



# EFC4612R

## N-Channel Power MOSFET 24V, 6A, 45mΩ, Dual EFCP

ON Semiconductor®

<http://onsemi.com>

### Features

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

### Specifications

Absolute Maximum Ratings at Ta=25°C

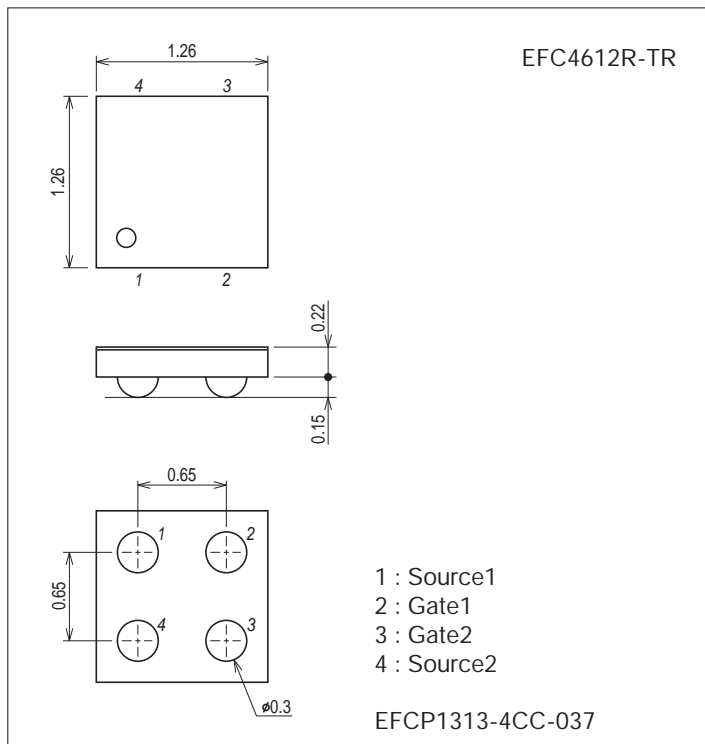
| Parameter                | Symbol           | Conditions   | Ratings     | Unit |
|--------------------------|------------------|--|-------------|------|
| Source-to-Source Voltage | V <sub>SSS</sub> |  | 24          | V    |
| Gate-to-Source Voltage   | V <sub>GSS</sub> |  | ±12         | V    |
| Source Current (DC)      | I <sub>S</sub>   |  | 6           | A    |
| Source Current (Pulse)   | I <sub>SP</sub>  | PW≤10μs, duty cycle≤1%   | 60          | A    |
| Total Dissipation        | P <sub>T</sub>   | When mounted on ceramic substrate (5000mm <sup>2</sup> ×0.8mm) | 1.6         | W    |
| Channel Temperature      | T <sub>ch</sub>  |  | 150         | °C   |
| Storage Temperature      | T <sub>stg</sub> |  | -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)

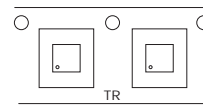
7064-001



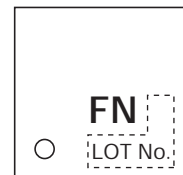
### Product & Package Information

- Package : EFCP
- JEITA, JEDEC : -
- Minimum Packing Quantity : 5,000 pcs./reel

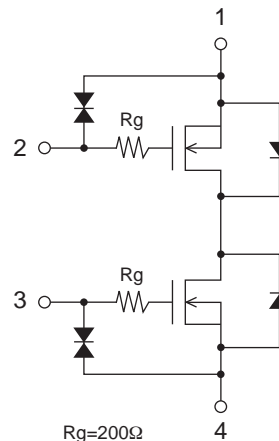
### Taping Type : TR



### Marking



### Electrical Connection



# EFC4612R

## Electrical Characteristics at Ta=25°C

| Parameter                                   | Symbol   | Conditions                                 | Ratings                  |     |     | Unit |
|---|----------|--|--------------------------|-----|-----|------|
|   |          |  | min                      | typ | max |      |
| Source-to-Source Breakdown Voltage          | V(BR)SSS | IS=1mA, VGS=0V Test Circuit 1              | 24                       |     |     | V    |
| Zero-Gate Voltage Source Current            | ISSS     | VSS=20V, VGS=0V Test Circuit 1             |                          |     | 1   | μA   |
| Gate-to-Source Leakage Current              | IGSS     | VGS=±8V, VSS=0V Test Circuit 2             |                          |     | ±10 | μA   |
| Cutoff Voltage                              | VGS(off) | VSS=10V, IS=1mA Test Circuit 3             | 0.5                      |     | 1.3 | V    |
| Forward Transfer Admittance                 | yfs      | VSS=10V, IS=3A Test Circuit 4              |                          | 3.1 |     | S    |
| Static Source-to-Source On-State Resistance | RSS(on)1 | IS=3A, VGS=4.5V Test Circuit 5             | 24                       | 39  | 45  | mΩ   |
|   | RSS(on)2 | IS=3A, VGS=4.0V Test Circuit 5             | 25                       | 41  | 48  | mΩ   |
|   | RSS(on)3 | IS=3A, VGS=3.7V Test Circuit 5             | 27.5                     | 43  | 50  | mΩ   |
|   | RSS(on)4 | IS=3A, VGS=3.1V Test Circuit 5             | 31.5                     | 48  | 57  | mΩ   |
|   | RSS(on)5 | IS=3A, VGS=2.5V Test Circuit 5             | 33.5                     | 58  | 72  | mΩ   |
| Turn-ON Delay Time                          | td(on)   | See specified Test Circuit. Test Circuit 7 |                          | 20  |     | ns   |
| Rise Time                                   | tr       |  |                          | 230 |     | ns   |
| Turn-OFF Delay Time                         | td(off)  |  |                          | 130 |     | ns   |
| Fall Time                                   | tf       |  |                          | 210 |     | ns   |
| Total Gate Charge                           | Qg       |  | VSS=10V, VGS=4.5V, IS=6A |     | 7   |      |
| Forward Source-to-Source Voltage            | VF(S-S)  | IS=3A, VGS=0V Test Circuit 6               |                          | 0.8 | 1.2 | V    |

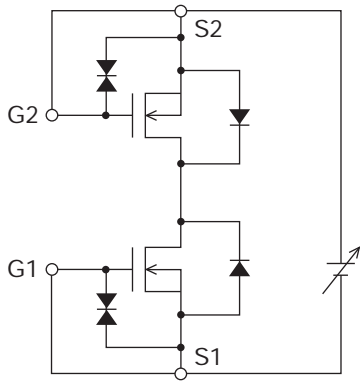
## Ordering Information

| Device      | Package | Shipping       | memo                     |
|-------------|---------|----------------|--------------------------|
| EFC4612R-TR | EFCP    | 5,000pcs./reel | Pb Free and Halogen Free |

Test circuits are example of measuring FET1 side

Test Circuit 1

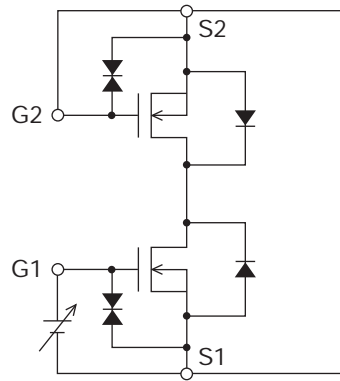
$V_{SSS} / I_{SSS}$



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Test Circuit 2

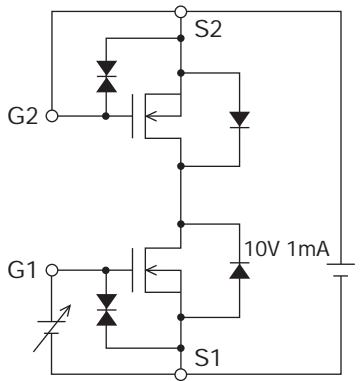
$I_{GSS(+)} / (-)$



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Test Circuit 3

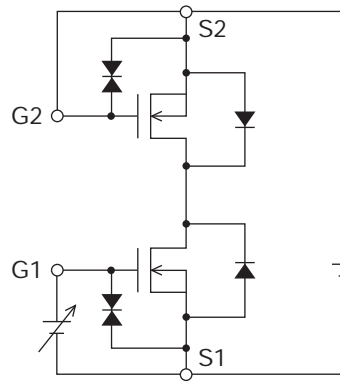
$V_{GS(off)}$



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Test Circuit 4

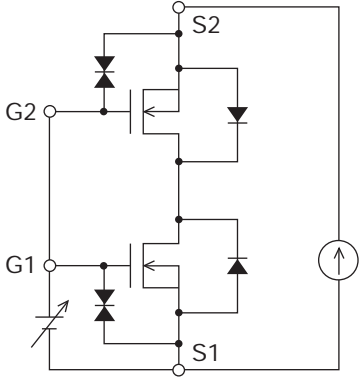
$|y_{fs}|$



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Test Circuit 5

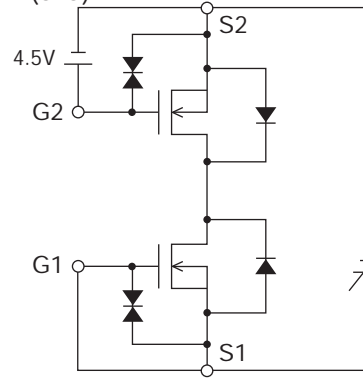
$R_{SS(on)}$



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Test Circuit 6

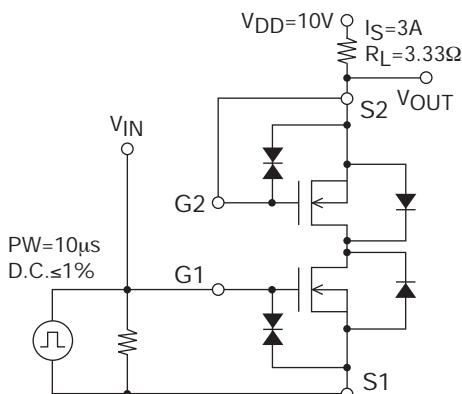
$V_{F(S-S)}$



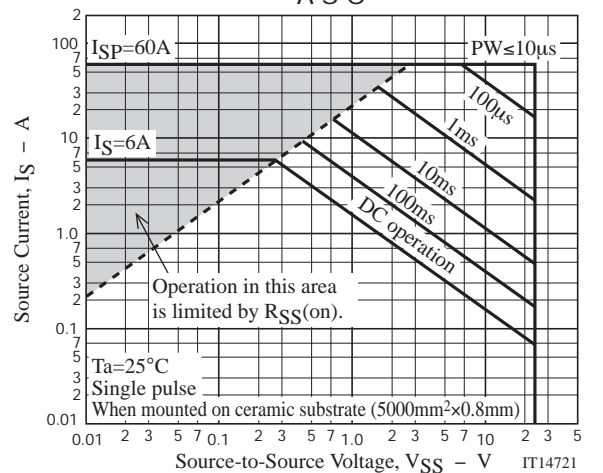
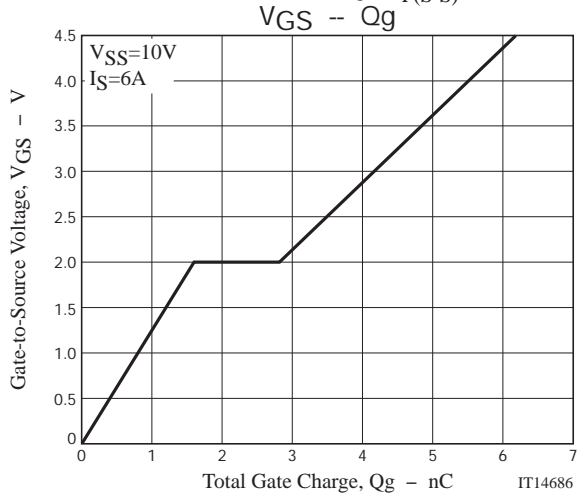
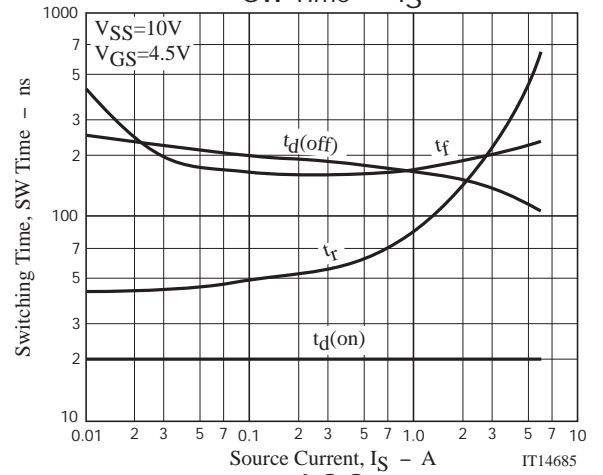
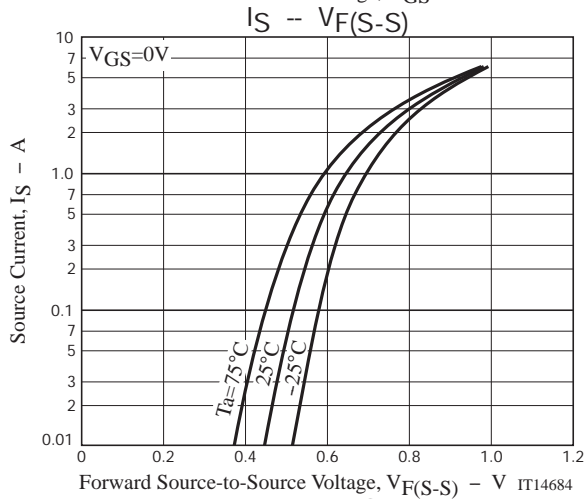
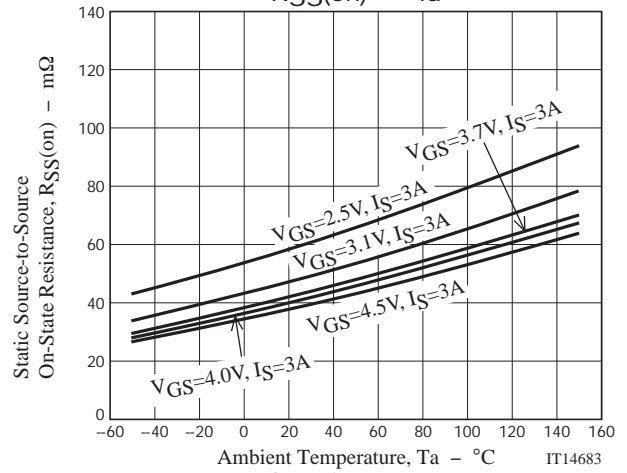
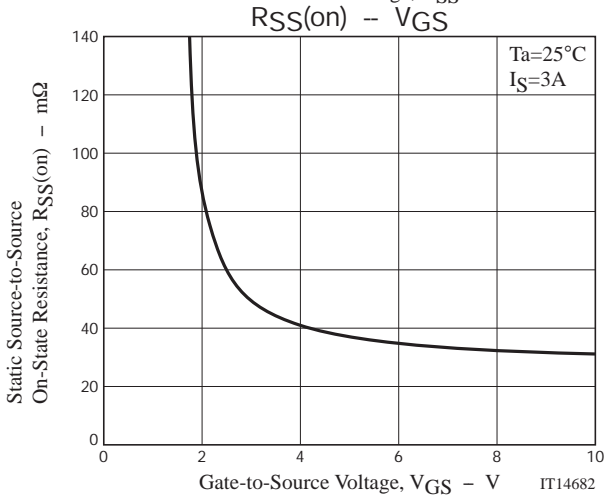
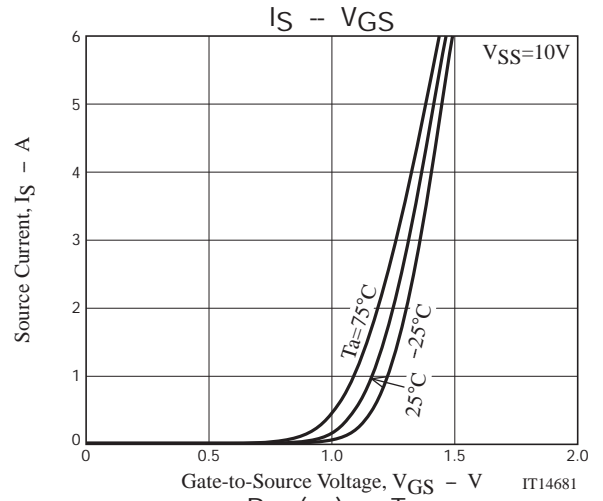
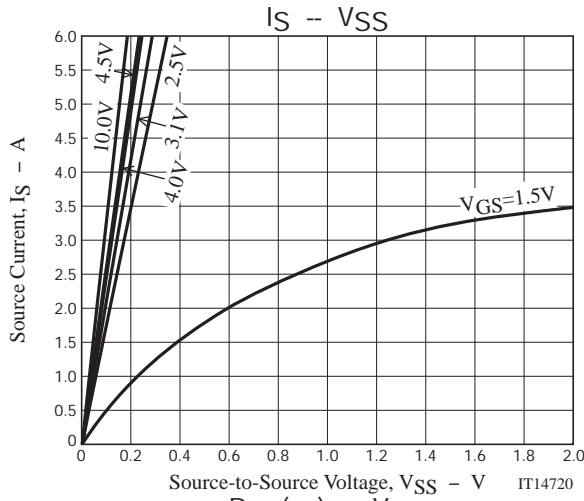
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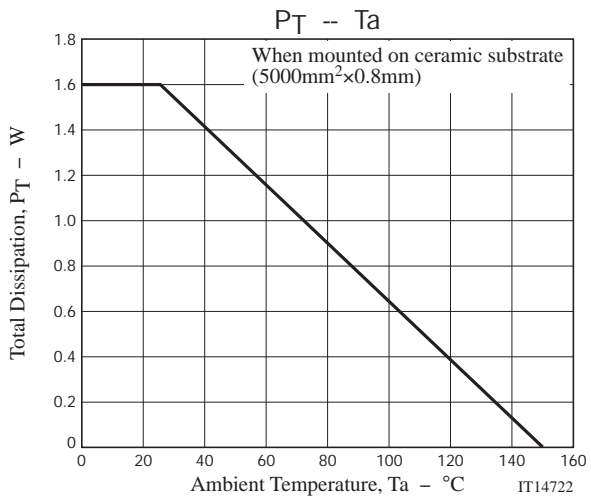
Test Circuit 7

$t_{d(on)}, t_r, t_{d(off)}, t_f$



\* Note: Connect the measurement terminal reversely if you want to measure the FET2 side.





Taping Specification

EFC4612R-TR

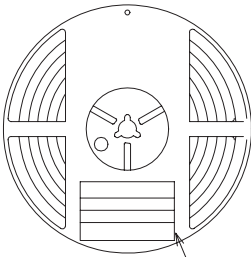
1. Packing Format

| 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)  |
| EFCP1313<br>-4CC-037 | 145145×055        | 5,000                                     | 25,000    | 150,000   | 5 reels contained<br>Dimensions:mm (external)<br>183×72×185 | 6 inner boxes contained<br>Dimensions:mm (external)<br>440×195×210 |

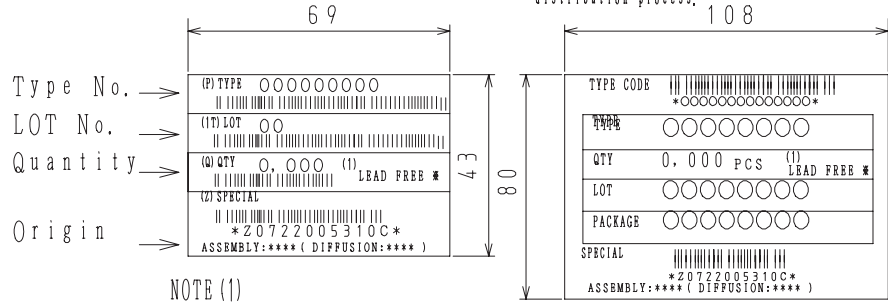
Packing method

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.]



Reel label

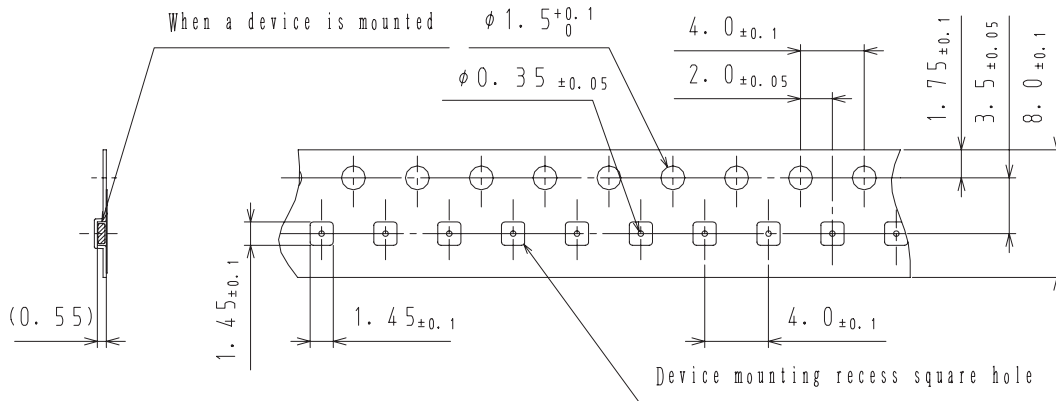


NOTE (1)  
The LEAD FREE 4 description shows that it is complete lead free.

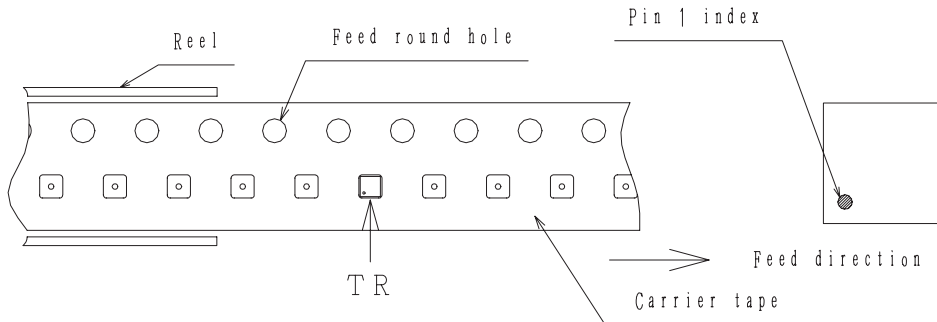
| Label       | JEITA Phase   |
|-------------|---------------|
| LEAD FREE 4 | JEITA Phase 3 |

2. Taping configuration

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



2-2. Device placement direction

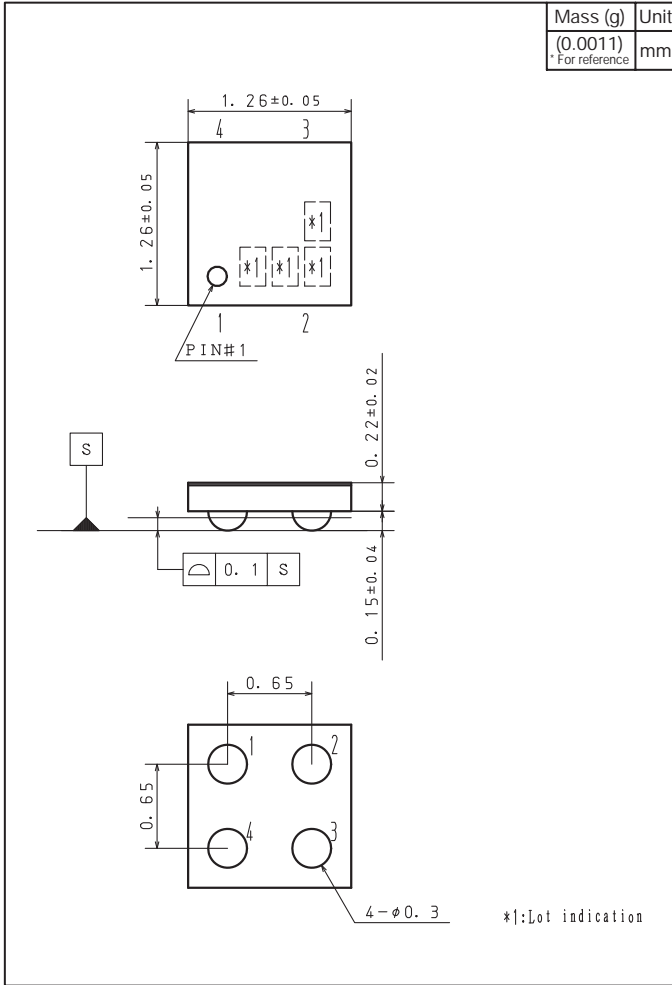


Those with pin 1 index on the opposite of feed hole.....TR

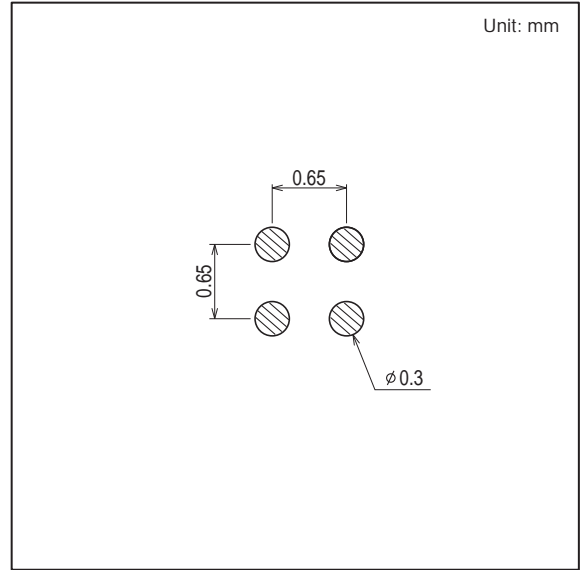
# EFC4612R

## Outline Drawing

EFC4612R-TR



## Land Pattern Example



Note on usage : Since the EFC4612R is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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