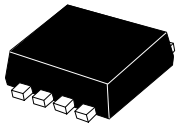
MOSFET – Power,
Complementary Dual ECH8

60 V, 4.7 A, 55 mΩ
-60 V, -3.5 A, 94 mΩ

ECH8690



SOT−28FL/ECH8
CASE 318BF

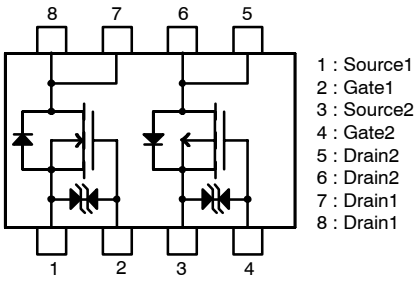
Description

This Power MOSFET is Produced Using onsemi's Trench Technology, Which is Specifically Designed to Low on Resistance. This devices is suitable for applications with low on resistance requirements.

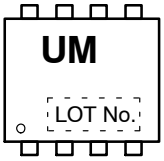
Features

- On−State Resistance
  - Nch:$R_{DS(on)}$ 1 = 42 mΩ (typ.)
  - Pch:$R_{DS(on)}$ 1 = 73 mΩ (typ.)
- Protection Diode In
- 4 V rive
- Nch + Pch MOSFET
- This Device is Pb−Free, Halogen Free and RoHS Compliant

ELECTRICAL CONNECTION



MARKING DIAGRAM



ORDERING INFORMATION

See detailed ordering and shipping information on page 7 of this data sheet.

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ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Symbol	Parameter	Conditions	N−Channel	P−Channel	Unit
V_{DSS}	Drain to Source Voltage		60	−60	V
V_{GSS}	Gate to Source Voltage		±20	±20	V
I_D	Drain Current (DC)		4.7	−3.5	A
I_{DP}	Drain Current (Pulse)	PW ≤ 10 μs, duty cycle ≤ 1%	30	−30	A
P_D	Allowable Power Dissipation	When mounted on ceramic substrate (1200 mm^2 X 0.8 mm) 1 unit	1.5		W
P_T	Total Dissipation	When mounted on ceramic substrate (1200 mm^2 X 0.8 mm)	1.8		W
Tch	Channel Temperature		150		°C
Tstg	Storage Temperature		−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 (T_A = 25°C) (Note 3)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
[N−channel]						
$V_{(BR)DSS}$	Drain to Source Breakdown Voltage	I_D = 1 mA, V_{GS} = 0 V	60	−	−	V
I_{DSS}	Zero−Gate Voltage Drain Current	V_{DS} = 60 V, V_{GS} = 0 V	−	−	1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±16 V, V_{DS} = 0 V		−	±10	μA
$V_{GS(off)}$	Cutoff Voltage	V_{DS} = 10 V, I_D = 1 mA	1.2	−	2.6	V
| yfs |	Forward Transfer Admittance	V_{DS} =10 V, I_D = 2 A	−	4.2	−	S
$R_{DS(on)1}$	Static Drain to Source On−State Resistance	I_D = 2 A, V_{GS} = 10 V	−	42	55	mΩ
$R_{DS(on)2}$		I_D = 1 A, V_{GS} = 4.5 V	−	53	74	mΩ
$R_{DS(on)3}$		I_D = 1 A, V_{GS} = 4 V	−	61	85	mΩ
Ciss	Input Capacitance	V_{DS} = 20 V, f = 1 MHz	−	955	−	pF
Coss	Output Capacitance		−	58	−	pF
Crss	Reverse Transfer Capacitance		−	45	−	pF
$t_{d(on)}$	Turn−ON Delay Time	See specified Test Circuit.	−	7	−	ns
t_r	Rise Time		−	8.4	−	ns
$t_{d(off)}$	Turn−OFF Delay Time		−	76	−	ns
t_f	Fall Time		−	23	−	ns
Qg	Total Gate Charge	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 4.7 A	−	18	−	nC
Qgs	Gate to Source Charge		−	3	−	nC
Qgd	Gate to Drain “Miller” Charge		−	2.8	−	nC
V_{SD}	Diode Forward Voltage	I_S = 4.7 A, V_{GS} = 0 V	−	0.82	1.2	V
[P−channel]						
$V_{(BR)DSS}$	Drain to Source Breakdown Voltage	I_D = −1 mA, V_{GS} = 0 V	−60	−	−	V
I_{DSS}	Zero−Gate Voltage Drain Current	V_{DS} = −60 V, V_{GS} = 0 V	−	−	−1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±16 V, V_{DS} = 0 V		−	±10	μA
$V_{GS(off)}$	Cutoff Voltage	V_{DS} = −10 V, I_D = −1 mA	−1.2	−	−2.6	V
| yfs |	Forward Transfer Admittance	V_{DS} = −10 V, I_D = −1.5 A	−	3.4	−	S
$R_{DS(on)1}$	Static Drain to Source On−State Resistance	I_D = −1 A, V_{GS} = −10 V	−	73	94	mΩ
$R_{DS(on)2}$		I_D = −0.5 A, V_{GS} = −4.5 V	−	97	135	mΩ
$R_{DS(on)3}$		I_D = −0.5 A, V_{GS} = 4 V	−	108	153	mΩ

ELECTRICAL CHARACTERISTICS (T_A = 25°C) (Note 3) (continued)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
[P−channel]						
Ciss	Input Capacitance	V_{DS} = −20 V, f = 1 MHz	–	790	–	pF
Coss	Output Capacitance		–	63	–	pF
Crss	Reverse Transfer Capacitance		–	45	–	pF
$t_{d(on)}$	Turn−ON Delay Time	See specified Test Circuit.	–	10	–	ns
t_r	Rise Time		–	8.8	–	ns
$t_{d(off)}$	Turn−OFF Delay Time		–	84	–	ns
t_f	Fall Time		–	29	–	ns
Qg	Total Gate Charge	V_{DS} = −30 V, V_{GS} = −10 V, I_D = −3.5 A	–	15	–	nC
Qgs	Gate to Source Charge		–	2.6	–	nC
Qgd	Gate to Drain “Miller” Charge		–	2.2	–	nC
V_{SD}	Diode Forward Voltage	I_S = −3.5 A, V_{GS} = 0 V	–	−0.83	−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.

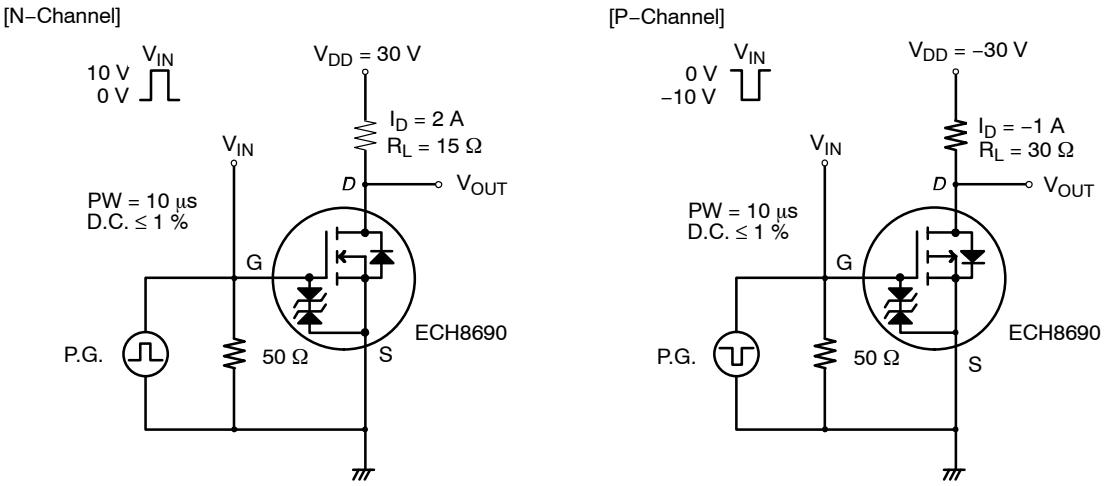


Figure 1. Switching Time Test Circuit

TYPICAL CHARACTERISTICS

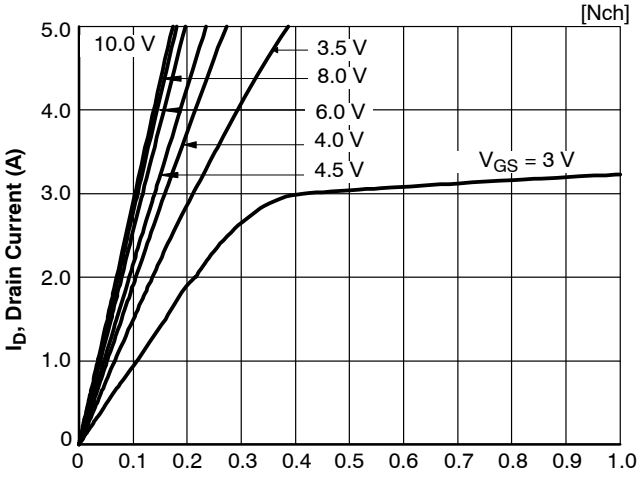


Figure 2. $I_D - V_{DS}$

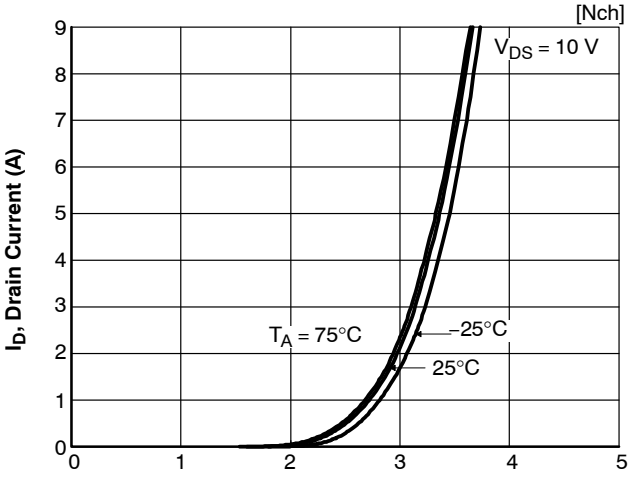


Figure 3. $I_D - V_{GS}$

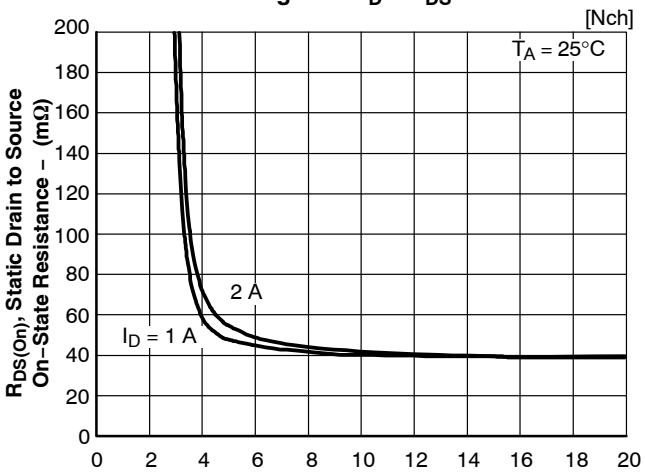


Figure 4. $R_{DS(on)} - V_{GS}$

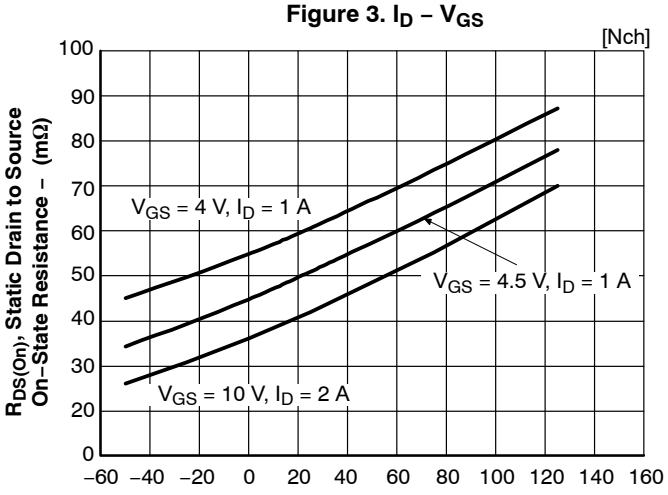


Figure 5. $R_{DS(on)} - T_A$

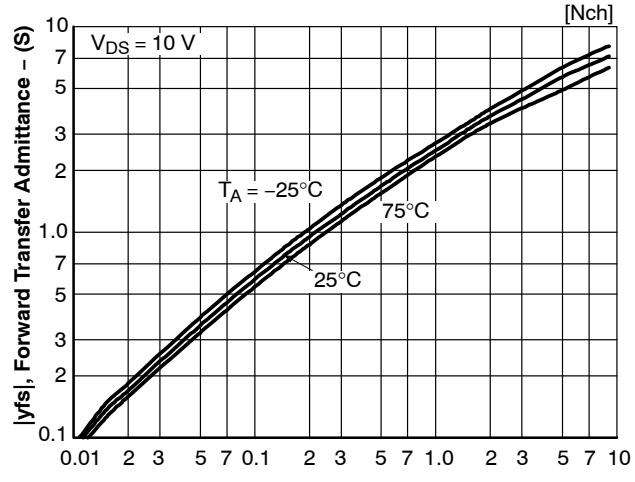


Figure 6. $|Yfs| - I_D$

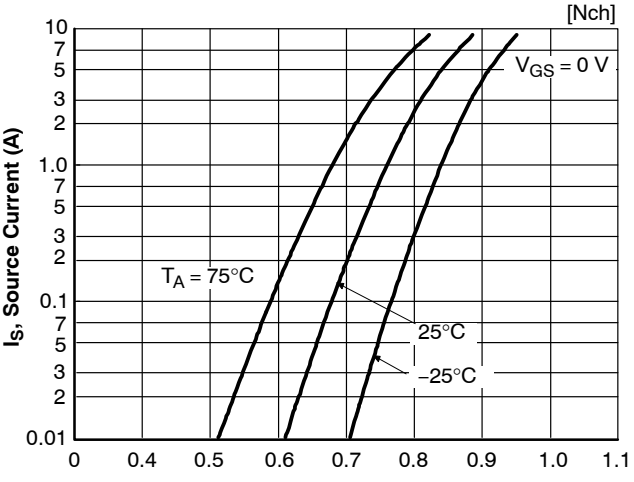


Figure 7. $I_S - V_{SD}$

TYPICAL CHARACTERISTICS (CONTINUED)

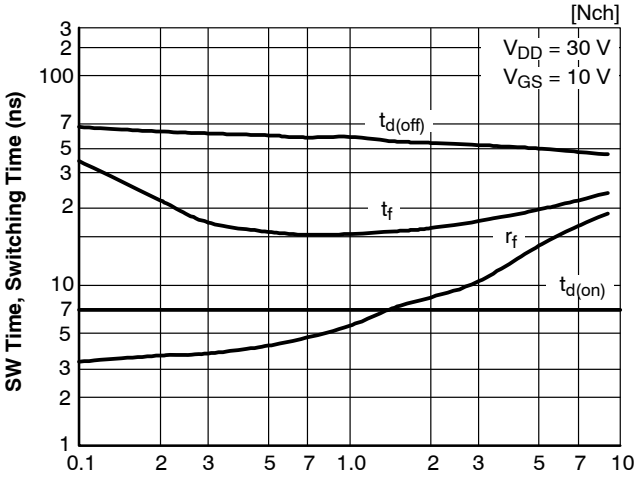


Figure 8. I_D – S/W Time

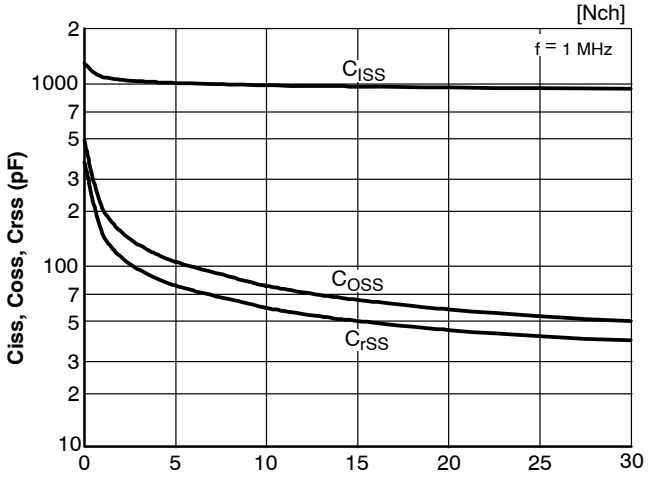


Figure 9. Ciss, Coss,Crss – V_{DS}

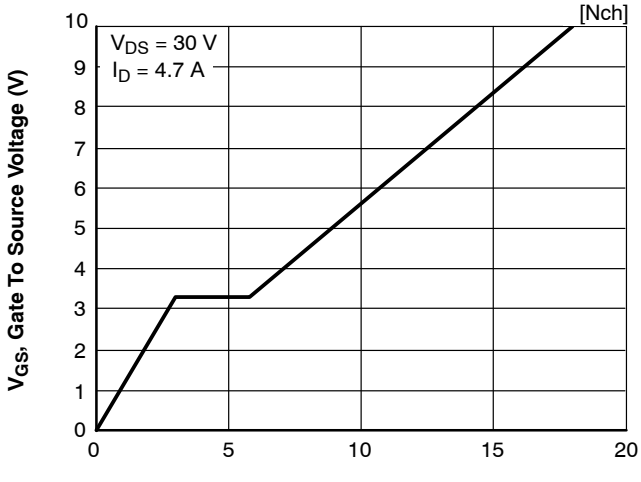


Figure 10. V_{GS} – Q_g

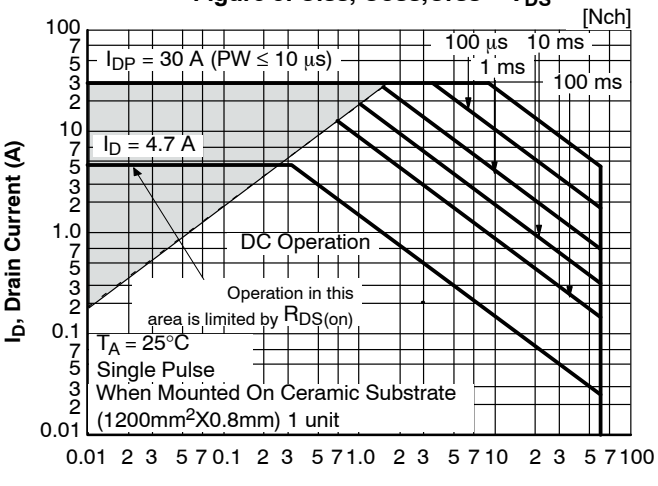


Figure 11. S O A

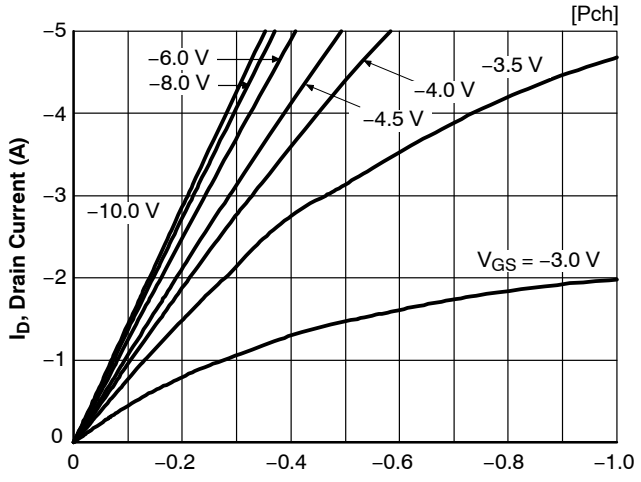


Figure 12. I_D – V_{DS}

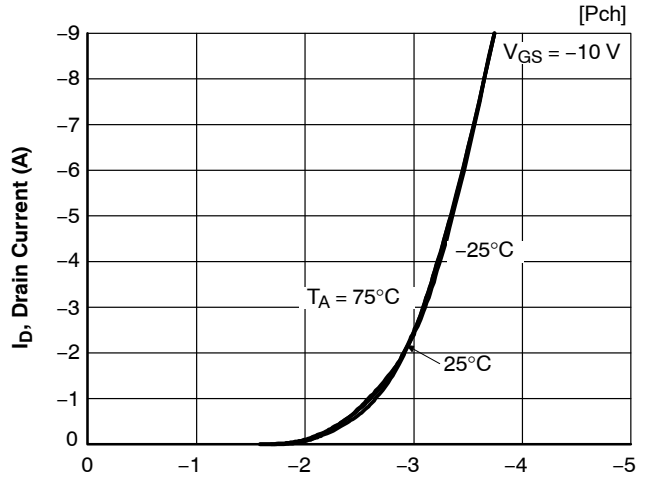


Figure 13. I_D – V_{GS}

TYPICAL CHARACTERISTICS (CONTINUED)

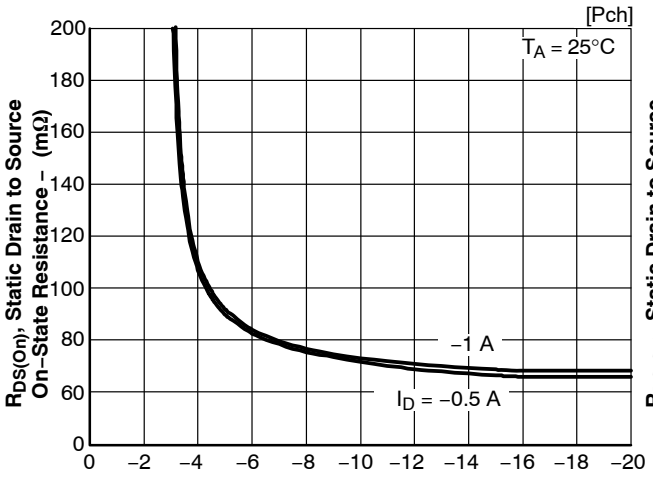


Figure 14. $R_{DS(on)}$ − V_{GS}

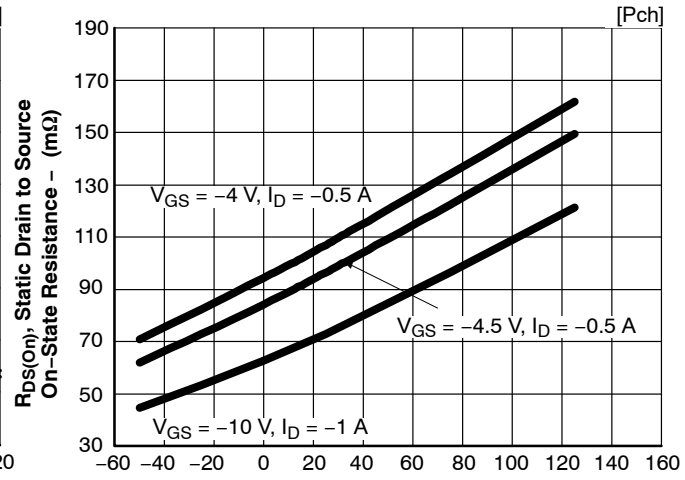


Figure 15. $R_{DS(on)}$ − T_A

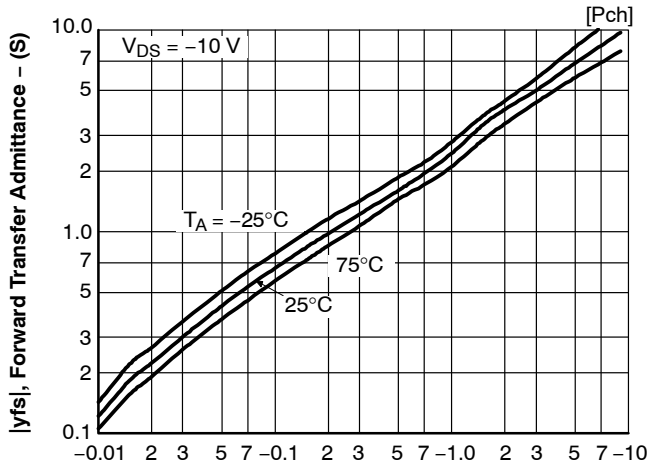


Figure 16. Yfs| − I_D

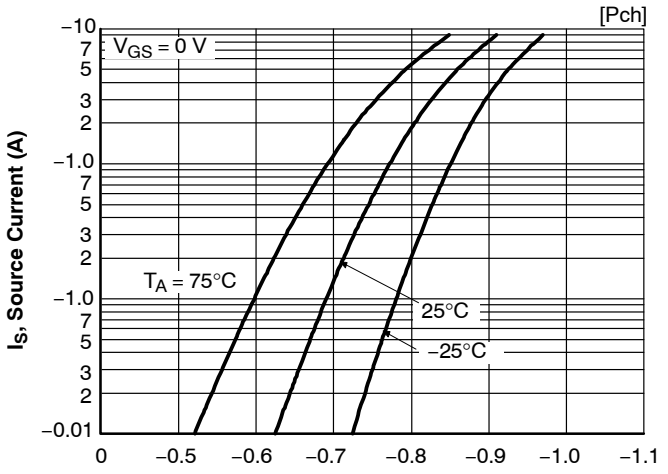


Figure 17. I_S − V_{SD}

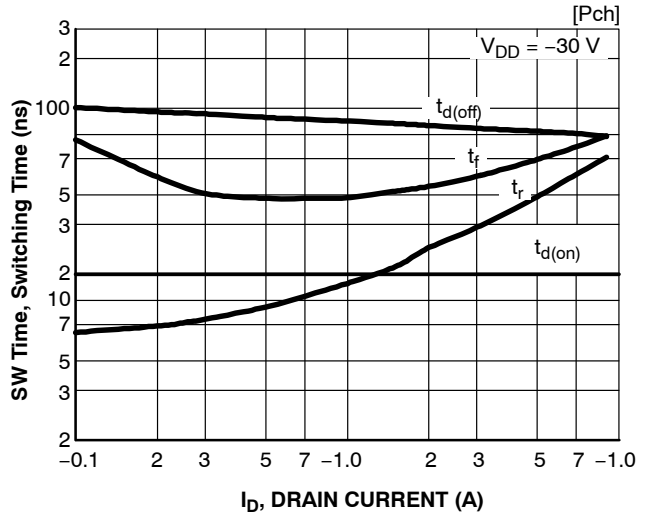


Figure 18. I_D − S/W Time

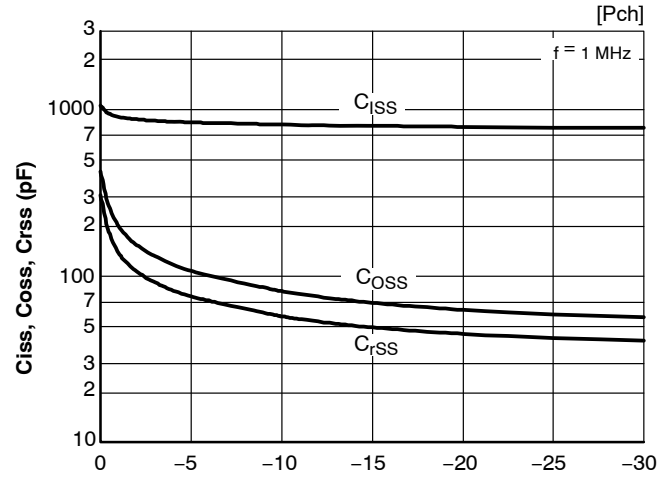


Figure 19. Ciss, Coss,Crss − V_{DS}

TYPICAL CHARACTERISTICS (CONTINUED)

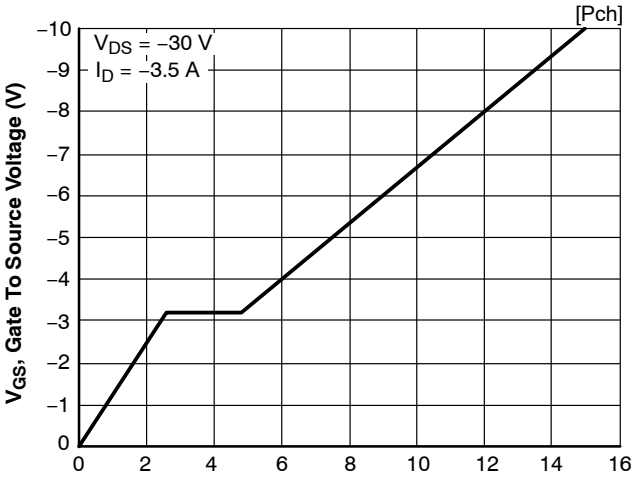


Figure 20. V_{GS} – Q_g

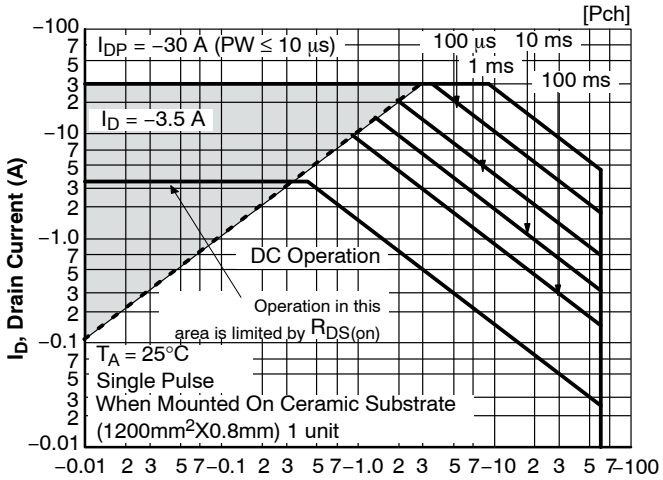


Figure 21. S O A

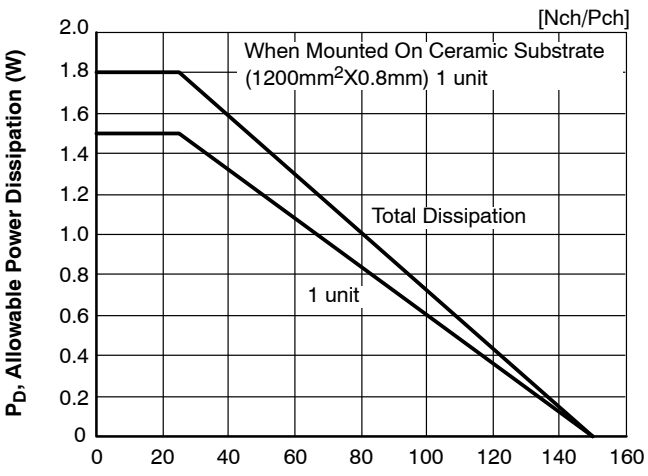


Figure 22. P_D – T_A

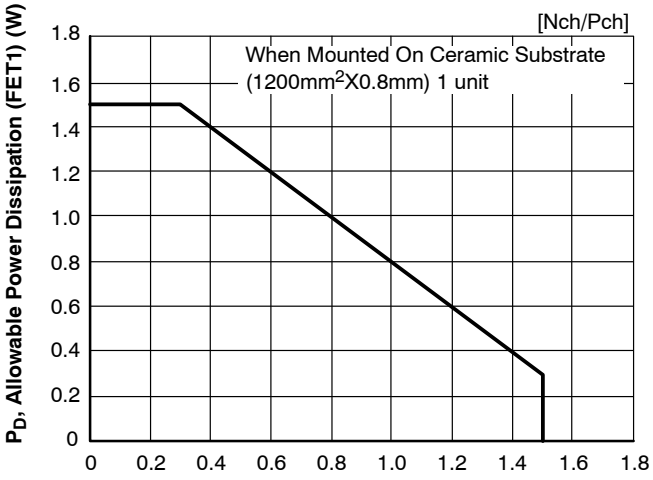


Figure 23. P_D (FET1) – P_D (FET2)

ORDERING INFORMATION

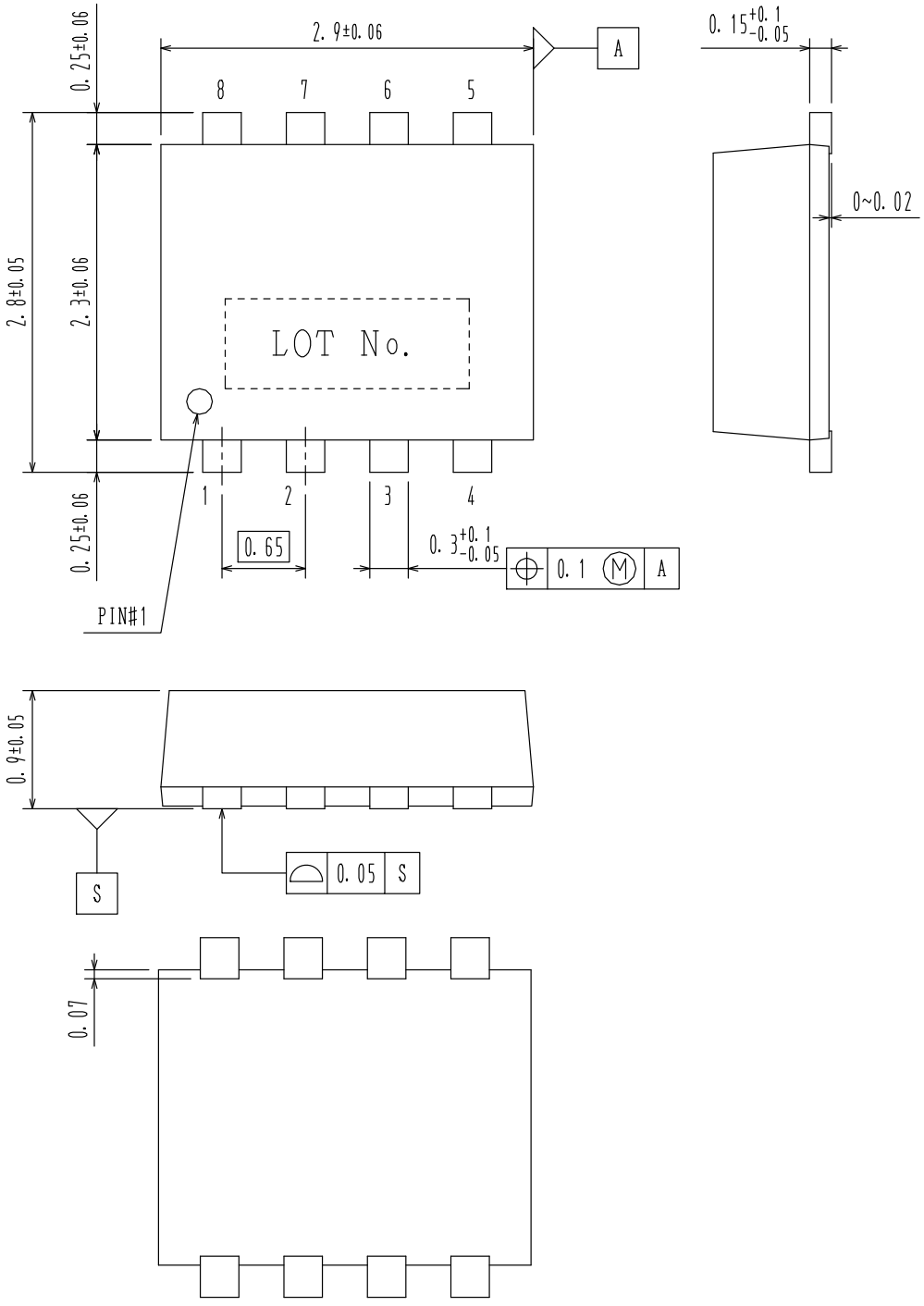
Product Number	Package	Shipping†
ECH8690−TL−H	SOT−28FL / ECH8 (Pb−Free / Halogen Free)	3000 / Tape and Reel

†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.

Note on usage : Since the ECH8690 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects. Please contact sales for use except the designated application.

SOT−28FL / ECH8
CASE 318BF
ISSUE O

DATE 31 MAR 2012



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