

# ECH8659

## Power MOSFET 30V, 24mΩ, 7A, Dual N-Channel

This Power MOSFET is produced using ON Semiconductor's trench technology, which is specifically designed to minimize gate charge and low on resistance. This device is suitable for applications with low gate charge driving or low on resistance requirements.

### Features

- 4V drive
- Composite type, Facilitating high-density mounting
- ESD Diode-Protected Gate
- Pb-Free, Halogen Free and RoHS compliance

### Typical Applications

- LiB Protection Switch
- Motor Drive

### SPECIFICATIONS

**ABSOLUTE MAXIMUM RATING** at Ta = 25°C (Note 1)

Parameter	Symbol	Value	Unit
Drain to Source Voltage	VDSS	30	V
Gate to Source Voltage	VGSS	±20	V
Drain Current (DC)	ID	7	A
Drain Current (Pulse) PW ≤ 10μs, duty cycle ≤ 1%	IDP	40	A
Power Dissipation When mounted on ceramic substrate (900mm <sup>2</sup> × 0.8mm) 1unit	PD	1.3	W
Total Dissipation When mounted on ceramic substrate (900mm <sup>2</sup> × 0.8mm)	PT	1.5	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 to +150	°C

Note 1 : 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 RESISTANCE RATINGS

Parameter	Symbol	Value	Unit
Junction to Ambient When mounted on ceramic substrate (900mm <sup>2</sup> × 0.8mm) 1unit	RθJA	96.1	°C/W

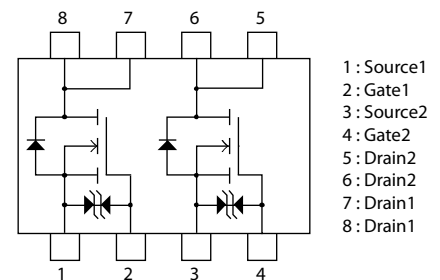


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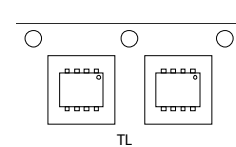
www.onsemi.com

VDSS	RDS(on) Max	ID Max
30V	24mΩ@ 10V	7A
	41mΩ@ 4.5V	
	55mΩ@ 4V	

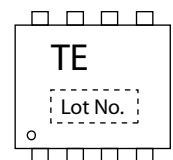
### ELECTRICAL CONNECTION N-Channel



### PACKING TYPE : TL



### MARKING



### ORDERING INFORMATION

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

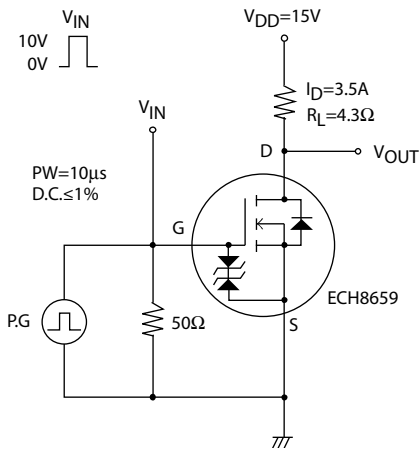
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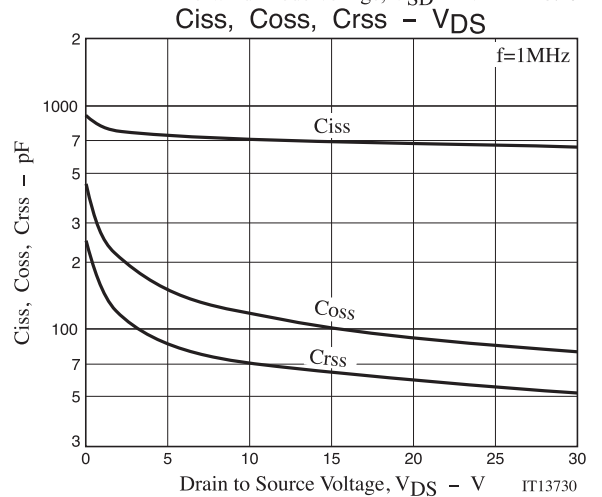
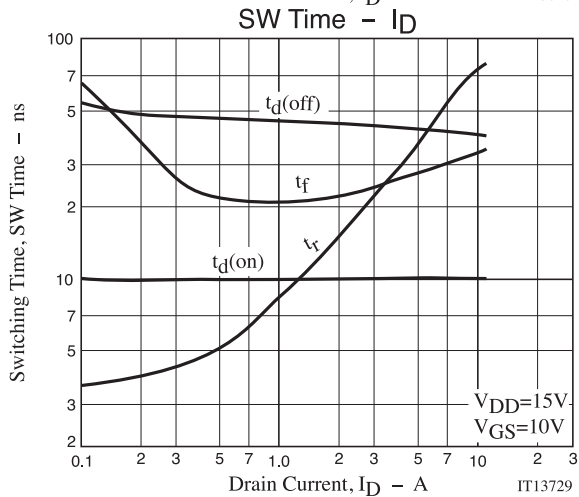
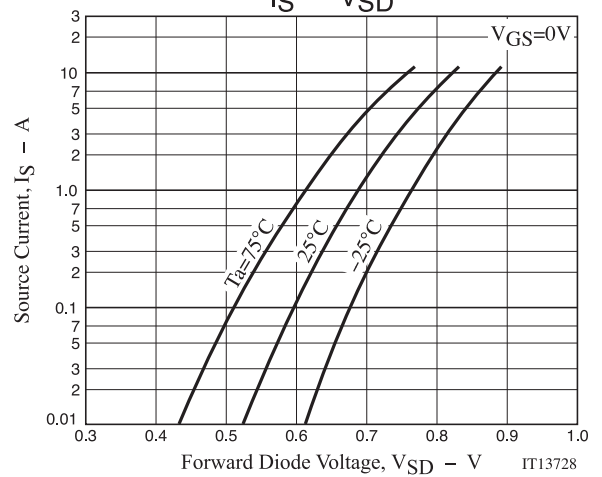
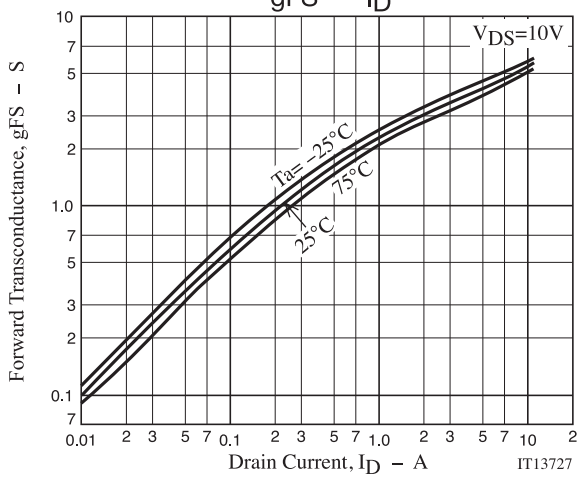
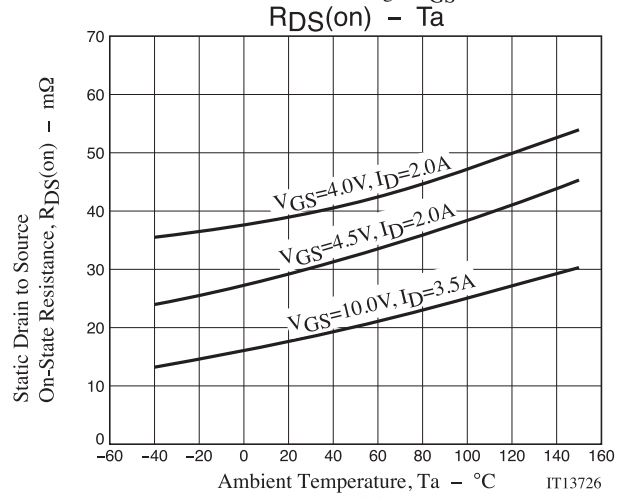
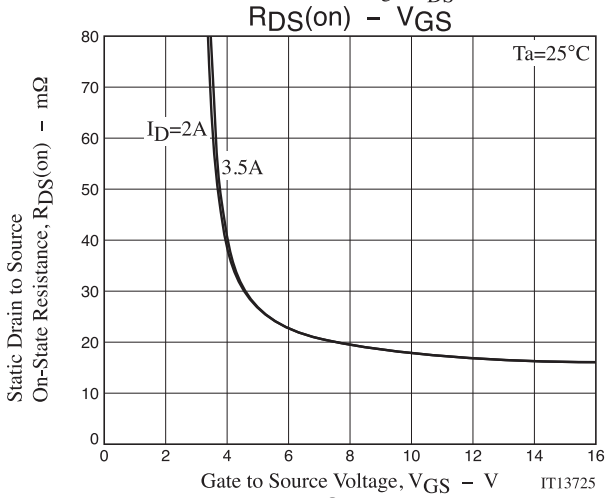
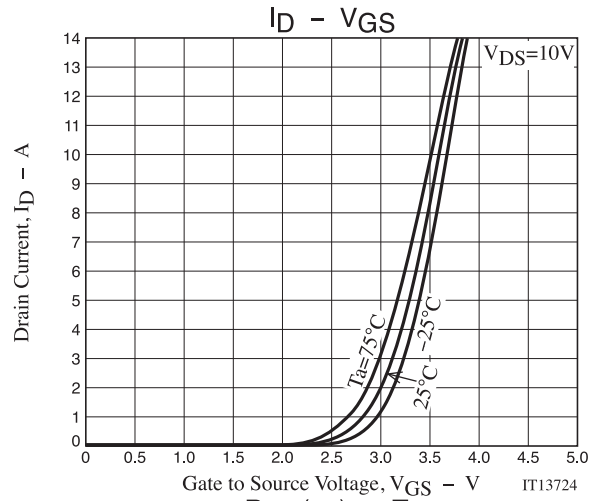
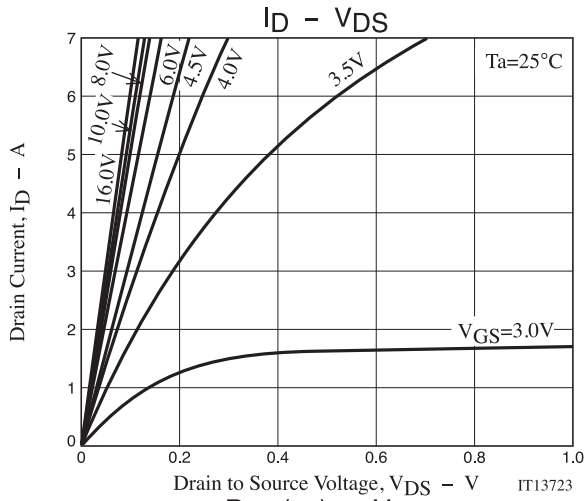
## ELECTRICAL CHARACTERISTICS at Ta = 25°C (Note 2)

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	V(BR)DSS	I <sub>D</sub> =1mA, V <sub>GS</sub> =0V	30			V
Zero-Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V			1	μA
Gate to Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±16V, V <sub>DS</sub> =0V			±10	μA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =1mA	1.2		2.6	V
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =3.5A	2.2	3.7		S
Static Drain to Source On-State Resistance	R <sub>DS(on)1</sub>	I <sub>D</sub> =3.5A, V <sub>GS</sub> =10V		18	24	mΩ
	R <sub>DS(on)2</sub>	I <sub>D</sub> =2A, V <sub>GS</sub> =4.5V		29	41	mΩ
	R <sub>DS(on)3</sub>	I <sub>D</sub> =2A, V <sub>GS</sub> =4V		39	55	mΩ
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, f=1MHz		710		pF
Output Capacitance	C <sub>oss</sub>			120		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			72		pF
Turn-ON Delay Time	t <sub>d(on)</sub>		See specified Test Circuit		10	
Rise Time	t <sub>r</sub>			25		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>			43		ns
Fall Time	t <sub>f</sub>			25		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =3.5A			11.8	
Gate to Source Charge	Q <sub>gs</sub>			2.4		nC
Gate to Drain "Miller" Charge	Q <sub>gd</sub>			2.0		nC
Forward Diode Voltage	V <sub>S</sub> D	I <sub>S</sub> =7A, V <sub>GS</sub> =0V		0.79	1.2	V

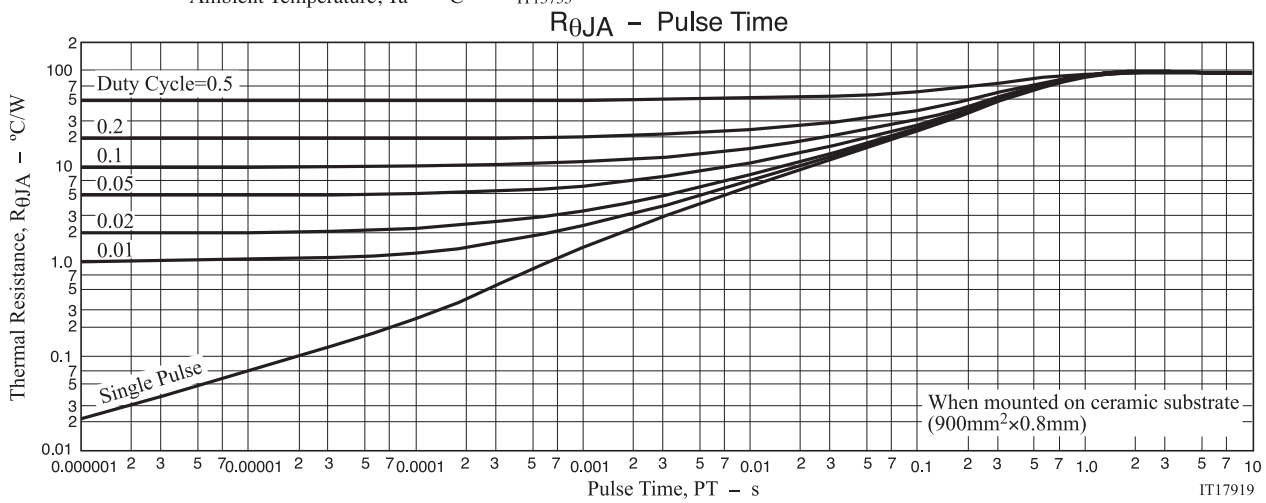
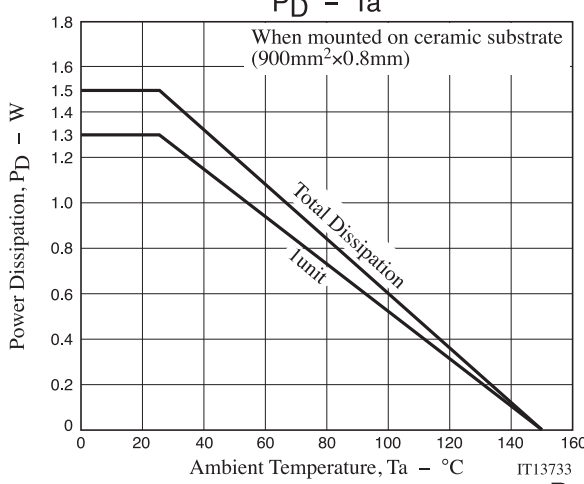
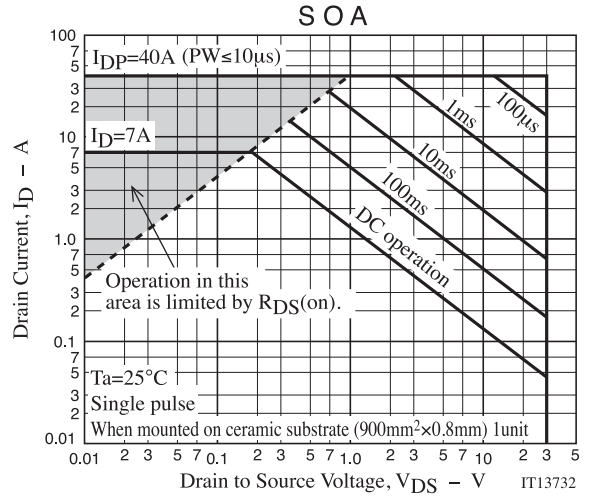
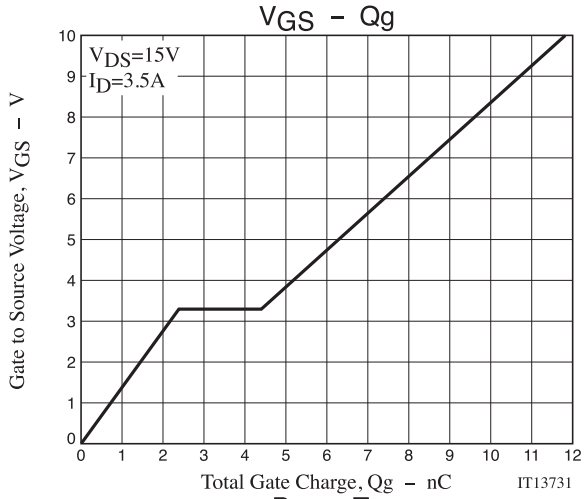
Note 2 : Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

### Switching Time Test Circuit





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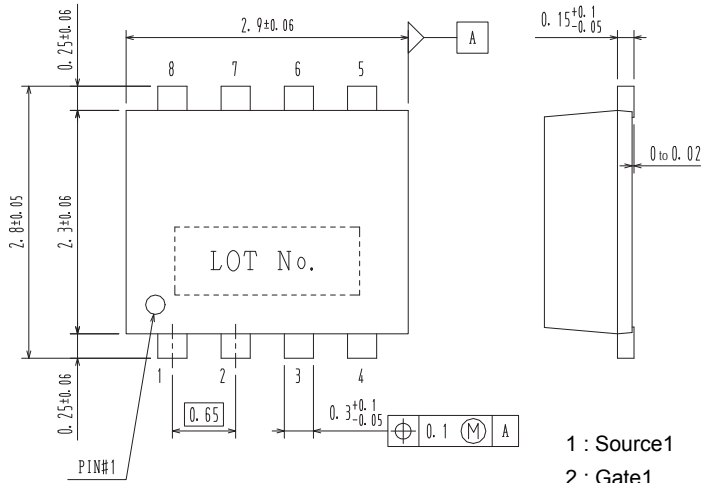


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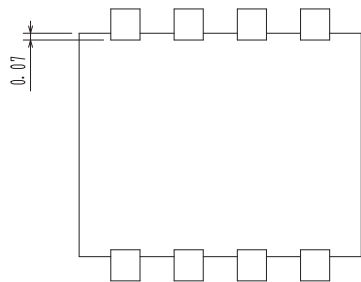
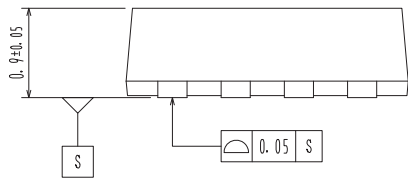
## PACKAGE DIMENSIONS

unit : mm

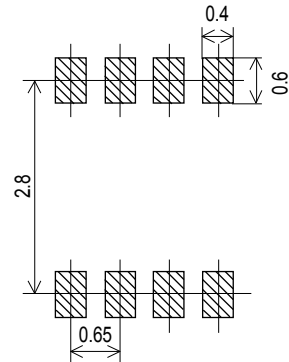
SOT-28FL / ECH8  
CASE 318BF  
ISSUE O



- 1 : Source1
- 2 : Gate1
- 3 : Source2
- 4 : Gate2
- 5 : Drain2
- 6 : Drain2
- 7 : Drain1
- 8 : Drain1



### Recommended Soldering Footprint



## ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
ECH8659-TL-H	TE	SOT-28FL / ECH8 (Pb-Free / Halogen Free)	3,000 / Tape & Reel
ECH8659-TL-W			

† 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. [http://www.onsemi.com/pub\\_link/Collateral/BRD8011-D.PDF](http://www.onsemi.com/pub_link/Collateral/BRD8011-D.PDF)

Note on usage : Since the ECH8659 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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