Ordering number : ENA1353

SANYO Semiconductors

DATA SHEET

N-Channel Silicon MOSFET

MCH3478 — General-Purpose Switching Device Applications

Features

- Low ON-resistance.
- Ultrahigh speed switching.
- 1.8V drive.
- 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 (900mm^2×0.8mm)	0.8	W
		When mounted on ceramic substrate (900mm^2×0.8mm), PW=10s	1.2	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C

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

Marking : FK

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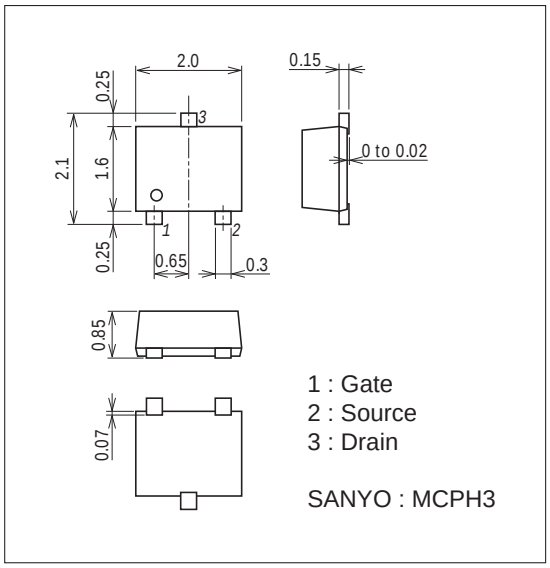
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Static Drain-to-Source On-State Resistance	$R_{DS}(on)1$	I_D=1A, V_{GS}=4.5V		125	165	mΩ
	$R_{DS}(on)2$	I_D=0.5A, V_{GS}=2.5V		165	235	mΩ
	$R_{DS}(on)3$	I_D=0.3A, V_{GS}=1.8V		250	375	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		130		pF
Output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

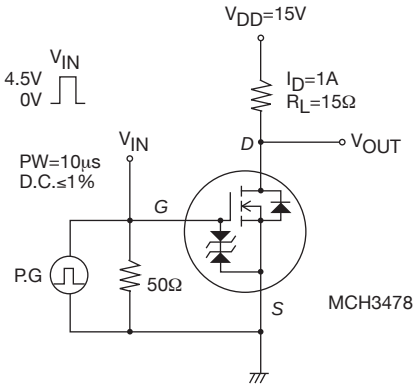
Package Dimensions

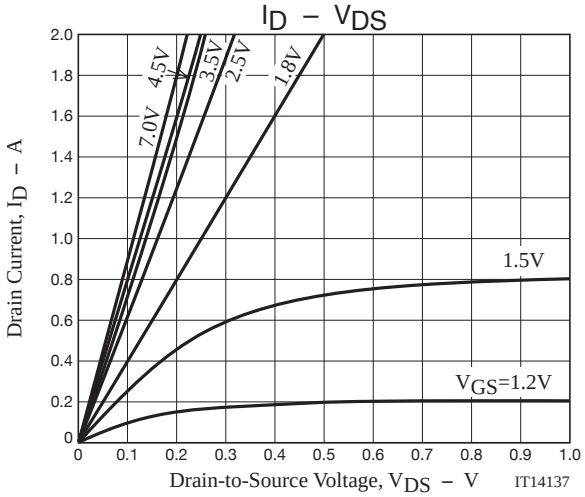
unit : mm (typ)

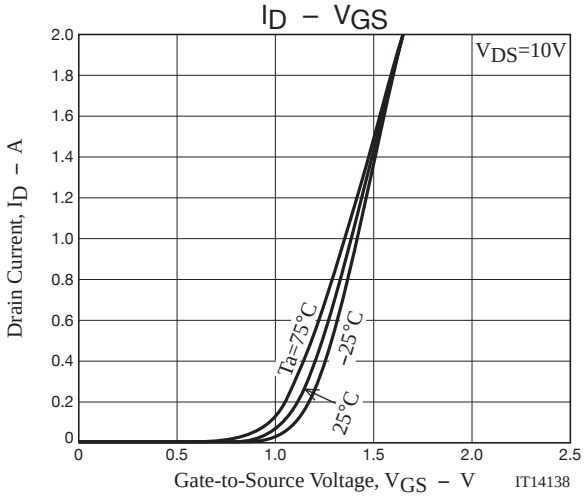
7019A-003

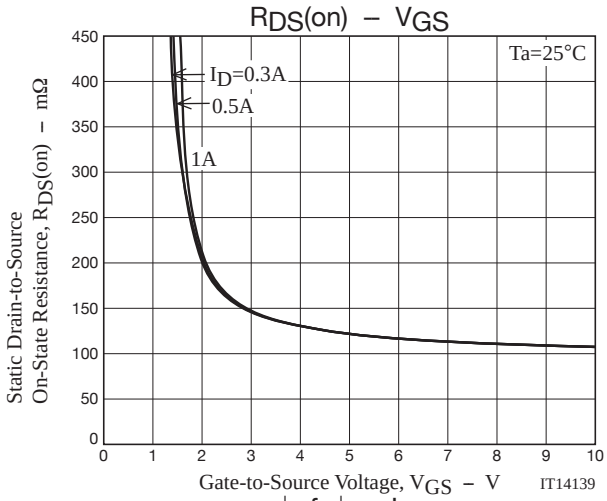


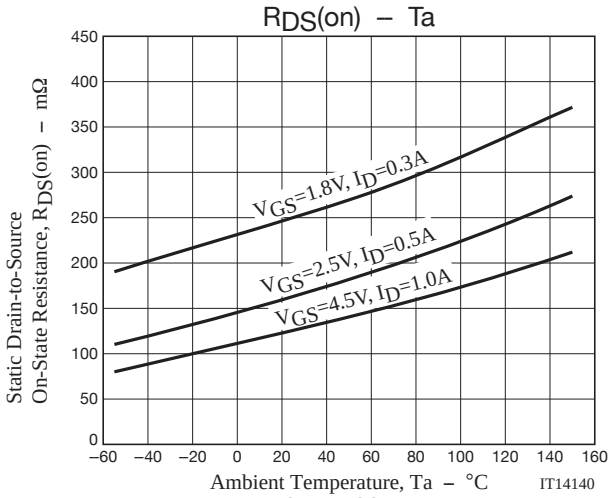
Switching Time Test Circuit

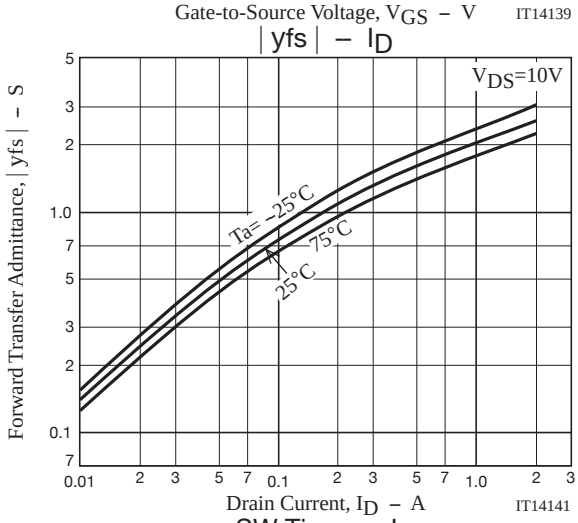


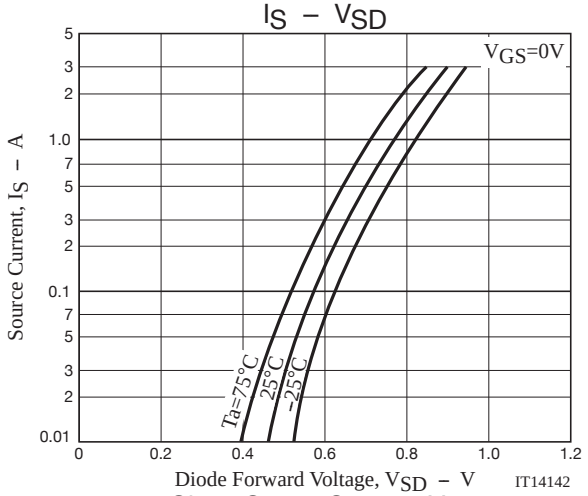


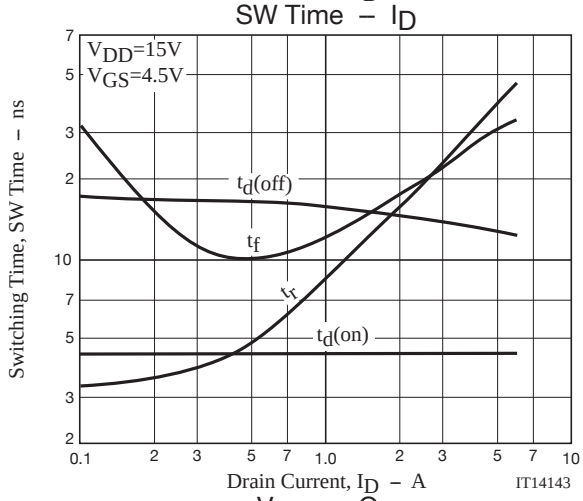


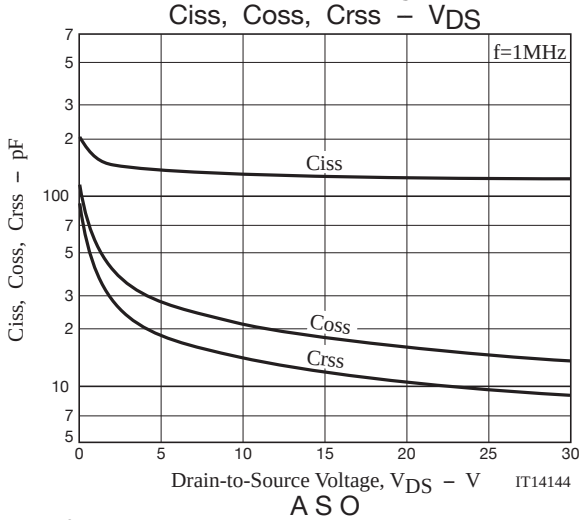

RDS(on) – VGS
Ta=25°C
ID=0.3A
0.5A
1A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT14139

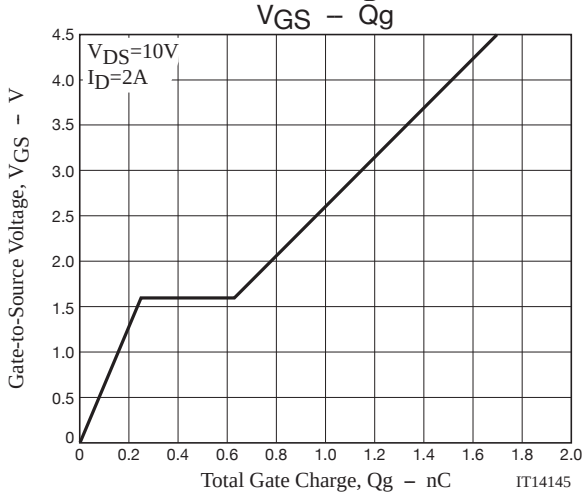

RDS(on) – Ta
VGS=1.8V, ID=0.3A
VGS=2.5V, ID=0.5A
VGS=4.5V, ID=1.0A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT14140

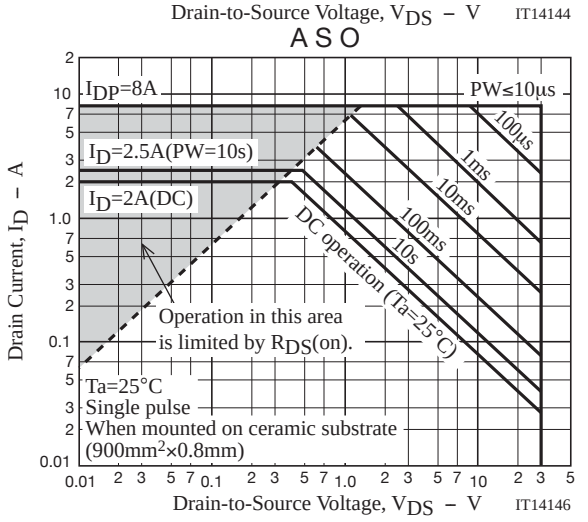

| yfs | – ID
VDS=10V
Ta=–25°C
75°C
25°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT14141

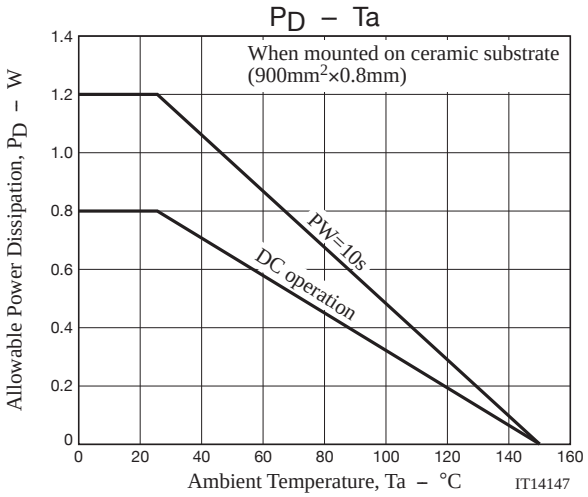

IS – VSD
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT14142


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


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


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


A S O
IDP=8A
PW≤10μs
100μs
ID=2.5A(PW=10s)
1ms
10ms
ID=2A(DC)
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



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