Ordering number : ENA1667A

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

N-Channel Silicon MOSFET

EMH1405 — General-Purpose Switching Device Applications

Features

- ON-resistance $R_{DS}(on)1$=14mΩ(typ)
- 4V drive
- Halogen free compliance
- Protection diode in

Specifications

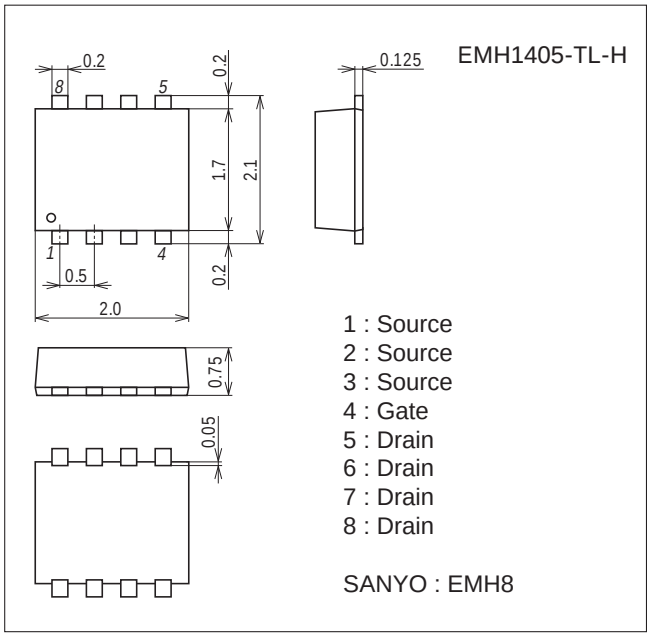
Absolute Maximum Ratings at Ta=25°C

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		8.5	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	34	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (1200mm²×0.8mm)	1.5	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C

Package Dimensions

unit : mm (typ.)

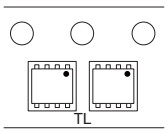
7045-001



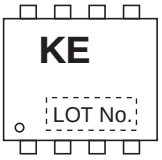
Product & Package Information

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

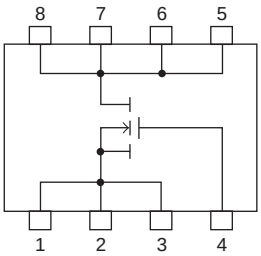
Taping Type : TL



Marking



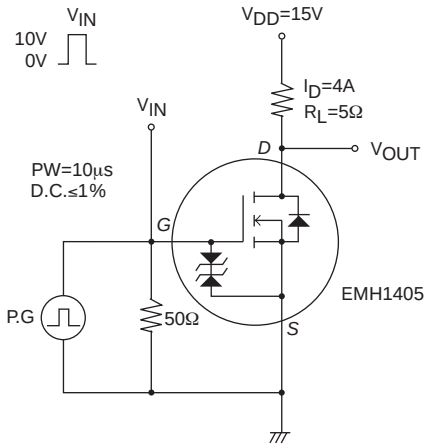
Electrical Connection



Electrical Characteristics at Ta=25°C

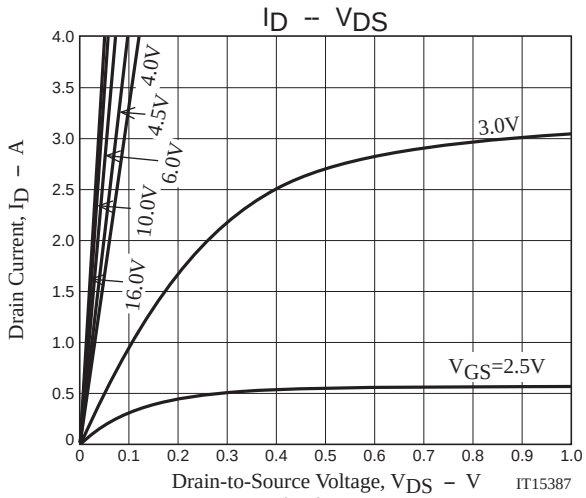
Parameter	Symbol	Conditions	Ratings			Unit
			min.	typ.	max.	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	30			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	1.2		2.6	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=4A		4.4		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=4A, V_{GS}=10V		14	19	mΩ
	R_{DS}(on)2	I_D=2A, V_{GS}=4.5V		24	34	mΩ
	R_{DS}(on)3	I_D=2A, V_{GS}=4V		30	42	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		820		pF
Output Capacitance	Coss			130		pF
Reverse Transfer Capacitance	Crss			90		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		9.5		ns
Rise Time	t_r			25		ns
Turn-OFF Delay Time	t_d(off)			63		ns
Fall Time	t_f			28		ns
Total Gate Charge	Qg	V_{DS}=15V, V_{GS}=10V, I_D=8.5A		15		nC
Gate-to-Source Charge	Qgs			2.6		nC
Gate-to-Drain “Miller” Charge	Qgd			2.7		nC
Diode Forward Voltage	V_{SD}	I_S=8.5A, V_{GS}=0V		0.8	1.2	V

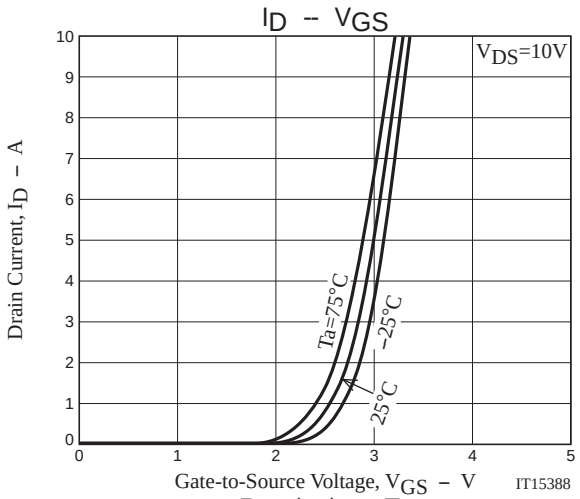
Switching Time Test Circuit

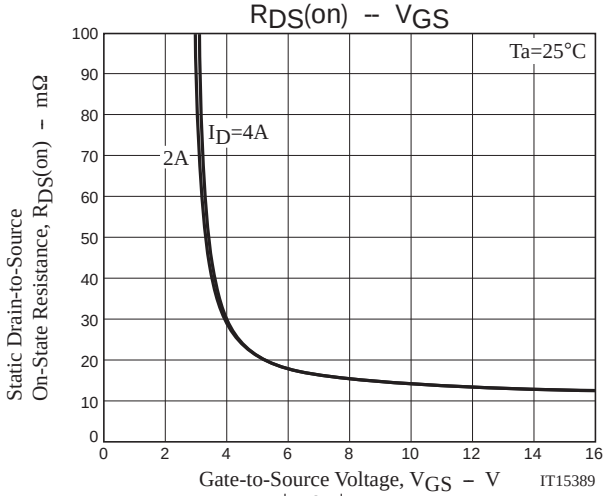


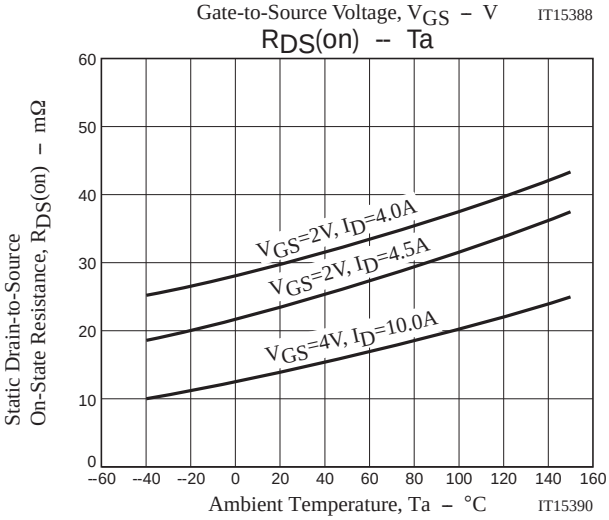
Ordering Information

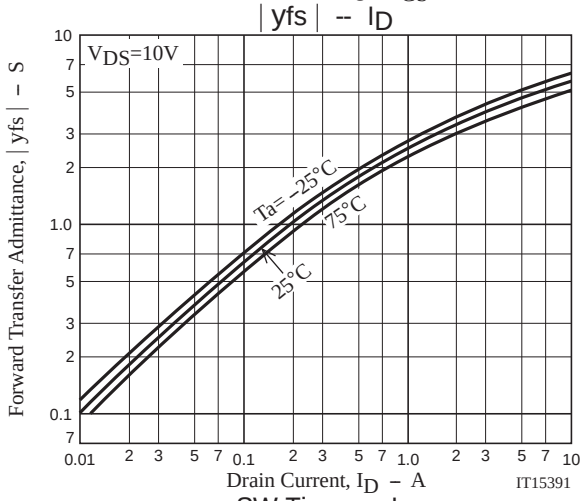
Device	Package	Shipping	memo
EMH1405-TL-H	EMH8	3,000pcs./reel	Pb Free and Halogen Free

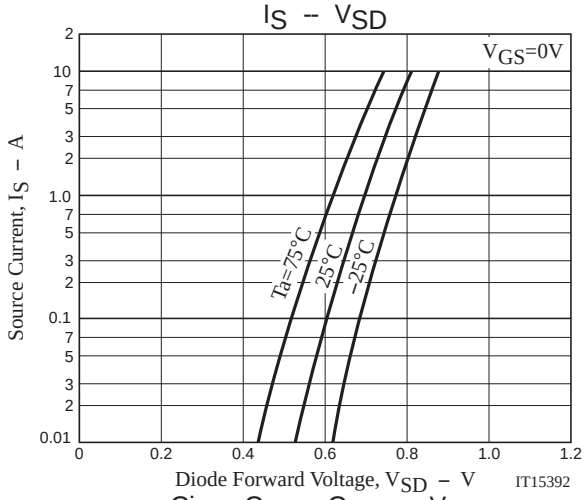

ID -- VDS
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT15387
4.0V
4.5V
6.0V
10.0V
16.0V
3.0V
VGS=2.5V

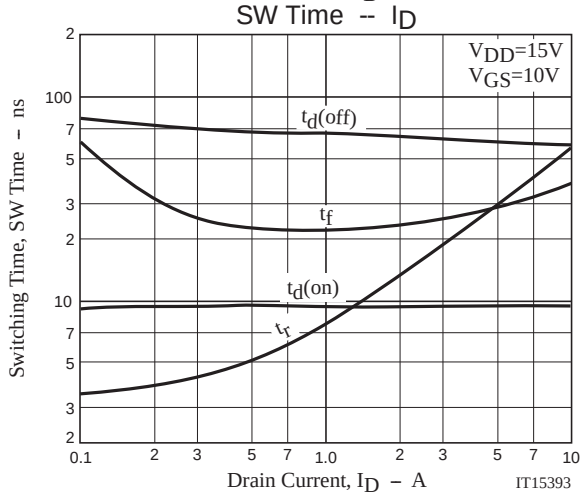

ID -- VGS
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT15388
VDS=10V
Ta=75°C
25°C
–25°C

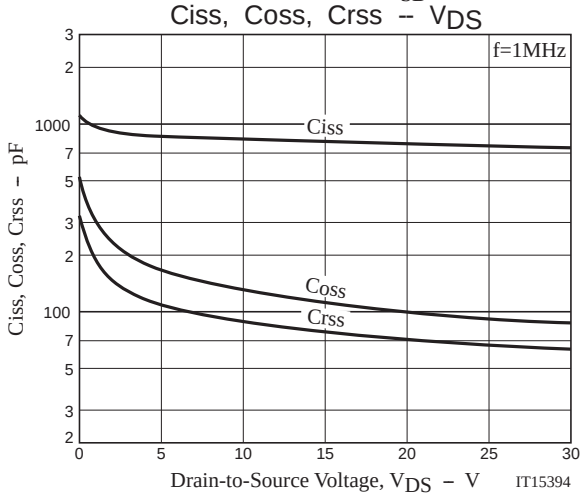

RDS(on) -- VGS
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT15389
Ta=25°C
ID=4A
2A

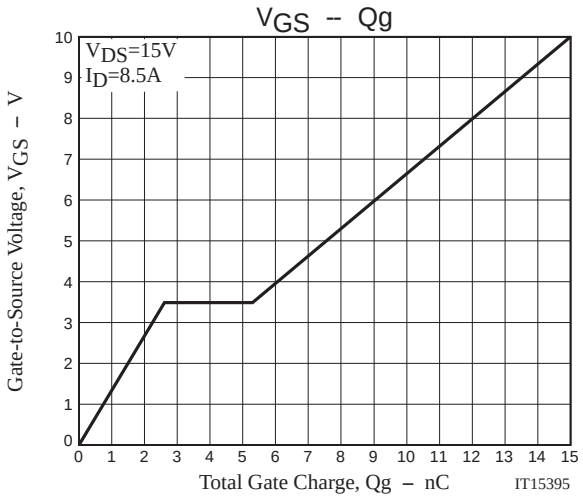

RDS(on) -- Ta
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT15390
VGS=2V, ID=4.0A
VGS=2V, ID=4.5A
VGS=4V, ID=10.0A

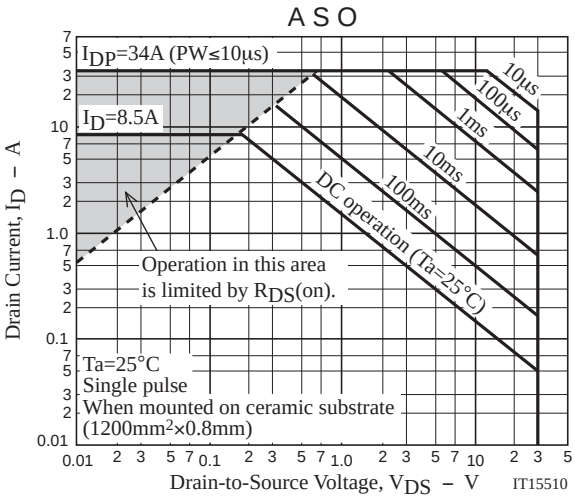

| yfs | -- ID
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT15391
VDS=10V
Ta= –25°C
75°C
25°C

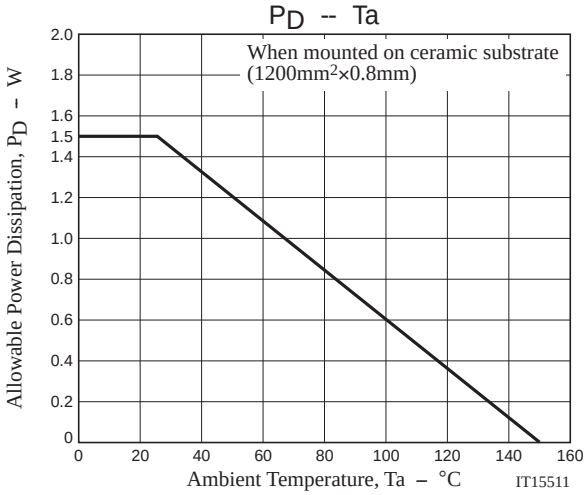

IS -- VSD
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT15392
VGS=0V
Ta=75°C
25°C
–25°C


SW Time -- ID
Switching Time, SW Time – ns
Drain Current, ID – A
IT15393
VDD=15V
VGS=10V
td(off)
tf
td(on)
tr


Ciss, Coss, Crss -- VDS
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT15394
f=1MHz
Ciss
Coss
Crss


VGS – Qg
VDS=15V
ID=8.5A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT15395


A S O
IDP=34A (PW≤10μs)
ID=8.5A
10μs
100μs
1ms
10ms
100ms
DC operation (Ta=25°C)
Operation in this area
is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate
(1200mm2×0.8mm)
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT15510


PD -- Ta
When mounted on ceramic substrate
(1200mm2×0.8mm)
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT15511

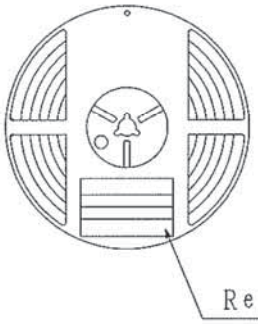
Embossed Taping Specification

EMH1405-TL-H

1. Packing Format

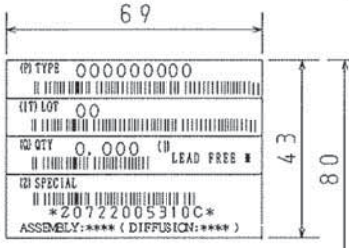
Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
EMH8	MCP4	3,000	15,000	90,000	5 reels contained Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

Packing method



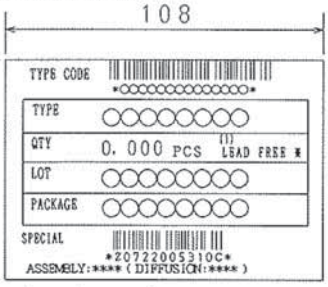
Reel label, Inner box label

(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.



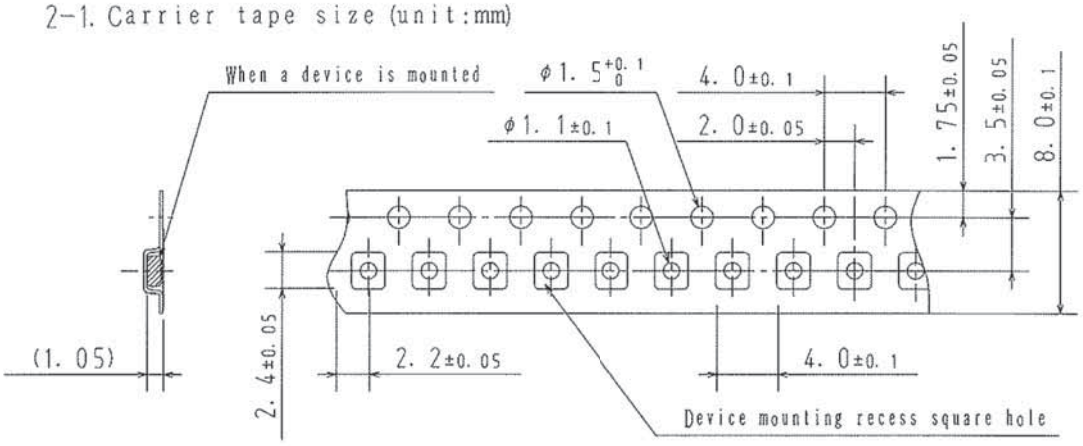
NOTE (1)

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

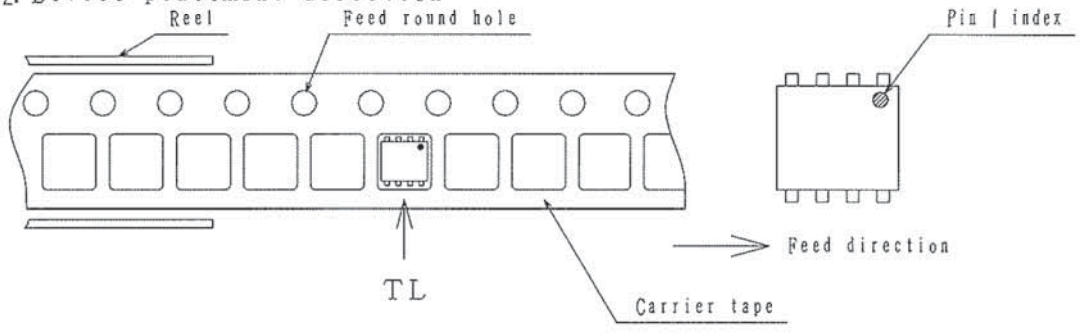
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



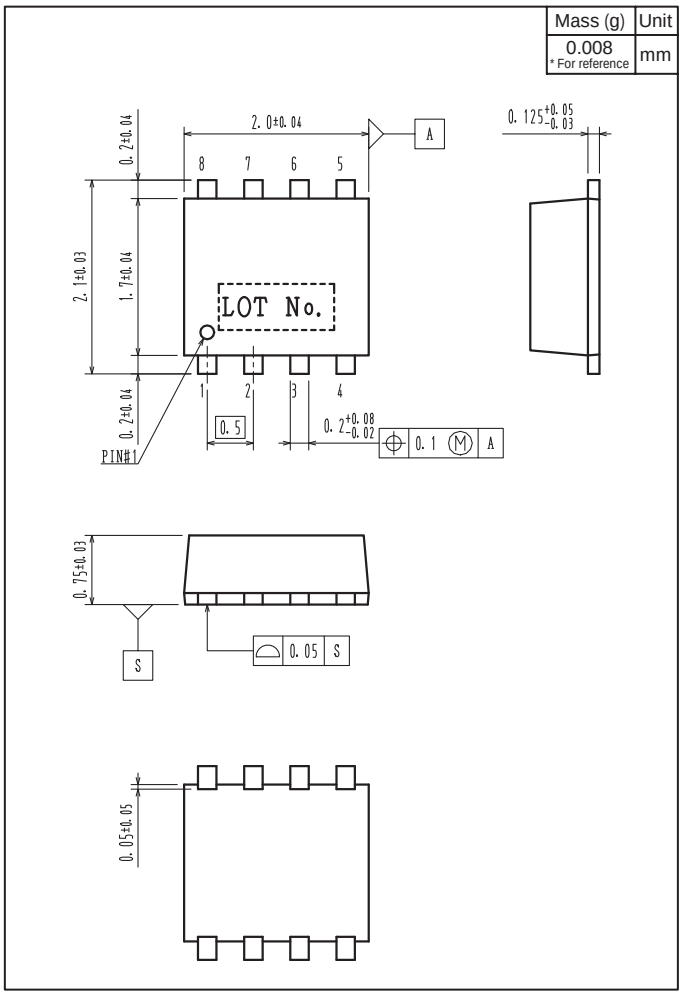
2-2. Device placement direction



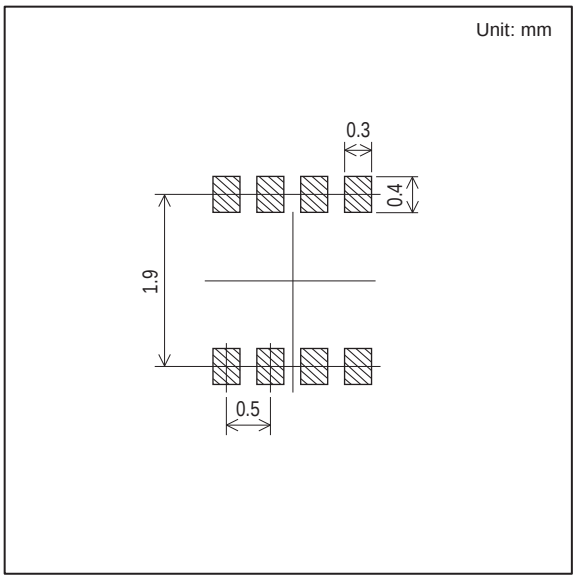
Those with pin 1 index on the feed hole side·····TL

Outline Drawing

EMH1405-TL-H



Land Pattern Example



Note on usage : Since the EMH1405 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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