



# ECH8668 — General-Purpose Switching Device Applications

N-Channel and P-Channel Silicon MOSFETs

## 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

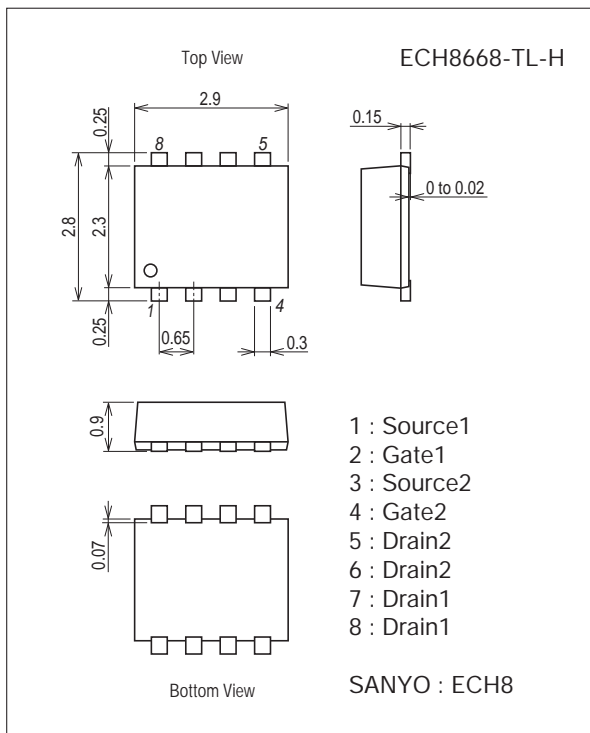
## Specifications

### 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 cycles≤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

## Package Dimensions

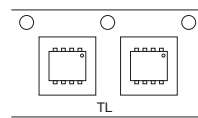
unit : mm (typ)  
7011A-001



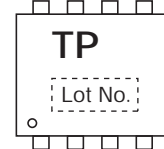
## Product & Package Information

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

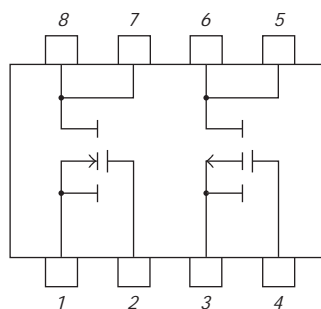
## Packing Type : TL



## Marking



## Electrical Connection



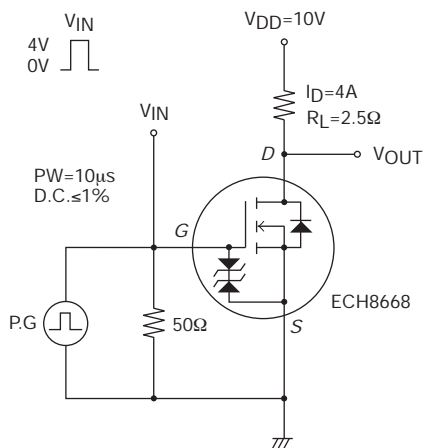
# ECH8668

## Electrical Characteristics at Ta=25°C

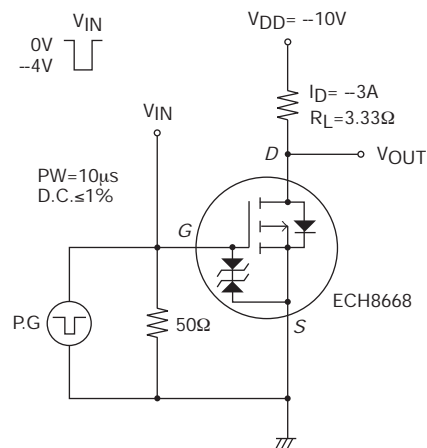
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[N-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=1mA, V_{GS}=0V$	20			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1	$\mu A$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8V, V_{DS}=0V$			$\pm 10$	$\mu A$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10V, I_D=1mA$	0.5		1.3	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10V, I_D=4A$	4.2	7		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=4A, V_{GS}=4.5V$		13	17	$m\Omega$
	$R_{DS(on)2}$	$I_D=2A, V_{GS}=2.5V$		18	26	$m\Omega$
	$R_{DS(on)3}$	$I_D=0.5A, V_{GS}=1.8V$		30	48	$m\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=10V, f=1MHz$		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	$Q_g$	$V_{DS}=10V, V_{GS}=4.5V, I_D=7.5A$		10.8		nC
Gate-to-Source Charge	$Q_{gs}$			2.1		nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$			2.9		nC
Diode Forward Voltage	$V_{SD}$		$I_S=7.5A, V_{GS}=0V$		0.74	1.2
[P-channel]						
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	$\mu A$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8V, V_{DS}=0V$			$\pm 10$	$\mu A$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=-10V, I_D=-1mA$	-0.4		-1.3	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=-10V, I_D=-3A$	4.9	8.3		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=-3A, V_{GS}=-4.5V$		29	38	$m\Omega$
	$R_{DS(on)2}$	$I_D=-1.5A, V_{GS}=-2.5V$		41	58	$m\Omega$
	$R_{DS(on)3}$	$I_D=-0.5A, V_{GS}=-1.8V$		64	98	$m\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, f=1MHz$		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	$Q_g$	$V_{DS}=-10V, V_{GS}=-4.5V, I_D=-5A$		11		nC
Gate-to-Source Charge	$Q_{gs}$			2.0		nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$			2.8		nC
Diode Forward Voltage	$V_{SD}$		$I_S=-5A, V_{GS}=0V$		-0.82	-1.2

### Switching Time Test Circuit

[N-channel]

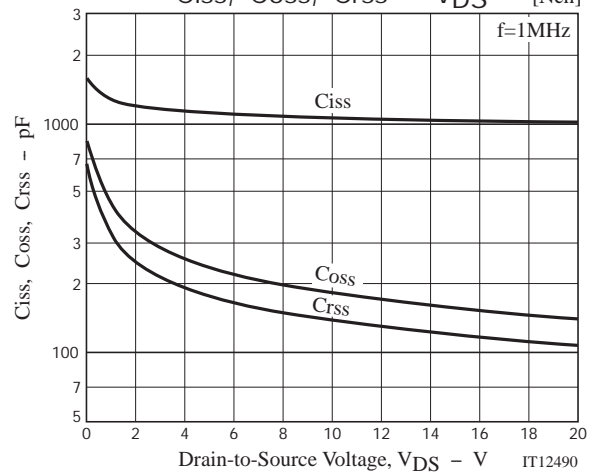
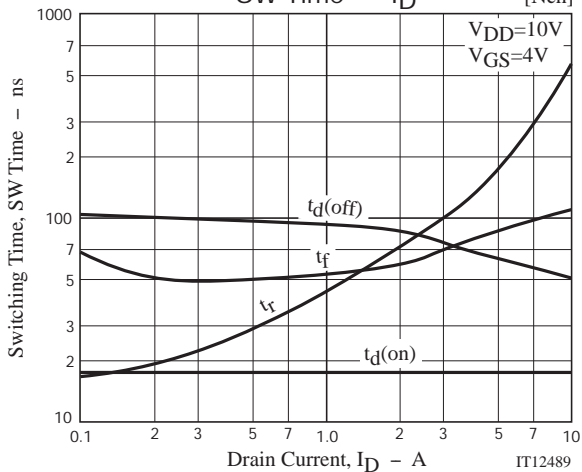
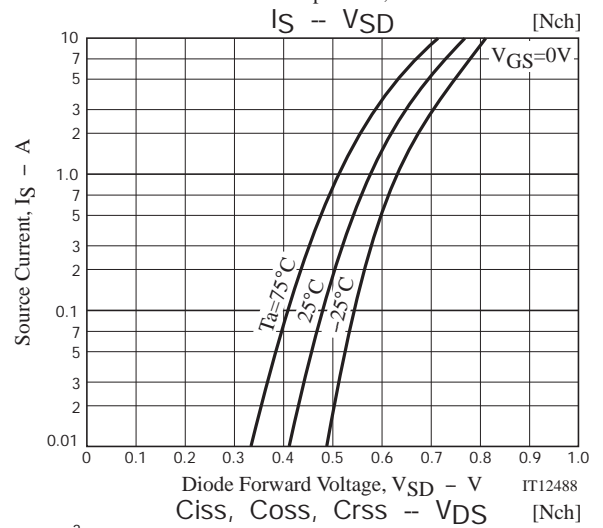
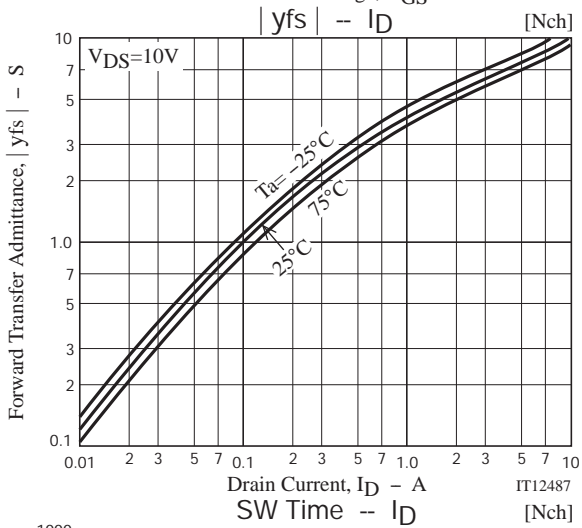
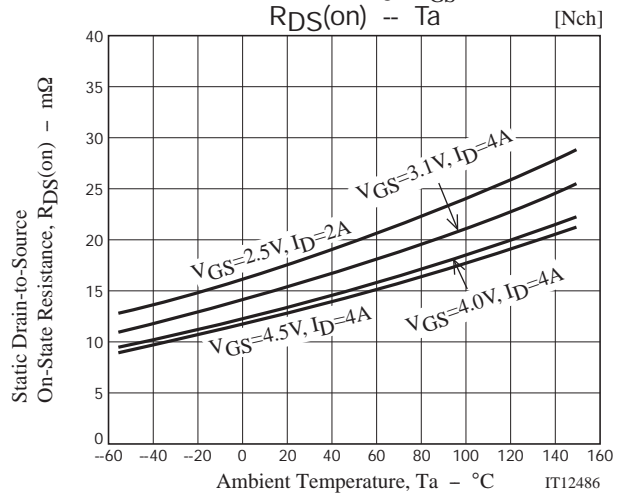
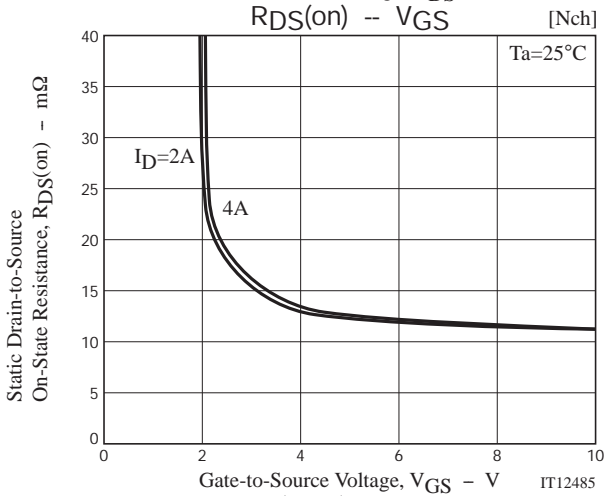
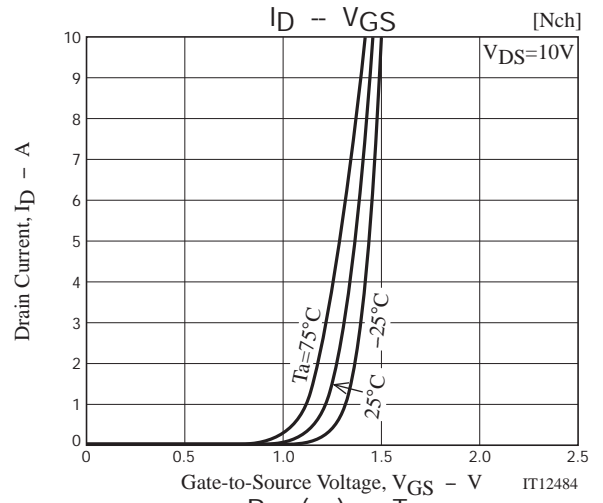
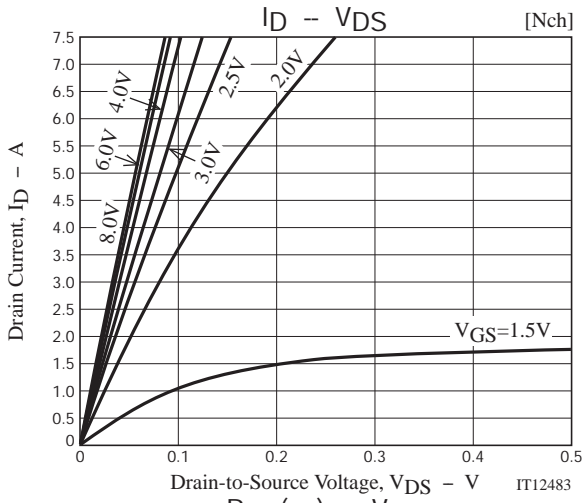


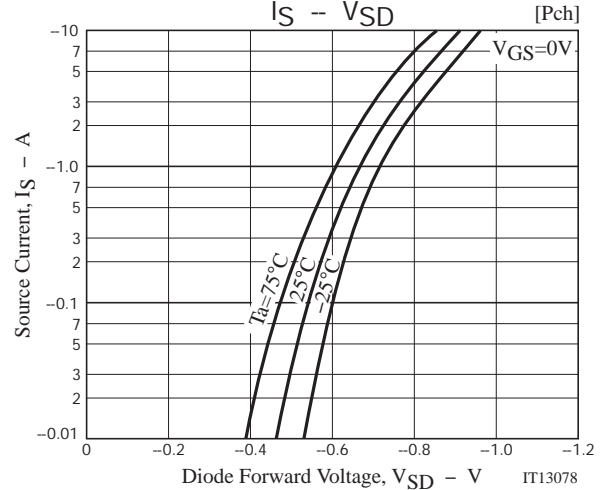
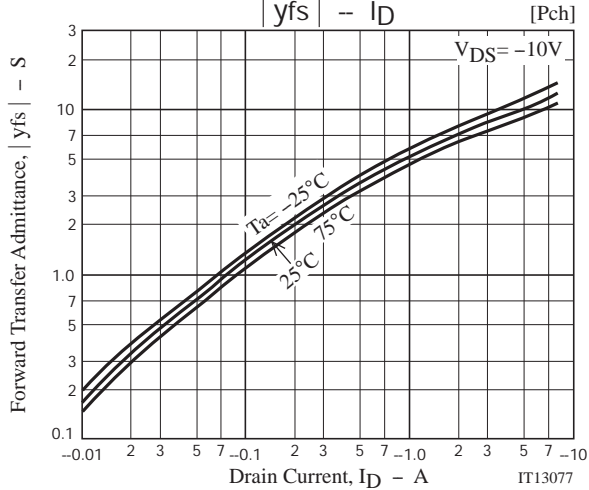
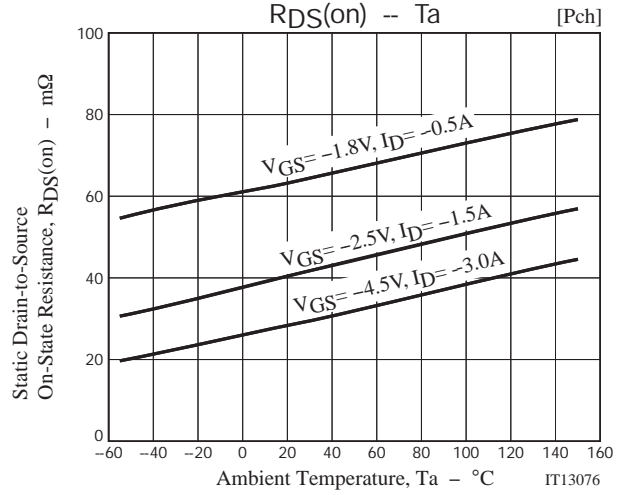
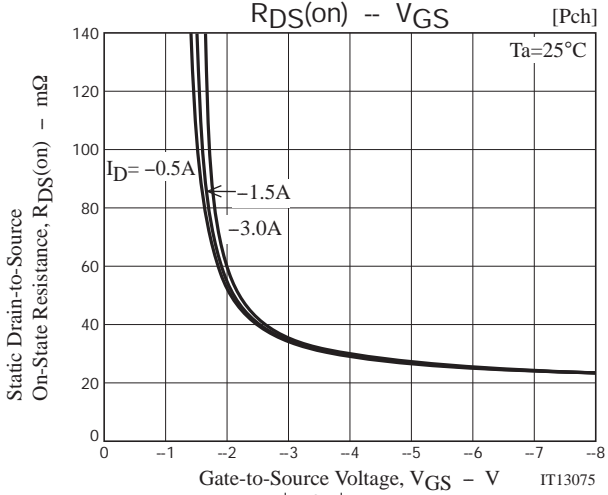
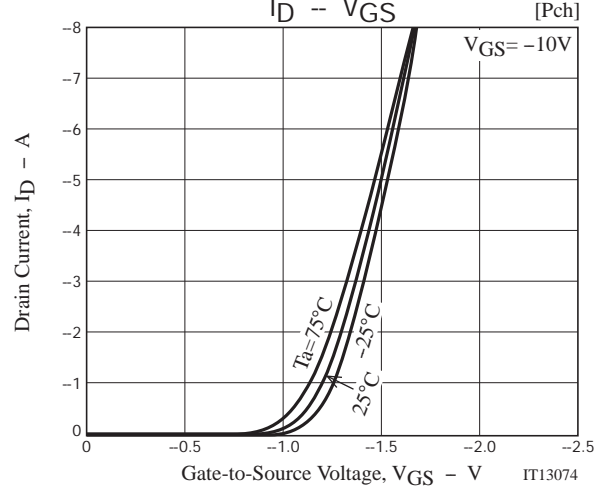
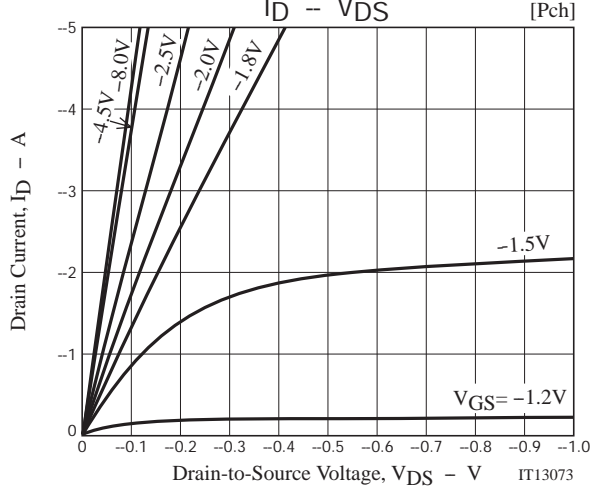
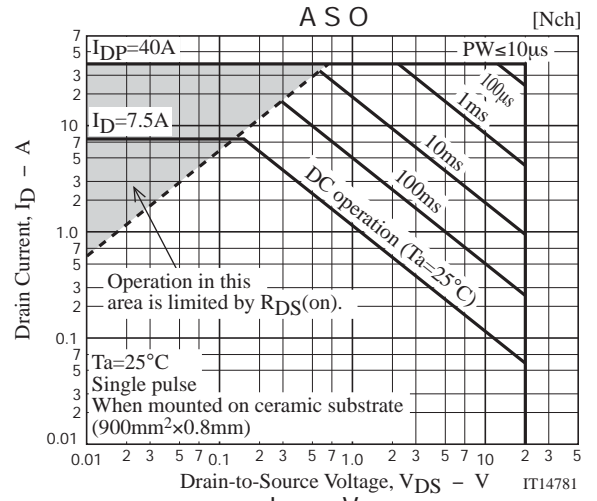
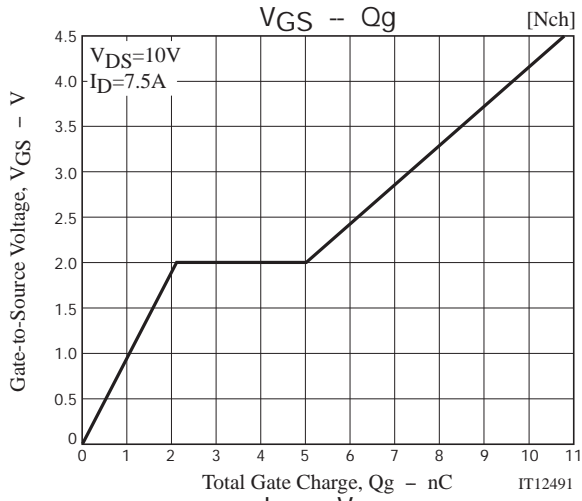
[P-channel]

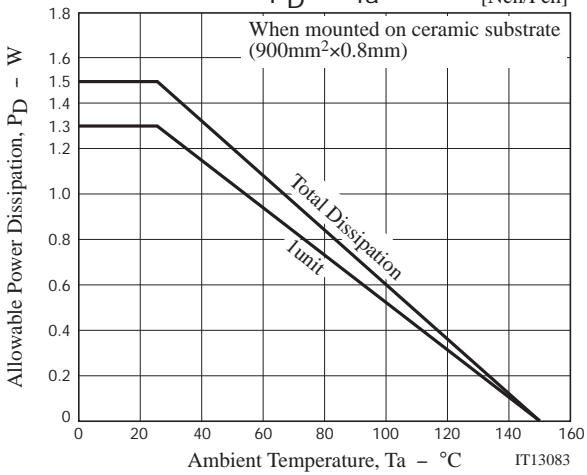
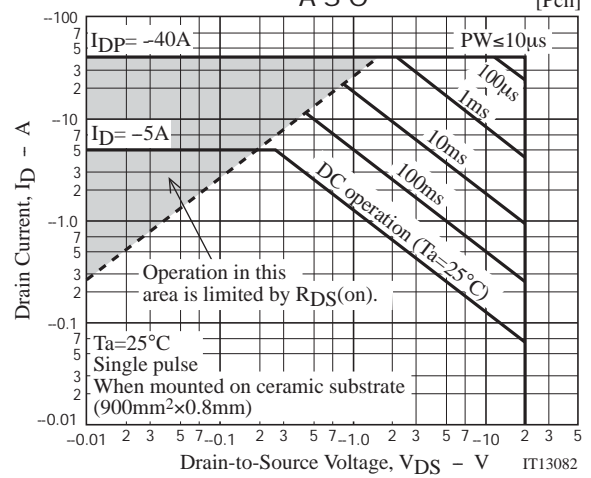
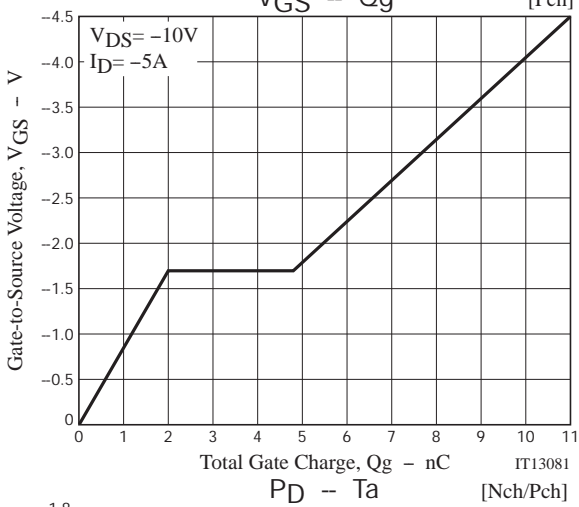
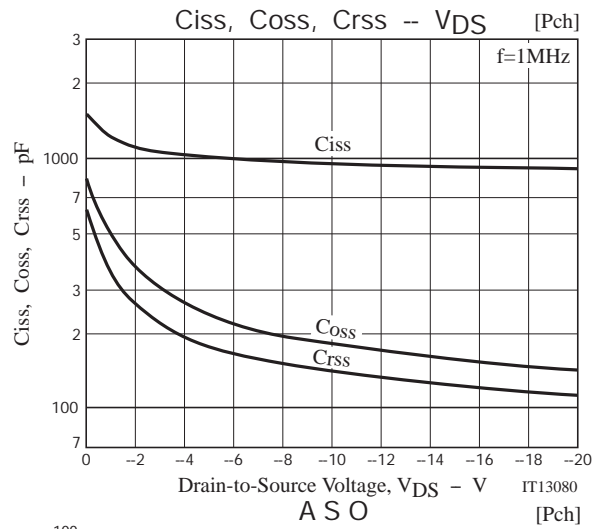
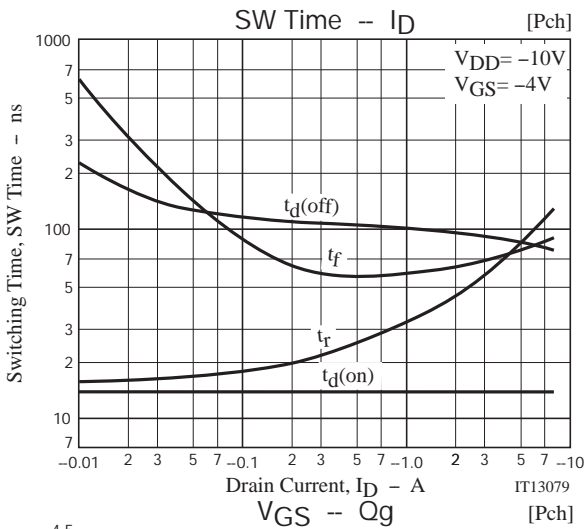


### Ordering Information

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







Embossed Taping Specification

ECH8668-TL-H

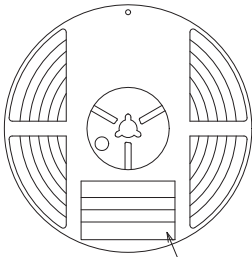
1. Packing Format

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

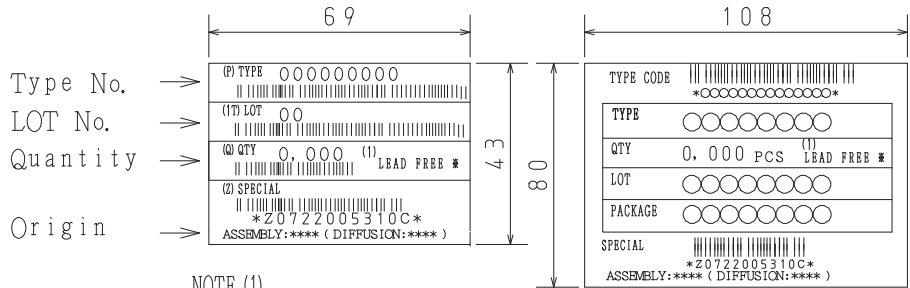
Reel label, Inner box label  
(unit :mm)

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



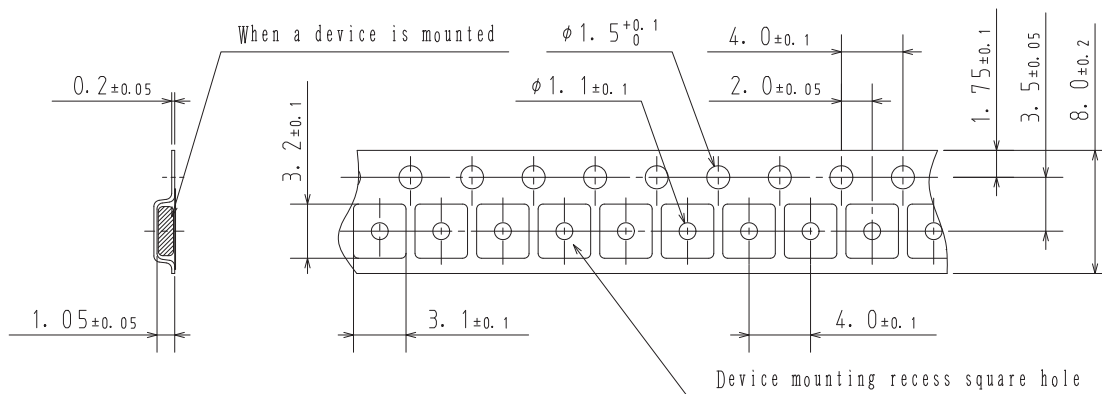
NOTE (1)

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

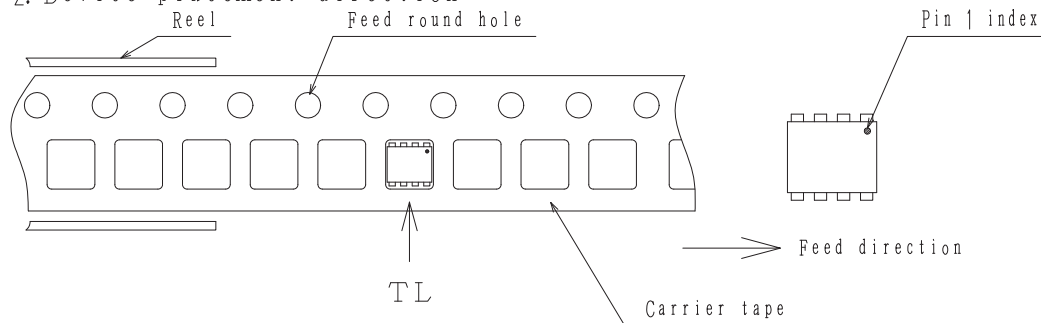
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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

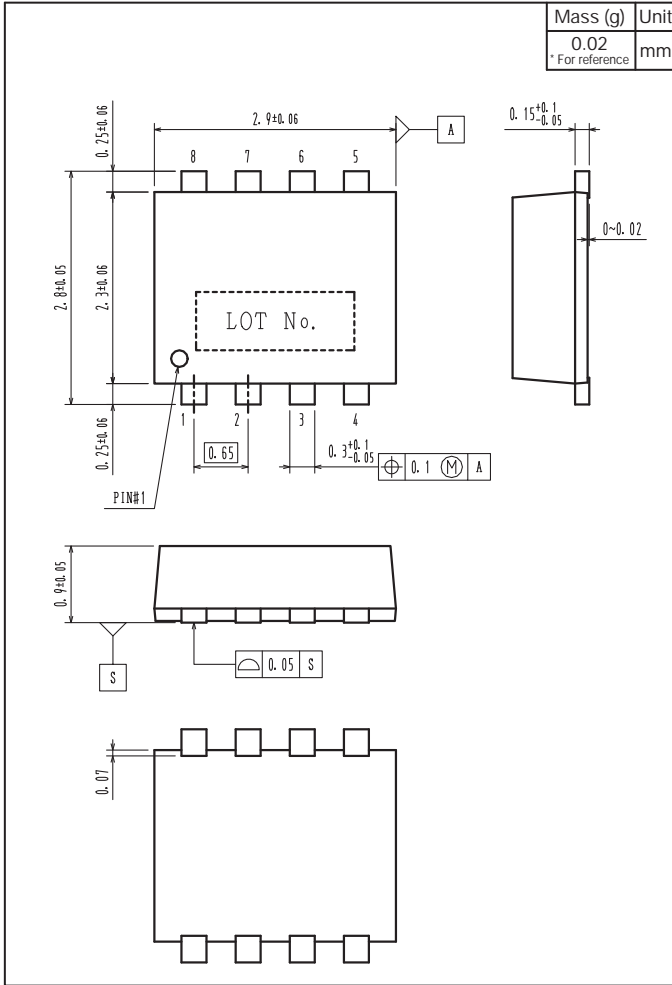


2-2. Device placement direction

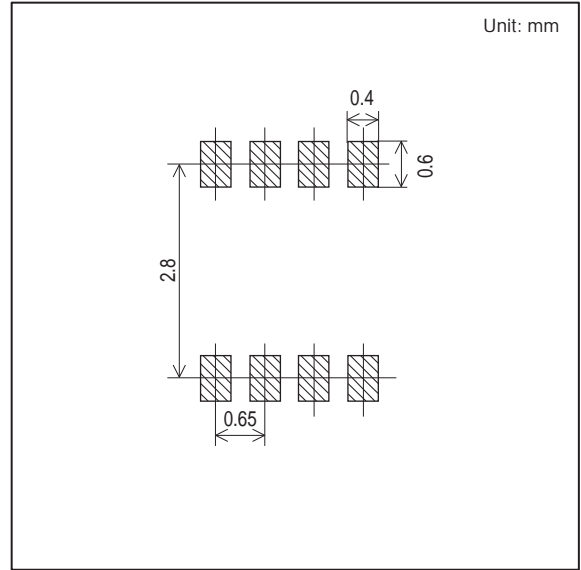


Those with pin 1 index on the feed hole side.....TL

Outline Drawing  
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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