



EMH2604

Power MOSFET

20V, 4A, 45mΩ, -20V, -3A, 85mΩ, Complementary Dual EMH8

ON Semiconductor®

<http://onsemi.com>

Features

- Nch + Pch MOSFET
- ON-resistance Nch : $R_{DS(on)1}=34m\Omega(\text{typ.})$
Pch : $R_{DS(on)1}=65m\Omega(\text{typ.})$
- 1.8V drive
- Halogen free compliance

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	V_{DSS}		20	-20	V
Gate-to-Source Voltage	V_{GSS}		± 10	± 10	V
Drain Current (DC)	I_D		4	-3	A
Drain Current (Pulse)	I_{DP}	$PW \leq 10\mu s$, duty cycle $\leq 1\%$	20	-20	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	T_{ch}		150		°C
Storage Temperature	T_{stg}		-55 to +150		°C

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

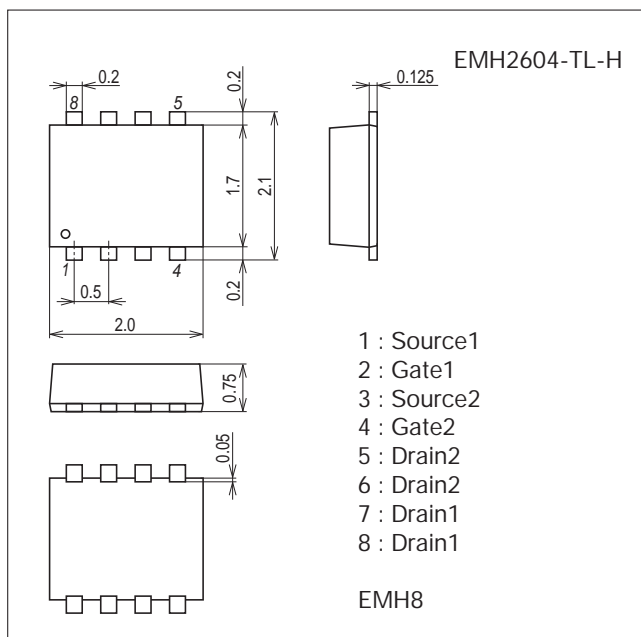
* Machine Model

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)

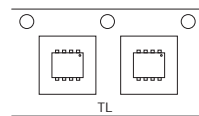
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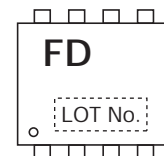
Product & Package Information

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

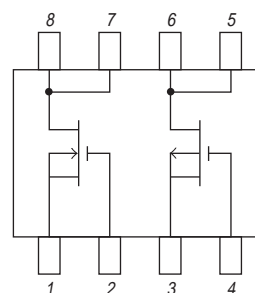
Packing Type : TL



Marking



Electrical Connection



EMH2604

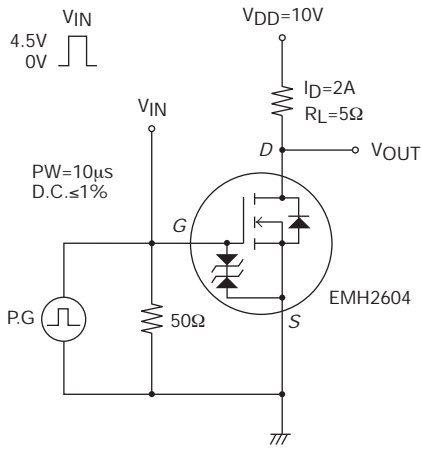
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[N-channel]						
Drain-to-Source Breakdown Voltage	V(BR)DSS	ID=1mA, VGS=0V	20			V
Zero-Gate Voltage Drain Current	IDSS	VDS=20V, VGS=0V			1	μA
Gate-to-Source Leakage Current	IGSS	VGS=±8V, VDS=0V			±10	μA
Cutoff Voltage	VGS(off)	VDS=10V, ID=1mA	0.4		1.3	V
Forward Transfer Admittance	yfs	VDS=10V, ID=2A		3.4		S
Static Drain-to-Source On-State Resistance	RDS(on)1	ID=4A, VGS=4.5V		34	45	mΩ
	RDS(on)2	ID=1A, VGS=2.5V		49	67	mΩ
	RDS(on)3	ID=0.5A, VGS=1.8V		74	115	mΩ
Input Capacitance	Ciss	VDS=10V, f=1MHz		345		pF
Output Capacitance	Coss			67		pF
Reverse Transfer Capacitance	Crss			52		pF
Turn-ON Delay Time	t _{d(on)}		See specified Test Circuit.		9.2	
Rise Time	t _r			60		ns
Turn-OFF Delay Time	t _{d(off)}			30		ns
Fall Time	t _f			38		ns
Total Gate Charge	Qg	VDS=10V, VGS=4.5V, ID=4A			4.7	
Gate-to-Source Charge	Qgs			0.65		nC
Gate-to-Drain "Miller" Charge	Qgd			1.6		nC
Diode Forward Voltage	VSD		IS=4A, VGS=0V		0.8	1.2
[P-channel]						
Drain-to-Source Breakdown Voltage	V(BR)DSS	ID=-1mA, VGS=0V	-20			V
Zero-Gate Voltage Drain Current	IDSS	VDS=-20V, VGS=0V			-1	μA
Gate-to-Source Leakage Current	IGSS	VGS=±8V, VDS=0V			±10	μA
Cutoff Voltage	VGS(off)	VDS=-10V, ID=-1mA	-0.4		-1.3	V
Forward Transfer Admittance	yfs	VDS=-10V, ID=-1.5A		3.6		S
Static Drain-to-Source On-State Resistance	RDS(on)1	ID=-3A, VGS=-4.5V		65	85	mΩ
	RDS(on)2	ID=-1A, VGS=-2.5V		98	137	mΩ
	RDS(on)3	ID=-0.5A, VGS=-1.8V		155	235	mΩ
Input Capacitance	Ciss	VDS=-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	
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	VDS=-10V, VGS=-4.5V, ID=-3A			4.0	
Gate-to-Source Charge	Qgs			0.6		nC
Gate-to-Drain "Miller" Charge	Qgd			1.1		nC
Diode Forward Voltage	VSD		IS=-3A, VGS=0V		-0.83	-1.2

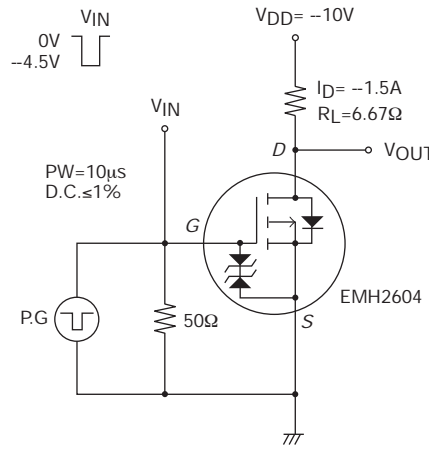
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Switching Time Test Circuit

[N-channel]

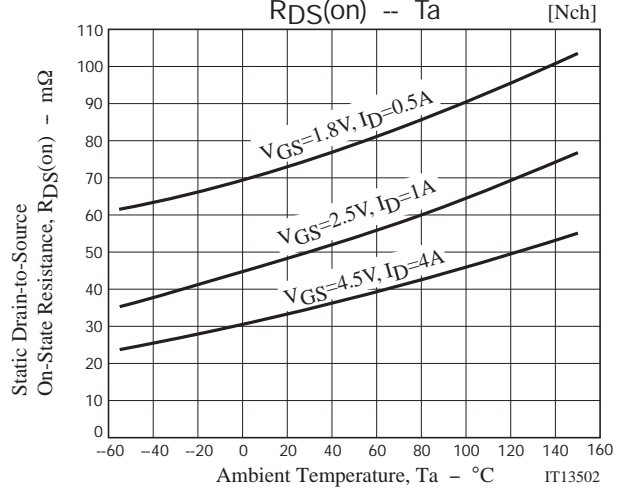
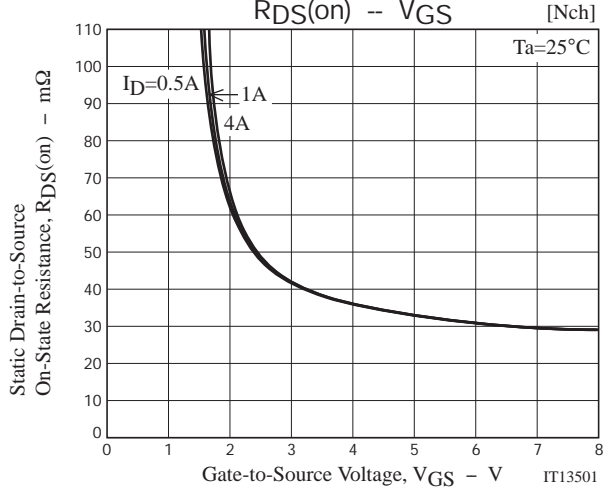
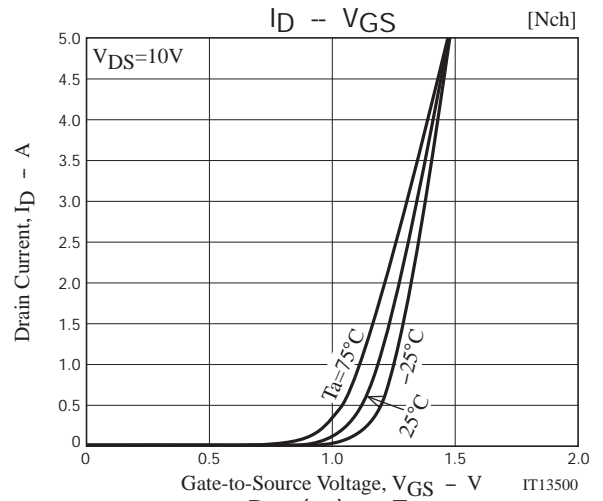
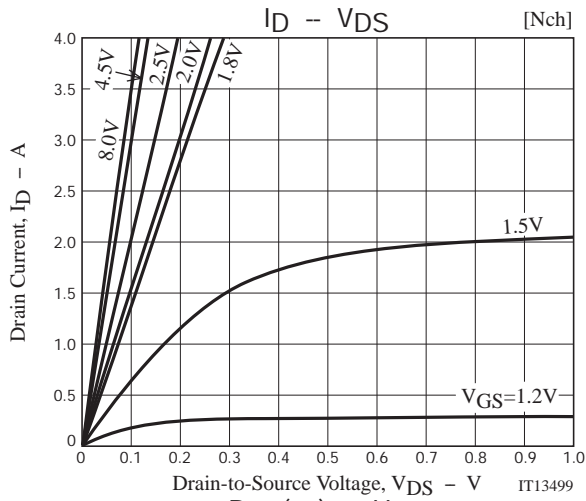


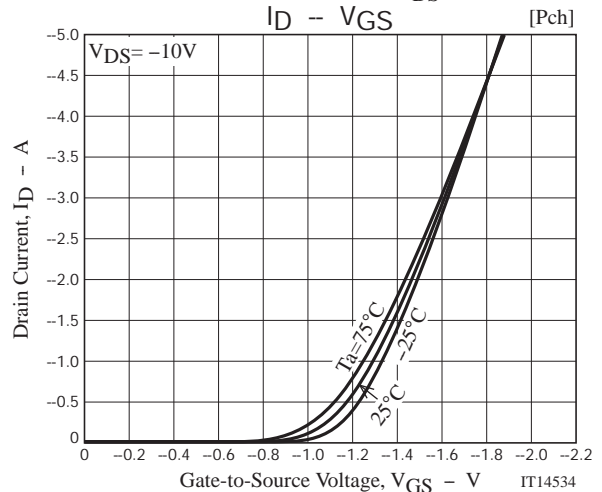
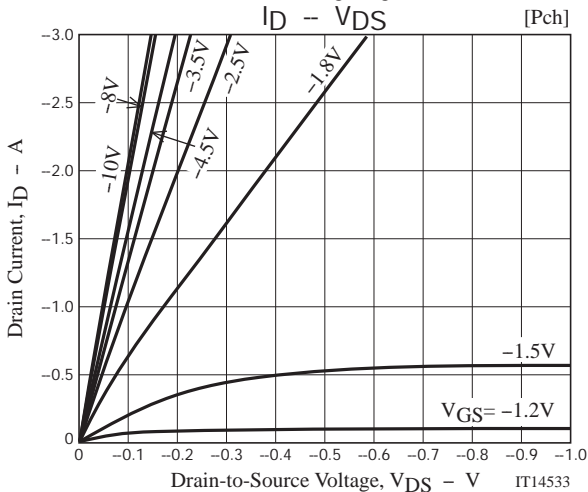
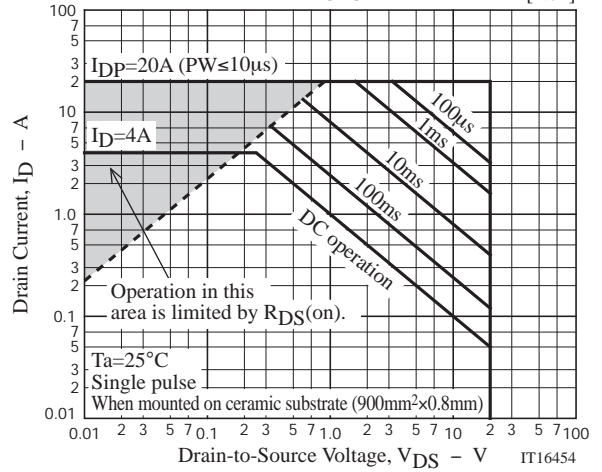
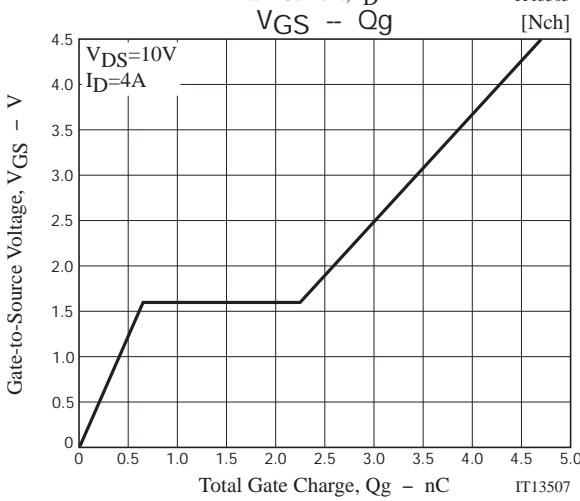
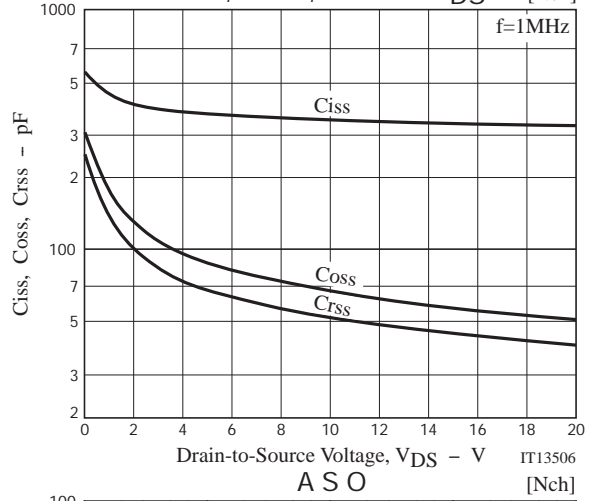
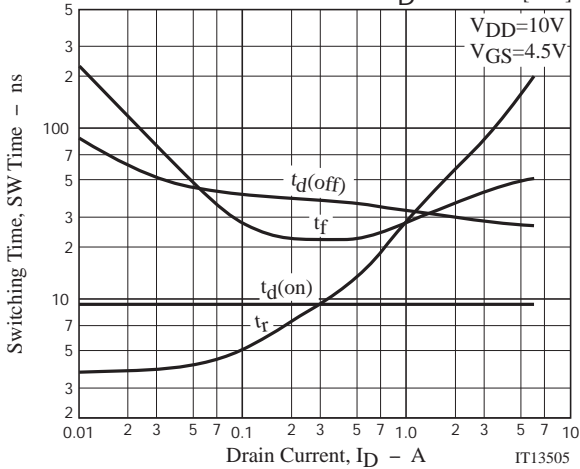
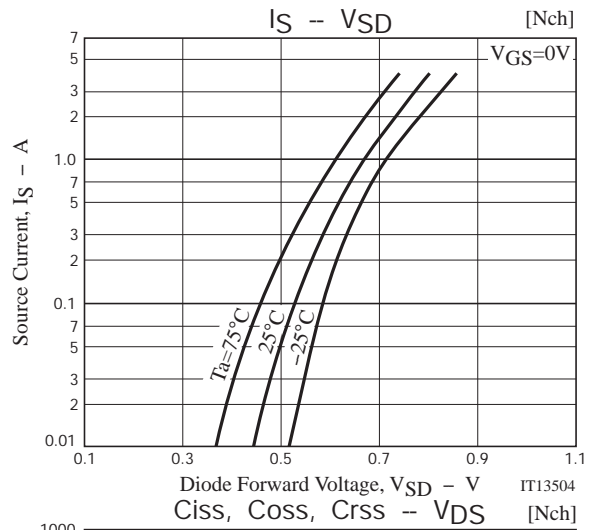
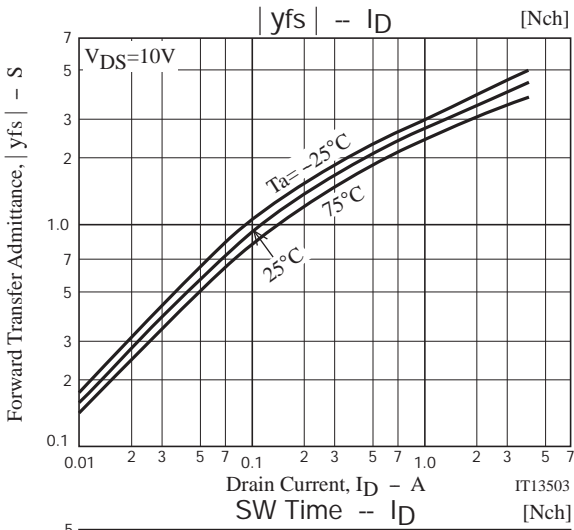
[P-channel]

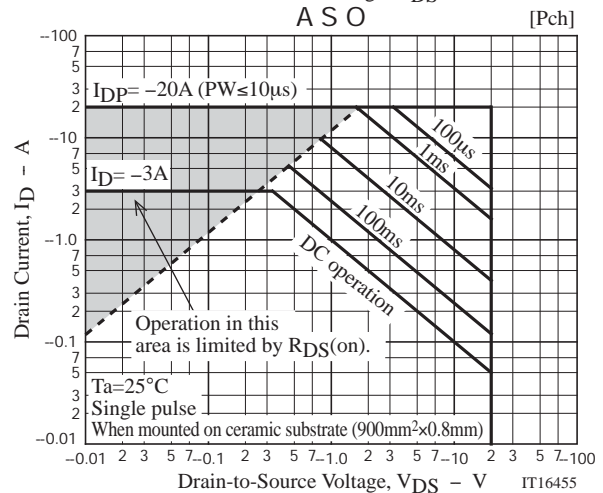
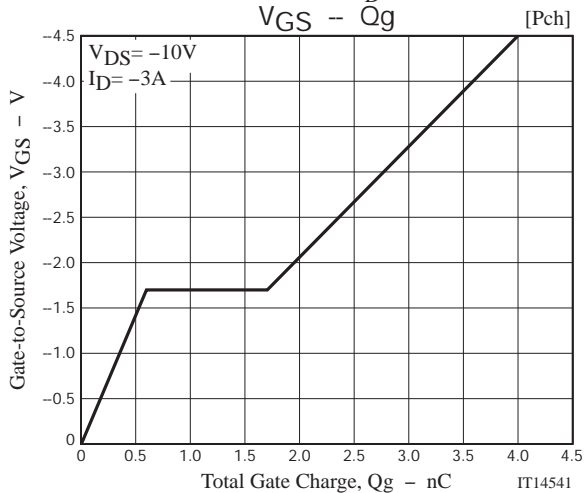
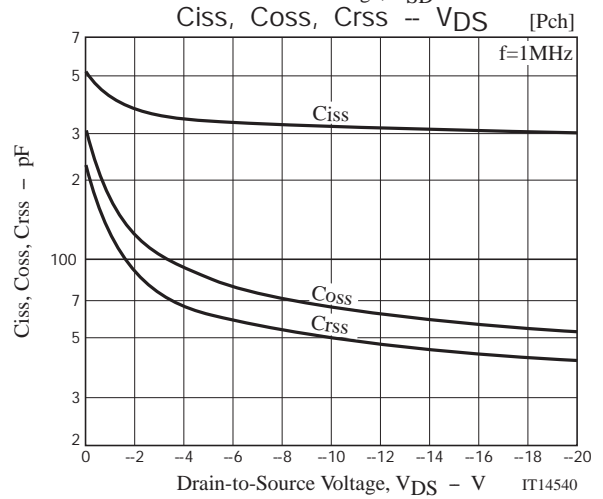
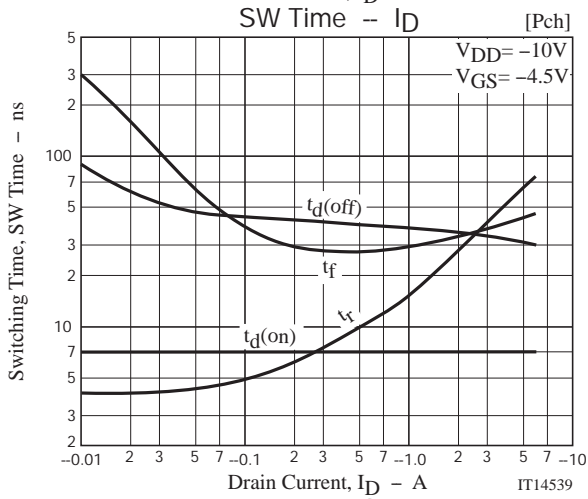
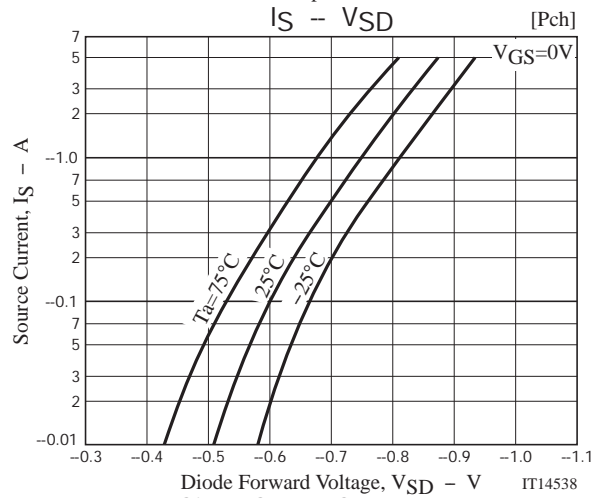
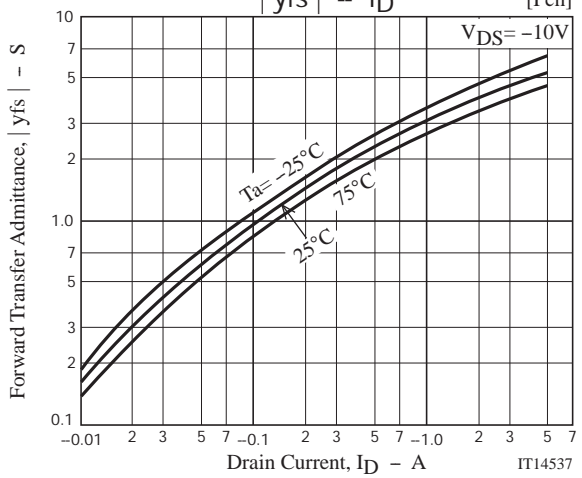
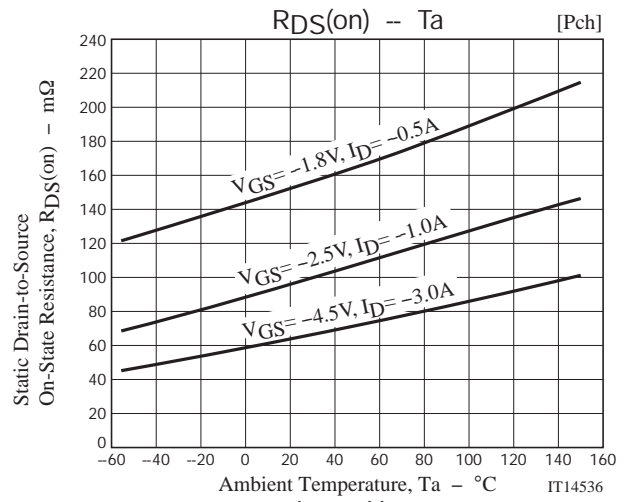
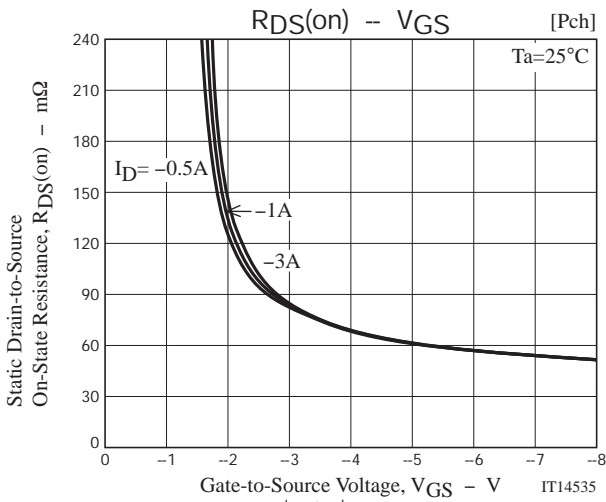


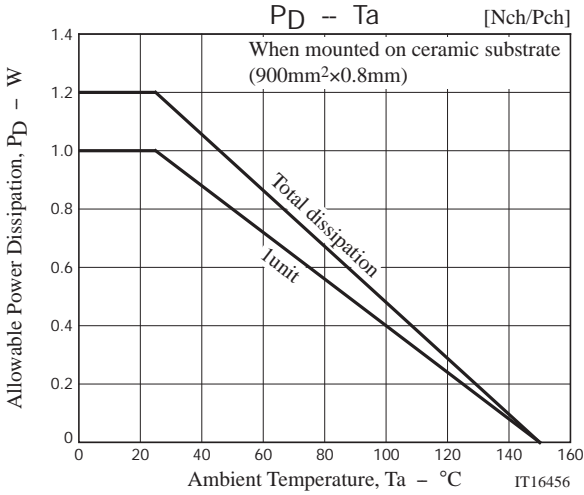
Ordering Information

Device	Package	Shipping	memo
EMH2604-TL-H	EMH8	3,000pcs./reel	Pb Free and Halogen Free









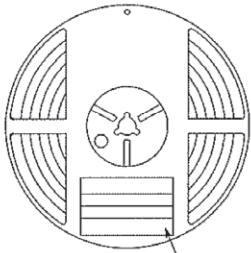
Embossed Taping Specification

EMH2604-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

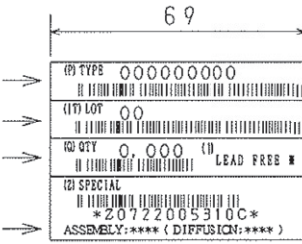
Packing method



Reel label

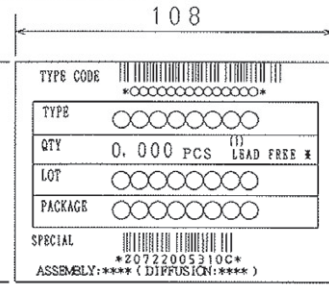
Type No. →
 LOT No. →
 Quantity →
 Origin →

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.



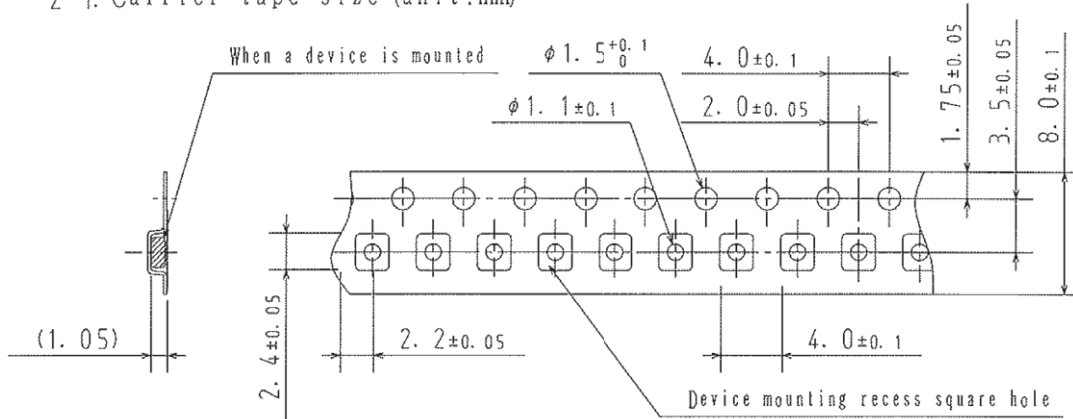
NOTE (1)

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

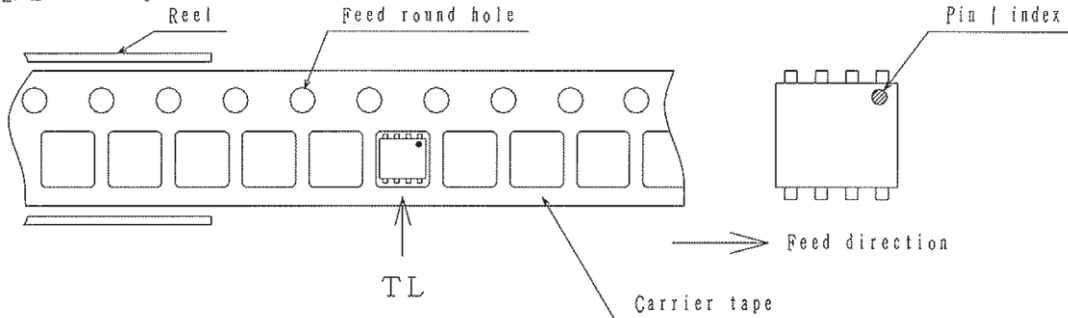
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



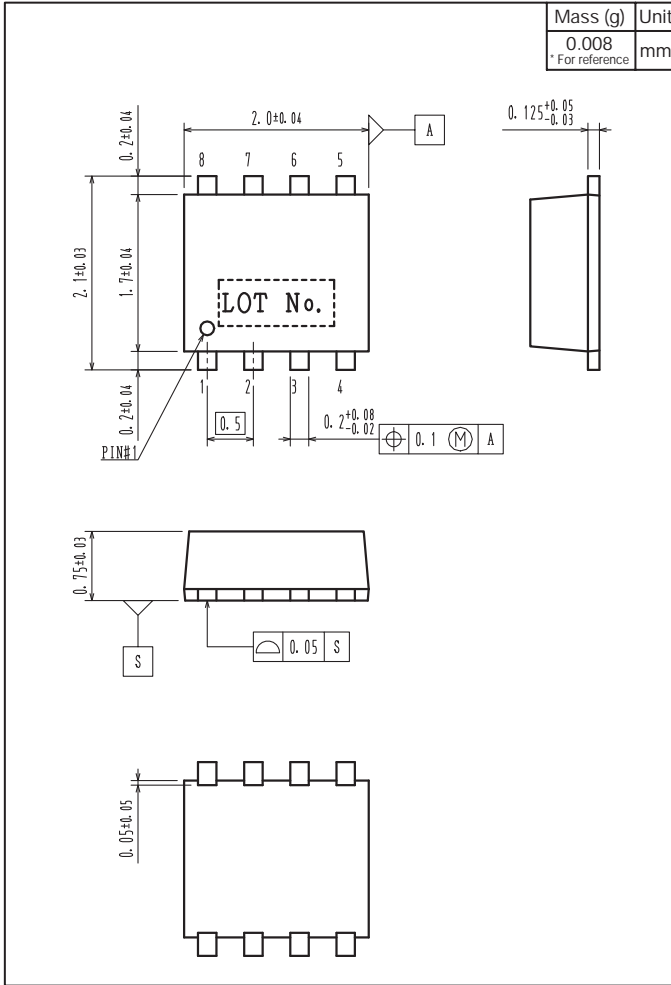
2-2. Device placement direction



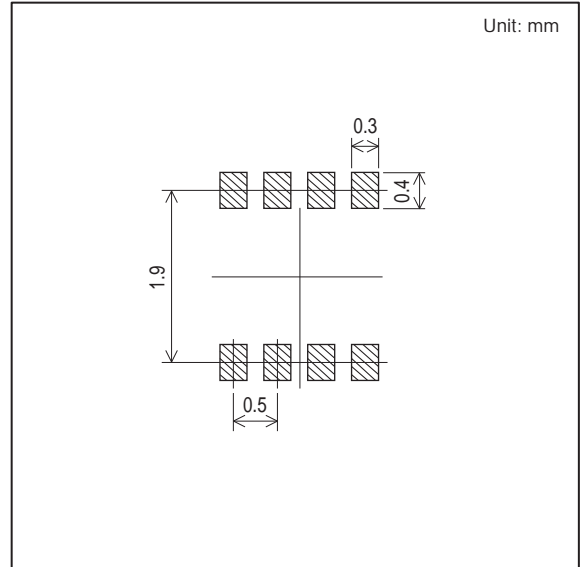
Those with pin 1 index on the feed hole side.....TL

EMH2604

Outline Drawing EMH2604-TL-H



Land Pattern Example



Note on usage : Since the EMH2604 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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