



ON Semiconductor®

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# MCH6431

## Power MOSFET 30V, 55mΩ, 5A, Single N-Channel

### Features

- Low On-Resistance
- 4V Drive
- ESD Diode-Protected Gate
- Pb-Free, Halogen Free and RoHS Compliance

### Specifications

**Absolute Maximum Ratings** at Ta = 25°C

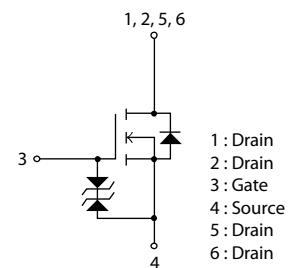
Parameter	Symbol	Value	Unit
Drain to Source Voltage	V <sub>DSS</sub>	30	V
Gate to Source Voltage	V <sub>GSS</sub>	±20	V
Drain Current (DC)	I <sub>D</sub>	5	A
Drain Current (Pulse) PW≤10μs, duty cycle≤1%	I <sub>DP</sub>	20	A
Power Dissipation When mounted on ceramic substrate (1200mm <sup>2</sup> × 0.8mm)	P <sub>D</sub>	1.5	W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55 to +150	°C

### Thermal Resistance Ratings

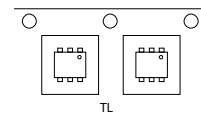
Parameter	Symbol	Value	Unit
Junction to Ambient When mounted on ceramic substrate (1200mm <sup>2</sup> × 0.8mm)	R <sub>θJA</sub>	83.3	°C/W

V <sub>DSS</sub>	R <sub>DS(on)</sub> Max	I <sub>D</sub> Max
30V	55mΩ@ 10V	5A
	91mΩ@ 4.5V	
	109mΩ@ 4V	

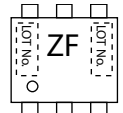
### Electrical Connection N-Channel



### Packing Type : TL



### Marking



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

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

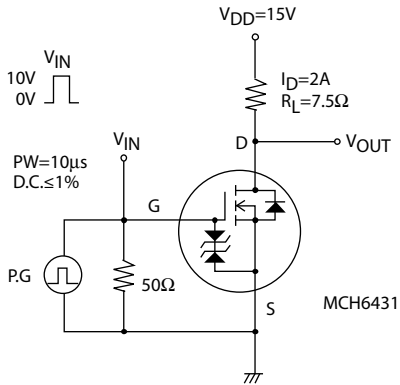
# MCH6431

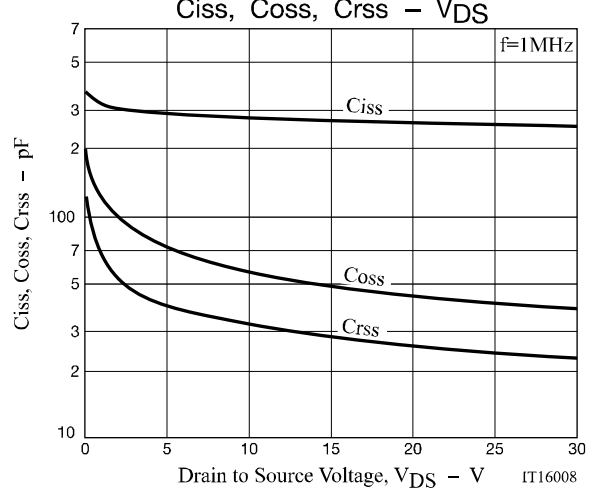
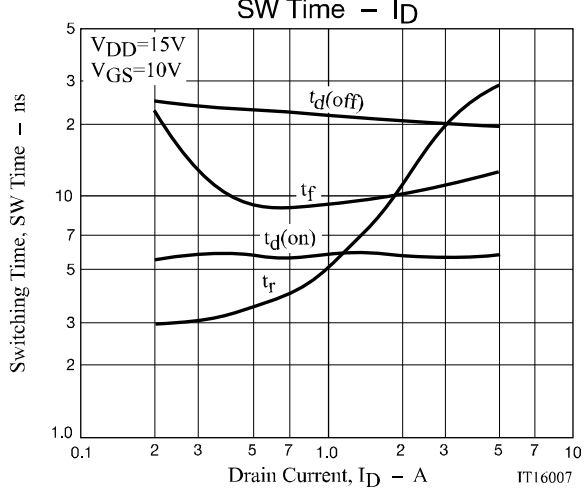
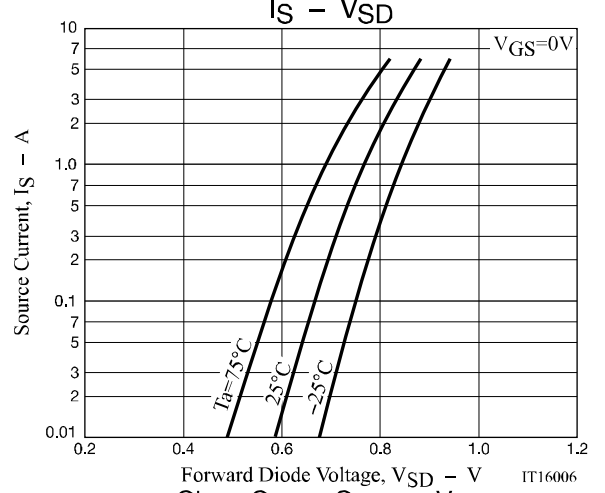
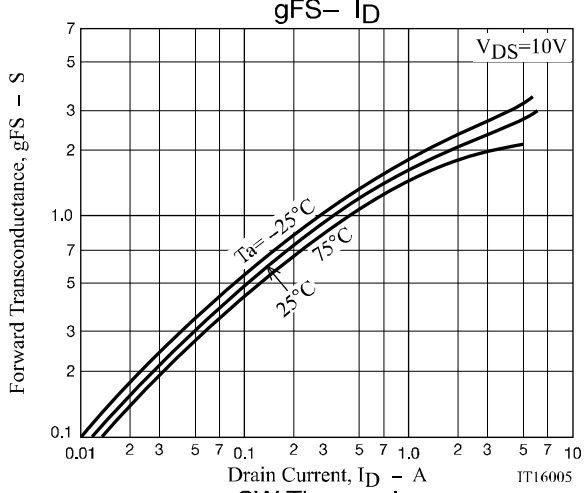
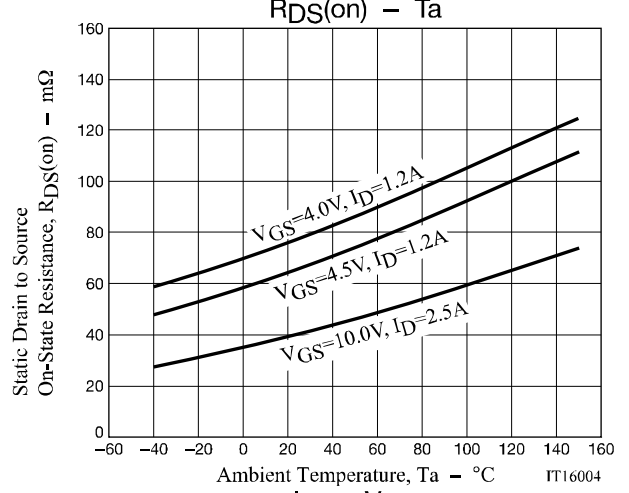
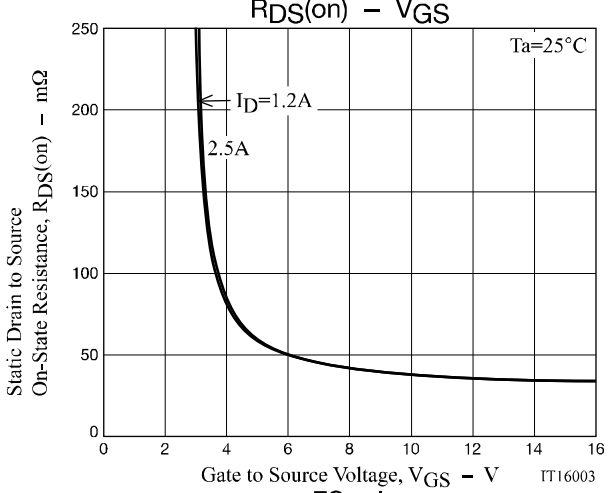
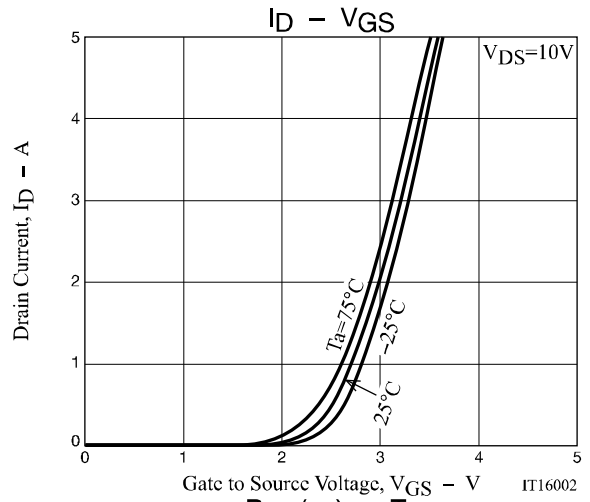
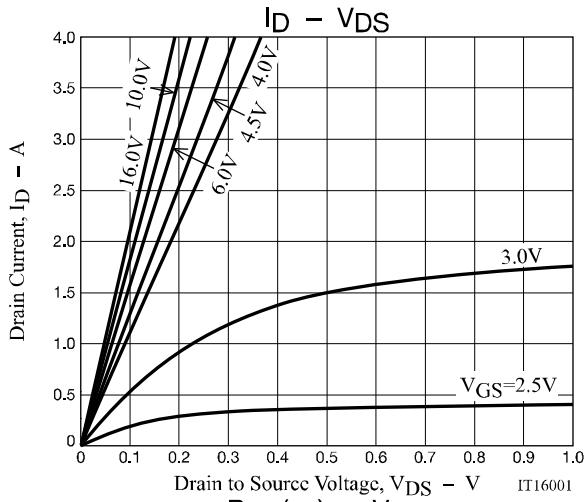
## Electrical Characteristics at $T_a = 25^\circ\text{C}$

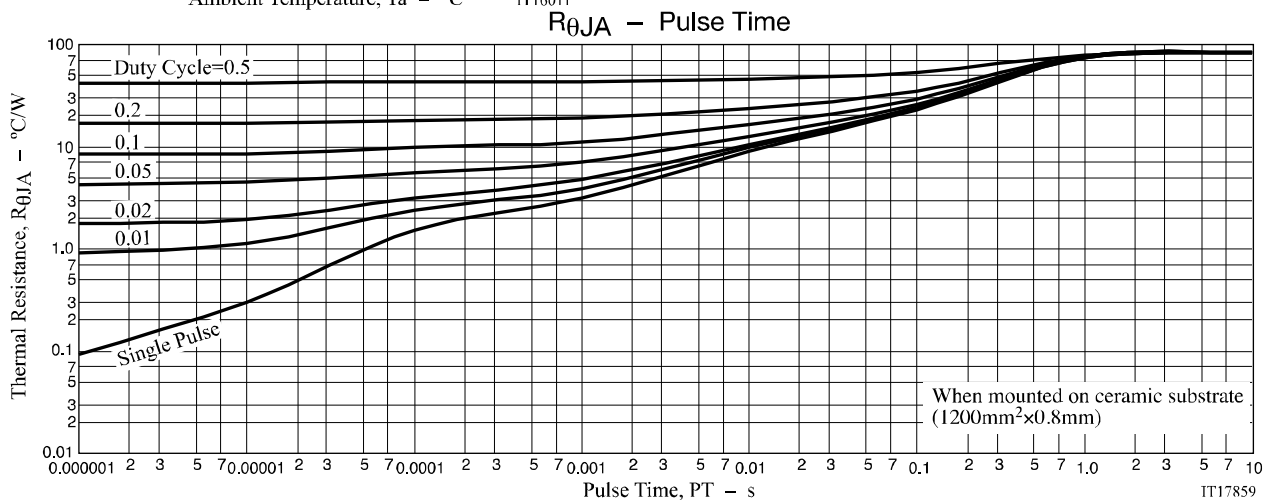
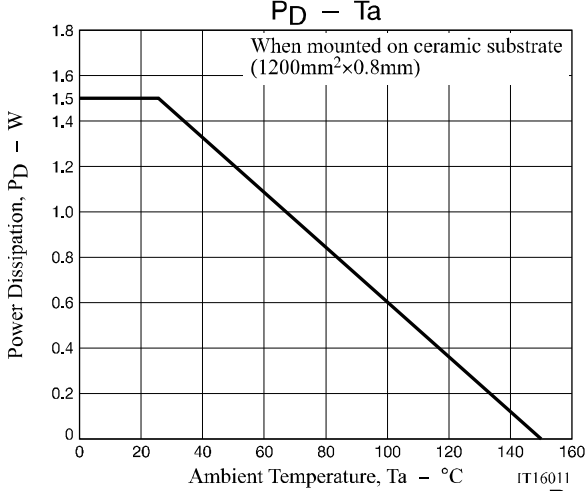
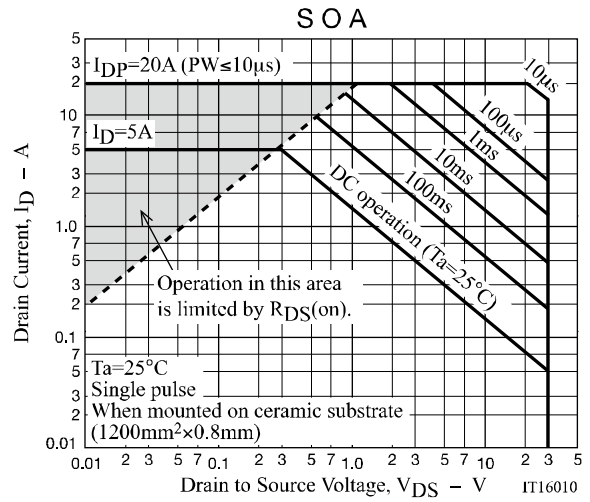
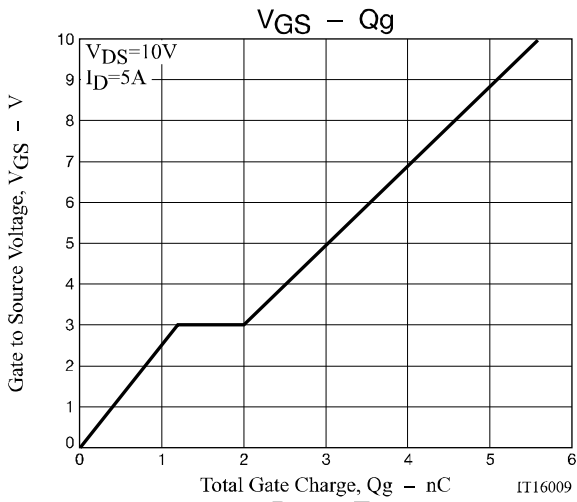
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=1\text{mA}, V_{GS}=0\text{V}$	30			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 16\text{V}, V_{DS}=0\text{V}$			$\pm 10$	$\mu\text{A}$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=10\text{V}, I_D=1\text{mA}$	1.2		2.6	V
Forward Transconductance	$g_{FS}$	$V_{DS}=10\text{V}, I_D=2.5\text{A}$		2.2		S
Static Drain to Source On-State Resistance	$R_{DS(on)1}$	$I_D=2.5\text{A}, V_{GS}=10\text{V}$		42	55	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D=1.2\text{A}, V_{GS}=4.5\text{V}$		65	91	$\text{m}\Omega$
	$R_{DS(on)3}$	$I_D=1.2\text{A}, V_{GS}=4\text{V}$		78	109	$\text{m}\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=10\text{V}, f=1\text{MHz}$		280		pF
Output Capacitance	$C_{oss}$			60		pF
Reverse Transfer Capacitance	$C_{rss}$			30		pF
Turn-ON Delay Time	$t_{d(on)}$			5.7		ns
Rise Time	$t_r$	See specified Test Circuit		11		ns
Turn-OFF Delay Time	$t_{d(off)}$			21		ns
Fall Time	$t_f$			10		ns
Total Gate Charge	$Q_g$	$V_{DS}=15\text{V}, V_{GS}=10\text{V}, I_D=5\text{A}$		5.6		nC
Gate to Source Charge	$Q_{gs}$			1.2		nC
Gate to Drain "Miller" Charge	$Q_{gd}$			0.8		nC
Forward Diode Voltage	$V_{SD}$		$I_S=5\text{A}, V_{GS}=0\text{V}$		0.85	1.2

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







# MCH6431

## Package Dimensions

MCH6431-TL-H / MCH6431-TL-W

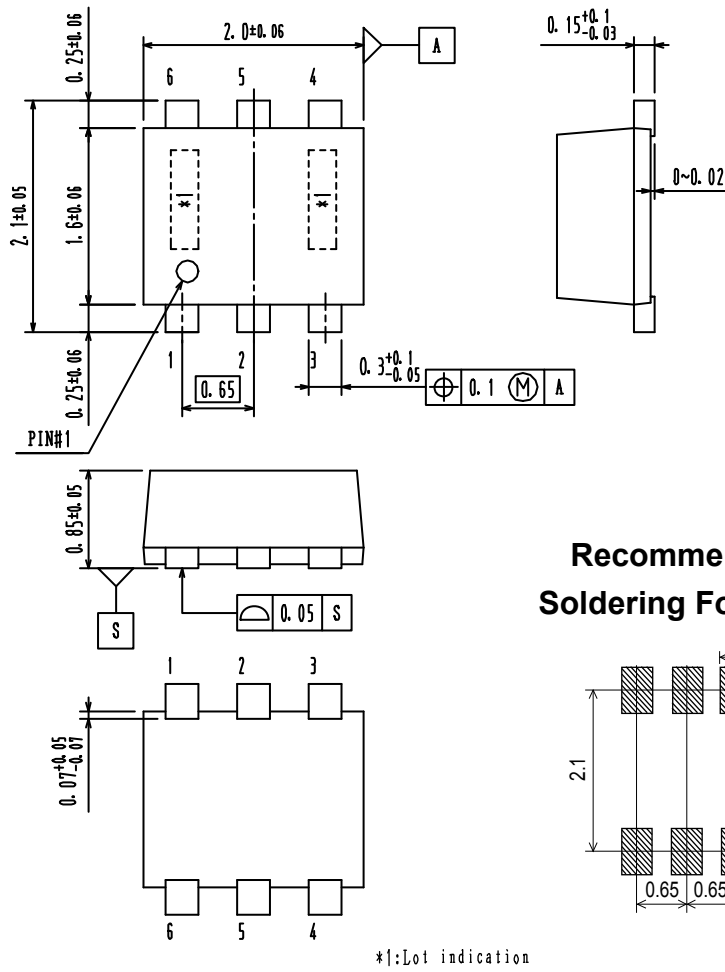
### MCPH6

CASE 419AS

ISSUE O

unit : mm

- 1 : Drain
- 2 : Drain
- 3 : Gate
- 4 : Source
- 5 : Drain
- 6 : Drain



### Recommended Soldering Footprint

## ORDERING INFORMATION

Device	Package	Shipping	Note
MCH6431-TL-H	MCPH6	3,000 pcs. / Tape & Reel	Pb-Free and Halogen Free
MCH6431-TL-W	SC-88FL, SC-70-6, SOT-363		

† 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 MCH6431 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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