Ordering number : ENA1890A

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

N-Channel Silicon MOSFET

EMH2409 — General-Purpose Switching Device Applications

Features

- The EMH2409 incorporates a N-channel MOSFET that feature low ON-resistance and ultrahigh-speed switching, thereby enabling high-density mounting
- 4V drive
- Halogen free compliance
- Protection diode in

Specifications

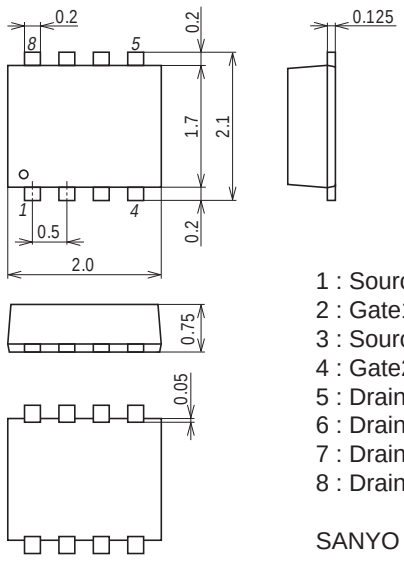
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		30	V
Gate-to-Source Voltage	V_{GSS}		±20	V
Drain Current (DC)	I_D		4	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	16	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (900mm^2×0.8mm) 1unit	1.0	W
Total Dissipation	P_T	When mounted on ceramic substrate (900mm^2×0.8mm)	1.2	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C

Package Dimensions

unit : mm (typ)

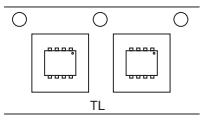
7045-006



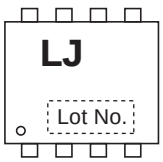
Product & Package Information

- Package : EMH8
- JEITA, JEDEC : -
- Minimum Packing Quantity : 3,000 pcs./reel

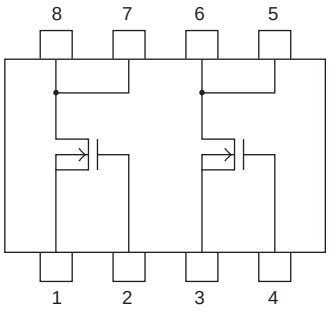
Packing Type : TL



Marking



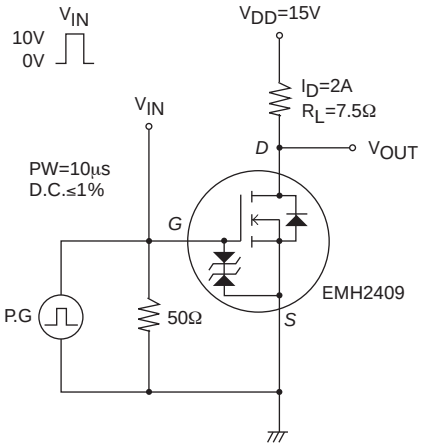
Electrical Connection



Electrical Characteristics at Ta=25°C

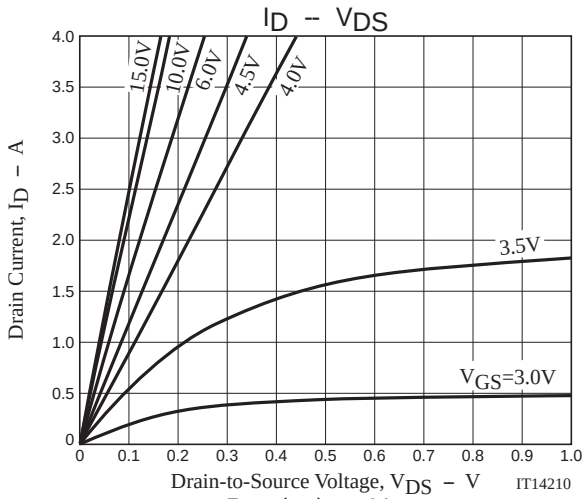
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	30			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	1.2		2.6	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=2A		1.66		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=2A, V_{GS}=10V		45	59	mΩ
	R_{DS}(on)2	I_D=1A, V_{GS}=4.5V		85	119	mΩ
	R_{DS}(on)3	I_D=1A, V_{GS}=4V		110	155	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		240		pF
Output Capacitance	Coss			45		pF
Reverse Transfer Capacitance	Crss			30		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		6.2		ns
Rise Time	t_r			11		ns
Turn-OFF Delay Time	t_d(off)			17		ns
Fall Time	t_f			7.5		ns
Total Gate Charge	Qg	V_{DS}=15V, V_{GS}=10V, I_D=4A		4.4		nC
Gate-to-Source Charge	Qgs			1.1		nC
Gate-to-Drain “Miller” Charge	Qgd			0.64		nC
Diode Forward Voltage	V_{SD}	I_S=4A, V_{GS}=0V		0.82	1.2	V

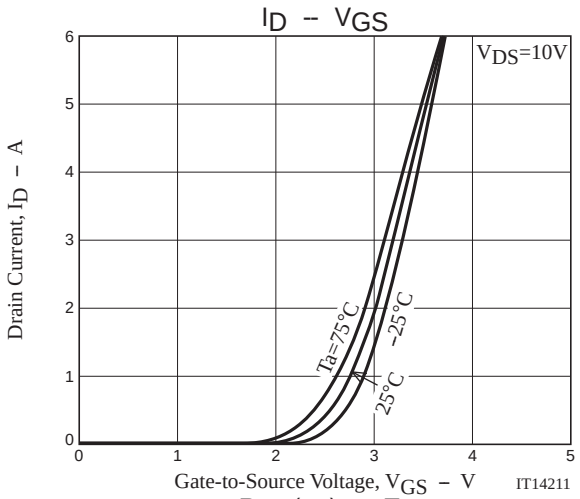
Switching Time Test Circuit

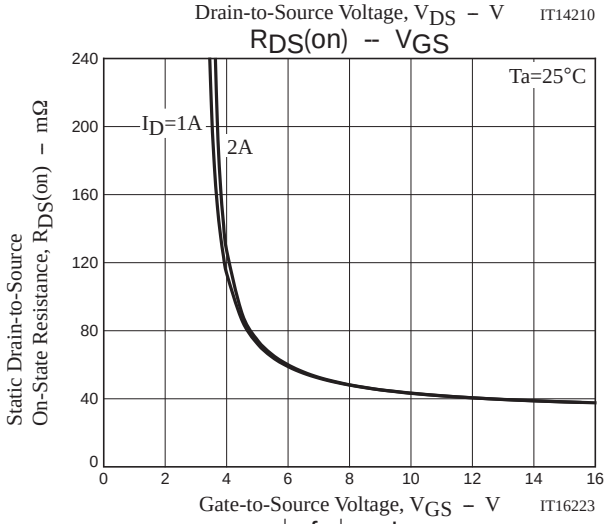


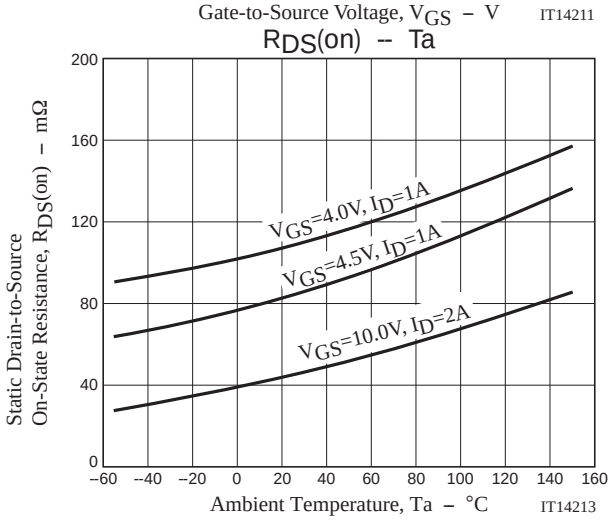
Ordering Information

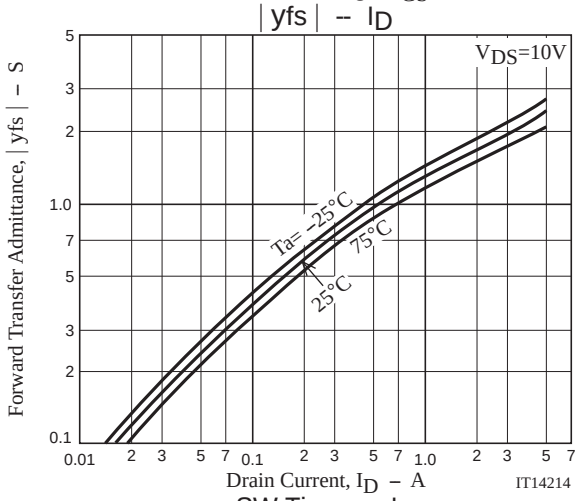
Device	Package	Shipping	memo
EMH2409-TL-H	EMH8	3,000pcs./reel	Pb Free and Halogen Free

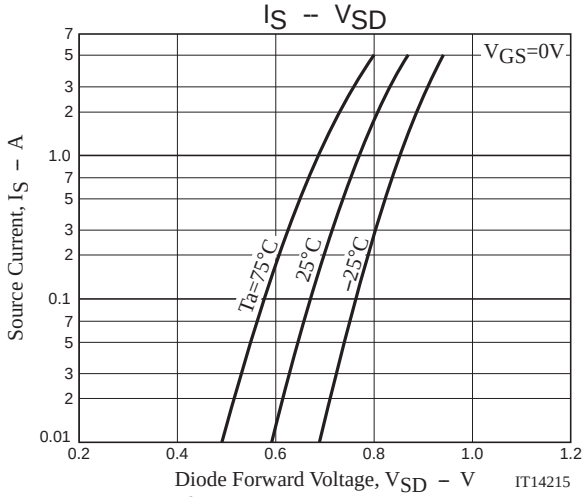

ID -- VDS
Drain Current, ID – A
15.0V
10.0V
6.0V
4.5V
4.0V
3.5V
VGS=3.0V
Drain-to-Source Voltage, VDS – V
IT14210

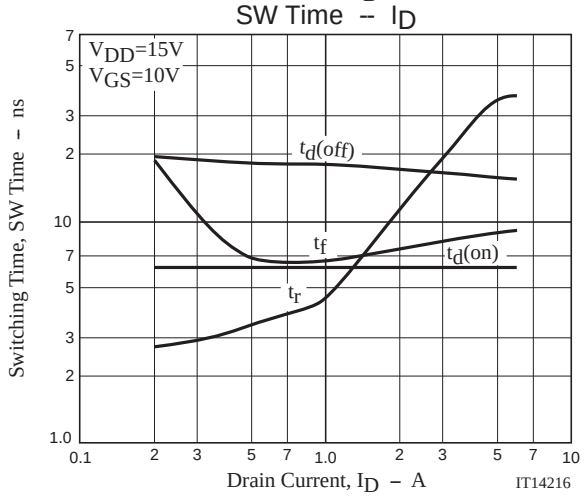

ID -- VGS
VDS=10V
Drain Current, ID – A
Ta=75°C
25°C
–25°C
Gate-to-Source Voltage, VGS – V
IT14211

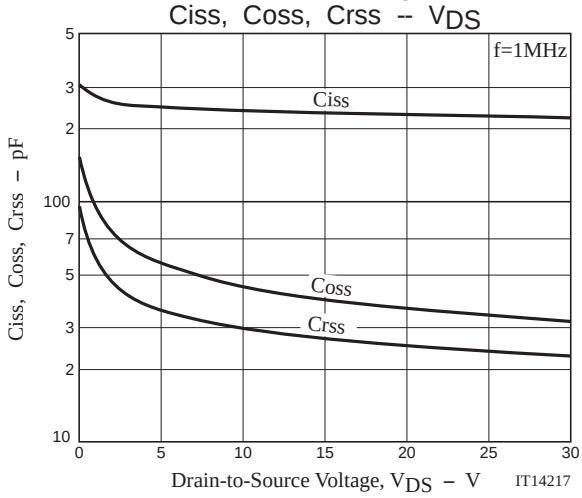

RDS(on) -- VGS
Ta=25°C
ID=1A
2A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT16223

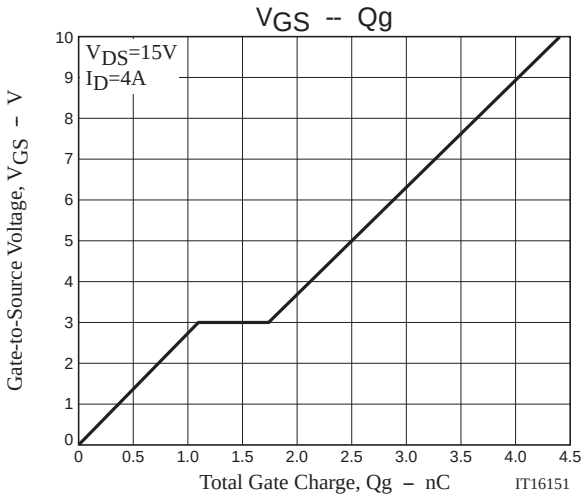

RDS(on) -- Ta
VGS=4.0V, ID=1A
VGS=4.5V, ID=1A
VGS=10.0V, ID=2A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT14213

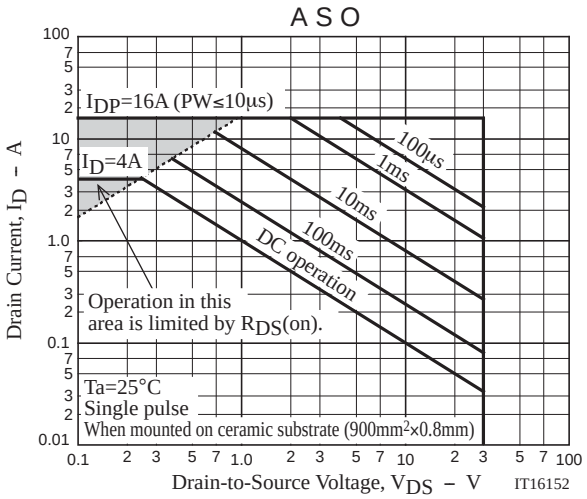

| yfs | -- ID
VDS=10V
Ta= –25°C
75°C
25°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT14214

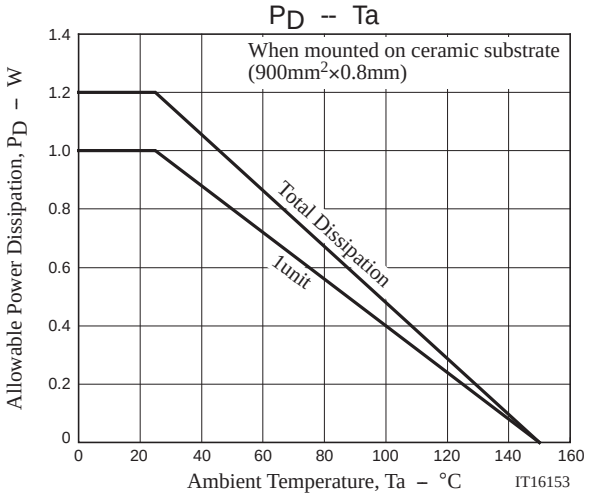

IS -- VSD
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT14215


SW Time -- ID
VDD=15V
VGS=10V
td(off)
tf
td(on)
tr
Switching Time, SW Time – ns
Drain Current, ID – A
IT14216


Ciss, Coss, Crss -- VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT14217


VGS -- Qg
VDS=15V
ID=4A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT16151


A S O
IDP=16A (PW≤10μs)
ID=4A
100μs
1ms
10ms
100ms
DC operation
Operation in this
area is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (900mm2×0.8mm)
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT16152


PD -- Ta
When mounted on ceramic substrate
(900mm2×0.8mm)
Total Dissipation
1unit
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT16153

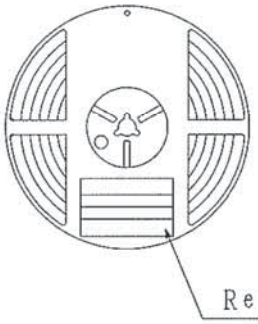
Embossed Taping Specification

EMH2409-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)
EMH8	MCP4	3,000	15,000	90,000	5 reels contained Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

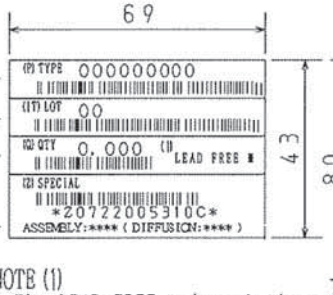
Packing method



Reel label

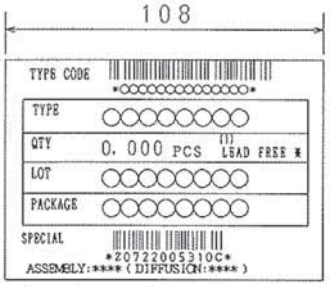
Reel label, Inner box label

(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.



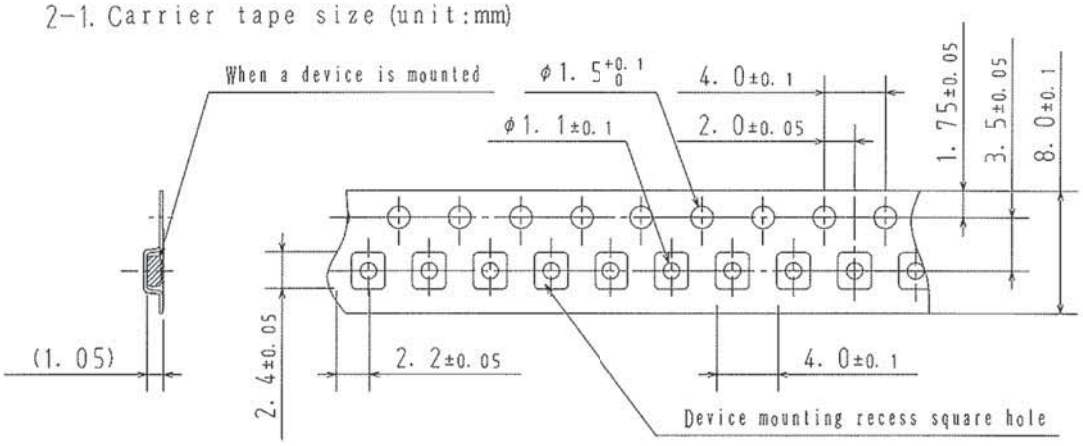
NOTE (1)

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

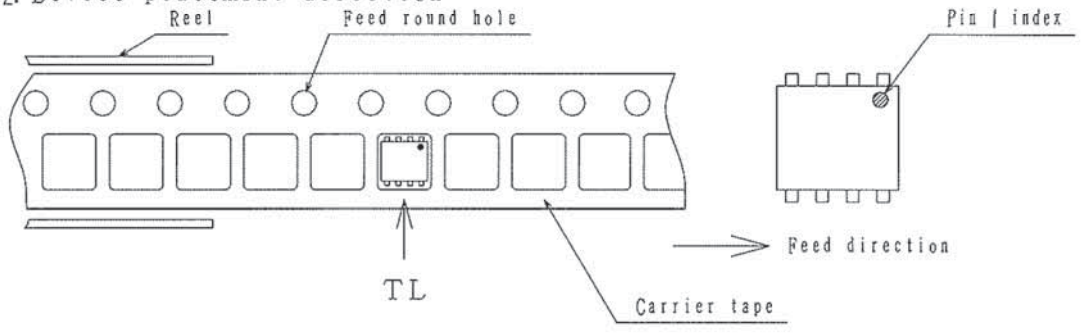
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



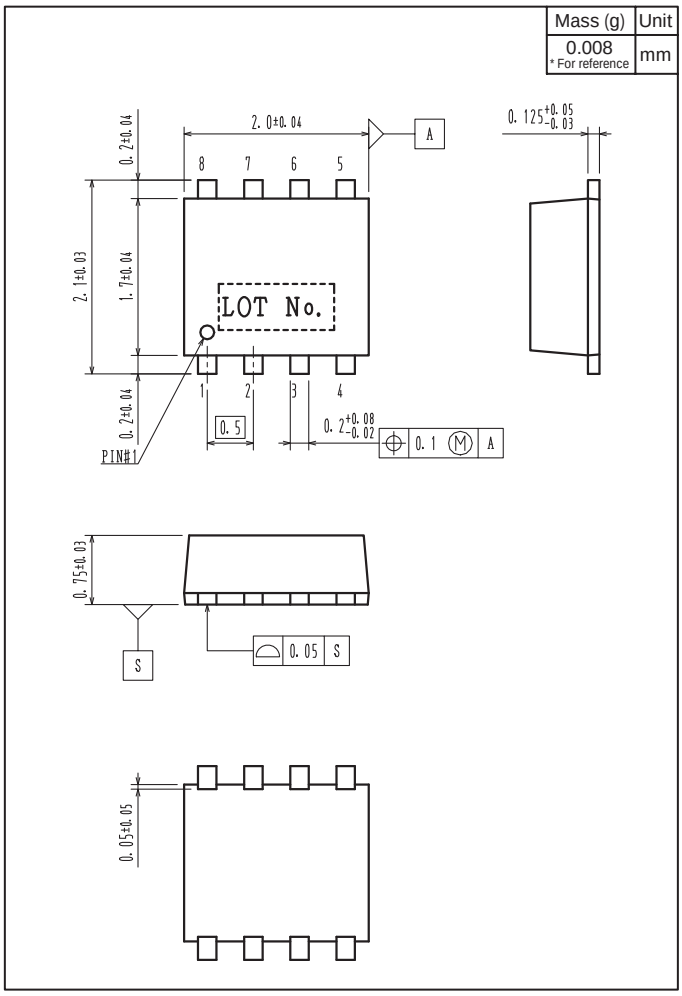
2-2. Device placement direction



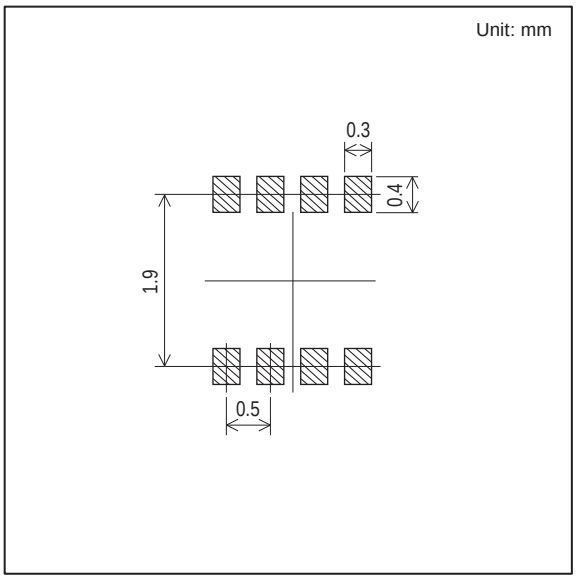
Those with pin 1 index on the feed hole side·····TL

Outline Drawing

EMH2409-TL-H



Land Pattern Example



Note on usage : Since the EMH2409 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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