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# ECH8668

## Power MOSFET

20V, 7.5A, 17mΩ, -20V, -5A, 38mΩ, Complementary Dual ECH8

ON Semiconductor®

<http://onsemi.com>

### Features

- The ECH8668 incorporates an N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance and high-speed switching , thereby enabling high-density mounting
- 1.8V drive
- Halogen free compliance
- Protection diode in

### Specifications

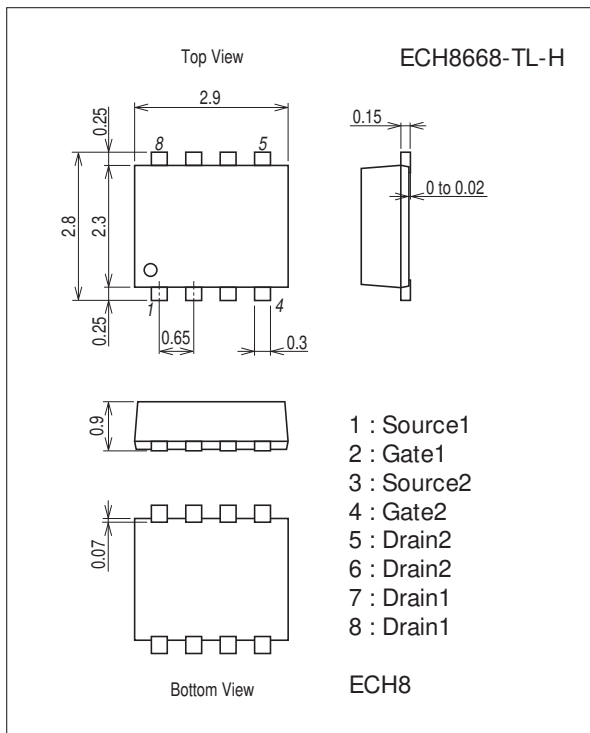
**Absolute Maximum Ratings** at Ta=25°C

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	V <sub>DSS</sub>		20	-20	V
Gate-to-Source Voltage	V <sub>GSS</sub>		±10	±10	V
Drain Current (DC)	I <sub>D</sub>		7.5	-5	A
Drain Current (Pulse)	I <sub>DP</sub>	PW≤10μs, duty cycle≤1%	40	-40	A
Allowable Power Dissipation	P <sub>D</sub>	When mounted on ceramic substrate (900mm <sup>2</sup> ×0.8mm) 1unit	1.3		W
Total Dissipation	P <sub>T</sub>	When mounted on ceramic substrate (900mm <sup>2</sup> ×0.8mm)	1.5		W
Channel Temperature	T <sub>ch</sub>		150		°C
Storage Temperature	T <sub>stg</sub>		-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

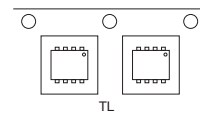
unit : mm (typ)  
7011A-001



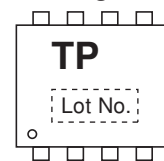
### Product & Package Information

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

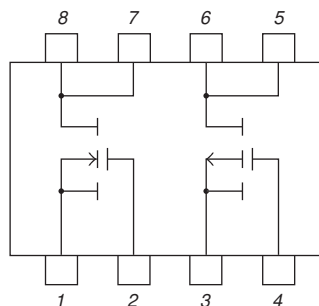
### Packing Type : TL



### Marking



### Electrical Connection



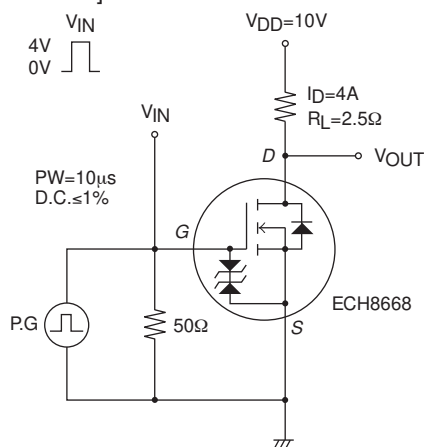
# ECH8668

## Electrical Characteristics at Ta=25°C

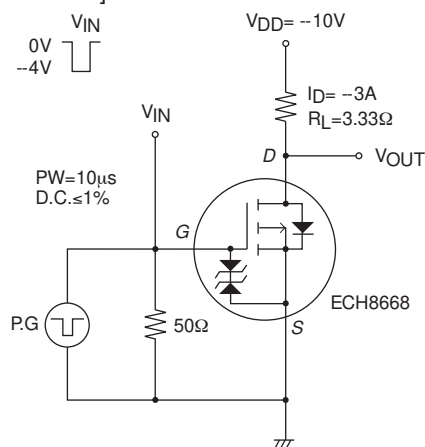
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[N-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=1\text{mA}, V_{GS}=0\text{V}$	20			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8\text{V}, V_{DS}=0\text{V}$			$\pm 10$	$\mu\text{A}$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10\text{V}, I_D=1\text{mA}$	0.5		1.3	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10\text{V}, I_D=4\text{A}$	4.2	7		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=4\text{A}, V_{GS}=4.5\text{V}$		13	17	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D=2\text{A}, V_{GS}=2.5\text{V}$		18	26	$\text{m}\Omega$
	$R_{DS(on)3}$	$I_D=0.5\text{A}, V_{GS}=1.8\text{V}$		30	48	$\text{m}\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=10\text{V}, f=1\text{MHz}$		1060		pF
Output Capacitance	$C_{oss}$			180		pF
Reverse Transfer Capacitance	$C_{rss}$			135		pF
Turn-ON Delay Time	$t_d(on)$			17.5		ns
Rise Time	$t_r$	See specified Test Circuit.		120		ns
Turn-OFF Delay Time	$t_d(off)$			68		ns
Fall Time	$t_f$			80		ns
Total Gate Charge	$Q_g$			10.8		nC
Gate-to-Source Charge	$Q_{gs}$	$V_{DS}=10\text{V}, V_{GS}=4.5\text{V}, I_D=7.5\text{A}$		2.1		nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$			2.9		nC
Diode Forward Voltage	$V_{SD}$		$I_S=7.5\text{A}, V_{GS}=0\text{V}$		0.74	1.2
[P-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=-1\text{mA}, V_{GS}=0\text{V}$	-20			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20\text{V}, V_{GS}=0\text{V}$			-1	$\mu\text{A}$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8\text{V}, V_{DS}=0\text{V}$			$\pm 10$	$\mu\text{A}$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=-10\text{V}, I_D=-1\text{mA}$	-0.4		-1.3	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=-10\text{V}, I_D=-3\text{A}$	4.9	8.3		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=-3\text{A}, V_{GS}=-4.5\text{V}$		29	38	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D=-1.5\text{A}, V_{GS}=-2.5\text{V}$		41	58	$\text{m}\Omega$
	$R_{DS(on)3}$	$I_D=-0.5\text{A}, V_{GS}=-1.8\text{V}$		64	98	$\text{m}\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=-10\text{V}, f=1\text{MHz}$		960		pF
Output Capacitance	$C_{oss}$			180		pF
Reverse Transfer Capacitance	$C_{rss}$			140		pF
Turn-ON Delay Time	$t_d(on)$			14		ns
Rise Time	$t_r$	See specified Test Circuit.		55		ns
Turn-OFF Delay Time	$t_d(off)$			92		ns
Fall Time	$t_f$			68		ns
Total Gate Charge	$Q_g$			11		nC
Gate-to-Source Charge	$Q_{gs}$	$V_{DS}=-10\text{V}, V_{GS}=-4.5\text{V}, I_D=-5\text{A}$		2.0		nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$			2.8		nC
Diode Forward Voltage	$V_{SD}$		$I_S=-5\text{A}, V_{GS}=0\text{V}$		-0.82	-1.2

## Switching Time Test Circuit

[N-channel]



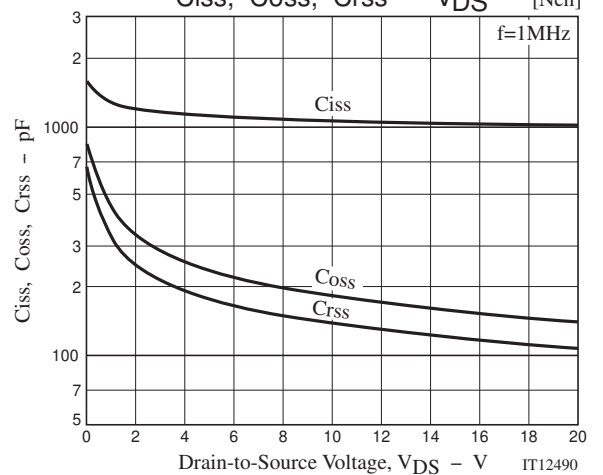
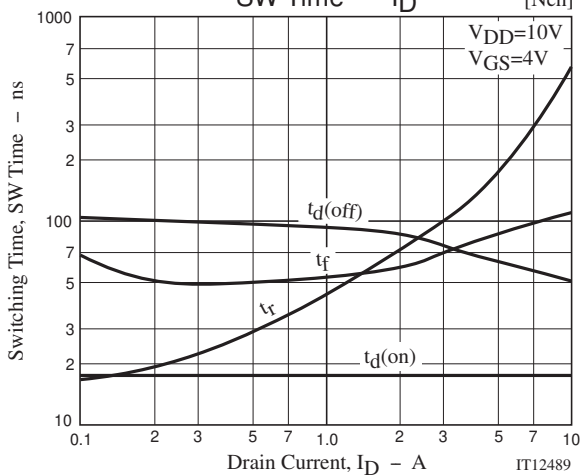
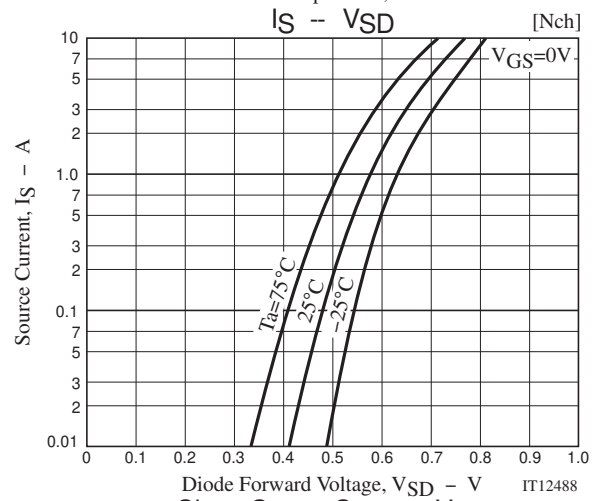
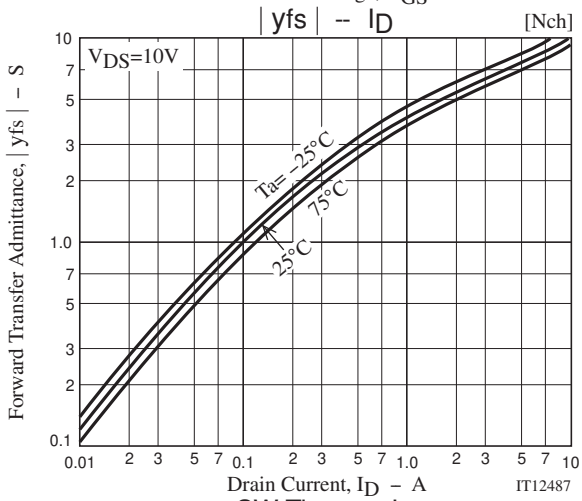
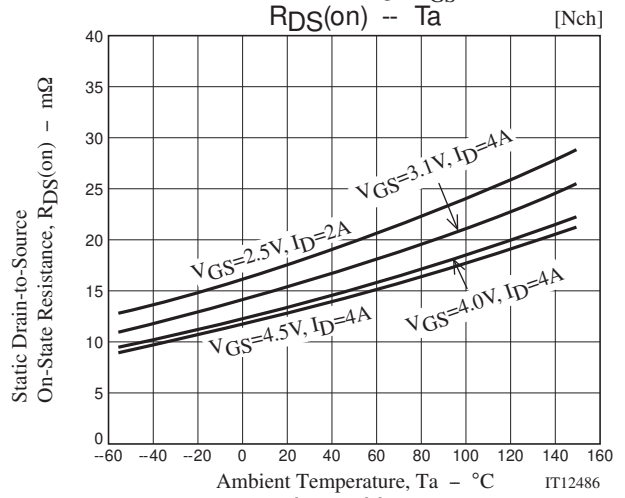
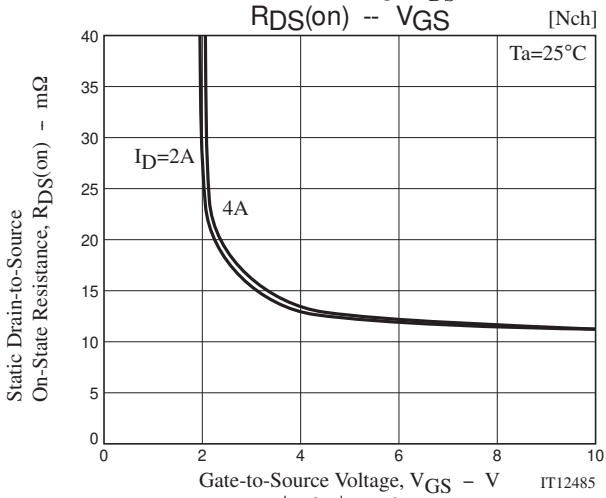
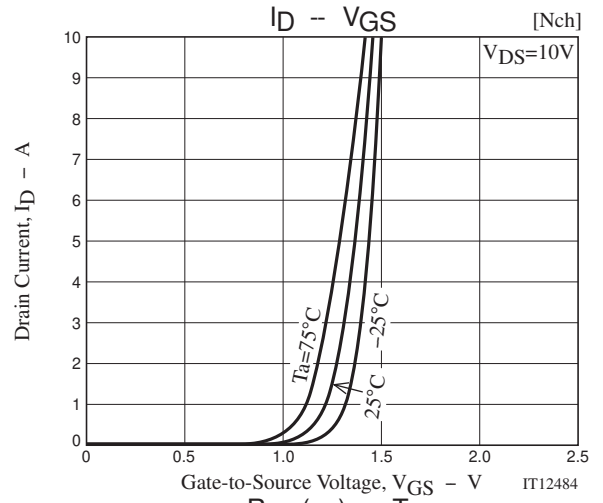
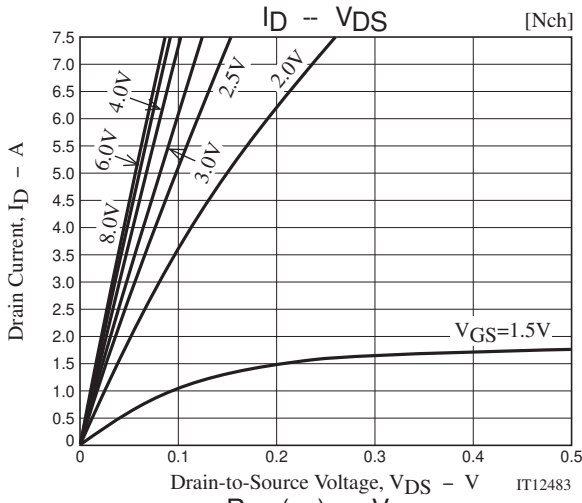
[P-channel]

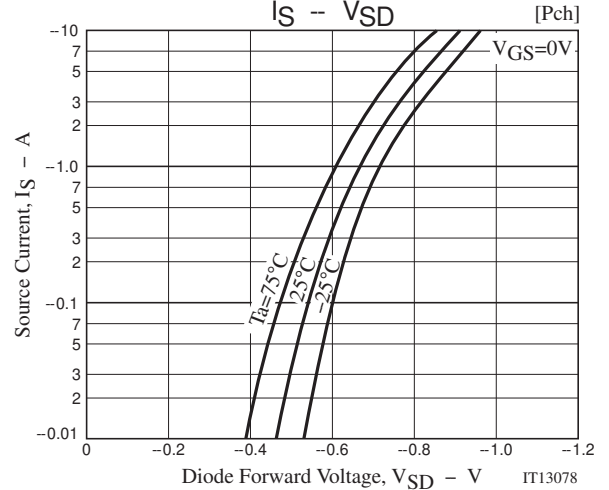
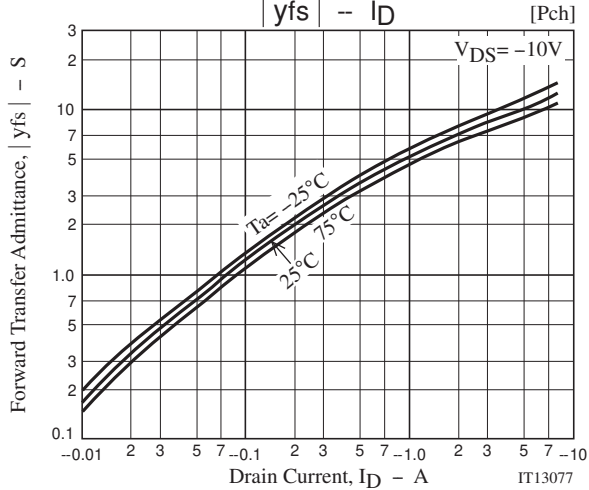
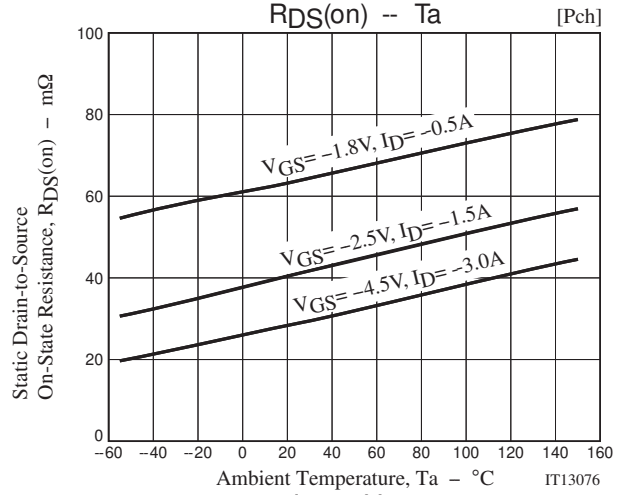
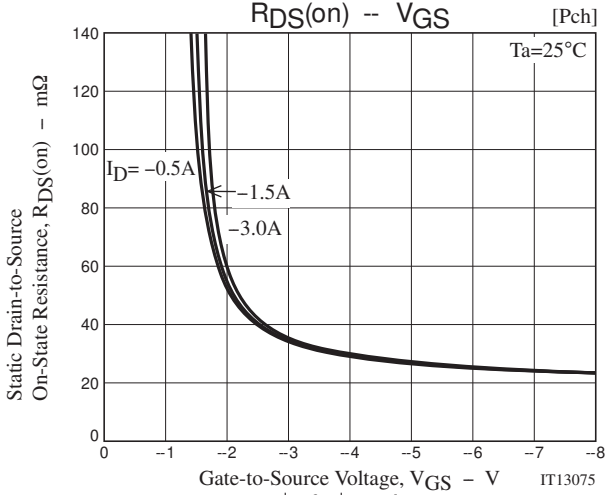
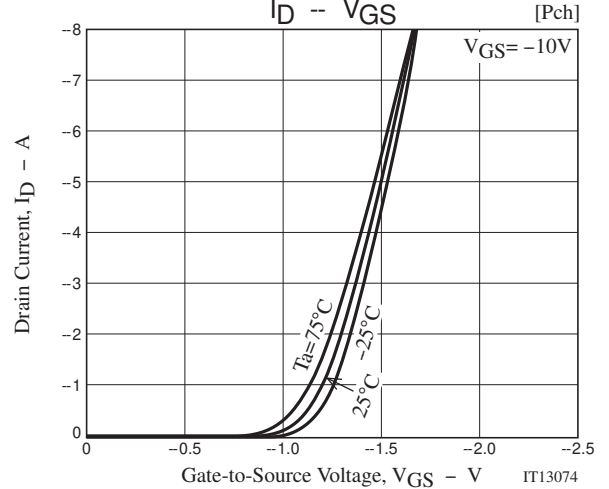
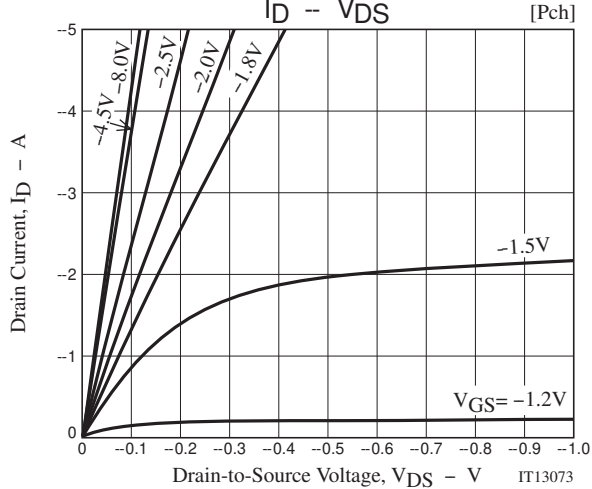
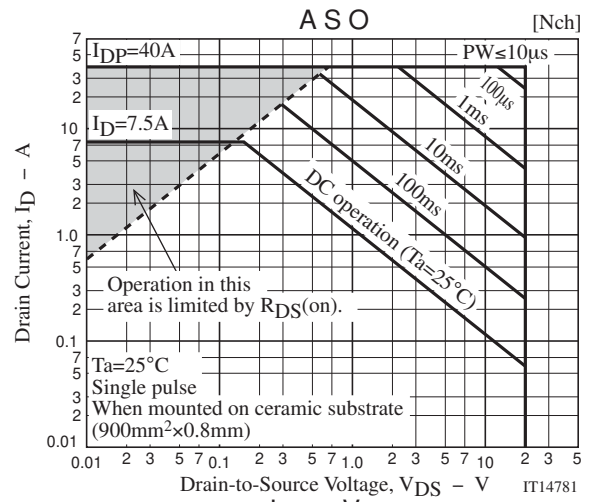
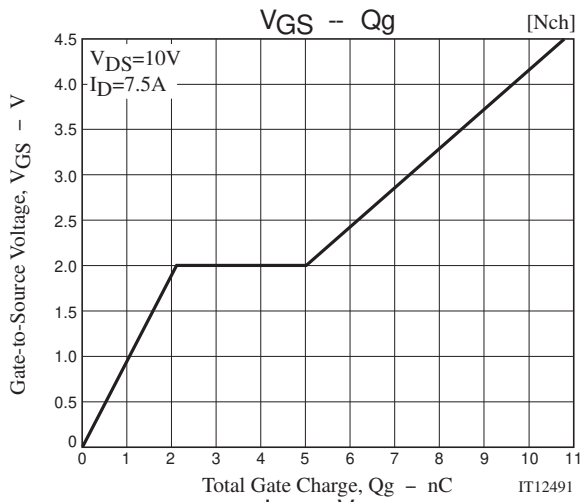


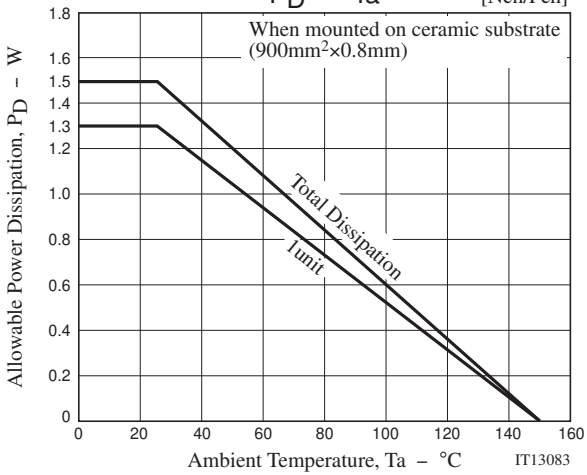
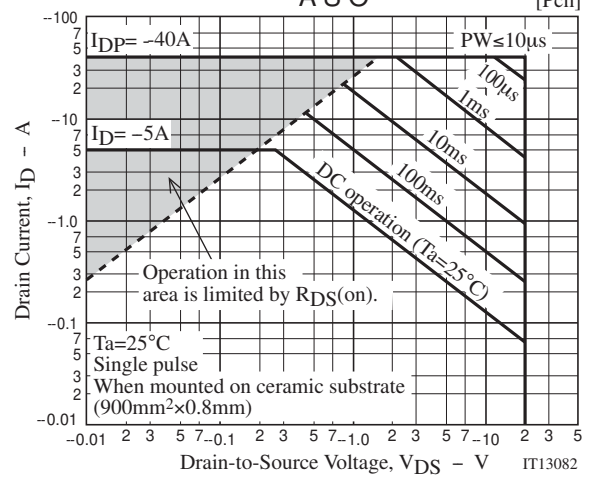
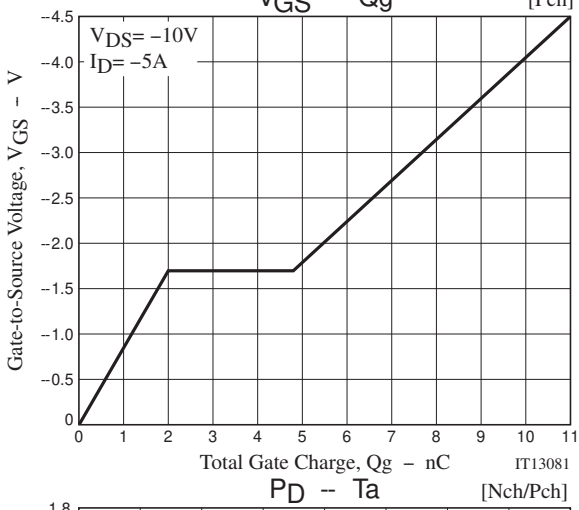
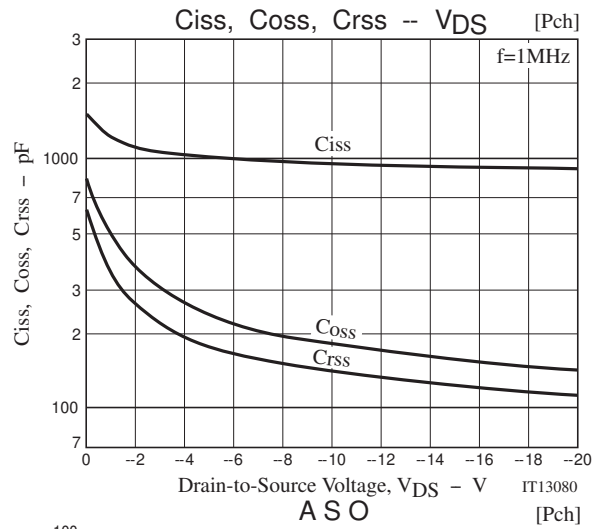
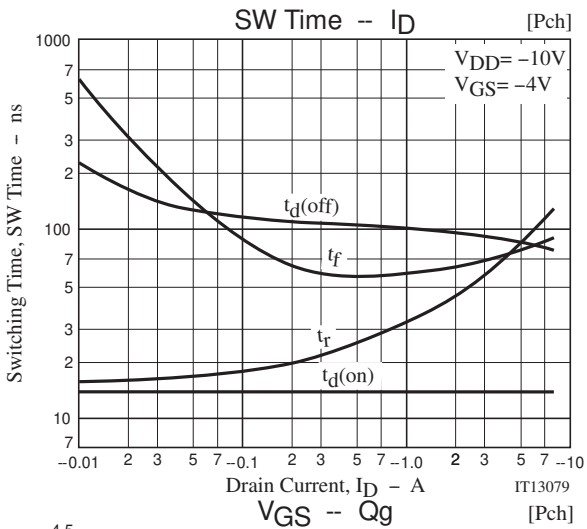
## Ordering Information

Device	Package	Shipping	memo
ECH8668-TL-H	ECH8	3,000pcs./reel	Pb Free and Halogen Free









**Embossed Taping Specification**

ECH8668-TL-H

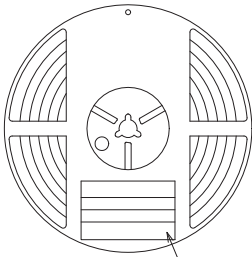
1. Packing Format

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

Reel label, Inner box label  
(unit :mm)

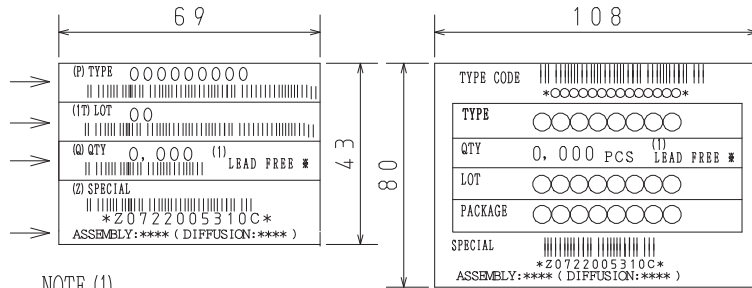
Outer box label  
It is a label at the time of factory shipments.  
The form of a label may change in physical distribution process.

Packing method



Reel label

Type No.  
LOT No.  
Quantity  
Origin



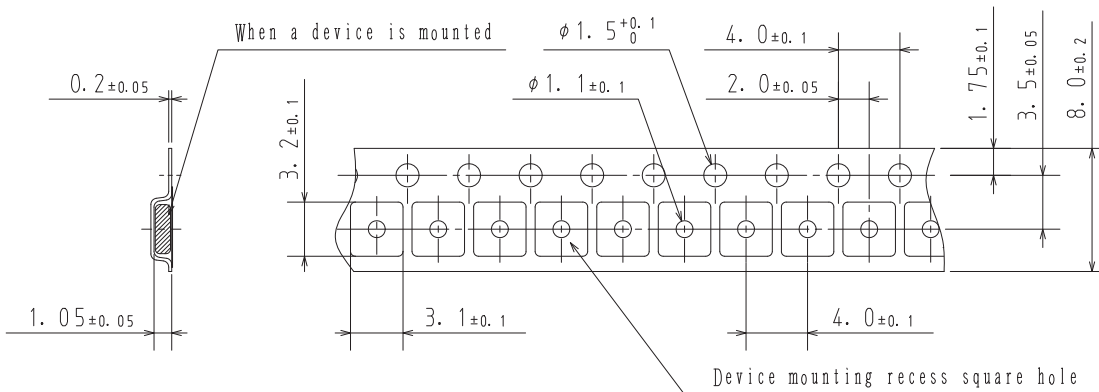
NOTE (1)

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

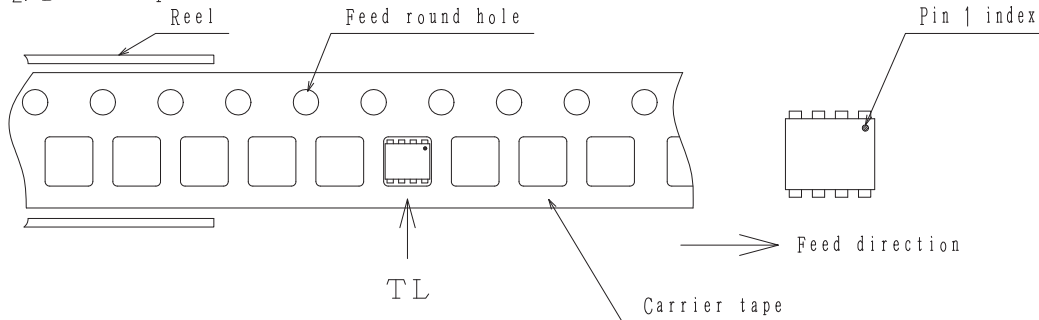
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



2-2. Device placement direction

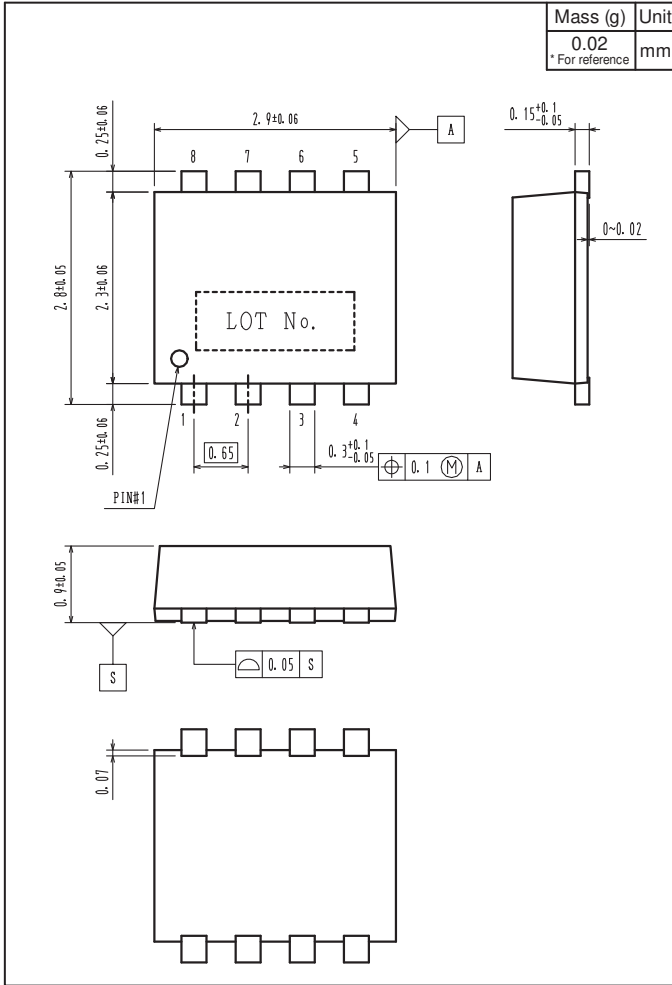


Those with pin 1 index on the feed hole side.....TL

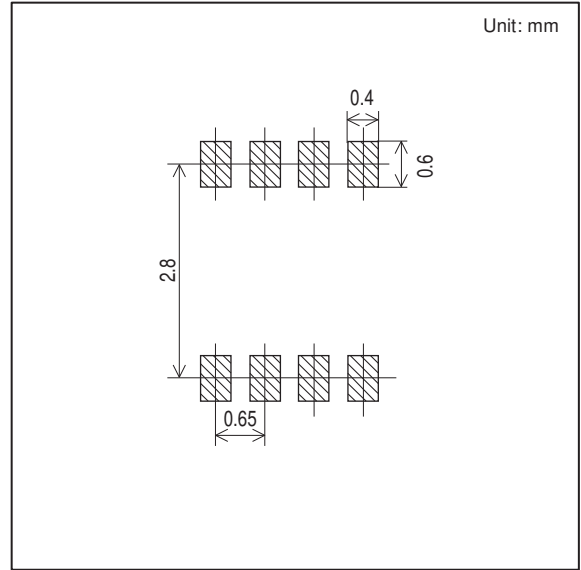
# ECH8668

## Outline Drawing

ECH8668-TL-H



## Land Pattern Example





Note on usage : Since the ECH8668 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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