Ordering number : ENA0851A

ECH8653

N-Channel Power MOSFET
20V, 7.5A, 20mΩ, Dual ECH8

ON Semiconductor®
http://onsemi.com

Features

- Low ON-resistance
- Best suited for LiB charging and discharging switch
- Halogen free compliance
- 4V drive
- Common-drain type
- Protection diode in

Specifications

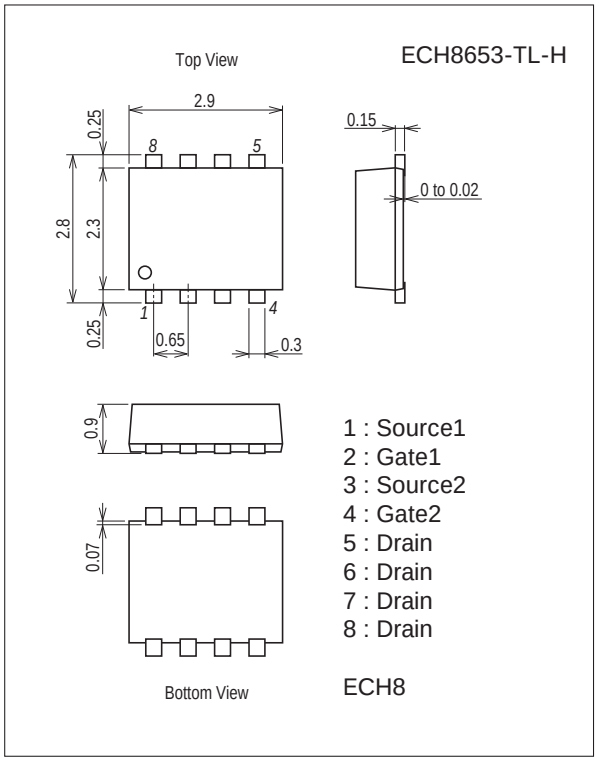
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		20	V
Gate-to-Source Voltage	V_{GSS}		±10	V
Drain Current (DC)	I_D		7.5	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	40	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (900mm²×0.8mm) 1unit	1.4	W
Total Power Dissipation	P_T	When mounted on ceramic substrate (900mm²×0.8mm)	1.5	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°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.

Package Dimensions

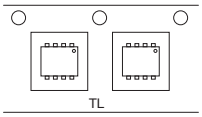
unit : mm (typ)
7011A-003



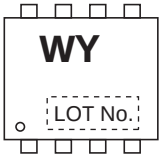
Product & Package Information

- Package : ECH8
- JEITA, JEDEC : -
- Minimum Packing Quantity : 3,000 pcs./reel

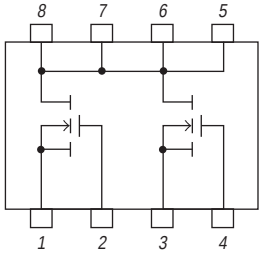
Packing Type : TL



Marking



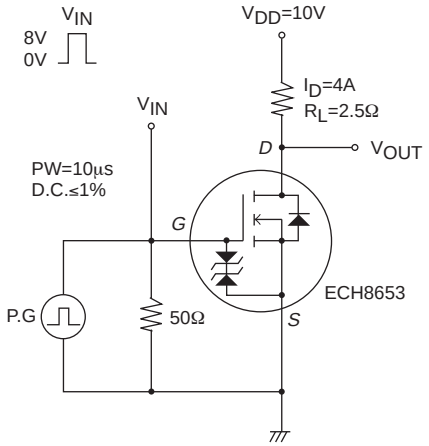
Electrical Connection



Electrical Characteristics at Ta=25°C

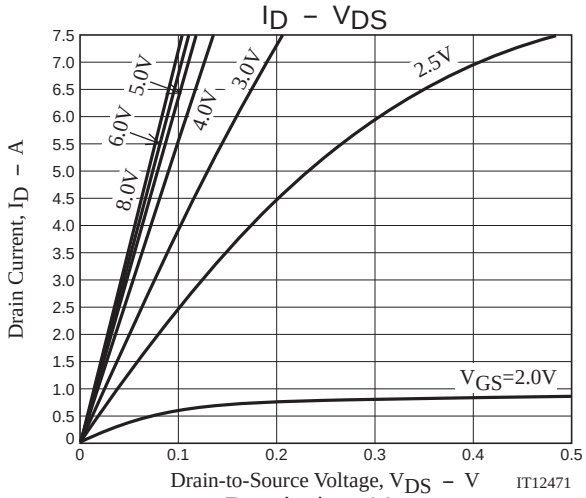
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	20			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	1.0		2.4	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=4A	3.4	5.8		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=4A, V_{GS}=8V	9	14	20	mΩ
	R_{DS}(on)2	I_D=4A, V_{GS}=4V	11	18	25	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		1280		pF
Output Capacitance	Coss			170		pF
Reverse Transfer Capacitance	Crss			105		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		13		ns
Rise Time	t_r			48		ns
Turn-OFF Delay Time	t_d(off)			94		ns
Fall Time	t_f			36		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=8V, I_D=7.5A		18.5		nC
Gate-to-Source Charge	Qgs			2.7		nC
Gate-to-Drain “Miller” Charge	Qgd			3.1		nC
Diode Forward Voltage	V_{SD}	I_S=7.5A, V_{GS}=0V		0.82	1.2	V

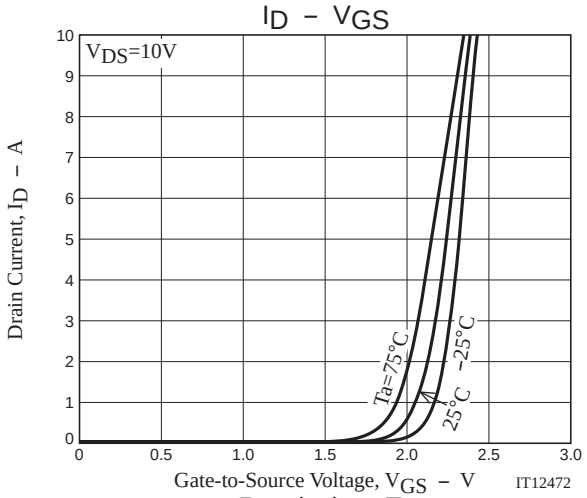
Switching Time Test Circuit

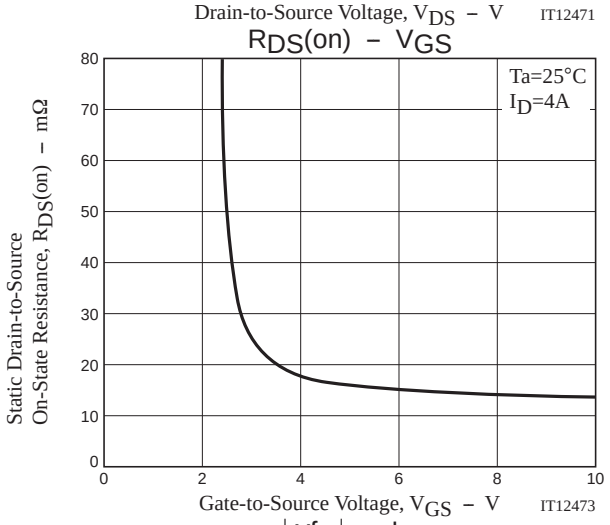


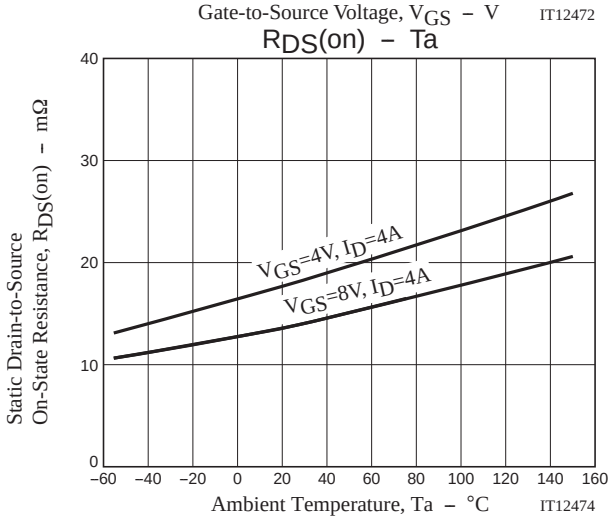
Ordering Information

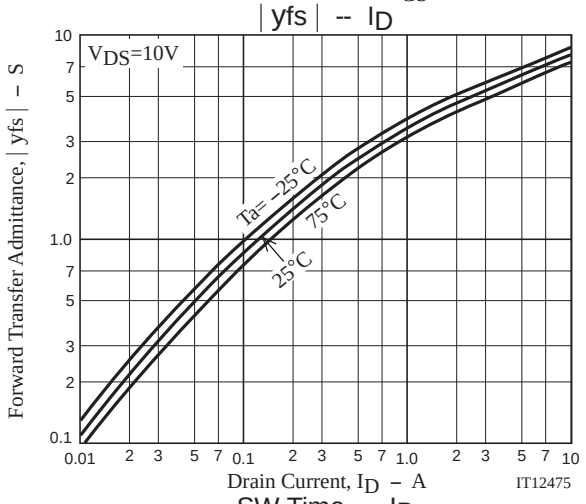
Device	Package	Shipping	memo
ECH8653-TL-H	ECH8	3,000pcs./reel	Pb Free and Halogen Free

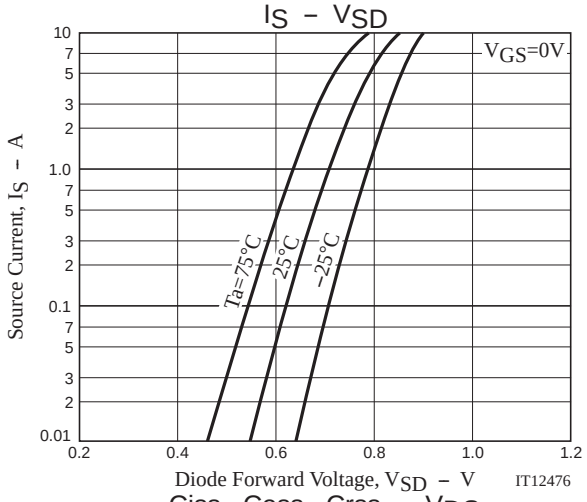

ID – VDS
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT12471
2.5V
3.0V
4.0V
5.0V
6.0V
8.0V
VGS=2.0V

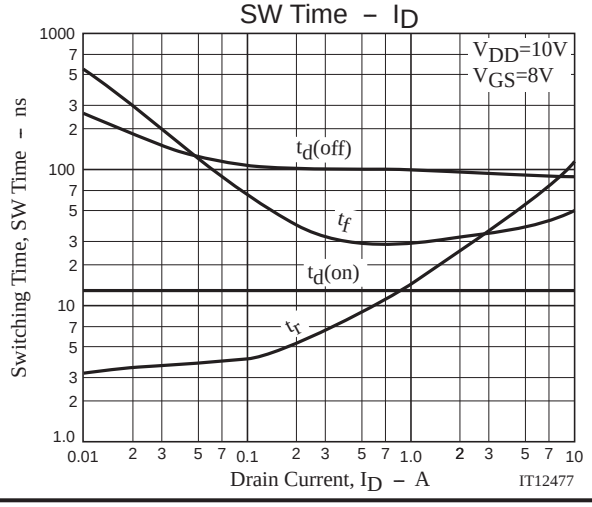

ID – VGS
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT12472
VDS=10V
Ta=75°C
25°C
–25°C

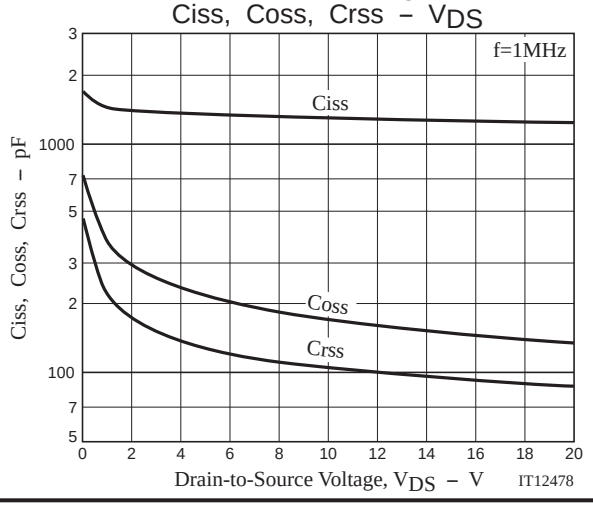

RDS(on) – VGS
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT12473
Ta=25°C
ID=4A

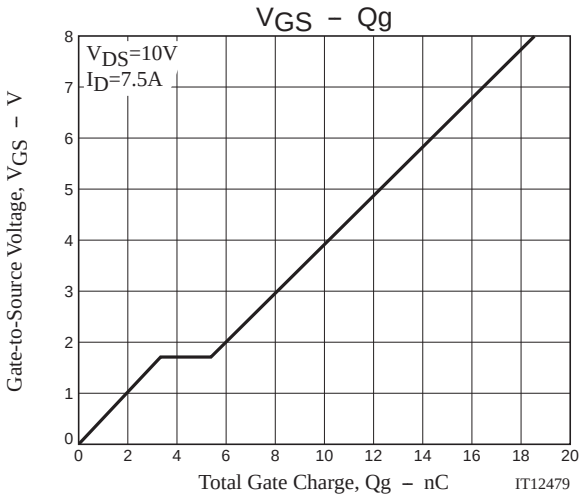

RDS(on) – Ta
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT12474
VGS=4V, ID=4A
VGS=8V, ID=4A

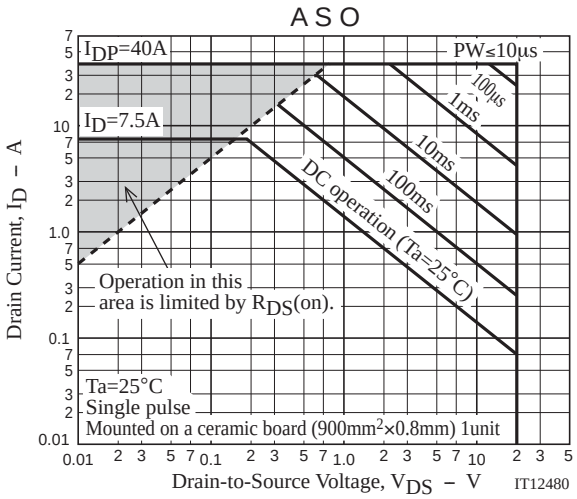

| yfs | -- ID
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT12475
VDS=10V
Ta= –25°C
25°C
75°C

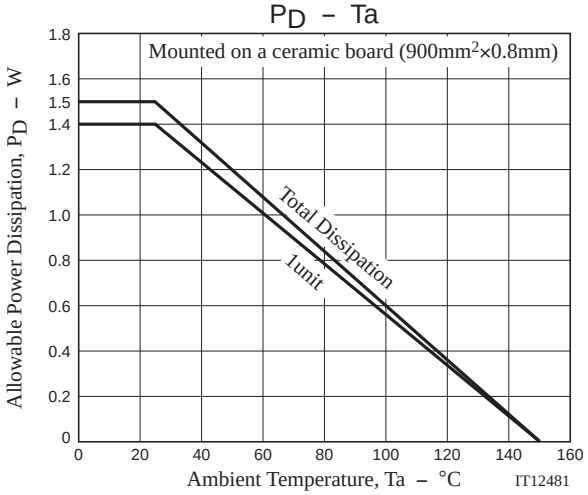

IS – VSD
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT12476
VGS=0V
Ta=75°C
25°C
–25°C


SW Time – ID
Switching Time, SW Time – ns
Drain Current, ID – A
IT12477
VDD=10V
VGS=8V
td(off)
tf
td(on)
tr


Ciss, Coss, Crss – VDS
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT12478
f=1MHz
Ciss
Coss
Crss


VGS – Qg
VDS=10V
ID=7.5A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT12479


A S O
IDP=40A
PW≤10μs
ID=7.5A
100μs
1ms
10ms
100ms
DC operation (Ta=25°C)
Operation in this
area is limited by RDS(on).
Ta=25°C
Single pulse
Mounted on a ceramic board (900mm2×0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT12480


PD – Ta
Mounted on a ceramic board (900mm2×0.8mm)
Total Dissipation
1unit
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT12481

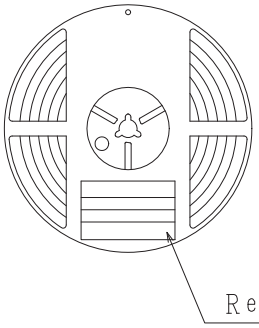
Embossed Taping Specification

ECH8653-TL-H

1. Packing Format

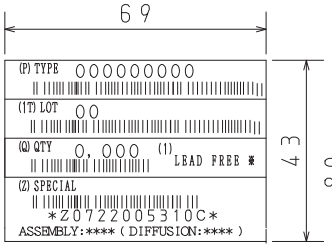
Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
ECH8	CPH6	3,000	15,000	90,000	5 reels contained Dimensions:mm(external) 183×72×185	6 inner boxes contained Dimensions:mm(external) 440×195×210

Packing method



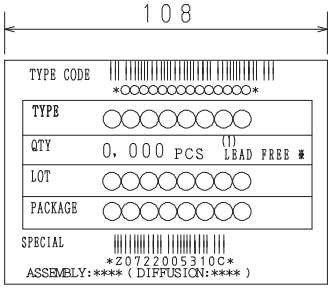
Reel label, Inner box label

(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.



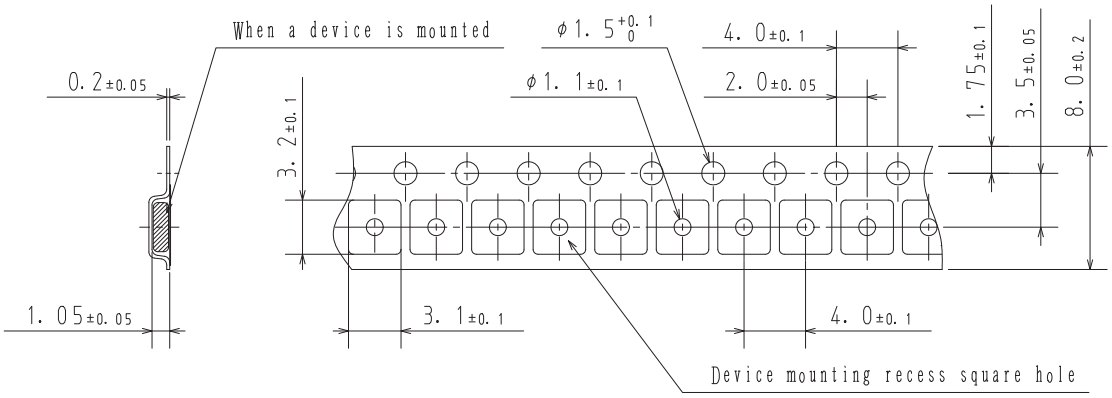
NOTE (1)

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

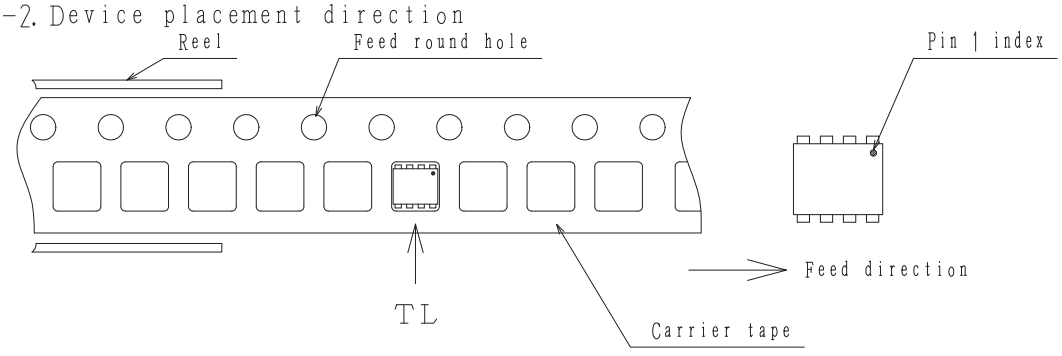
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



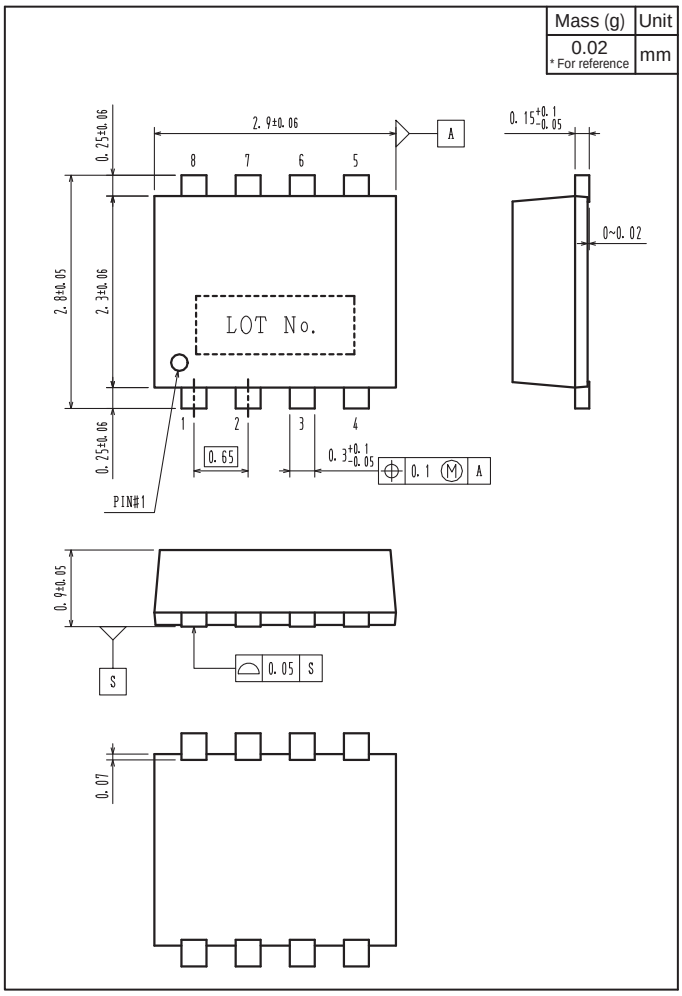
2-2. Device placement direction



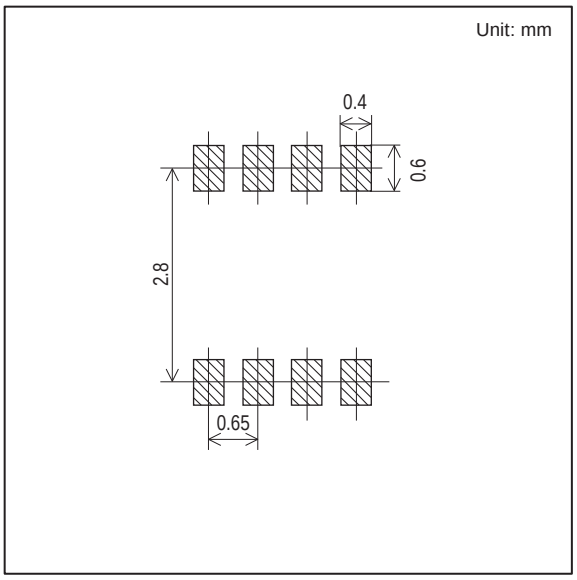
Those with pin 1 index on the feed hole side·····TL

Outline Drawing

ECH8653-TL-H



Land Pattern Example



Note on usage : Since the ECH8653 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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