Ordering number : ENA1477B

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

N-Channel Silicon MOSFET

EFC4612R — General-Purpose Switching Device Applications

Features

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

Specifications

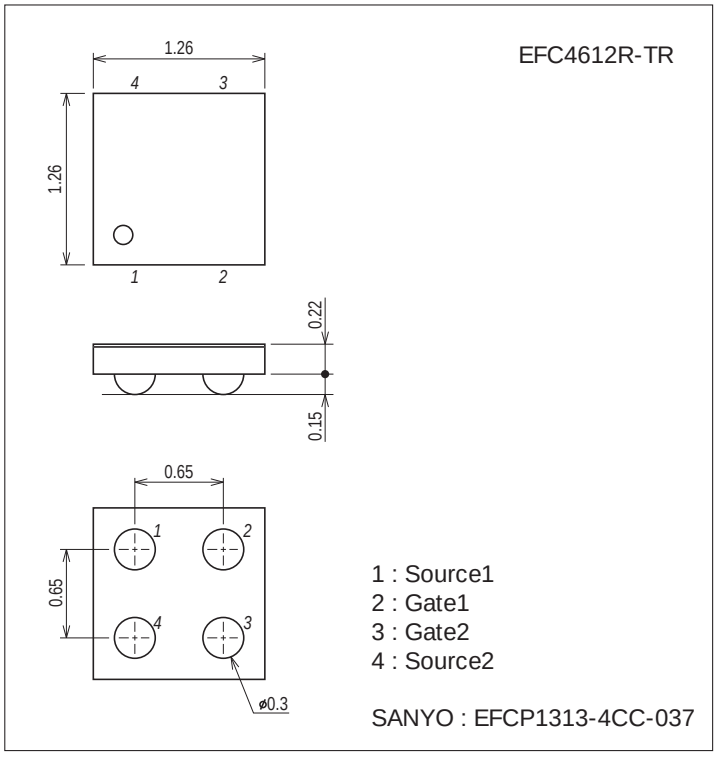
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Source-to-Source Voltage	V_{SSS}		24	V
Gate-to-Source Voltage	V_{GSS}		±12	V
Source Current (DC)	I_S		6	A
Source Current (Pulse)	I_{SP}	PW≤10μs, duty cycle≤1%	60	A
Total Dissipation	P_T	When mounted on ceramic substrate (5000mm²×0.8mm)	1.6	W
Channel Temperature	Tch		150	℃
Storage Temperature	Tstg		−55 to +150	℃

Package Dimensions

unit : mm (typ)

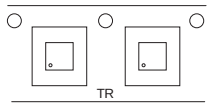
7064-001



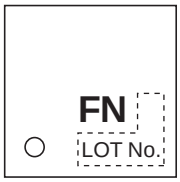
Product & Package Information

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

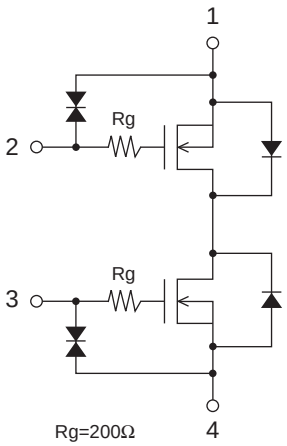
Taping Type : TR



Marking



Electrical Connection



Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions		Ratings min	Ratings typ	Ratings max	Unit
Source-to-Source Breakdown Voltage	$V_{(BR)SSS}$	I_S=1mA, V_{GS}=0V	Test Circuit 1	24			V
Zero-Gate Voltage Source Current	I_{SSS}	V_{SS}=20V, V_{GS}=0V	Test Circuit 1			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{SS}=0V	Test Circuit 2			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{SS}=10V, I_S=1mA	Test Circuit 3	0.5		1.3	V
Forward Transfer Admittance	| yfs |	V_{SS}=10V, I_S=3A	Test Circuit 4		3.1		S
Static Source-to-Source On-State Resistance	R_{SS}(on)1	I_S=3A, V_{GS}=4.5V	Test Circuit 5	24	39	45	mΩ
	R_{SS}(on)2	I_S=3A, V_{GS}=4.0V	Test Circuit 5	25	41	48	mΩ
	R_{SS}(on)3	I_S=3A, V_{GS}=3.7V	Test Circuit 5	27.5	43	50	mΩ
	R_{SS}(on)4	I_S=3A, V_{GS}=3.1V	Test Circuit 5	31.5	48	57	mΩ
	R_{SS}(on)5	I_S=3A, V_{GS}=2.5V	Test Circuit 5	33.5	58	72	mΩ
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.	Test Circuit 7		20		ns
Rise Time	t_r				230		ns
Turn-OFF Delay Time	t_d(off)				130		ns
Fall Time	t_f				210		ns
Total Gate Charge	Qg	V_{SS}=10V, V_{GS}=4.5V, I_S=6A			7		nC
Forward Source-to-Source Voltage	$V_{F(S-S)}$	I_S=3A, V_{GS}=0V	Test Circuit 6		0.8	1.2	V

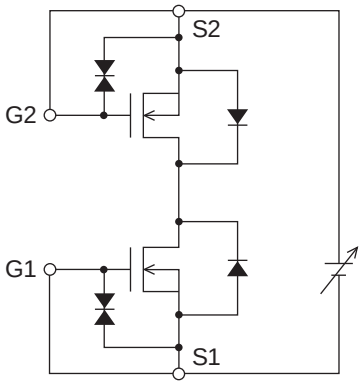
Ordering Information

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

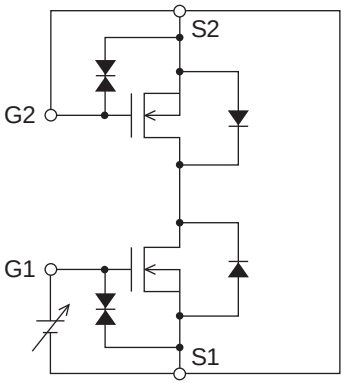
V_{SSS} / I_{SSS}



IT11565

Test Circuit 2

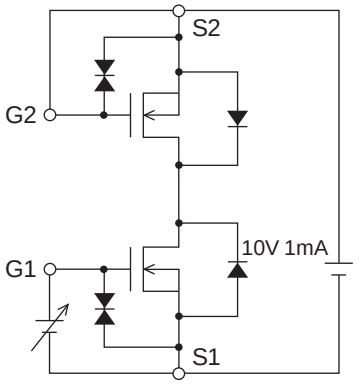
I_{GSS}(+) / (--)



IT11566

Test Circuit 3

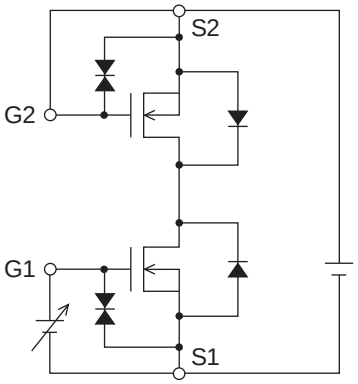
V_{GS}(off)



IT11567

Test Circuit 4

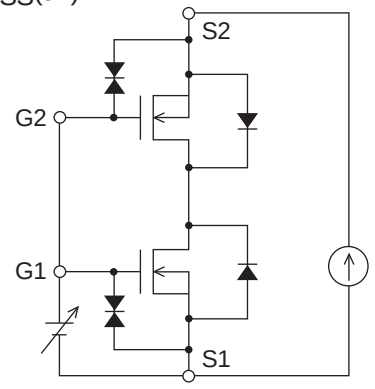
| yfs |



IT11568

Test Circuit 5

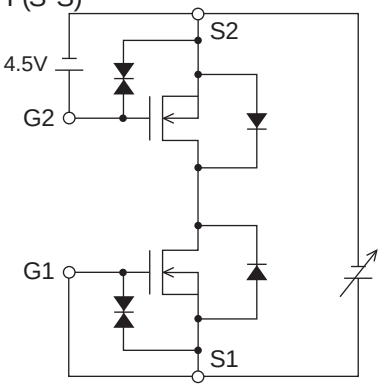
R_{SS}(on)



IT11569

Test Circuit 6

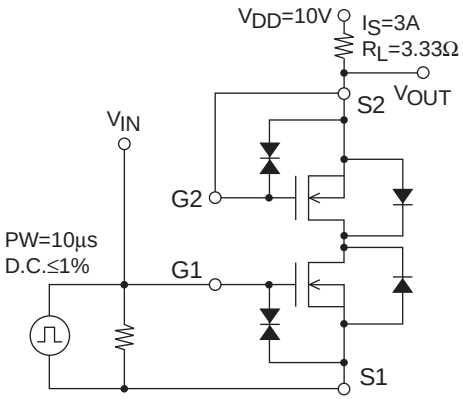
$V_{F(S-S)}$



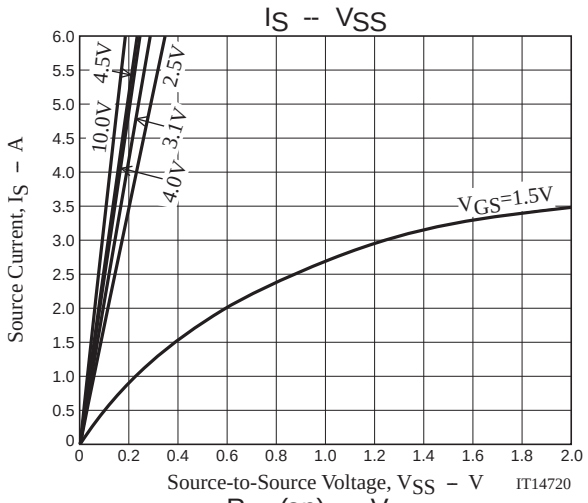
IT11570

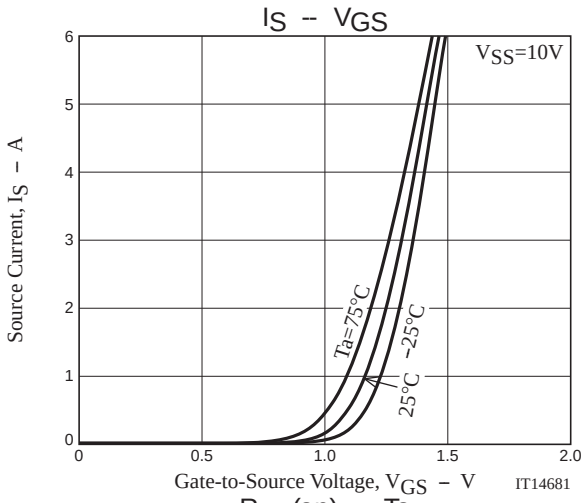
Test Circuit 7

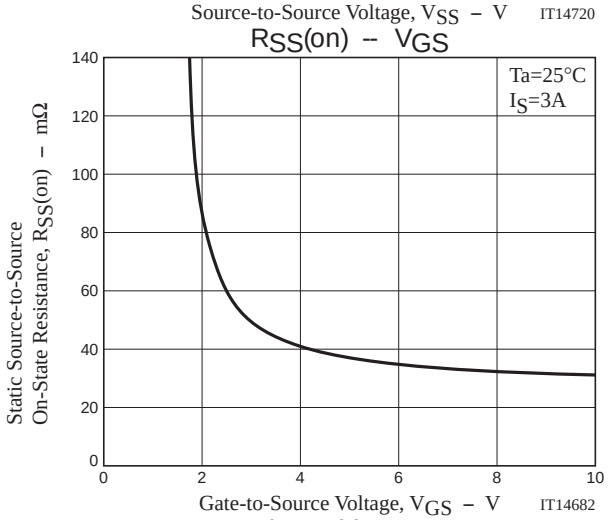
t_d(on), t_r, t_d(off), t_f

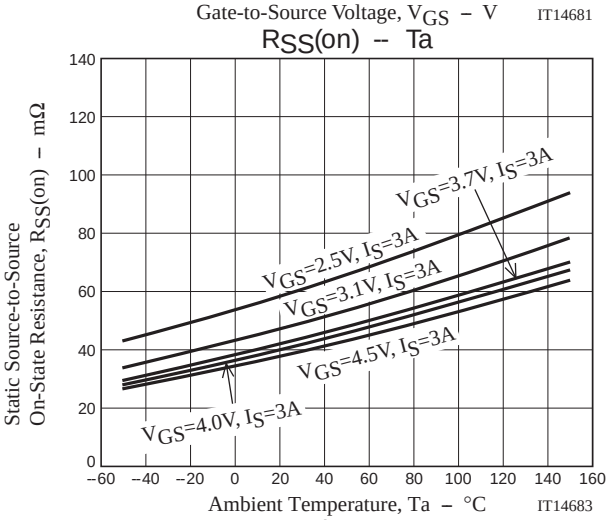


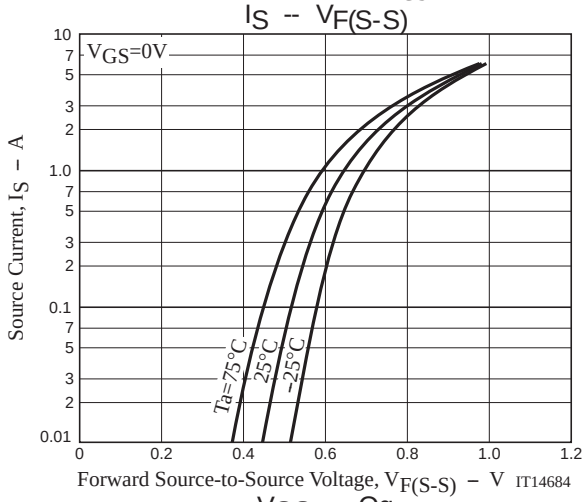
* Note: Connect the mesurement terminal reversely if you want to measure the FET2 side.

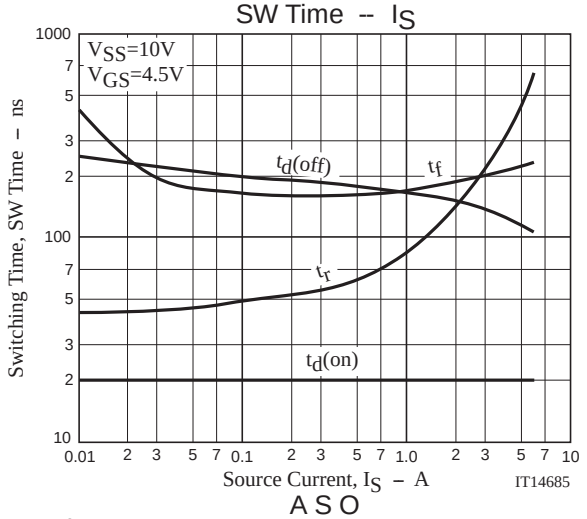

IS -- VSS
Source Current, IS – A
Source-to-Source Voltage, VSS – V
IT14720
VGS=1.5V
10.0V
4.5V
4.0V
3.1V
2.5V

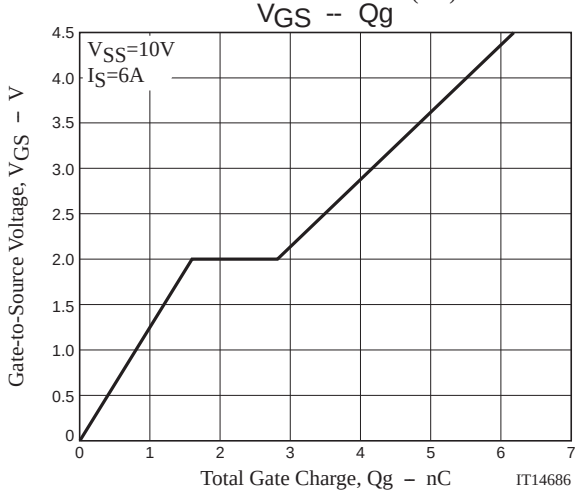

IS -- VGS
Source Current, IS – A
Gate-to-Source Voltage, VGS – V
IT14681
VSS=10V
Ta=75°C
25°C
–25°C

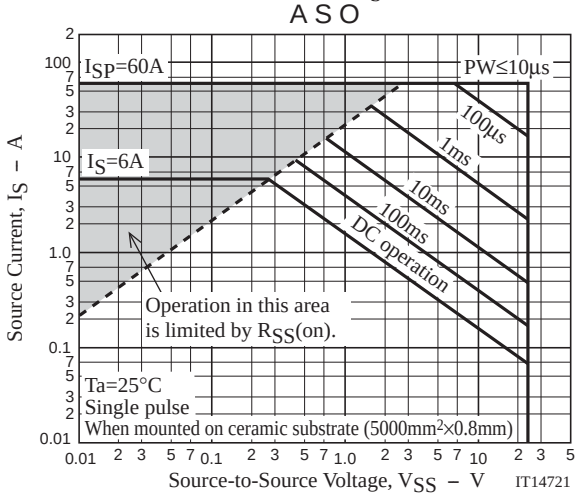

RSS(on) -- VGS
Static Source-to-Source On-State Resistance, RSS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT14682
Ta=25°C
IS=3A

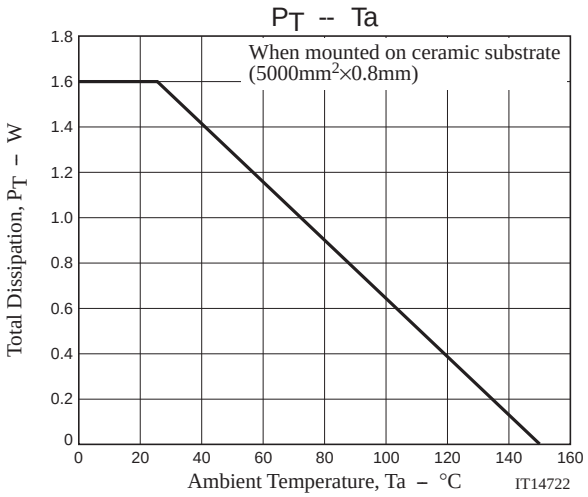

RSS(on) -- Ta
Static Source-to-Source On-State Resistance, RSS(on) – mΩ
Ambient Temperature, Ta – °C
IT14683
VGS=3.7V, IS=3A
VGS=2.5V, IS=3A
VGS=3.1V, IS=3A
VGS=4.5V, IS=3A
VGS=4.0V, IS=3A


IS -- VF(S-S)
Source Current, IS – A
Forward Source-to-Source Voltage, VF(S-S) – V
IT14684
VGS=0V
Ta=75°C
25°C
–25°C


SW Time -- IS
Switching Time, SW Time – ns
Source Current, IS – A
IT14685
VSS=10V
VGS=4.5V
td(off)
tf
tr
td(on)


VGS -- Qg
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT14686
VSS=10V
IS=6A


A S O
Source Current, IS – A
Source-to-Source Voltage, VSS – V
IT14721
ISP=60A
PW≤10μs
IS=6A
100μs
1ms
10ms
100ms
DC operation
Operation in this area
is limited by RSS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (5000mm²×0.8mm)


PT -- Ta
When mounted on ceramic substrate
(5000mm2×0.8mm)
Total Dissipation, PT – W
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
140
160
Ambient Temperature, Ta – °C
IT14722

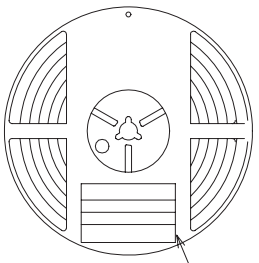
Taping Specification

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

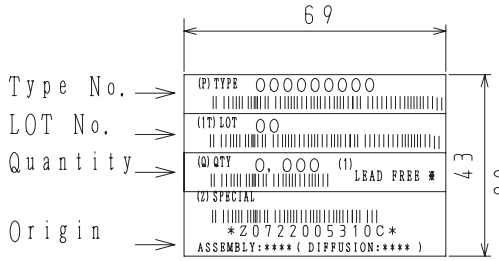
Packing method



Reel label

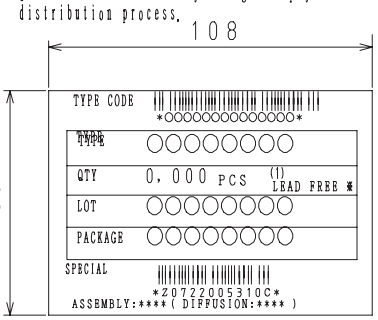
Reel label, Inner box label

(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.

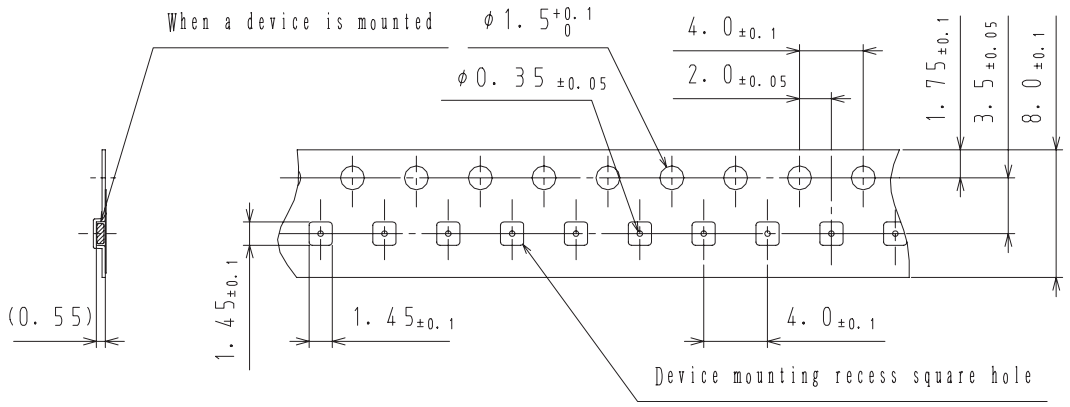


NOTE (1)
The LEAD FREE 4 description shows that it is complete lead free.

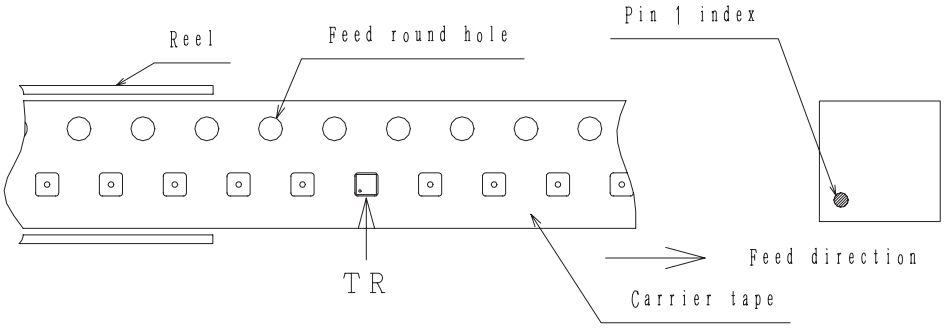
Label	JEITA Phase
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



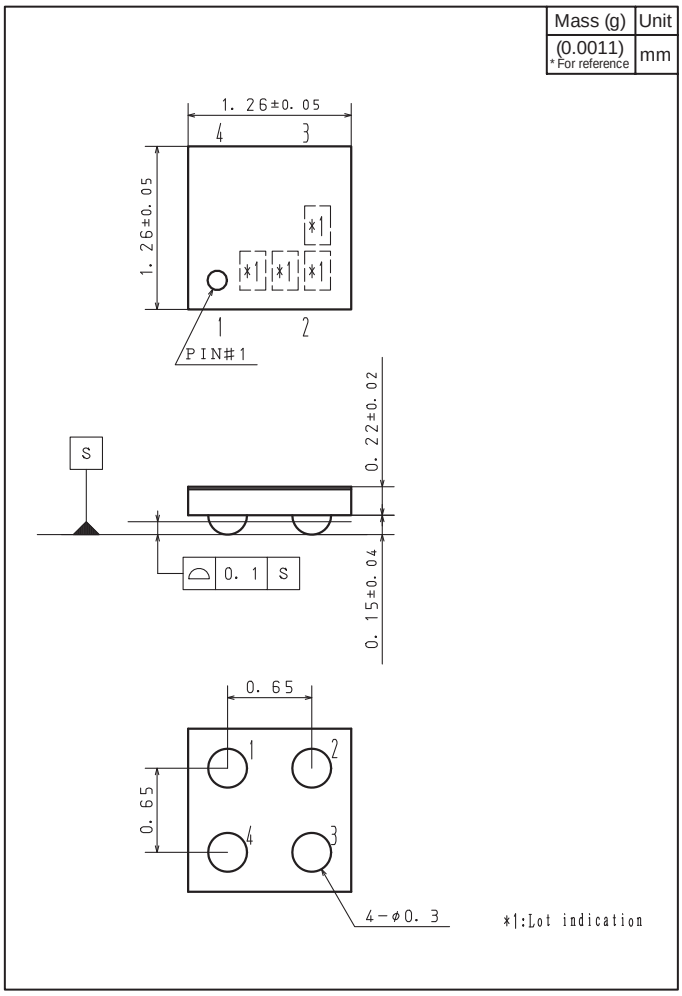
2-2. Device placement direction



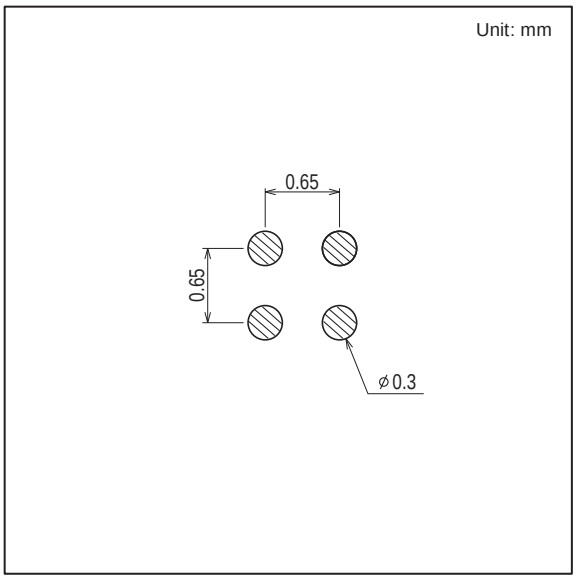
Those with pin 1 index on the opposide of feed hole·····TR

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.

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