Ordering number : ENN7125

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

MCH5805

DC / DC Converter Applications

Features

- Composite type with a P-channel sillicon MOSFET (MCH3314) and a Schottky barrier diode (SB01-05) contained in one package facilitating high-density mounting.

[MOSFET]

- Low ON-resistance.
- Ultrahigh-speed switching.
- 4V drive.

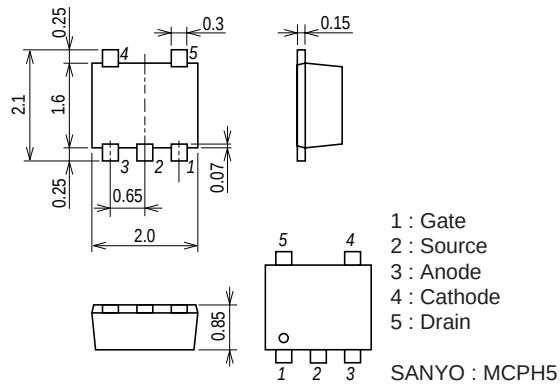
[SBD]

- Short reverse recovery time.
- Low forward voltage.

Package Dimensions

unit : mm
2195

[MCH5805]



Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
[MOSFET]				
Drain-to-Source Voltage	V_{DSS}		−60	V
Gate-to-Source Voltage	V_{GSS}		±20	V
Drain Current (DC)	I_D		−0.6	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	−2.4	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}		50	V
Nonrepetitive Peak Reverse Surge Voltage	V_{RSM}		50	V
Average Output Current	I_O		0.1	A
Surge Forward Current	I_{FSM}	50Hz sine wave, 1 cycle	2	A
Junction Temperature	Tj		−55 to +125	°C
Storage Temperature	Tstg		−55 to +125	°C

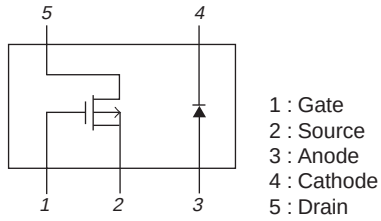
Marking : QE

SANYO Electric Co.,Ltd. Semiconductor Company
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

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	–60			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=–60V, V_{GS}=0			–1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=–10V, I_D=–1mA	–1.2		–2.6	V
Forward Transfer Admittance	|yfs|	V_{DS}=–10V, I_D=–0.3A	460	670		mS
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=–0.3A, V_{GS}=–10V		1.3	1.7	Ω
	R_{DS}(on)2	I_D=–0.2A, V_{GS}=–4V		1.6	2.3	Ω
Input Capacitance	Ciss	V_{DS}=–20V, f=1MHz		73		pF
Output Capacitance	Coss	V_{DS}=–20V, f=1MHz		7		pF
Reverse Transfer Capacitance	Crss	V_{DS}=–20V, f=1MHz		4		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		6		ns
Rise Time	t_r	See specified Test Circuit.		3.5		ns
Turn-OFF Delay Time	t_d(off)	See specified Test Circuit.		12.5		ns
Fall Time	t_f	See specified Test Circuit.		3		ns
Total Gate Charge	Qg	V_{DS}=–10V, V_{GS}=–10V, I_D=–0.6A		2.4		nC
Gate-to-Source Charge	Qgs	V_{DS}=–10V, V_{GS}=–10V, I_D=–0.6A		0.6		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=–10V, V_{GS}=–10V, I_D=–0.6A		0.2		nC
Diode Forward Voltage	V_{SD}	I_S=–0.6A, V_{GS}=0		–0.88	–1.2	V
[SBD]						
Reverse Voltage	V_R	I_R=50μA	50			V
Forward Voltage	V_F1	I_F=100mA			0.55	V
Reverse Current	I_R	V_R=25V			15	μA
Interterminal Capacitance	C	V_R=10V, f=1MHz		4.4		pF
Reverse Recovery Time	t_{rr}	I_F=I_R=100mA, See specified Test Circuit.			10	ns

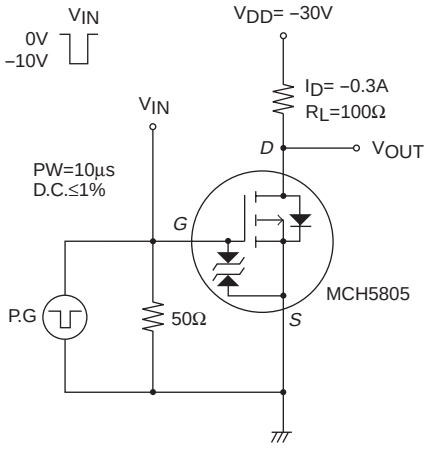
Electrical Connection (Top view)



1 : Gate
2 : Source
3 : Anode
4 : Cathode
5 : Drain

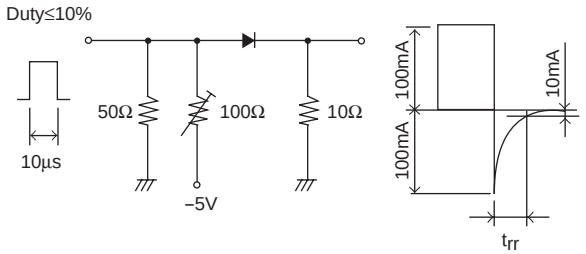
Switching Time Test Circuit

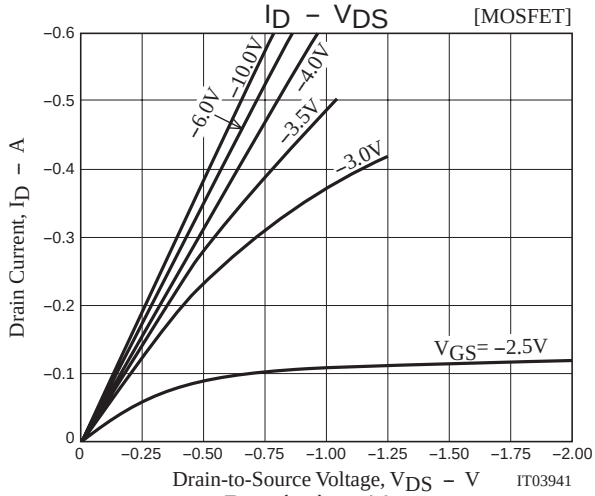
[MOSFET]

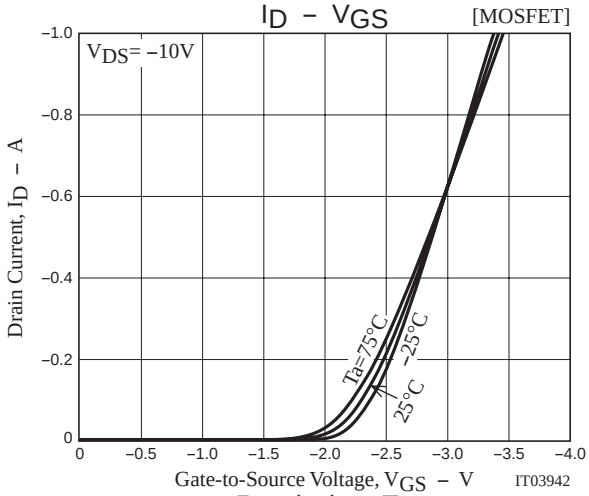


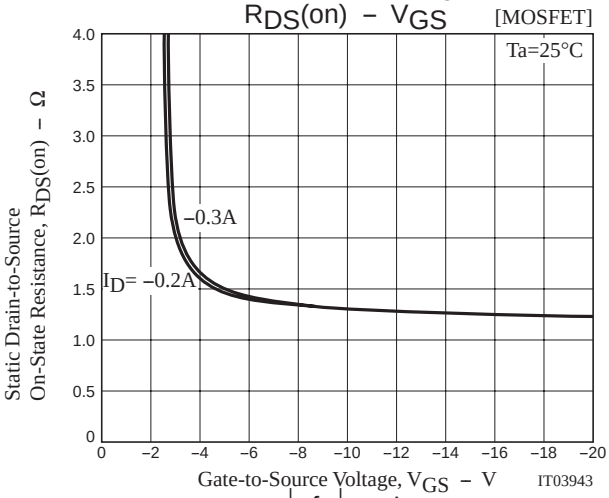
trr Test Circuit

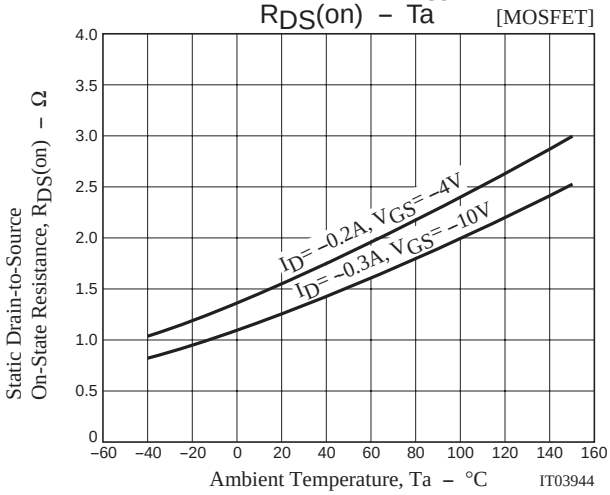
[SBD]

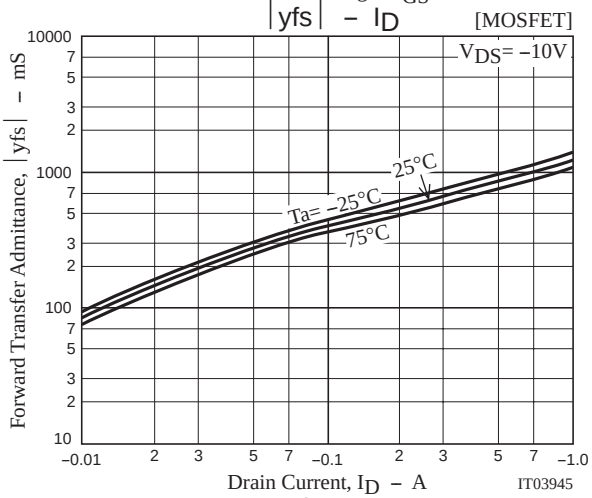


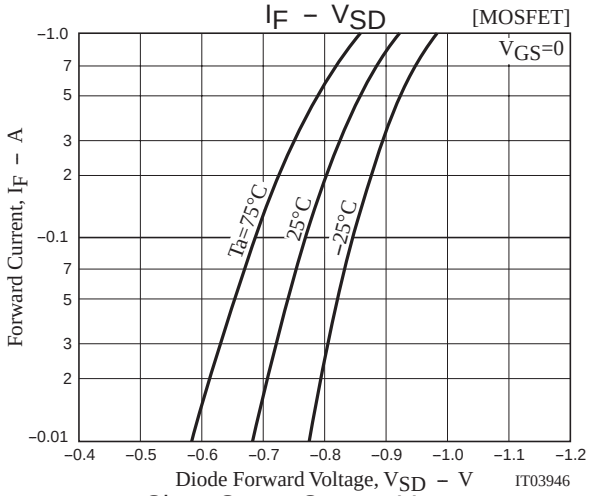

ID – VDS [MOSFET]
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT03941
–6.0V
–10.0V
–4.0V
–3.5V
–3.0V
VGS= –2.5V

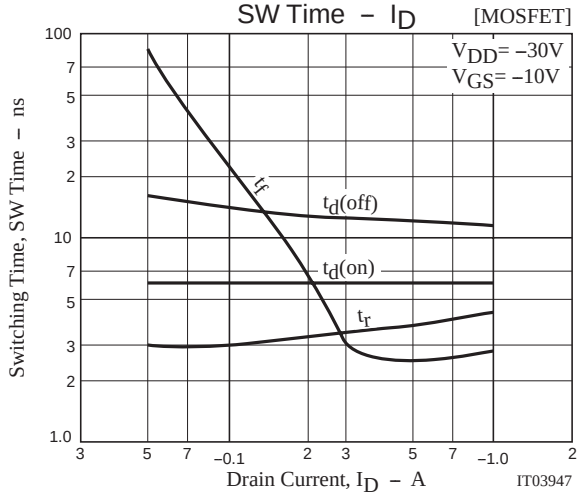

ID – VGS [MOSFET]
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT03942
VDS= –10V
Ta=75°C
–25°C
25°C

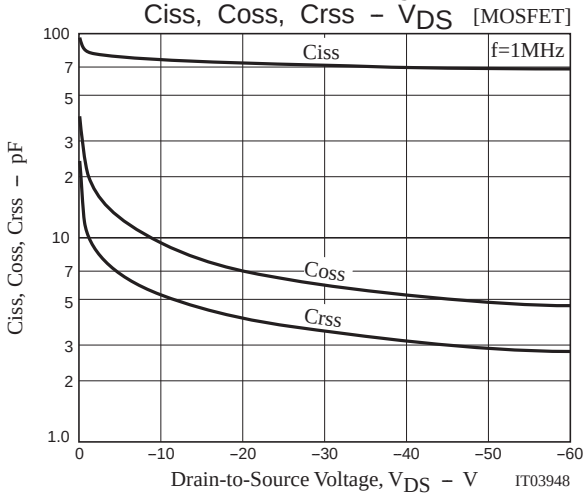

RDS(on) – VGS [MOSFET]
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Gate-to-Source Voltage, VGS – V
IT03943
Ta=25°C
–0.3A
ID= –0.2A

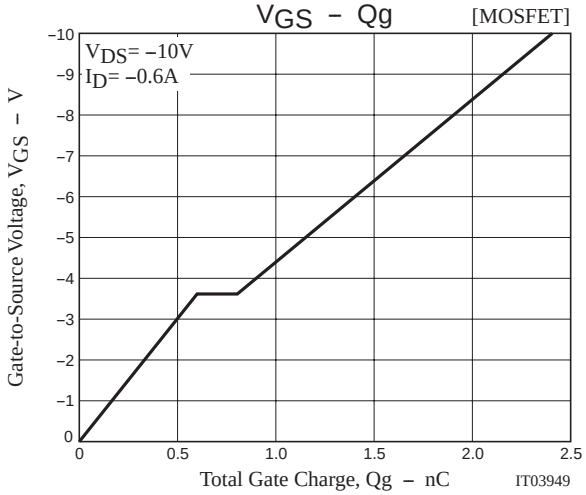

RDS(on) – Ta [MOSFET]
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Ambient Temperature, Ta – °C
IT03944
ID= –0.2A, VGS= –4V
ID= –0.3A, VGS= –10V

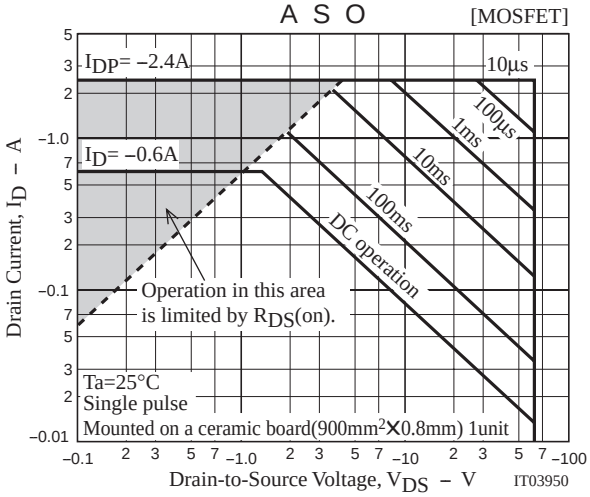

|yfs| – ID [MOSFET]
Forward Transfer Admittance, |yfs| – mS
Drain Current, ID – A
IT03945
VDS= –10V
25°C
Ta= –25°C
75°C

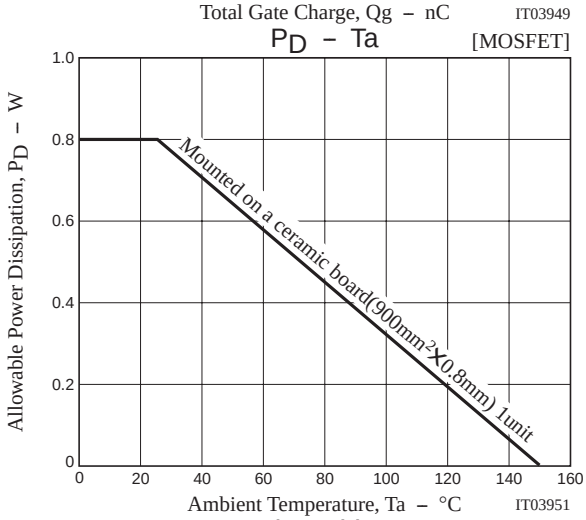

IF – VSD [MOSFET]
Forward Current, IF – A
Diode Forward Voltage, VSD – V
IT03946
VGS=0
Ta=75°C
25°C
–25°C

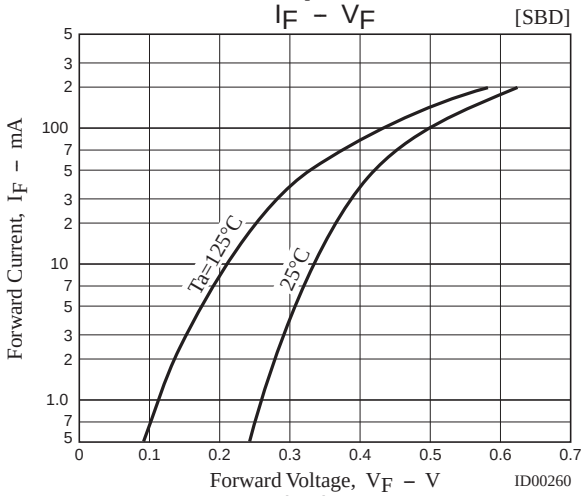

SW Time – ID [MOSFET]
Switching Time, SW Time – ns
Drain Current, ID – A
IT03947
VDD= –30V
VGS= –10V
tf
td(off)
td(on)
tr

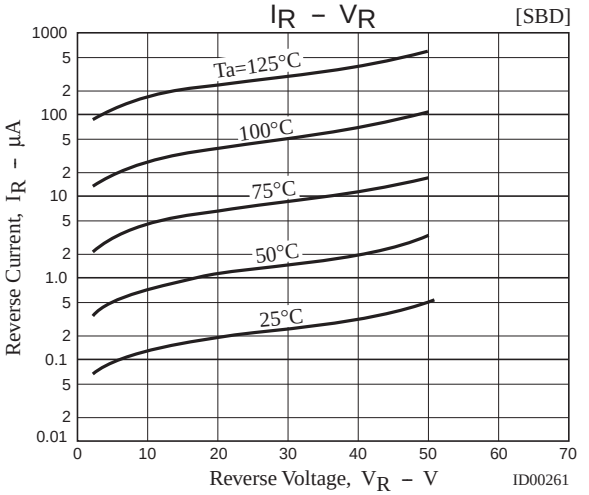

Ciss, Coss, Crss – VDS [MOSFET]
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT03948
f=1MHz
Ciss
Coss
Crss

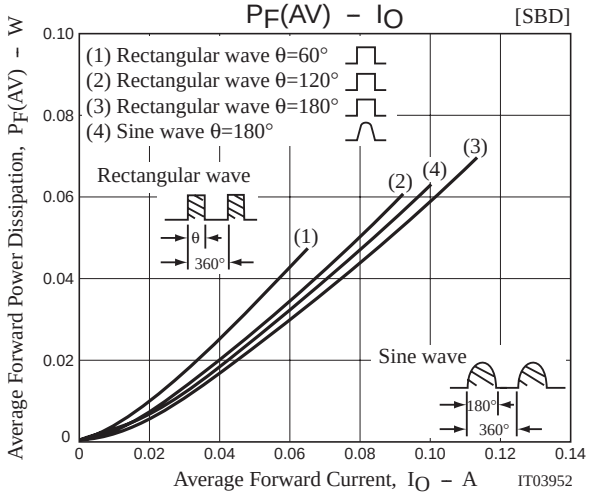

VGS – Qg
[MOSFET]
VDS= –10V
ID= –0.6A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT03949

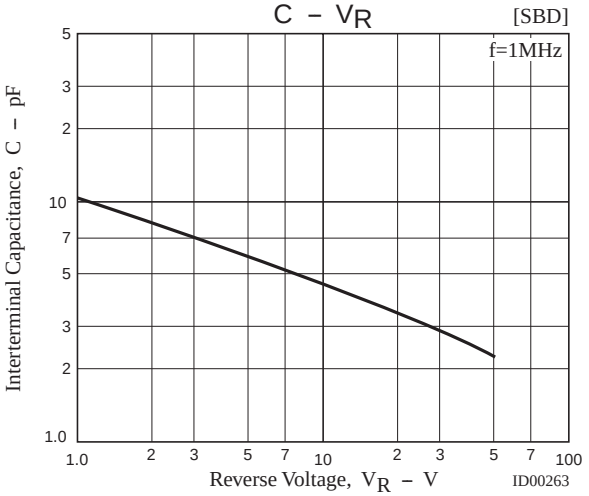

A S O
[MOSFET]
IDP= –2.4A
ID= –0.6A
10μs
100μs
1ms
10ms
100ms
DC operation
Operation in this area
is limited by RDS(on).
Ta=25°C
Single pulse
Mounted on a ceramic board(900mm2×0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT03950


PD – Ta
[MOSFET]
Mounted on a ceramic board(900mm2×0.8mm) 1unit
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT03951


IF – VF
[SBD]
Ta=125°C
25°C
Forward Current, IF – mA
Forward Voltage, VF – V
ID00260


IR – VR
[SBD]
Ta=125°C
100°C
75°C
50°C
25°C
Reverse Current, IR – μA
Reverse Voltage, VR – V
ID00261


PF(AV) – IO
[SBD]
(1) Rectangular wave θ=60°
(2) Rectangular wave θ=120°
(3) Rectangular wave θ=180°
(4) Sine wave θ=180°
Rectangular wave
θ
360°
Sine wave
180°
360°
Average Forward Power Dissipation, PF(AV) – W
Average Forward Current, IO – A
IT03952


C – VR
[SBD]
f=1MHz
Interterminal Capacitance, C – pF
Reverse Voltage, VR – V
ID00263