Ordering number : ENA1011A

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

N-Channel Silicon MOSFET

ECH8655R — General-Purpose Switching Device Applications

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

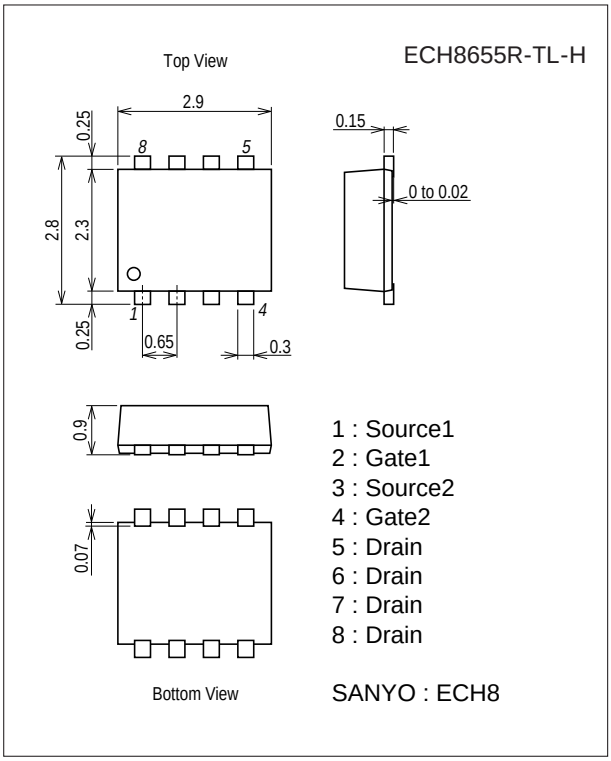
Absolute Maximum Ratings at Ta=25°C

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		9	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

Package Dimensions

unit : mm (typ)

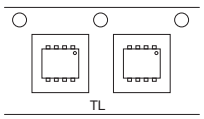
7011A-003



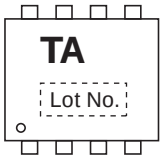
Product & Package Information

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

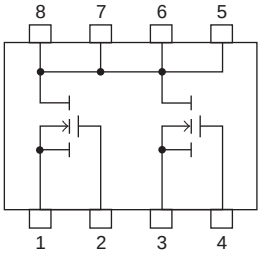
Packing Type : TL



Marking



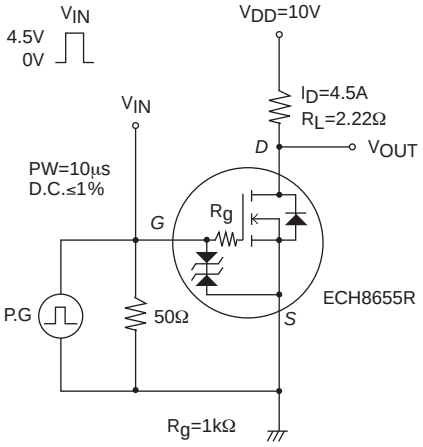
Electrical Connection



Electrical Characteristics at Ta=25°C

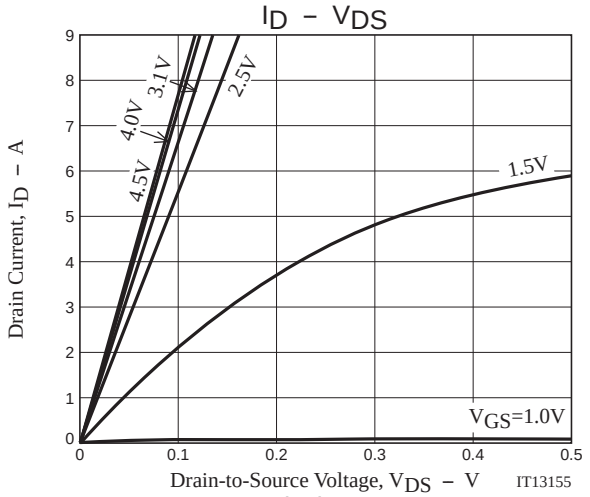
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	24			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	0.5		1.3	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=4.5A	4.8	8		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=4.5A, V_{GS}=4.5V	9	13	17	mΩ
	R_{DS}(on)2	I_D=4.5A, V_{GS}=4.0V	9	13.5	18	mΩ
	R_{DS}(on)3	I_D=4.5A, V_{GS}=3.1V	9.2	15	21	mΩ
	R_{DS}(on)4	I_D=2A, V_{GS}=2.5V	10.5	18	25.5	mΩ
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		320		ns
Rise Time	t_r			1100		ns
Turn-OFF Delay Time	t_d(off)			2400		ns
Fall Time	t_f			2100		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=10V, I_D=9A		16.8		nC
Gate-to-Source Charge	Qgs			1.6		nC
Gate-to-Drain “Miller” Charge	Qgd			4.8		nC
Diode Forward Voltage	V_{SD}	I_S=9A, V_{GS}=0V		0.8	1.2	V

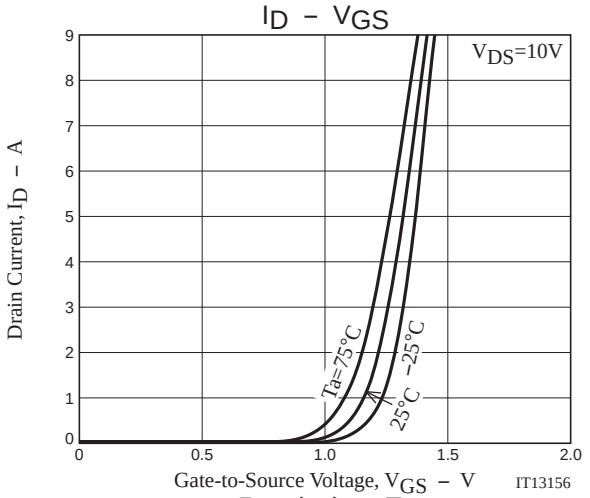
Switching Time Test Circuit

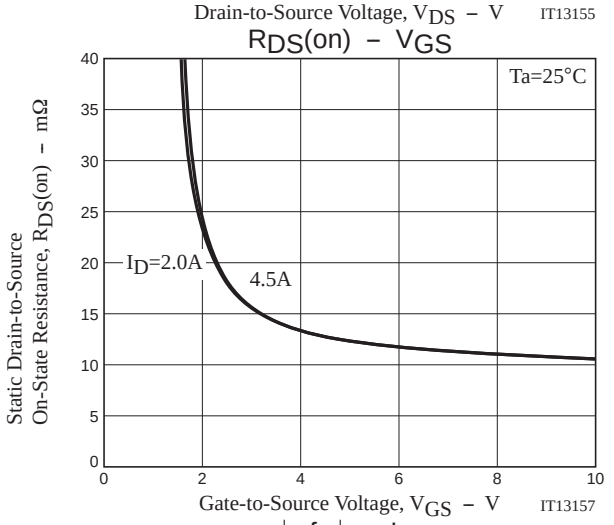


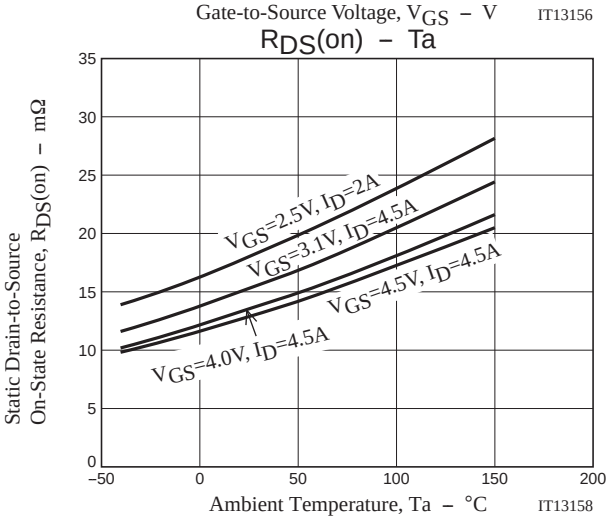
Ordering Information

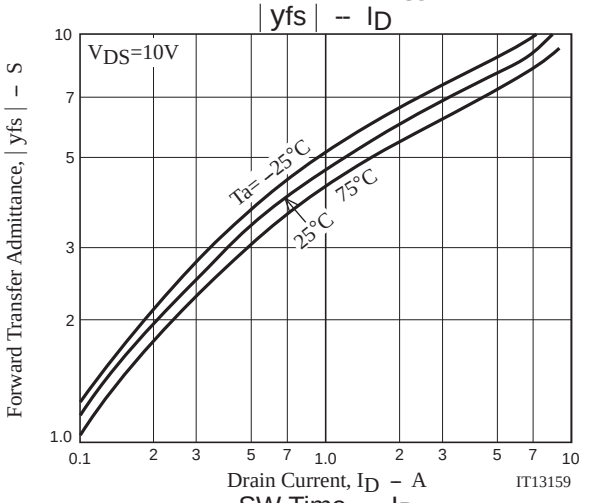
Device	Package	Shipping	memo
ECH8655R-TL-H	ECH8	3,000pcs./reel	Pb Free and Halogen Free

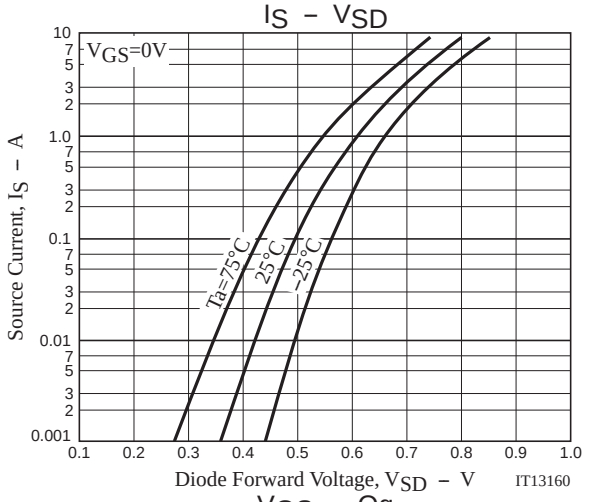

ID – VDS
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT13155
4.0V
3.1V
2.5V
4.5V
1.5V
VGS=1.0V

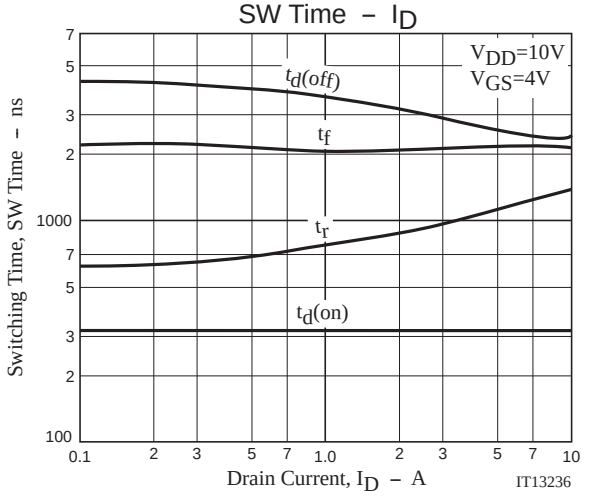

ID – VGS
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT13156
VDS=10V
Ta=75°C
25°C
–25°C

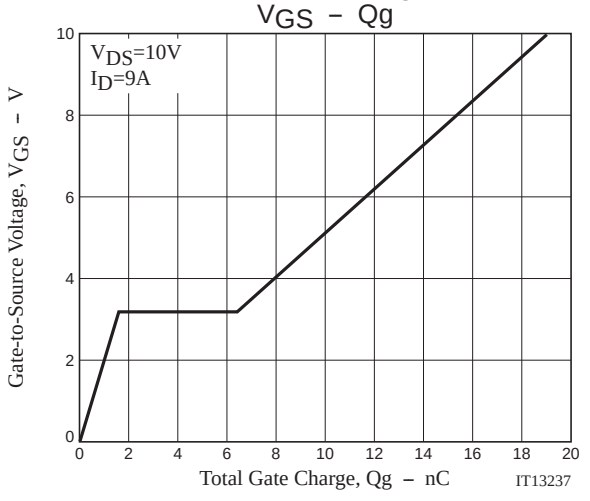

RDS(on) – VGS
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT13157
Ta=25°C
ID=2.0A
4.5A

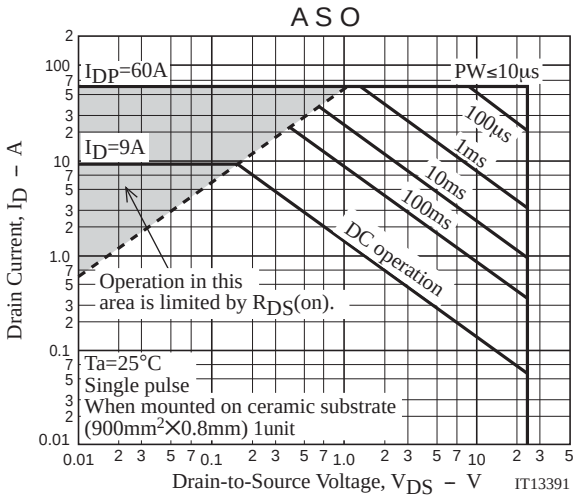

RDS(on) – Ta
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT13158
VGS=2.5V, ID=2A
VGS=3.1V, ID=4.5A
VGS=4.5V, ID=4.5A
VGS=4.0V, ID=4.5A

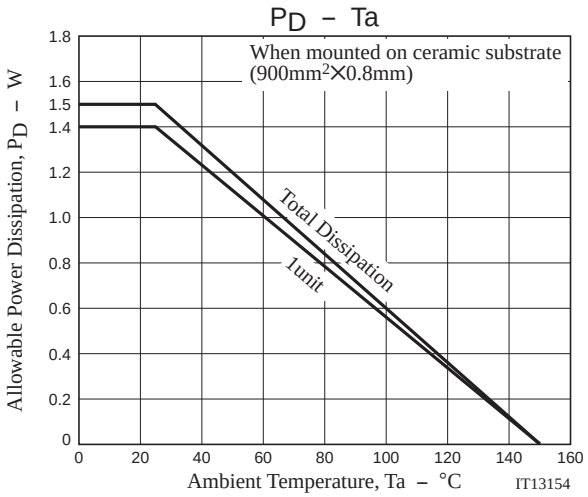

| yfs | – ID
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT13159
VDS=10V
Ta= –25°C
25°C
75°C


IS – VSD
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT13160
VGS=0V
Ta=75°C
25°C
–25°C


SW Time – ID
Switching Time, SW Time – ns
Drain Current, ID – A
IT13236
VDD=10V
VGS=4V
td(off)
tf
tr
td(on)


VGS – Qg
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT13237
VDS=10V
ID=9A


A S O
Drain Current, I_D – A
Drain-to-Source Voltage, V_{DS} – V
I_{DP}=60A
PW≤10μs
I_D=9A
100μs
1ms
10ms
100ms
DC operation
Operation in this
area is limited by R_{DS}(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate
(900mm²×0.8mm) 1unit
IT13391


P_D – Ta
Allowable Power Dissipation, P_D – W
Ambient Temperature, Ta – °C
When mounted on ceramic substrate
(900mm²×0.8mm)
Total Dissipation
1unit
IT13154

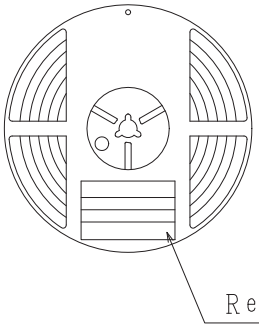
Embossed Taping Specification

ECH8655R-TL-H

1. Packing Format

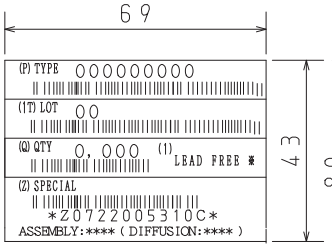
Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
ECH8	CPH6	3,000	15,000	90,000	5 reels contained Dimensions:mm(external) 183×72×185	6 inner boxes contained Dimensions:mm(external) 440×195×210

Packing method



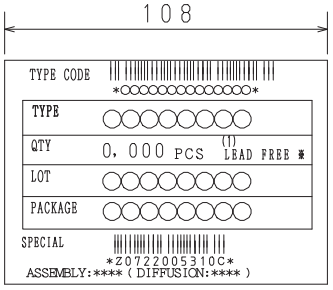
Reel label, Inner box label

(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.



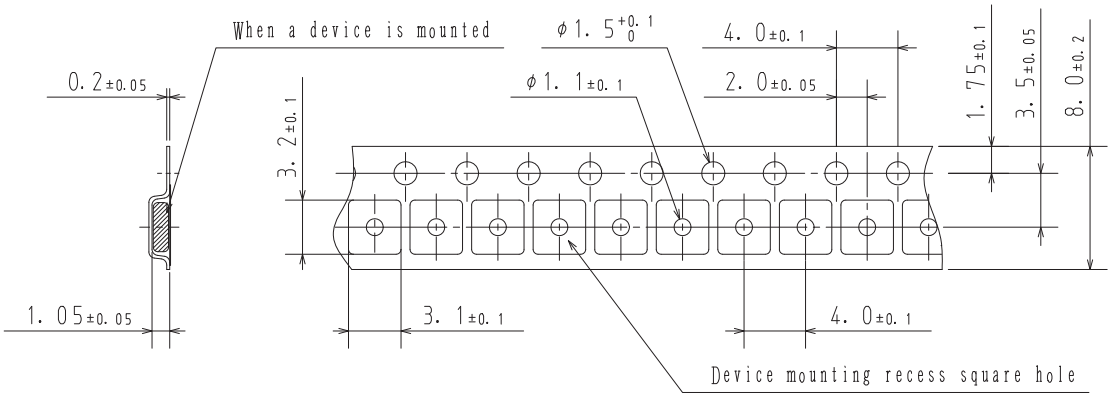
NOTE (1)

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

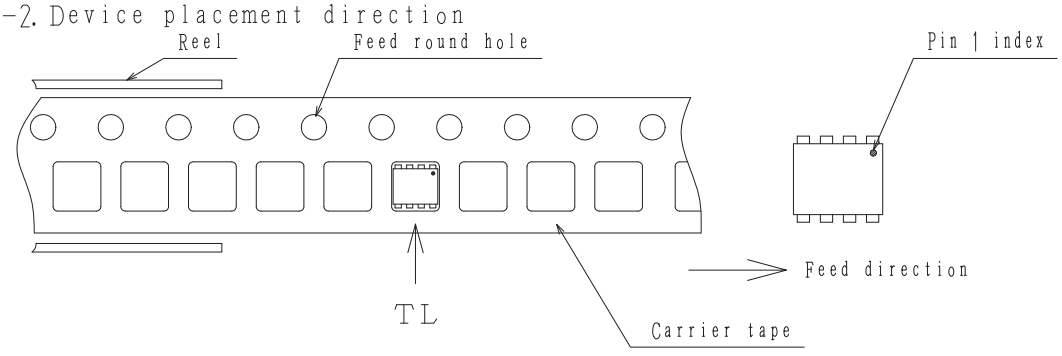
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



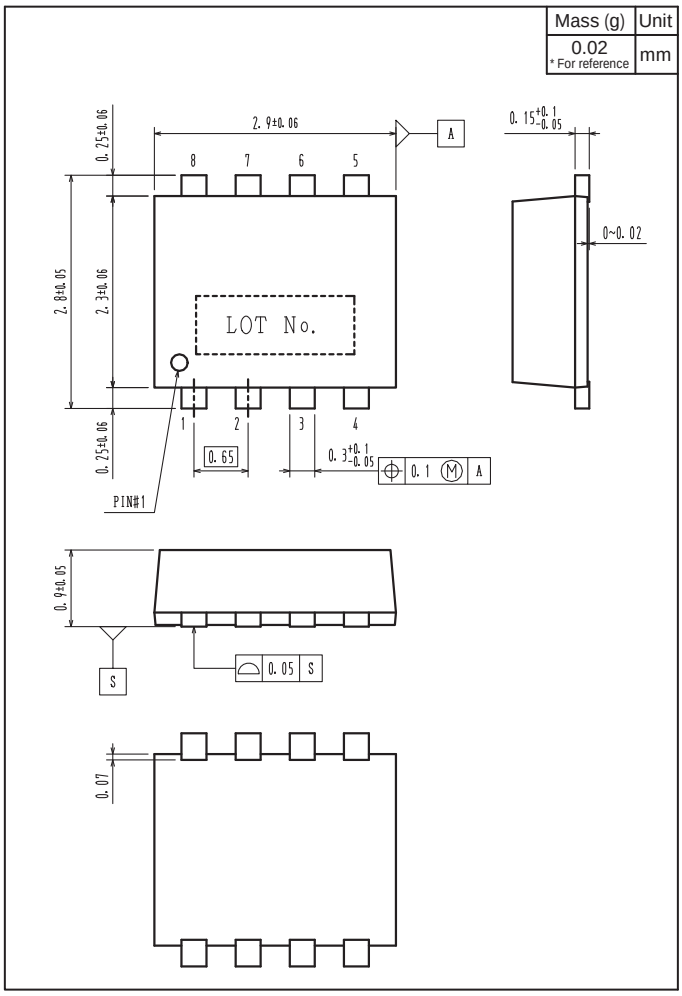
2-2. Device placement direction



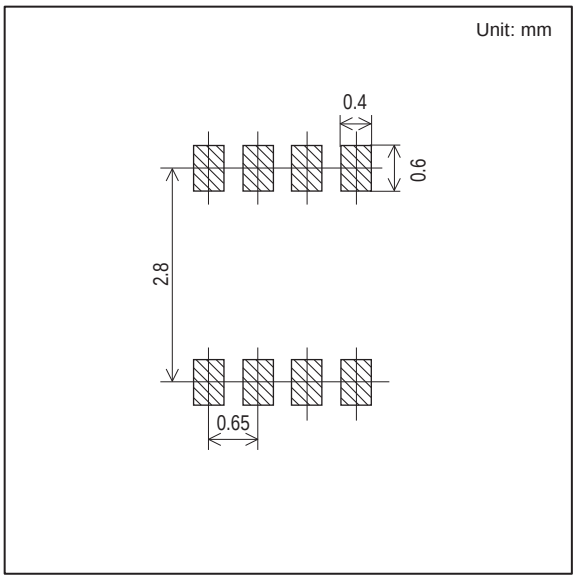
Those with pin 1 index on the feed hole side·····TL

Outline Drawing

ECH8655R-TL-H



Land Pattern Example



Note on usage : Since the ECH8655R is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

This catalog provides information as of May, 2012. Specifications and information herein are subject to change without notice.