

# MOSFET – Power, Single, P-Channel

**-30 V, 25 mΩ, -7.5 A**

## ECH8315

### Description

This Power MOSFET is produced using onsemi's trench technology, which is specifically designed to low on resistance. This device is suitable for applications with low on resistance requirements.

### Features

- Low On-Resistance
- 4 V Drive
- ESD Diode-Protected Gate
- Pb-Free, Halogen Free and RoHS Compliant

### Typical Applications

- Load Switch
- Protection Switch for Lithium-ion Battery
- Motor Driver

### ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

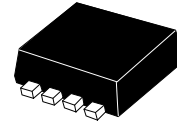
| Parameter                                                                                | Symbol           | Value       | Unit |
|------------------------------------------------------------------------------------------|------------------|-------------|------|
| Drain to Source Voltage                                                                  | V <sub>DSS</sub> | -30         | V    |
| Gate to Source Voltage                                                                   | V <sub>GSS</sub> | ±20         | V    |
| Drain Current (DC)                                                                       | I <sub>D</sub>   | -7.5        | A    |
| Drain Current (Pulse)<br>PW ≤ 10 μs, duty cycle ≤ 1%                                     | I <sub>DP</sub>  | -40         | A    |
| Power Dissipation<br>When mounted on ceramic substrate<br>(900 mm <sup>2</sup> x 0.8 mm) | P <sub>D</sub>   | 1.5         | W    |
| Junction Temperature                                                                     | T <sub>j</sub>   | 150         | °C   |
| Storage Temperature                                                                      | T <sub>stg</sub> | -55 to +150 | °C   |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS

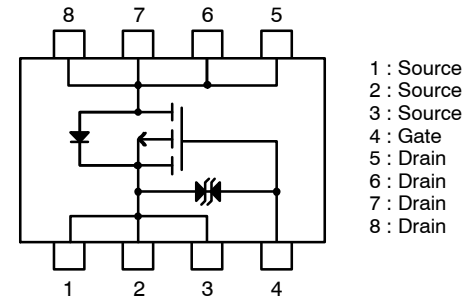
| Parameter                                                                                  | Symbol           | Value | Unit |
|--------------------------------------------------------------------------------------------|------------------|-------|------|
| Junction to Ambient<br>When mounted on ceramic substrate<br>(900 mm <sup>2</sup> x 0.8 mm) | R <sub>θJA</sub> | 83.3  | °C/W |

| V <sub>DSS</sub> | R <sub>DS(on)</sub> Max | I <sub>D</sub> Max |
|------------------|-------------------------|--------------------|
| -30 V            | 25 mΩ @ -10 V           | -7.5 A             |
|                  | 44 mΩ @ -4.5 V          |                    |
|                  | 49 mΩ @ -4 V            |                    |

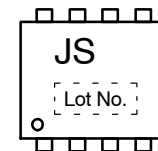


**SOT-28FL/ ECH8  
CASE 318BF**

### ELECTRICAL CONNECTION P-Channel



### MARKING DIAGRAM



### ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Parameter                                  | Symbol        | Conditions                                                                   | Value |       |          | Unit             |
|--------------------------------------------|---------------|------------------------------------------------------------------------------|-------|-------|----------|------------------|
|                                            |               |                                                                              | Min   | Typ   | Max      |                  |
| Drain to Source Breakdown Voltage          | $V_{(BR)DSS}$ | $I_D = -1 \text{ mA}$ , $V_{GS} = 0 \text{ V}$                               | -30   | -     | -        | V                |
| Zero-Gate Voltage Drain Current            | $I_{DSS}$     | $V_{DS} = -30 \text{ V}$ , $V_{GS} = 0 \text{ V}$                            | -     | -     | -1       | $\mu\text{A}$    |
| Gate to Source Leakage Current             | $I_{GSS}$     | $V_{GS} = \pm 16 \text{ V}$ , $V_{DS} = 0 \text{ V}$                         | -     | -     | $\pm 10$ | $\mu\text{A}$    |
| Gate Threshold Voltage                     | $V_{GS(th)}$  | $V_{DS} = -10 \text{ V}$ , $I_D = -1 \text{ mA}$                             | -1.2  | -     | -2.6     | V                |
| Forward Transconductance                   | $g_{FS}$      | $V_{DS} = -10 \text{ V}$ , $I_D = -3.5 \text{ A}$                            | 5     | 8.4   | -        | S                |
| Static Drain to Source On-State Resistance | $R_{DS(on)}$  | $I_D = -3.5 \text{ A}$ , $V_{GS} = -10 \text{ V}$                            | -     | 19    | 25       | $\text{m}\Omega$ |
|                                            |               | $I_D = -2 \text{ A}$ , $V_{GS} = -4.5 \text{ V}$                             | -     | 31    | 44       | $\text{m}\Omega$ |
|                                            |               | $I_D = -2 \text{ A}$ , $V_{GS} = -4 \text{ V}$                               | -     | 35    | 49       | $\text{m}\Omega$ |
| Input Capacitance                          | $C_{iss}$     | $V_{DS} = -10 \text{ V}$ , $f = 1 \text{ MHz}$                               | -     | 875   | -        | $\text{pF}$      |
| Output Capacitance                         | $C_{oss}$     |                                                                              | -     | 200   | -        |                  |
| Reverse Transfer Capacitance               | $C_{rss}$     |                                                                              | -     | 150   | -        |                  |
| Turn-ON Delay Time                         | $t_{d(on)}$   | See Figure 1                                                                 | -     | 8.1   | -        | ns               |
| Rise Time                                  | $t_r$         |                                                                              | -     | 33    | -        | ns               |
| Turn-OFF Delay Time                        | $t_{d(off)}$  |                                                                              | -     | 92    | -        | ns               |
| Fall Time                                  | $t_f$         |                                                                              | -     | 60    | -        | ns               |
| Total Gate Charge                          | $Q_g$         | $V_{DS} = -15 \text{ V}$ , $V_{GS} = -10 \text{ V}$ , $I_D = -7.5 \text{ A}$ | -     | 18    | -        | nC               |
| Gate to Source Charge                      | $Q_{gs}$      |                                                                              | -     | 2.1   | -        | nC               |
| Gate to Drain "Miller" Charge              | $Q_{gd}$      |                                                                              | -     | 4.7   | -        | nC               |
| Forward Diode Voltage                      | $V_{SD}$      | $I_S = -7.5 \text{ A}$ , $V_{GS} = 0 \text{ V}$                              | -     | -0.82 | -1.2     | V                |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

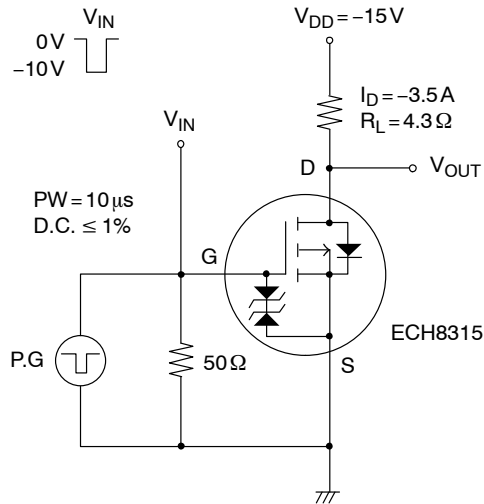


Figure 1. Switching Time Test Circuit 1

TYPICAL CHARACTERISTICS

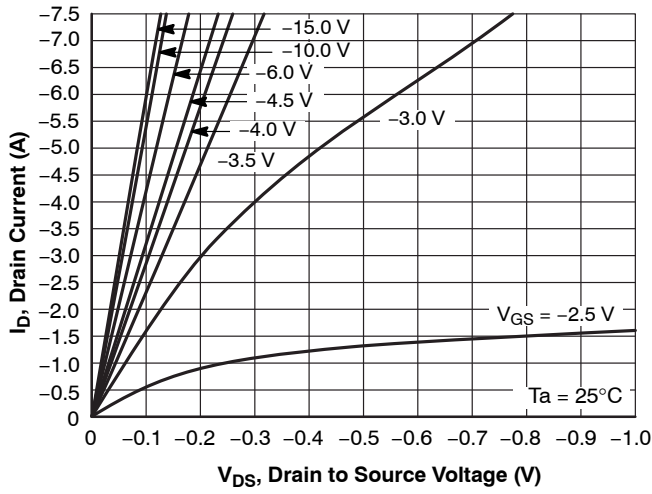


Figure 2.  $I_D - V_{DS}$

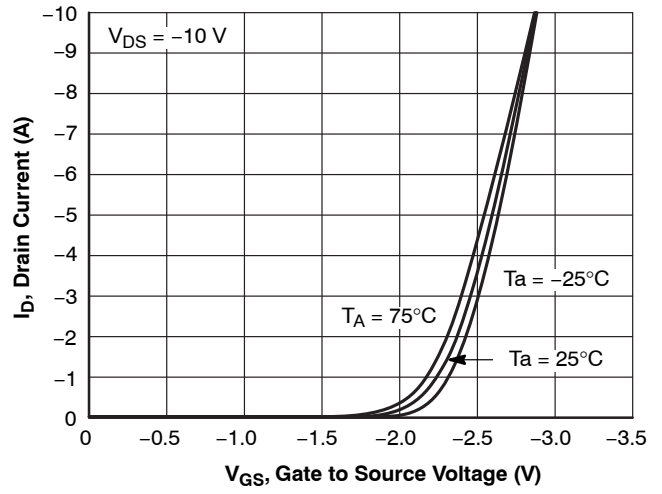


Figure 3.  $I_D - V_{GS}$

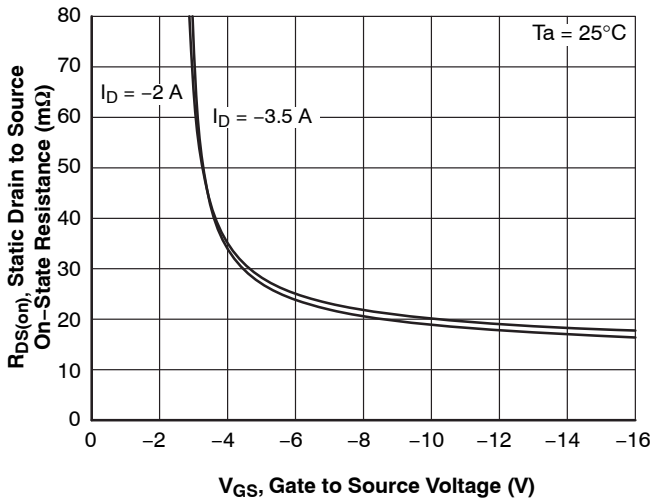


Figure 4.  $R_{DS(on)} - V_{GS}$

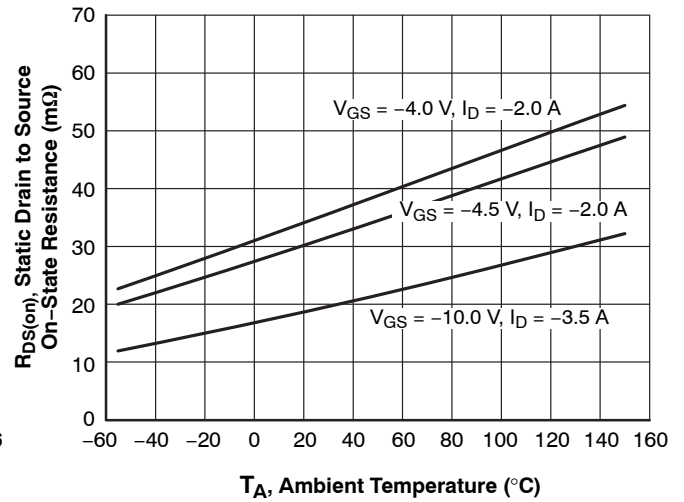


Figure 5.  $R_{DS(on)} - T_A$

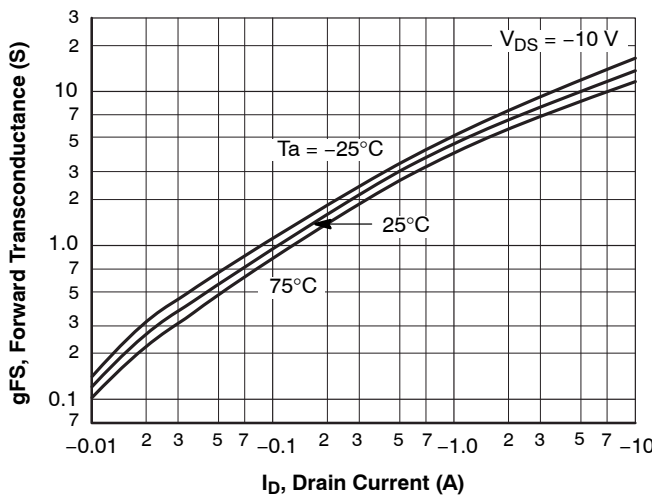


Figure 6.  $g_{FS} - I_D$

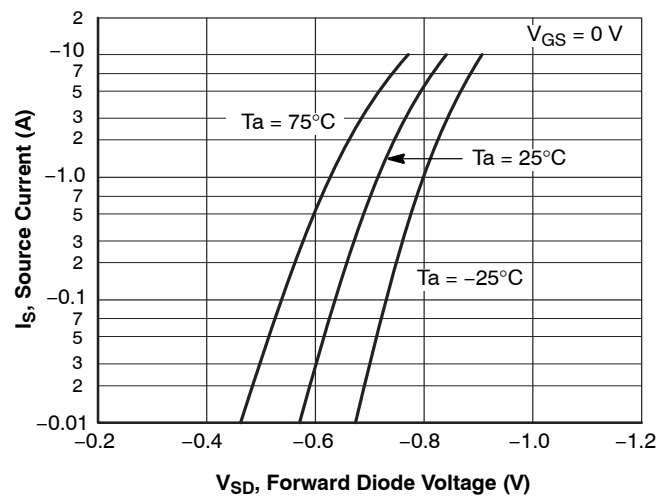


Figure 7.  $I_S - V_{SD}$

TYPICAL CHARACTERISTICS (continued)

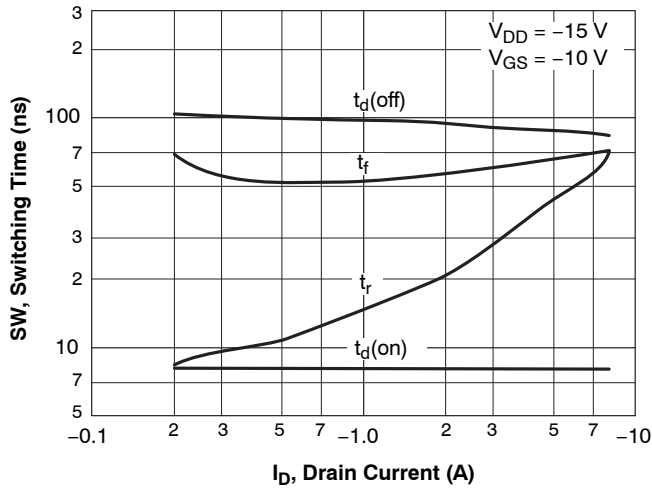


Figure 8. SW Time –  $I_D$

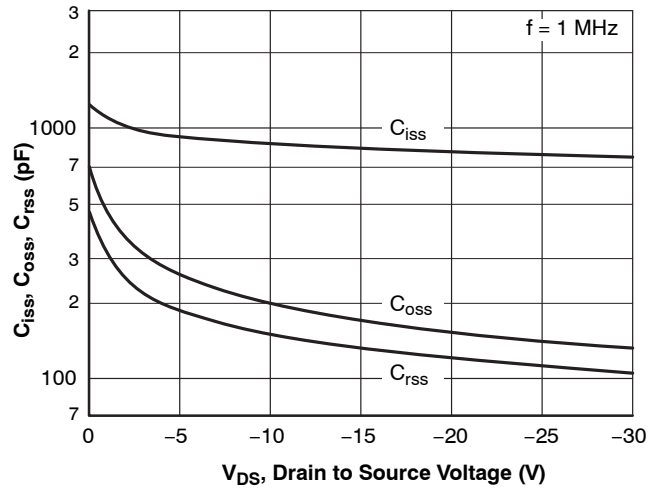


Figure 9.  $C_{iss}$ ,  $C_{oss}$ ,  $C_{rss}$  –  $V_{DS}$

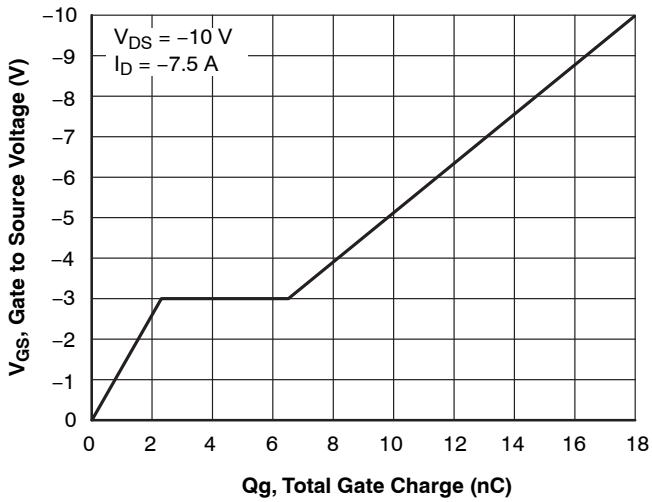


Figure 10.  $V_{GS}$  –  $Q_g$

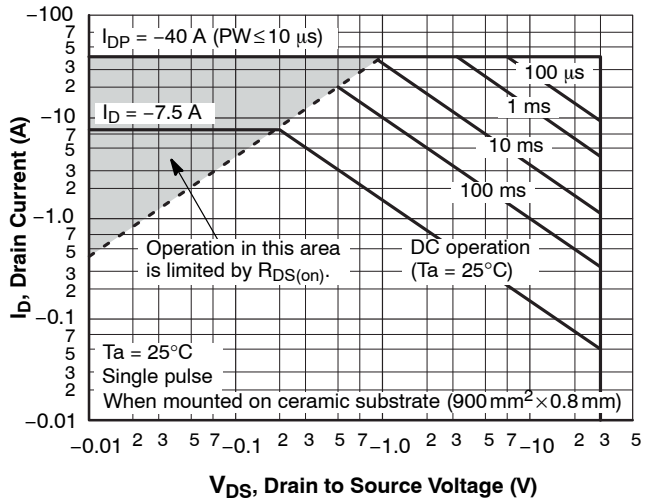


Figure 11. SOA

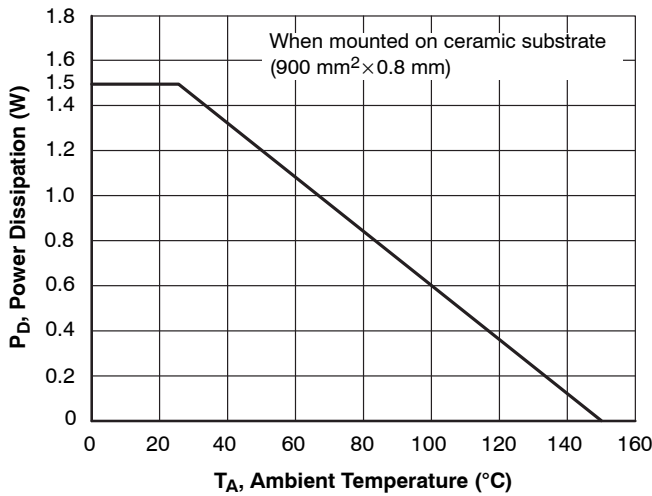
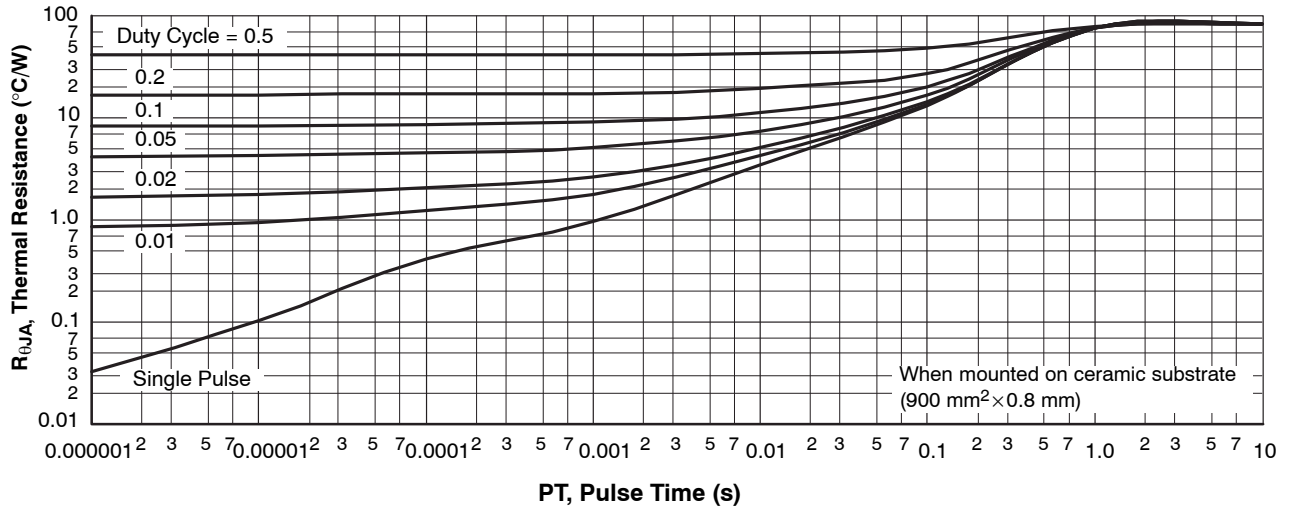


Figure 12.  $P_D$  –  $T_a$

# ECH8315

## TYPICAL CHARACTERISTICS (CONTINUED)



### ORDERING INFORMATION

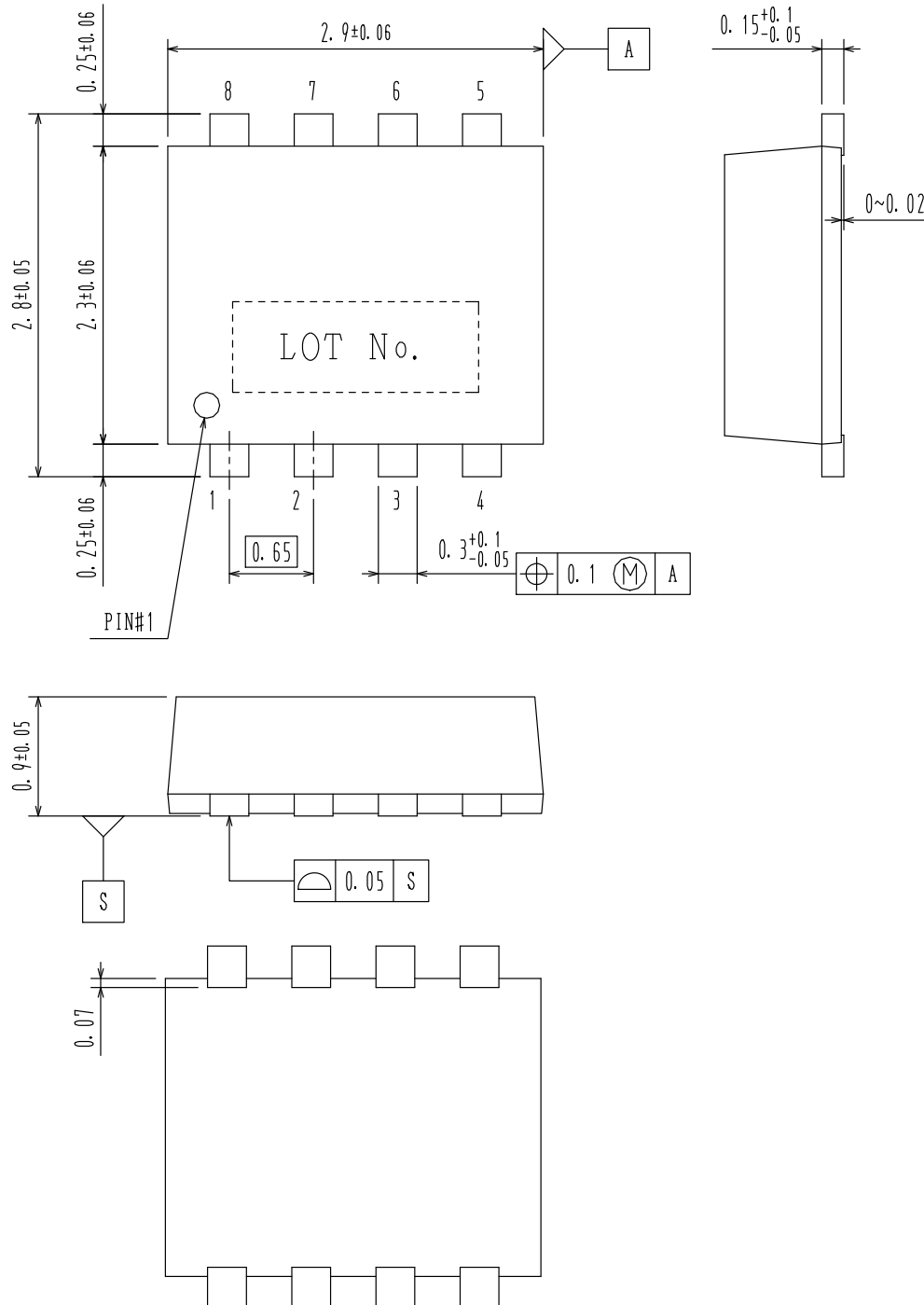
| Product Number | Marking | Package                                     | Shipping (Qty / Packing) <sup>†</sup> |
|----------------|---------|---------------------------------------------|---------------------------------------|
| ECH8315-TL-H   | JS      | SOT-28FL / ECH8<br>(Pb-Free / Halogen Free) | 3000 / Tape and Reel                  |

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

Note on usage : Since the ECH8315 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

**SOT-28FL / ECH8**  
**CASE 318BF**  
**ISSUE O**

DATE 31 MAR 2012



|                         |                        |                                                                                                                                                                                     |
|-------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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