

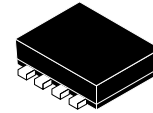
# MOSFET – Power, N-Channel

**20 V, 14 A, 6.8 mΩ, Single ECH8**

## ECH8420

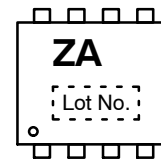
### Features

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

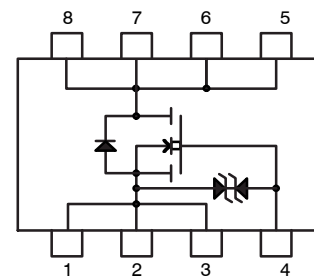


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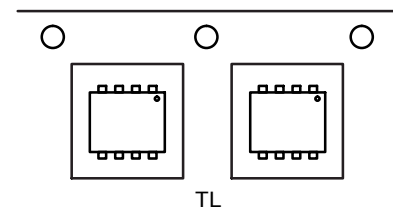
### MARKING DIAGRAM



### ELECTRICAL CONNECTION



### PACKING TYPE: TL



### ORDERING INFORMATION

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

<sup>†</sup>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](http://BRD8011/D).

### Package Dimension

Unit : mm (typ)  
7011A-002

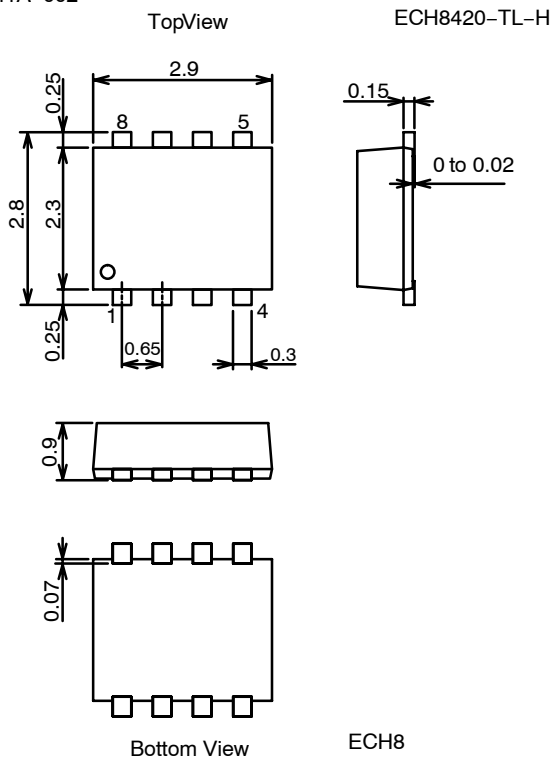


Figure 1. Package Dimensions

## Specifications

### ABSOLUTE MAXIMUM RATINGS at $T_A = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DSS}$		20	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 12$	V
Drain Current (DC)	$I_D$		14	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10 \mu\text{s}$ , duty cycle $\leq 1\%$	50	A
Allowable Power Dissipation	$P_D$	When mounted on ceramic substrate ( $900 \text{ mm}^2 \times 0.8 \text{ mm}$ )	1.6	W
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		$-55$ to $+150$	$^\circ\text{C}$

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.

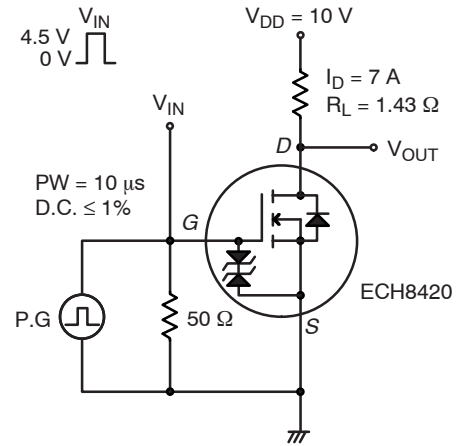
### ELECTRICAL CHARACTERISTICS at $T_A = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 1 \text{ mA}$ , $V_{GS} = 0 \text{ V}$	20	–	–	V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 20 \text{ V}$ , $V_{GS} = 0 \text{ V}$	–	–	1	$\mu\text{A}$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 8 \text{ V}$ , $V_{DS} = 0 \text{ V}$	–	–	$\pm 10$	$\mu\text{A}$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$	0.4	–	1.3	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = 10 \text{ V}$ , $I_D = 7 \text{ A}$	–	14.5	–	S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D = 7 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$	–	5.2	6.8	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D = 4 \text{ A}$ , $V_{GS} = 2.5 \text{ V}$	–	8	11.5	$\text{m}\Omega$
	$R_{DS(on)3}$	$I_D = 2 \text{ A}$ , $V_{GS} = 1.8 \text{ V}$	–	15	22.5	$\text{m}\Omega$
Input Capacitance	$C_{iss}$	$V_{DS} = 10 \text{ V}$ , $f = 1 \text{ MHz}$	–	2430	–	pF
Output Capacitance	$C_{oss}$		–	410	–	pF
Reverse Transfer Capacitance	$C_{rss}$		–	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	$Q_g$	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ , $I_D = 14 \text{ A}$	–	29	–	nC
Gate-to-Source Charge	$Q_{gs}$		–	4.8	–	nC
Gate-to-Drain “Miller” Charge	$Q_{gd}$		–	8.7	–	nC
Diode Forward Voltage	$V_{SD}$	$I_S = 14 \text{ A}$ , $V_{GS} = 0 \text{ V}$	–	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.

## ECH8420

### Switching Time Test Circuit



**Figure 2. Switching Time Test Circuit**

TYPICAL CHARACTERISTICS

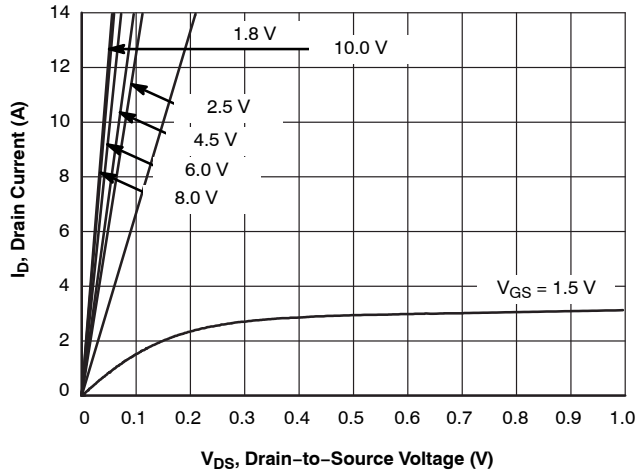


Figure 3.  $I_D - V_{DS}$

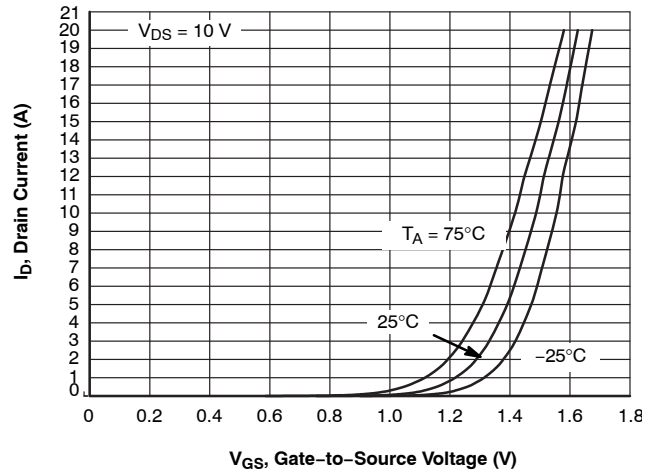


Figure 4.  $I_D - V_{GS}$

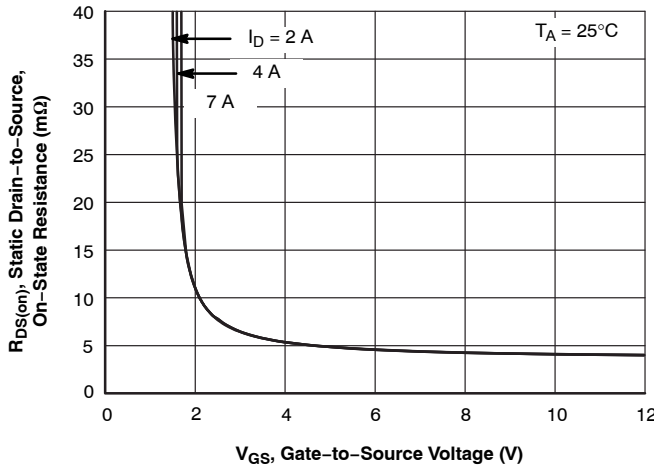


Figure 5.  $R_{DS(on)} - V_{GS}$

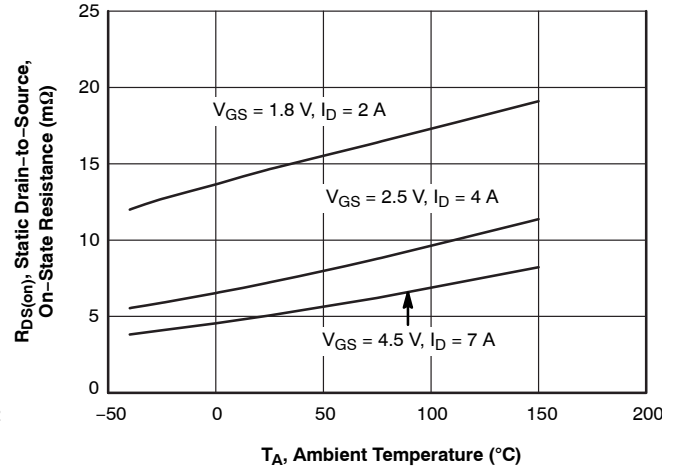


Figure 6.  $R_{DS(on)} - T_A$

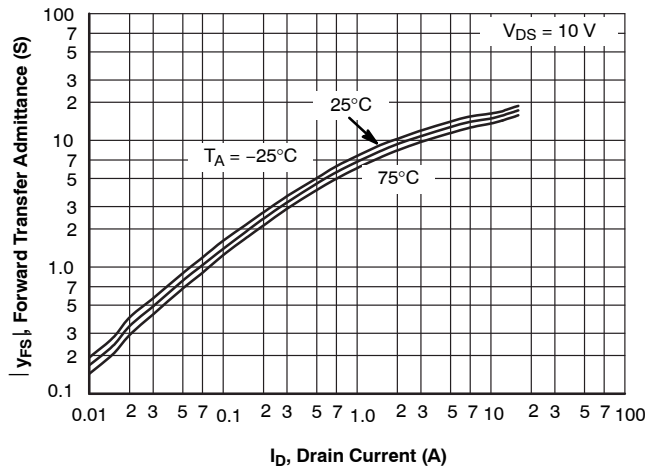


Figure 7.  $|y_{fs}| - I_D$

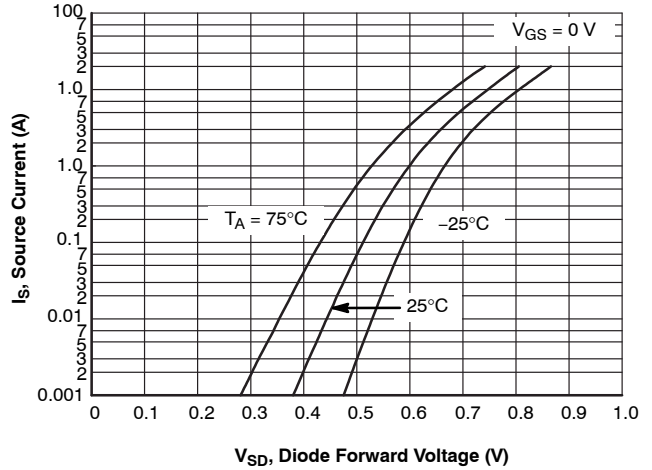


Figure 8.  $I_S - V_{SD}$

TYPICAL CHARACTERISTICS (continued)

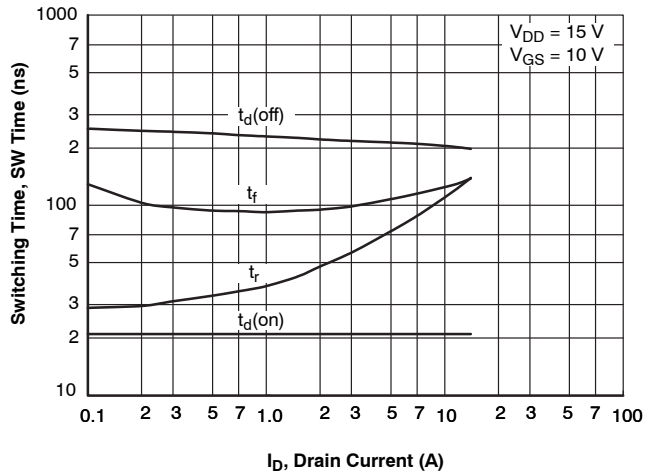


Figure 9. SW Time –  $I_D$

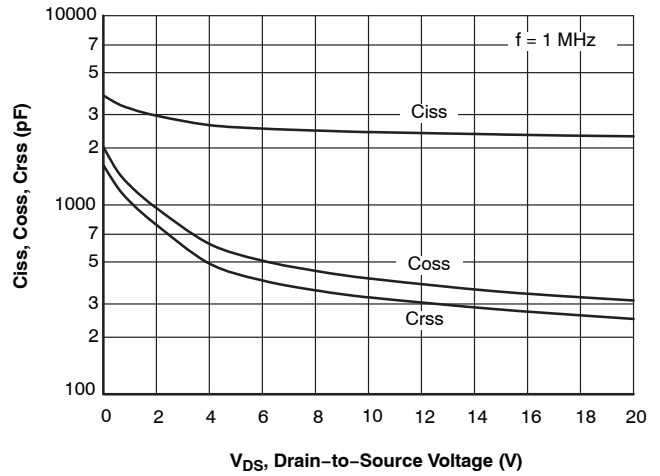


Figure 10.  $C_{iss}$ ,  $C_{oss}$ ,  $C_{rss}$  –  $V_{DS}$

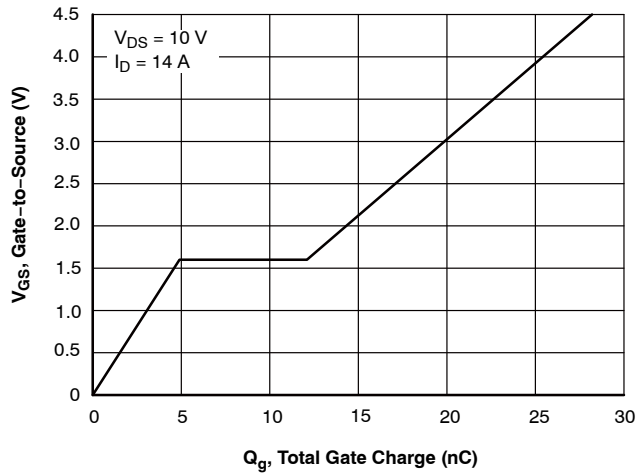


Figure 11.  $V_{GS}$  –  $Q_g$

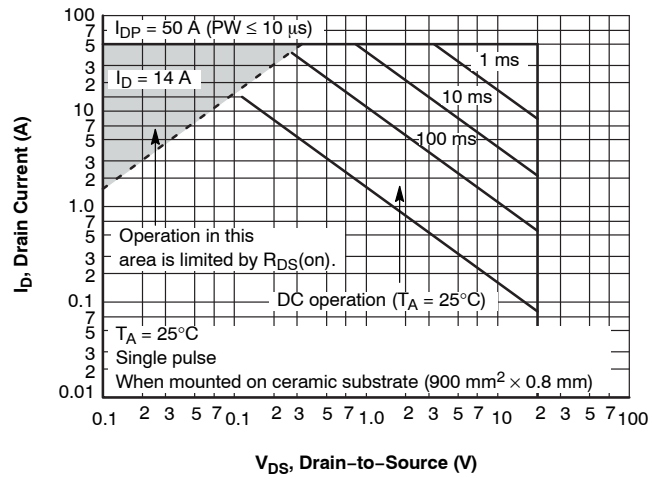


Figure 12. ASO

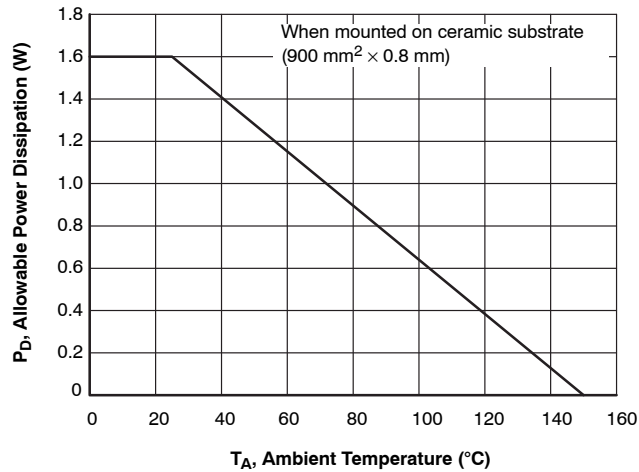
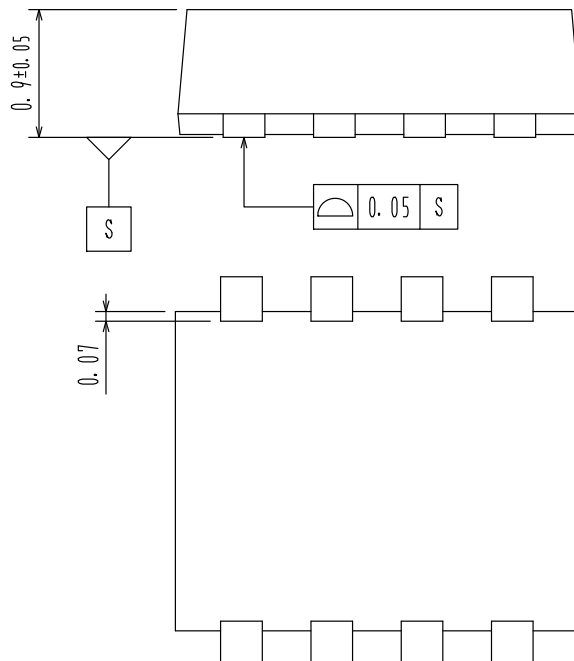
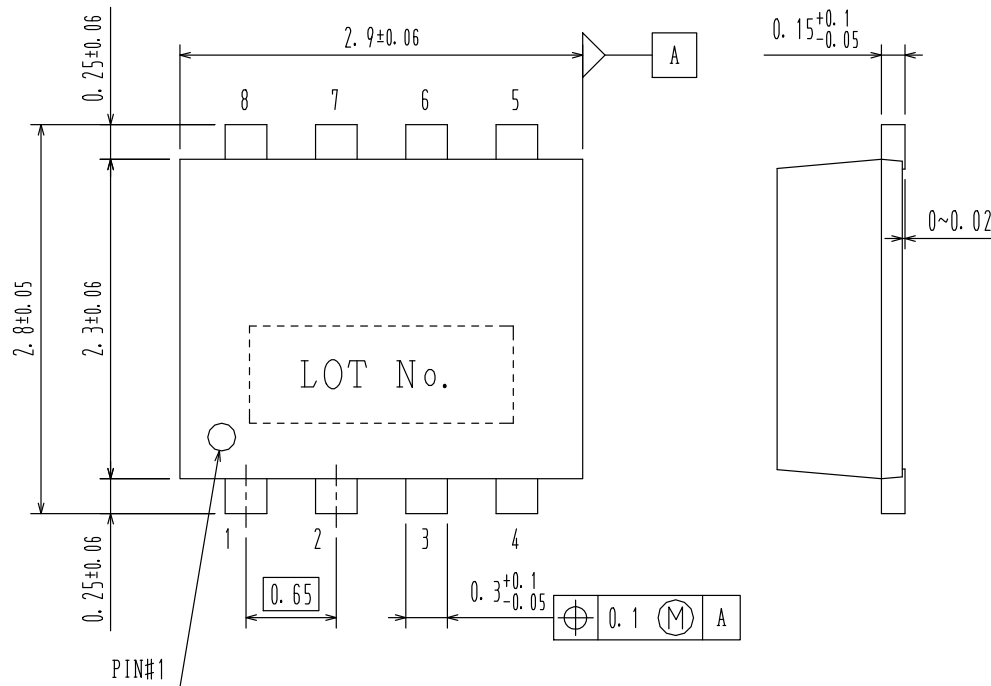



Figure 13.  $P_D$  –  $T_A$

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**ISSUE O**

DATE 31 MAR 2012



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