Ordering number : ENA1353B

MCH3478

N-Channel Power MOSFET
30V, 2A, 165mΩ, Single MCPH3

ON Semiconductor®
http://onsemi.com

Features

- Low ON-resistance
- 1.8V drive
- Protection diode in
- Ultrahigh speed switching
- Halogen free compliance

Specifications

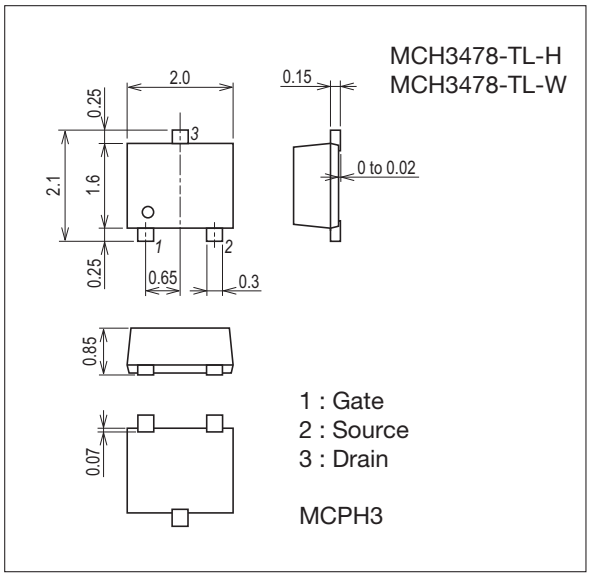
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain to Source Voltage	V_{DSS}		30	V
Gate to Source Voltage	V_{GSS}		±12	V
Drain Current (DC)	I_D		2	A
Drain Current (PW≤10s)	I_D	Duty cycle≤1%	2.5	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	8	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (900mm²×0.8mm)	0.8	W
		When mounted on ceramic substrate (900mm²×0.8mm), PW=10s	1.2	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Package Dimensions

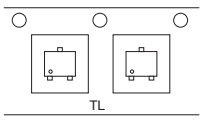
unit : mm (typ)
7019A-003



Product & Package Information

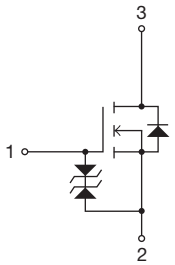
- Package : MCPH3
- JEITA, JEDEC : SC-70, SOT-323
- Minimum Packing Quantity : 3,000 pcs./reel

Packing Type : TL



Marking

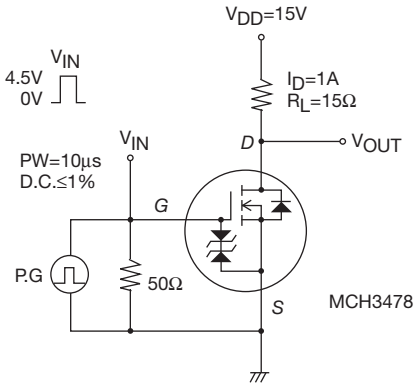
Electrical Connection



Electrical Characteristics at Ta=25°C

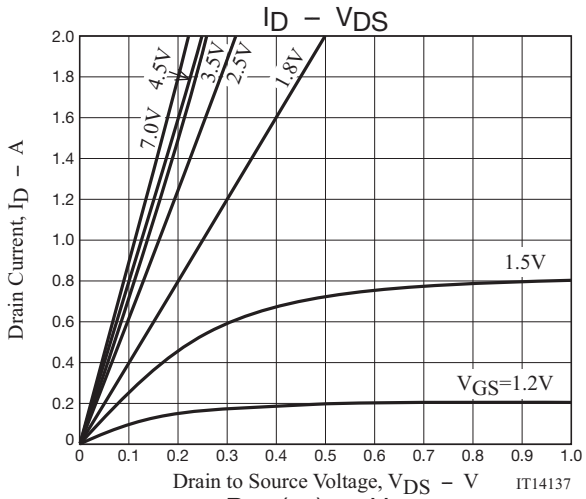
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	30			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	0.4		1.3	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=1A	1.2	2.0		S
Static Drain to Source On-State Resistance	R_{DS}(on)1	I_D=1A, V_{GS}=4.5V		125	165	mΩ
	R_{DS}(on)2	I_D=0.5A, V_{GS}=2.5V		165	235	mΩ
	R_{DS}(on)3	I_D=0.3A, V_{GS}=1.8V		250	375	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		130		pF
Output Capacitance	Coss			21		pF
Reverse Transfer Capacitance	Crss			14		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		4.4		ns
Rise Time	t_r			8.7		ns
Turn-OFF Delay Time	t_d(off)			16		ns
Fall Time	t_f			12		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=4.5V, I_D=2A		1.7		nC
Gate to Source Charge	Qgs			0.25		nC
Gate to Drain “Miller” Charge	Qgd			0.38		nC
Diode Forward Voltage	V_{SD}	I_S=2A, V_{GS}=0V		0.85	1.2	V

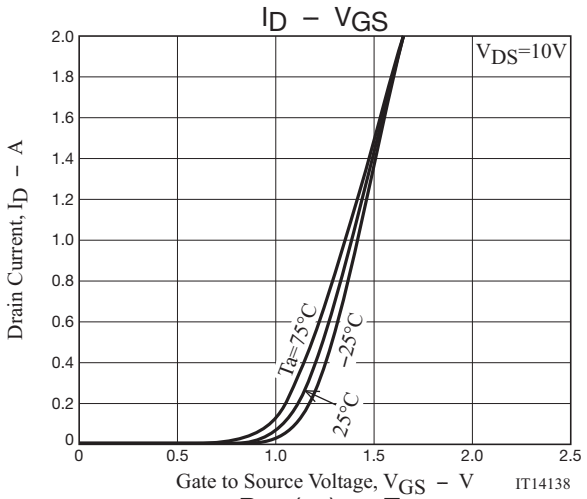
Switching Time Test Circuit

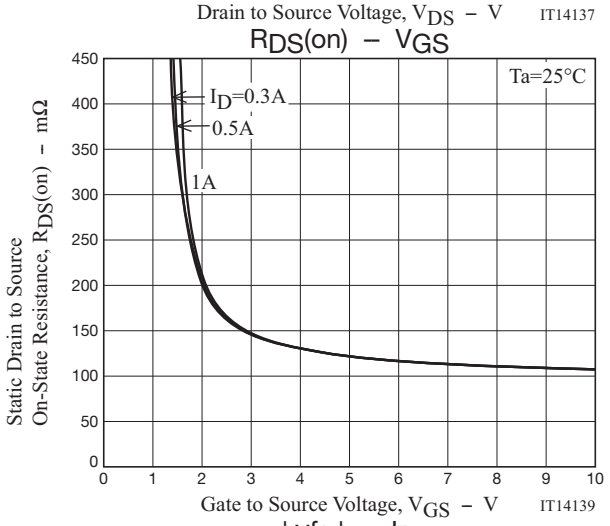


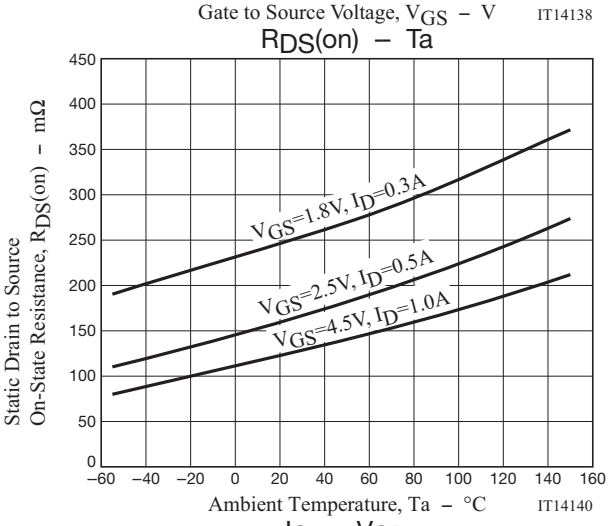
Ordering Information

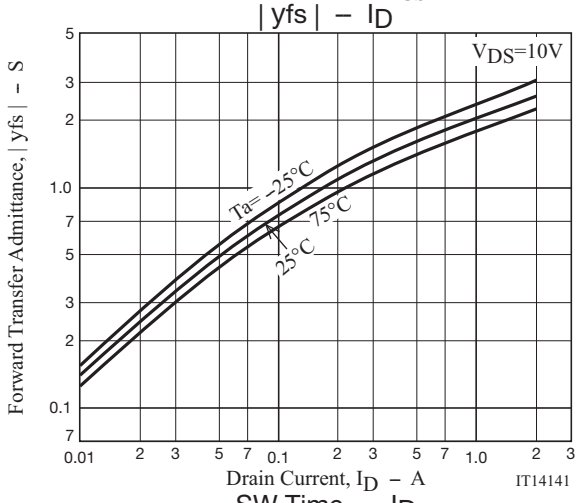
Device	Package	Shipping	memo
MCH3478-TL-H	MCPH3	3,000pcs./reel	Pb Free and Halogen Free
MCH3478-TL-W			

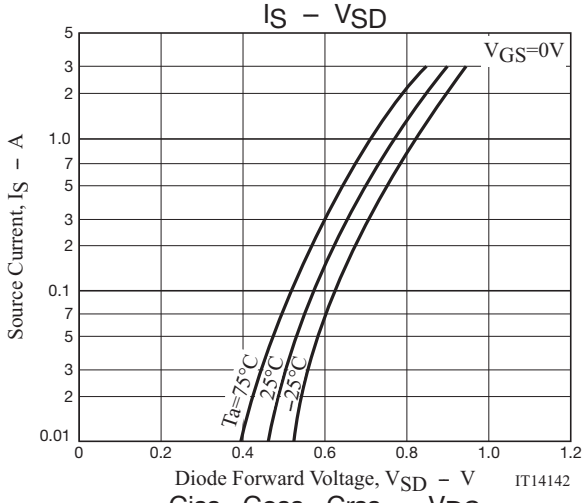

ID – VDS
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT14137
4.5V
3.5V
2.5V
1.8V
7.0V
1.5V
VGS=1.2V

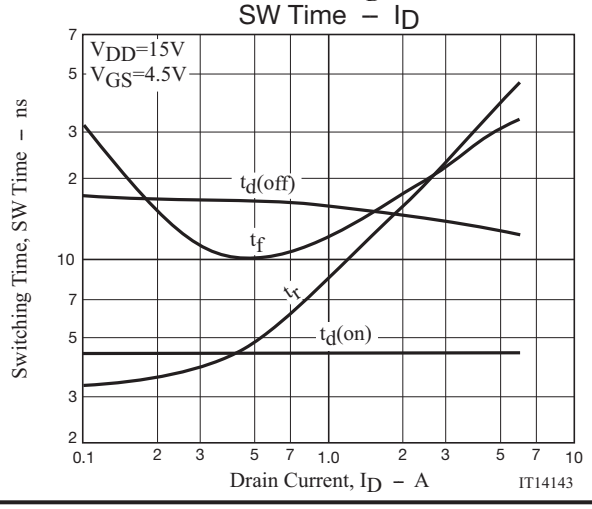

ID – VGS
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT14138
VDS=10V
Ta=75°C
–25°C
25°C

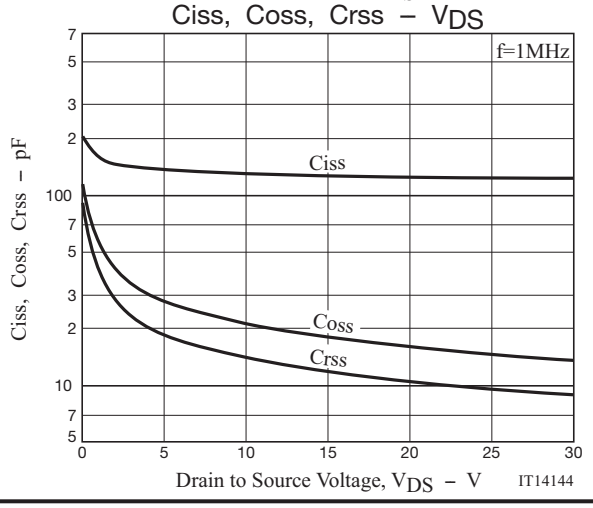

RDS(on) – VGS
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT14139
Ta=25°C
ID=0.3A
0.5A
1A

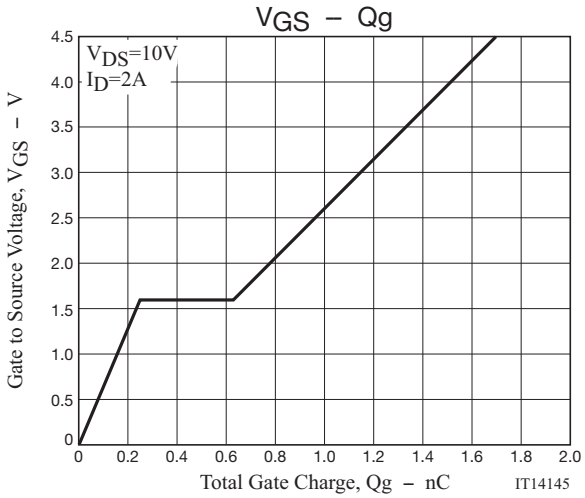

RDS(on) – Ta
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT14140
VGS=1.8V, ID=0.3A
VGS=2.5V, ID=0.5A
VGS=4.5V, ID=1.0A

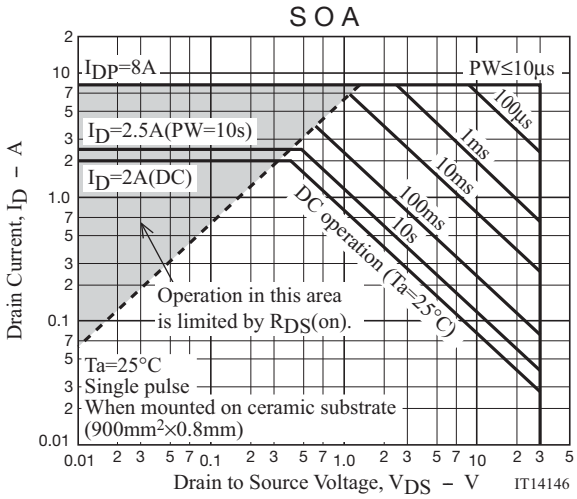

| yfs | – ID
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT14141
VDS=10V
Ta= –25°C
75°C
25°C

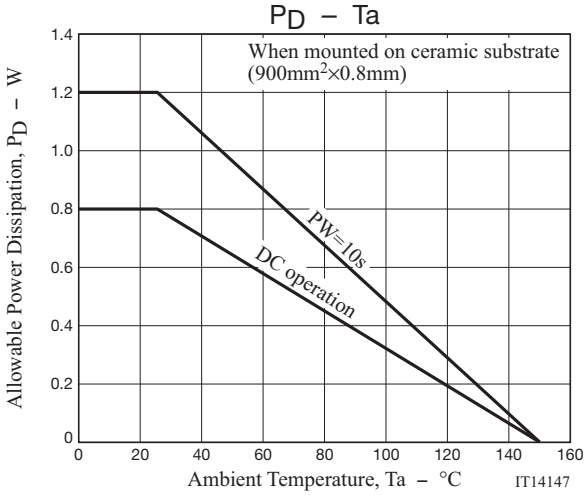

IS – VSD
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT14142
VGS=0V
Ta=75°C
25°C
–25°C


SW Time – ID
Switching Time, SW Time – ns
Drain Current, ID – A
IT14143
VDD=15V
VGS=4.5V
td(off)
tf
tr
td(on)


Ciss, Coss, Crss – VDS
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT14144
f=1MHz
Ciss
Coss
Crss

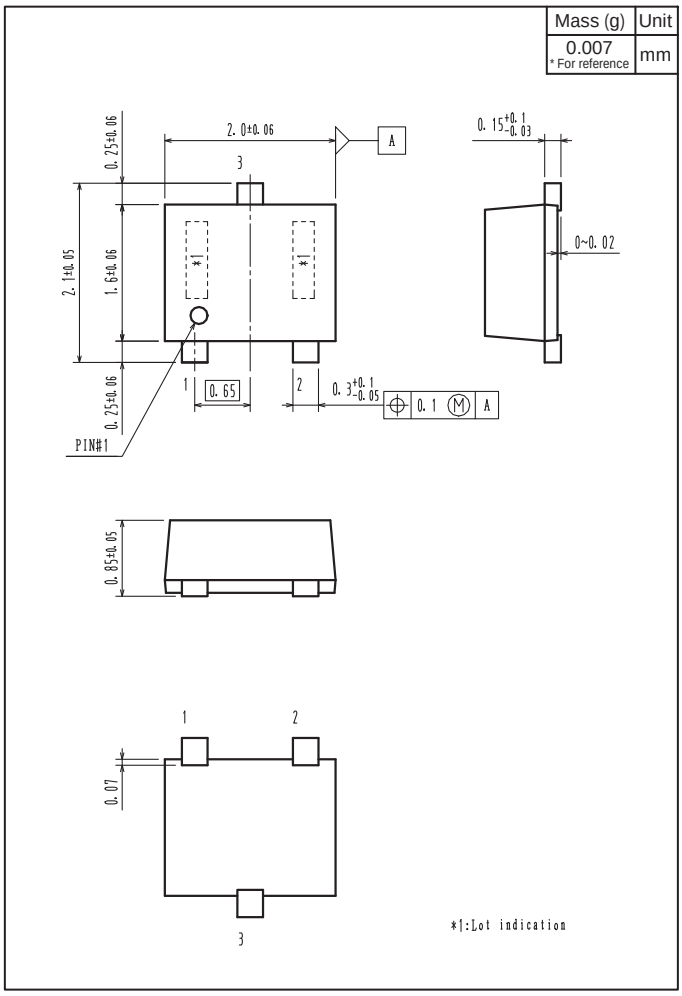

VGS – Qg
VDS=10V
ID=2A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT14145


S O A
IDP=8A
PW≤10μs
ID=2.5A(PW=10s)
ID=2A(DC)
100μs
1ms
10ms
100ms
10s
DC operation (Ta=25°C)
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
IT14146

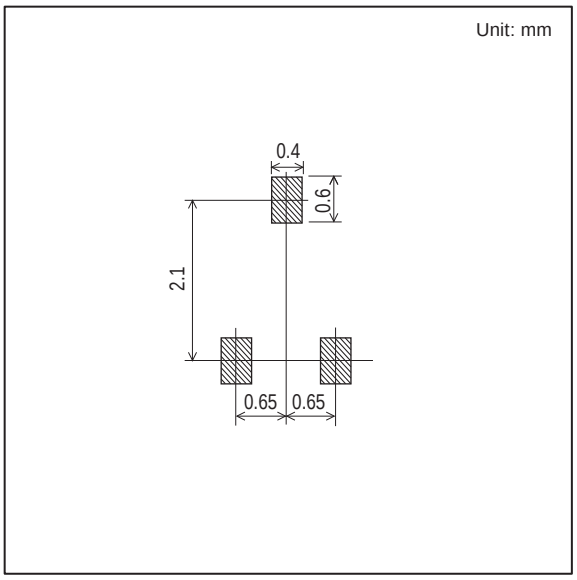

PD – Ta
When mounted on ceramic substrate
(900mm2×0.8mm)
PW=10s
DC operation
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT14147

Outline Drawing

MCH3478-TL-H, MCH3478-TL-W



Land Pattern Example



Note on usage : Since the MCH3478 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.