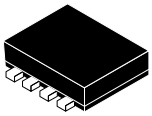
# MOSFET – Power, N-Channel

## 20 V, 14 A, 6.8 mΩ, Single ECH8

# ECH8420

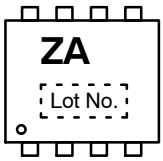


SOT−28FL / ECH8
CASE 318BF

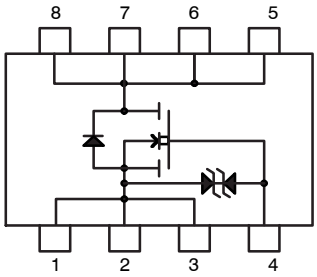
### Features

- ON−resistance $R_{DS}(on)1$ = 5.2 mΩ (Typ.)
- 1.8 V Drive
- Protection Diode in
- This Device is Pb−Free and Halide Free

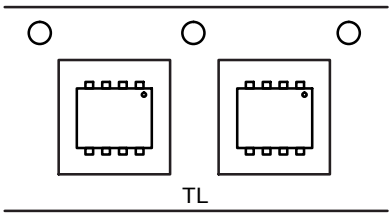
### MARKING DIAGRAM




### ELECTRICAL CONNECTION




### PACKING TYPE: TL




### Package Dimension

Unit : mm (typ)
7011A−002

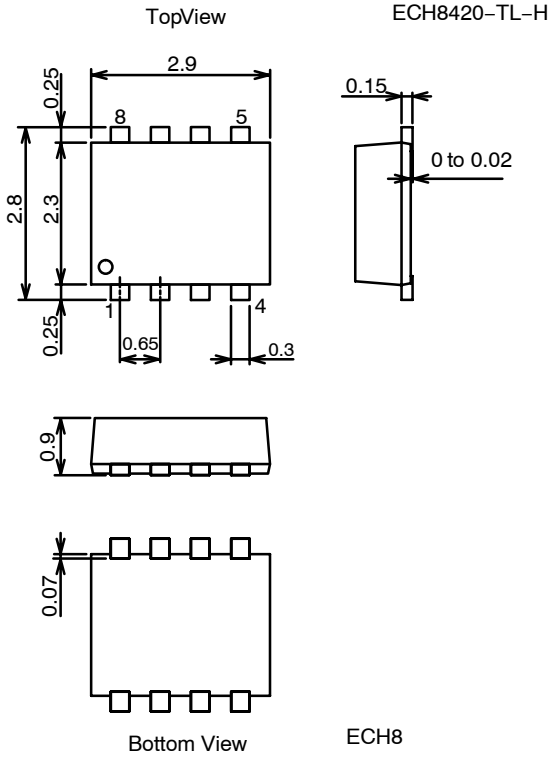



**Figure 1. Package Dimensions**

### ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| ECH8420−TL−H | SOT−28FL / ECH8 (Pb−Free, Halide Free) | 3000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

## Specifications

### ABSOLUTE MAXIMUM RATINGS at $T_A$ = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Drain−to−Source Voltage | $V_{DSS}$ | | 20 | V |
| Gate−to−Source Voltage | $V_{GSS}$ | | ±12 | V |
| Drain Current (DC) | $I_D$ | | 14 | A |
| Drain Current (Pulse) | $I_{DP}$ | PW ≤ 10 μs, duty cycle ≤ 1% | 50 | A |
| Allowable Power Dissipation | $P_D$ | When mounted on ceramic substrate (900 $mm^2 \times 0.8$ mm) | 1.6 | W |
| Channel Temperature | $T_{ch}$ | | 150 | °C |
| Storage Temperature | $T_{stg}$ | | −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.

### ELECTRICAL CHARACTERISTICS at $T_A$ = 25°C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| Drain−to−Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$ = 1 mA, $V_{GS}$ = 0 V | 20 | – | – | V |
| Zero−Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 20 V, $V_{GS}$ = 0V | – | – | 1 | μA |
| Gate−to−Source Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±8 V, $V_{DS}$ = 0 V | – | – | ±10 | μA |
| Cutoff Voltage | $V_{GS}$(off) | $V_{DS}$ = 10 V, $I_D$ = 1 mA | 0.4 | – | 1.3 | V |
| Forward Transfer Admittance | \| yfs \| | $V_{DS}$ = 10 V, $I_D$ = 7 A | – | 14.5 | – | S |
| Static Drain−to−Source On−State Resistance | $R_{DS}$(on)1 | $I_D$ = 7 A, $V_{GS}$ = 4.5 V | – | 5.2 | 6.8 | mΩ |
| | $R_{DS}$(on)2 | $I_D$ = 4 A, $V_{GS}$ = 2.5 V | – | 8 | 11.5 | mΩ |
| | $R_{DS}$(on)3 | $I_D$ = 2 A, $V_{GS}$ = 1.8 V | – | 15 | 22.5 | mΩ |
| Input Capacitance | Ciss | $V_{DS}$ = 10 V, f = 1 MHz | – | 2430 | – | pF |
| Output Capacitance | Coss | | – | 410 | – | pF |
| Reverse Transfer Capacitance | Crss | | – | 330 | – | pF |
| Turn−ON Delay Time | $t_d$(on) | See specified Test Circuit. | – | 21 | – | ns |
| Rise Time | $t_r$ | | – | 88 | – | ns |
| Turn−OFF Delay Time | $t_d$(off) | | – | 210 | – | ns |
| Fall Time | $t_f$ | | – | 115 | – | ns |
| Total Gate Charge | Qg | $V_{DS}$ = 10 V, $V_{GS}$ = 4.5 V, $I_D$ = 14 A | – | 29 | – | nC |
| Gate−to−Source Charge | Qgs | | – | 4.8 | – | nC |
| Gate−to−Drain “Miller” Charge | Qgd | | – | 8.7 | – | nC |
| Diode Forward Voltage | $V_{SD}$ | $I_S$ = 14 A, $V_{GS}$ = 0 V | – | 0.75 | 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.

**Switching Time Test Circuit**

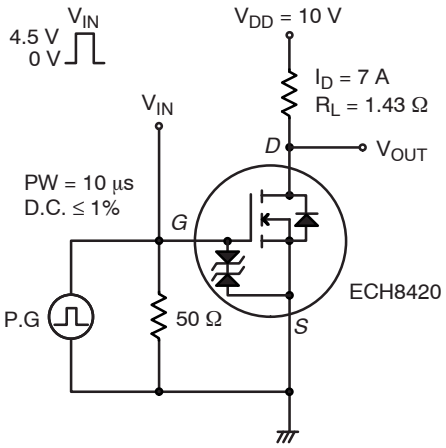



**Figure 2. Switching Time Test Circuit**

## TYPICAL CHARACTERISTICS

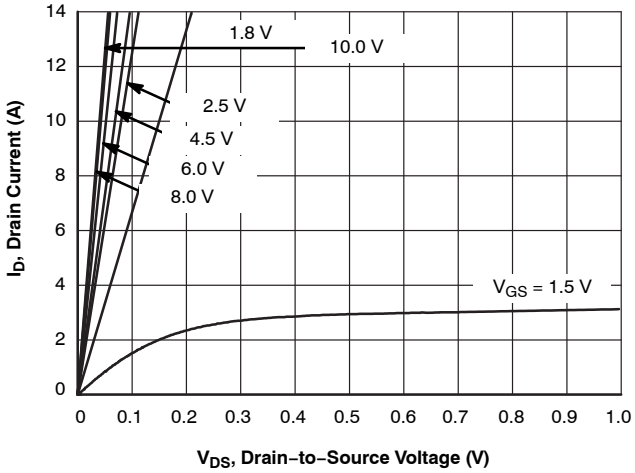



Figure 3. $I_D - V_{DS}$

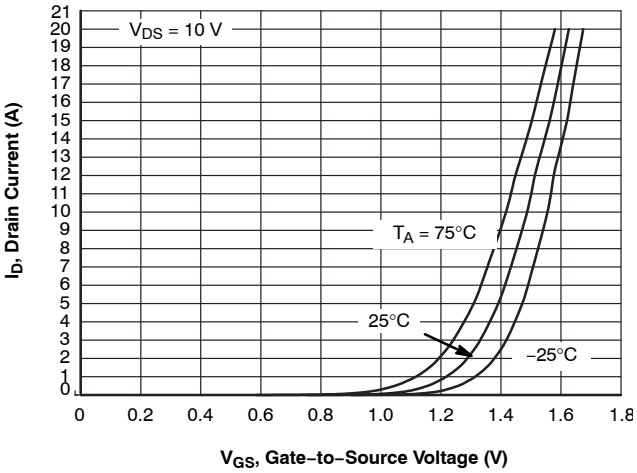



Figure 4. $I_D - V_{GS}$

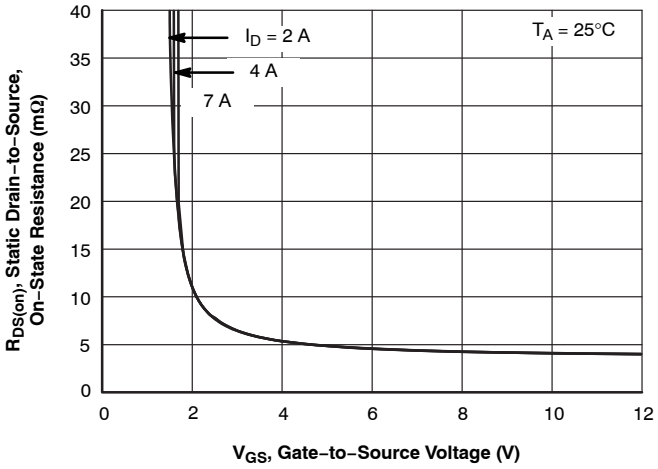



Figure 5. $R_{DS(on)} - V_{GS}$

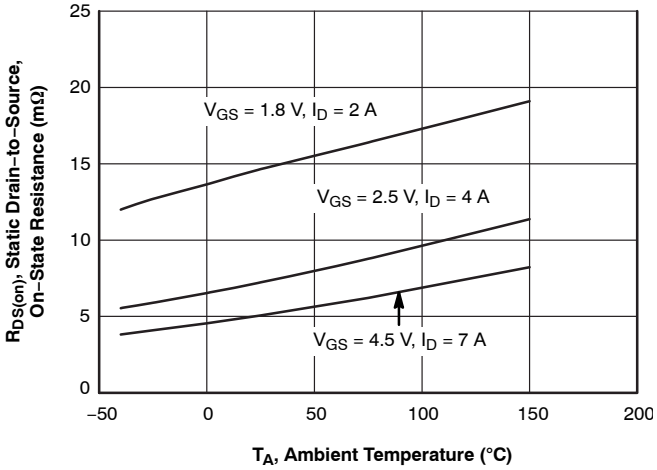



Figure 6. $R_{DS(on)} - T_A$

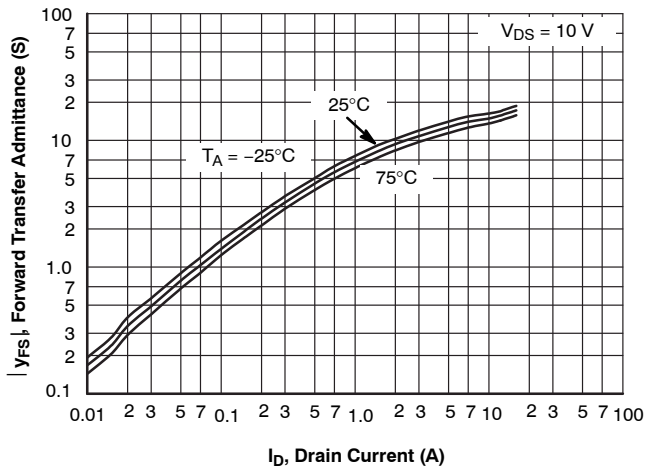



Figure 7. $|yfs| - I_D$

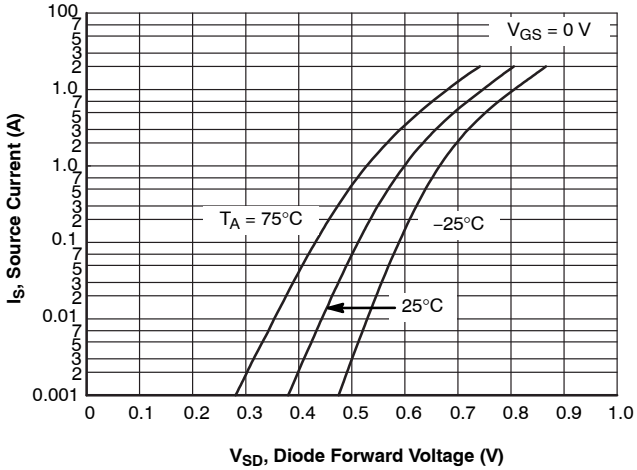



Figure 8. $I_S - V_{SD}$

## TYPICAL CHARACTERISTICS (continued)

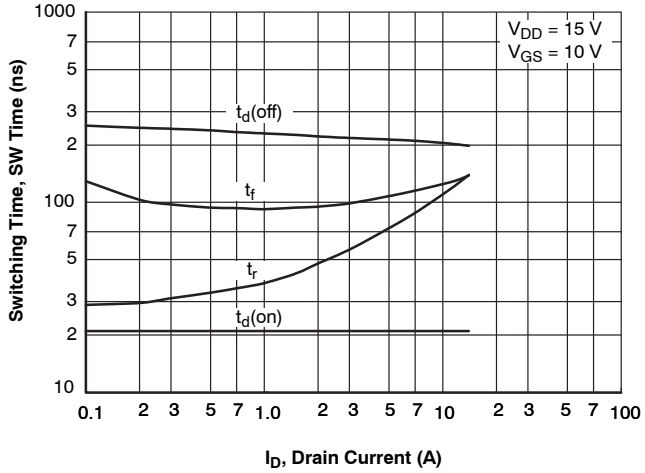



**Figure 9. SW Time – $I_D$**

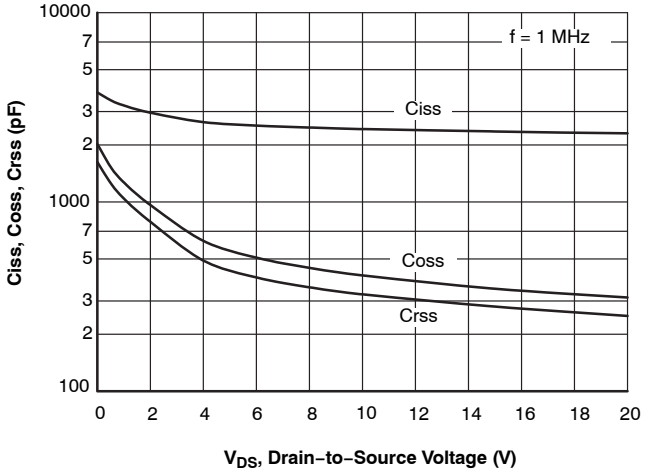



**Figure 10. Ciss, Coss, Crss – $V_{DS}$**

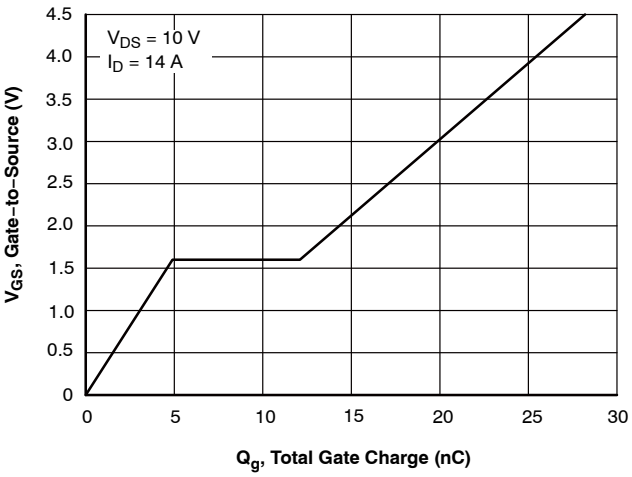



**Figure 11. $V_{GS}$ – Qg**

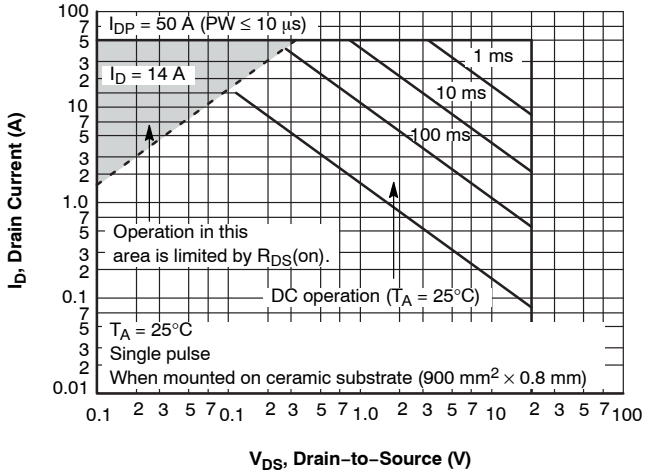



**Figure 12. ASO**

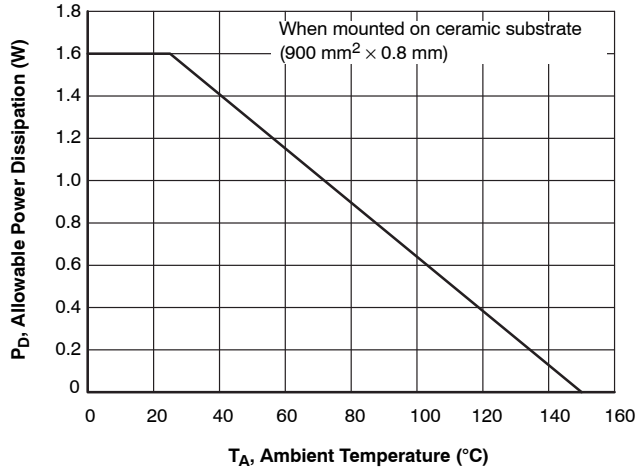
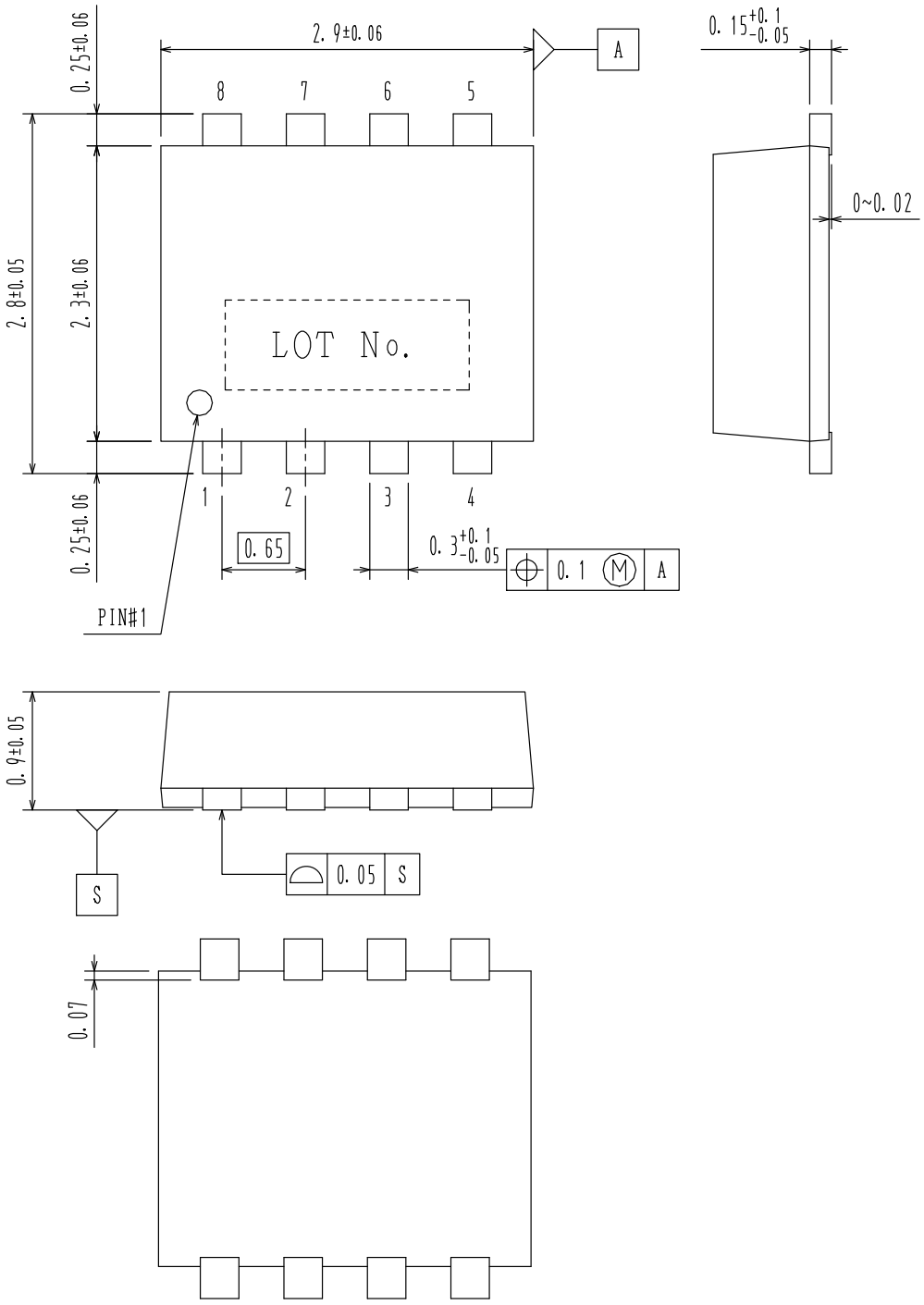



**Figure 13. $P_D$ – $T_A$**

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

DATE 31 MAR 2012

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