



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## EMH1405 — N-Channel Silicon MOSFET General-Purpose Switching Device Applications

### Features

- ON-resistance  $R_{DS(on)} I = 14m\Omega(\text{typ})$
- 4V drive
- Halogen free compliance
- Protection diode in

### Specifications

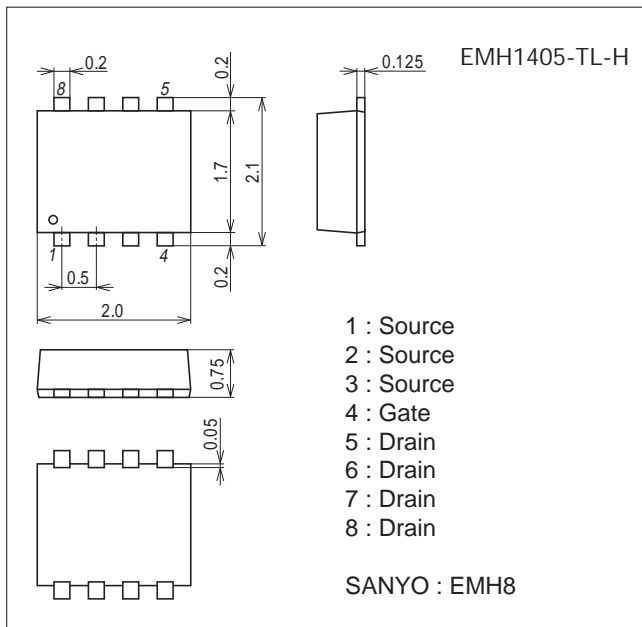
Absolute Maximum Ratings at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DSS}$		30	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 20$	V
Drain Current (DC)	$I_D$		8.5	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycles $\leq 1\%$	34	A
Allowable Power Dissipation	$P_D$	When mounted on ceramic substrate (1200mm <sup>2</sup> × 0.8mm)	1.5	W
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

### Package Dimensions

unit : mm (typ.)

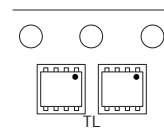
7045-001



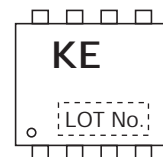
### Product & Package Information

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

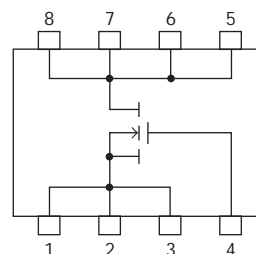
Taping Type : TL



Marking



### Electrical Connection

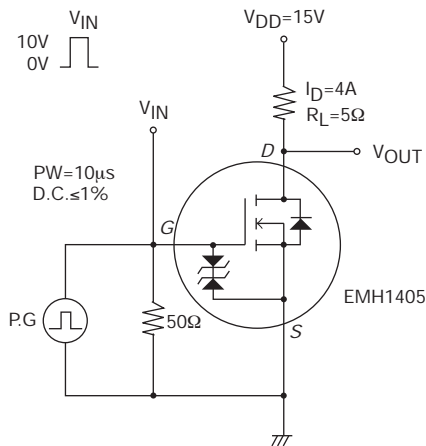


# EMH1405

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

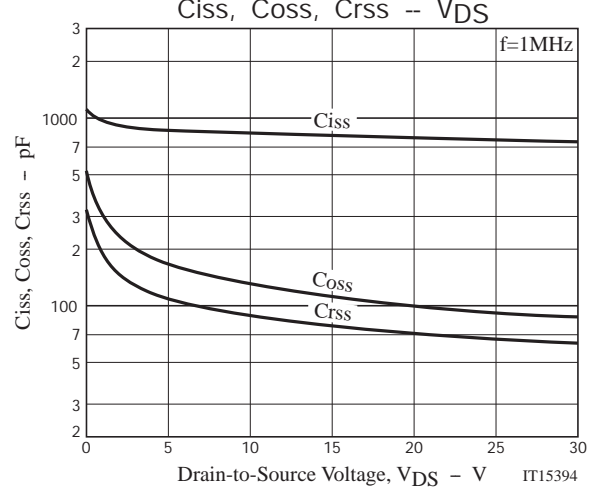
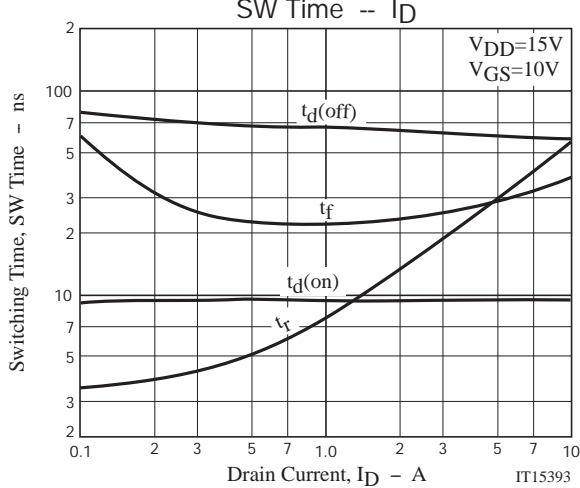
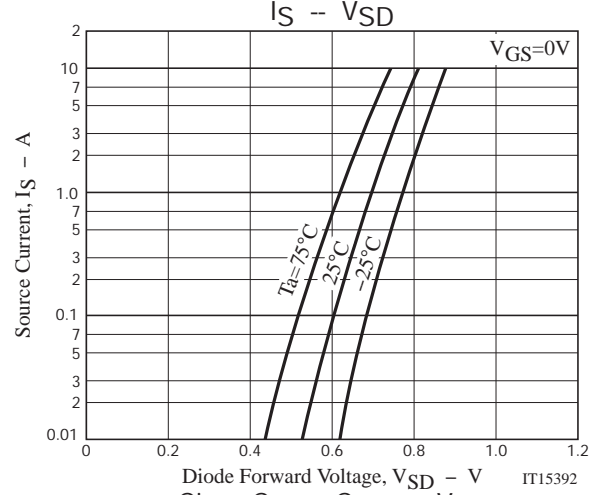
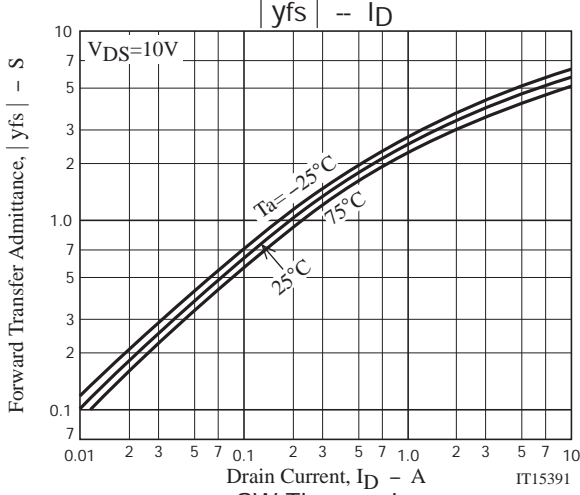
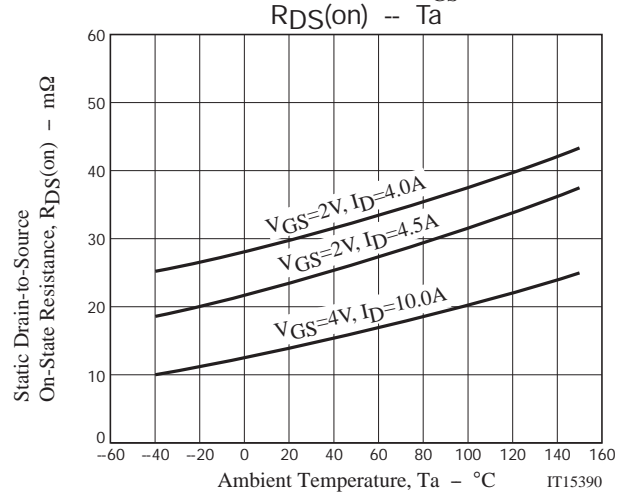
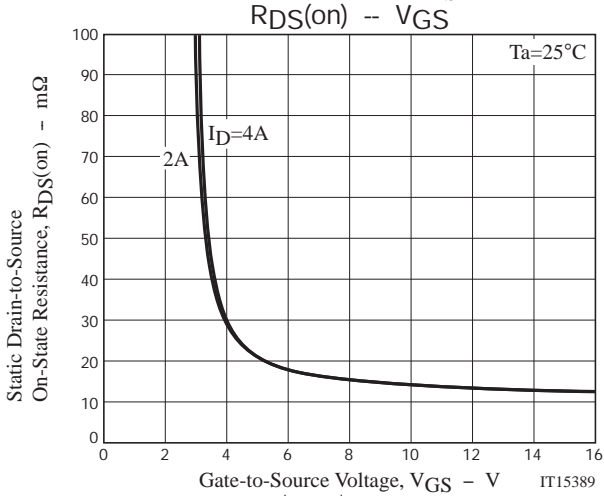
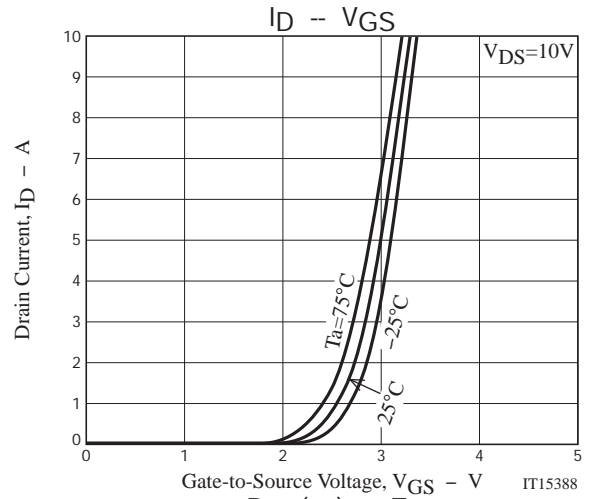
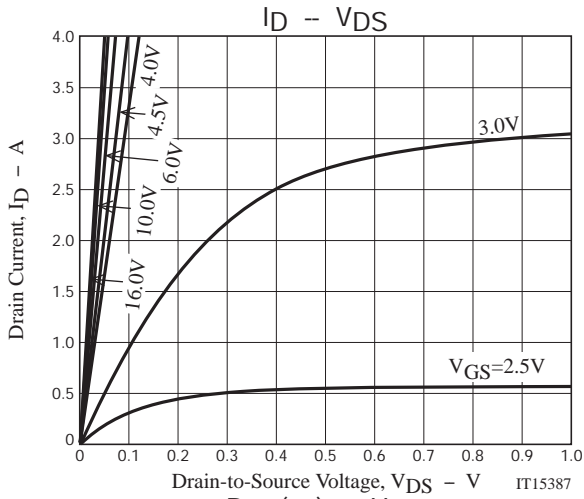
Parameter	Symbol	Conditions	Ratings			Unit	
			min.	typ.	max.		
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=1\text{mA}$ , $V_{GS}=0\text{V}$	30			V	
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=30\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$	
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 16\text{V}$ , $V_{DS}=0\text{V}$			$\pm 10$	$\mu\text{A}$	
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10\text{V}$ , $I_D=1\text{mA}$	1.2		2.6	V	
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10\text{V}$ , $I_D=4\text{A}$		4.4		S	
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=4\text{A}$ , $V_{GS}=10\text{V}$		14	19	$\text{m}\Omega$	
	$R_{DS(on)2}$	$I_D=2\text{A}$ , $V_{GS}=4.5\text{V}$		24	34	$\text{m}\Omega$	
	$R_{DS(on)3}$	$I_D=2\text{A}$ , $V_{GS}=4\text{V}$		30	42	$\text{m}\Omega$	
Input Capacitance	$C_{iss}$	See specified Test Circuit.		820		$\text{pF}$	
Output Capacitance	$C_{oss}$		$V_{DS}=10\text{V}$ , $f=1\text{MHz}$		130		$\text{pF}$
Reverse Transfer Capacitance	$C_{rss}$				90		$\text{pF}$
Turn-ON Delay Time	$t_{d(on)}$				9.5		ns
Rise Time	$t_r$	See specified Test Circuit.		25		ns	
Turn-OFF Delay Time	$t_{d(off)}$				63		ns
Fall Time	$t_f$				28		ns
Total Gate Charge	$Q_g$		$V_{DS}=15\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=8.5\text{A}$		15		nC
Gate-to-Source Charge	$Q_{gs}$			2.6		nC	
Gate-to-Drain "Miller" Charge	$Q_{gd}$			2.7		nC	
Diode Forward Voltage	$V_{SD}$	$I_S=8.5\text{A}$ , $V_{GS}=0\text{V}$			0.8	1.2	V

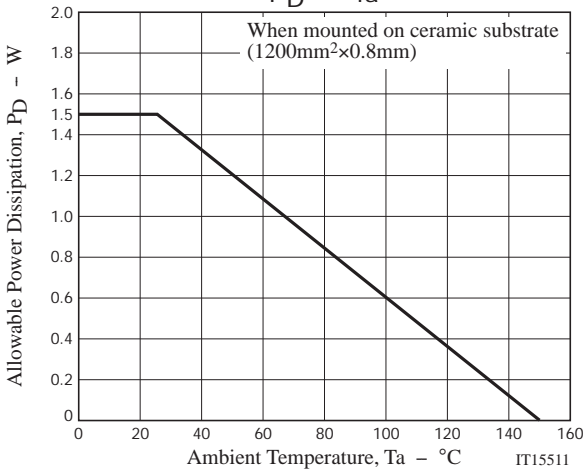
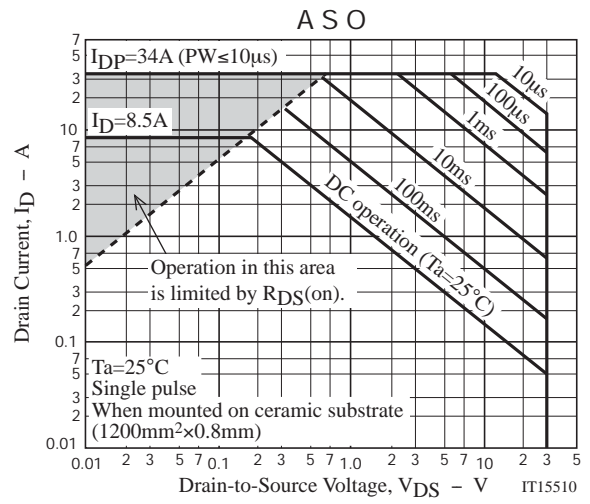
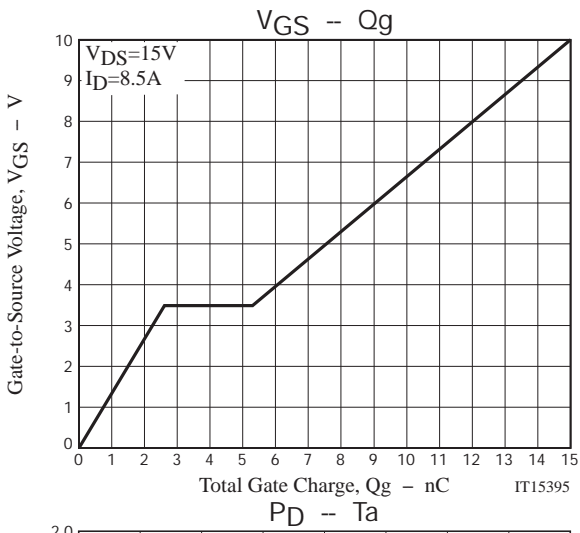
## Switching Time Test Circuit



## Ordering Information

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





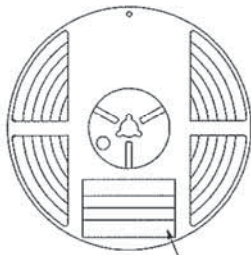
Embossed Taping Specification

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

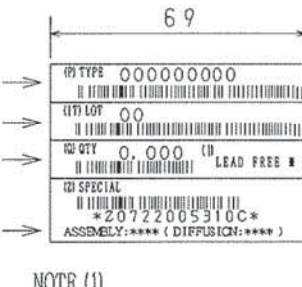
Packing method



Reel label

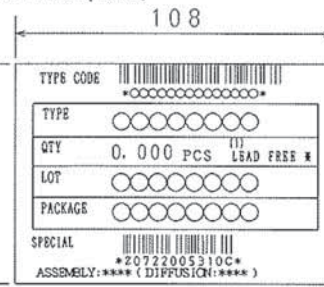
Type No.  
LOT No.  
Quantity  
Origin

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.



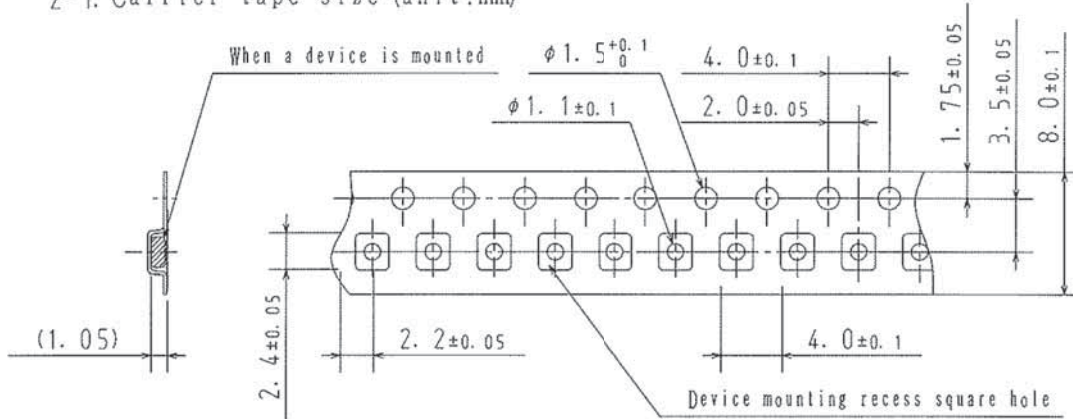
NOTE (1)

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

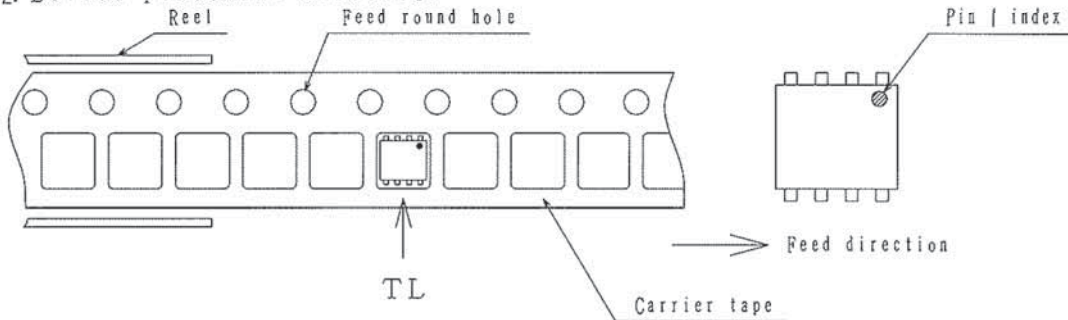
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



2-2. Device placement direction



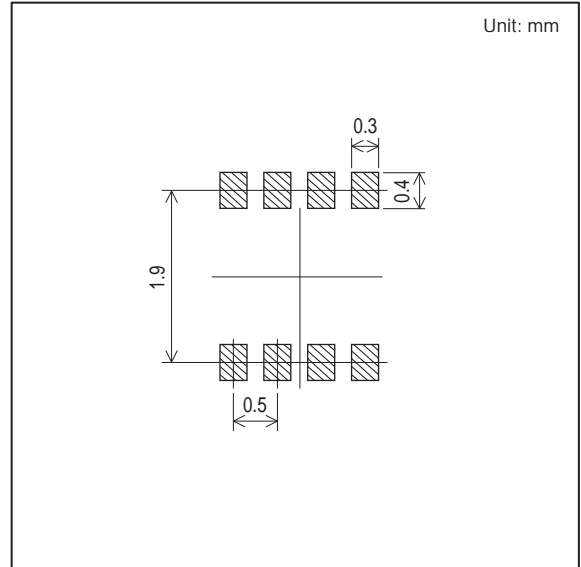
Those with pin | index on the feed hole side.....TL

# EMH1405

## 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.

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