Ordering number : ENA0473

SANYO Semiconductors
DATA SHEET

N-Channel and P-Channel Silicon MOSFETs

CPH6619 — General-Purpose Switching Device Applications

Features

- Composite type of a low on-resistance ultra-high switching P-channel MOSFET and a small signal N-channel MOSFET for driving P-channel MOSFET enables high-density mounting.
- Excellent ON-resistance characterristic.
- Best suited for load switches.
- N-channel 1.5V drive, P-channel 1.8V drive.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	V_{DSS}		30	−12	V
Gate-to-Source Voltage	V_{GSS}		±10	±8	V
Drain Current (DC)	I_D		0.4	−2	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	1.6	−8	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (900mm²X0.8mm) 1unit	0.8		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}=±8V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=100μA	0.4		1.3	V
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=10V, I_D=80mA	0.13	0.22		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=80mA, V_{GS}=4V		2.9	3.7	Ω
	R_{DS}(on)2	I_D=40mA, V_{GS}=2.5V		3.7	5.2	Ω
	R_{DS}(on)3	I_D=10mA, V_{GS}=1.5V		6.4	12.8	Ω
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		7		pF
Output Capacitance	Coss	V_{DS}=10V, f=1MHz		5.9		pF
Reverse Transfer Capacitance	Crss	V_{DS}=10V, f=1MHz		2.3		pF

Marking : WF

Continued on next page.

■ Any and all SANYO Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO Semiconductor representative nearest you before usingany SANYO Semiconductor products described or contained herein in such applications.

■ SANYO Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO Semiconductor products described or contained herein.

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

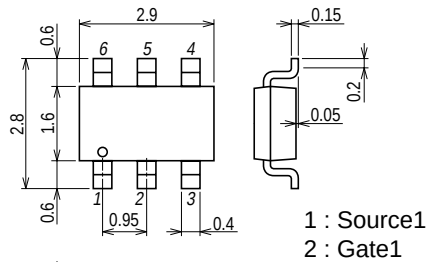
Continued from preceding page.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		19		ns
Rise Time	t_r	See specified Test Circuit.		65		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		155		ns
Fall Time	t_f	See specified Test Circuit.		120		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=10V, I_D=150mA		1.58		nC
Gate-to-Source Charge	Qgs	V_{DS}=10V, V_{GS}=10V, I_D=150mA		0.26		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=10V, V_{GS}=10V, I_D=150mA		0.31		nC
Diode Forward Voltage	V_{SD}	I_S=150mA, V_{GS}=0V		0.87	1.2	V
[P-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=−1mA, V_{GS}=0V	−12			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=−12V, V_{GS}=0V			−10	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±6.4V, V_{DS}=0V			±10	μA
Cutoff Voltage	$V_{GS(off)}$	V_{DS}=−6V, I_D=−1mA	−0.3		−1.0	V
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=−6V, I_D=−1A	1.74	2.9		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	I_D=−1A, V_{GS}=−4.5V		130	165	mΩ
	$R_{DS(on)2}$	I_D=−0.5A, V_{GS}=−2.5V		180	245	mΩ
	$R_{DS(on)3}$	I_D=−0.2A, V_{GS}=−1.8V		240	350	mΩ
Input Capacitance	Ciss	V_{DS}=−6V, f=1MHz		310		pF
Output Capacitance	Coss	V_{DS}=−6V, f=1MHz		90		pF
Reverse Transfer Capacitance	Crss	V_{DS}=−6V, f=1MHz		80		pF
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		14		ns
Rise Time	t_r	See specified Test Circuit.		53		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		53		ns
Fall Time	t_f	See specified Test Circuit.		52		ns
Total Gate Charge	Qg	V_{DS}=−6V, V_{GS}=−4.5V, I_D=−2.0A		4.6		nC
Gate-to-Source Charge	Qgs	V_{DS}=−6V, V_{GS}=−4.5V, I_D=−2.0A		0.7		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=−6V, V_{GS}=−4.5V, I_D=−2.0A		1.3		nC
Diode Forward Voltage	V_{SD}	I_S=−2.0A, V_{GS}=0V		−0.89	−1.5	V

Package Dimensions

unit : mm (typ)

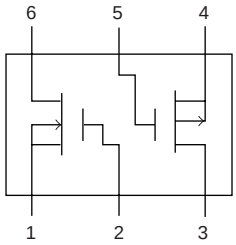
7018A-007



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

SANYO : CPH6

Electrical Connection

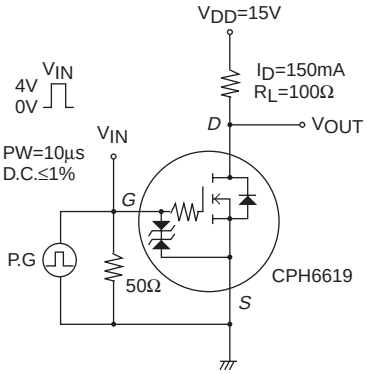


1 : Source1
2 : Gate1
3 : Drain2
4 : Source2
5 : Gate2
6 : Drain1

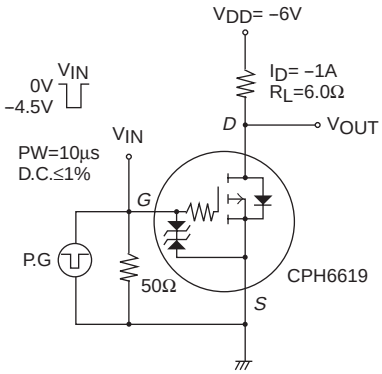
Top view

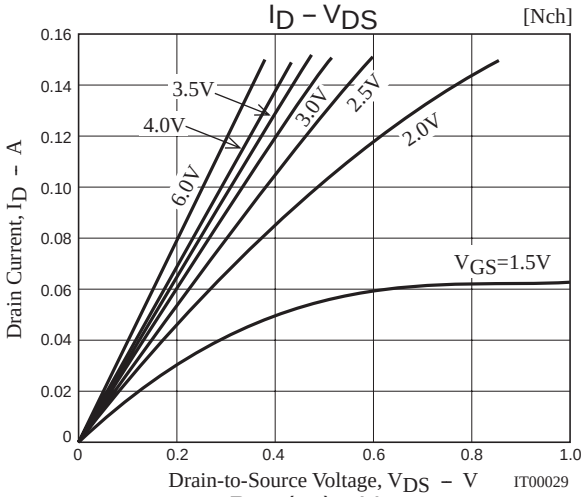
Switching Time Test Circuit

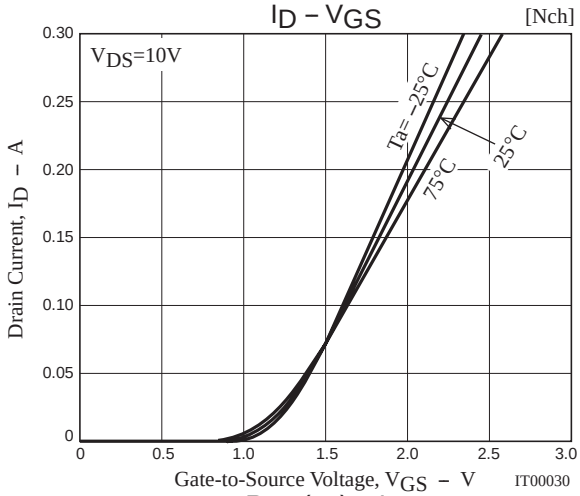
[N-channel]

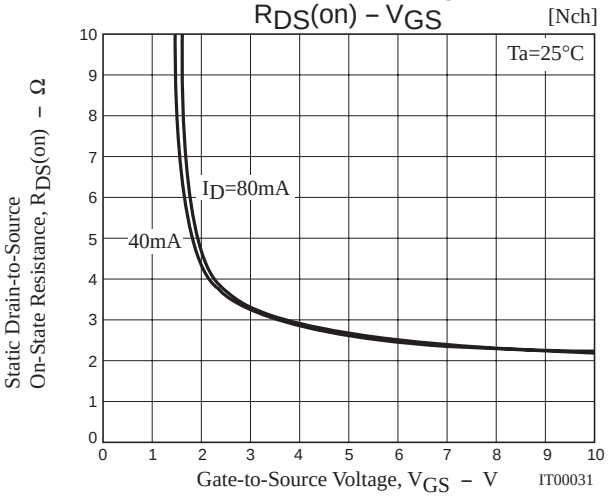


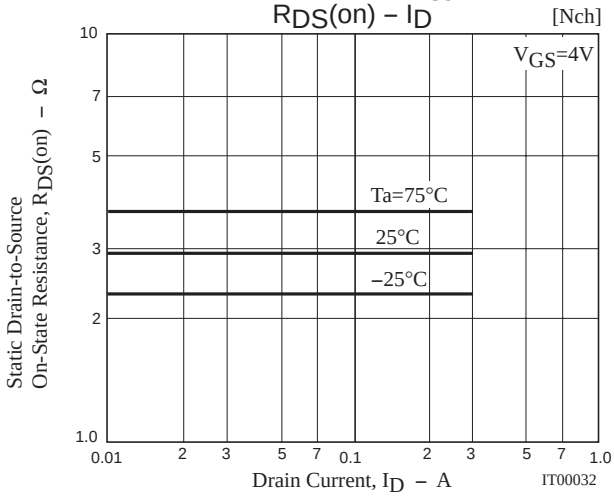
[P-channel]

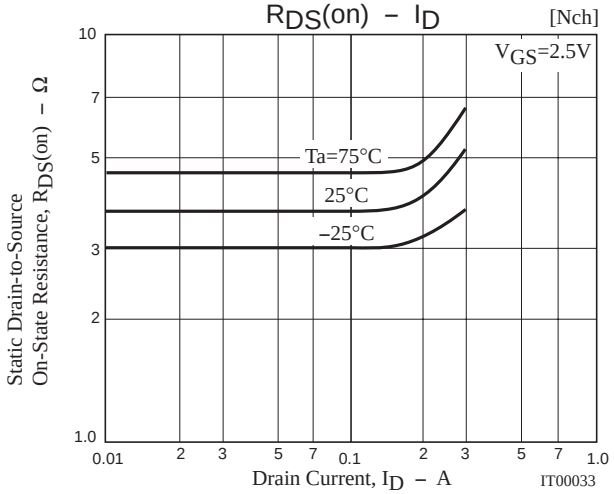


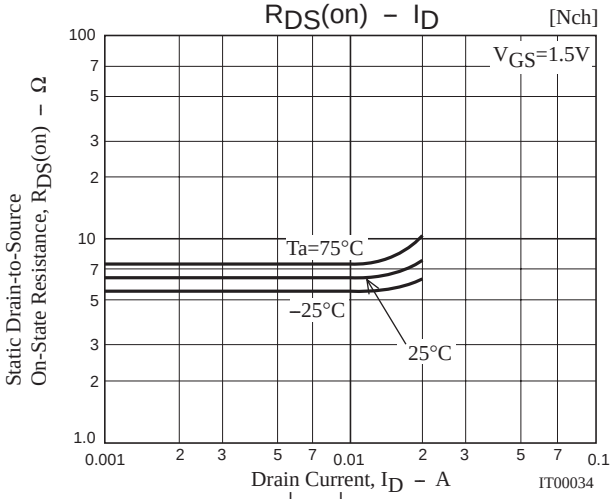


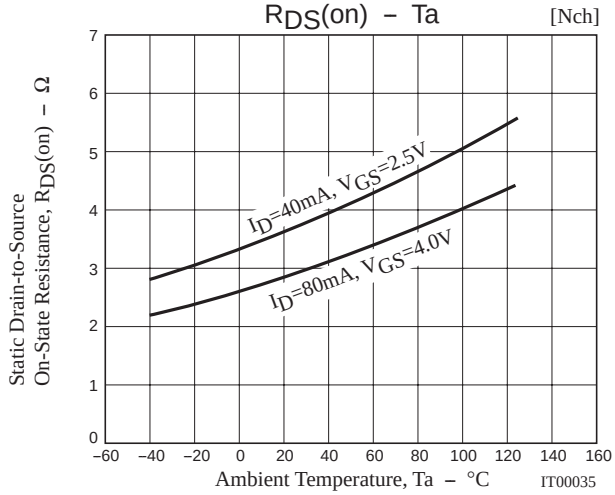


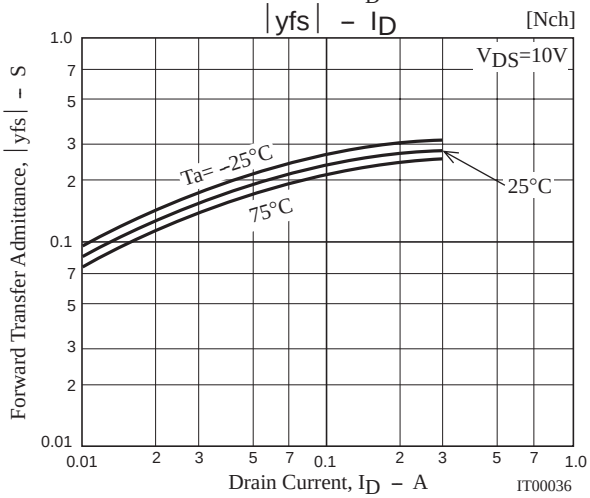


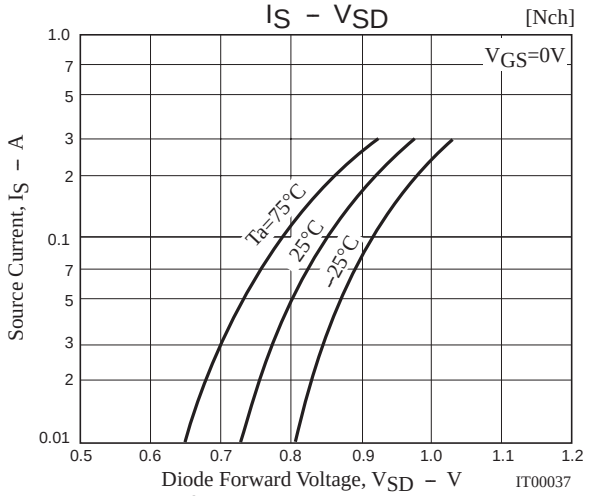


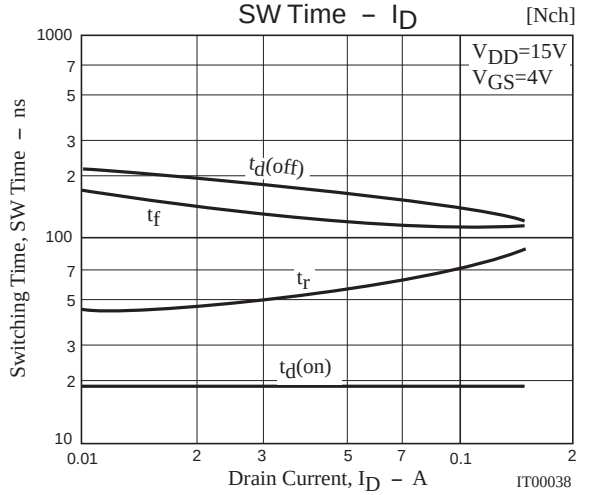

RDS(on) – ID
[Nch]
VGS=2.5V
Ta=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Drain Current, ID – A
IT00033

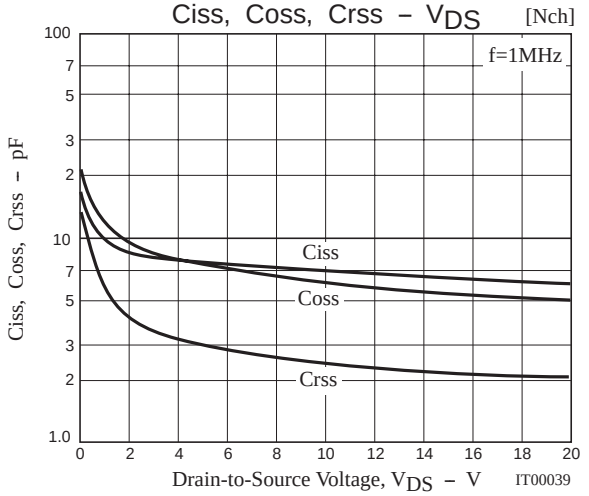

RDS(on) – ID
[Nch]
VGS=1.5V
Ta=75°C
–25°C
25°C
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Drain Current, ID – A
IT00034

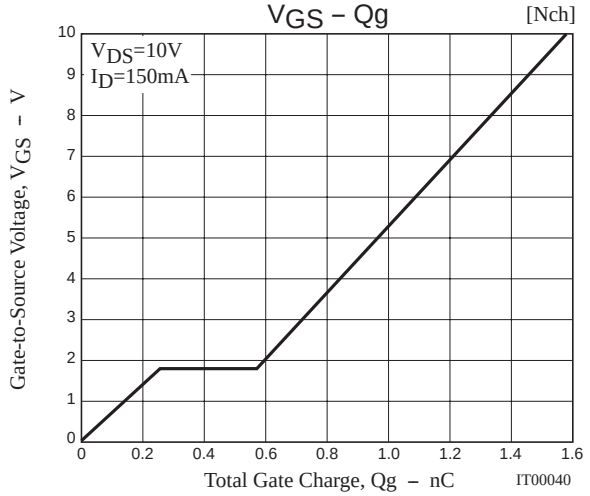

RDS(on) – Ta
[Nch]
ID=40mA, VGS=2.5V
ID=80mA, VGS=4.0V
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Ambient Temperature, Ta – °C
IT00035

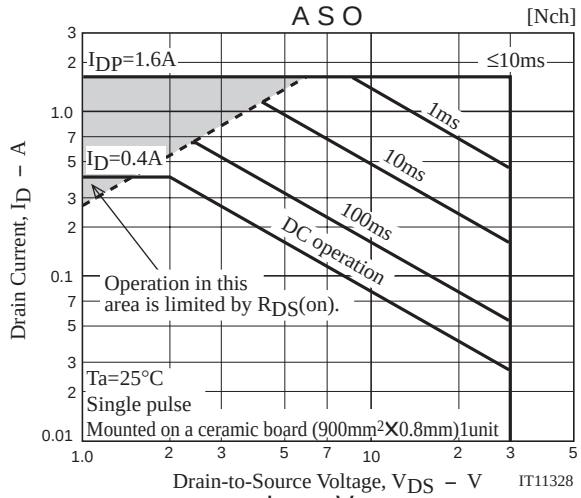

|yfs| – ID
[Nch]
VDS=10V
Ta= –25°C
75°C
25°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT00036

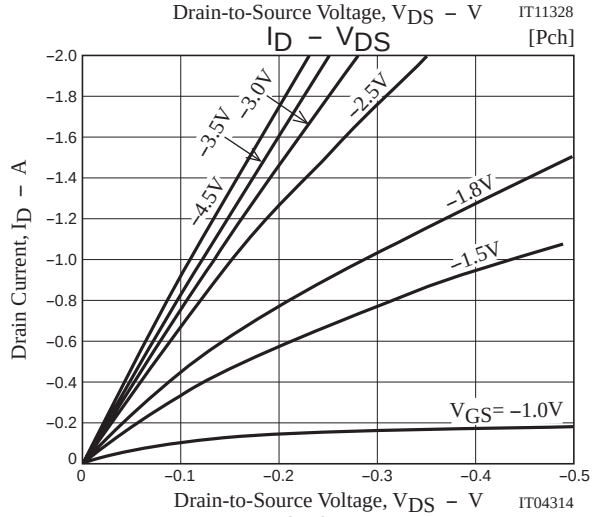

IS – VSD
[Nch]
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT00037

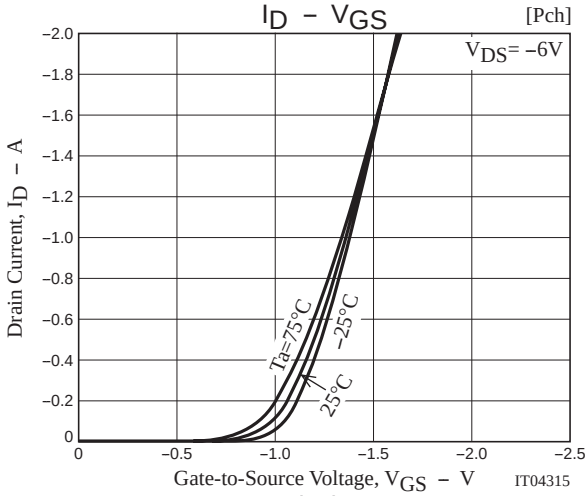

SW Time – ID
[Nch]
VDD=15V
VGS=4V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT00038

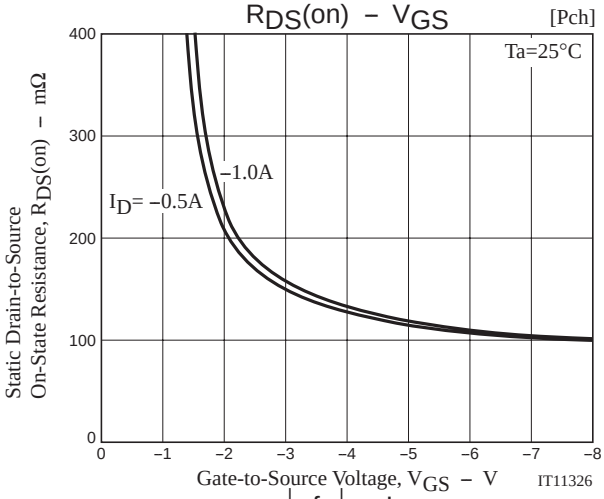

Ciss, Coss, Crss – VDS
[Nch]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT00039

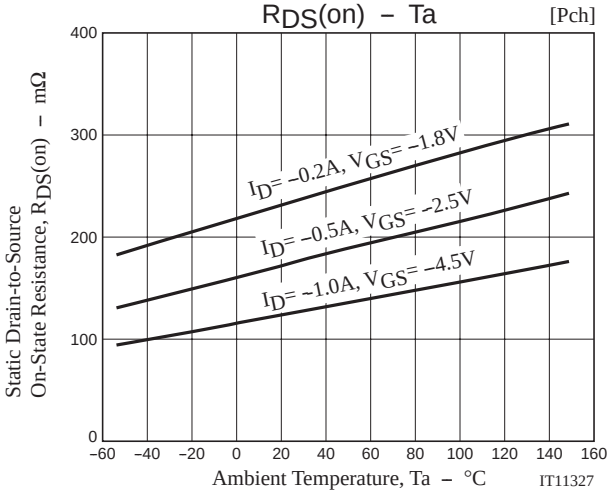

VGS – Qg
[Nch]
VDS=10V
ID=150mA
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT00040

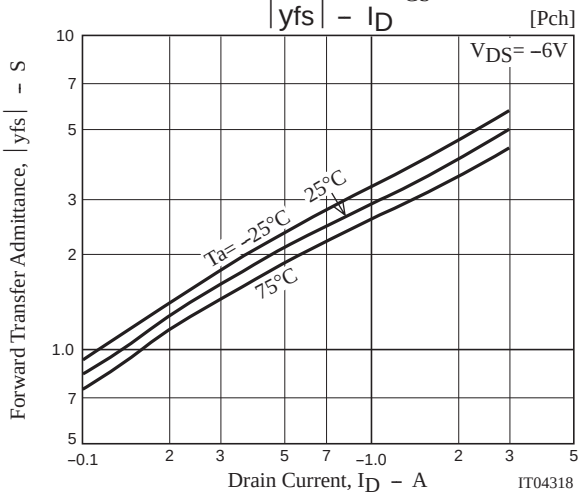

A S O
[Nch]
IDP=1.6A
≤10ms
1ms
10ms
100ms
DC operation
ID=0.4A
Operation in this area is limited by RDS(on).
Ta=25°C
Single pulse
Mounted on a ceramic board (900mm²×0.8mm)1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT11328

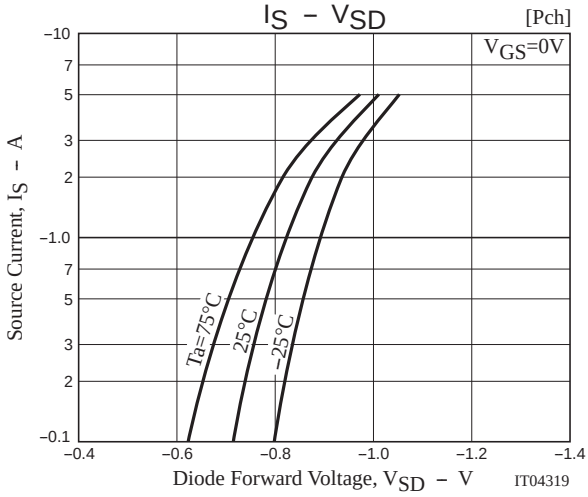

ID – VDS
[Pch]
–3.5V
–3.0V
–2.5V
–4.5V
–1.8V
–1.5V
VGS= –1.0V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT04314

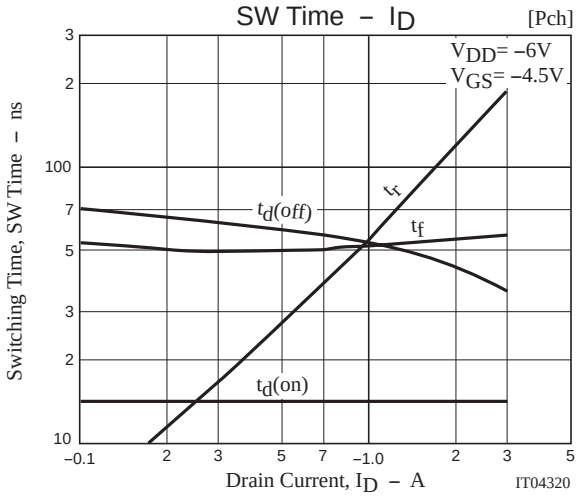

ID – VGS
[Pch]
VDS= –6V
Ta=75°C
–25°C
25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT04315

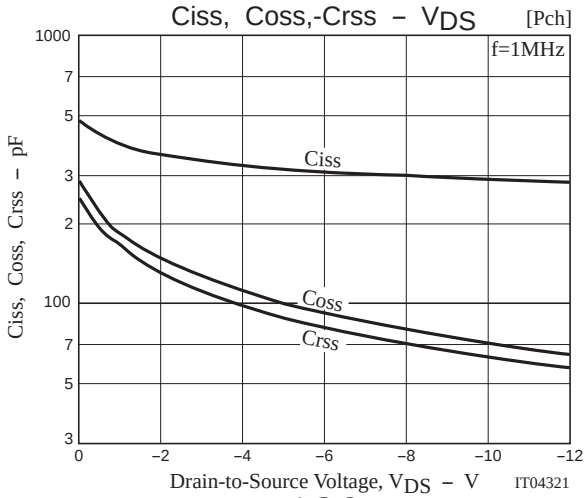

RDS(on) – VGS
[Pch]
Ta=25°C
–1.0A
ID= –0.5A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT11326

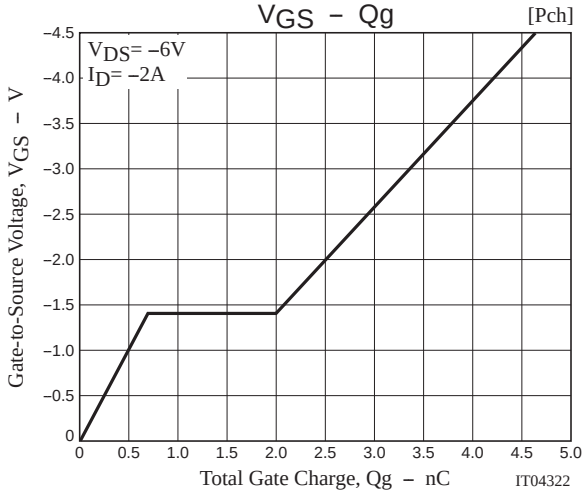

RDS(on) – Ta
[Pch]
ID= –0.2A, VGS= –1.8V
ID= –0.5A, VGS= –2.5V
ID= –1.0A, VGS= –4.5V
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT11327

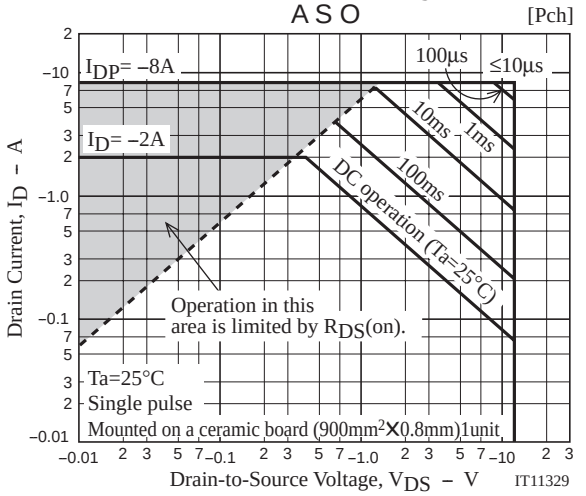

|yfs| – ID
[Pch]
VDS= –6V
Ta= –25°C
25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT04318

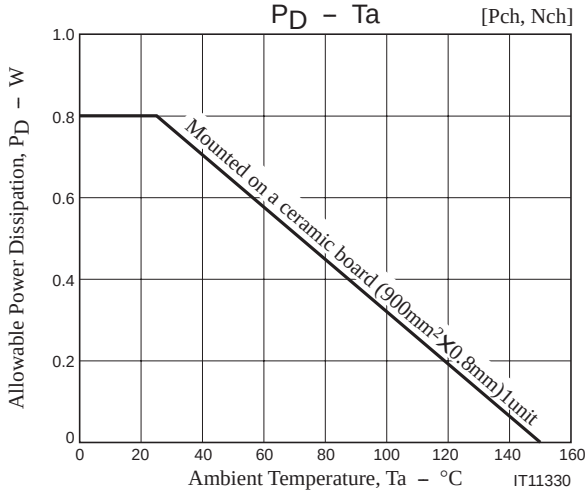

IS – VSD
[Pch]
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT04319


SW Time – ID
[Pch]
VDD= –6V
VGS= –4.5V
tr
td(off)
tf
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT04320


Ciss, Coss,-Crss – VDS
[Pch]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT04321


VGS – Qg
[Pch]
VDS= –6V
ID= –2A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT04322


ASO
[Pch]
IDP= –8A
100µs
≤10µs
10ms
1ms
ID= –2A
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 (900mm2X0.8mm)1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT11329


PD – Ta
[Pch, Nch]
Mounted on a ceramic board (900mm2X0.8mm)1unit
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT11330

Note on usage : Since the CPH6619 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

- Specifications of any and all SANYO Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- SANYO Semiconductor Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO Semiconductor products (including technical data,services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of SANYO Semiconductor Co., Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO Semiconductor product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of July, 2006. Specifications and information herein are subject to change without notice.