# MCH3476

## Power MOSFET
## 20V, 125mΩ, 2A, Single N-Channel

ON Semiconductor®

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### Features

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

| $V_{DSS}$ | $R_{DS}$(on) Max | $I_D$ Max |
|---|---|---|
| 20V | 125mΩ@ 4.5V | 2A |
| | 190mΩ@ 2.5V | |
| | 310mΩ@ 1.8V | |

### Specifications

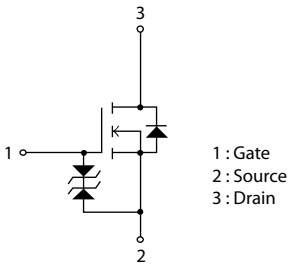
**Absolute Maximum Ratings** at Ta = 25°C

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain to Source Voltage | $V_{DSS}$ | 20 | V |
| Gate to Source Voltage | $V_{GSS}$ | ±12 | V |
| Drain Current (DC) | $I_D$ | 2 | A |
| Drain Current (Pulse)<br>PW≤10μs, duty cycle≤1% | $I_{DP}$ | 8 | A |
| Power Dissipation<br>When mounted on ceramic substrate<br>(900mm$^2$ × 0.8mm) | $P_D$ | 0.8 | W |
| Junction Temperature | Tj | 150 | °C |
| Storage Temperature | Tstg | –55 to +150 | °C |

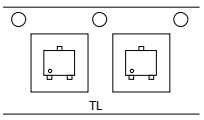
**Thermal Resistance Ratings**

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction to Ambient<br>When mounted on ceramic substrate<br>(900mm$^2$ × 0.8mm) | $R_{\theta JA}$ | 156.2 | °C/W |

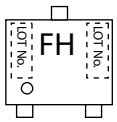
**Electrical Connection**
**N-Channel**




**Packing Type : TL**




**Marking**




FH : Device Code

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.

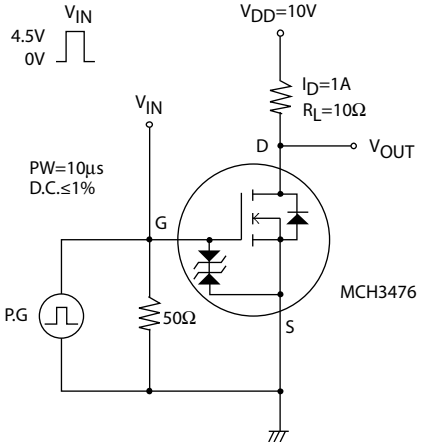
**ORDERING INFORMATION**
See detailed ordering and shipping information on page 5 of this data sheet.

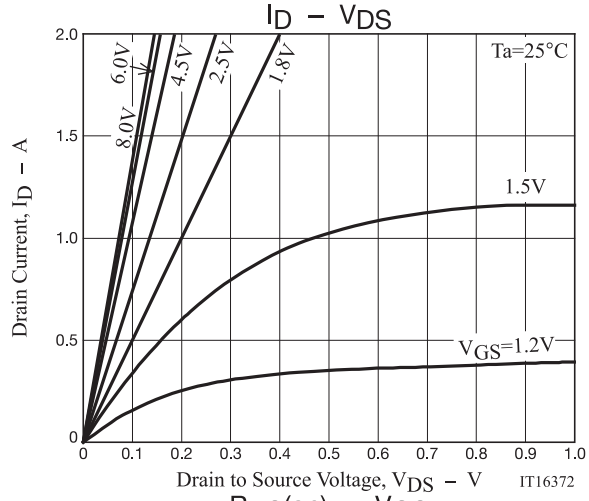
**Electrical Characteristics** at Ta = 25°C

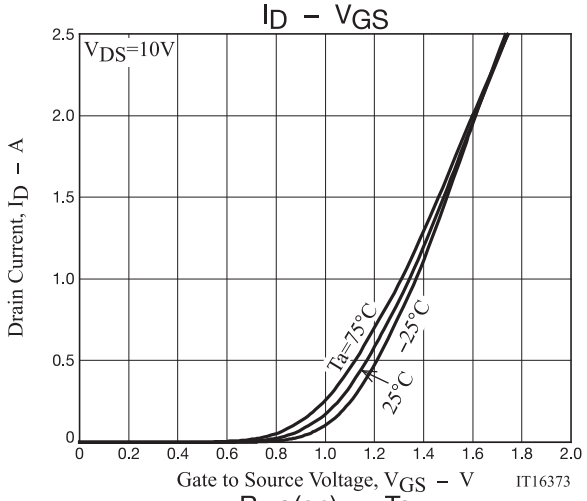
| Parameter | Symbol | Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$=1mA, $V_{GS}$=0V | 20 | | | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=20V, $V_{GS}$=0V | | | 1 | μA |
| Gate to Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±8V, $V_{DS}$=0V | | | ±10 | μA |
| Gate Threshold Voltage | $V_{GS}(th)$ | $V_{DS}$=10V, $I_D$=1mA | 0.4 | | 1.3 | V |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=10V, $I_D$=1A | | 1.9 | | S |
| Static Drain to Source On-State Resistance | $R_{DS}(on)1$ | $I_D$=1A, $V_{GS}$=4.5V | | 93 | 125 | mΩ |
| | $R_{DS}(on)2$ | $I_D$=0.5A, $V_{GS}$=2.5V | | 135 | 190 | mΩ |
| | $R_{DS}(on)3$ | $I_D$=0.3A, $V_{GS}$=1.8V | | 200 | 310 | mΩ |
| Input Capacitance | Ciss | $V_{DS}$=10V, f=1MHz | | 128 | | pF |
| Output Capacitance | Coss | | | 28 | | pF |
| Reverse Transfer Capacitance | Crss | | | 21 | | pF |
| Turn-ON Delay Time | $t_d(on)$ | See specified Test Circuit | | 5.1 | | ns |
| Rise Time | $t_r$ | | | 11 | | ns |
| Turn-OFF Delay Time | $t_d(off)$ | | | 14.5 | | ns |
| Fall Time | $t_f$ | | | 12 | | ns |
| Total Gate Charge | Qg | $V_{DS}$=10V, $V_{GS}$=4.5V, $I_D$=2A | | 1.8 | | nC |
| Gate to Source Charge | Qgs | | | 0.3 | | nC |
| Gate to Drain “Miller” Charge | Qgd | | | 0.55 | | nC |
| Forward Diode Voltage | $V_{SD}$ | $I_S$=2A, $V_{GS}$=0V | | 0.85 | 1.2 | V |

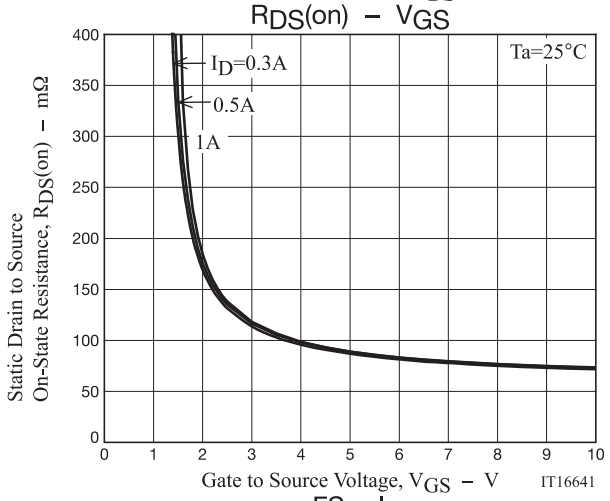
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

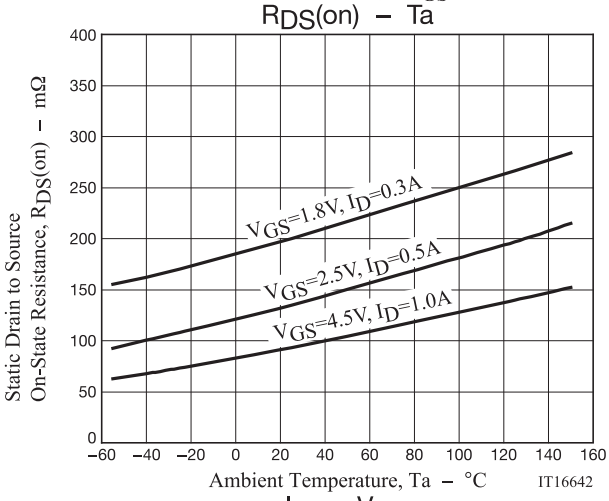
## Switching Time Test Circuit

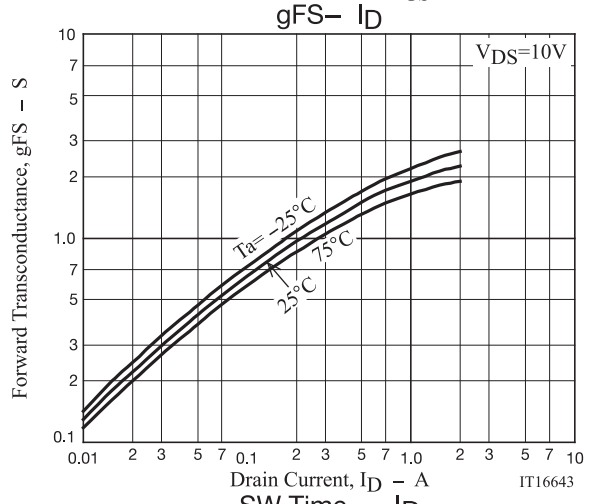


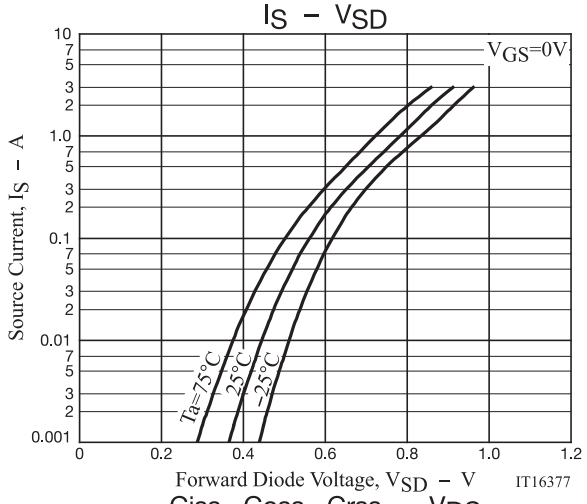

ID – VDS
Ta=25°C
6.0V
8.0V
4.5V
2.5V
1.8V
1.5V
VGS=1.2V
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT16372

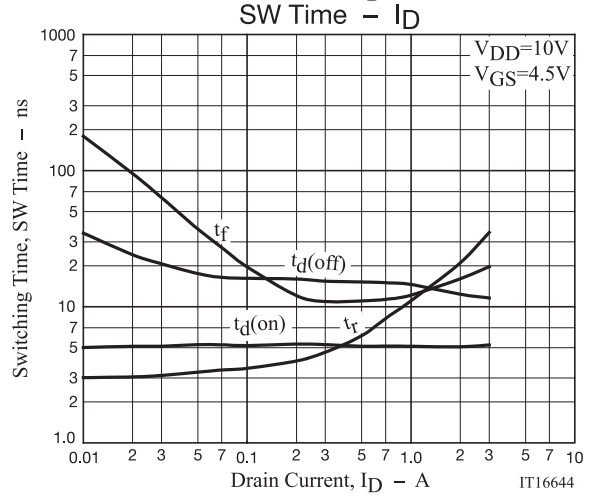

ID – VGS
VDS=10V
Ta=75°C
–25°C
25°C
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT16373

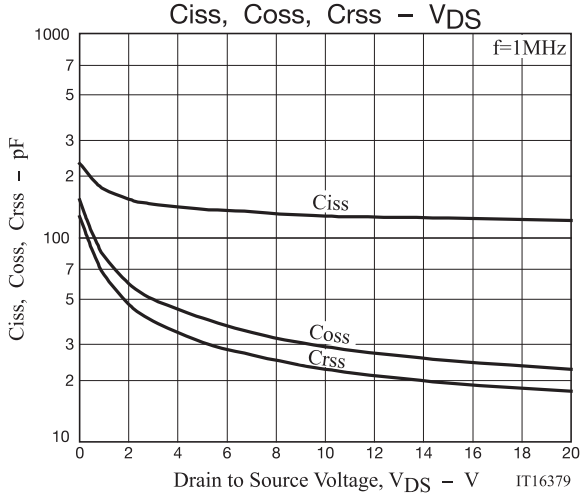

RDS(on) – VGS
Ta=25°C
ID=0.3A
0.5A
1A
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT16641

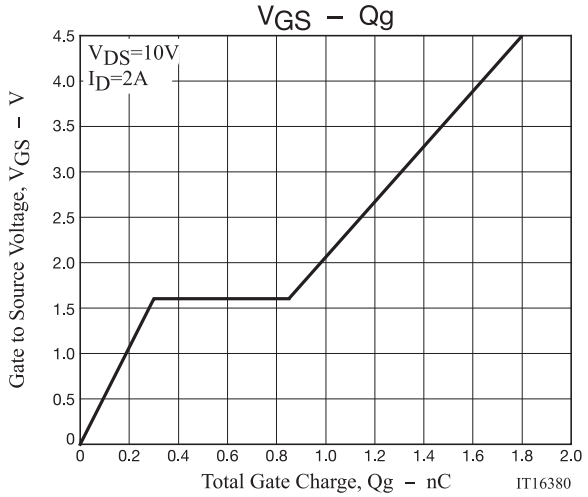

RDS(on) – Ta
VGS=1.8V, ID=0.3A
VGS=2.5V, ID=0.5A
VGS=4.5V, ID=1.0A
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT16642

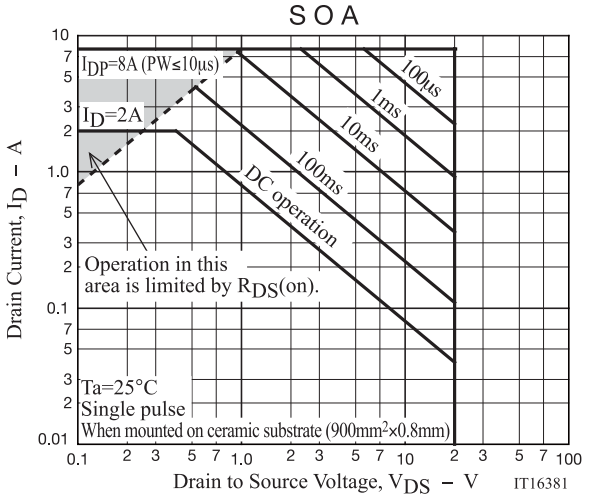

gFS– ID
VDS=10V
Ta= –25°C
75°C
25°C
Forward Transconductance, gFS – S
Drain Current, ID – A
IT16643

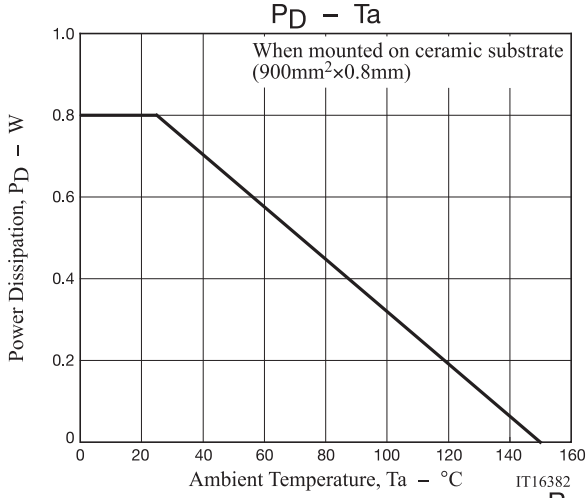

IS – VSD
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Forward Diode Voltage, VSD – V
IT16377

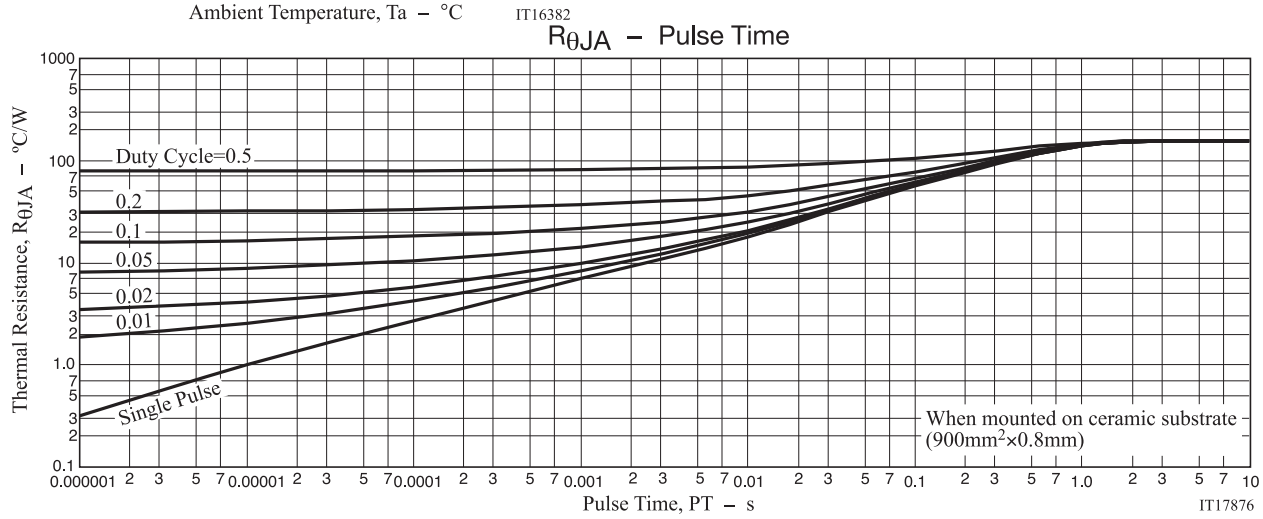

SW Time – ID
VDD=10V
VGS=4.5V
tf
td(off)
td(on)
tr
Switching Time, SW Time – ns
Drain Current, ID – A
IT16644


Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT16379


VGS – Qg
VDS=10V
ID=2A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT16380


S O A
IDP=8A (PW≤10μs)
ID=2A
100μs
1ms
10ms
100ms
DC operation
Operation in this
area is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (900mm2×0.8mm)
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT16381


PD – Ta
When mounted on ceramic substrate
(900mm2×0.8mm)
Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT16382


RθJA – Pulse Time
Duty Cycle=0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
When mounted on ceramic substrate
(900mm2×0.8mm)
Thermal Resistance, RθJA – °C/W
Pulse Time, PT – s
IT17876

## Package Dimensions

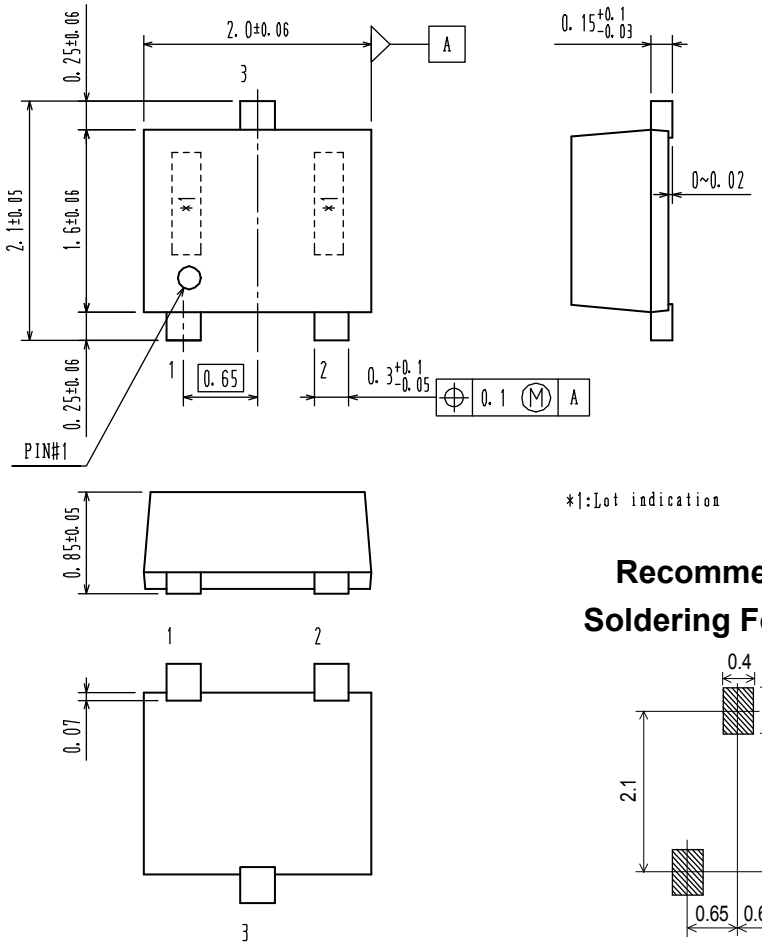
MCH3476-TL-H / MCH3476-TL-W

### MCPH3

CASE 419AQ
ISSUE O

unit : mm

1 : Gate
2 : Source
3 : Drain




### Recommended Soldering Footprint




## ORDERING INFORMATION

| Device | Package | Shipping | Note |
|---|---|---|---|
| MCH3476-TL-H | MCPH3<br>SC-70FL, SOT-323 | 3,000 pcs. / Tape & Reel | Pb-Free<br>and Halogen Free |
| MCH3476-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

Note on usage : Since the MCH3476 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

# Mouser Electronics

Authorized Distributor

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ON Semiconductor:

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