

# MCH6437

## Power MOSFET 20V, 24mΩ, 7A, Single N-Channel



ON Semiconductor®

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### Features

- Low On-Resistance
- 1.8V Drive
- ESD Diode-Protected Gate
- Pb-Free and RoHS Compliance

### Specifications

**Absolute Maximum Ratings** at  $T_a = 25^\circ\text{C}$

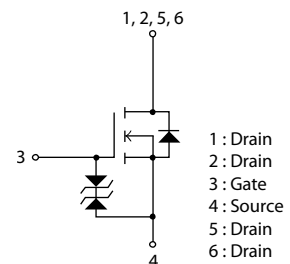
| Parameter                                                                                           | Symbol    | Value       | Unit             |
|-----------------------------------------------------------------------------------------------------|-----------|-------------|------------------|
| Drain to Source Voltage                                                                             | $V_{DS}$  | 20          | V                |
| Gate to Source Voltage                                                                              | $V_{GS}$  | $\pm 12$    | V                |
| Drain Current (DC)                                                                                  | $I_D$     | 7           | A                |
| Drain Current (Pulse)<br>$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$                            | $I_{DP}$  | 28          | A                |
| Power Dissipation<br>When mounted on ceramic substrate<br>( $1200\text{mm}^2 \times 0.8\text{mm}$ ) | $P_D$     | 1.5         | W                |
| Junction Temperature                                                                                | $T_J$     | 150         | $^\circ\text{C}$ |
| Storage Temperature                                                                                 | $T_{stg}$ | -55 to +150 | $^\circ\text{C}$ |

### Thermal Resistance Ratings

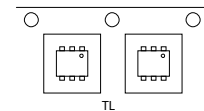
| Parameter                                                                                             | Symbol          | Value | Unit               |
|-------------------------------------------------------------------------------------------------------|-----------------|-------|--------------------|
| Junction to Ambient<br>When mounted on ceramic substrate<br>( $1200\text{mm}^2 \times 0.8\text{mm}$ ) | $R_{\theta JA}$ | 83.3  | $^\circ\text{C/W}$ |

| $V_{DS}$ | $R_{DS(on)}$ Max | $I_D$ Max |
|----------|------------------|-----------|
| 20V      | 24mΩ@ 4.5V       | 7A        |
|          | 35mΩ@ 2.5V       |           |
|          | 65mΩ@ 1.8V       |           |

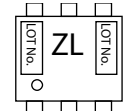
### Electrical Connection N-Channel



### 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.

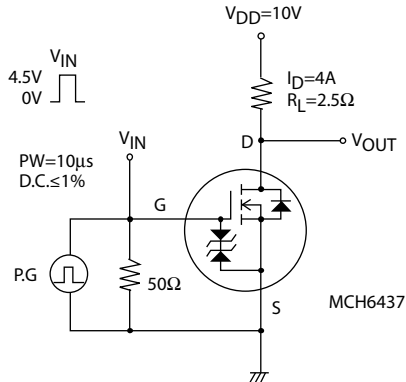
# MCH6437

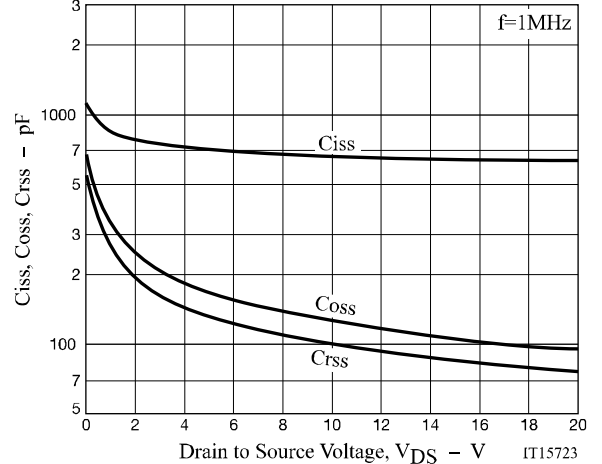
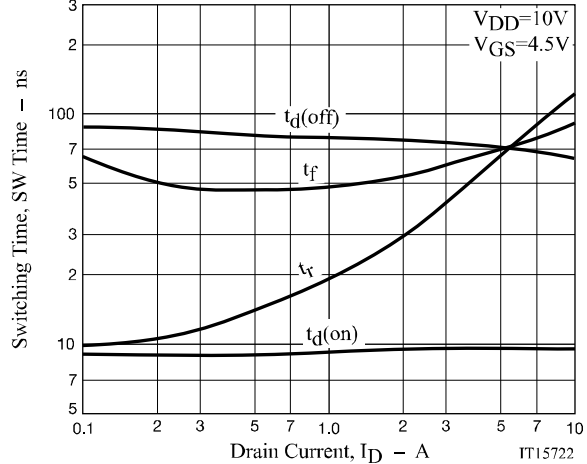
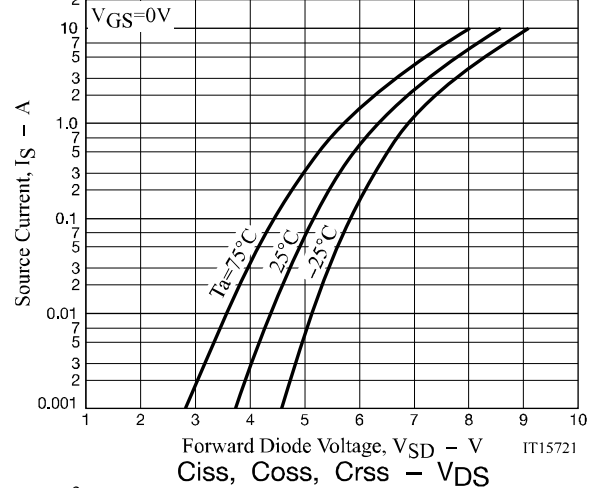
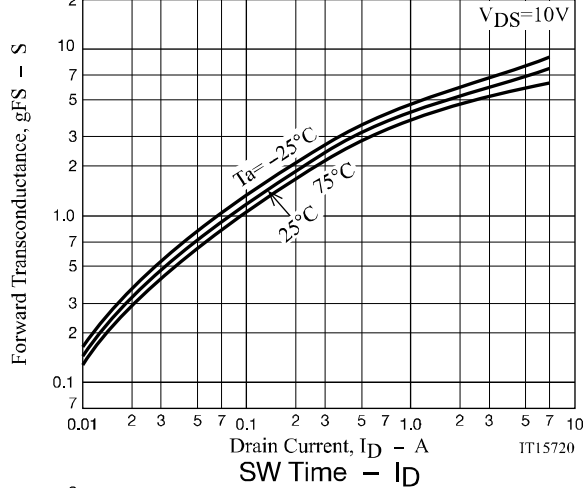
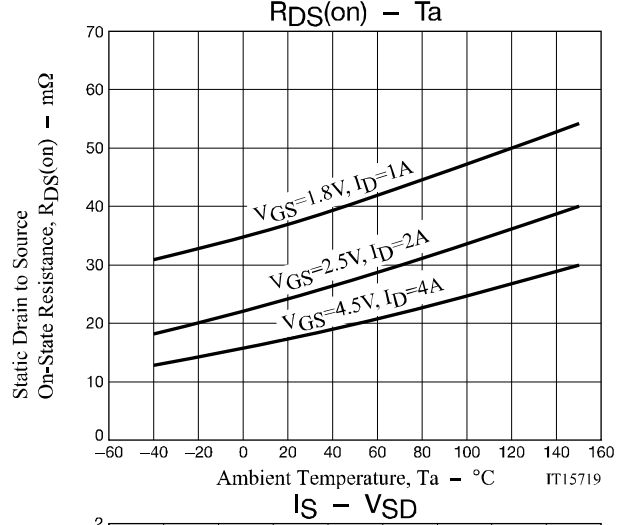
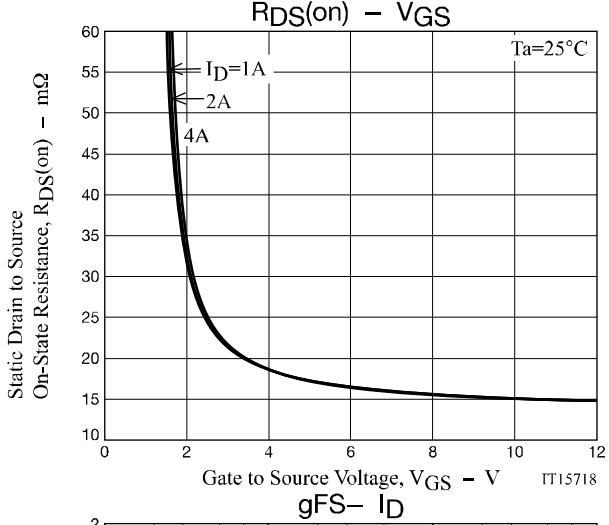
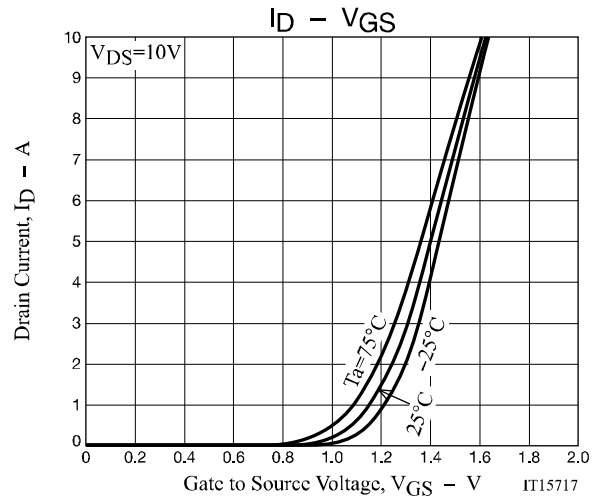
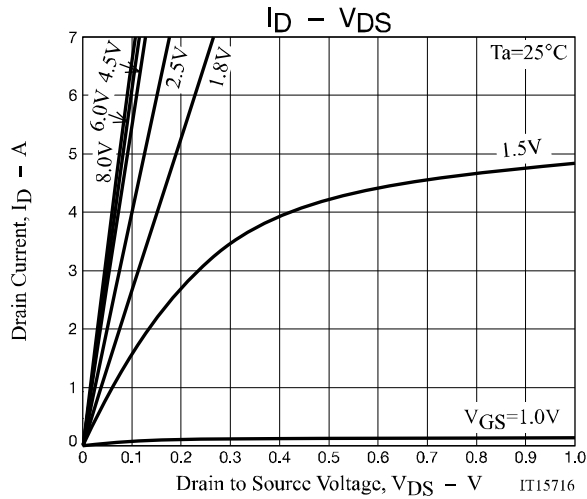
## Electrical Characteristics at $T_a = 25^\circ\text{C}$

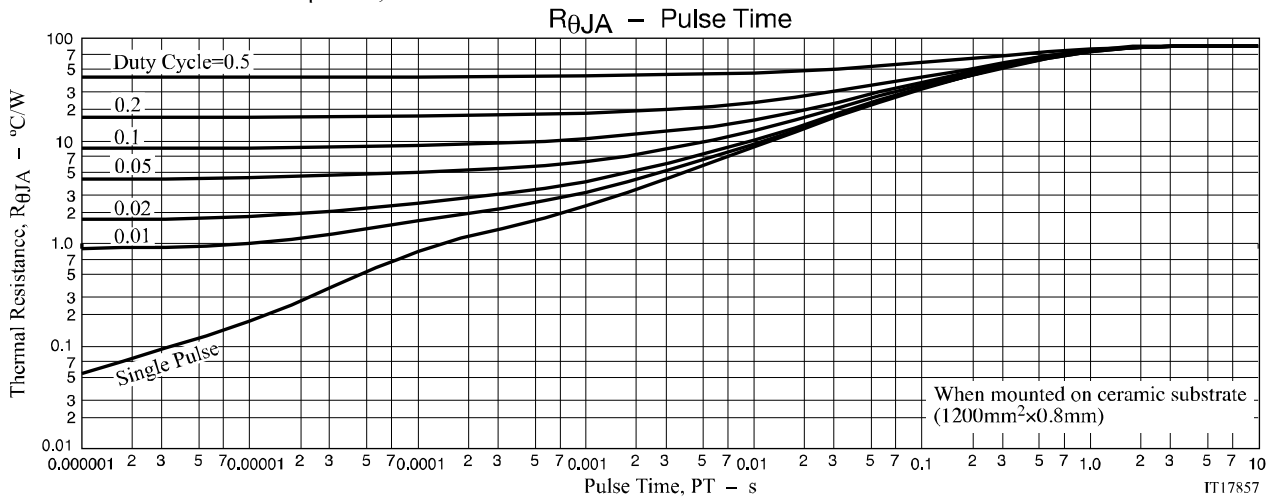
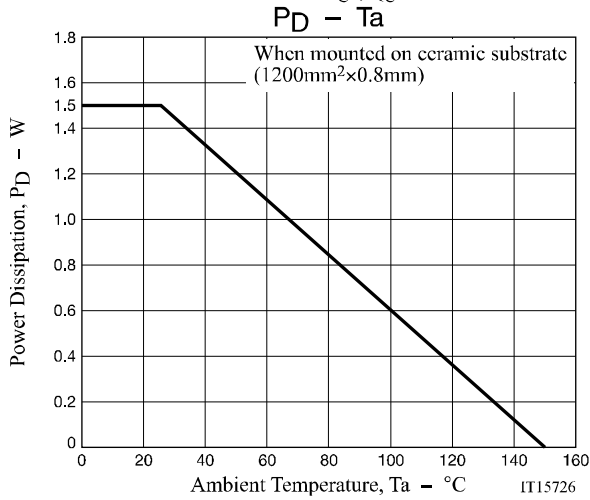
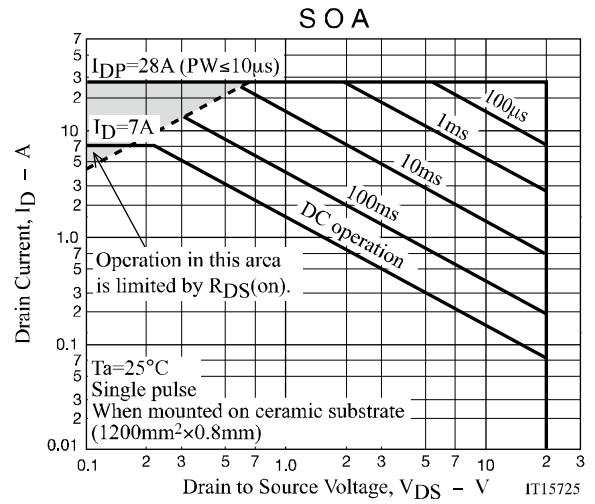
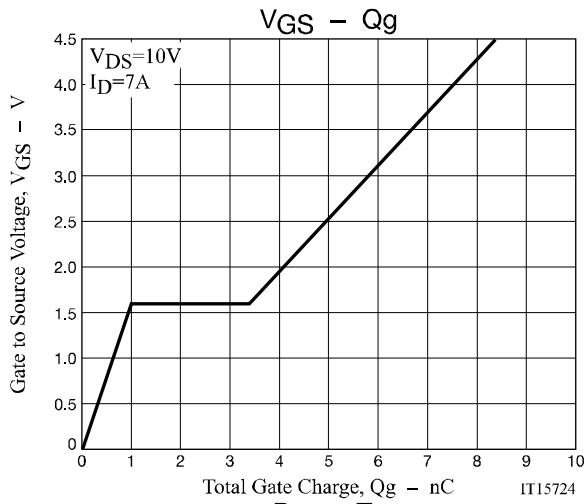
| Parameter                                  | Symbol        | Conditions                                                   | Value |      |          | Unit             |
|--------------------------------------------|---------------|--------------------------------------------------------------|-------|------|----------|------------------|
|                                            |               |                                                              | min   | typ  | max      |                  |
| Drain to Source Breakdown Voltage          | $V_{(BR)DSS}$ | $I_D=1\text{mA}$ , $V_{GS}=0\text{V}$                        | 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             | $I_{GSS}$     | $V_{GS}=\pm 8\text{V}$ , $V_{DS}=0\text{V}$                  |       |      | $\pm 10$ | $\mu\text{A}$    |
| Gate Threshold Voltage                     | $V_{GS(th)}$  | $V_{DS}=10\text{V}$ , $I_D=1\text{mA}$                       | 0.4   |      | 1.3      | V                |
| Forward Transconductance                   | $g_{FS}$      | $V_{DS}=10\text{V}$ , $I_D=4\text{A}$                        |       | 6.2  |          | S                |
| Static Drain to Source On-State Resistance | $R_{DS(on)1}$ | $I_D=4\text{A}$ , $V_{GS}=4.5\text{V}$                       |       | 18   | 24       | $\text{m}\Omega$ |
|                                            | $R_{DS(on)2}$ | $I_D=2\text{A}$ , $V_{GS}=2.5\text{V}$                       |       | 25   | 35       | $\text{m}\Omega$ |
|                                            | $R_{DS(on)3}$ | $I_D=1\text{A}$ , $V_{GS}=1.8\text{V}$                       |       | 38   | 65       | $\text{m}\Omega$ |
| Input Capacitance                          | $C_{iss}$     | $V_{DS}=10\text{V}$ , $f=1\text{MHz}$                        |       | 660  |          | pF               |
| Output Capacitance                         | $C_{oss}$     |                                                              |       | 125  |          | pF               |
| Reverse Transfer Capacitance               | $C_{rss}$     |                                                              |       | 100  |          | pF               |
| Turn-ON Delay Time                         | $t_{d(on)}$   | See specified Test Circuit                                   |       | 9.7  |          | ns               |
| Rise Time                                  | $t_r$         |                                                              |       | 53   |          | ns               |
| Turn-OFF Delay Time                        | $t_{d(off)}$  |                                                              |       | 72   |          | ns               |
| Fall Time                                  | $t_f$         |                                                              |       | 65   |          | ns               |
| Total Gate Charge                          | $Q_g$         | $V_{DS}=10\text{V}$ , $V_{GS}=4.5\text{V}$ , $I_D=7\text{A}$ |       | 8.4  |          | nC               |
| Gate to Source Charge                      | $Q_{gs}$      |                                                              |       | 1.0  |          | nC               |
| Gate to Drain "Miller" Charge              | $Q_{gd}$      |                                                              |       | 2.4  |          | nC               |
| Forward Diode Voltage                      | $V_{SD}$      | $I_S=7\text{A}$ , $V_{GS}=0\text{V}$                         |       | 0.81 | 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.

## Switching Time Test Circuit







## Package Dimensions

MCH6437-TL-E / MCH6437-TL-W

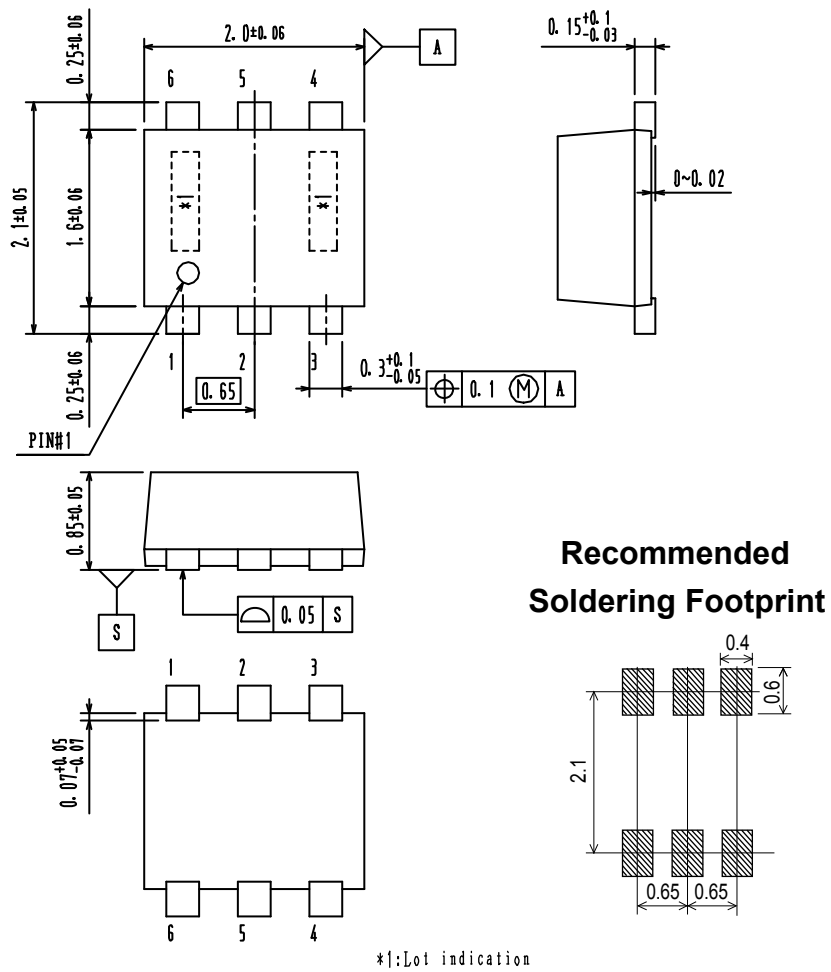
### MCPH6

CASE 419AS

ISSUE O

unit : mm

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



## ORDERING INFORMATION

| Device       | Package                            | Shipping                 | Note                        |
|--------------|------------------------------------|--------------------------|-----------------------------|
| MCH6437-TL-E | MCPH6<br>SC-88FL, SC-70-6, SOT-363 | 3,000 pcs. / Tape & Reel | Pb-Free                     |
| MCH6437-TL-W |                                    |                          | Pb-Free<br>and Halogen Free |

† 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 MCH6437 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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