Ordering number : ENN7998

SANYO Semiconductors
DATA SHEET

MCH5812

MOSFET : N-Channel Silicon MOSFET
SBD : Schottky Barrier Diode

General-Purpose Switching Device Applications

Features

- Composite type with a N-channel sillicon MOSFET (MCH3445) and a schottky barrier diode (SS10015M) contained in one package facilitating high-density mounting.
- [MOSFET]
  - Low ON-resistance.
  - Ultrahigh-speed switching.
  - 1.8V drive.
- [SBD]
  - Short reverse recovery time.
  - Low forward voltage.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
[MOSFET]				
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)	I_{DP}	PW≤10μs, duty cycle≤1%	8	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (900mm²×0.8mm) 1unit	0.8	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +125	°C
[SBD]				
Repetitive Peak Reverse Voltage	V_{RRM}		15	V
Nonrepetitive Peak Reverse Surge Voltage	V_{RSM}		15	V
Average Output Current	I_O		1	A
Surge Forward Current	I_{FSM}	50Hz sine wave, 1 cycle	3	A
Junction Temperature	Tj		−55 to +125	°C
Storage Temperature	Tstg		−55 to +125	°C

Marking : QN

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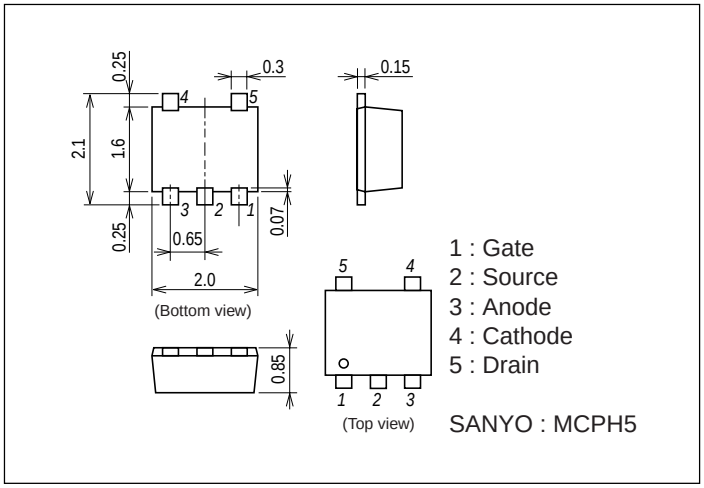
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[MOSFET]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0	20			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0			±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	1.4	2.4		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=1A, V_{GS}=4V		125	165	mΩ
	R_{DS}(on)2	I_D=0.5A, V_{GS}=2.5V		165	235	mΩ
	R_{DS}(on)3	I_D=0.1A, V_{GS}=1.8V		225	340	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		120		pF
Output Capacitance	Coss	V_{DS}=10V, f=1MHz		31		pF
Reverse Transfer Capacitance	Crss	V_{DS}=10V, f=1MHz		25		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit		9		ns
Rise Time	t_r	See specified Test Circuit		29		ns
Turn-OFF Delay Time	t_d(off)	See specified Test Circuit		18		ns
Fall Time	t_f	See specified Test Circuit		22		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=4V, I_D=2A		2.3		nC
Gate-to-Source Charge	Qgs	V_{DS}=10V, V_{GS}=4V, I_D=2A		0.5		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=10V, V_{GS}=4V, I_D=2A		0.75		nC
Diode Forward Voltage	V_{SD}	I_S=2A, V_{GS}=0		0.94	1.2	V
[SBD]						
Reverse Voltage	V_R	I_R=0.5mA	15			V
Forward Voltage	V_F1	I_F=0.3A		0.3	0.33	V
	V_F2	I_F=0.5A		0.33	0.36	V
Reverse Current	I_R	V_R=6V			90	μA
Interterminal Capacitance	C	V_R=10V, f=1MHz, 1 cycle		20		pF
Reverse Recovery Time	t_{rr}	I_F=I_R=100mA, See specified Test Circuit.			10	ns

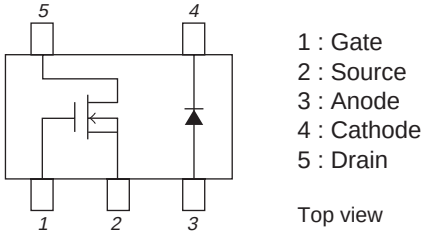
Package Dimensions

unit : mm

2195

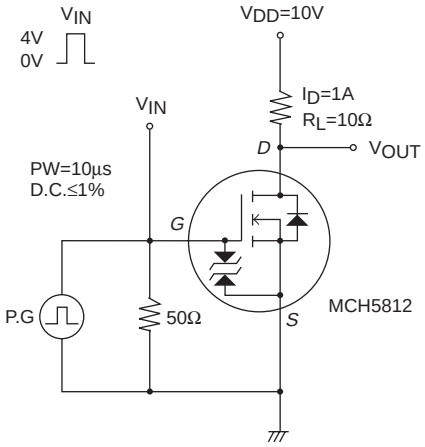


Electrical Connection



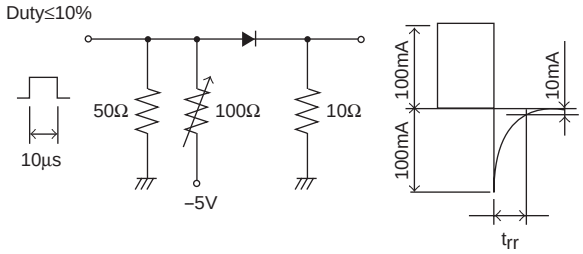
Switching Time Test Circuit

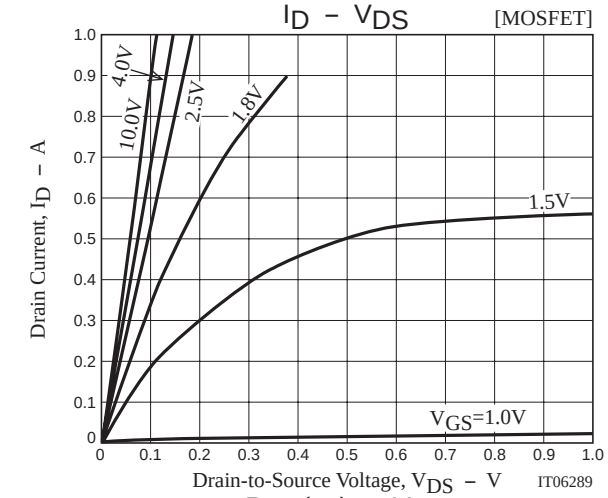
[MOSFET]

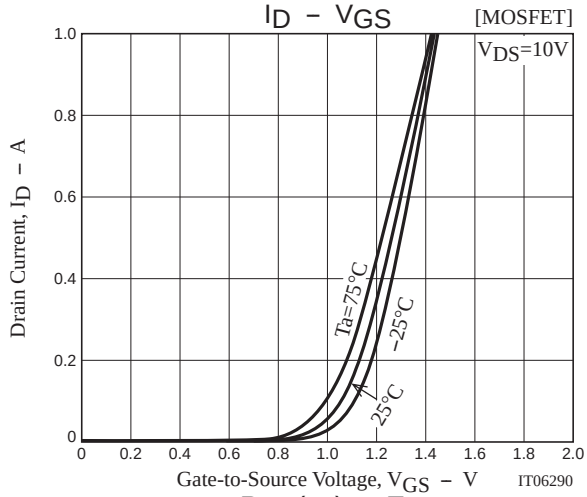


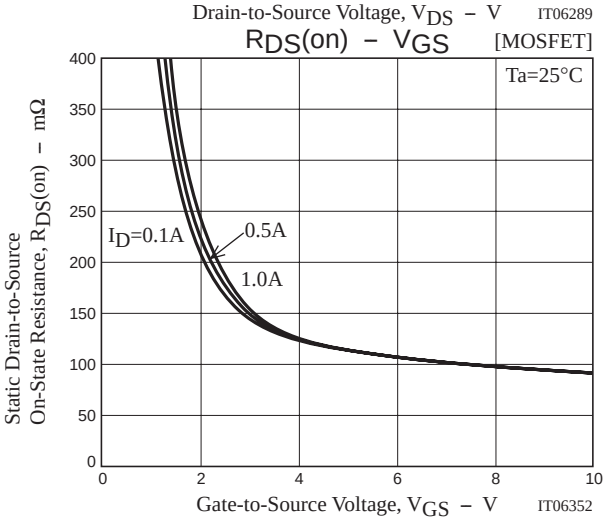
t_{rr} Test Circuit

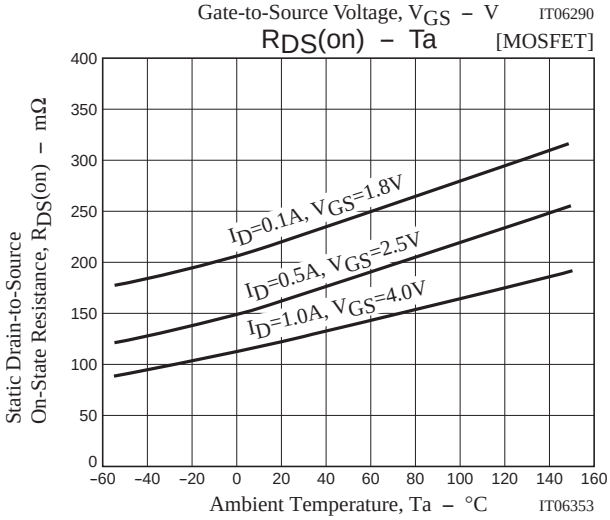
[SBD]

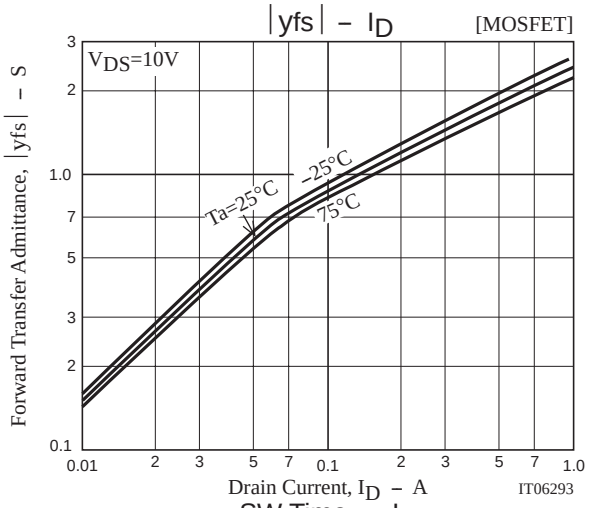


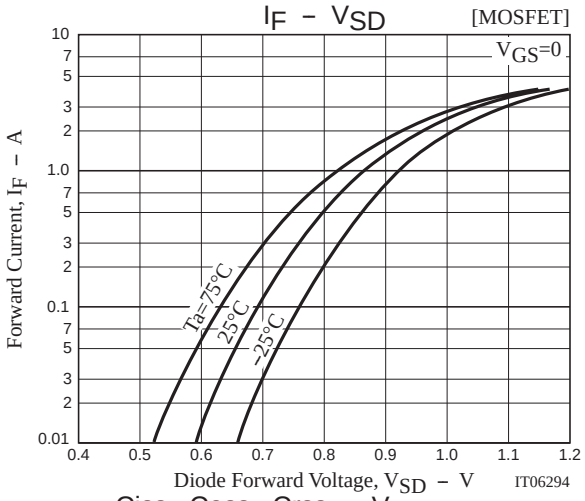


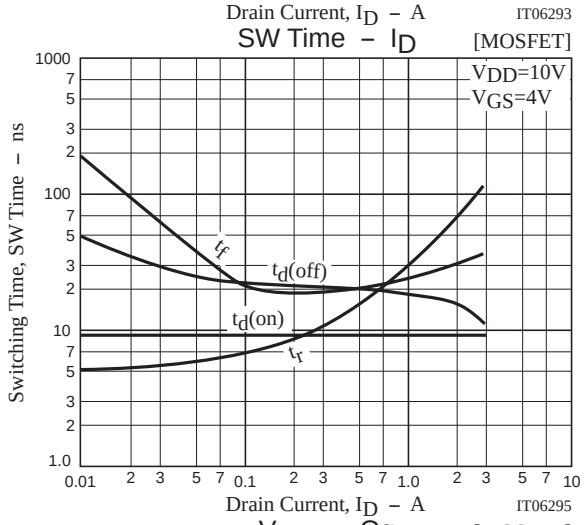


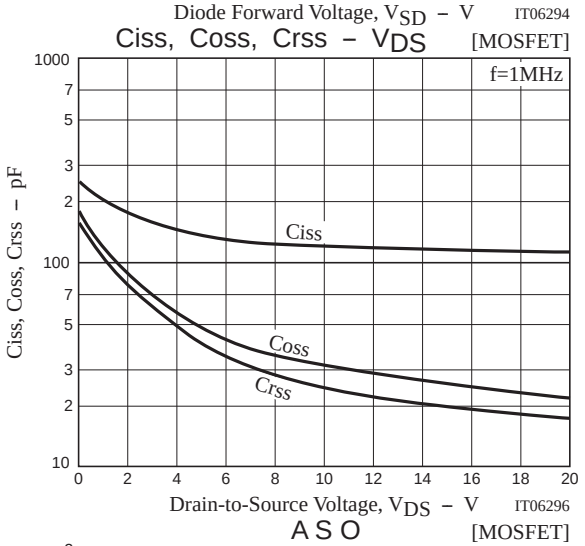


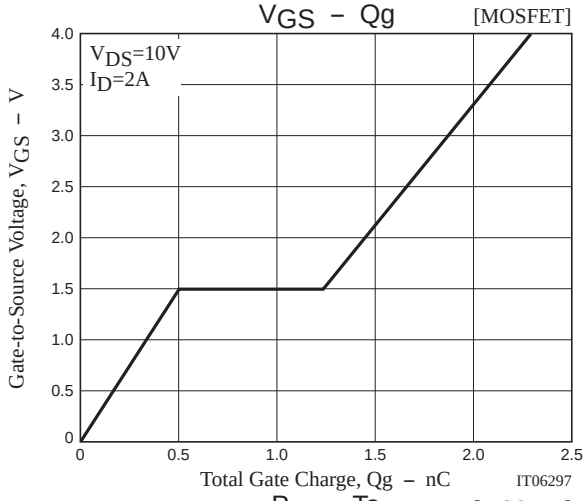


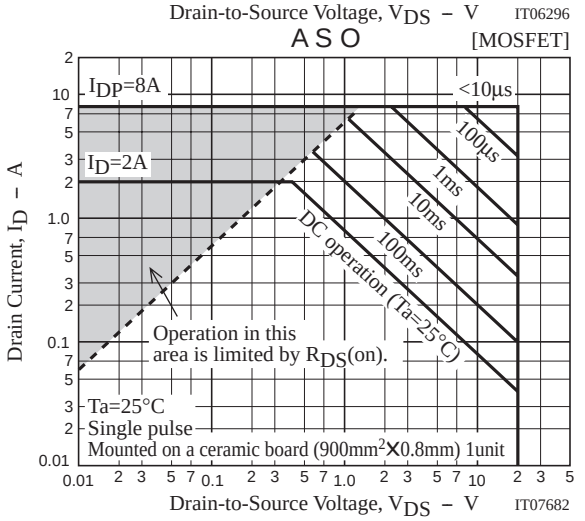

|yfs| – ID [MOSFET]
VDS=10V
Ta=25°C
–25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT06293

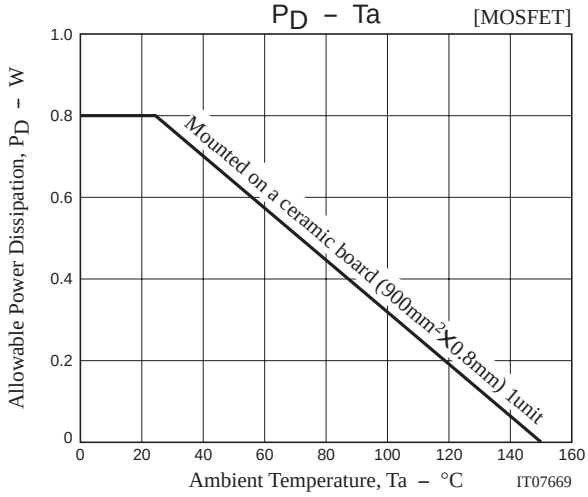

IF – VSD [MOSFET]
VGS=0
Ta=75°C
25°C
–25°C
Forward Current, IF – A
Diode Forward Voltage, VSD – V
IT06294


SW Time – ID [MOSFET]
VDD=10V
VGS=4V
tf
td(off)
td(on)
tr
Switching Time, SW Time – ns
Drain Current, ID – A
IT06295

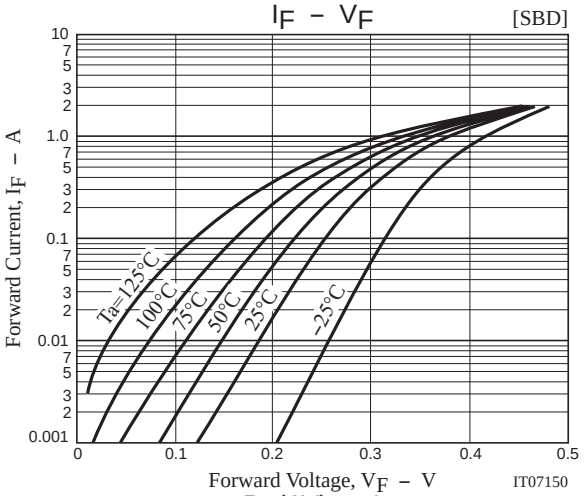

Ciss, Coss, Crss – VDS [MOSFET]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT06296


VGS – Qg [MOSFET]
VDS=10V
ID=2A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT06297

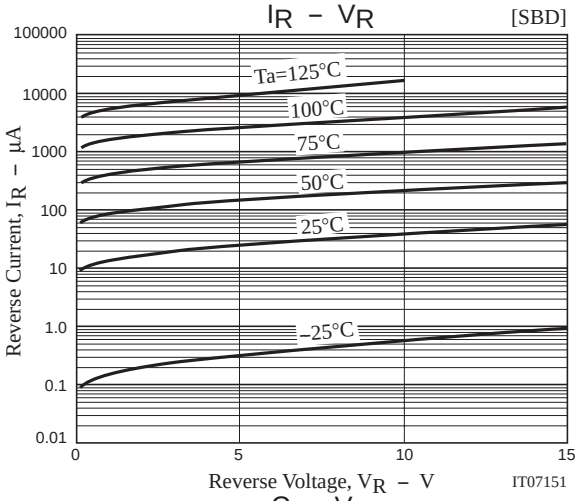

ASO [MOSFET]
IDP=8A
ID=2A
<10µs
100µs
1ms
10ms
100ms
DC operation (Ta=25°C)
Operation in this area is limited by RDS(on).
Ta=25°C
Single pulse
Mounted on a ceramic board (900mm2×0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT07682


PD – Ta [MOSFET]
Mounted on a ceramic board (900mm2×0.8mm) 1unit
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT07669

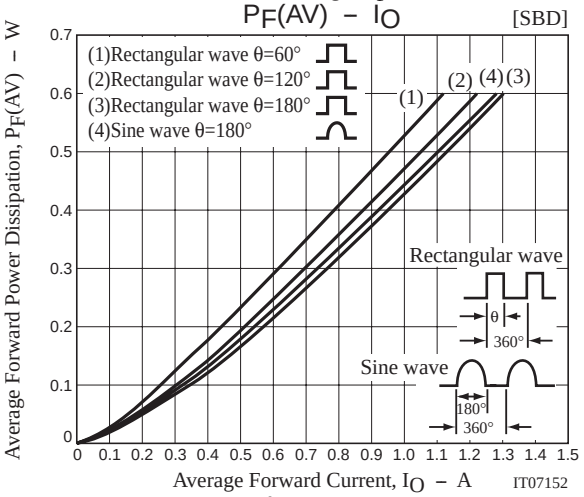
$I_F - V_F$ [SBD]



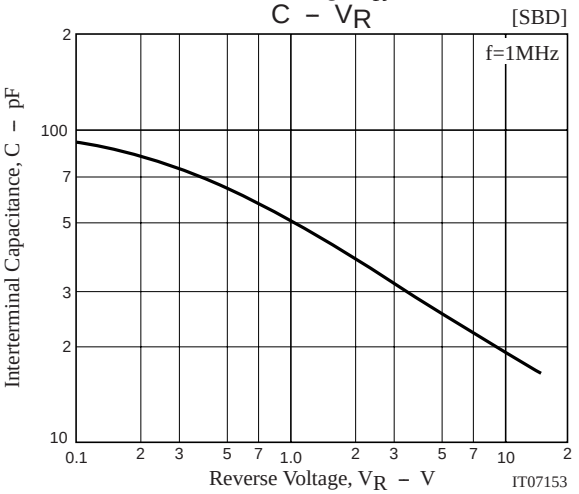
$I_R - V_R$ [SBD]



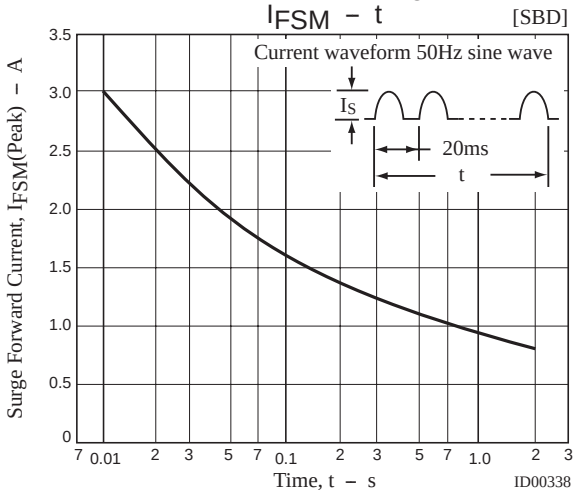
$P_{F(AV)} - I_O$ [SBD]



$C - V_R$ [SBD]



$I_{FSM} - t$ [SBD]



Note on usage : Since the MCH5812 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.