

# ECH8651R

## N-Channel Power MOSFET 24V, 10A, 14mΩ, Dual ECH8



ON Semiconductor®

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### Features

- Low ON-resistance
- 2.5V drive
- Common-drain type
- Protection diode in
- Built-in gate protection resistor
- Best suited for LiB charging and discharging switch
- Halogen free compliance

### Specifications

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

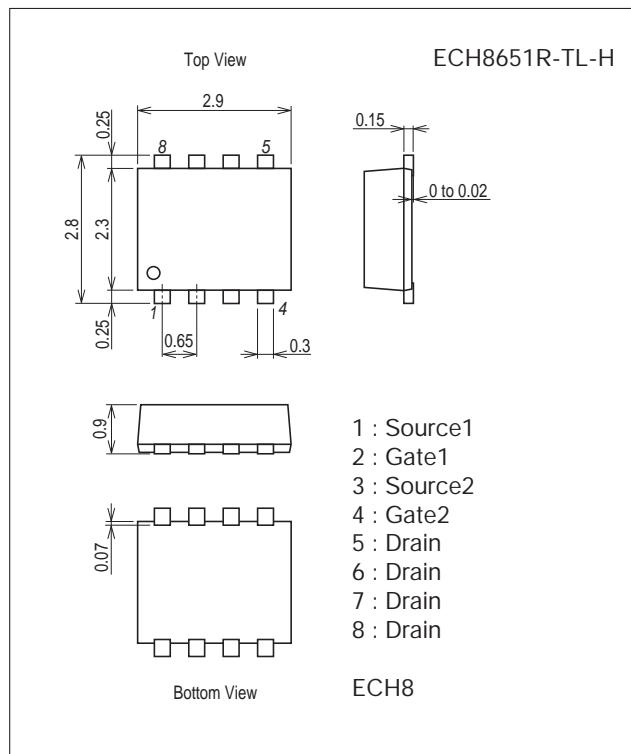
Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V <sub>DSS</sub>		24	V
Gate-to-Source Voltage	V <sub>GSS</sub>		±12	V
Drain Current (DC)	I <sub>D</sub>		10	A
Drain Current (Pulse)	I <sub>DP</sub>	PW≤10μs, duty cycle≤1%	60	A
Allowable Power Dissipation	P <sub>D</sub>	When mounted on ceramic substrate (900mm <sup>2</sup> ×0.8mm) 1unit	1.4	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)

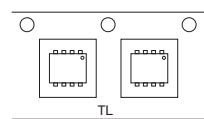
7011A-003



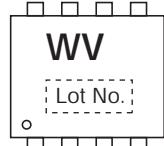
### Product & Package Information

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

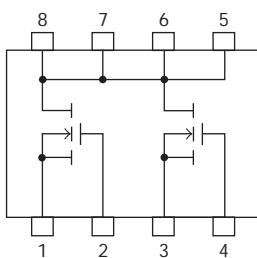
### Packing Type : TL



### Marking



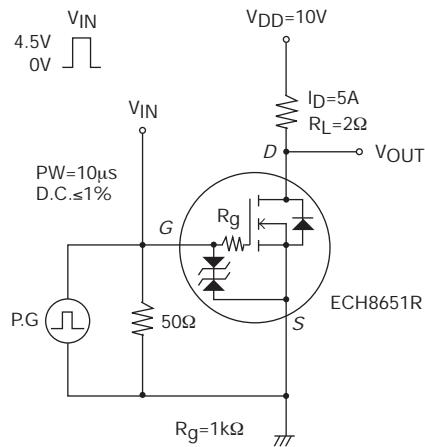
### Electrical Connection



Electrical Characteristics at  $T_a=25^\circ\text{C}$ 

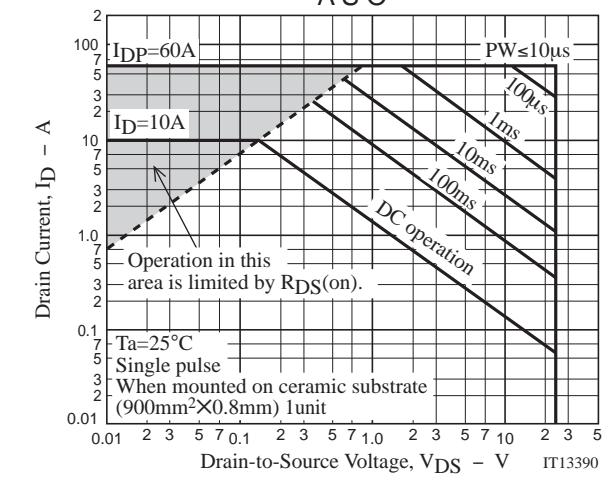
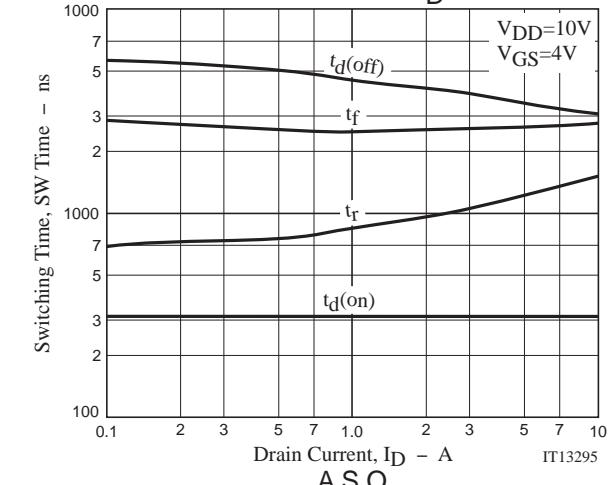
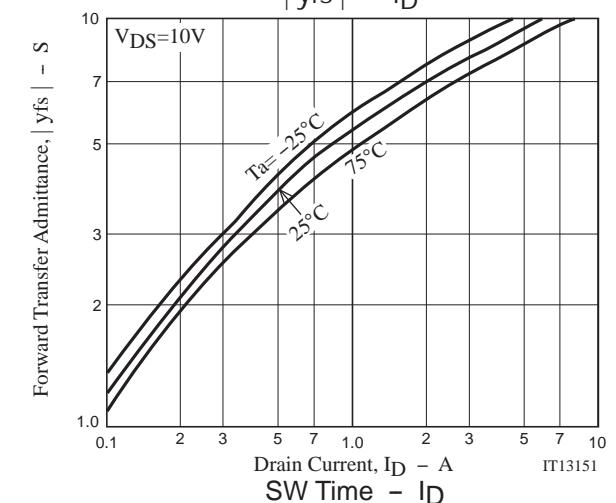
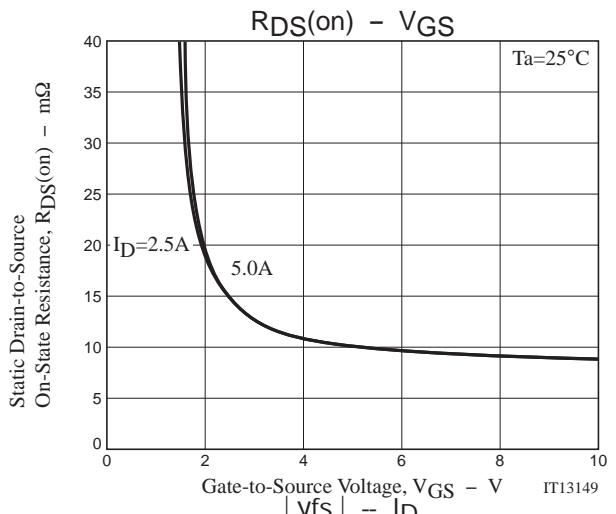
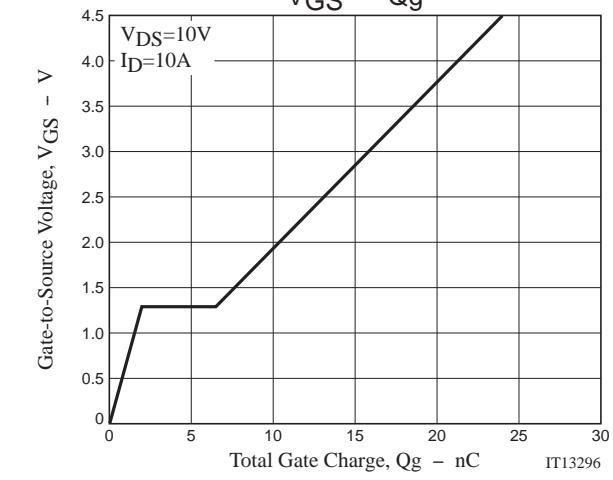
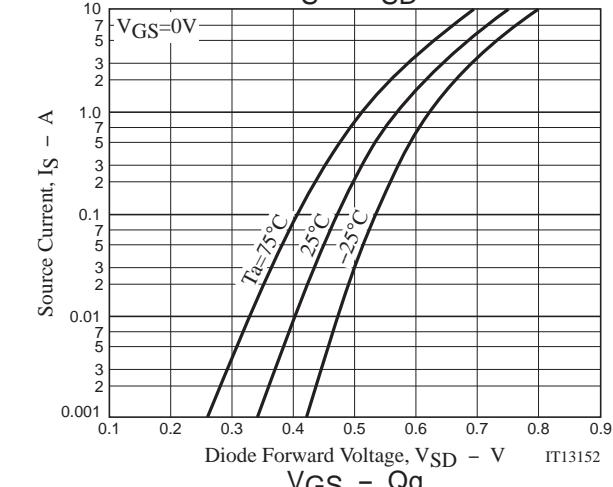
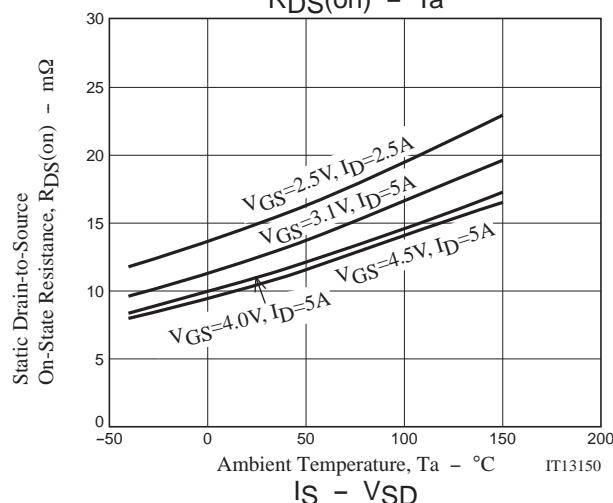
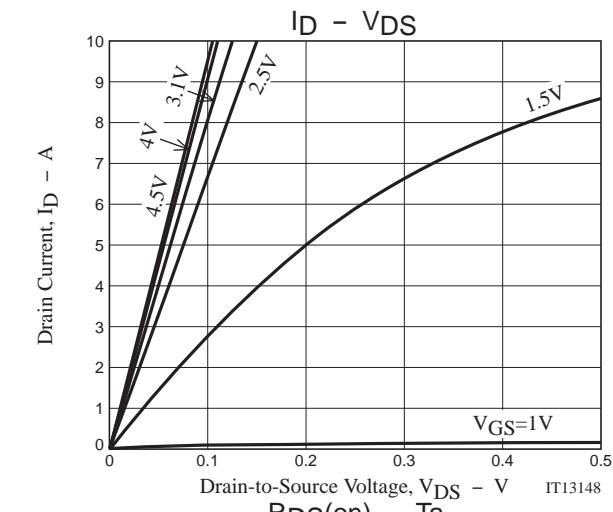
Parameter	Symbol	Conditions	Ratings			Unit	
			min	typ	max		
Drain-to-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$I_D=1\text{mA}, V_{GS}=0\text{V}$	24			V	
Zero-Gate Voltage Drain Current	$I_{\text{DSS}}$	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$			1	$\mu\text{A}$	
Gate-to-Source Leakage Current	$I_{\text{GSS}}$	$V_{GS}=\pm 8\text{V}, V_{DS}=0\text{V}$			$\pm 10$	$\mu\text{A}$	
Cutoff Voltage	$V_{GS(\text{off})}$	$V_{DS}=10\text{V}, I_D=1\text{mA}$	0.5		1.3	V	
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10\text{V}, I_D=5\text{A}$	5.5	9.5		S	
Static Drain-to-Source On-State Resistance	$R_{DS(\text{on})1}$	$I_D=5\text{A}, V_{GS}=4.5\text{V}$	7	10.5	14	$\text{m}\Omega$	
	$R_{DS(\text{on})2}$	$I_D=5\text{A}, V_{GS}=4.0\text{V}$	7.2	11	15	$\text{m}\Omega$	
	$R_{DS(\text{on})3}$	$I_D=5\text{A}, V_{GS}=3.1\text{V}$	7.5	12.5	17.5	$\text{m}\Omega$	
	$R_{DS(\text{on})4}$	$I_D=2.5\text{A}, V_{GS}=2.5\text{V}$	9	15	21	$\text{m}\Omega$	
Turn-ON Delay Time	$t_{\text{d}(\text{on})}$	See specified Test Circuit.			300	ns	
Rise Time	$t_r$				1000	ns	
Turn-OFF Delay Time	$t_{\text{d}(\text{off})}$				4000	ns	
Fall Time	$t_f$				2500	ns	
Total Gate Charge	$Q_g$	$V_{DS}=10\text{V}, V_{GS}=10\text{V}, I_D=10\text{A}$			24	$\text{nC}$	
Gate-to-Source Charge	$Q_{gs}$				2	$\text{nC}$	
Gate-to-Drain "Miller" Charge	$Q_{gd}$				4.5	$\text{nC}$	
Diode Forward Voltage	$V_{SD}$	$I_S=10\text{A}, V_{GS}=0\text{V}$			0.77	1.2	V

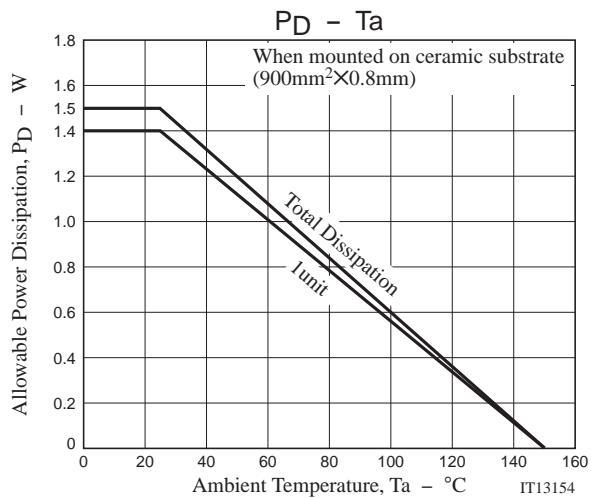
## Switching Time Test Circuit



## Ordering Information

Device	Package	Shipping	memo
ECH8651R-TL-H	ECH8	3,000pcs./reel	Pb Free and Halogen Free



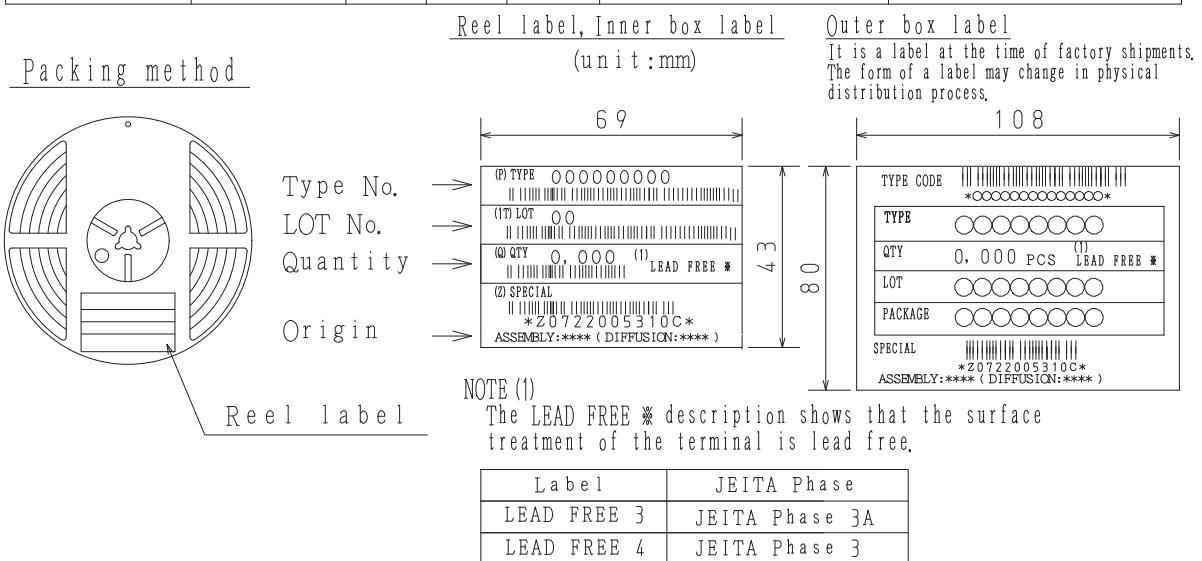


## Embossed Taping Specification

ECH8651R-TL-H

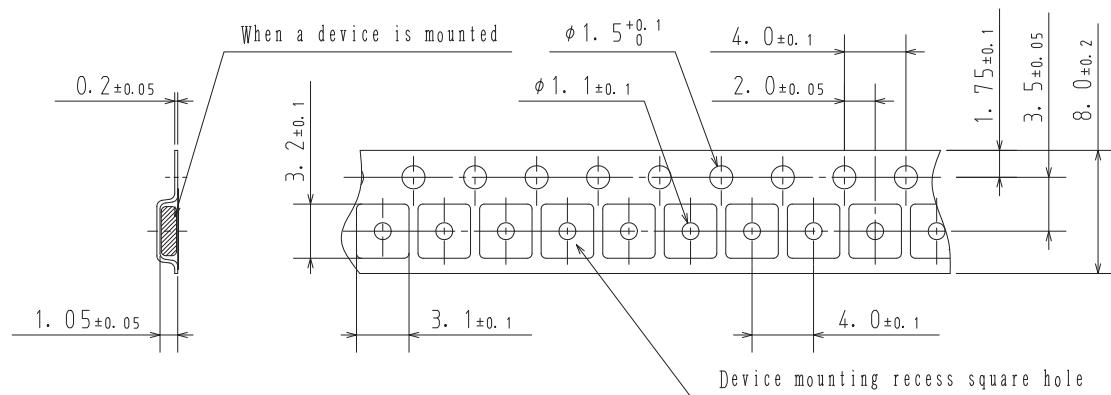
## 1. Packing Format

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

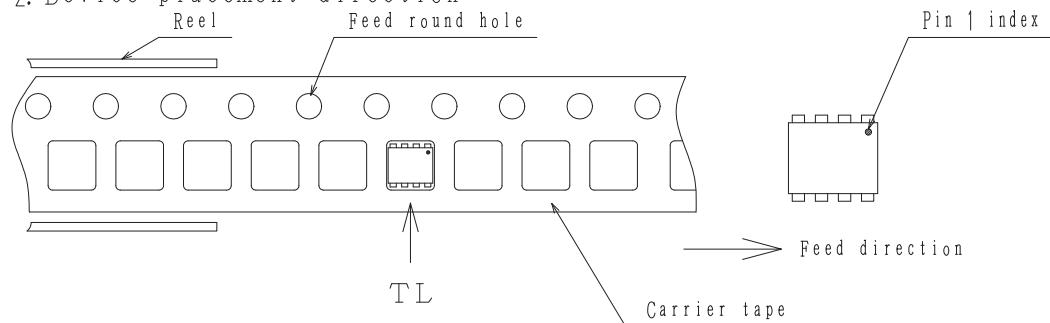


## 2. Taping configuration

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



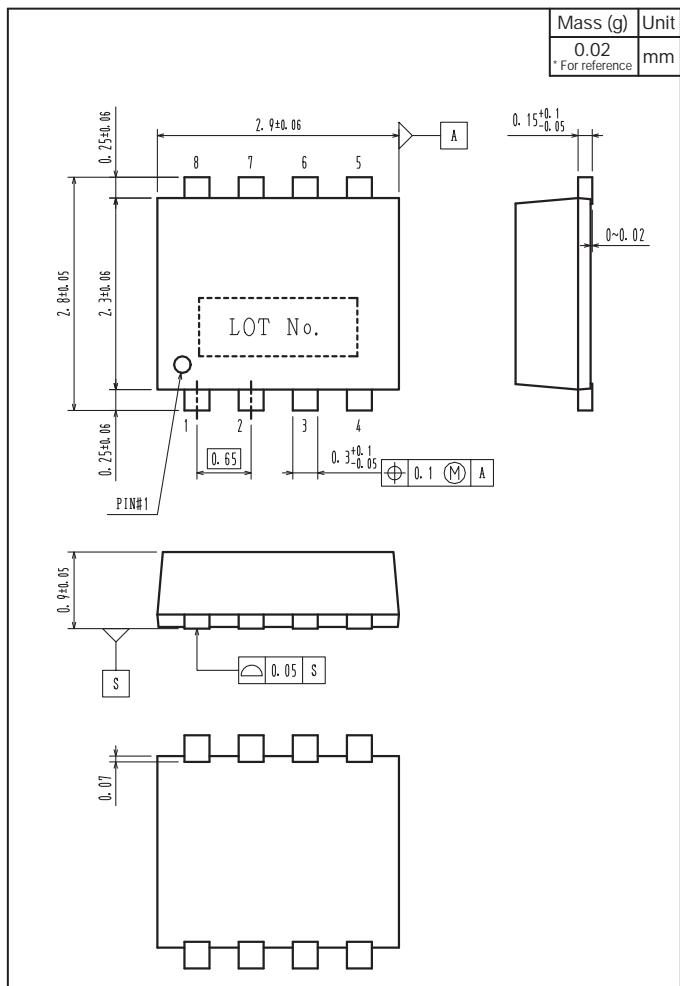
## 2-2. Device placement direction



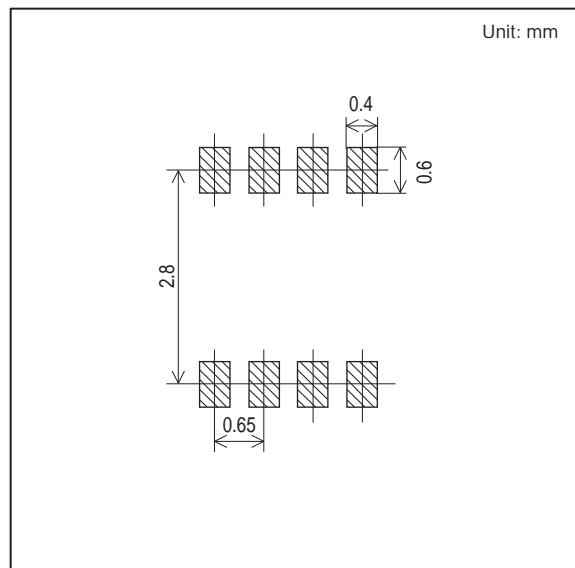
Those with pin 1 index on the feed hole side.....TL

## Outline Drawing

ECH8651R-TL-H



## Land Pattern Example



**Note on usage :** Since the ECH8651R is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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