Ordering number : ENA0424

SANYO Semiconductors
DATA SHEET

N-Channel and P-Channel Silicon MOSFETs

FW340 — General-Purpose Switching Device Applications

Features

- For motor drives, inverters.
- Composite type with an N-channel MOSFET and a P-channel MOSFET driving from a 4V supply voltage contained in a single package.
- High-density mounting.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	V_{DSS}		30	−30	V
Gate-to-Source Voltage	V_{GSS}		±20	±20	V
Drain Current (DC)	I_D		5	−5	A
Drain Current (PW≤10s)	I_D	Duty cycle≤1%	5.5	−5.5	A
Drain Current (PW≤100ms)	I_D	Duty cycle≤1%	7	−9	A
Drain Current (PW≤10μs)	I_{DP}	Duty cycle≤1%	20	−20	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (2000mm²×0.8mm)1unit, PW≤10s	1.8		W
Total Dissipation	P_T	Mounted on a ceramic board (2000mm²×0.8mm), PW≤10s	2.2		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	
[N-channel]						
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}=±16V, V_{DS}=0V			±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=5A	3.3	5.5		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=5A, V_{GS}=10V		37	48	mΩ
	R_{DS}(on)2	I_D=3A, V_{GS}=4.5V		56	78	mΩ
	R_{DS}(on)3	I_D=3A, V_{GS}=4V		64	90	mΩ

Marking : W340

Continued on next page.

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

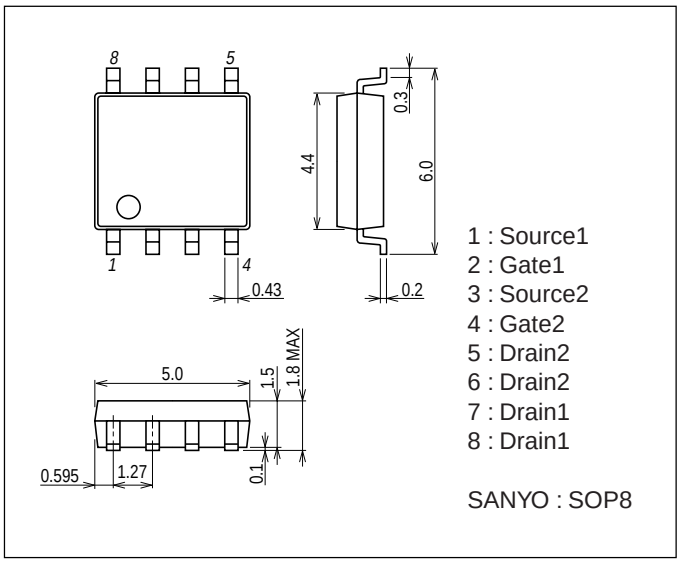
Continued from preceding page.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		460		pF
Output Capacitance	Coss	V_{DS}=10V, f=1MHz		95		pF
Reverse Transfer Capacitance	Crss	V_{DS}=10V, f=1MHz		75		pF
Turn-ON Delay Time	t_{d}(on)	See specified Test Circuit.		11		ns
Rise Time	t_{r}	See specified Test Circuit.		20		ns
Turn-OFF Delay Time	t_{d}(off)	See specified Test Circuit.		30		ns
Fall Time	t_{f}	See specified Test Circuit.		20		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=10V, I_{D}=5A		8.6		nC
Gate-to-Source Charge	Qgs	V_{DS}=10V, V_{GS}=10V, I_{D}=5A		2.0		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=10V, V_{GS}=10V, I_{D}=5A		1.6		nC
Diode Forward Voltage	V_{SD}	I_{S}=5A, V_{GS}=0V		0.9	1.2	V
[P-channel]						
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}=±16V, V_{DS}=0V			±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}=–5A	4.5	7.5		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_{D}=–5A, V_{GS}=–10V		41	53	mΩ
	R_{DS}(on)2	I_{D}=–3A, V_{GS}=–4.5V		62	87	mΩ
	R_{DS}(on)3	I_{D}=–3A, V_{GS}=–4V		70	98	mΩ
Input Capacitance	Ciss	V_{DS}=–10V, f=1MHz		1000		pF
Output Capacitance	Coss	V_{DS}=–10V, f=1MHz		195		pF
Reverse Transfer Capacitance	Crss	V_{DS}=–10V, f=1MHz		150		pF
Turn-ON Delay Time	t_{d}(on)	See specified Test Circuit.		13		ns
Rise Time	t_{r}	See specified Test Circuit.		82		ns
Turn-OFF Delay Time	t_{d}(off)	See specified Test Circuit.		87		ns
Fall Time	t_{f}	See specified Test Circuit.		55		ns
Total Gate Charge	Qg	V_{DS}=–10V, V_{GS}=–10V, I_{D}=–5A		16.5		nC
Gate-to-Source Charge	Qgs	V_{DS}=–10V, V_{GS}=–10V, I_{D}=–5A		2.5		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=–10V, V_{GS}=–10V, I_{D}=–5A		2.5		nC
Diode Forward Voltage	V_{SD}	I_{S}=–5A, V_{GS}=0V		–0.85	–1.5	V

Package Dimensions

unit : mm

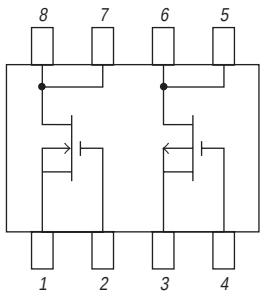
7005-003



1 : Source1
2 : Gate1
3 : Source2
4 : Gate2
5 : Drain2
6 : Drain2
7 : Drain1
8 : Drain1

SANYO : SOP8

Electrical Connection

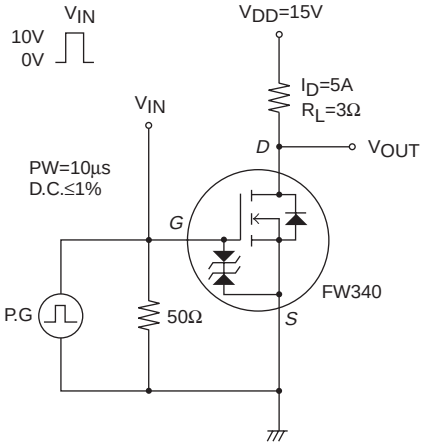


1 : Source1
2 : Gate1
3 : Source2
4 : Gate2
5 : Drain2
6 : Drain2
7 : Drain1
8 : Drain1

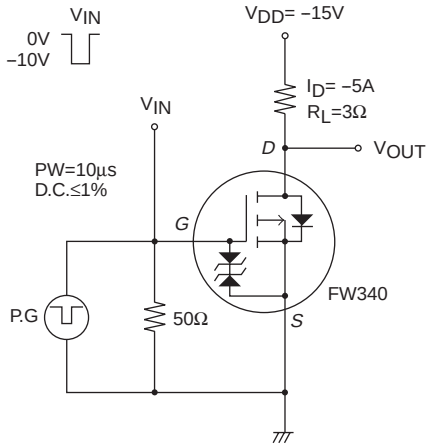
Top view

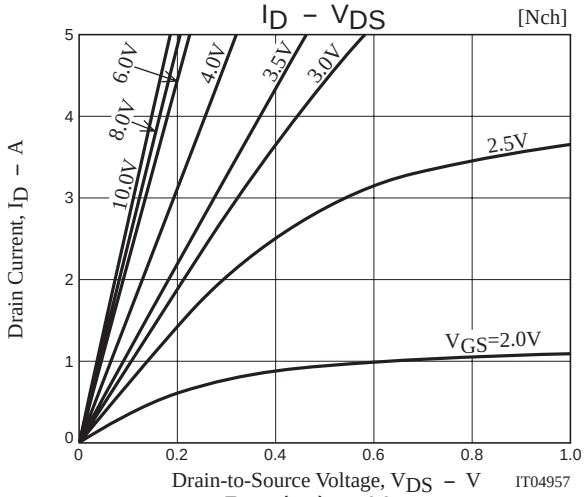
Switching Time Test Circuit

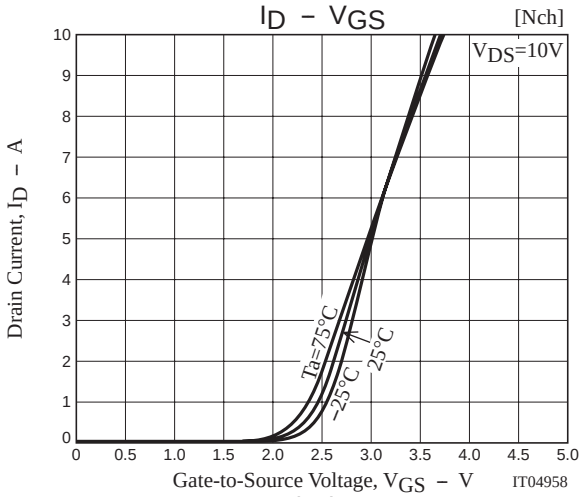
[N-channel]

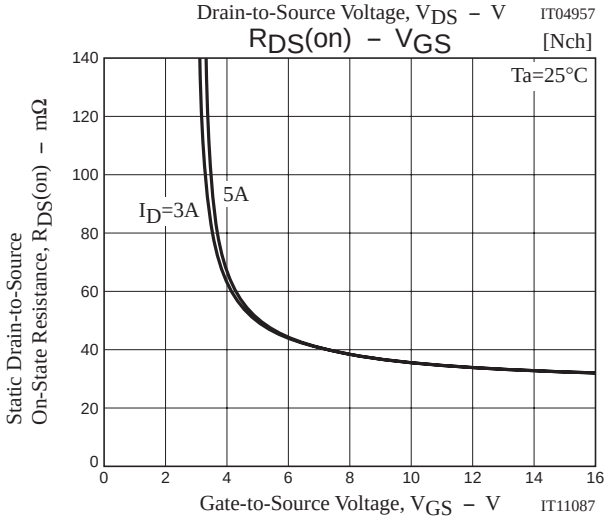


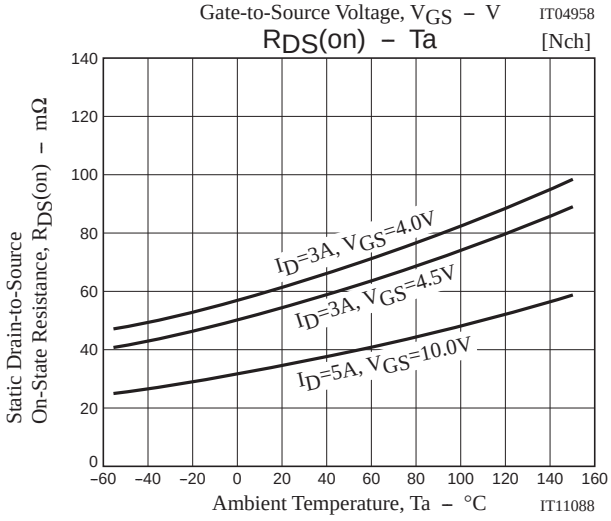
[P-channel]

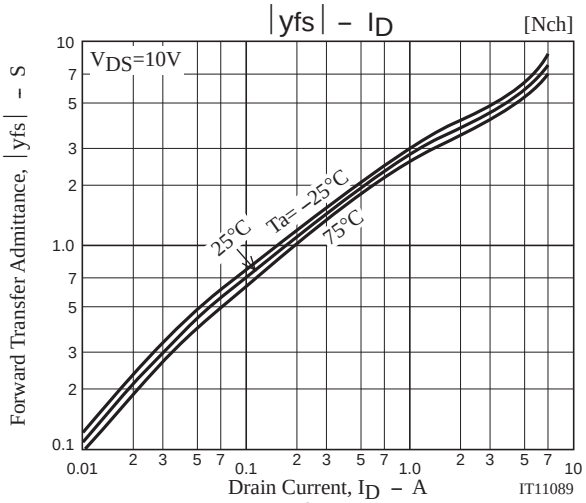


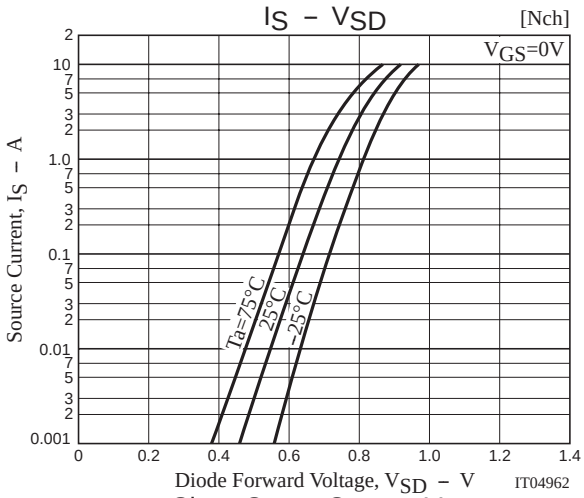


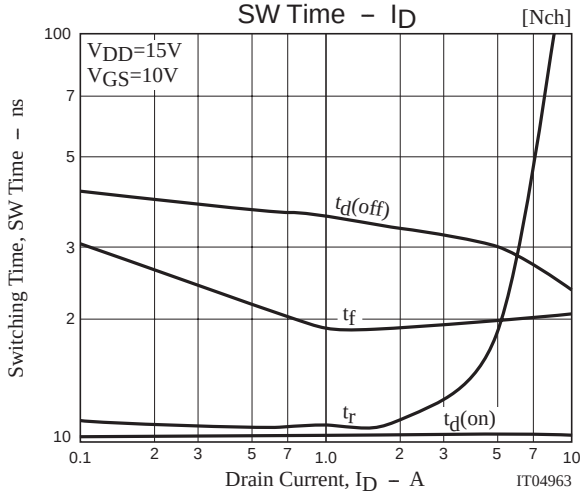


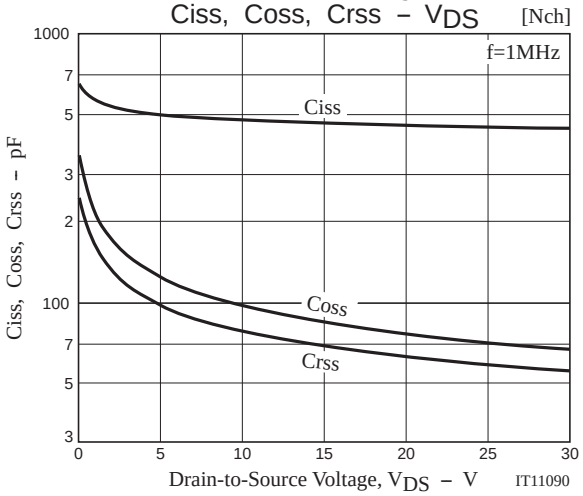


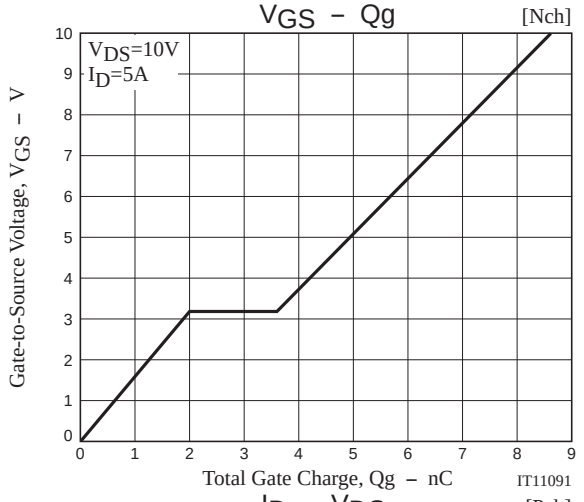


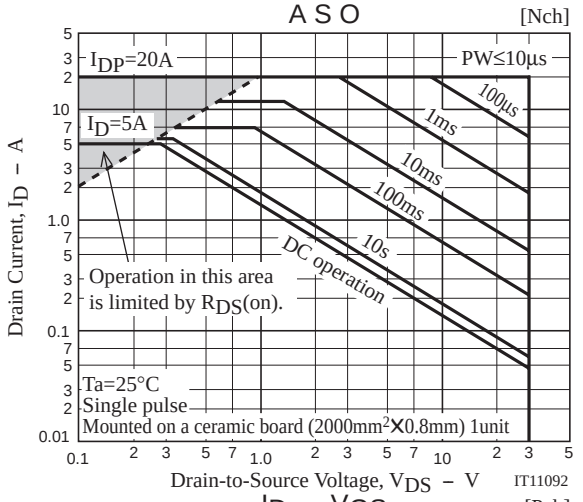

|yfs| – ID
[Nch]
VDS=10V
25°C
Ta=–25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT11089

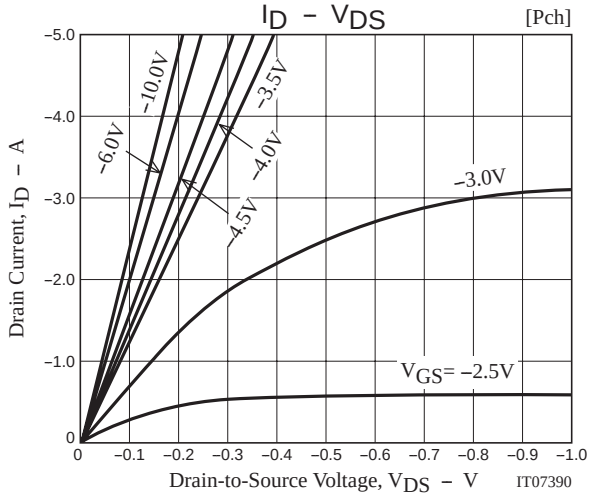

IS – VSD
[Nch]
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT04962

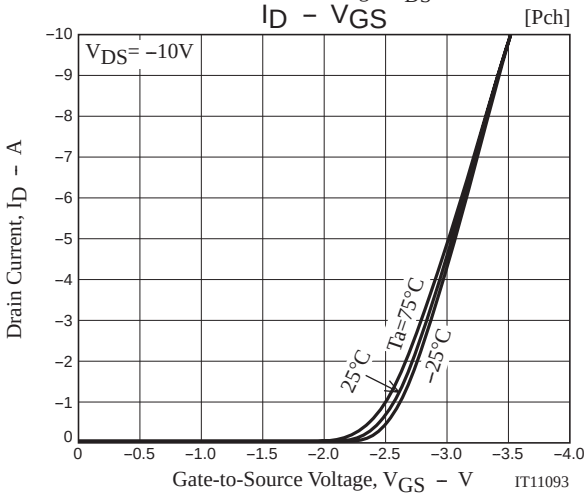

SW Time – ID
[Nch]
VDD=15V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT04963

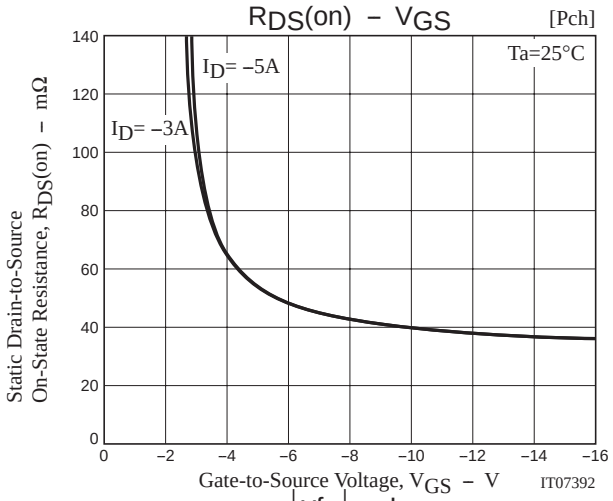

Ciss, Coss, Crss – VDS
[Nch]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT11090

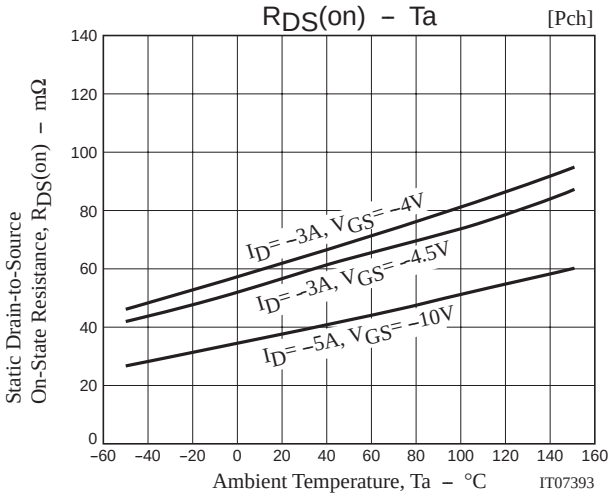

VGS – Qg
[Nch]
VDS=10V
ID=5A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT11091

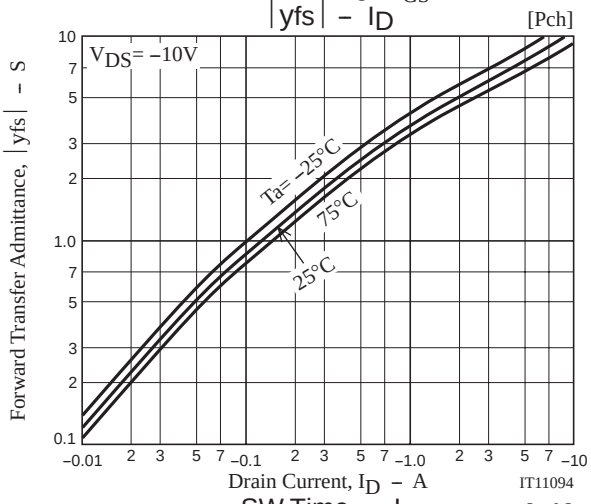

A S O
[Nch]
IDP=20A
PW≤10μs
ID=5A
100μs
1ms
10ms
100ms
10s
DC operation
Operation in this area
is limited by RDS(on).
Ta=25°C
Single pulse
Mounted on a ceramic board (2000mm²×0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT11092

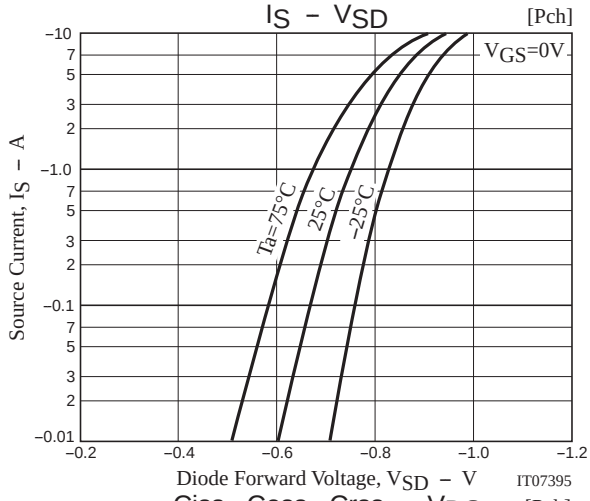

ID – VDS
[Pch]
–10.0V
–6.0V
–3.5V
–4.0V
–4.5V
–3.0V
VGS= –2.5V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT07390

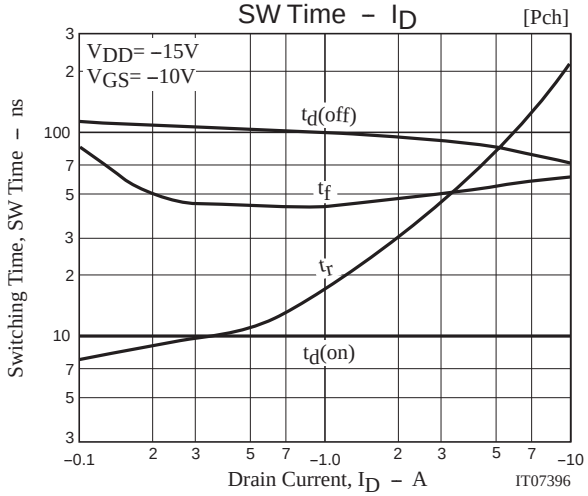

ID – VGS
[Pch]
VDS= –10V
Ta=75°C
25°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT11093

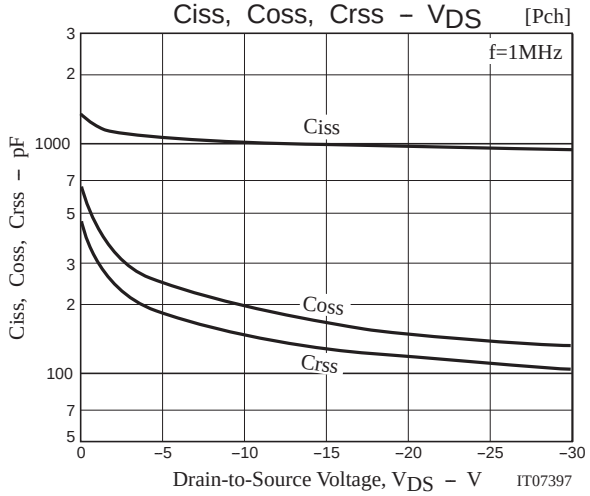

RDS(on) – VGS
[Pch]
Ta=25°C
ID= –5A
ID= –3A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT07392

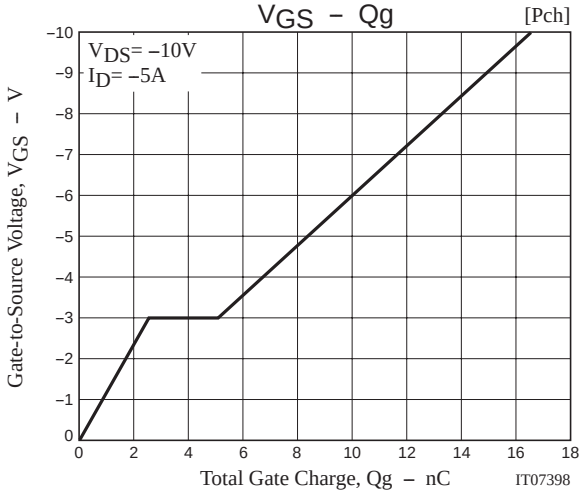

RDS(on) – Ta
[Pch]
ID= –3A, VGS= –4V
ID= –3A, VGS= –4.5V
ID= –5A, VGS= –10V
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT07393

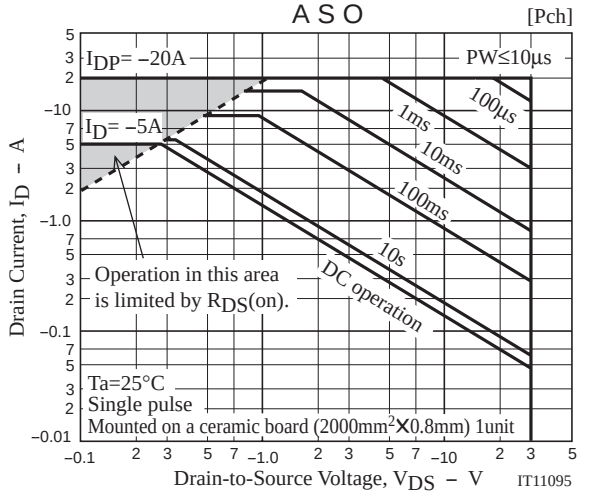

|yfs| – ID
[Pch]
VDS= –10V
Ta= –25°C
75°C
25°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT11094

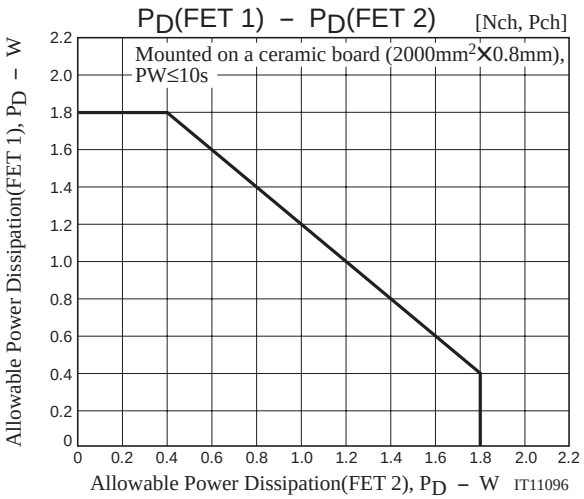

IS – VSD
[Pch]
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT07395

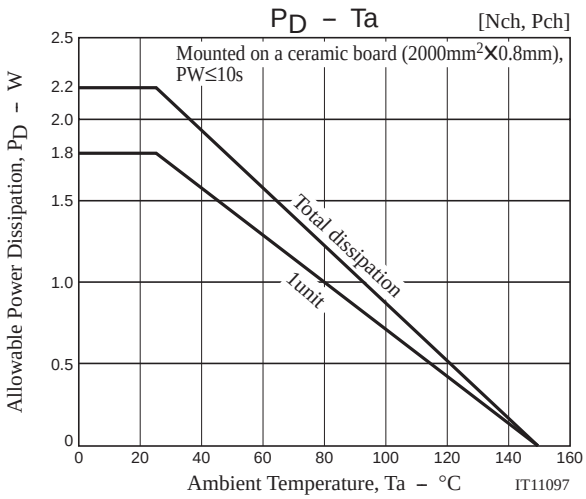

SW Time – ID
[Pch]
VDD= –15V
VGS= –10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT07396


Ciss, Coss, Crss – VDS
[Pch]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT07397


VGS – Qg
[Pch]
VDS= –10V
ID= –5A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT07398


A S O
[Pch]
IDP= –20A
PW≤10μs
ID= –5A
100μs
1ms
10ms
100ms
10s
DC operation
Operation in this area is limited by RDS(on).
Ta=25°C
Single pulse
Mounted on a ceramic board (2000mm²×0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT11095





Note on usage : Since the FW340 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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