MCH3484

Power MOSFET
20V, 40mΩ, 4.5A, Single N-Channel

ON Semiconductor®

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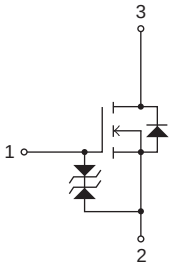
Features

- On-Resistance $R_{DS}(on)1$=33mΩ (typ)
- 0.9V Drive
- Pb-Free, Halogen Free and RoHS Compliance
- ESD Diode-Protected Gate

Electrical Connection
N-Channel



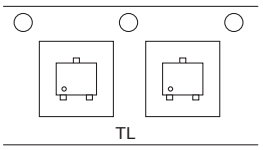
1 : Gate
2 : Source
3 : Drain

Specifications

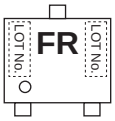
Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Value	Unit
Drain to Source Voltage	V_{DSS}	20	V
Gate to Source Voltage	V_{GSS}	±5	V
Drain Current (DC)	I_D	4.5	A
Drain Current (Pulse) PW≤10μs, duty cycle≤1%	I_{DP}	18	A
Power Dissipation When mounted on ceramic substrate (900mm²×0.8mm)	P_D	1.0	W
Junction Temperature	Tj	150	°C
Operating Temperature	Topr	–5 to +150	°C
Storage Temperature	Tstg	–55 to +150	°C

Packing Type : TL



Marking



Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Junction to Ambient When mounted on ceramic substrate (900mm² × 0.8mm)	$R_{\theta JA}$	125	°C/W

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

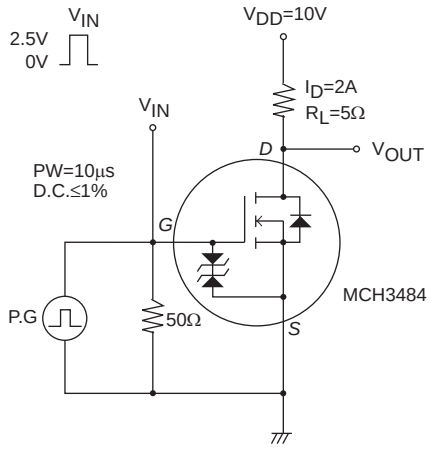
See detailed ordering and shipping information on page 5 of this data sheet.

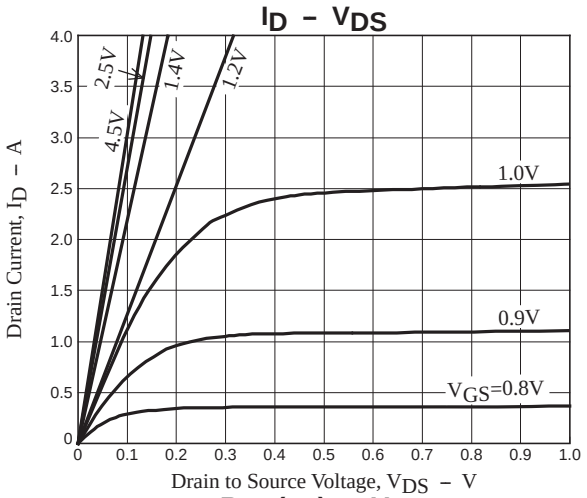
Electrical Characteristics at Ta = 25°C

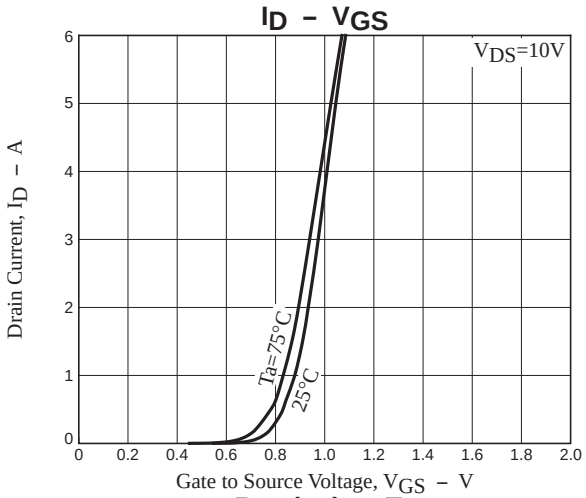
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	20			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±4V, V_{DS}=0V			±10	μA
Gate Threshold Voltage	$V_{GS}(th)$	V_{DS}=10V, I_D=1mA	0.3		0.8	V
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=2A		5.6		S
Static Drain to Source On-State Resistance	$R_{DS}(on)1$	I_D=2A, V_{GS}=2.5V		33	40	mΩ
	$R_{DS}(on)2$	I_D=1A, V_{GS}=1.8V		37	49	mΩ
	$R_{DS}(on)3$	I_D=0.5A, V_{GS}=1.2V		79	119	mΩ
	$R_{DS}(on)4$	I_D=0.1A, V_{GS}=0.9V		165	330	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		630		pF
Output Capacitance	Coss			75		pF
Reverse Transfer Capacitance	Crss			65		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit		8.9		ns
Rise Time	t_r			49		ns
Turn-OFF Delay Time	$t_d(off)$			63		ns
Fall Time	t_f			57		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=2.5V, I_D=4.5A		11		nC
Gate to Source Charge	Qgs			0.9		nC
Gate to Drain “Miller” Charge	Qgd			1.8		nC
Forward Diode Voltage	V_{SD}	I_S=4.5A, V_{GS}=0V		0.8	1.2	V

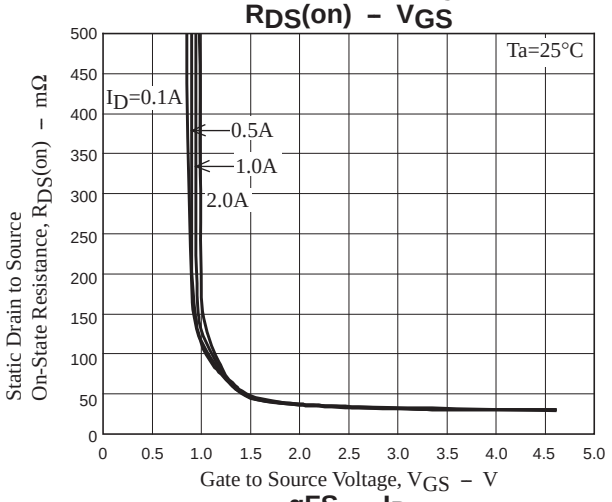
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

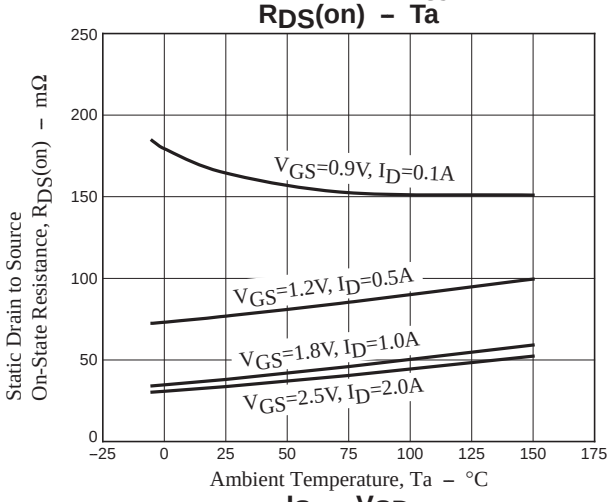
Switching Time Test Circuit

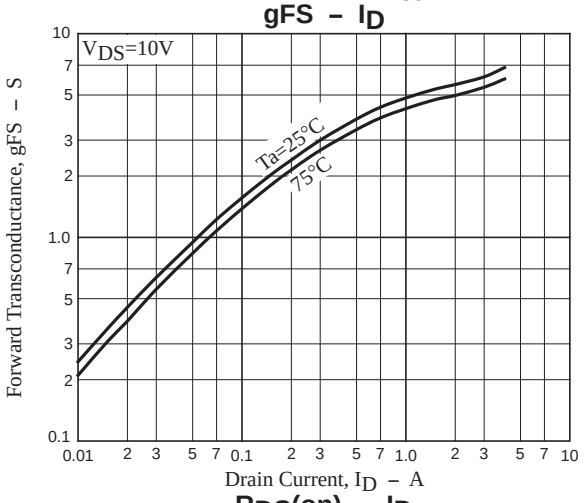


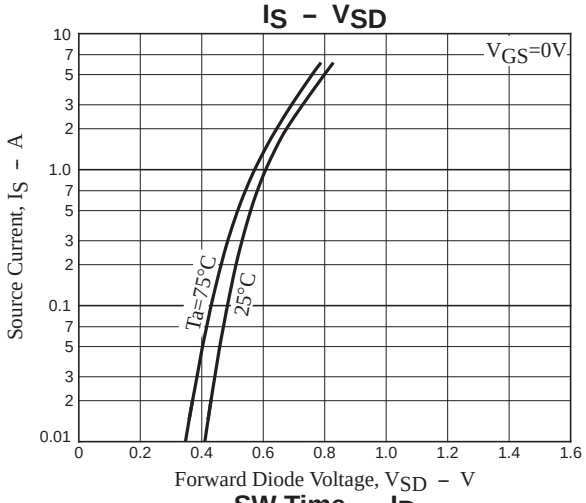

ID – VDS
Drain Current, ID – A
Drain to Source Voltage, VDS – V
2.5V
4.5V
1.4V
1.2V
1.0V
0.9V
VGS=0.8V

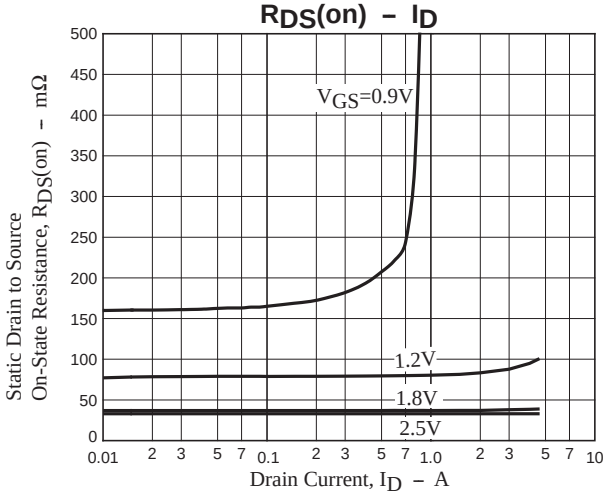

ID – VGS
Drain Current, ID – A
Gate to Source Voltage, VGS – V
VDS=10V
Ta=75°C
25°C

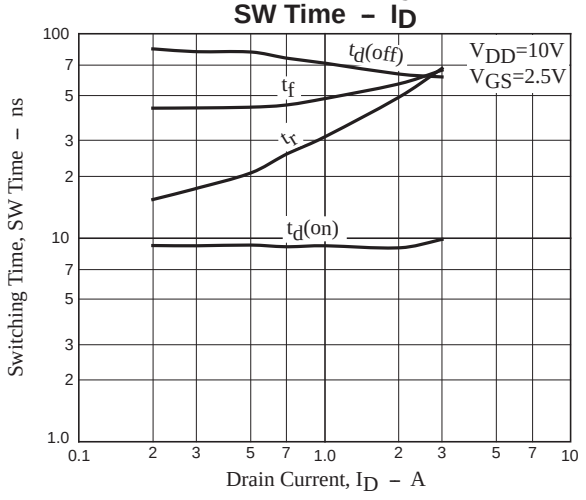

RDS(on) – VGS
Static Drain to Source
On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
Ta=25°C
ID=0.1A
0.5A
1.0A
2.0A

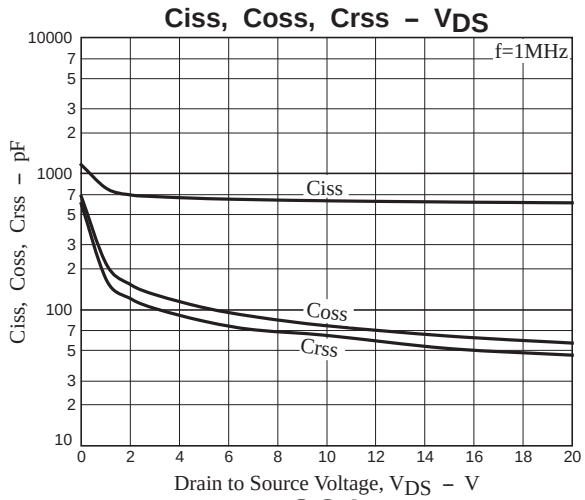

RDS(on) – Ta
Static Drain to Source
On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
VGS=0.9V, ID=0.1A
VGS=1.2V, ID=0.5A
VGS=1.8V, ID=1.0A
VGS=2.5V, ID=2.0A

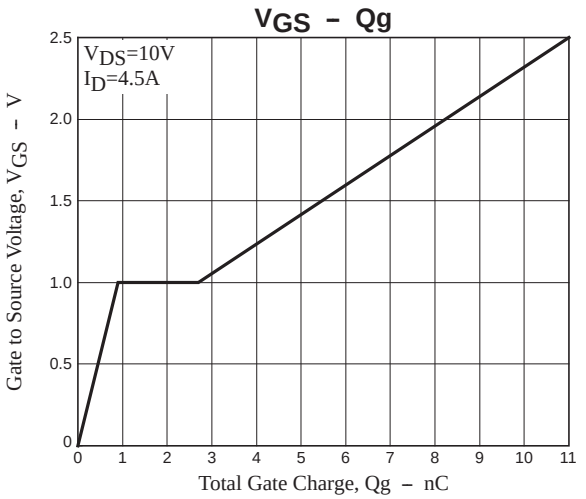

gFS – ID
Forward Transconductance, gFS – S
Drain Current, ID – A
VDS=10V
Ta=25°C
75°C

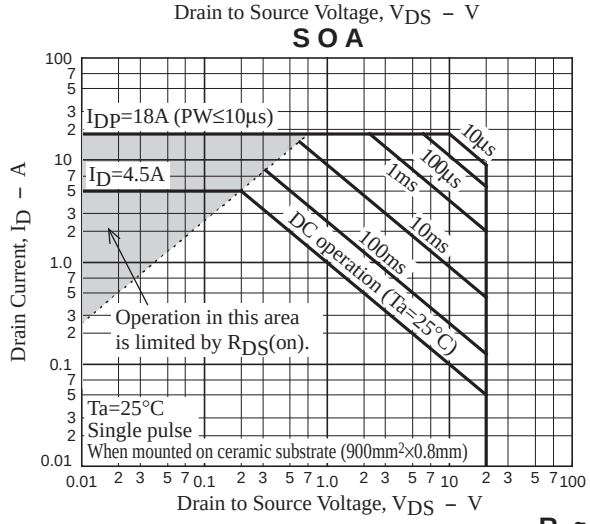

IS – VSD
Source Current, IS – A
Forward Diode Voltage, VSD – V
VGS=0V
Ta=75°C
25°C

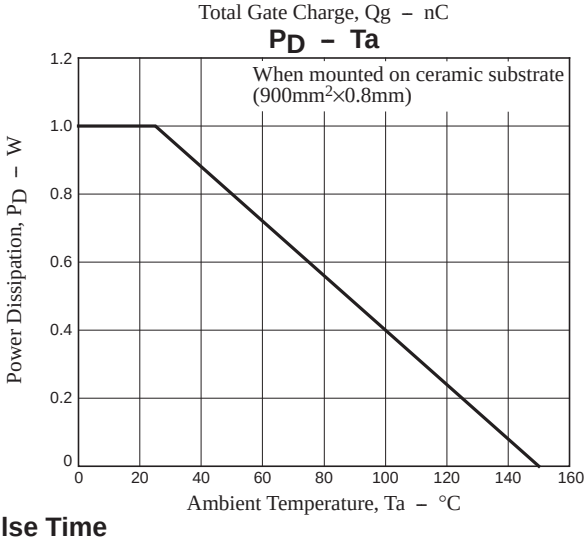

RDS(on) – ID
Static Drain to Source
On-State Resistance, RDS(on) – mΩ
Drain Current, ID – A
VGS=0.9V
1.2V
1.8V
2.5V

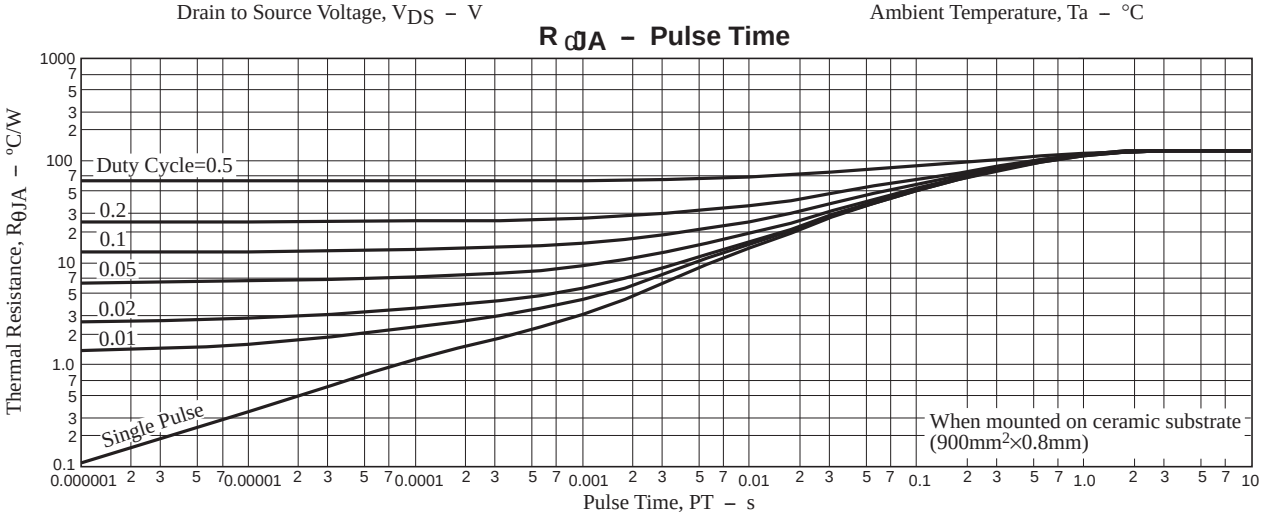

SW Time – ID
Switching Time, SW Time – ns
Drain Current, ID – A
td(off)
tf
tr
td(on)
VDD=10V
VGS=2.5V


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


VGS – Qg
VDS=10V
ID=4.5A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC


S O A
IDP=18A (PW≤10μs)
ID=4.5A
10μs
100μs
1ms
10ms
100ms
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


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


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

Package Dimensions

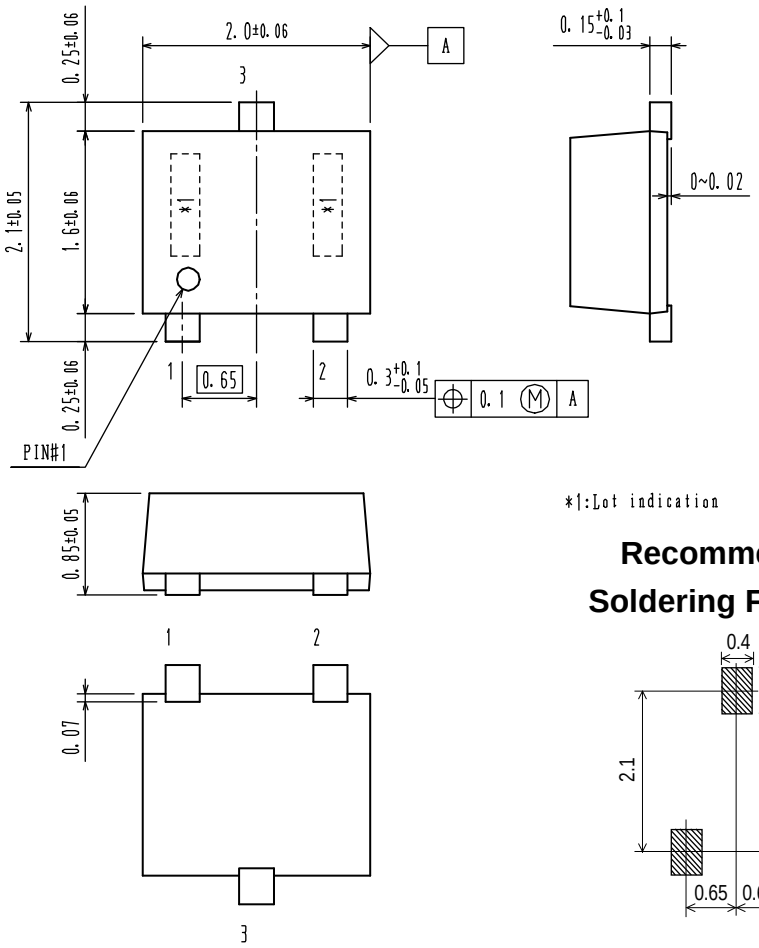
MCH3484-TL-H / MCH3484-TL-W

MCPH3

CASE 419AQ
ISSUE O

unit : mm

1 : Gate
2 : Source
3 : Drain



Recommended Soldering Footprint

ORDERING INFORMATION

Device	Package	Shipping	Note
MCH3484-TL-H	MCPH3 SC-70,SOT-323	3,000 pcs. / reel	Pb-Free and Halogen Free
MCH3484-TL-W			

Note on usage : Since the MCH3484 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.