Ordering number : ENA2151A

EFC6601R

N-Channel Power MOSFET
24V, 13A, 11.5mΩ, Dual EFCP

ON Semiconductor®
http://onsemi.com

Features

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

Specifications

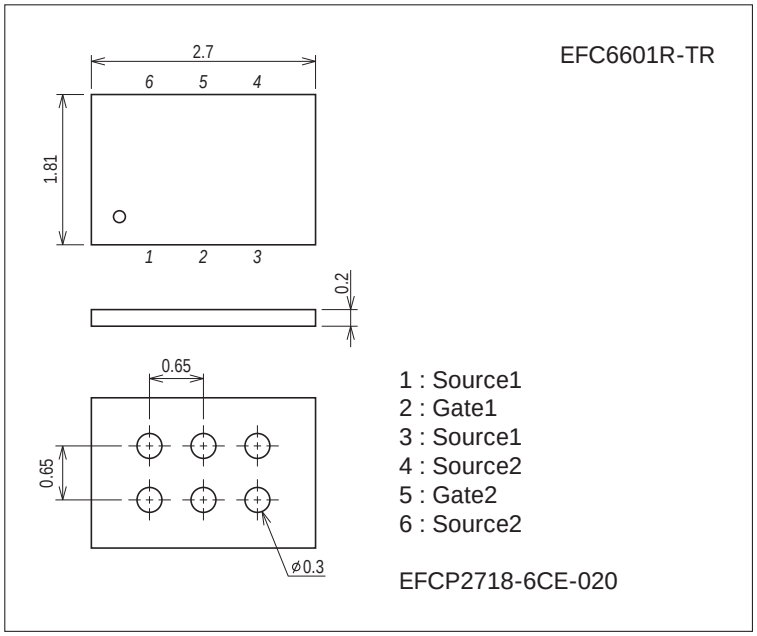
Absolute Maximum Ratings at Ta=25°C

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		13	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)	2.0	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

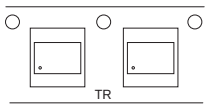
unit : mm (typ)
7073-001



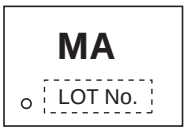
Product & Package Information

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

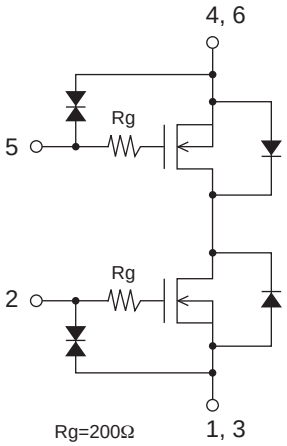
Taping Type : TR



Marking



Electrical Connection



Electrical Characteristics at Ta=25°C

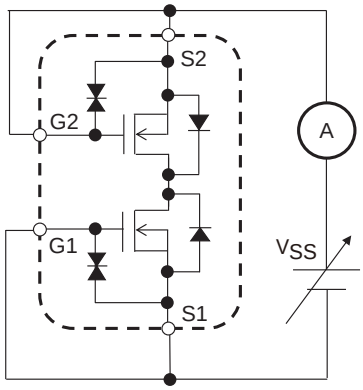
Parameter	Symbol	Conditions		Ratings			Unit
				min	typ	max	
Source-to-Source Breakdown Voltage	$V_{(BR)SSS}$	I_S=1mA, V_{GS}=0V	Test Circuit 1	24			V
Zero-Gate Voltage Source Current	I_{SSS}	V_{SS}=20V, V_{GS}=0V	Test Circuit 1			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{SS}=0V	Test Circuit 2			±1	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		15.5		S
Static Source-to-Source On-State Resistance	R_{SS}(on)1	I_S=3A, V_{GS}=4.5V	Test Circuit 5	6.6	9.5	11.5	mΩ
	R_{SS}(on)2	I_S=3A, V_{GS}=4.0V	Test Circuit 5	7.0	10	12	mΩ
	R_{SS}(on)3	I_S=3A, V_{GS}=3.8V	Test Circuit 5	7.3	10.5	13	mΩ
	R_{SS}(on)4	I_S=3A, V_{GS}=3.1V	Test Circuit 5	8.0	11.5	15	mΩ
	R_{SS}(on)5	I_S=3A, V_{GS}=2.5V	Test Circuit 5	9.0	13	17	mΩ
Turn-ON Delay Time	t_d(on)	V_{DD}=10V, V_{GS}=4.5V, I_S=3A	Test Circuit 7		280		ns
Rise Time	t_r				630		ns
Turn-OFF Delay Time	t_d(off)				53000		ns
Fall Time	t_f				47000		ns
Total Gate Charge	Qg	V_{DD}=10V, V_{GS}=4.5V, I_S=13A	Test Circuit 8		48		nC
Forward Source-to-Source Voltage	$V_{F(S-S)}$	I_S=3A, V_{GS}=0V	Test Circuit 6		0.76	1.2	V

Ordering Information

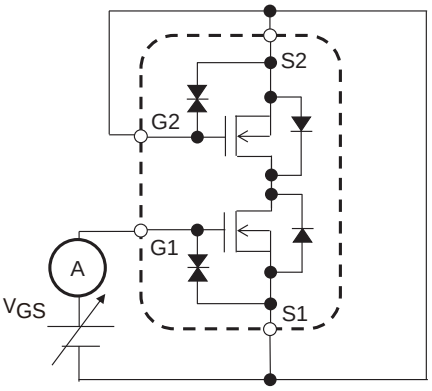
Device	Package	Shipping	memo
EFC6601R-TR	EFCP	5,000pcs./reel	Pb Free and Halogen Free

Test circuits are example of measuring FET1 side

Test Circuit 1
I_{SSS}

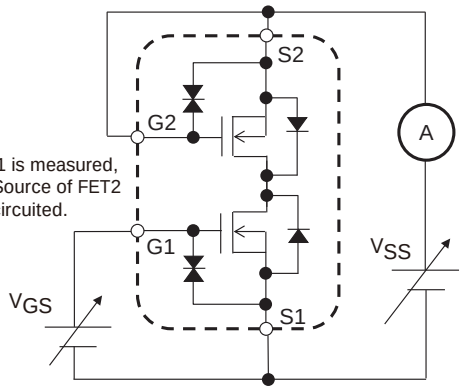


Test Circuit 2
I_{GSS}



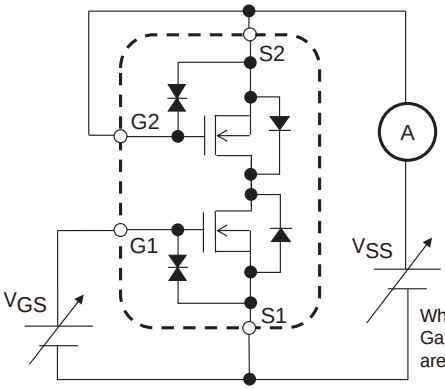
When FET1 is measured, Gate and Source of FET2 are short-circuited.

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



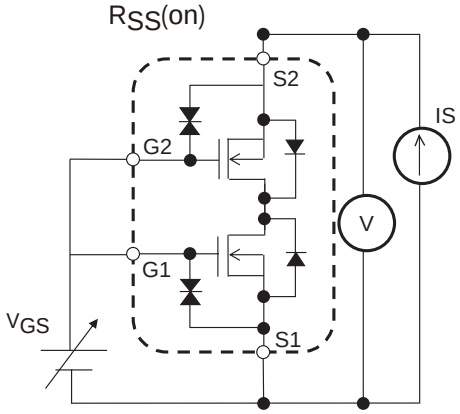
When FET1 is measured, Gate and Source of FET2 are short-circuited.

Test Circuit 4
$|y_{fs}|$

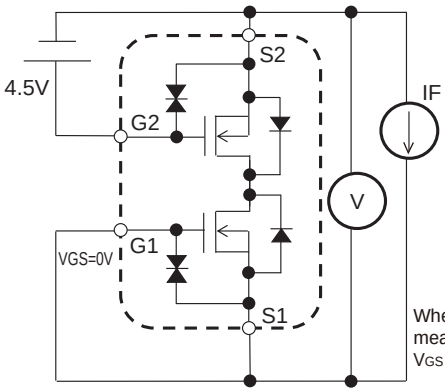


When FET1 is measured, Gate and Source of FET2 are short-circuited.

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

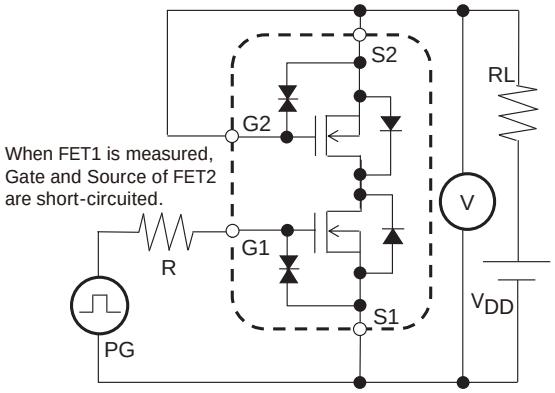


Test Circuit 6
$V_{F(S-S)}$



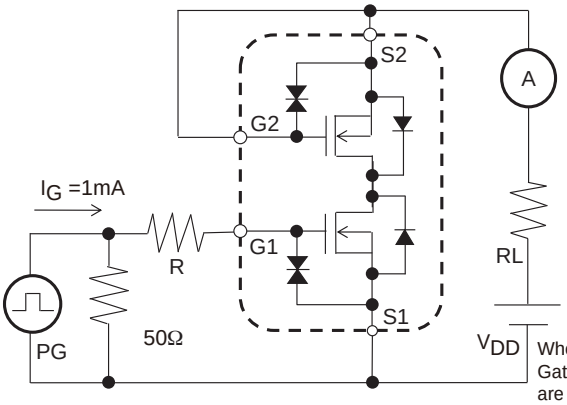
When FET1 is measured,+4.5V is added to V_{GS} of FET2.

Test Circuit 7
$t_{d(on)}$, t_r, $t_{d(off)}$, t_f

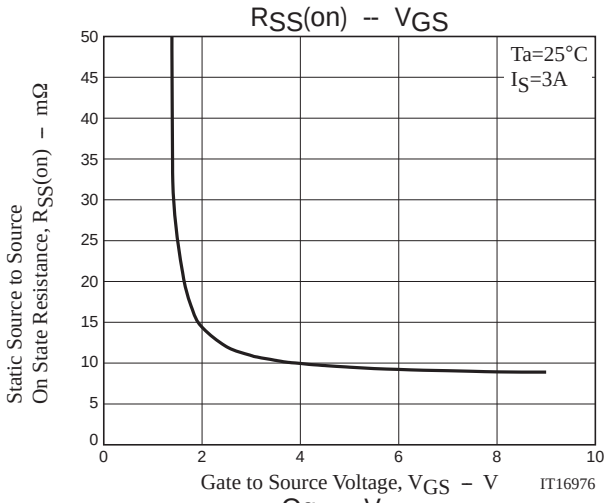


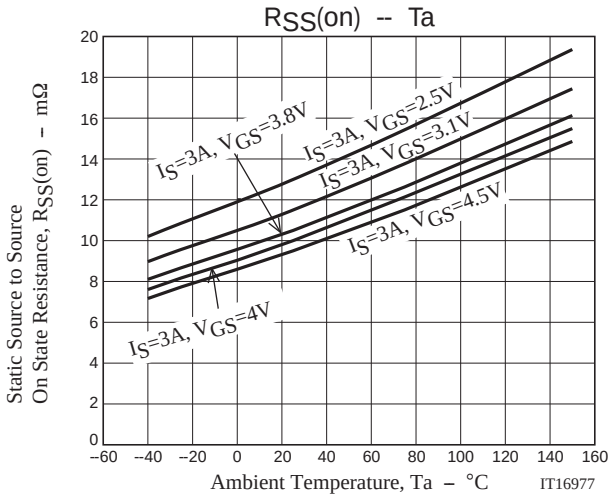
When FET1 is measured, Gate and Source of FET2 are short-circuited.

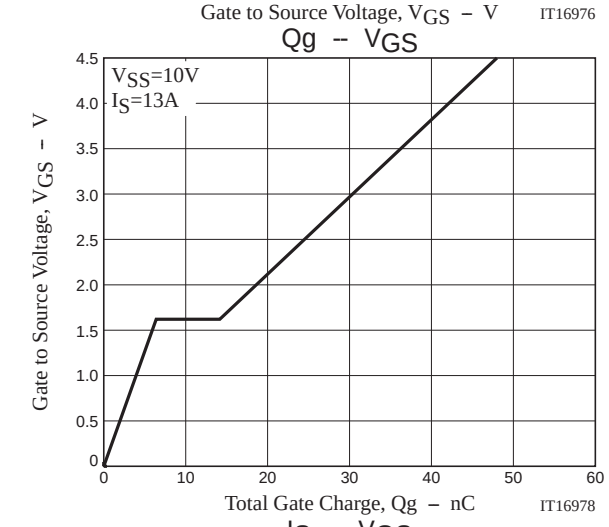
Test Circuit 8
Qg

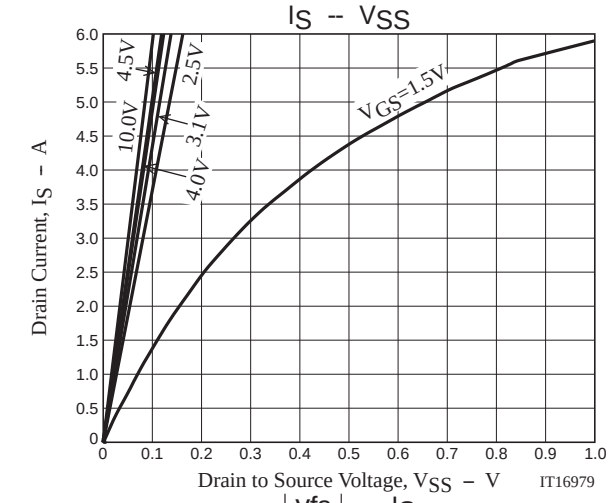


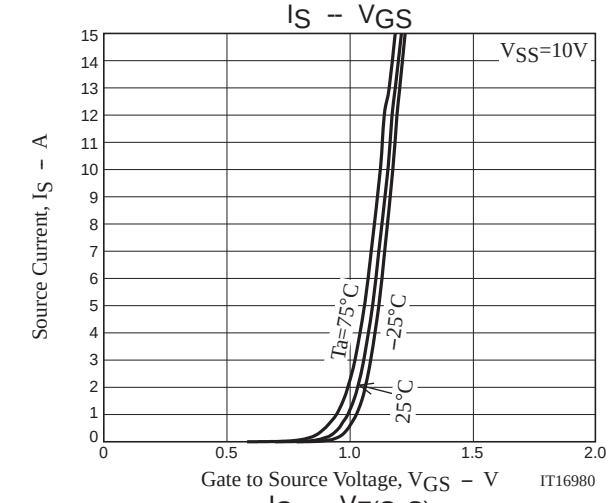
When FET1 is measured, Gate and Source of FET2 are short-circuited.

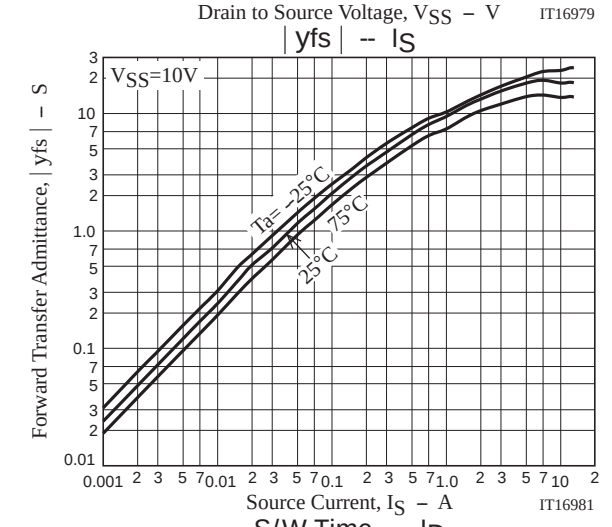

RSS(on) -- VGS
Ta=25°C
IS=3A
Static Source to Source On State Resistance, RSS(on) – mΩ
Gate to Source Voltage, VGS – V
IT16976

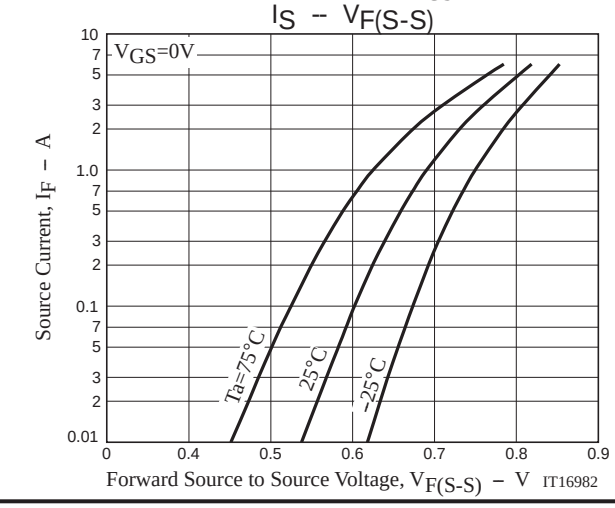

RSS(on) -- Ta
IS=3A, VGS=3.8V
IS=3A, VGS=2.5V
IS=3A, VGS=3.1V
IS=3A, VGS=4.5V
IS=3A, VGS=4V
Static Source to Source On State Resistance, RSS(on) – mΩ
Ambient Temperature, Ta – °C
IT16977

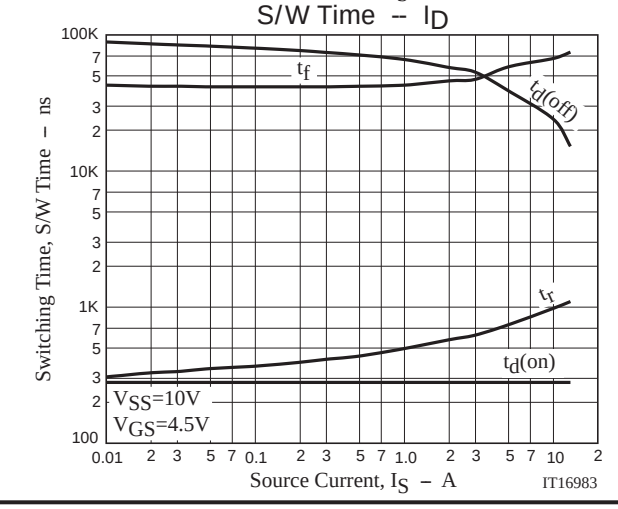

Qg -- VGS
VSS=10V
IS=13A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT16978

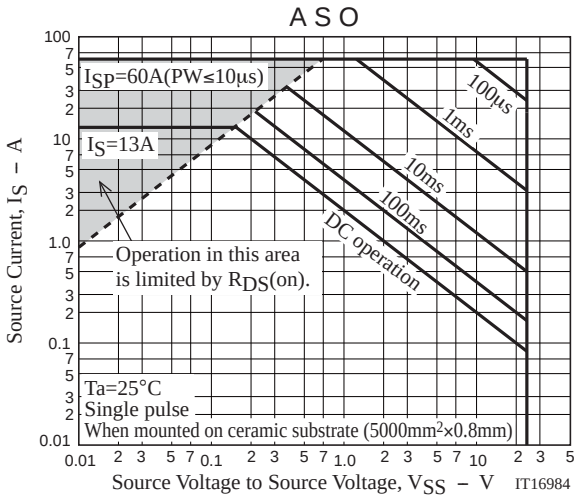

IS -- VSS
4.5V
2.5V
10.0V
3.1V
4.0V
VGS=1.5V
Drain Current, IS – A
Drain to Source Voltage, VSS – V
IT16979

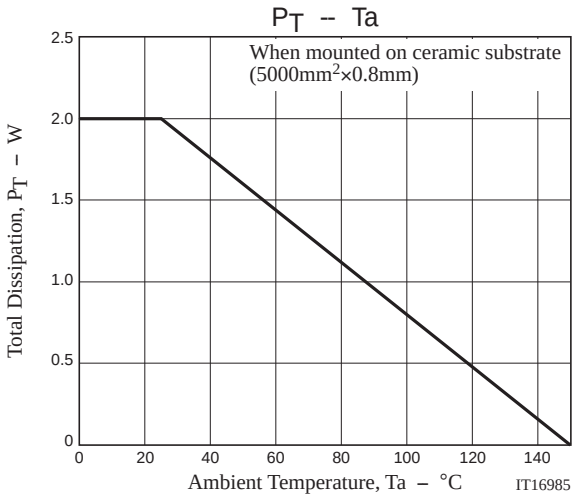

IS -- VGS
VSS=10V
Ta=75°C
–25°C
25°C
Source Current, IS – A
Gate to Source Voltage, VGS – V
IT16980


| yfs | -- IS
VSS=10V
Ta= –25°C
25°C
75°C
Forward Transfer Admittance, | yfs | – S
Source Current, IS – A
IT16981


IS -- VF(S-S)
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IF – A
Forward Source to Source Voltage, VF(S-S) – V
IT16982


S/W Time -- ID
tf
td(off)
tr
td(on)
VSS=10V
VGS=4.5V
Switching Time, S/W Time – ns
Source Current, IS – A
IT16983


A S O
Source Current, IS – A
Source Voltage to Source Voltage, VSS – V
ISP=60A(PW≤10μs)
IS=13A
Operation in this area
is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (5000mm2×0.8mm)
100μs
1ms
10ms
100ms
DC operation
IT16984

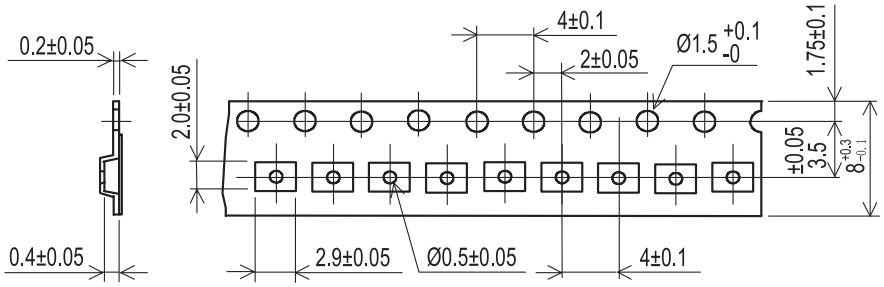

PT – Ta
Total Dissipation, PT – W
Ambient Temperature, Ta – °C
When mounted on ceramic substrate
(5000mm2×0.8mm)
IT16985

Taping Specification

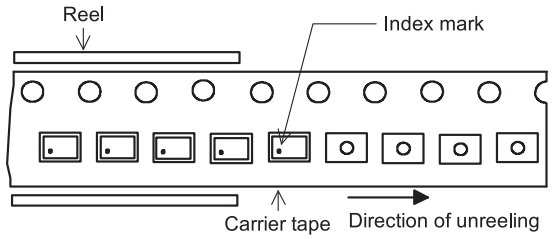
EFC6601R-TR

1.Taping Configuration

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

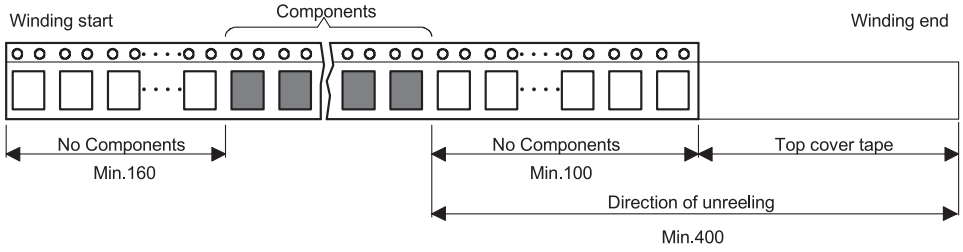


1-2 .Device Placement Direction



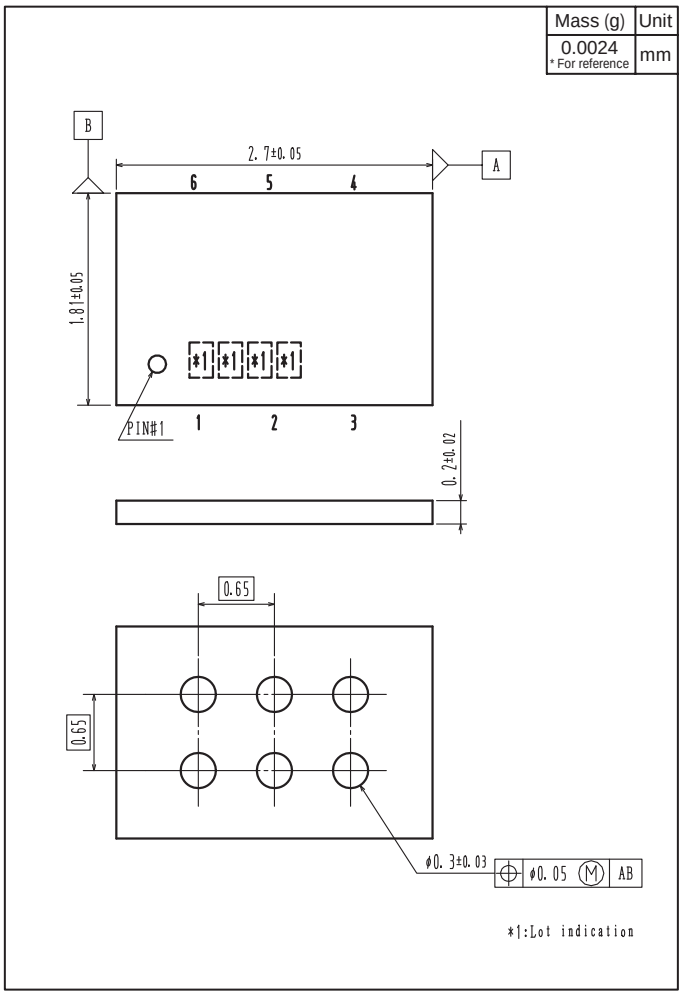
Packing type・・・・・TR

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

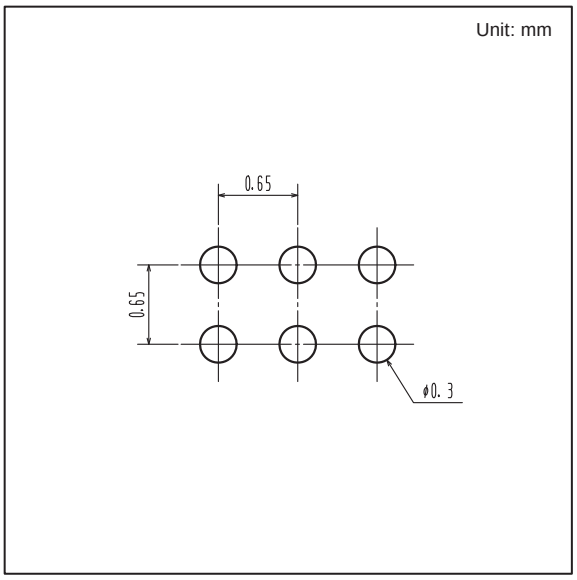


Outline Drawing

EFC6601R-TR



Land Pattern Example



Note on usage : Since the EFC6601R is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.