Ordering number : ENN7274

N-Channel and P-Channel Silicon MOSFETs

FW307

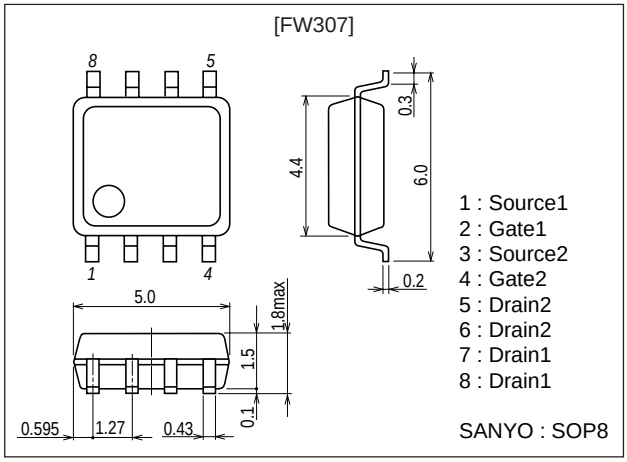
Ultrahigh-Speed Switching Applications

Features

- The FW307 incorporates an N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance and high-speed switching, thereby enabling high-density mounting.
- Excellent ON-resistance characteristic.

Package Dimensions

unit : mm
2129



Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings		Unit
			N-channel	P-channel	
Drain-to-Source Voltage	V_{DSS}		250	−250	V
Gate-to-Source Voltage	V_{GSS}		±30	±30	V
Drain Current (DC)	I_D		1	−0.7	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	5	−3	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (900mm²X0.8mm)1unit	1.7		W
Total Dissipation	P_T	Mounted on a ceramic board (900mm²X0.8mm)	2.0		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}=0	250			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=250V, V_{GS}=0			100	μA
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=15V, V_{GS}=0, Ta=0 to 60°C			4	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±25V, V_{DS}=0			±10	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±15V, V_{DS}=0, Ta=0 to 60°C			±1.2	μA

Continued on next page.

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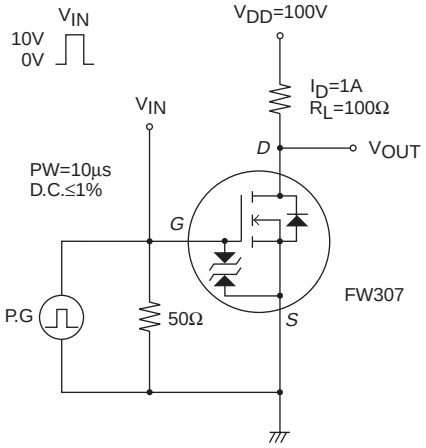
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

Continued from preceding page.

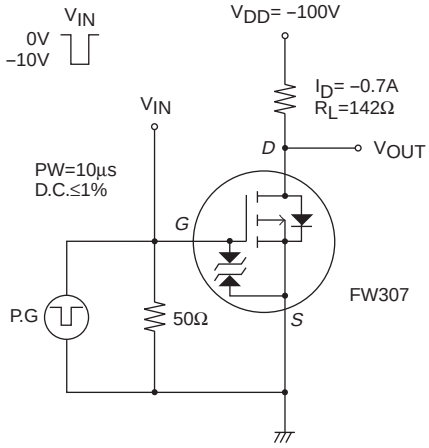
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	1.5		2.5	V
Forward Transfer Admittance	|yfs|	V_{DS}=10V, I_D=1A	1.4	2.1		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)	I_D=1A, V_{GS}=10V		1.2	1.6	Ω
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		160		pF
Output Capacitance	Coss	V_{DS}=20V, f=1MHz		40		pF
Reverse Transfer Capacitance	Crss	V_{DS}=20V, f=1MHz		15		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		10		ns
Rise Time	t_r	See specified Test Circuit.		15		ns
Turn-OFF Delay Time	t_d(off)	See specified Test Circuit.		80		ns
Fall Time	t_f	See specified Test Circuit.		30		ns
Diode Forward Voltage	V_{SD}	I_S=1A, V_{GS}=0		1.0	1.2	V
[P-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=−1mA, V_{GS}=0	−250			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=−250V, V_{GS}=0			−100	μA
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=15V, V_{GS}=0, Ta=0 to 60°C			−4	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±25V, V_{DS}=0			±10	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±15V, V_{DS}=0, Ta=0 to 60°C			±1.2	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=−10V, I_D=−1mA	−1.5		−2.5	V
Forward Transfer Admittance	|yfs|	V_{DS}=−10V, I_D=−0.7A	0.7	1.1		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)	I_D=−0.7A, V_{GS}=−10V		3	4	Ω
Input Capacitance	Ciss	V_{DS}=−20V, f=1MHz		160		pF
Output Capacitance	Coss	V_{DS}=−20V, f=1MHz		45		pF
Reverse Transfer Capacitance	Crss	V_{DS}=−20V, f=1MHz		20		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		12		ns
Rise Time	t_r	See specified Test Circuit.		15		ns
Turn-OFF Delay Time	t_d(off)	See specified Test Circuit.		90		ns
Fall Time	t_f	See specified Test Circuit.		40		ns
Diode Forward Voltage	V_{SD}	I_S=−1A, V_{GS}=0		−1.0	−1.2	V

Switching Time Test Circuit

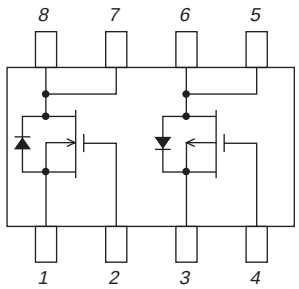
[N-channel]



[P-channel]

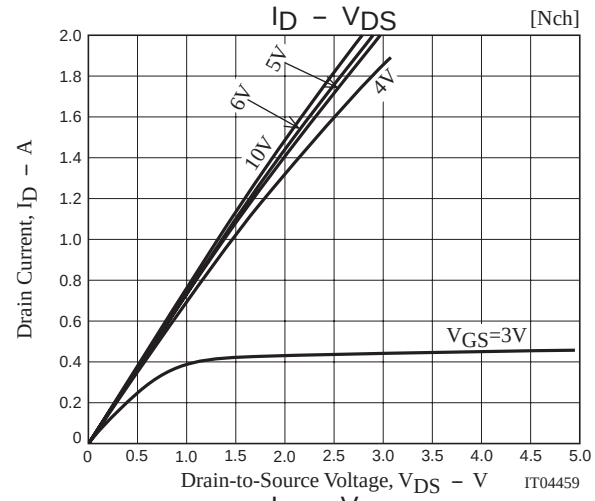


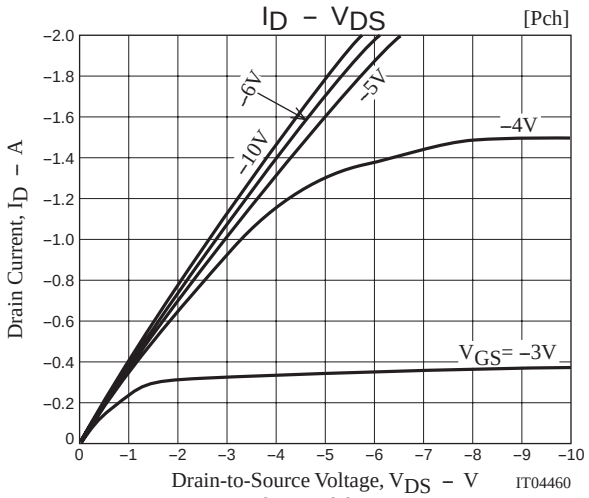
Electrical Connection

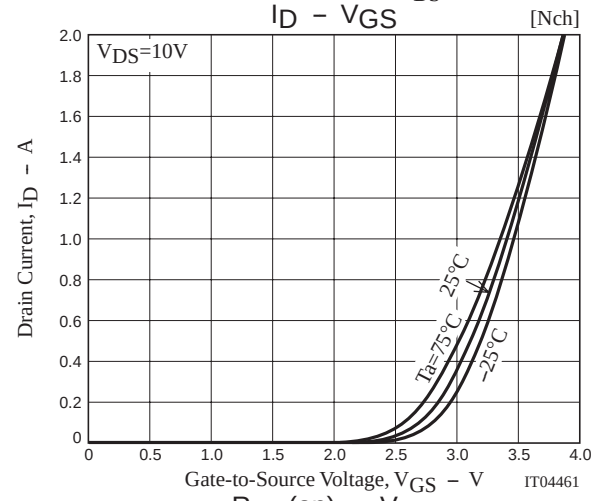


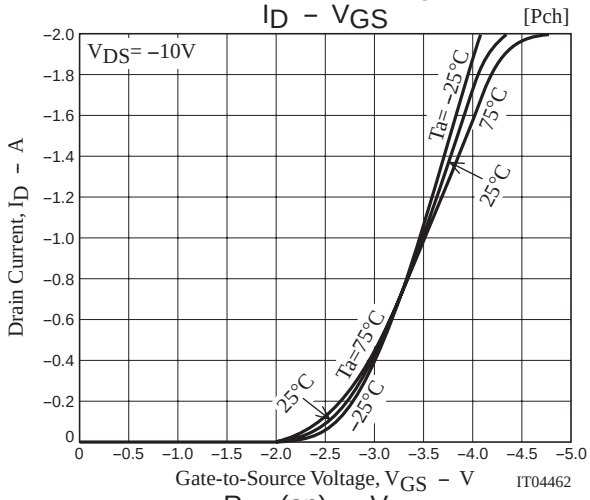
1 : Source1
2 : Gate1
3 : Source2
4 : Gate2
5 : Drain2
6 : Drain2
7 : Drain1
8 : Drain1

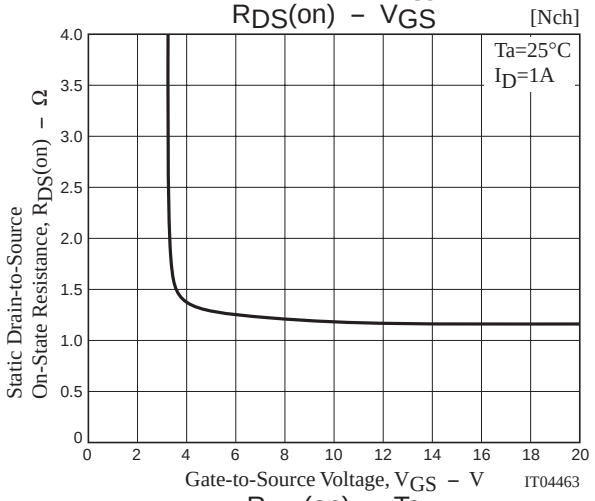
(Top view)

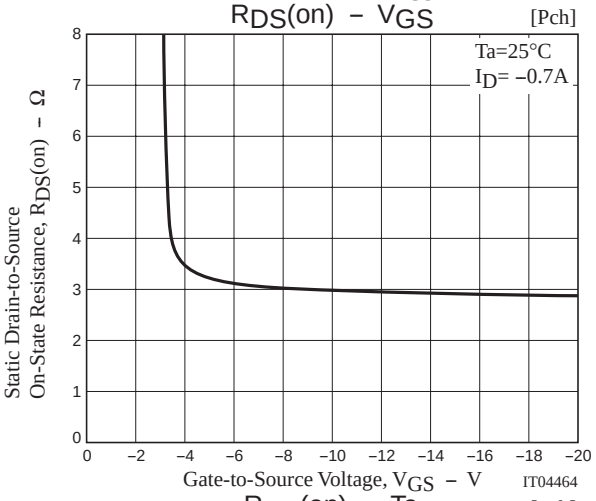

ID – VDS
[Nch]
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT04459
6V
5V
10V
4V
VGS=3V

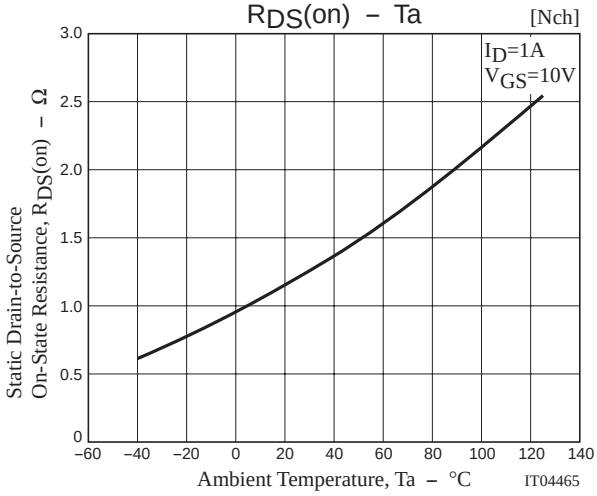

ID – VDS
[Pch]
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT04460
–6V
–5V
–10V
–4V
VGS= –3V

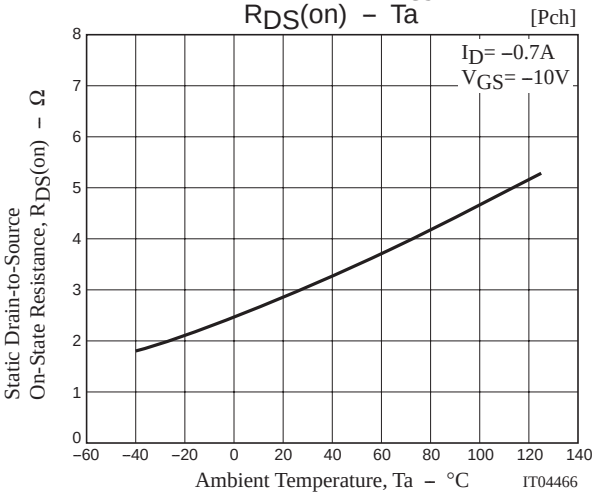

ID – VGS
[Nch]
VDS=10V
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT04461
Ta=75°C
25°C
–25°C

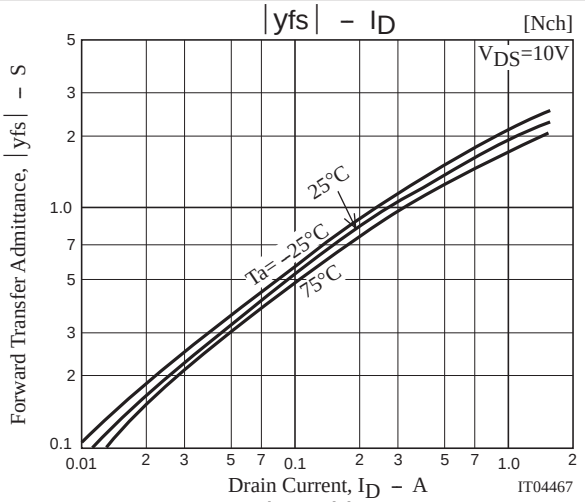

ID – VGS
[Pch]
VDS= –10V
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT04462
Ta= –25°C
75°C
25°C
25°C
Ta=75°C
–25°C

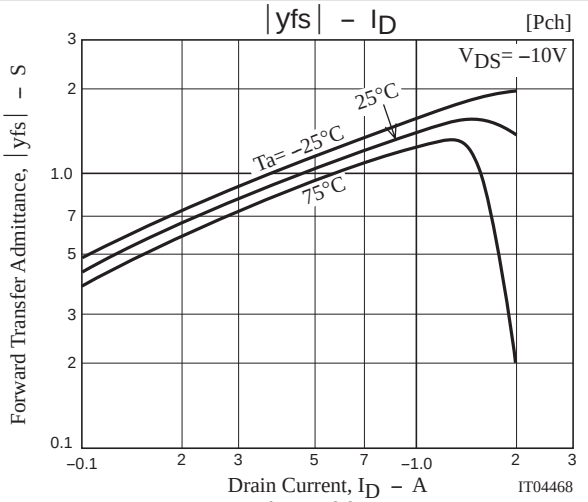

RDS(on) – VGS
[Nch]
Ta=25°C
ID=1A
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Gate-to-Source Voltage, VGS – V
IT04463

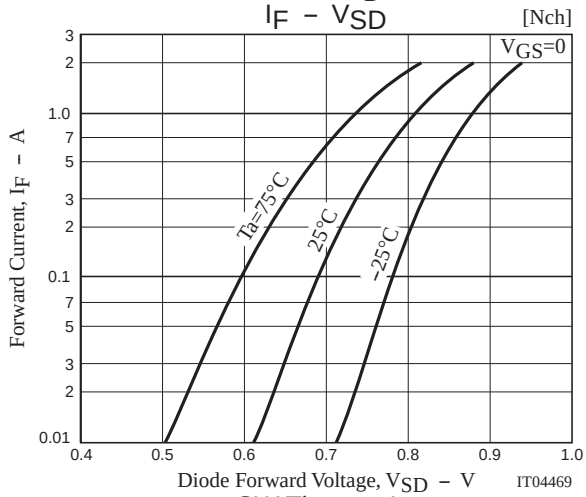

RDS(on) – VGS
[Pch]
Ta=25°C
ID= –0.7A
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Gate-to-Source Voltage, VGS – V
IT04464

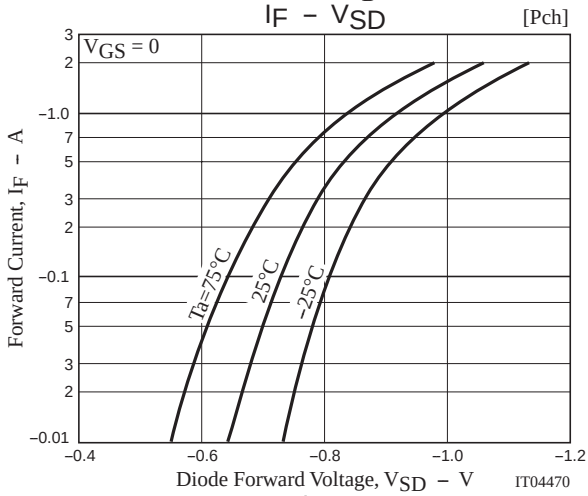

RDS(on) – Ta
[Nch]
ID=1A
VGS=10V
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Ambient Temperature, Ta – °C
IT04465

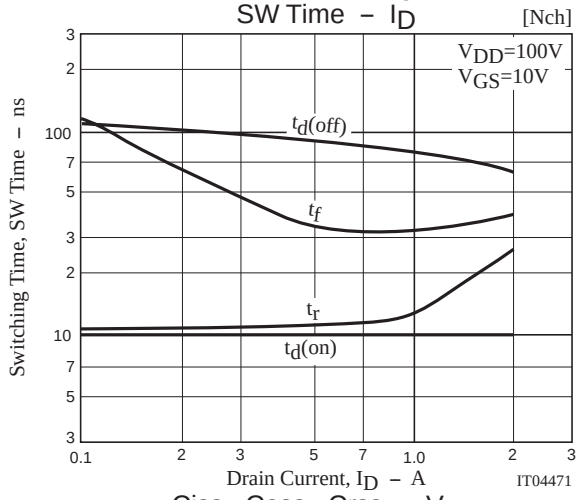

RDS(on) – Ta
[Pch]
ID= –0.7A
VGS= –10V
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Ambient Temperature, Ta – °C
IT04466

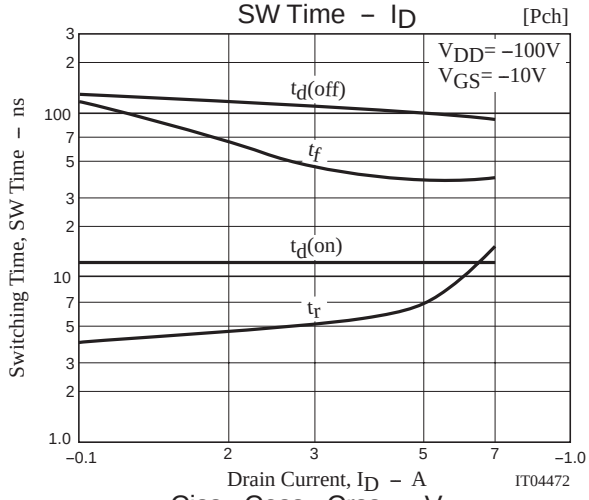

|yfs| – ID
[Nch]
VDS=10V
25°C
Ta= –25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT04467

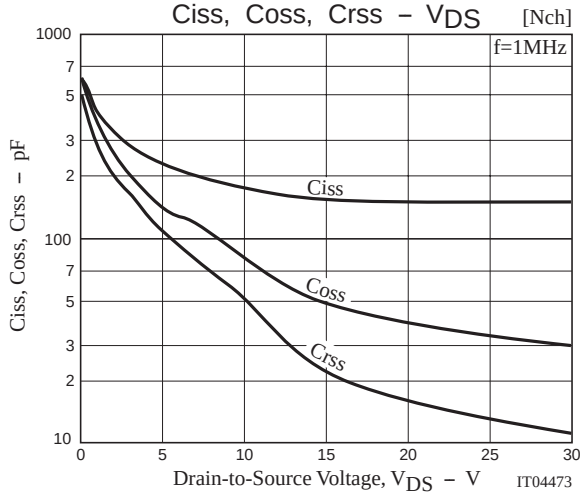

|yfs| – ID
[Pch]
VDS= –10V
25°C
Ta= –25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT04468

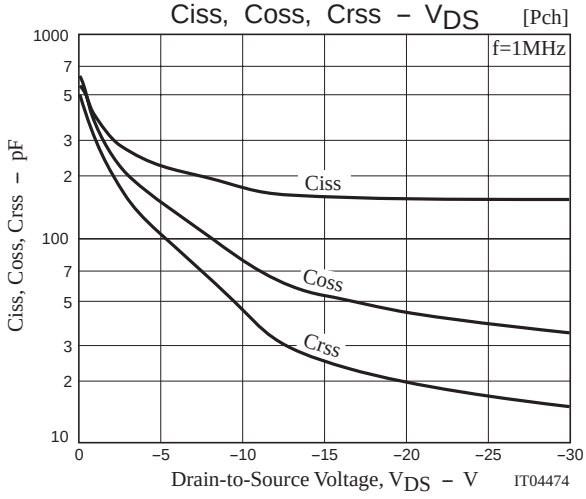

IF – VSD
[Nch]
VGS=0
Ta=75°C
25°C
–25°C
Forward Current, IF – A
Diode Forward Voltage, VSD – V
IT04469


IF – VSD
[Pch]
VGS = 0
Ta=75°C
25°C
–25°C
Forward Current, IF – A
Diode Forward Voltage, VSD – V
IT04470


SW Time – ID
[Nch]
VDD=100V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT04471


SW Time – ID
[Pch]
VDD= –100V
VGS= –10V
td(off)
tf
td(on)
tr
Switching Time, SW Time – ns
Drain Current, ID – A
IT04472


Ciss, Coss, Crss – VDS
[Nch]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT04473


Ciss, Coss, Crss – VDS
[Pch]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT04474