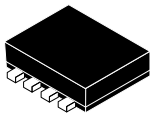
# MOSFET – Power, P-Channel, Dual ECH8

## -20 V, -5 A, 38 mΩ

# ECH8654



SOT−28FL / ECH8
CASE 318BF

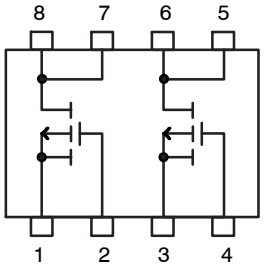
### Features

- Low ON−resistance
- 1.8 V Drive
- Halogen Free Compliance
- Protection Diode in

### MARKING DIAGRAM




### ELECTRICAL CONNECTION




1: Source 1
2: Gate 1
3: Source 2
4: Gate 2
5: Drain 2
6: Drain 2
7: Drain 1
8: Drain 1

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

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Drain−to−Source Voltage | $V_{DSS}$ | | −20 | V |
| Gate−to−Source Voltage | $V_{GSS}$ | | ±10 | V |
| Drain Current (DC) | $I_D$ | | −5 | A |
| Drain Current (Pulse) | $I_{DP}$ | PW ≤ 10 μs, duty cycle ≤ 1% | −40 | A |
| Allowable Power Dissipation | $P_D$ | When mounted on ceramic substrate (900 $mm^2$ × 0.8 mm) 1 unit | 1.3 | W |
| Total Power Dissipation | $P_T$ | When mounted on ceramic substrate (900 $mm^2$ × 0.8 mm) | 1.5 | W |
| Channel Temperature | Tch | | 150 | °C |
| Storage Temperature | Tstg | | −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.

### ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| ECH8654−TL−H | SOT−28FL / ECH8 (Pb−Free and 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 Specifications Brochure, BRD8011/D.

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**ELECTRICAL CHARACTERISTICS** (at Ta = 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, $V_{GS}$ = 0 V | – | – | −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, $I_D$ = −3 A | 4.9 | 8.3 | – | S |
| Static Drain−to−Source On−State Resistance | $R_{DS}$(on)1 | $I_D$ = −3 A, $V_{GS}$ = −4.5 V | – | 29 | 38 | mΩ |
| | $R_{DS}$(on)2 | $I_D$ = −1.5 A, $V_{GS}$ = −2.5 V | – | 41 | 58 | mΩ |
| | $R_{DS}$(on)3 | $I_D$ = −0.5 A, $V_{GS}$ = −1.8 V | – | 64 | 98 | mΩ |
| Input Capacitance | Ciss | $V_{DS}$ = −10 V, f = 1 MHz | – | 960 | – | pF |
| Output Capacitance | Coss | | – | 180 | – | pF |
| Reverse Transfer Capacitance | Crss | | – | 140 | – | pF |
| Turn−ON Delay Time | $t_d$(on) | See specified Test Circuit. | – | 14 | – | ns |
| Rise Time | $t_r$ | | – | 55 | – | ns |
| Turn−OFF Delay Time | $t_d$(off) | | – | 92 | – | ns |
| Fall Time | $t_f$ | | – | 68 | – | ns |
| Total Gate Charge | Qg | $V_{DS}$ = −10 V, $V_{GS}$ = −4.5 V, $I_D$ = −5 A | – | 11 | – | nC |
| Gate−to−Source Charge | Qgs | | – | 2.0 | – | nC |
| Gate−to−Drain “Miller” Charge | Qgd | | – | 2.8 | – | nC |
| Diode Forward Voltage | $V_{SD}$ | $I_S$ = −5 A, $V_{GS}$ = 0 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.

### Switching Time Test Circuit

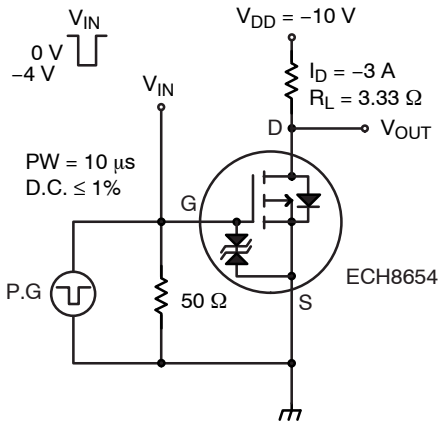


**Figure 1. Switching Time Test Circuit**



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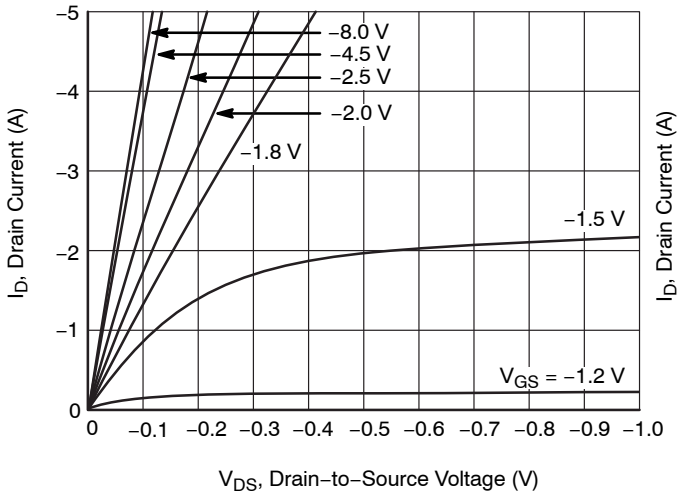


**Figure 2. $I_D$ – $V_{DS}$**

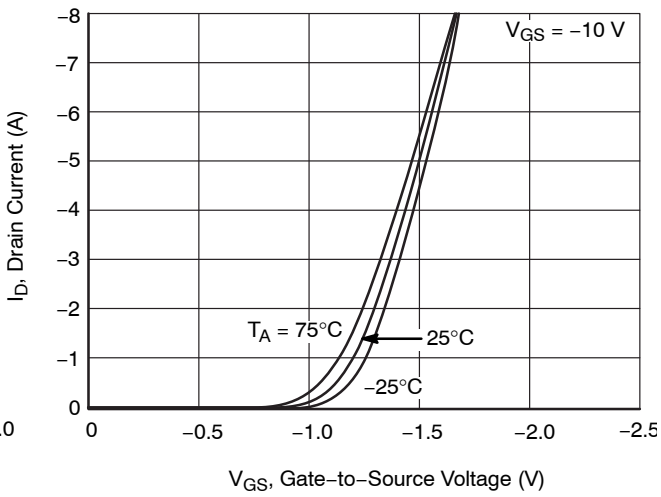


**Figure 3. $I_D$ – $V_{GS}$**

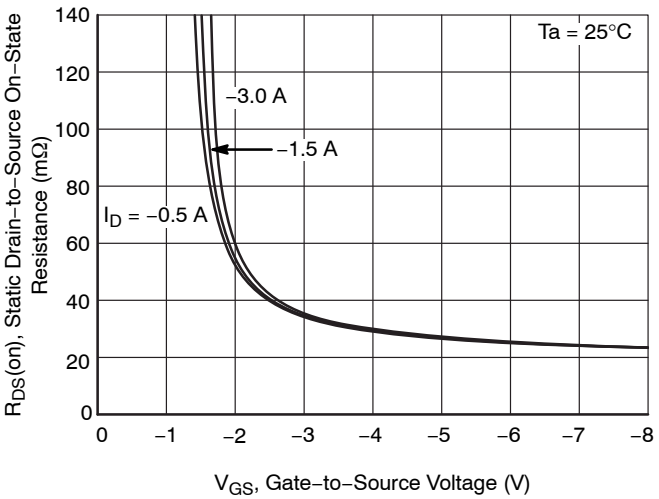


**Figure 4. $R_{DS(on)}$ – $V_{GS}$**

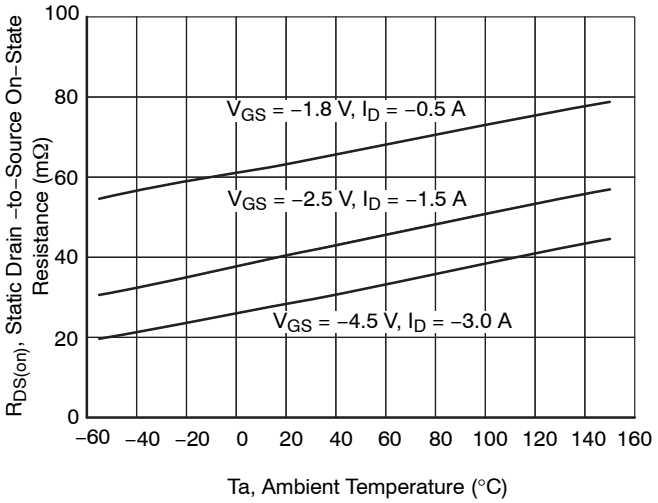


**Figure 5. $R_{DS(on)}$ – Ta**

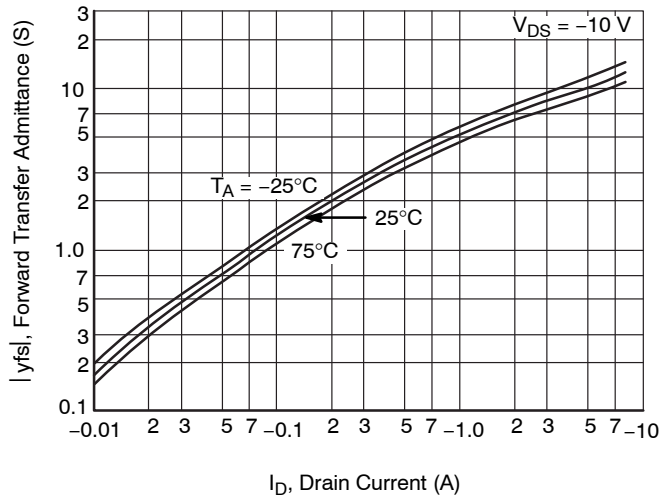


**Figure 6. $|yfs|$ – $I_D$**

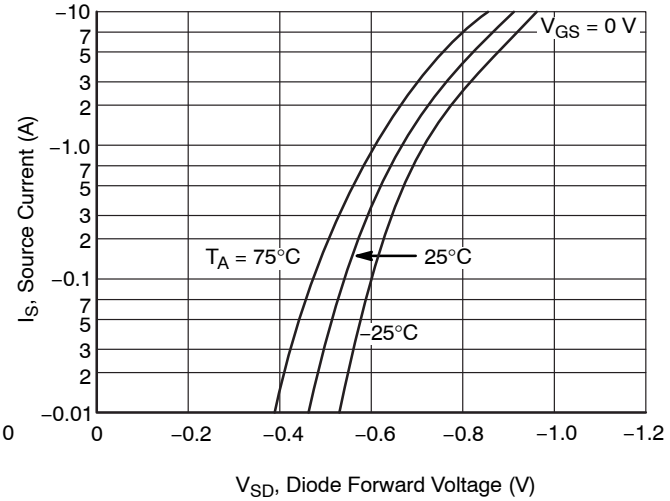


**Figure 7. $I_S$ – $V_{SD}$**



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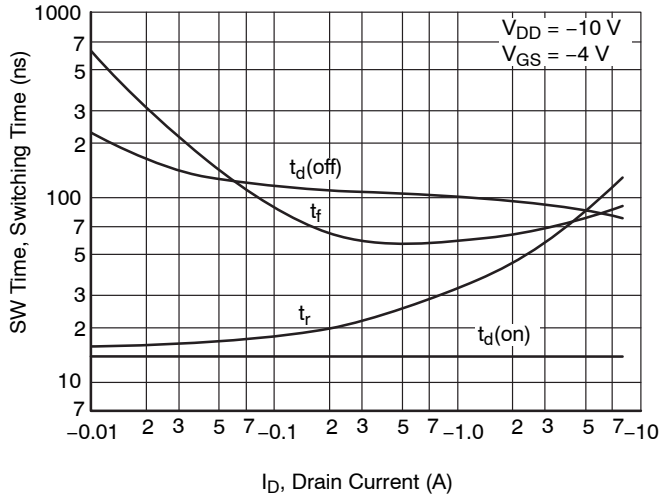


**Figure 8. SW Time – $I_D$**

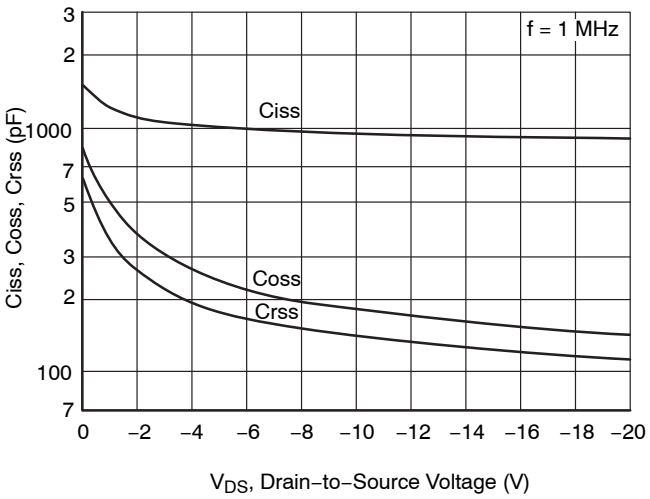


**Figure 9. Ciss, Coss, Crss – $V_{DS}$**

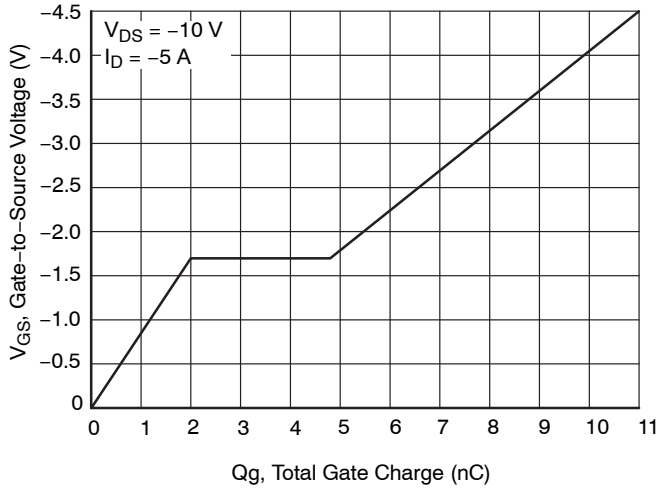


**Figure 10. $V_{GS}$ – Qg**

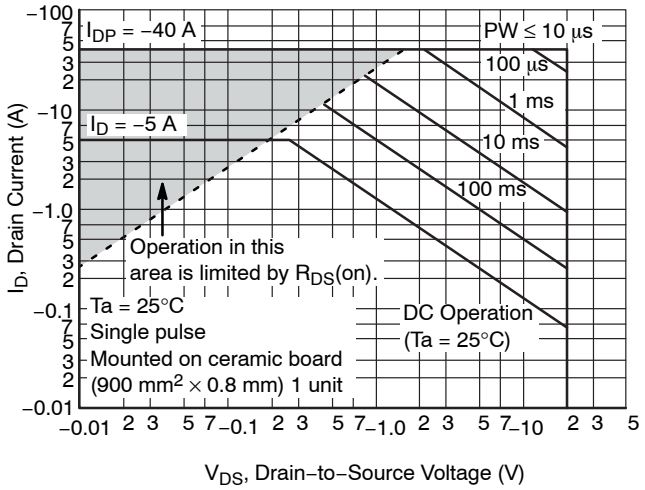


**Figure 11. ASO**

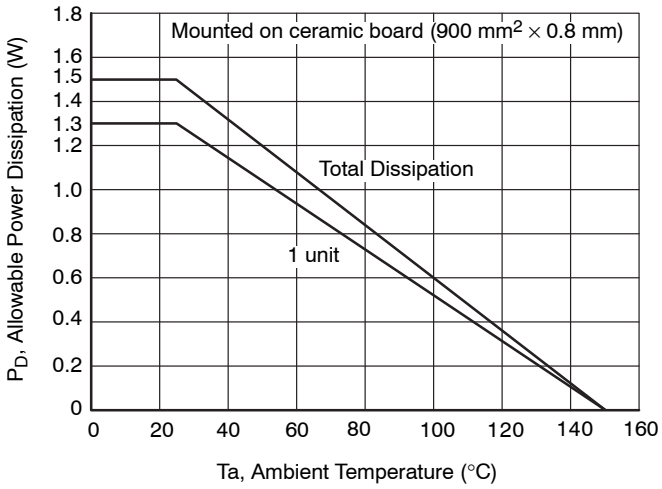


**Figure 12. $P_D$ – Ta**



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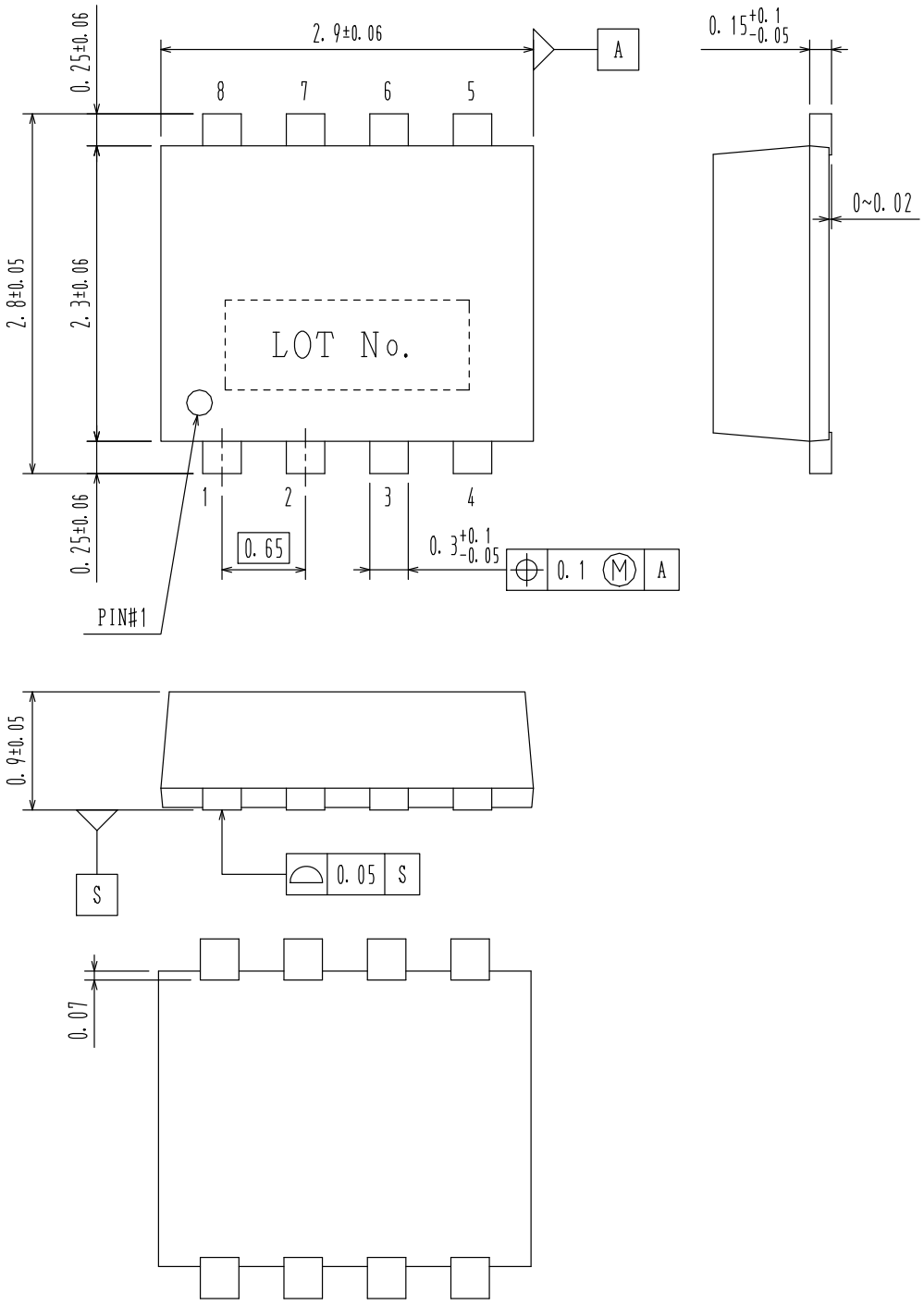


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