Ordering number : ENA1010A

# ECH8651R

## N-Channel Power MOSFET
## 24V, 10A, 14mΩ, Dual ECH8

ON Semiconductor®
http://onsemi.com

### Features

- Low ON-resistance
- 2.5V drive
- Common-drain type
- Protection diode in
- Built-in gate protection resistor
- Best suited for LiB charging and discharging switch
- Halogen free compliance

### Specifications

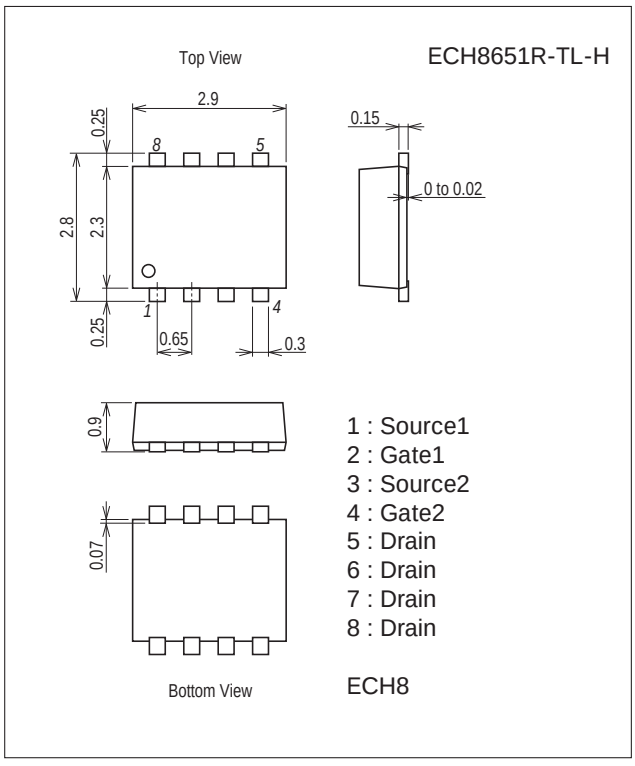
#### Absolute Maximum Ratings at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Drain-to-Source Voltage | $V_{DSS}$ | | 24 | V |
| Gate-to-Source Voltage | $V_{GSS}$ | | ±12 | V |
| Drain Current (DC) | $I_D$ | | 10 | 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) 1unit | 1.4 | W |
| Total Dissipation | $P_T$ | When mounted on ceramic substrate (900mm²×0.8mm) | 1.5 | W |
| Channel Temperature | Tch | | 150 | °C |
| Storage Temperature | Tstg | | −55 to +150 | °C |

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

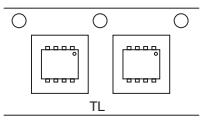
unit : mm (typ)
7011A-003



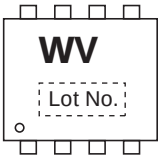

### Product & Package Information

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

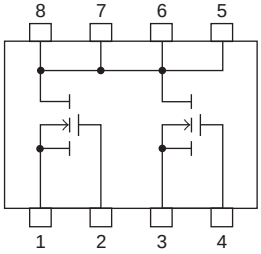
### Packing Type : TL




### Marking



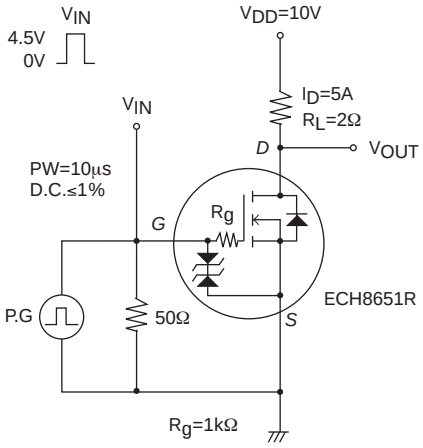

### Electrical Connection



## Electrical Characteristics at Ta=25°C

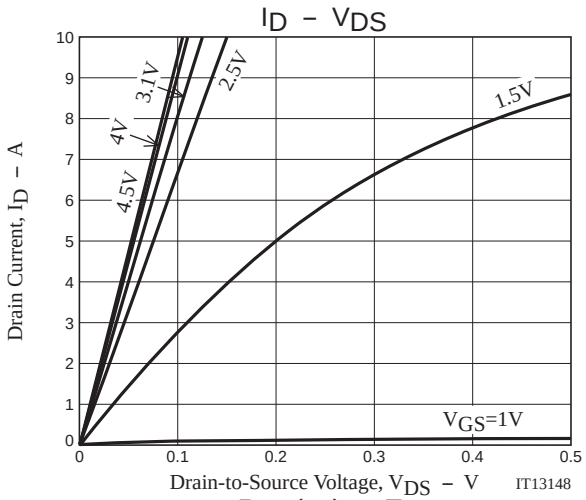
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$=1mA, $V_{GS}$=0V | 24 | | | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=20V, $V_{GS}$=0V | | | 1 | μA |
| Gate-to-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±8V, $V_{DS}$=0V | | | ±10 | μA |
| Cutoff Voltage | $V_{GS}$(off) | $V_{DS}$=10V, $I_D$=1mA | 0.5 | | 1.3 | V |
| Forward Transfer Admittance | \| yfs \| | $V_{DS}$=10V, $I_D$=5A | 5.5 | 9.5 | | S |
| Static Drain-to-Source On-State Resistance | $R_{DS}$(on)1 | $I_D$=5A, $V_{GS}$=4.5V | 7 | 10.5 | 14 | mΩ |
| | $R_{DS}$(on)2 | $I_D$=5A, $V_{GS}$=4.0V | 7.2 | 11 | 15 | mΩ |
| | $R_{DS}$(on)3 | $I_D$=5A, $V_{GS}$=3.1V | 7.5 | 12.5 | 17.5 | mΩ |
| | $R_{DS}$(on)4 | $I_D$=2.5A, $V_{GS}$=2.5V | 9 | 15 | 21 | mΩ |
| Turn-ON Delay Time | $t_{d(on)}$ | See specified Test Circuit. | | 300 | | ns |
| Rise Time | $t_r$ | | | 1000 | | ns |
| Turn-OFF Delay Time | $t_{d(off)}$ | | | 4000 | | ns |
| Fall Time | $t_f$ | | | 2500 | | ns |
| Total Gate Charge | Qg | $V_{DS}$=10V, $V_{GS}$=10V, $I_D$=10A | | 24 | | nC |
| Gate-to-Source Charge | Qgs | | | 2 | | nC |
| Gate-to-Drain “Miller” Charge | Qgd | | | 4.5 | | nC |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=10A, $V_{GS}$=0V | | 0.77 | 1.2 | V |

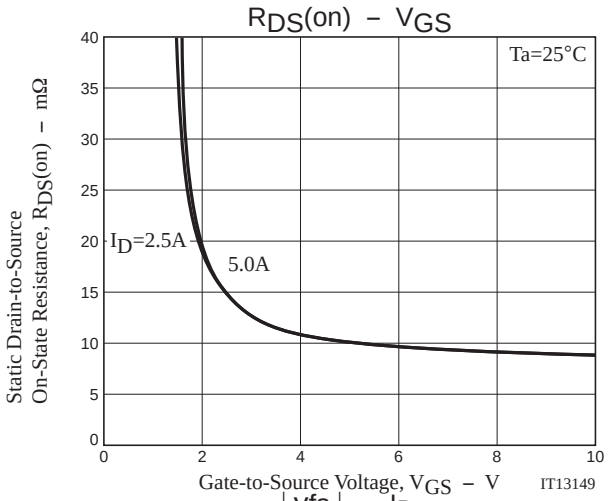
## Switching Time Test Circuit

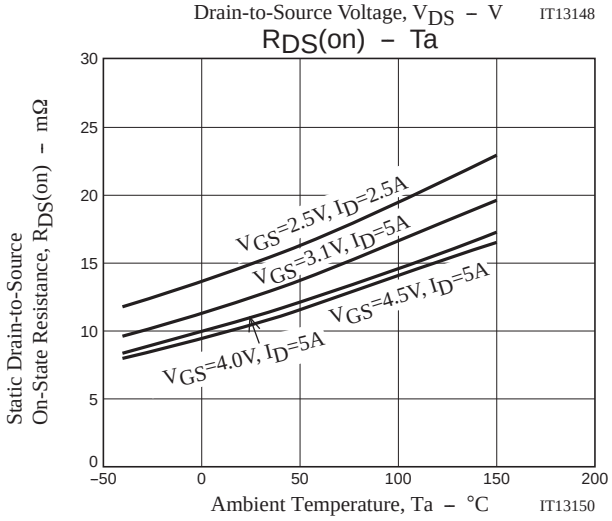


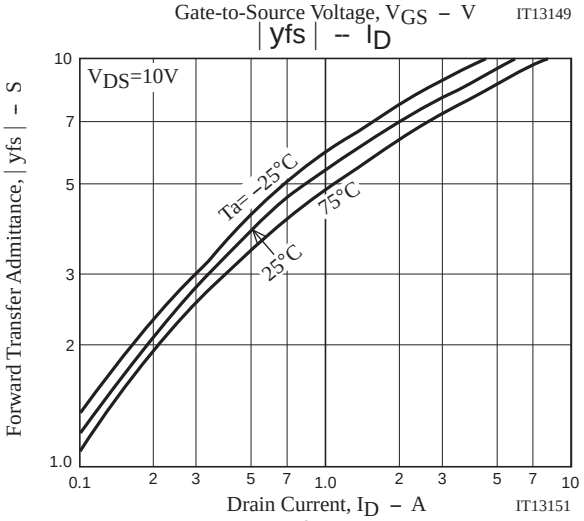

## Ordering Information

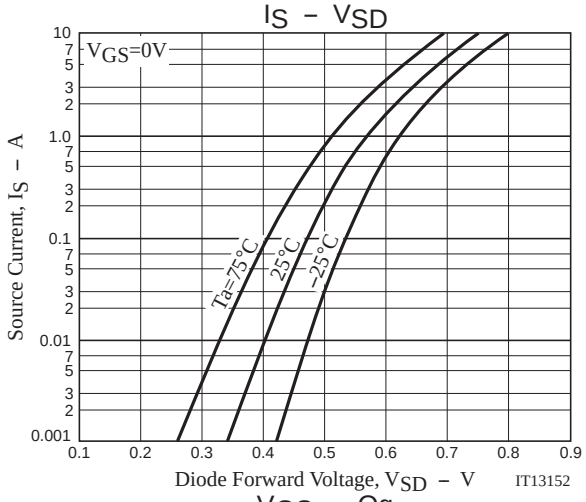
| Device | Package | Shipping | memo |
|---|---|---|---|
| ECH8651R-TL-H | ECH8 | 3,000pcs./reel | Pb Free and Halogen Free |

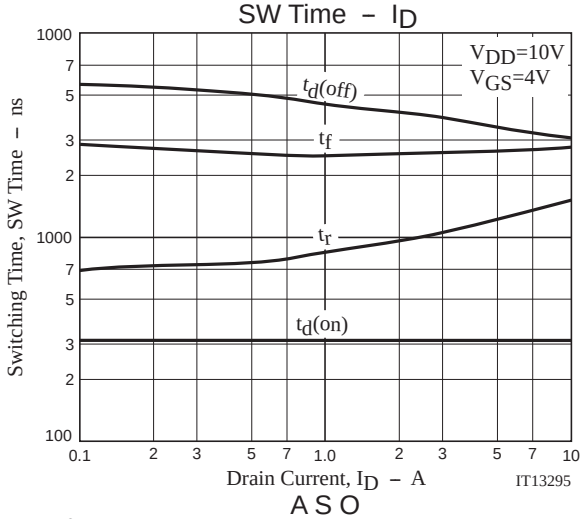


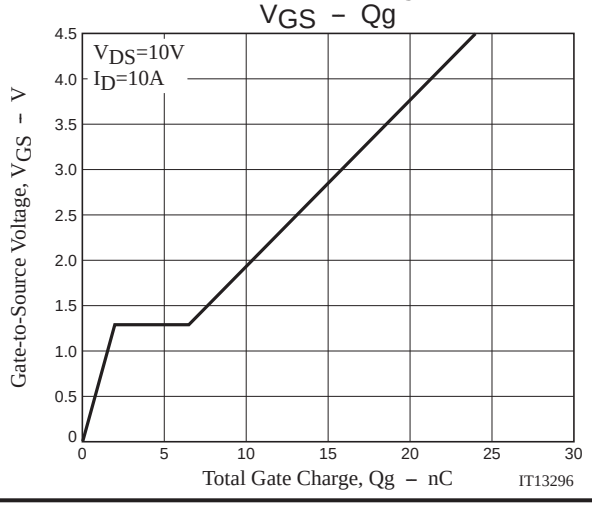



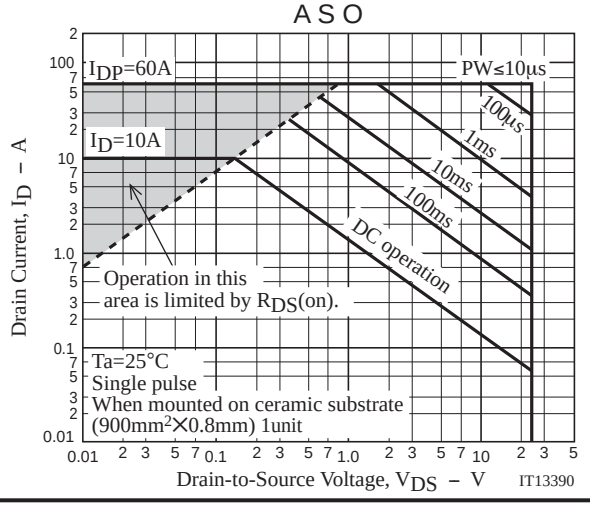



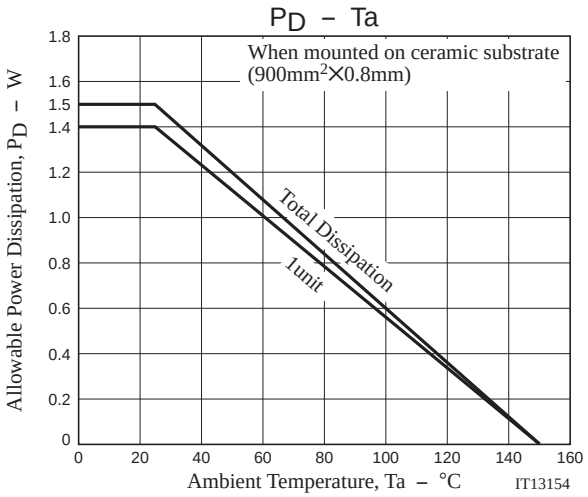





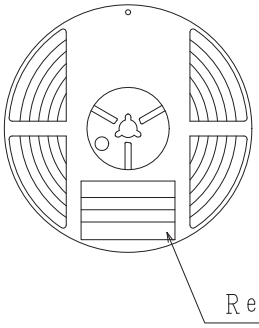
**Embossed Taping Specification**

ECH8651R-TL-H

## 1. Packing Format

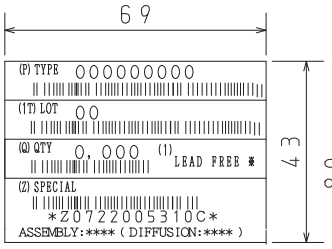
| Package Name | Carrier Tape Type | Maximum Number of devices contained (pcs) | | | Packing format | |
|---|---|---|---|---|---|---|
| | | Reel | Inner box | Outer box | Inner BOX (C-1) | Outer BOX (A-7) |
| ECH8 | CPH6 | 3,000 | 15,000 | 90,000 | 5 reels contained<br>Dimensions:mm (external)<br>183×72×185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

Packing method



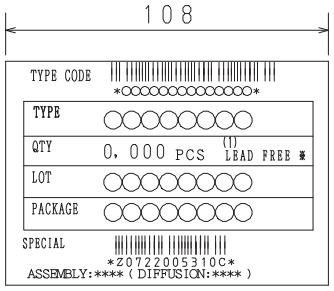

Reel label, Inner box label

(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.



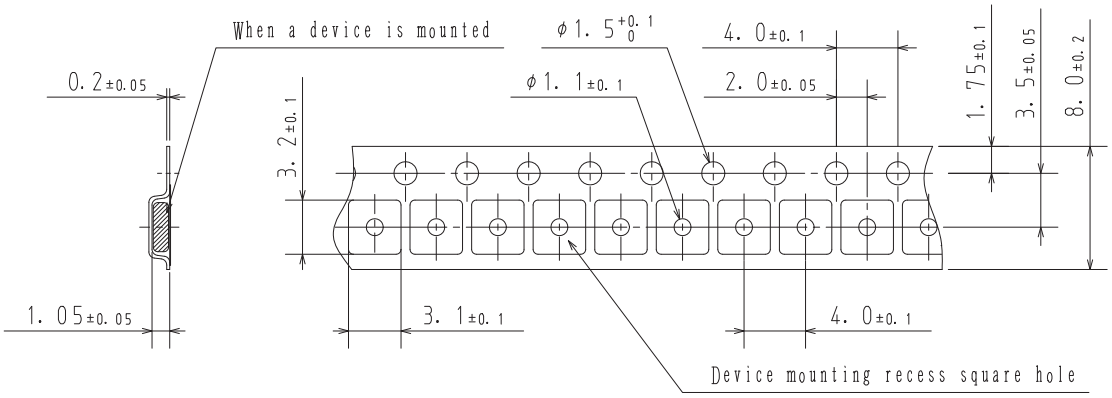

NOTE (1)

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

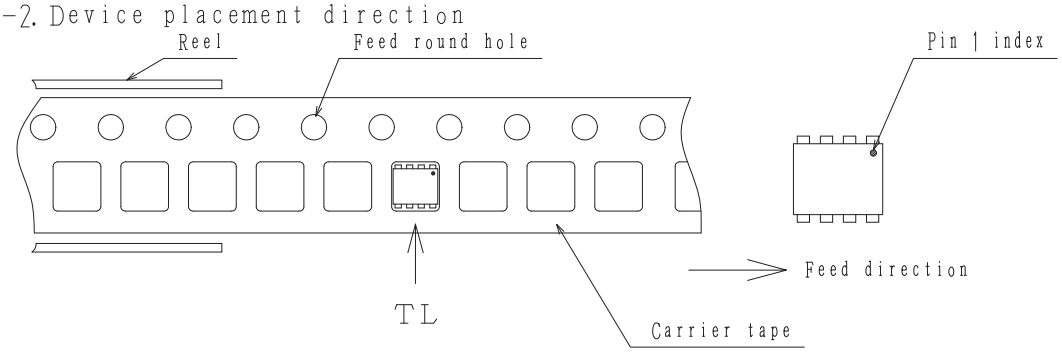
| Label | JEITA Phase |
|---|---|
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3 |

## 2. Taping configuration

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



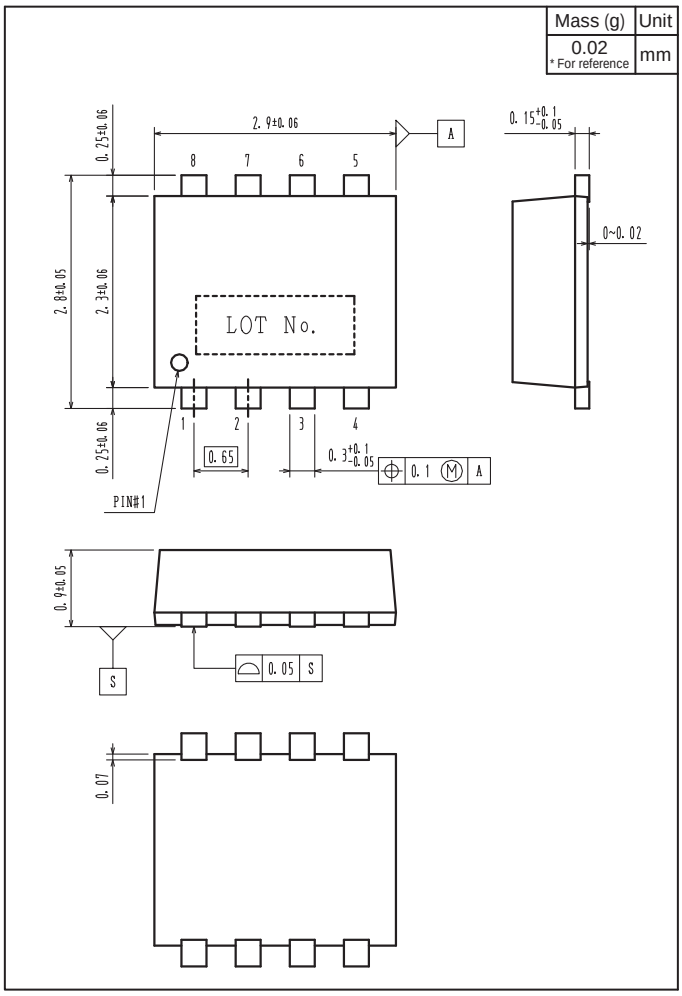

### 2-2. Device placement direction



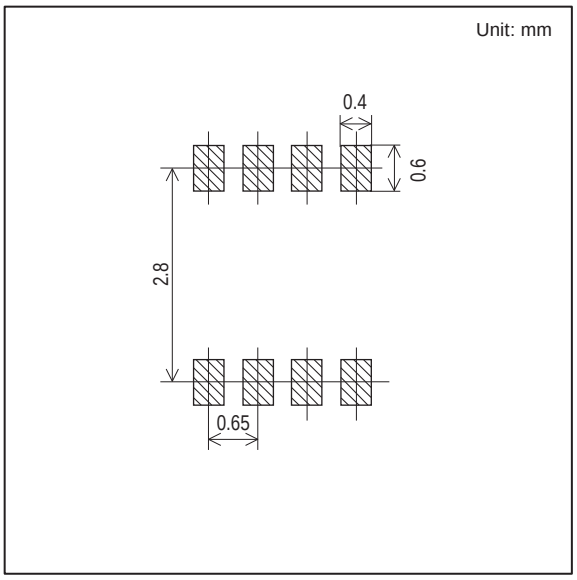

Those with pin 1 index on the feed hole side·····TL

## Outline Drawing

ECH8651R-TL-H




## Land Pattern Example



Note on usage : Since the ECH8651R is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.