Ordering number : EN8725A

SANYO Semiconductors
DATA SHEET

P-Channel Silicon MOSFET

EMH2301 — General-Purpose Switching Device Applications

Features

- The EMH2301 incorporates 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	P-channel	Unit
Drain-to-Source Voltage	V_{DSS}		-20	V
Gate-to-Source Voltage	V_{GSS}		±12	V
Drain Current (DC)	I_D		-2	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	-8	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (900mm²×0.8mm) 1unit	1.0	W
Total Dissipation	P_T	Mounted on a ceramic board (900mm²×0.8mm)	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	
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

Marking : MA

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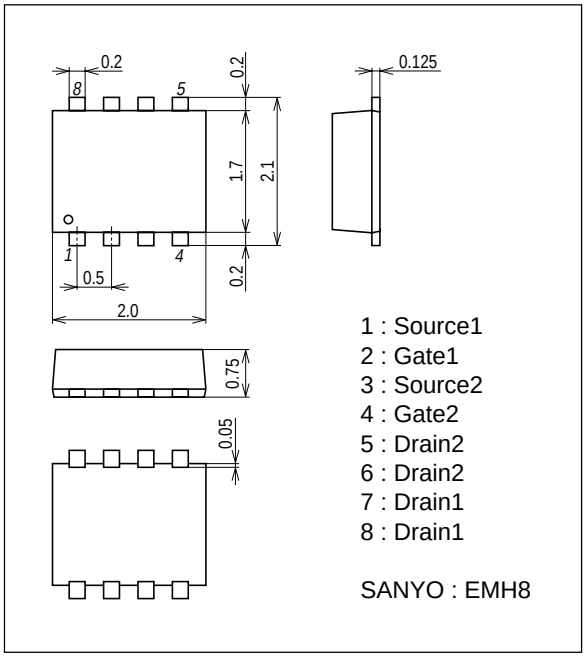
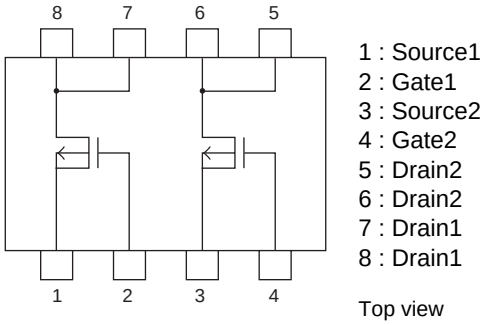
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Total Gate Charge	Qg	V_{DS}=−10V, V_{GS}=−4V, I_D=−2A		4.7		nC
Gate-to-Source Charge	Qgs	V_{DS}=−10V, V_{GS}=−4V, I_D=−2A		0.75		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=−10V, V_{GS}=−4V, I_D=−2A		1.6		nC
Diode Forward Voltage	V_{SD}	I_S=−2A, V_{GS}=0V		−0.83	−1.2	V

Package Dimensions

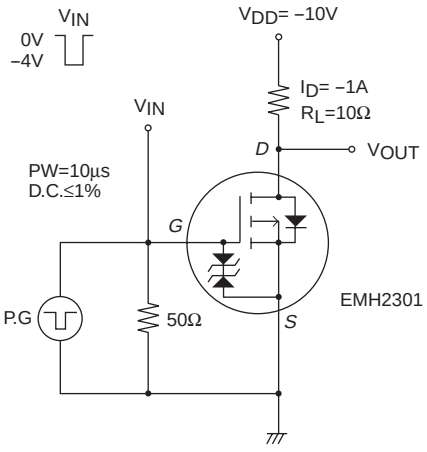
unit : mm (typ)
7045-002

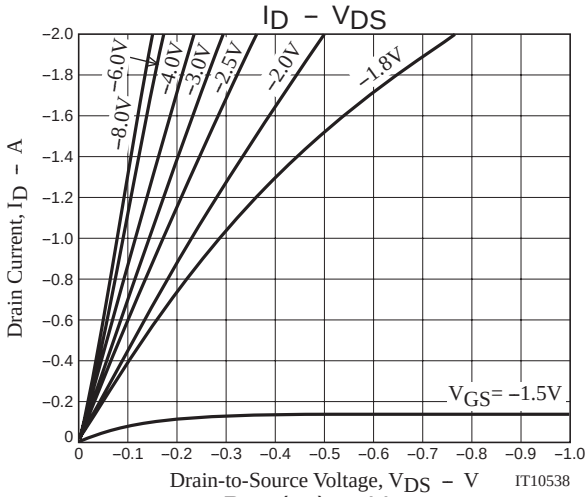


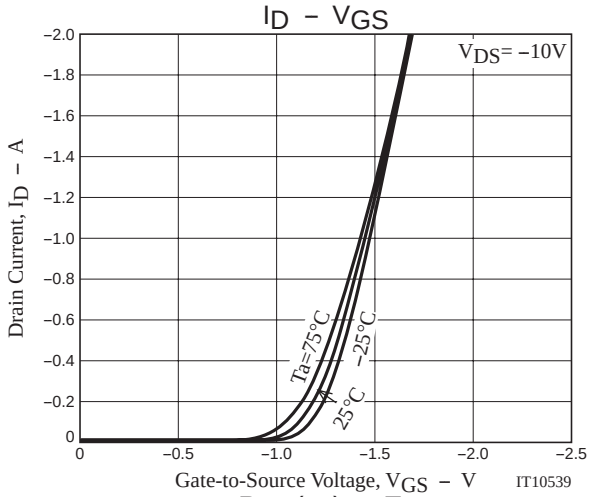
Electrical Connection

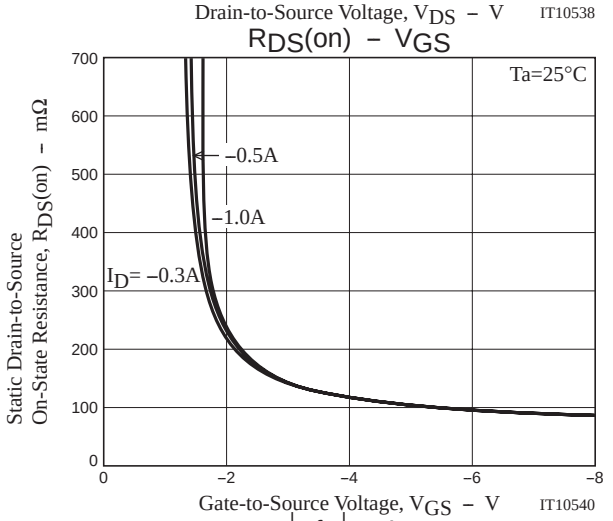


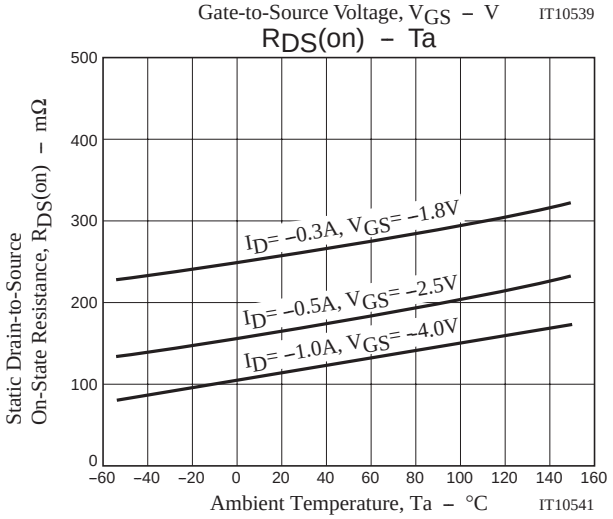
Switching Time Test Circuit

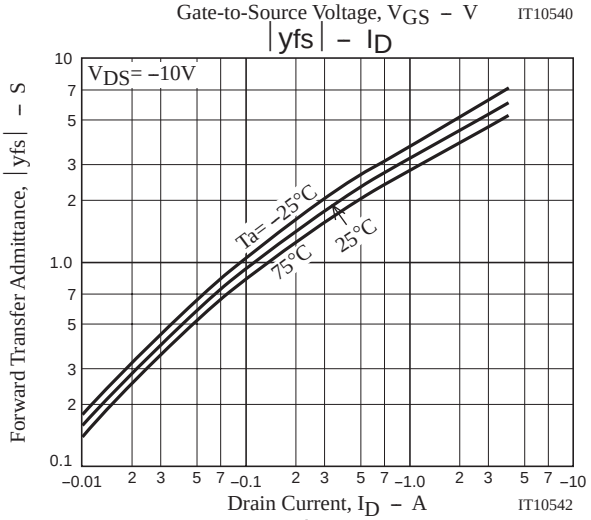


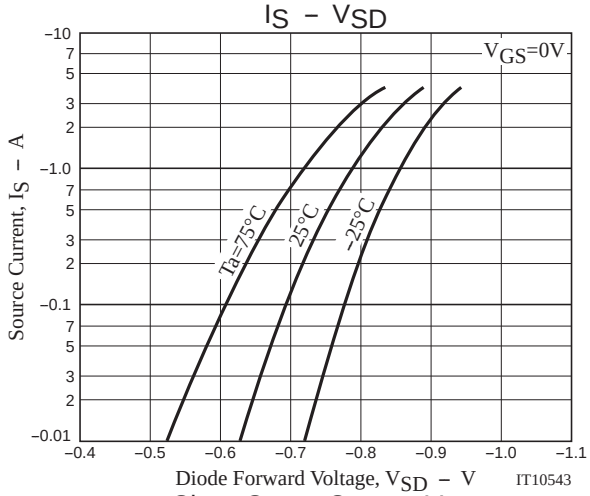

ID – VDS
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT10538
–8.0V
–6.0V
–4.0V
–3.0V
–2.5V
–2.0V
–1.8V
VGS= –1.5V

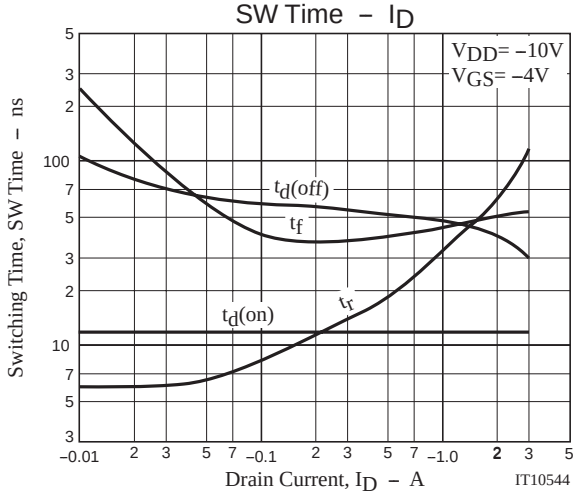

ID – VGS
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT10539
VDS= –10V
Ta=75°C
25°C
–25°C

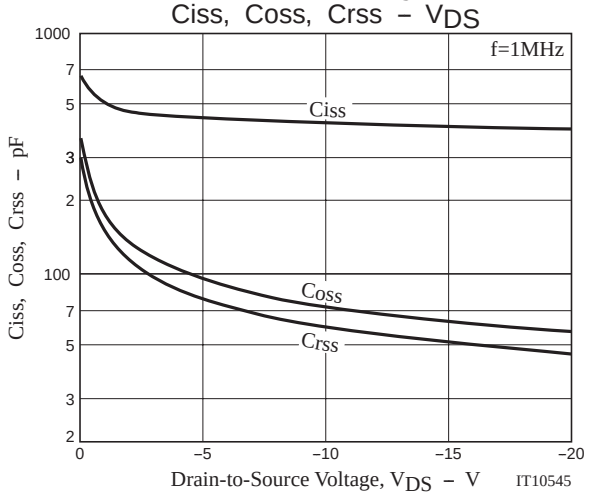

RDS(on) – VGS
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT10540
Ta=25°C
–0.5A
–1.0A
ID= –0.3A

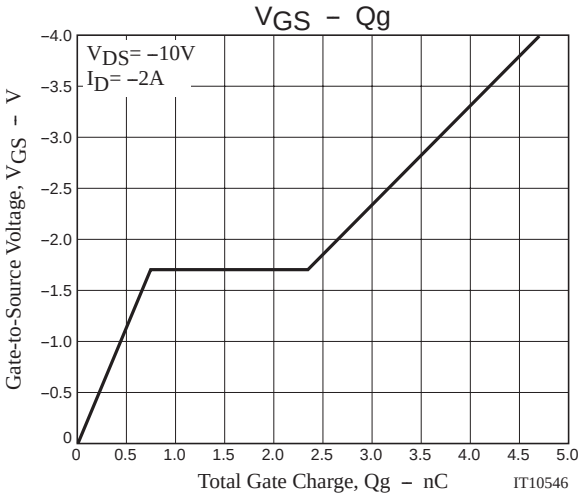

RDS(on) – Ta
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT10541
ID= –0.3A, VGS= –1.8V
ID= –0.5A, VGS= –2.5V
ID= –1.0A, VGS= –4.0V

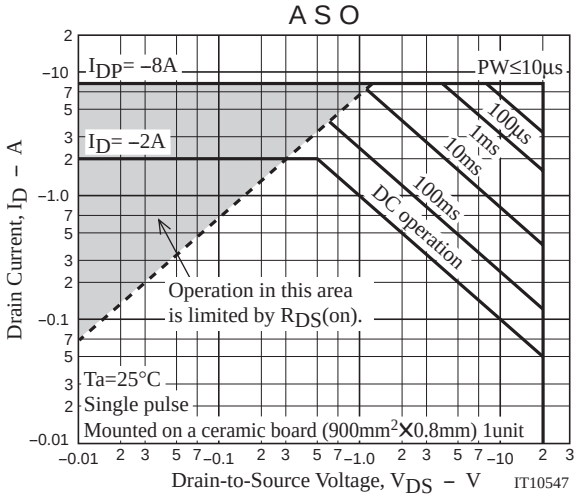

|yfs| – ID
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT10542
VDS= –10V
Ta= –25°C
75°C
25°C

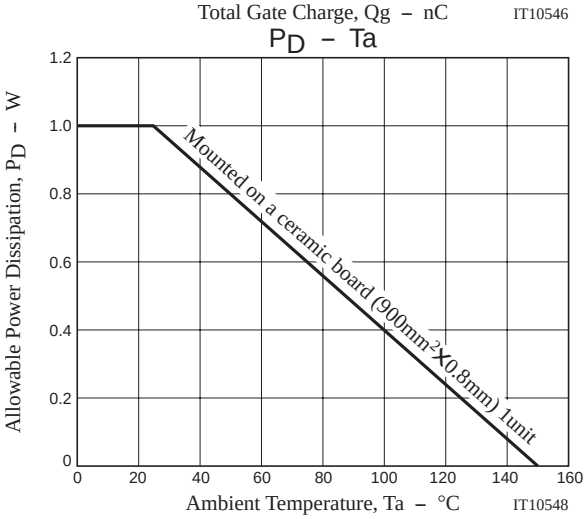

IS – VSD
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT10543
VGS=0V
Ta=75°C
25°C
–25°C


SW Time – ID
Switching Time, SW Time – ns
Drain Current, ID – A
IT10544
VDD= –10V
VGS= –4V
td(off)
tf
tr
td(on)


Ciss, Coss, Crss – VDS
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT10545
f=1MHz
Ciss
Coss
Crss







Note on usage : Since the EMH2301 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.