Ordering number : EN8731

SANYO Semiconductors

DATA SHEET

N-Channel and P-Channel Silicon MOSFETs

EMH2601 — General-Purpose Switching Device Applications

Features

- The EMH2601 incorporates an N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance and ultrahigh-speed switching, thereby enabling high-density mounting.
- 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}		20	-20	V
Gate-to-Source Voltage	V_{GSS}		±10	±10	V
Drain Current (DC)	I_D		3	-2	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	12	-8	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (900mm²X0.8mm) 1unit	1.0		W
Total Dissipation	P_T	Mounted on a ceramic board (900mm²X0.8mm)	1.2		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	20			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, 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=1mA	0.4		1.3	V
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=10V, I_D=1.5A	2.4	4.0		S
Static Drain-to-Source On-State Resistance	$R_{DS}(on)1$	I_D=1.5A, V_{GS}=4V		58	76	mΩ
	$R_{DS}(on)2$	I_D=0.8A, V_{GS}=2.5V		71	99	mΩ
	$R_{DS}(on)3$	I_D=0.3A, V_{GS}=1.8V		98	150	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		365		pF
Output Capacitance	Coss	V_{DS}=10V, f=1MHz		77		pF
Reverse Transfer Capacitance	Crss	V_{DS}=10V, f=1MHz		67		pF

Marking : FA

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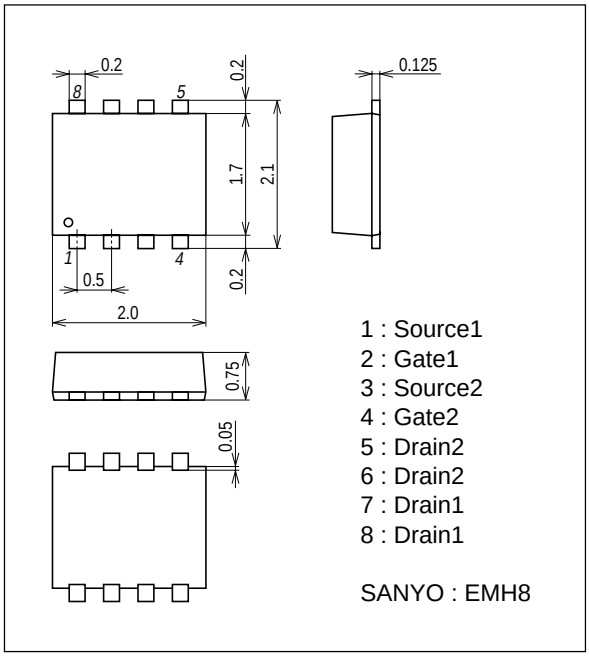
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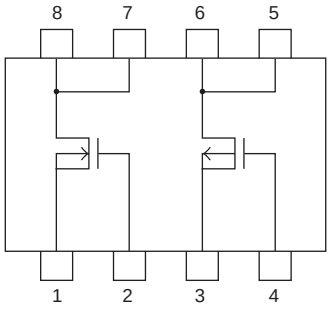
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		11.2		ns
Rise Time	t_r	See specified Test Circuit.		45		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		42		ns
Fall Time	t_f	See specified Test Circuit.		46		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=4V, I_D=3A		4.9		nC
Gate-to-Source Charge	Qgs	V_{DS}=10V, V_{GS}=4V, I_D=3A		0.7		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=10V, V_{GS}=4V, I_D=3A		2.0		nC
Diode Forward Voltage	V_{SD}	I_S=3A, V_{GS}=0V		0.85	1.2	V
[P-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=–1mA, V_{GS}=0V	–20			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=–20V, 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=–1mA	–0.4		–1.4	V
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=–10V, I_D=–1A	1.9	3.2		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	I_D=–1A, V_{GS}=–4V		115	150	mΩ
	$R_{DS(on)2}$	I_D=–0.5A, V_{GS}=–2.5V		165	235	mΩ
	$R_{DS(on)3}$	I_D=–0.3A, V_{GS}=1.8V		260	520	mΩ
Input Capacitance	Ciss	V_{DS}=–10V, f=1MHz		420		pF
Output Capacitance	Coss	V_{DS}=–10V, f=1MHz		73		pF
Reverse Transfer Capacitance	Crss	V_{DS}=–10V, f=1MHz		60		pF
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		11.8		ns
Rise Time	t_r	See specified Test Circuit.		33		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		48		ns
Fall Time	t_f	See specified Test Circuit.		43		ns
Total Gate Charge	Qg	V_{DS}=–10V, V_{GS}=–4V, I_D=–2A		4.7		nC
Gate-to-Source Charge	Qgs	V_{DS}=–10V, V_{GS}=–4V, I_D=–2A		0.75		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=–10V, V_{GS}=–4V, I_D=–2A		1.6		nC
Diode Forward Voltage	V_{SD}	I_S=–2A, V_{GS}=0V		–0.83	–1.2	V

Package Dimensions

unit : mm (typ)
7045-002



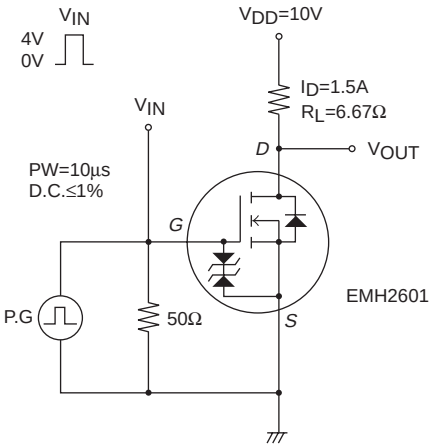
Electrical Connection



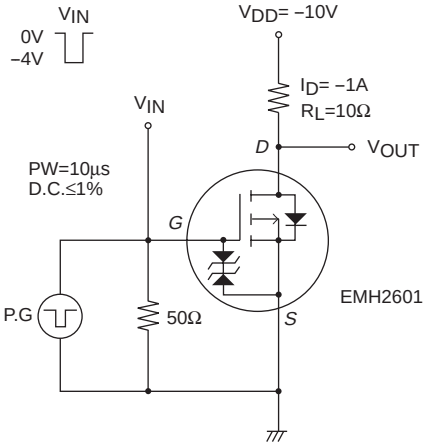
Top view

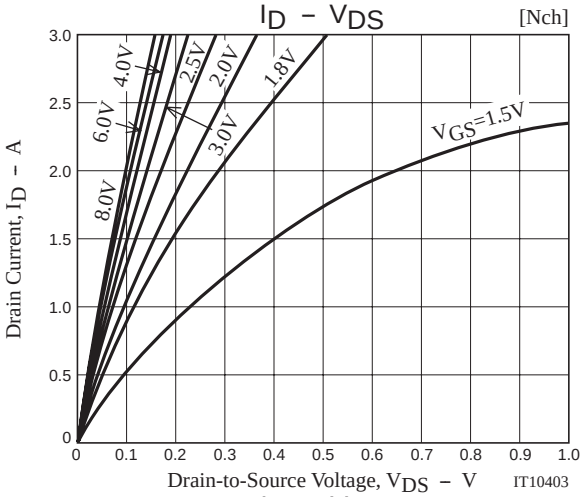
Switching Time Test Circuit

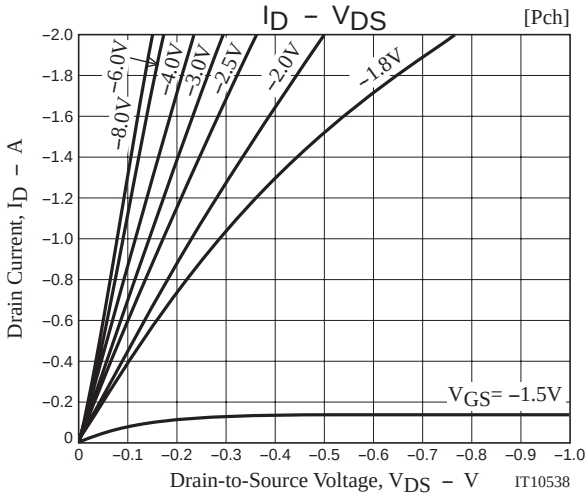
[N-channel]

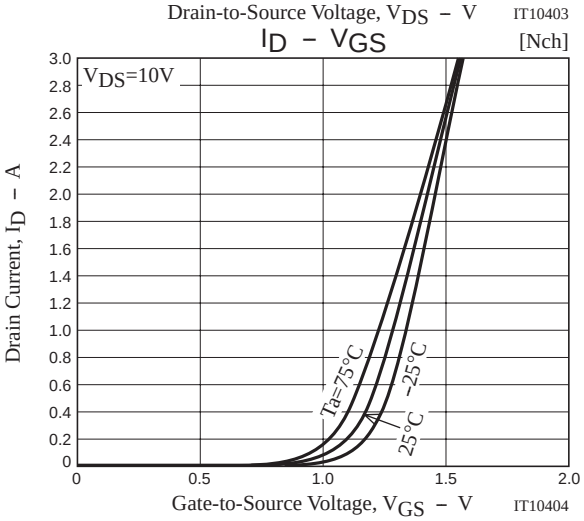


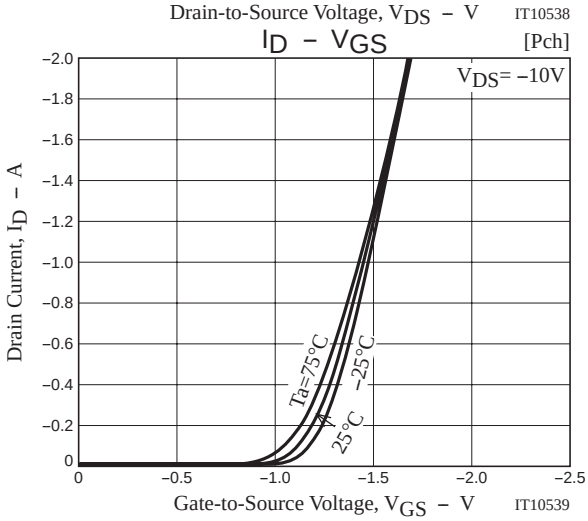
[P-channel]

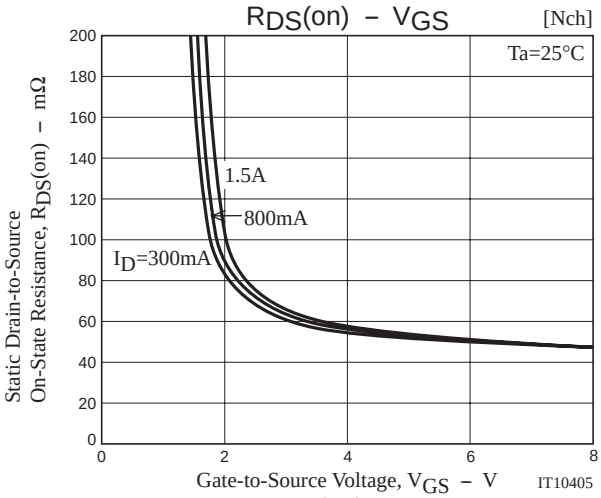


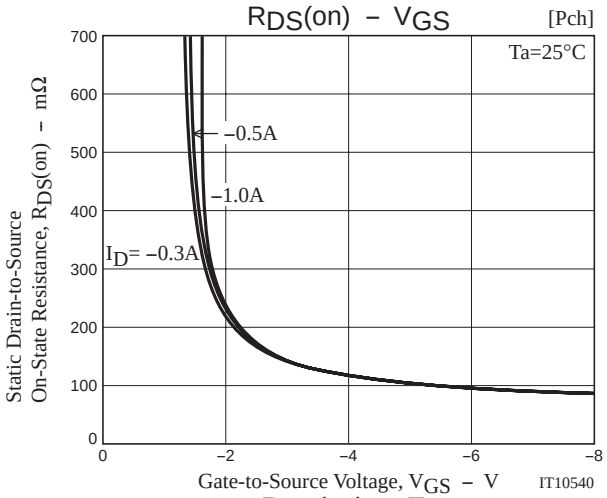


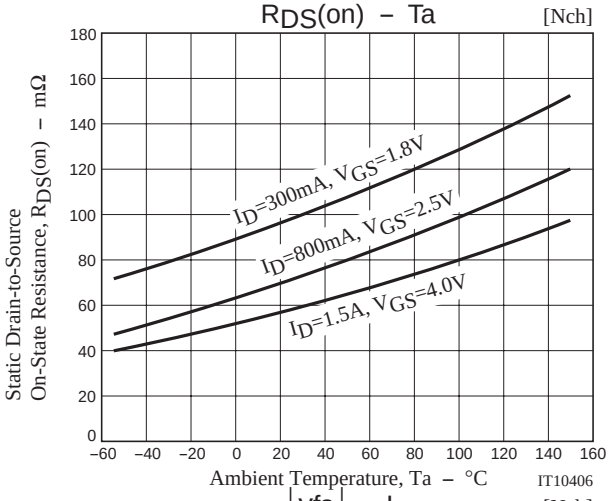


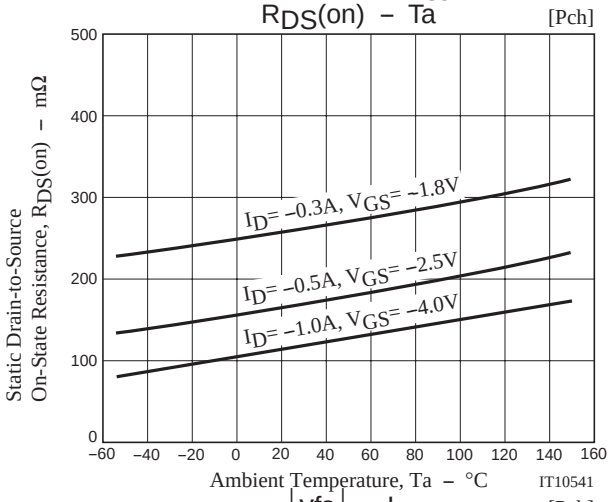


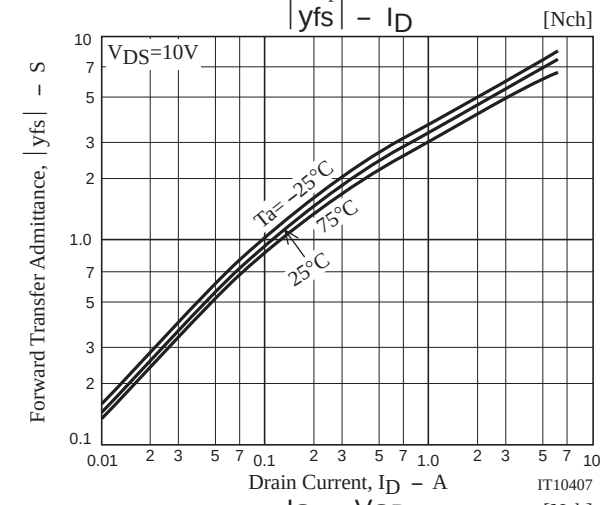


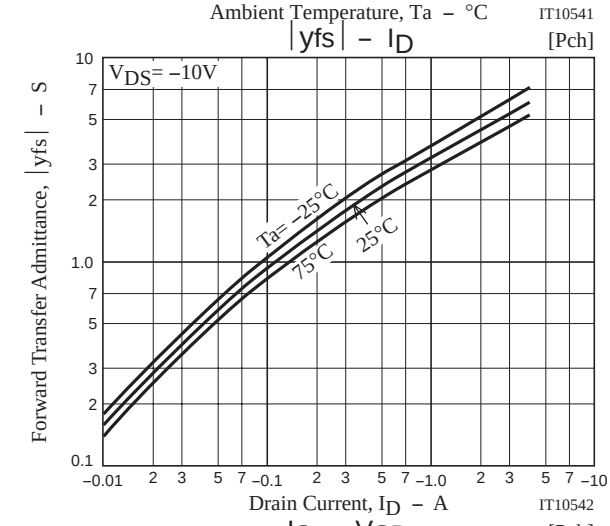

RDS(on) – VGS
[Nch]
Ta=25°C
1.5A
800mA
ID=300mA
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT10405

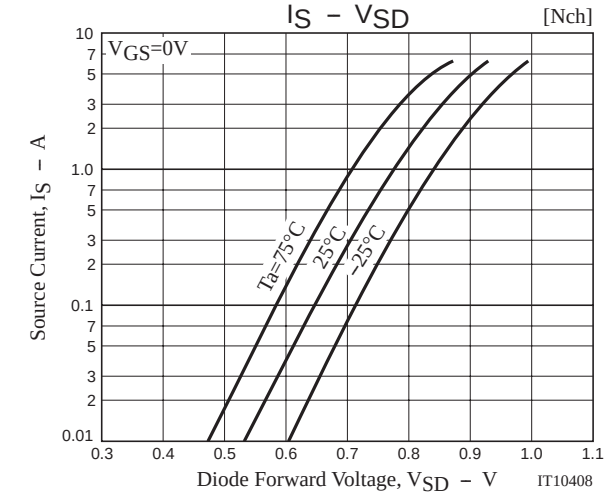

RDS(on) – VGS
[Pch]
Ta=25°C
–0.5A
–1.0A
ID= –0.3A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT10540

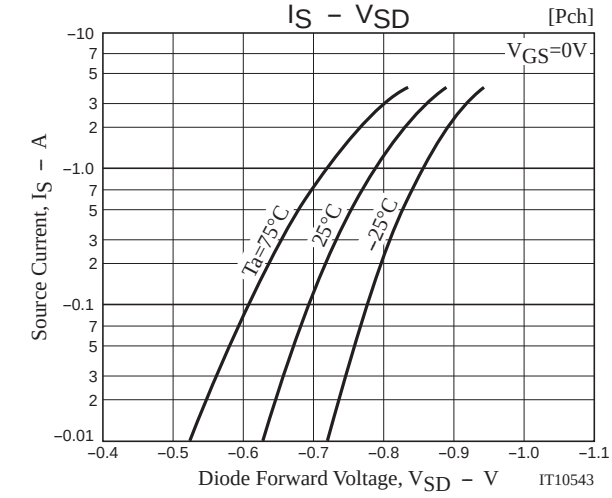

RDS(on) – Ta
[Nch]
ID=300mA, VGS=1.8V
ID=800mA, VGS=2.5V
ID=1.5A, VGS=4.0V
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT10406


RDS(on) – Ta
[Pch]
ID= –0.3A, VGS= –1.8V
ID= –0.5A, VGS= –2.5V
ID= –1.0A, VGS= –4.0V
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT10541

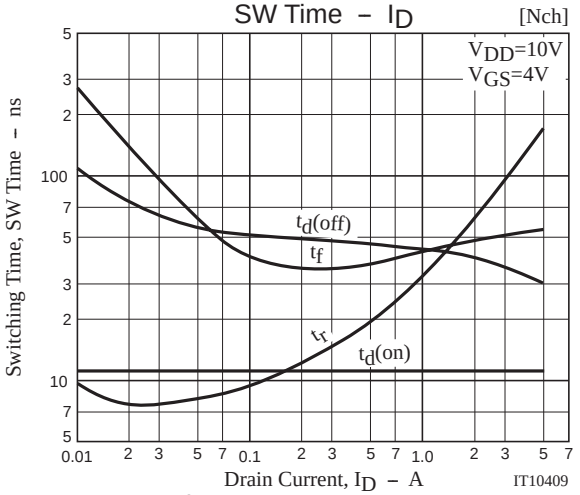

|yfs| – ID
[Nch]
VDS=10V
Ta= –25°C
75°C
25°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT10407


|yfs| – ID
[Pch]
VDS= –10V
Ta= –25°C
75°C
25°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT10542

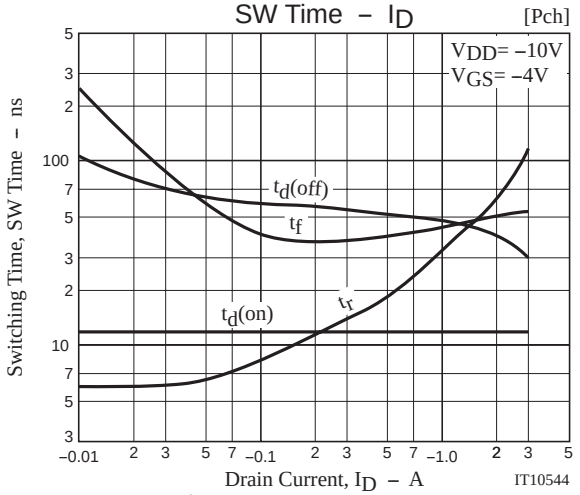

IS – VSD
[Nch]
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT10408


IS – VSD
[Pch]
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT10543

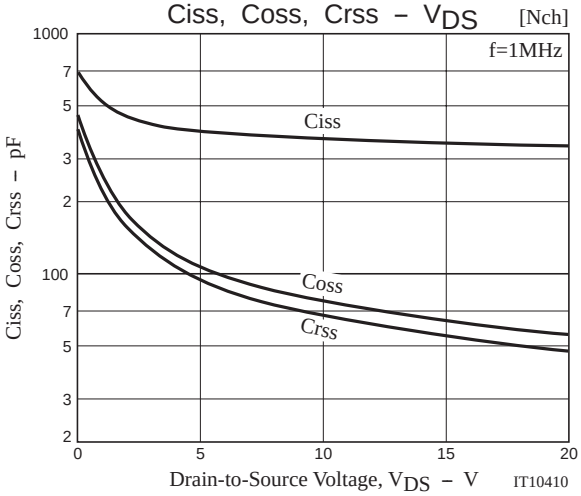
SW Time – I_D [Nch]



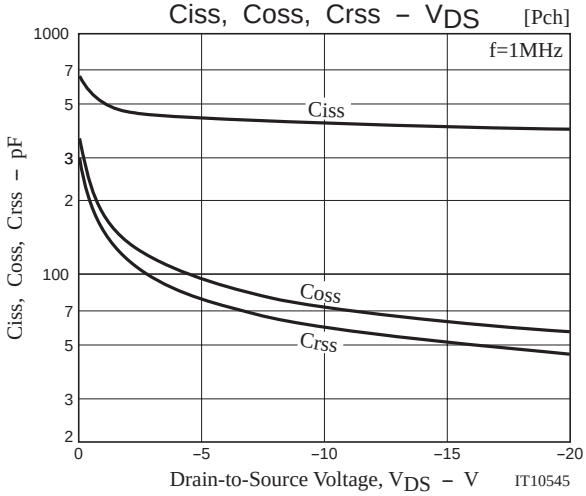
SW Time – I_D [Pch]



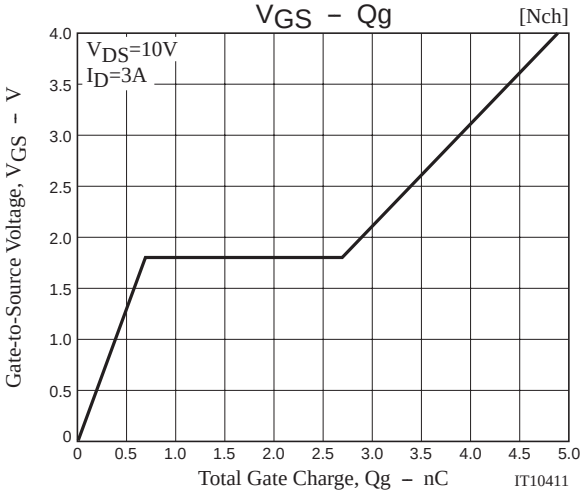
Ciss, Coss, Crss – V_{DS} [Nch]



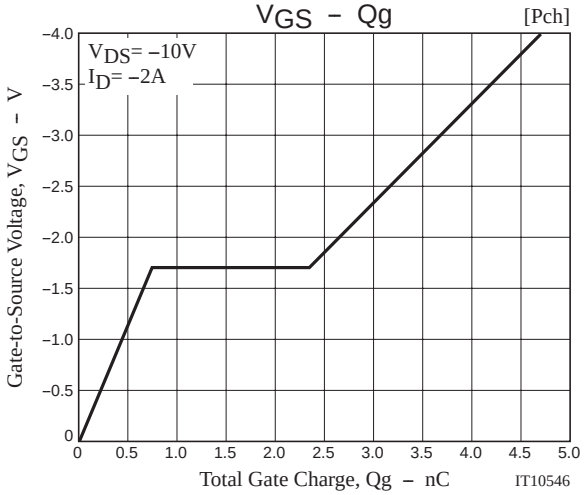
Ciss, Coss, Crss – V_{DS} [Pch]



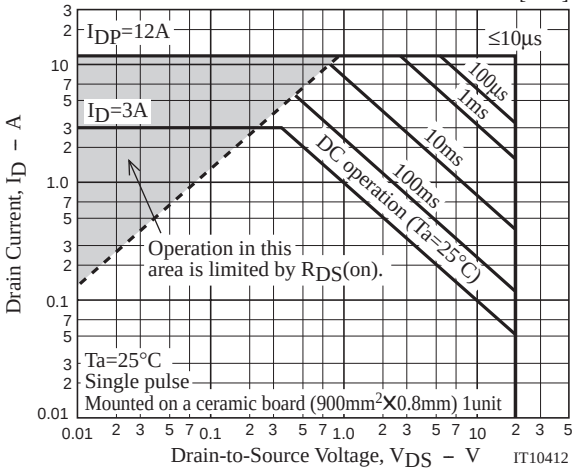
V_{GS} – Qg [Nch]



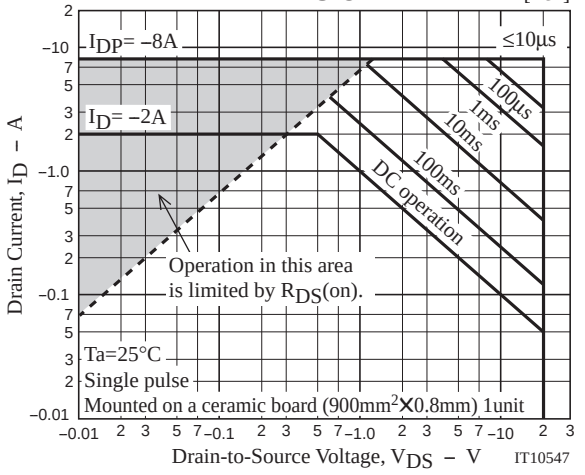
V_{GS} – Qg [Pch]

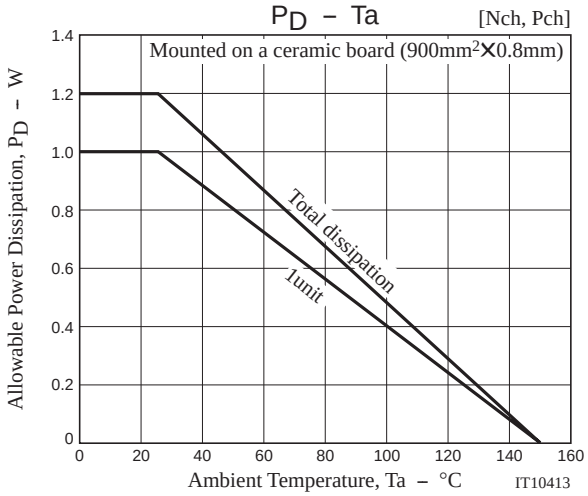


A S O [Nch]



A S O [Pch]





Note on usage : Since the EMH2601 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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