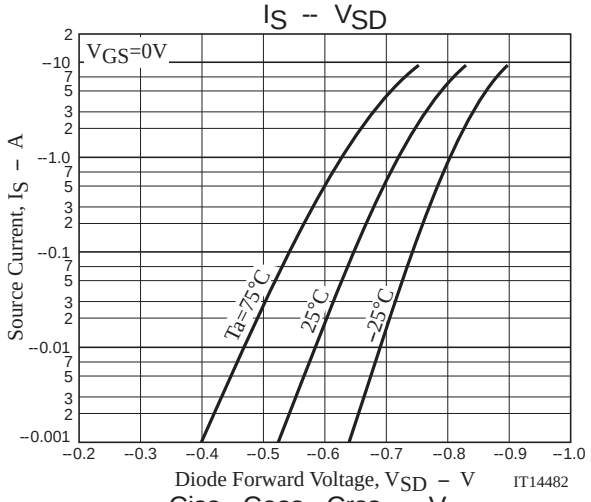

ID -- VDS
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT15075
VGS= –2.5V
–8.0V
–10.0V
–4.0V
–3.5V
–4.5V
–6.0V

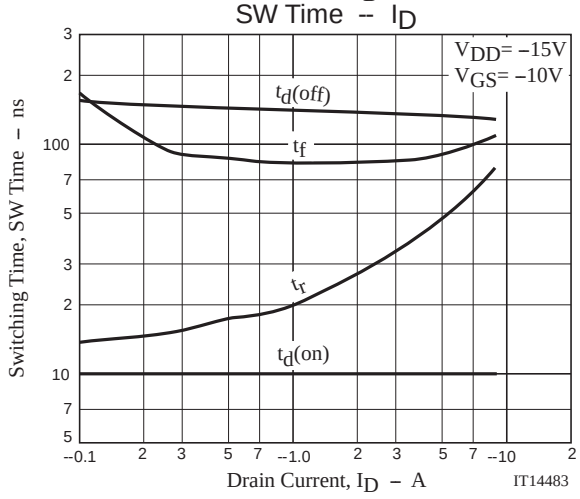

ID -- VGS
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT14478
VDS= –10V
Ta=75°C
–25°C
25°C

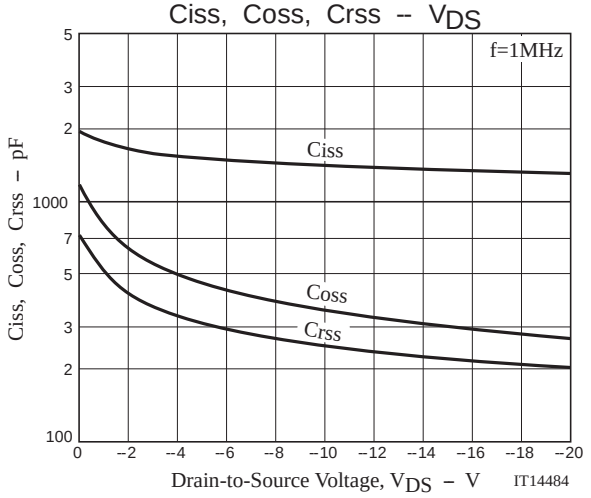

RDS(on) -- VGS
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT14479
Ta=25°C
ID= –2A
–4.5A

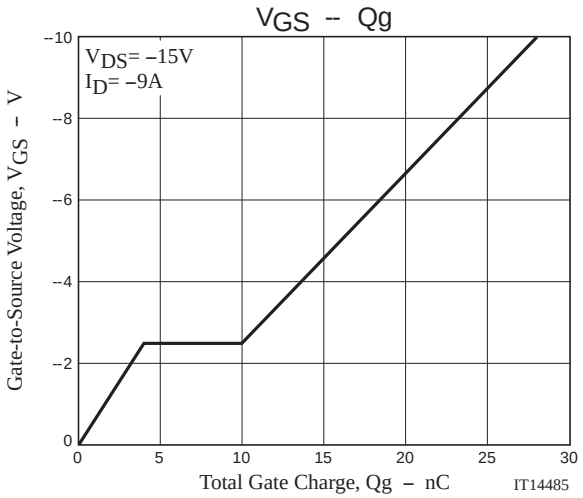

RDS(on) -- Ta
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT14480
VGS= –4.0V, ID= –2.0A
VGS= –4.5V, ID= –2.0A
VGS= –10.0V, ID= –4.5A

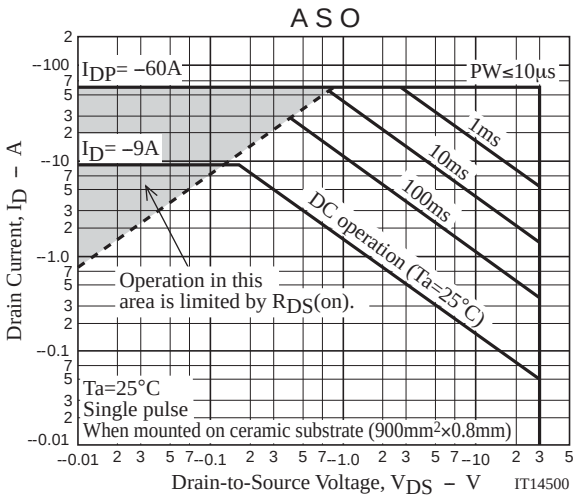

| yfs | -- ID
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT14481
VDS= –10V
Ta= –25°C
75°C
25°C

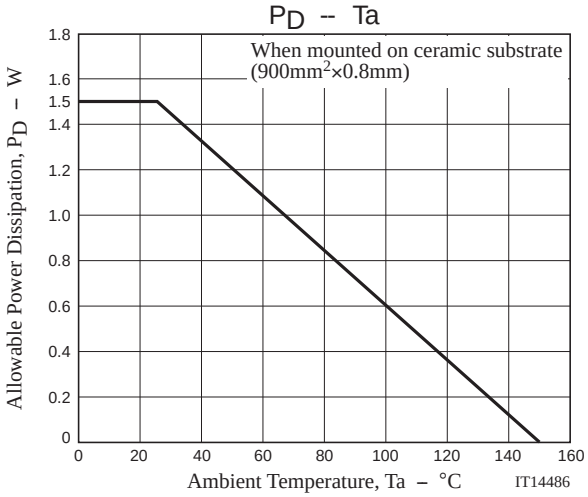

IS -- VSD
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT14482
VGS=0V
Ta=75°C
25°C
–25°C


SW Time -- ID
Switching Time, SW Time – ns
Drain Current, ID – A
IT14483
VDD= –15V
VGS= –10V
td(off)
tf
tr
td(on)


Ciss, Coss, Crss -- VDS
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT14484
f=1MHz
Ciss
Coss
Crss


VGS -- Qg
VDS= −15V
ID= −9A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT14485


A S O
IDP= −60A
PW≤10μs
ID= −9A
1ms
10ms
100ms
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
IT14500


PD -- Ta
When mounted on ceramic substrate
(900mm2×0.8mm)
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT14486

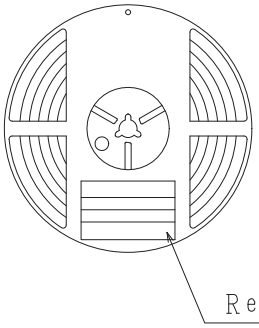
**Embossed Taping Specification**

ECH8310-TL-H

## 1. Packing Format

| Package Name | Carrier Tape Type | Maximum Number of devices contained (pcs) | | | Packing format | |
|---|---|---|---|---|---|---|
| | | Reel | Inner box | Outer box | Inner BOX (C-1) | Outer BOX (A-7) |
| ECH8 | CPH6 | 3,000 | 15,000 | 90,000 | 5 reels contained<br>Dimensions:mm(external)<br>183×72×185 | 6 inner boxes contained<br>Dimensions:mm(external)<br>440×195×210 |

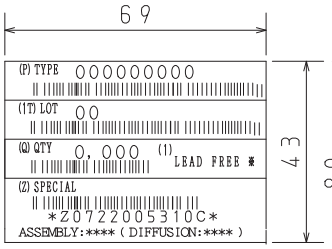
Packing method



Reel label

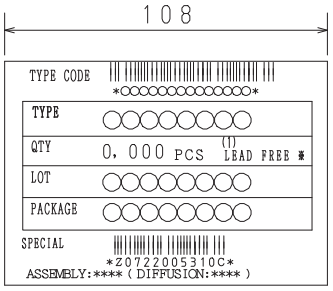
Reel label, Inner box label

(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.



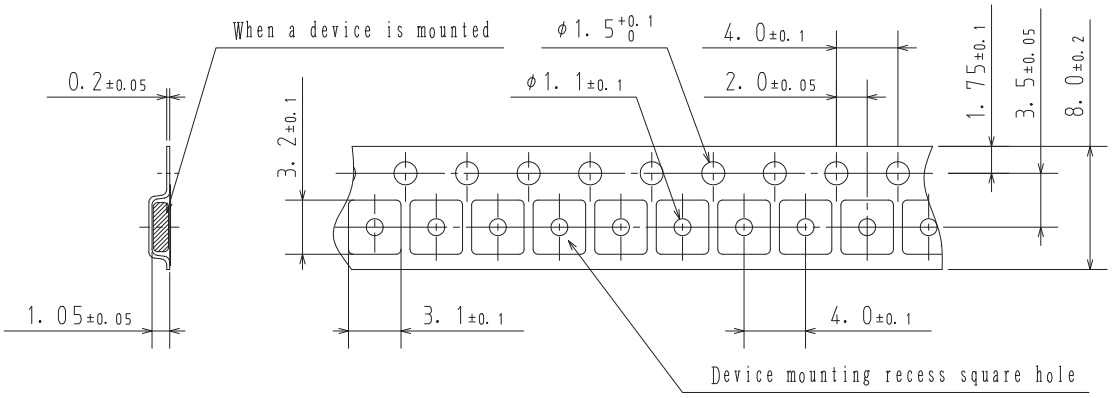

NOTE (1)

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

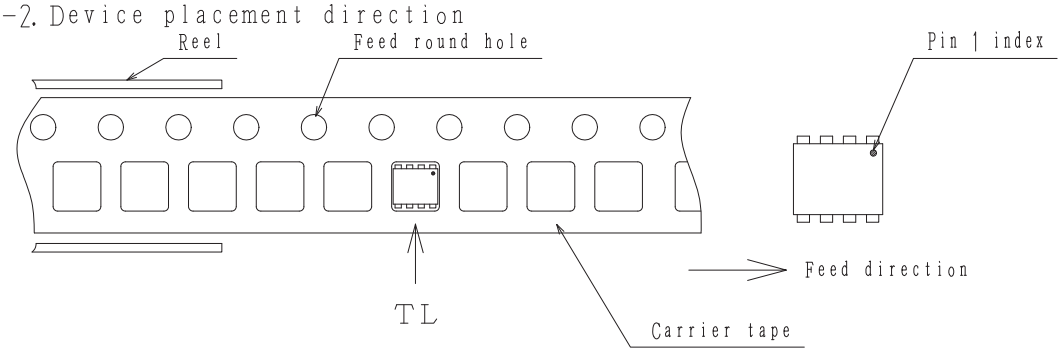
| Label | JEITA Phase |
|---|---|
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3 |

## 2. Taping configuration

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



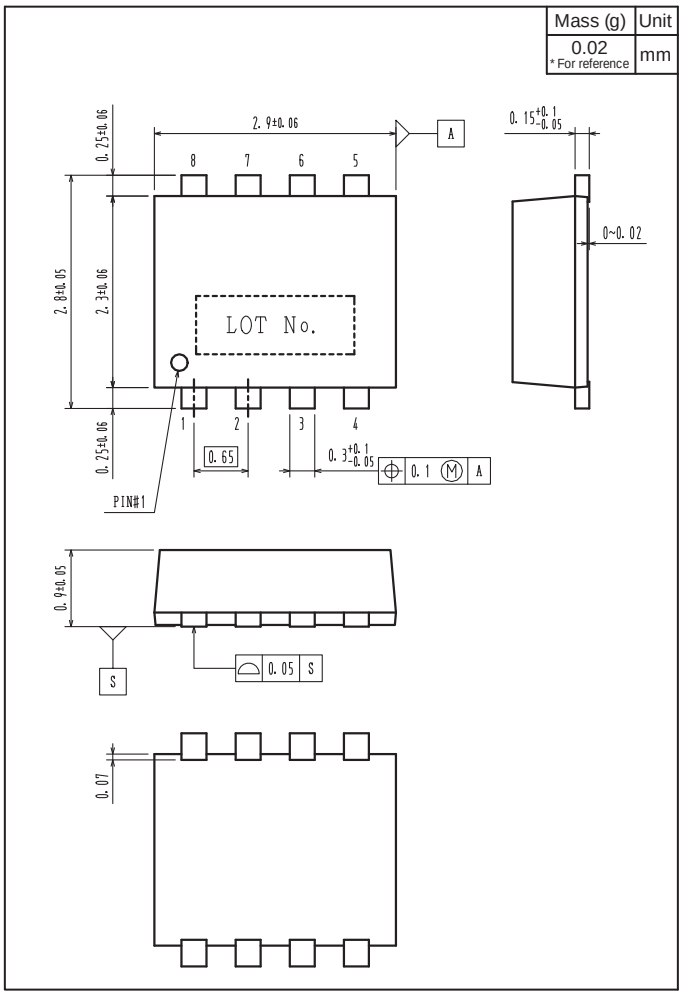

### 2-2. Device placement direction



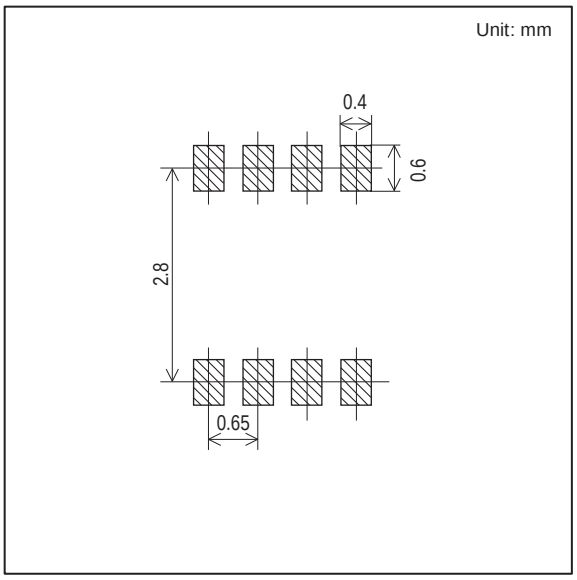

Those with pin 1 index on the feed hole side·····TL

## Outline Drawing

ECH8310-TL-H




## Land Pattern Example



Note on usage : Since the ECH8310 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.