



ON Semiconductor®

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# EFC4619R

## Power MOSFET

### 24V, 6A, 23mΩ N-Channel Dual EFCP

#### Features

- 2.5V drive
- Common-drain type
- 2KV ESD HBM
- Protection diode in
- Halogen free compliance

#### Applications

- Lithium-ion battery charging and discharging switch

#### Specifications

Absolute Maximum Ratings at  $T_a = 25^\circ\text{C}$ 

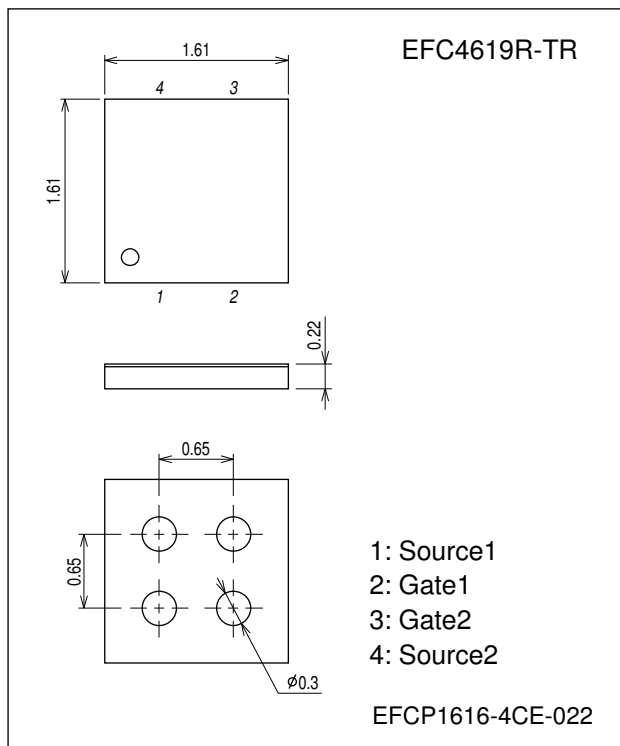
Parameter	Symbol	Conditions	Ratings	Unit
Source to Source Voltage	$V_{SSS}$		24	V
Gate to Source Voltage	$V_{GSS}$		$\pm 12$	V
Source Current (DC)	$I_S$		6	A
Source Current (Pulse)	$I_{SP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	60	A
Total Dissipation	$P_T$	When mounted on ceramic substrate (5000mm <sup>2</sup> × 0.8mm)	1.6	W
Channel Temperature	$T_{ch}$		150	°C
Storage Temperature	$T_{stg}$		-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)

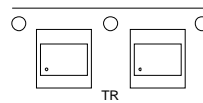
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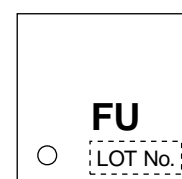
#### Ordering & Package Information

Device	Package	Shipping	note
EFC4619R-TR	EFCP	5000 pcs. / reel	Pb-Free and Halogen-Free

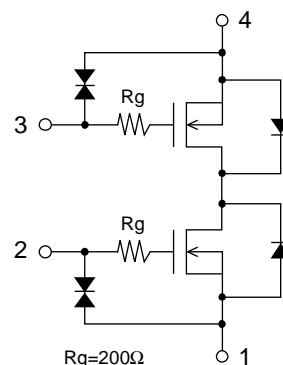
#### Packing Type: TR



#### Marking



#### Electrical Connection



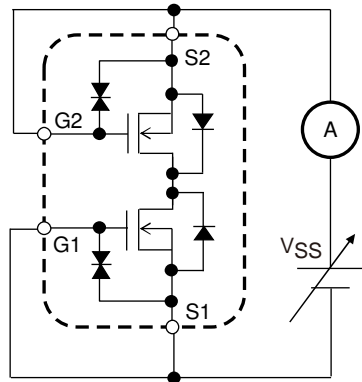
# EFC4619R

## Electrical Characteristics at $T_a = 25^{\circ}\text{C}$

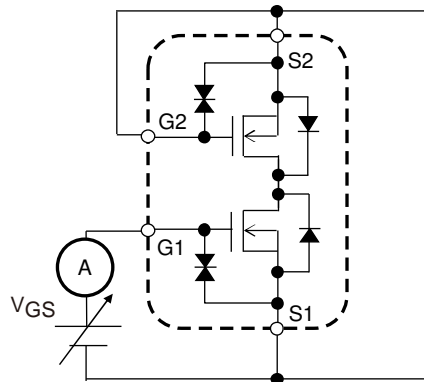
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Source to Source Breakdown Voltage	$V_{(BR)SSS}$	$I_S=1\text{mA}$ , $V_{GS}=0\text{V}$ Test Circuit 1	24			V
Zero-Gate Voltage Source Current	$I_{SSS}$	$V_{SS}=20\text{V}$ , $V_{GS}=0\text{V}$ Test Circuit 1			1	$\mu\text{A}$
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8\text{V}$ , $V_{SS}=0\text{V}$ Test Circuit 2			$\pm 1$	$\mu\text{A}$
Cutoff Voltage	$V_{GS(off)}$	$V_{SS}=10\text{V}$ , $I_S=1\text{mA}$ Test Circuit 3	0.5		1.3	V
Forward Transfer Admittance	$ y_{fs} $	$V_{SS}=10\text{V}$ , $I_S=3\text{A}$ Test Circuit 4		5.8		S
Static Source to Source On-State Resistance	$R_{SS(on)1}$	$I_S=3\text{A}$ , $V_{GS}=4.5\text{V}$ Test Circuit 5	13.5	19.8	23	$\text{m}\Omega$
	$R_{SS(on)2}$	$I_S=3\text{A}$ , $V_{GS}=4.0\text{V}$ Test Circuit 5	14	20.5	24	$\text{m}\Omega$
	$R_{SS(on)3}$	$I_S=3\text{A}$ , $V_{GS}=3.7\text{V}$ Test Circuit 5	14.5	21	25.5	$\text{m}\Omega$
	$R_{SS(on)4}$	$I_S=3\text{A}$ , $V_{GS}=3.1\text{V}$ Test Circuit 5	14.9	23	30	$\text{m}\Omega$
	$R_{SS(on)5}$	$I_S=3\text{A}$ , $V_{GS}=2.5\text{V}$ Test Circuit 5	18.5	27	35	$\text{m}\Omega$
Turn-ON Delay Time	$t_{d(on)}$	$V_{SS}=10\text{V}$ , $V_{GS}=4.5\text{V}$ , $I_S=3\text{A}$ Test Circuit 7		340		ns
Rise Time	$t_r$			440		ns
Turn-OFF Delay Time	$t_{d(off)}$			24400		ns
Fall Time	$t_f$			22400		ns
Total Gate Charge	$Q_g$	$V_{SS}=10\text{V}$ , $V_{GS}=4.5\text{V}$ , $I_S=6\text{A}$ Test Circuit 8		21.7		nC
Forward Source to Source Voltage	$V_{F(S-S)}$	$I_S=3\text{A}$ , $V_{GS}=0\text{V}$ Test Circuit 6		0.8	1.2	V

Test circuits are example of measuring FET1 side

Test Circuit 1  
 $I_{SS}$

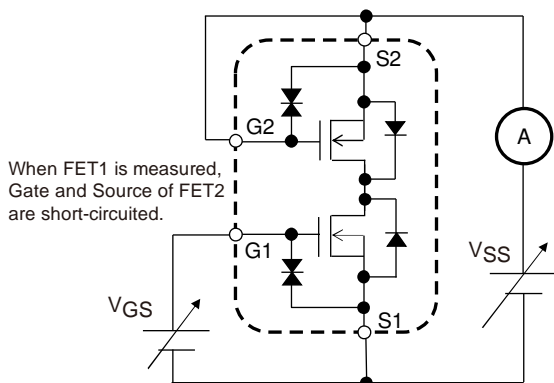


Test Circuit 2  
 $I_{GSS}$

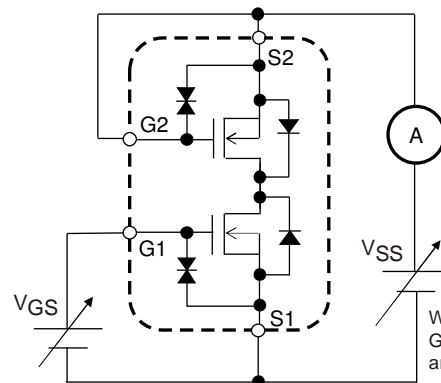


When FET1 is measured, Gate and Source of FET2 are short-circuited.

Test Circuit 3  
 $V_{GS(off)}$

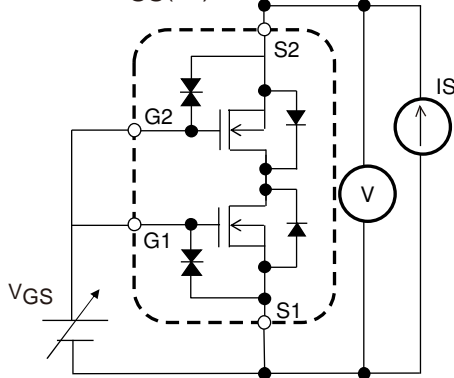


Test Circuit 4  
 $|y_{fs}|$

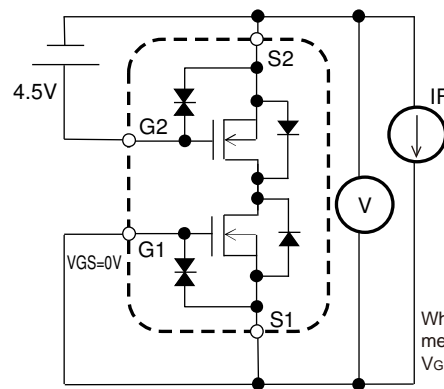


When FET1 is measured, Gate and Source of FET2 are short-circuited.

Test Circuit 5  
 $R_{SS(on)}$

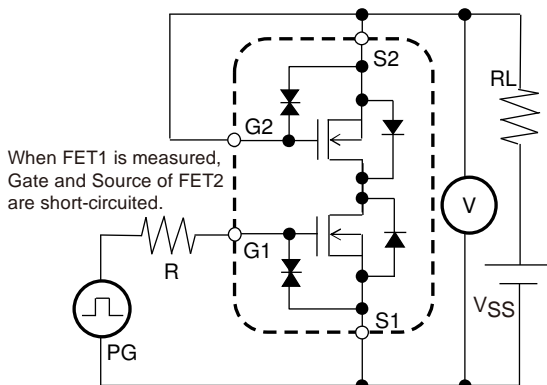


Test Circuit 6  
 $V_F(S-S)$

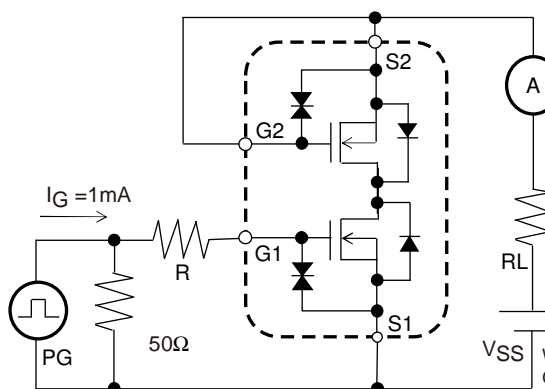


When FET1 is measured, +4.5V is added to  $V_{GS}$  of FET2.

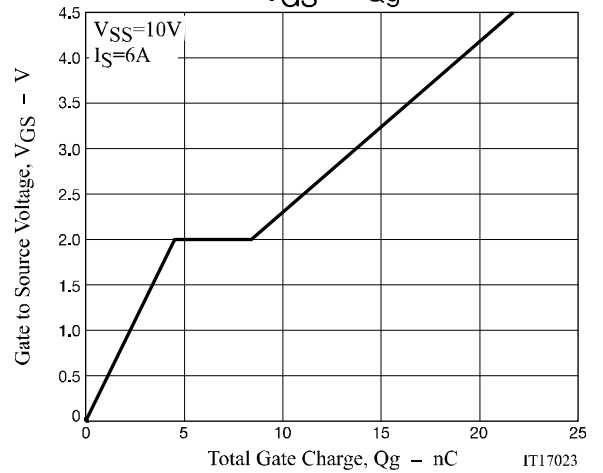
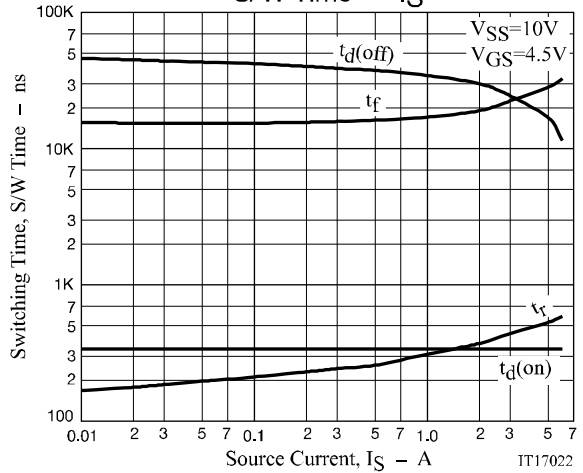
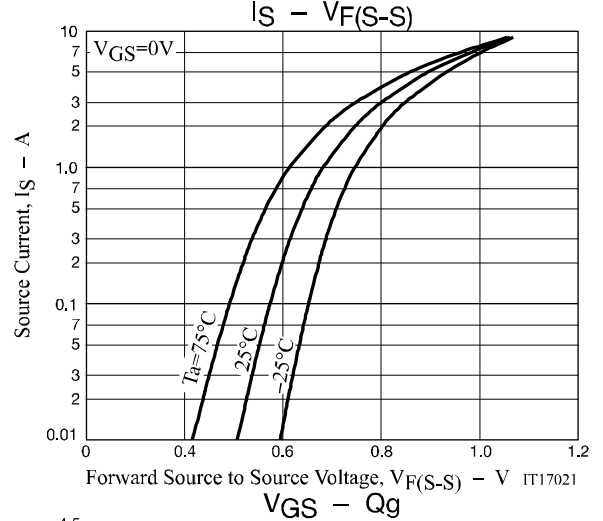
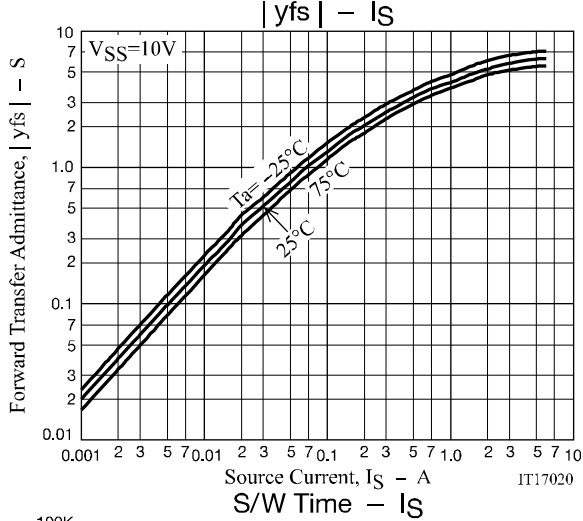
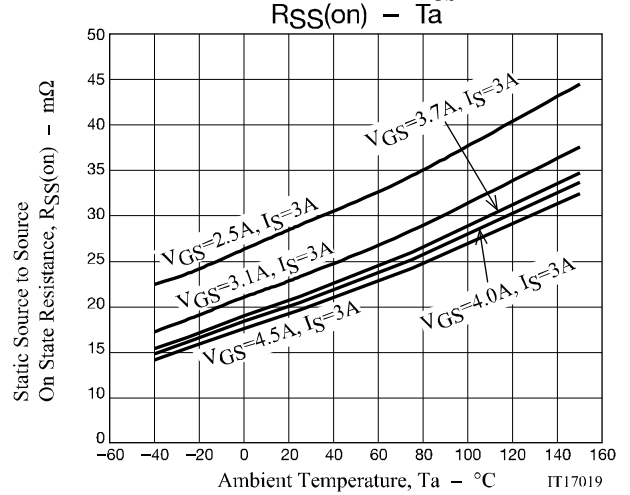
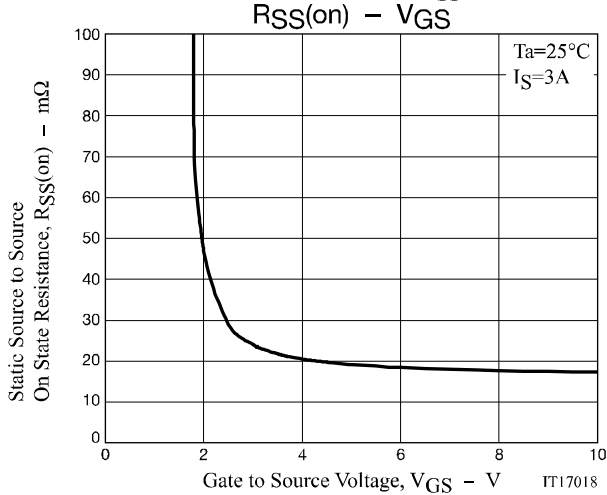
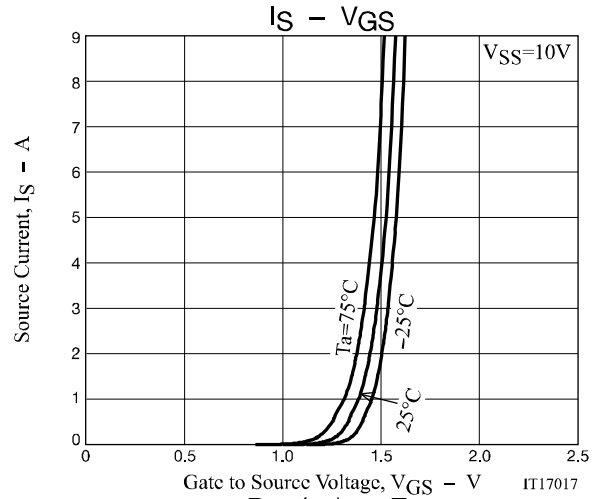
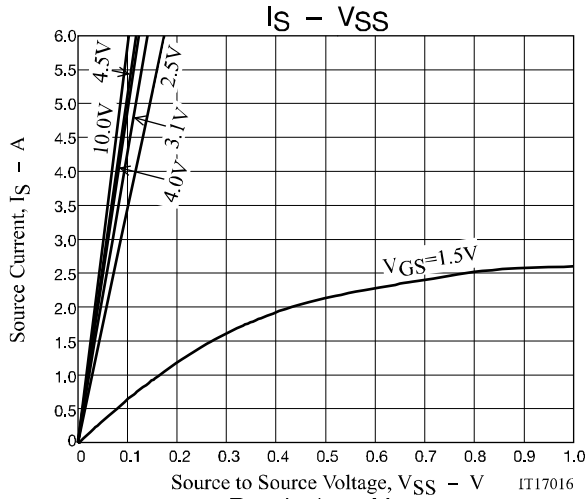
Test Circuit 7  
 $t_d(on)$ ,  $t_r$ ,  $t_d(off)$ ,  $t_f$

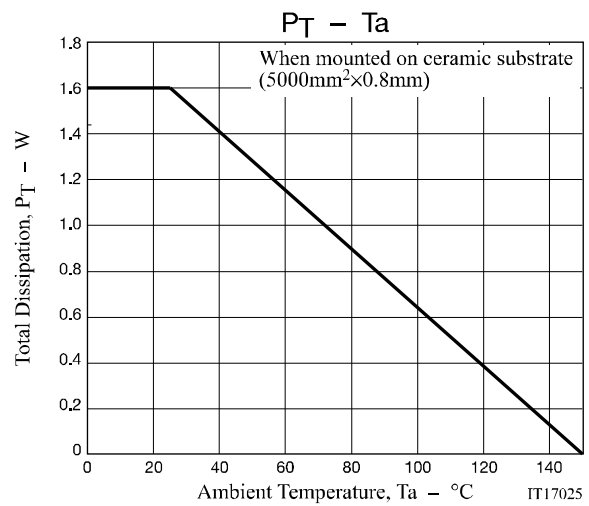
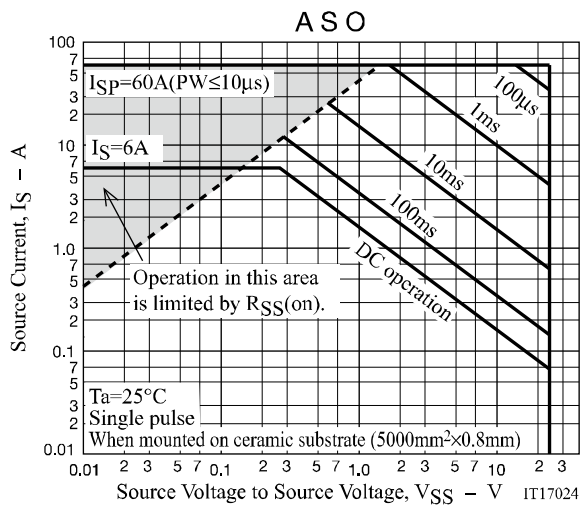


Test Circuit 8  
 $Q_g$



When FET1 is measured, Gate and Source of FET2 are short-circuited.



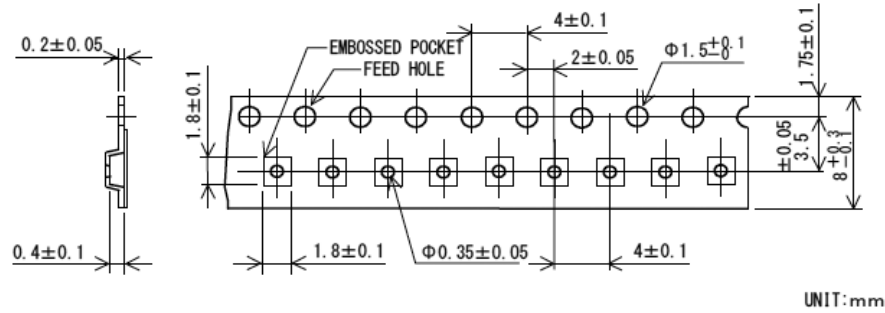


Taping Specification

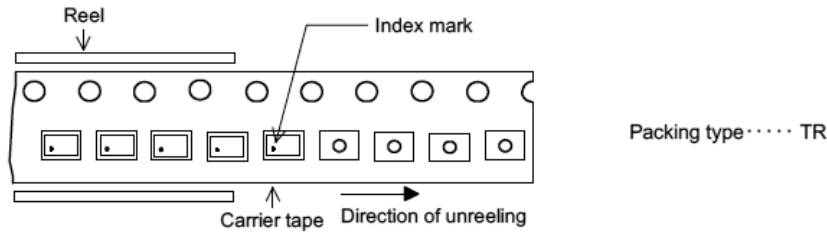
EFC4619R-TR

1.Taping Configuration

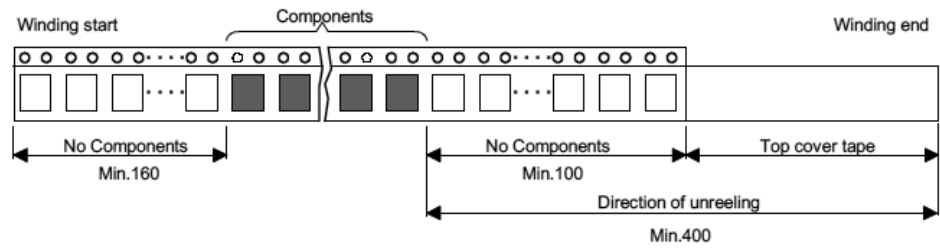
1- 1 .Carrier Tape Size (unit:mm)



1- 2 .Device Placement Direction



1- 3 .Leader portion and Trailer portion (unit:mm)



EFC4619R

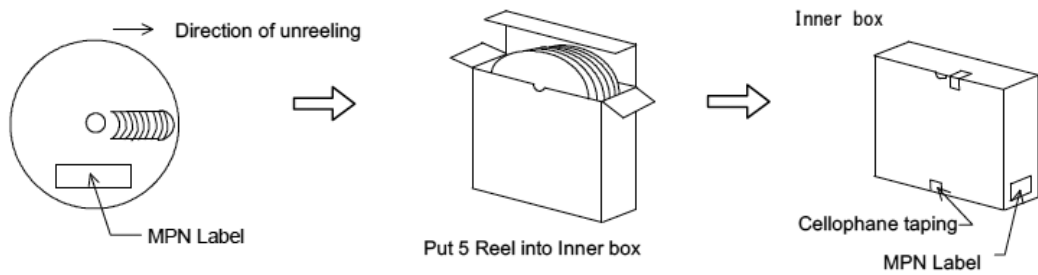
Packing Format

Carrier Tape code	Package code	Maximum Number of devices contained. (pcs.)			Packing Format	
		Reel	Inner box		Inner box BOX(C-1)	
1818X04	EFCP1616-4CE-022	5,000	25,000		5reels contained. Dimensions:mm 183×72×185	

MPN Label

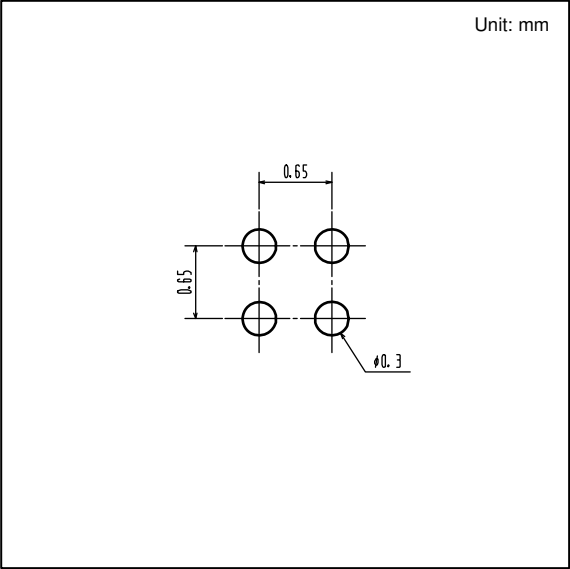
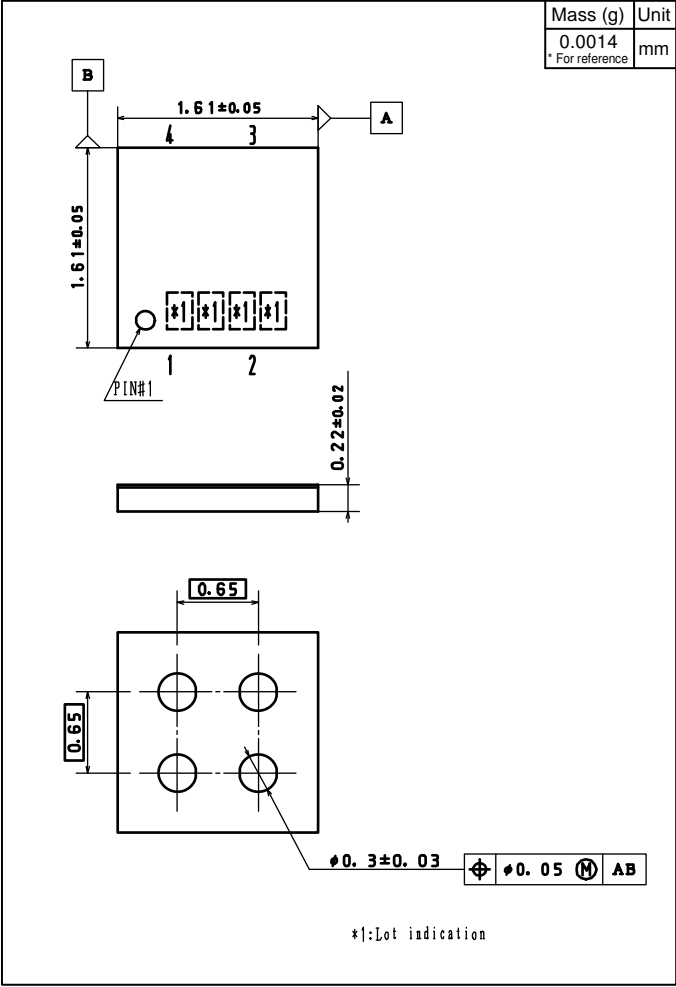


Packing Method



Outline Drawing  
EFC4619R-TR

Land Pattern Example





Note on usage : Since the EFC4619R is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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