

# 1HP04CH

## Small Signal MOSFET –100V, 18Ω, –170mA, Single P-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

- High Voltage (100V)
- 4V drive
- High Speed Switching and Low Loss
- ESD Diode-Protected Gate
- Pb-Free, Halogen Free and RoHS compliance

### Typical Applications

- Lithium-ion Battery Charging and Discharging Cell Balance

### SPECIFICATIONS

**ABSOLUTE MAXIMUM RATING** at  $T_a = 25^\circ\text{C}$  (Note 1)

Parameter	Symbol	Value	Unit
Drain to Source Voltage	$V_{DS}$	–100	V
Gate to Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current (DC)	$I_D$	–170	mA
Drain Current (Pulse) $PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	$I_{DP}$	–680	mA
Power Dissipation When mounted on ceramic substrate ( $900\text{mm}^2 \times 0.8\text{mm}$ )	$P_D$	0.6	W
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	–55 to +150	$^\circ\text{C}$

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 ( $900\text{mm}^2 \times 0.8\text{mm}$ )	$R_{\theta JA}$	208	$^\circ\text{C/W}$

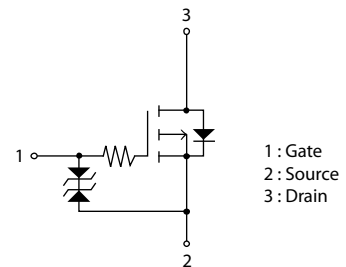


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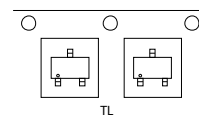
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$V_{DS}$	$R_{DS(on)}$ Max	$I_D$ Max
–100V	18Ω@ –10V	–170mA
	21Ω@ –4V	

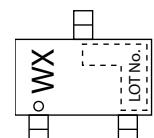
### ELECTRICAL CONNECTION P-Channel



### PACKING TYPE : TL



### MARKING



### ORDERING INFORMATION

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

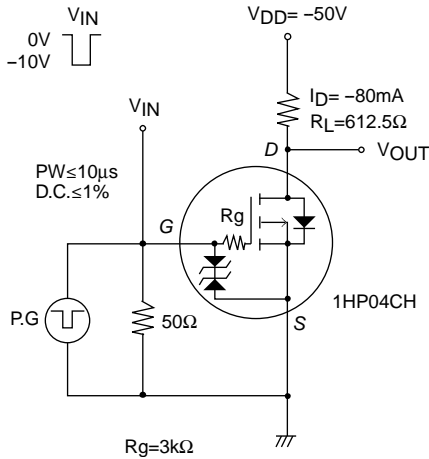
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## ELECTRICAL CHARACTERISTICS at Ta = 25°C (Note 2)

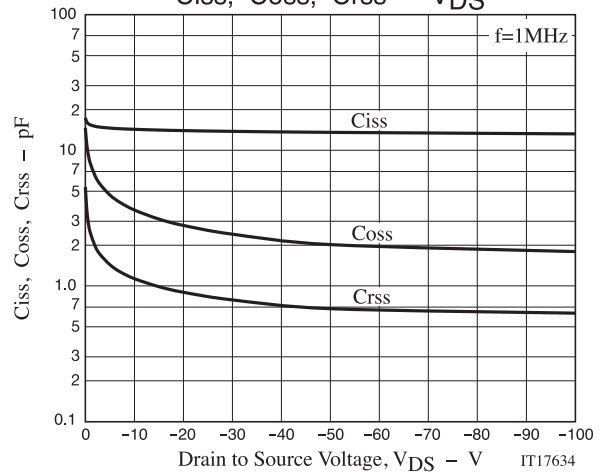
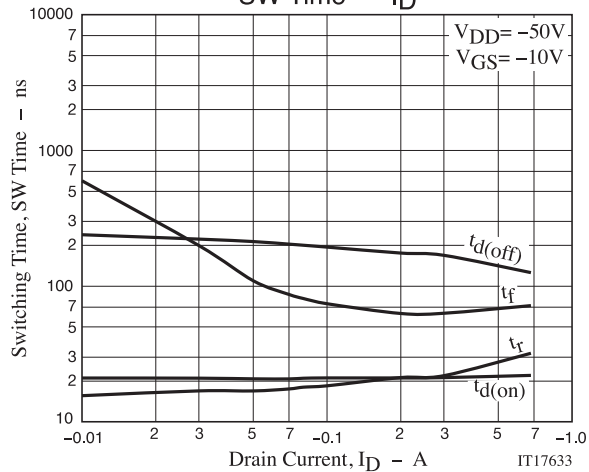
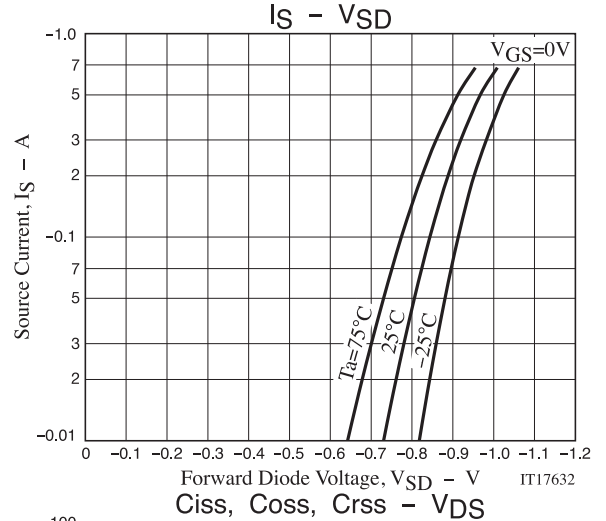
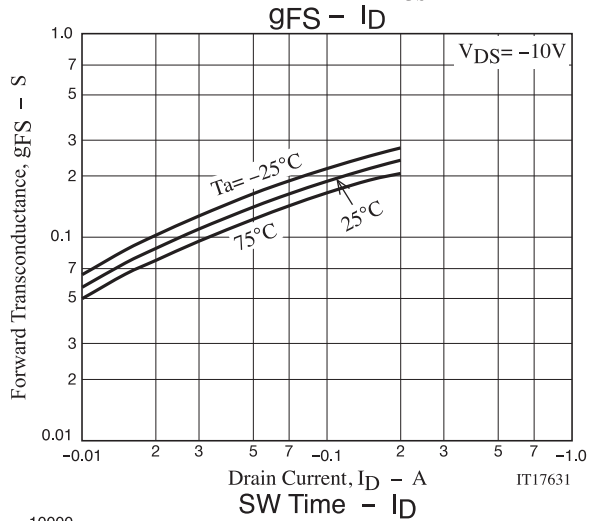
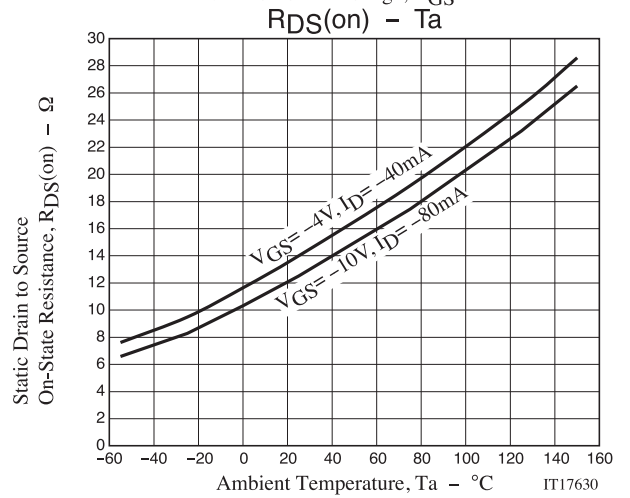
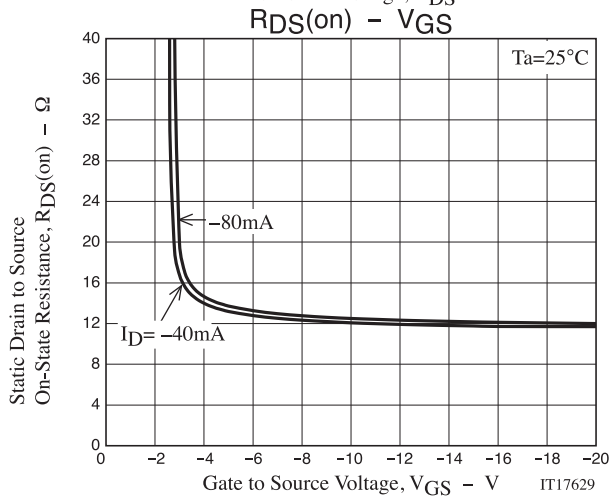
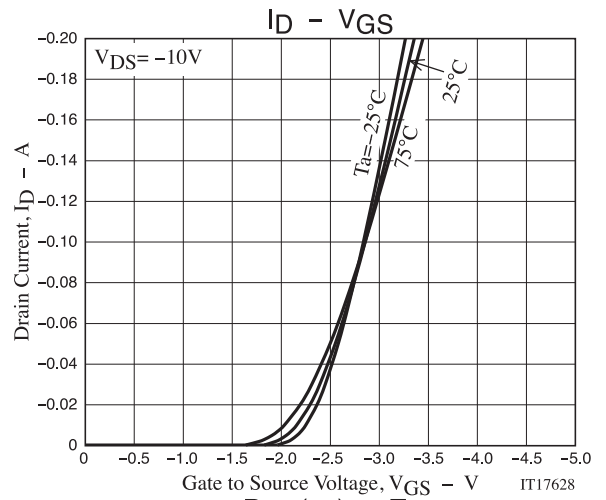
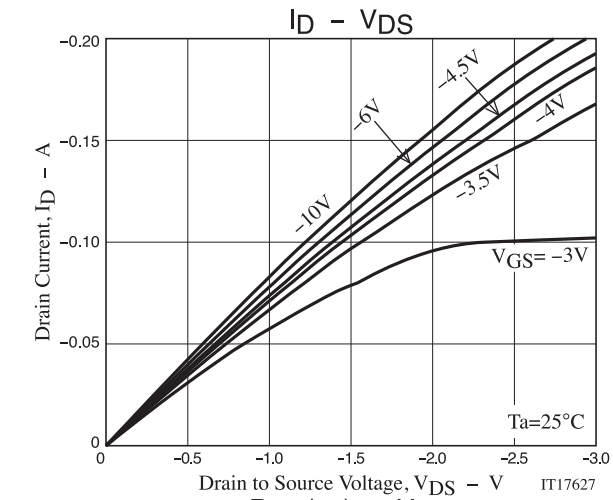
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	V(BR)DSS	I <sub>D</sub> =-1mA, V <sub>GS</sub> =0V	-100			V
Zero-Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V			-1	μA
Gate to Source Leakage Current	I <sub>GSS</sub>	V <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> =-100μA	-1.2		-2.6	V
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-80mA		170		mS
Static Drain to Source On-State Resistance	R <sub>DS(on)1</sub>	I <sub>D</sub> =-80mA, V <sub>GS</sub> =-10V		12.5	18	Ω
	R <sub>DS(on)2</sub>	I <sub>D</sub> =-40mA, V <sub>GS</sub> =-4V		14	21	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-20V, f=1MHz		14		pF
Output Capacitance	C <sub>oss</sub>			2.8		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			0.9		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	See specified Test Circuit		21		ns
Rise Time	t <sub>r</sub>			18		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>			200		ns
Fall Time	t <sub>f</sub>			81		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-50V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-170mA		0.9		nC
Gate to Source Charge	Q <sub>gs</sub>			0.14		nC
Gate to Drain "Miller" Charge	Q <sub>gd</sub>			0.27		nC
Forward Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> =-170mA, V <sub>GS</sub> =0V		-0.88	-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.

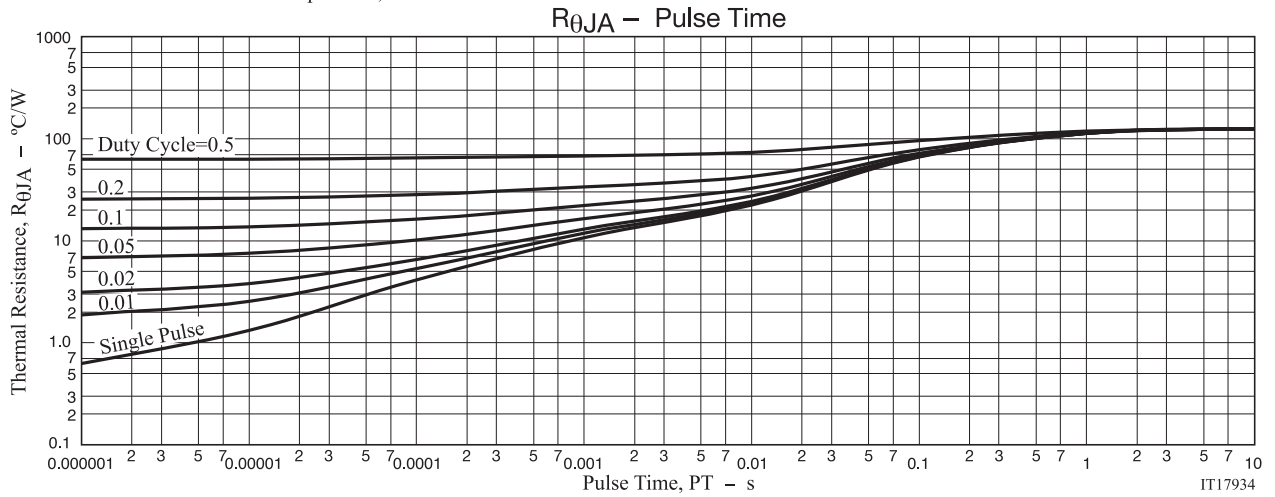
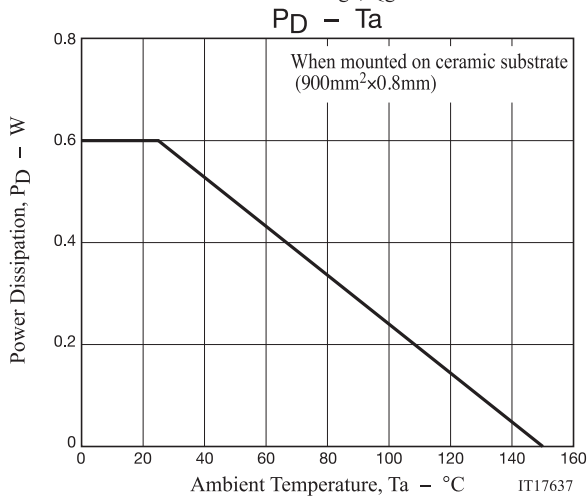
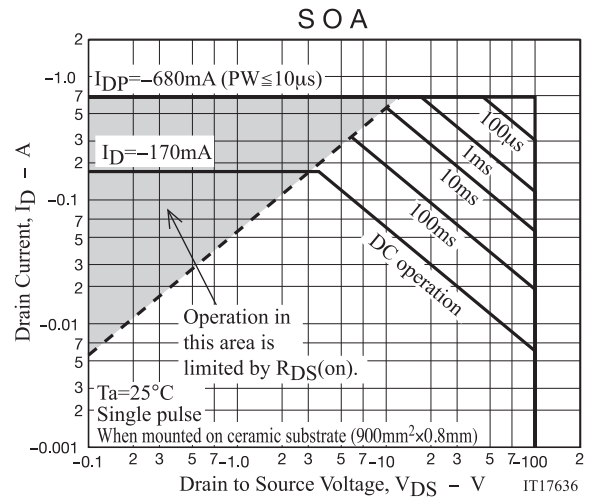
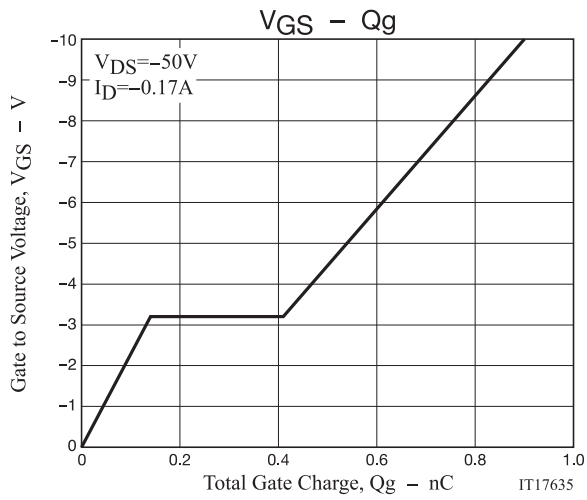
## Switching Time Test Circuit



# 1HP04CH



# 1HP04CH

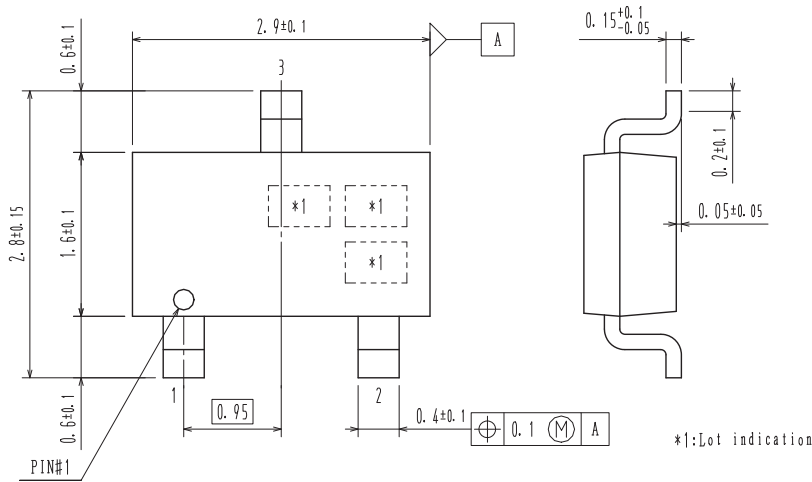


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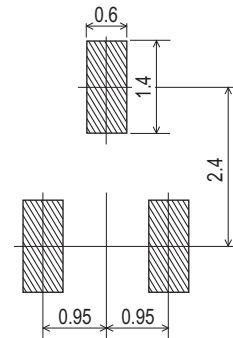
## PACKAGE DIMENSIONS

unit : mm

CPH3  
CASE 318BA  
ISSUE O



## Recommended Soldering Footprint



## ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
1HP04CH-TL-W	WX	CPH3 SC-59, SOT-23, TO-236 (Pb-Free / Halogen Free)	3,000 / 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. [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 1HP04CH is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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