Ordering number : ENA1010A

ECH8651R

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

ON Semiconductor®
http://onsemi.com

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

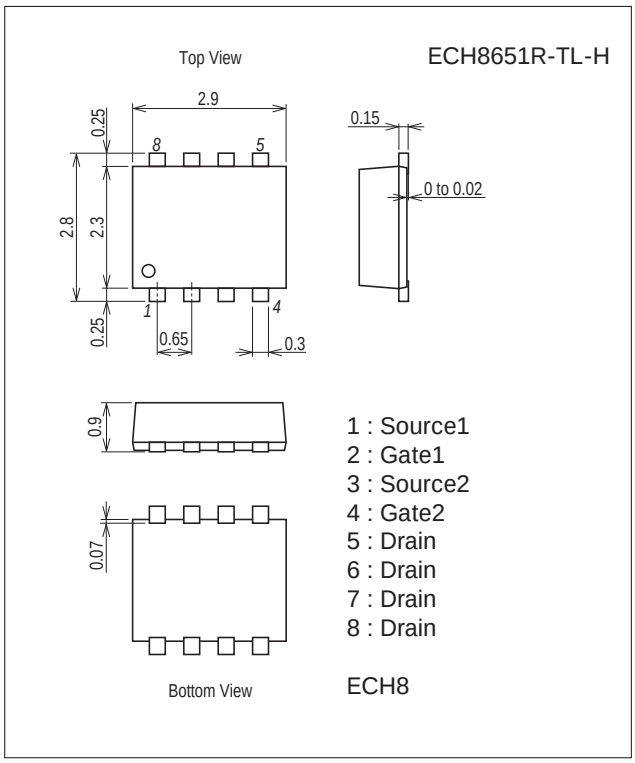
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		24	V
Gate-to-Source Voltage	V_{GSS}		±12	V
Drain Current (DC)	I_D		10	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	60	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (900mm²×0.8mm) 1unit	1.4	W
Total 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

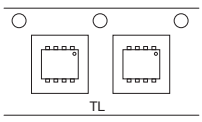
unit : mm (typ)
7011A-003



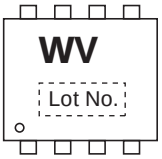
Product & Package Information

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

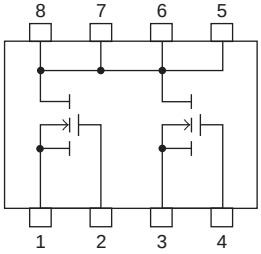
Packing Type : TL



Marking



Electrical Connection

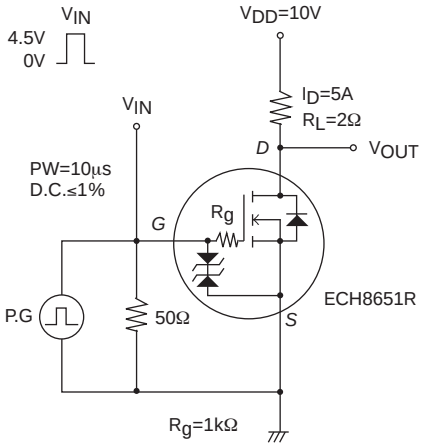


Semiconductor Components Industries, LLC, 2013

Electrical Characteristics at Ta=25°C

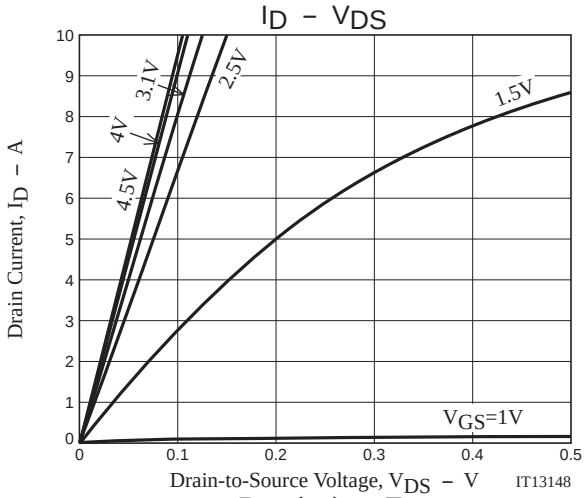
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	24			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V,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

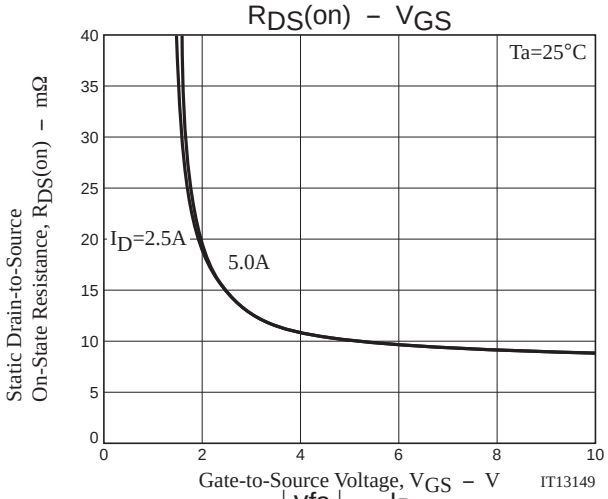
Switching Time Test Circuit

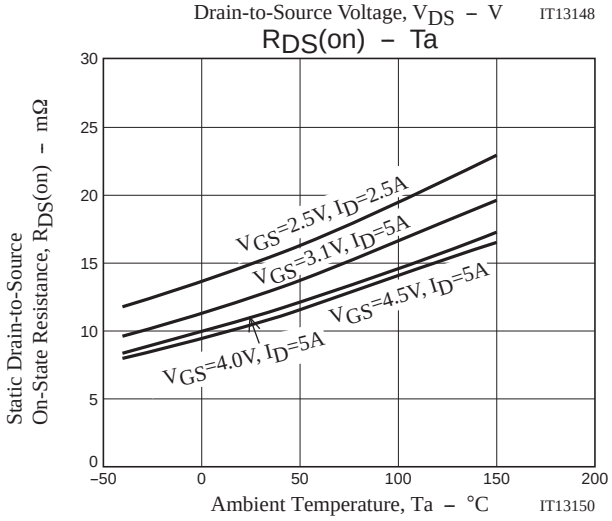


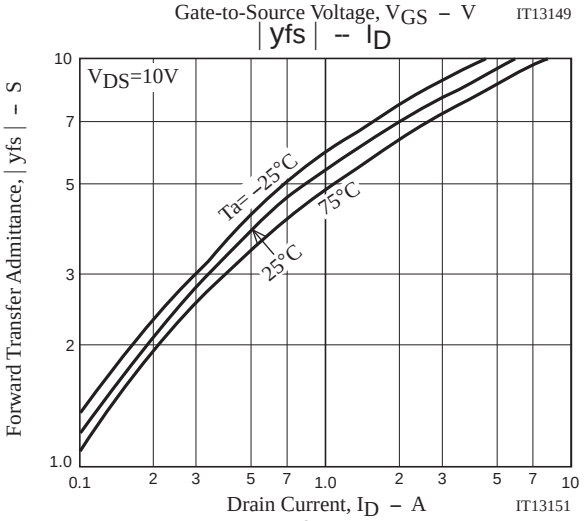
Ordering Information

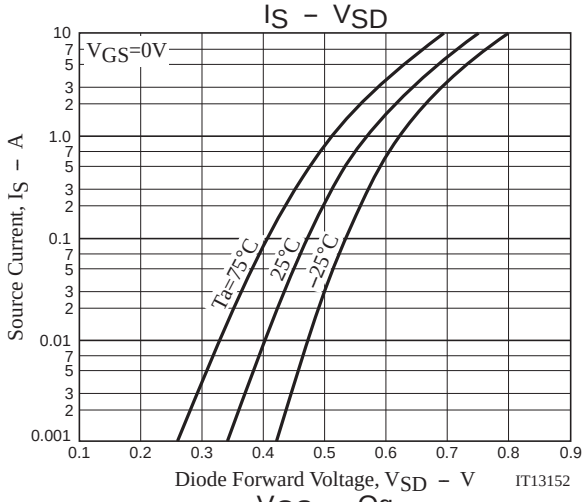
Device	Package	Shipping	memo
ECH8651R-TL-H	ECH8	3,000pcs./reel	Pb Free and Halogen Free

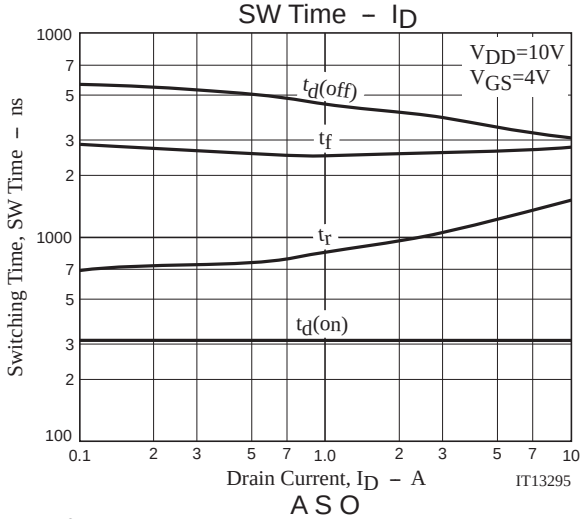

ID – VDS
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT13148
VGS=1V
1.5V
2.5V
3.1V
4V
4.5V

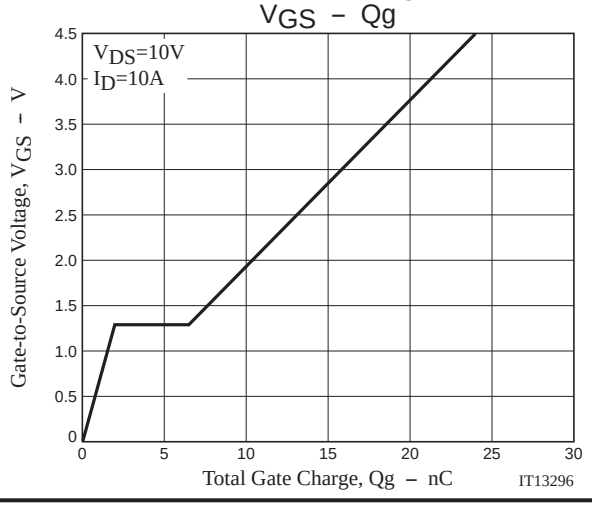

RDS(on) – VGS
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT13149
Ta=25°C
ID=2.5A
5.0A

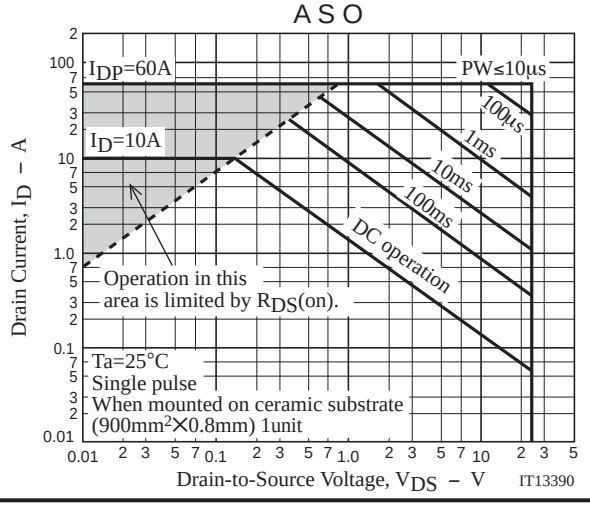

RDS(on) – Ta
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT13150
VGS=2.5V, ID=2.5A
VGS=3.1V, ID=5A
VGS=4.5V, ID=5A
VGS=4.0V, ID=5A

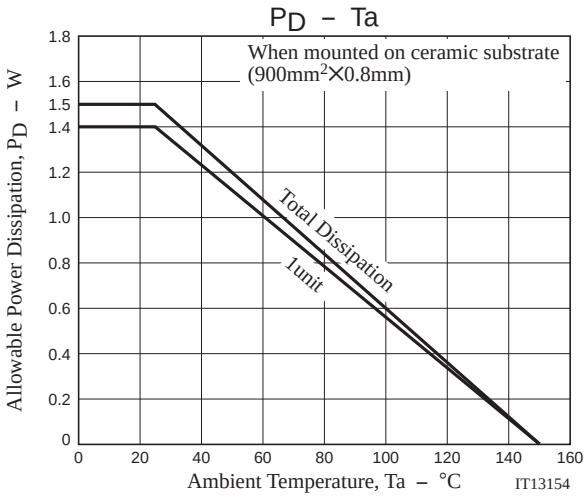

| yfs | – ID
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT13151
VDS=10V
Ta= –25°C
25°C
75°C


IS – VSD
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT13152
VGS=0V
Ta=75°C
25°C
–25°C


SW Time – ID
Switching Time, SW Time – ns
Drain Current, ID – A
IT13295
VDD=10V
VGS=4V
td(off)
tf
tr
td(on)


VGS – Qg
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT13296
VDS=10V
ID=10A


A S O
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT13390
IDP=60A
PW≤10μs
ID=10A
100μs
1ms
10ms
100ms
DC operation
Operation in this
area is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate
(900mm²×0.8mm) 1unit


PD – Ta
When mounted on ceramic substrate
(900mm2×0.8mm)
Total Dissipation
1unit
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT13154
0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.5
1.6
1.8
0
20
40
60
80
100
120
140
160

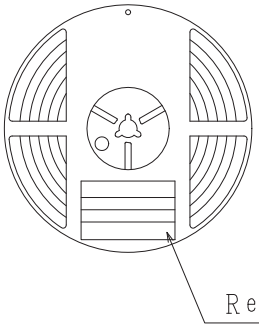
Embossed Taping Specification

ECH8651R-TL-H

1. Packing Format

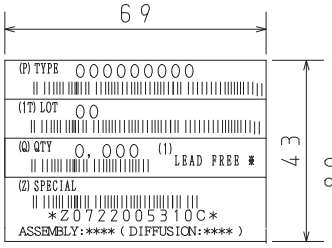
Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
ECH8	CPH6	3,000	15,000	90,000	5 reels contained Dimensions:mm(external) 183×72×185	6 inner boxes contained Dimensions:mm(external) 440×195×210

Packing method



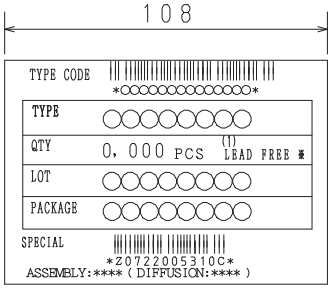
Reel label, Inner box label

(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.



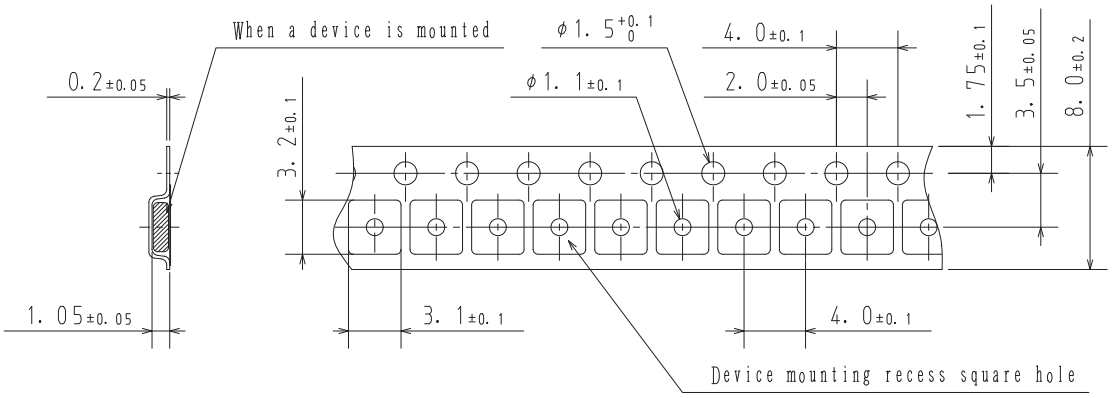
NOTE (1)

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

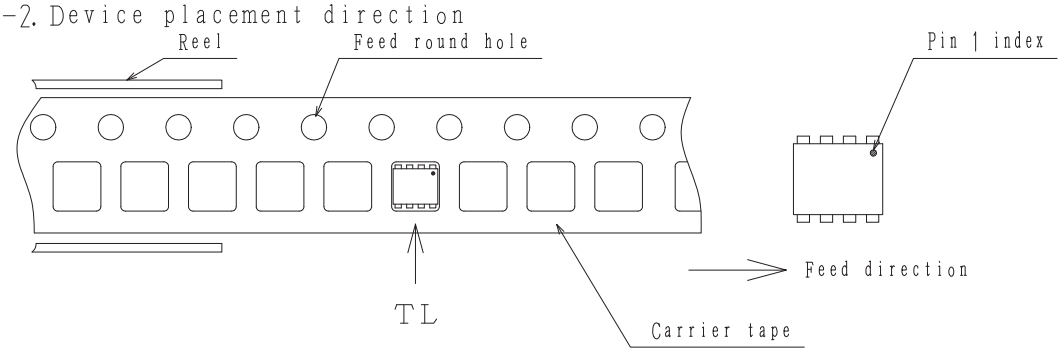
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



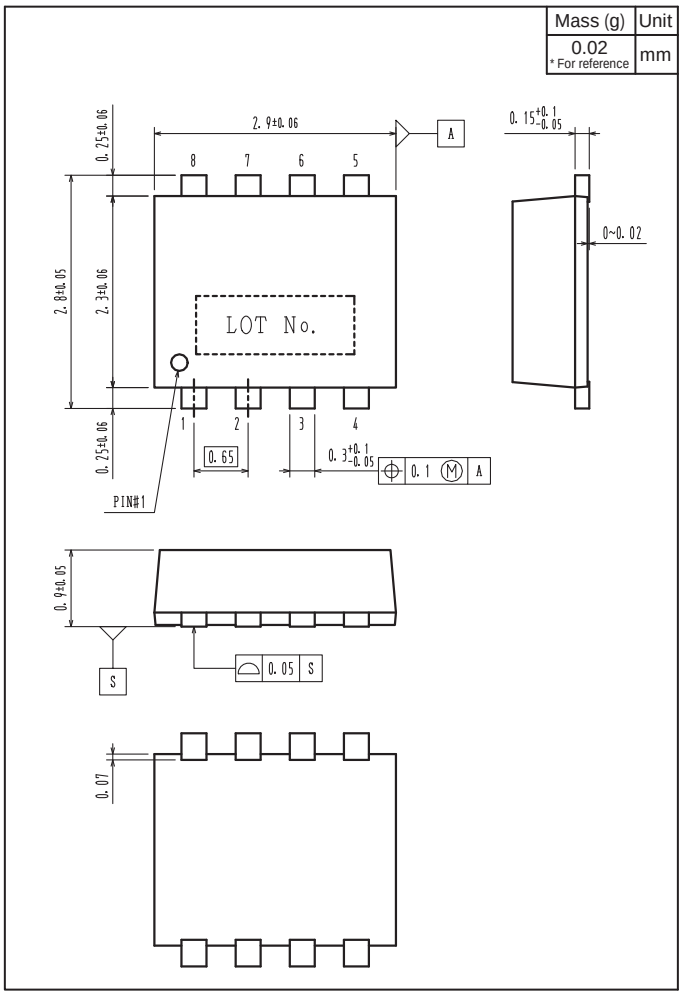
2-2. Device placement direction



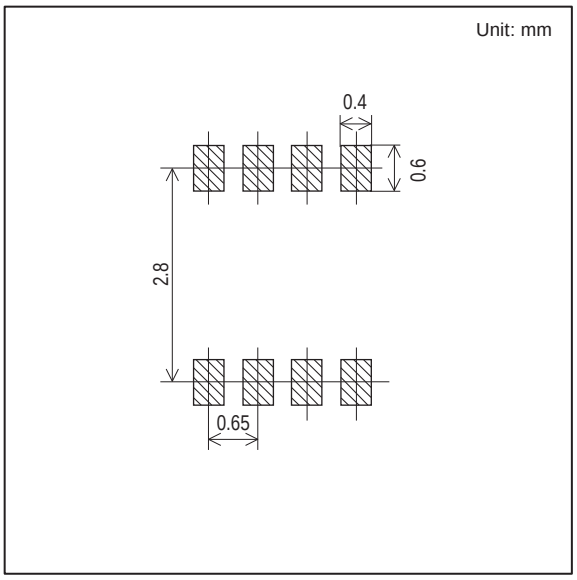
Those with pin 1 index on the feed hole side·····TL

Outline Drawing

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.

ON Semiconductor and the ON logo are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.