Ordering number : ENA1821A

EMH2801

P-Channel Power MOSFET
−20V, −3A, 85mΩ, Single EMH8 with Schottky Diode

ON Semiconductor®
http://onsemi.com

Features

- Composite type with a P-Channel Sillicon MOSFET and a Schottky Barrier Diode contained in one package facilitating high-density mounting
- [MOSFET] · Low ON-resistance
- [MOSFET] · 1.8V drive
- [SBD] · Small switching noise
- [SBD] · Low forward voltage (I_F=2.0A, V_F max=0.46V)
- Halogen free compliance

Specifications

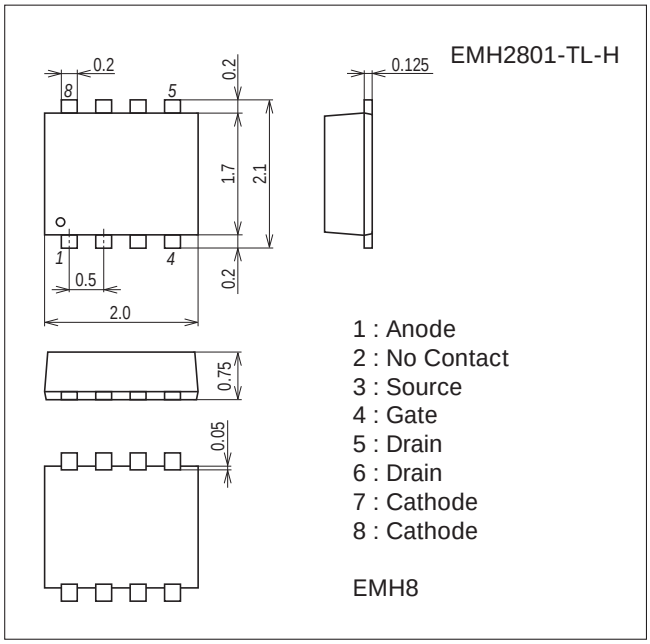
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
[MOSFET]				
Drain-to-Source Voltage	V_{DSS}		−20	V
Gate-to-Source Voltage	V_{GSS}		±10	V
Drain Current (DC)	I_D		−3	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	−20	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (900mm²×0.8mm) 1unit	1.0	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +125	°C

Continued on next page.

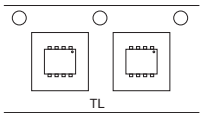
This product is designed to "ESD immunity < 200V*", so please take care when handling.
* Machine Model

Package Dimensions
unit : mm (typ)
7045-007

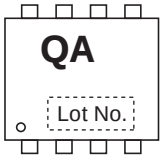


Product & Package Information
- Package : EMH8
- JEITA, JEDEC : -
- Minimum Packing Quantity : 3,000 pcs./reel

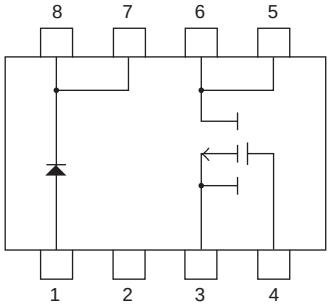
Packing Type : TL



Marking



Electrical Connection



Continued from preceding page.

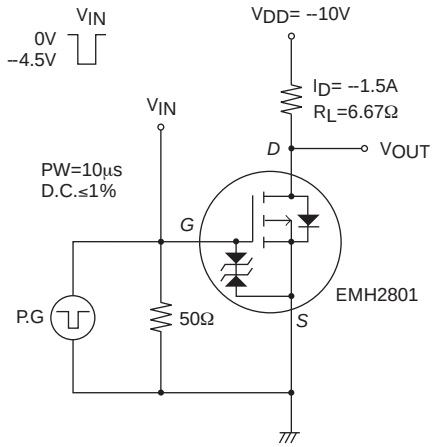
Parameter	Symbol	Conditions	Ratings	Unit
[SBD]				
Repetitive Peak Reverse Voltage	V_{RRM}		15	V
Nonrepetitive Peak Reverse Surge Voltage	V_{RSM}		15	V
Average Output Current	I_O	Rectangular wave	2.0	A
Surge Forward Current	I_{FSM}	50Hz sine wave, 1 cycle	20	A
Junction Temperature	Tj		−55 to +125	°C
Storage Temperature	Tstg		−55 to +125	°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.

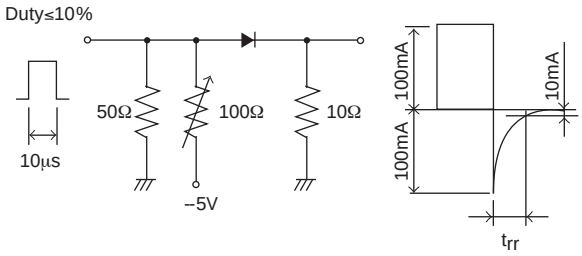
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[MOSFET]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=−1mA, V_{GS}=0V	−20			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=−20V, V_{GS}=0V			−1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=−10V, I_D=−1mA	−0.4		−1.3	V
Forward Transfer Admittance	| yfs |	V_{DS}=−10V, I_D=−1.5A		3.6		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=−1.5A, V_{GS}=−4.5V		65	85	mΩ
	R_{DS}(on)2	I_D=−1A, V_{GS}=−2.5V		98	137	mΩ
	R_{DS}(on)3	I_D=−0.5A, V_{GS}=−1.8V		155	235	mΩ
Input Capacitance	Ciss	V_{DS}=−10V, f=1MHz		320		pF
Output Capacitance	Coss			66		pF
Reverse Transfer Capacitance	Crss			50		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		7.1		ns
Rise Time	t_r			21		ns
Turn-OFF Delay Time	t_d(off)			37		ns
Fall Time	t_f			32		ns
Total Gate Charge	Qg	V_{DS}=−10V, V_{GS}=−4.5V, I_D=−3A		4.0		nC
Gate-to-Source Charge	Qgs			0.6		nC
Gate-to-Drain “Miller” Charge	Qgd			1.1		nC
Diode Forward Voltage	V_{SD}	I_S=−3A, V_{GS}=0V		−0.83	−1.2	V
[SBD]						
Reverse Voltage	V_R	I_R=1mA	15			V
Forward Voltage	V_F1	I_F=1.0A		0.33	0.39	V
	V_F2	I_F=2.0A		0.39	0.46	V
Reverse Current	I_R	V_R=7.5V			300	μA
Interterminal Capacitance	C	V_R=10V, f=1MHz		35		pF

Switching Time Test Circuit
(MOSFET)

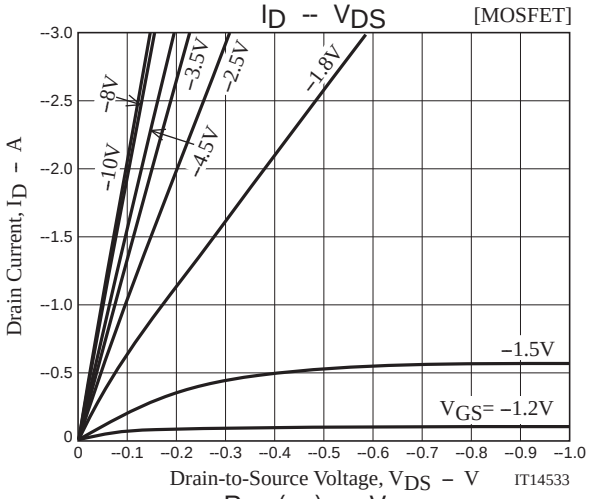


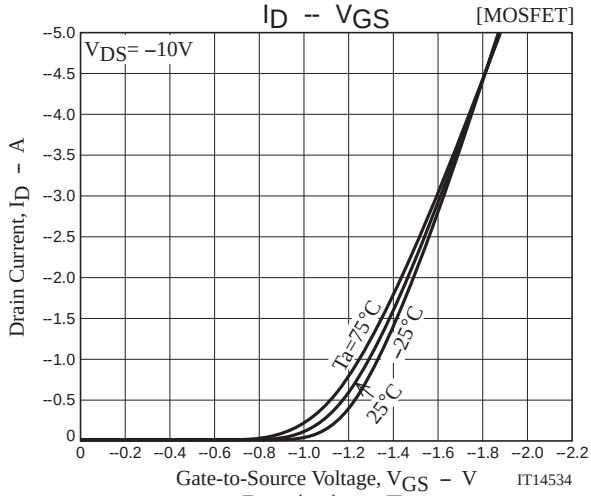
t_{rr} Test Circuit
(SBD)

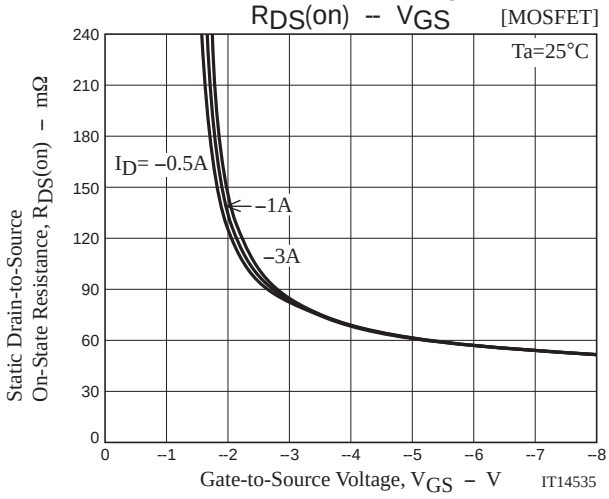


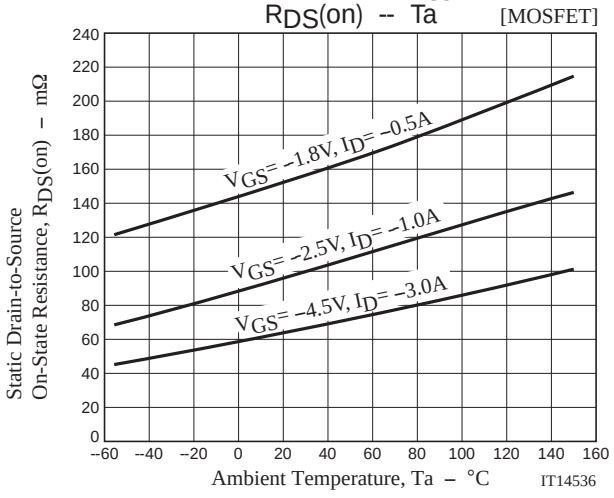
Ordering Information

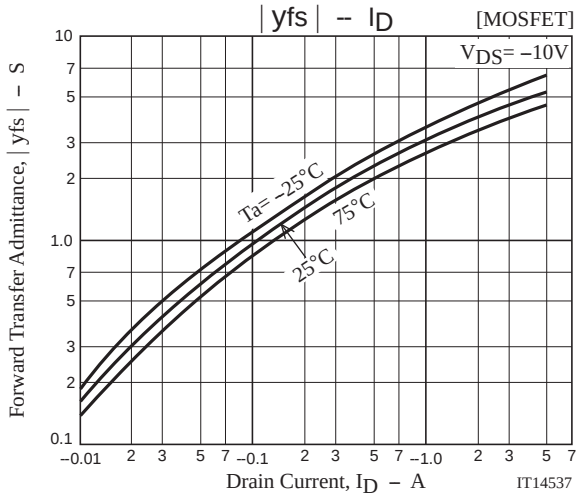
Device	Package	Shipping	memo
EMH2801-TL-H	EMH8	3,000pcs./reel	Pb Free and Halogen Free

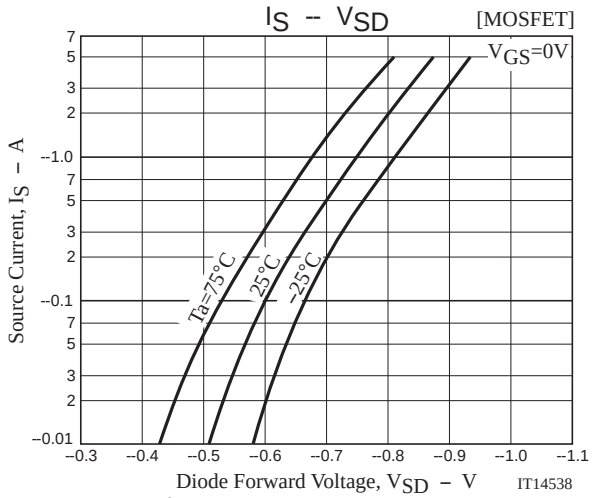


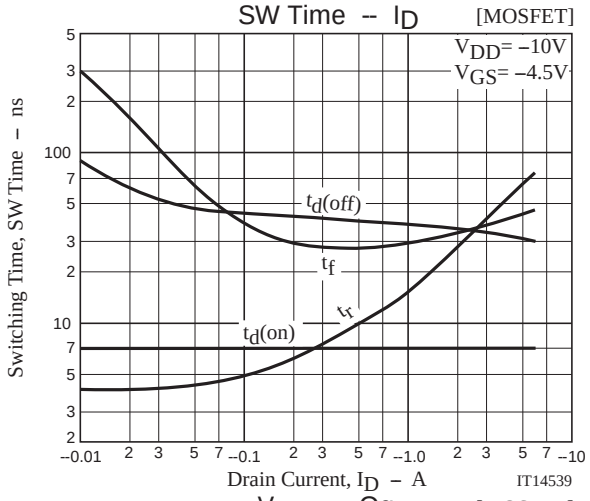


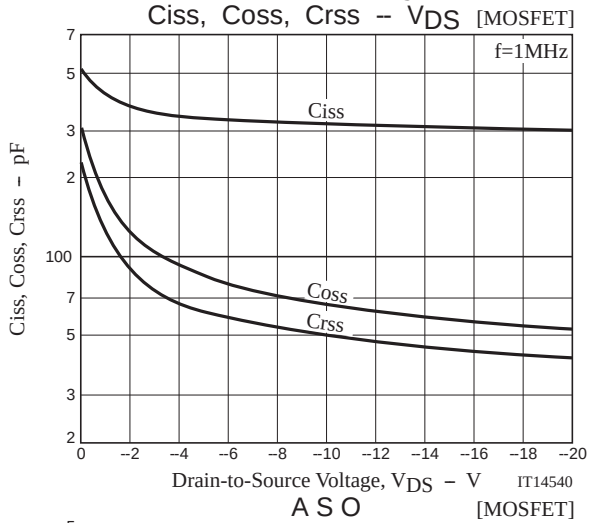


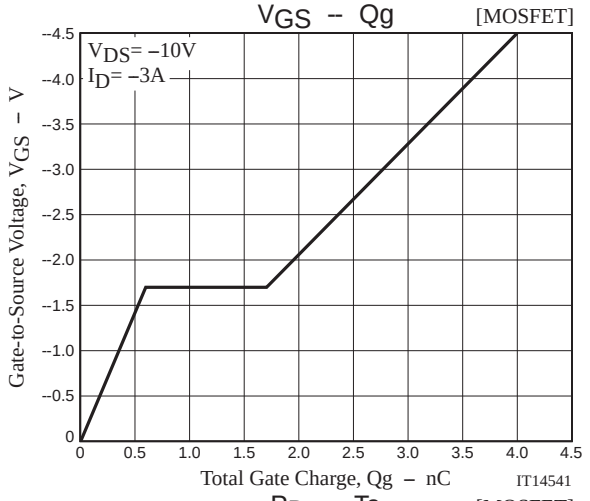


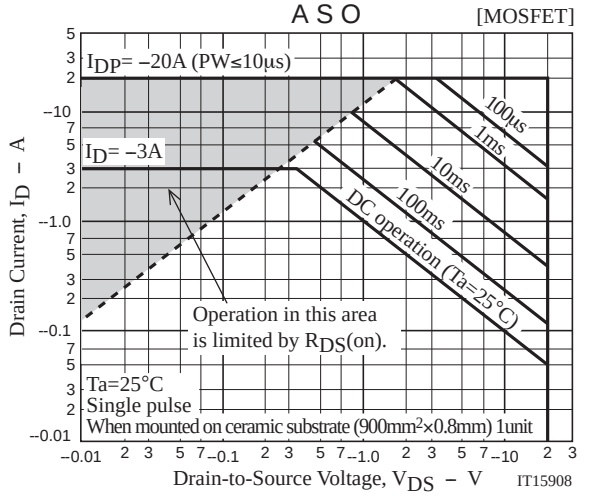

| yfs | -- ID [MOSFET]
VDS= –10V
Ta= –25°C
75°C
25°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT14537

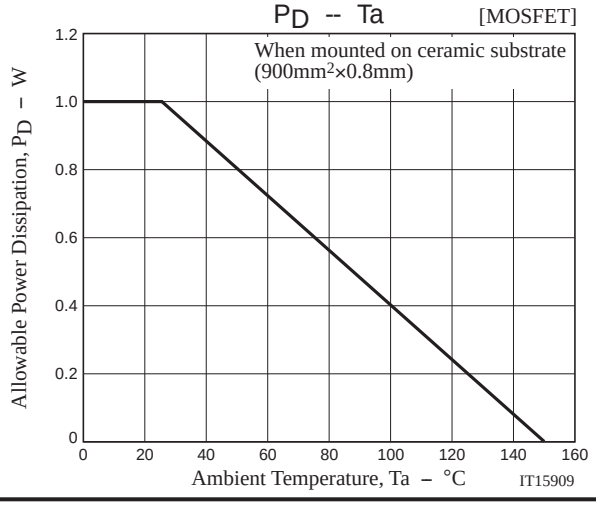

IS – VSD [MOSFET]
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT14538

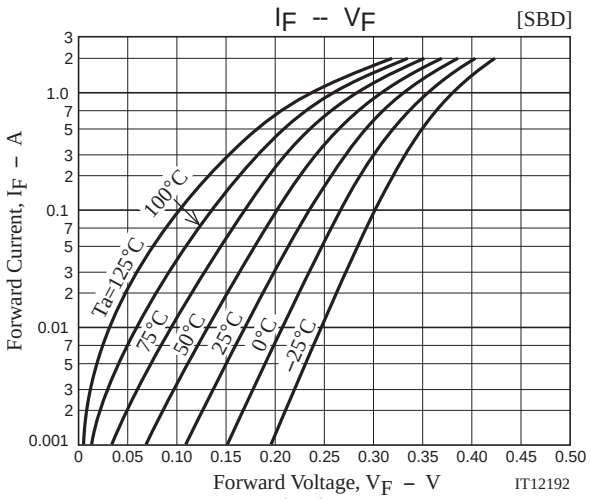

SW Time -- ID [MOSFET]
VDD= –10V
VGS= –4.5V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT14539

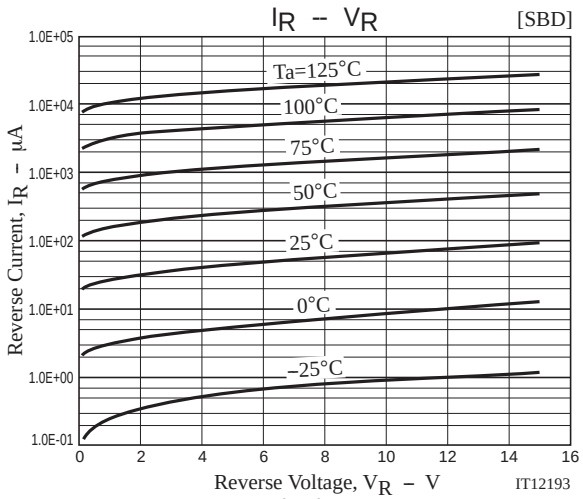

Ciss, Coss, Crss -- VDS [MOSFET]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT14540

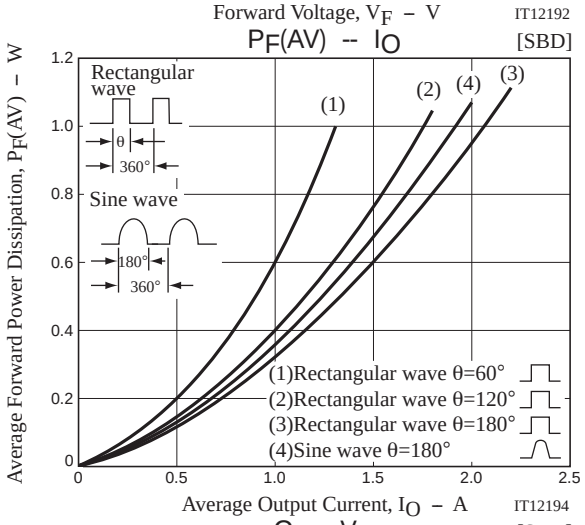

VGS -- Qg [MOSFET]
VDS= –10V
ID= –3A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT14541

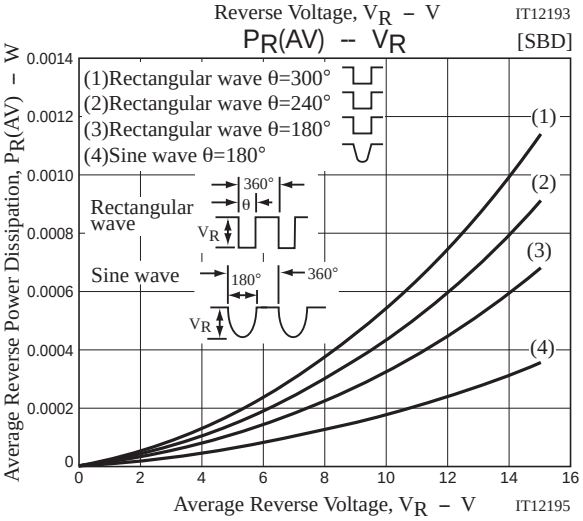

A S O [MOSFET]
IDP= –20A (PW≤10μs)
ID= –3A
100μs
1ms
10ms
100ms
DC operation (Ta=25°C)
Operation in this area
is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (900mm²×0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT15908

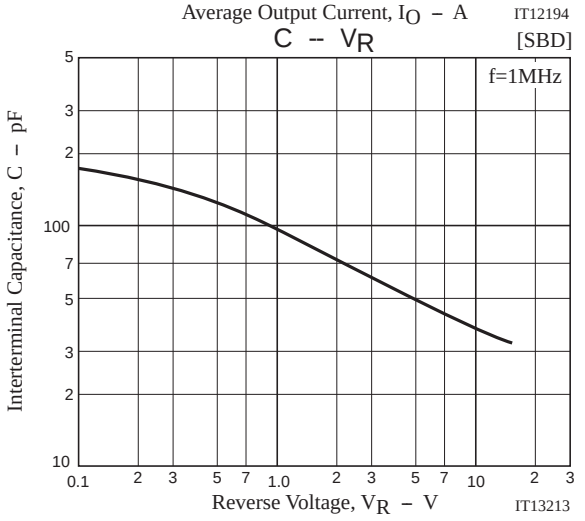

PD -- Ta [MOSFET]
When mounted on ceramic substrate
(900mm²×0.8mm)
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT15909

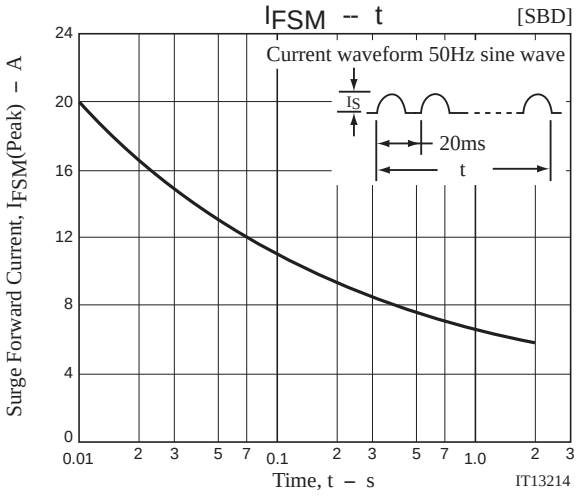

IF -- VF
[SBD]
Forward Current, IF – A
Forward Voltage, VF – V
IT12192
Ta=125°C
100°C
75°C
50°C
25°C
0°C
–25°C


IR -- VR
[SBD]
Reverse Current, IR – μA
Reverse Voltage, VR – V
IT12193
Ta=125°C
100°C
75°C
50°C
25°C
0°C
–25°C


PF(AV) -- IO
[SBD]
Average Forward Power Dissipation, PF(AV) – W
Average Output Current, IO – A
IT12194
Rectangular wave
θ
360°
Sine wave
180°
360°
(1)
(2)
(4)
(3)
(1)Rectangular wave θ=60°
(2)Rectangular wave θ=120°
(3)Rectangular wave θ=180°
(4)Sine wave θ=180°


PR(AV) -- VR
[SBD]
Average Reverse Power Dissipation, PR(AV) – W
Average Reverse Voltage, VR – V
IT12195
(1)Rectangular wave θ=300°
(2)Rectangular wave θ=240°
(3)Rectangular wave θ=180°
(4)Sine wave θ=180°
Rectangular wave
360°
θ
VR
Sine wave
180°
360°
VR
(1)
(2)
(3)
(4)


C -- VR
[SBD]
f=1MHz
Interterminal Capacitance, C – pF
Reverse Voltage, VR – V
IT13213


IFSM -- t
[SBD]
Current waveform 50Hz sine wave
IS
20ms
t
Surge Forward Current, IFSM(Peak) – A
Time, t – s
IT13214

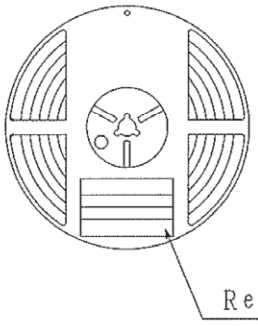
Embossed Taping Specification

EMH2801-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

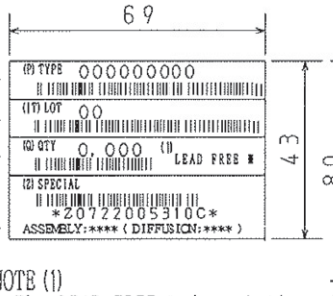
Packing method



Reel label

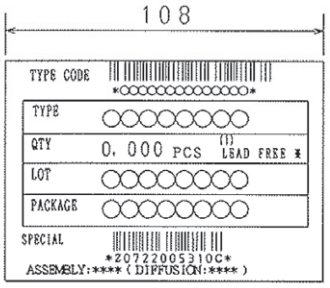
Reel label, Inner box label

(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.

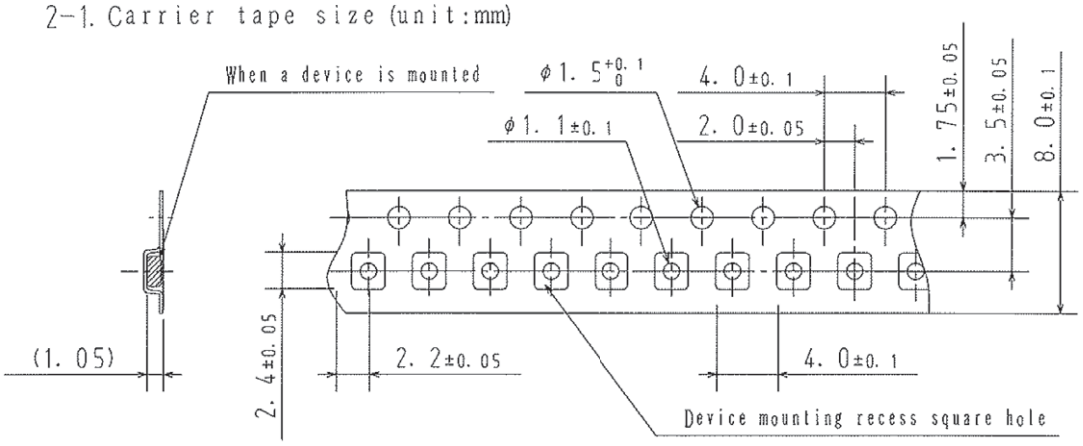


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

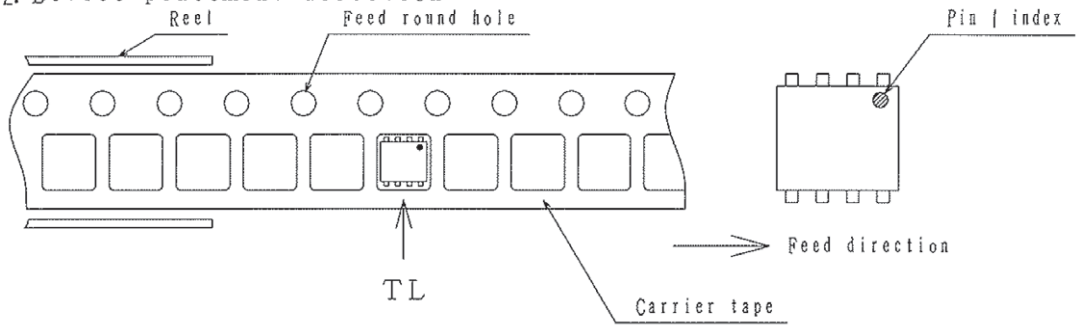
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



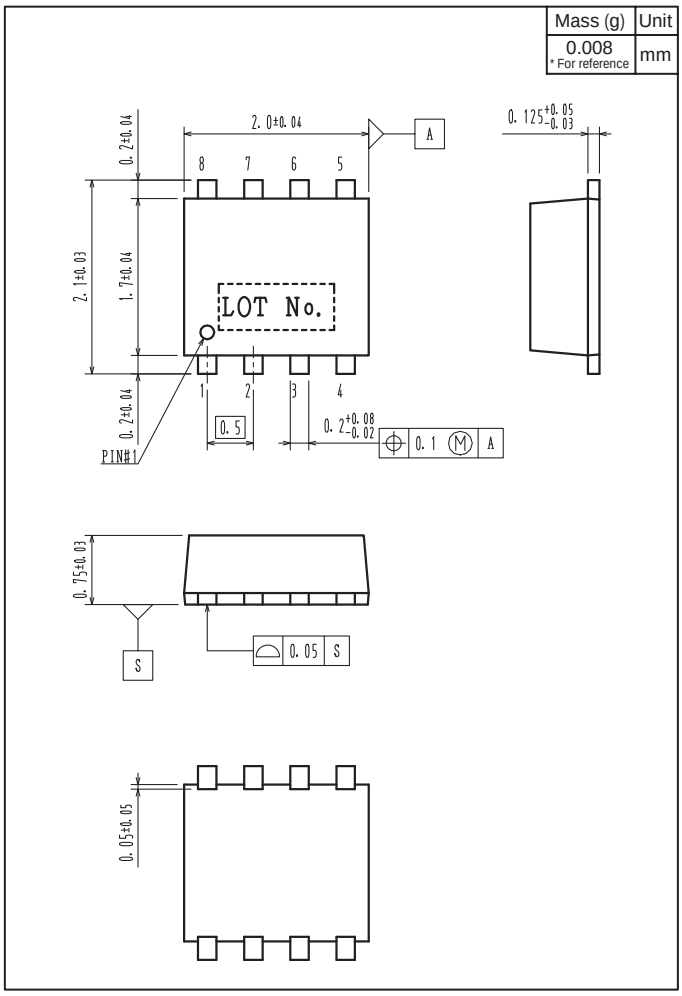
2-2. Device placement direction



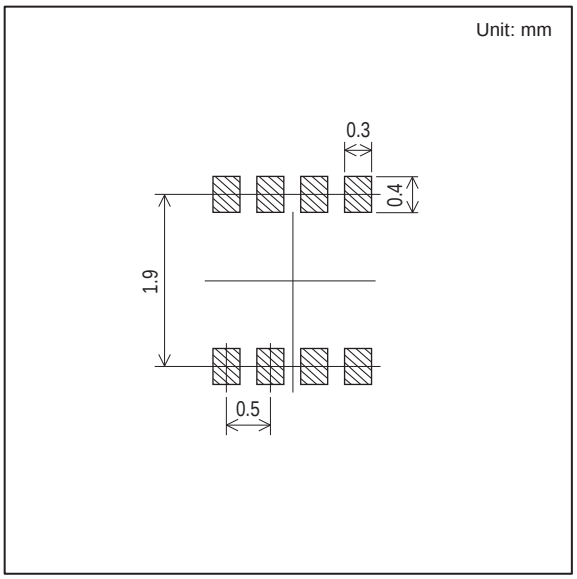
Those with pin 1 index on the feed hole side·····TL

Outline Drawing

EMH2801-TL-H



Land Pattern Example



Note on usage : Since the EMH2801 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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