Ordering number : EN8258A

SANYO Semiconductors

DATA SHEET

N-Channel Silicon MOSFET

ECH8612 — General-Purpose Switching Device Applications

Features

- Low ON-resistance.
- Best suited for load switches.
- 1.8V drive.
- Composite type, facilitating high-density mounting.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		20	V
Gate-to-Source Voltage	V_{GSS}		±8	V
Drain Current (DC)	I_D		7	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	40	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (900mm²×0.8mm) 1unit	1.3	W
Total Dissipation	P_T	Mounted on a ceramic board (900mm²×0.8mm)	1.5	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}=±6.4V, V_{DS}=0V			±10	μA
Cutoff Voltage	$V_{GS}(off)$	V_{DS}=10V, I_D=1mA	0.4		1.2	V
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=10V, I_D=3.5A	6.6	11		S
Static Drain-to-Source On-State Resistance	$R_{DS}(on)1$	I_D=3A, V_{GS}=4.5V		18	24	mΩ
	$R_{DS}(on)2$	I_D=1.5A, V_{GS}=2.5V		25	36	mΩ
	$R_{DS}(on)3$	I_D=0.5A, V_{GS}=1.8V		35	52	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		920		pF
Output Capacitance	Coss	V_{DS}=10V, f=1MHz		150		pF
Reverse Transfer Capacitance	Crss	V_{DS}=10V, f=1MHz		120		pF

Marking : FE

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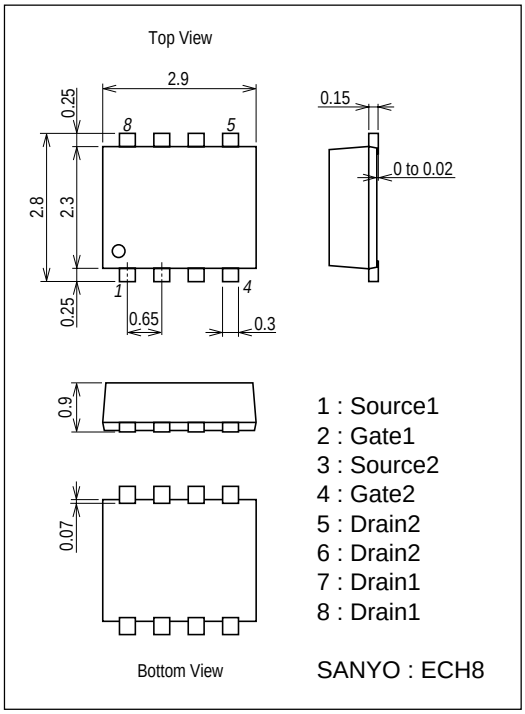
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		14		ns
Rise Time	t_r	See specified Test Circuit.		170		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		100		ns
Fall Time	t_f	See specified Test Circuit.		98		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=4.5V, I_D=7A		12		nC
Gate-to-Source Charge	Qgs	V_{DS}=10V, V_{GS}=4.5V, I_D=7A		1.3		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=10V, V_{GS}=4.5V, I_D=7A		3.7		nC
Diode Forward Voltage	V_{SD}	I_S=7A, V_{GS}=0V		0.83	1.2	V

Package Dimensions

unit : mm

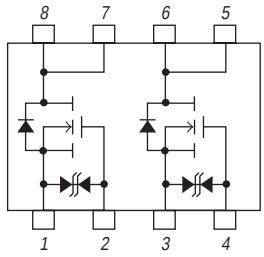
7011A-001



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

SANYO : ECH8

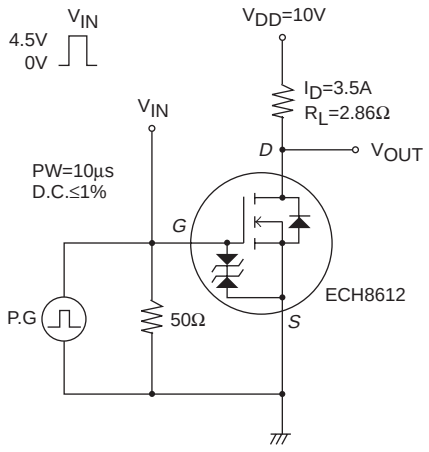
Electrical Connection

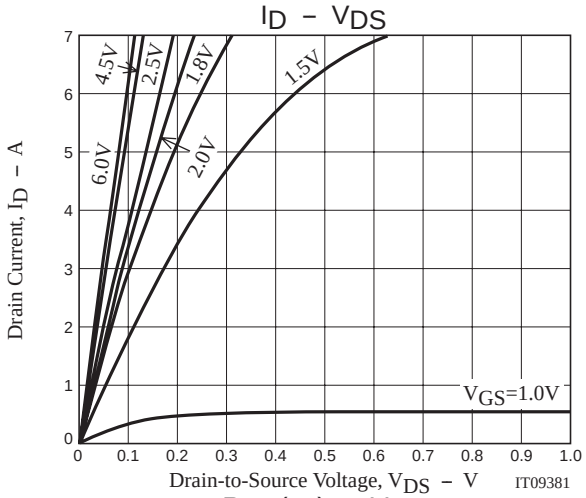


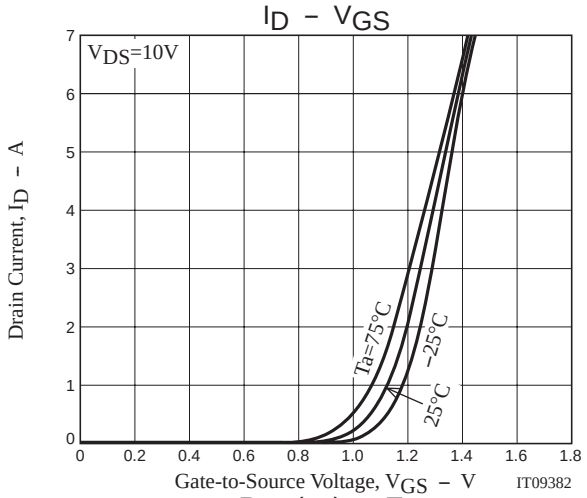
1 : Source1
2 : Gate1
3 : Source2
4 : Gate2
5 : Drain2
6 : Drain2
7 : Drain1
8 : Drain1

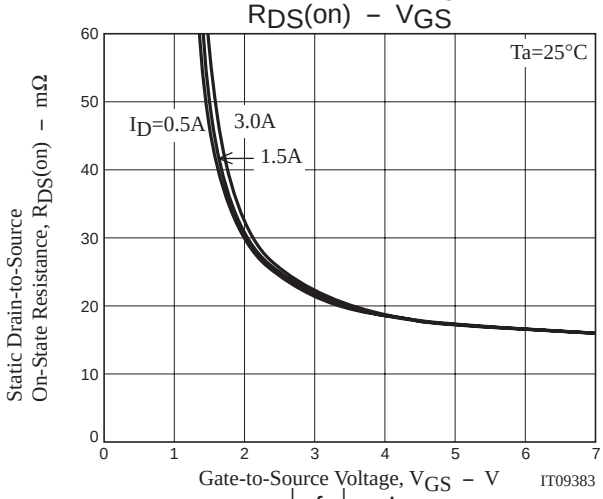
Top view

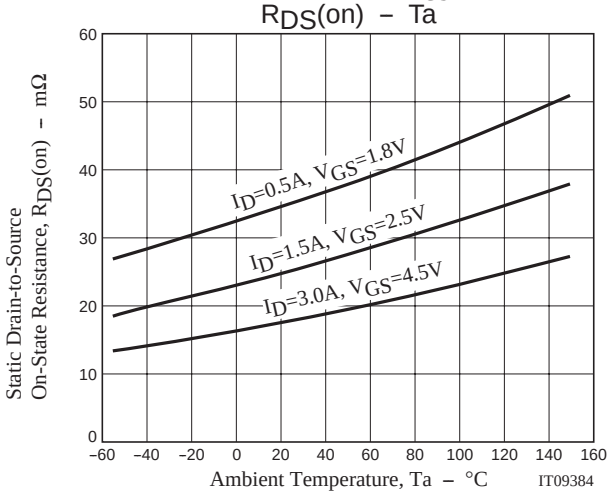
Switching Time Test Circuit

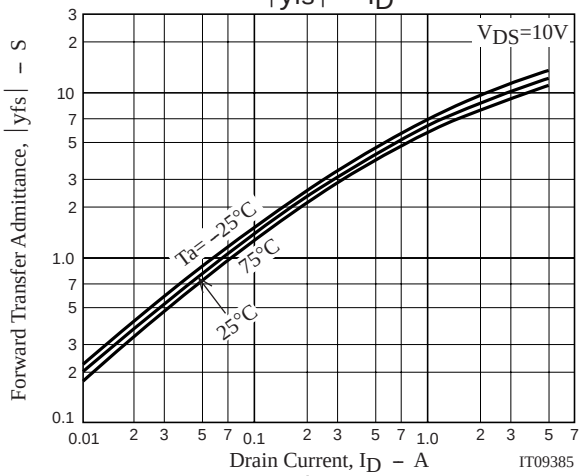


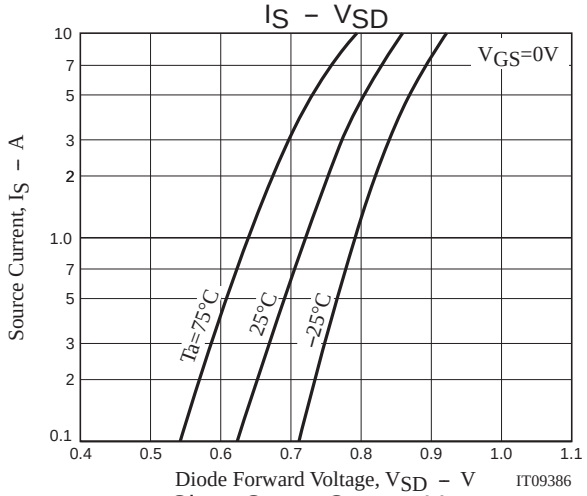

ID – VDS
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT09381
4.5V
2.5V
1.8V
1.5V
6.0V
2.0V
VGS=1.0V

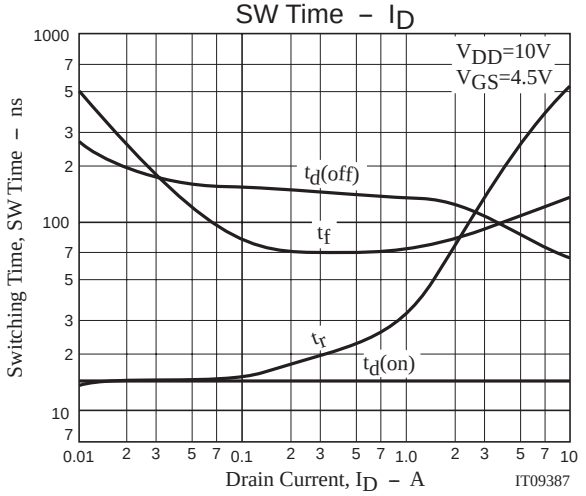

ID – VGS
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT09382
VDS=10V
Ta=75°C
–25°C
25°C

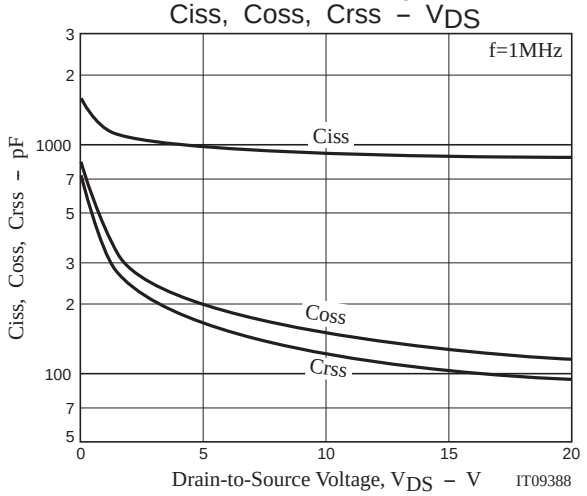

RDS(on) – VGS
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT09383
Ta=25°C
ID=0.5A
3.0A
1.5A

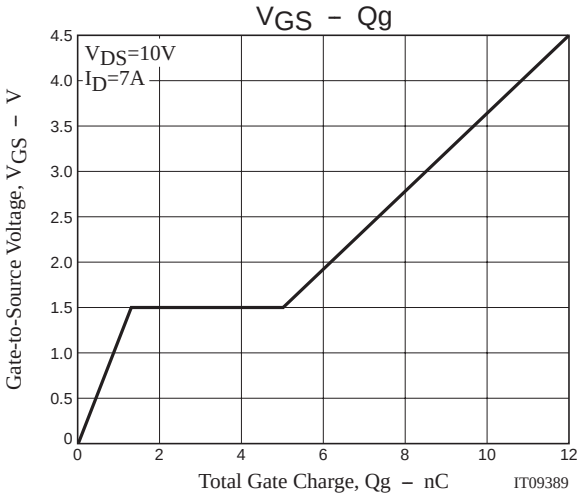

RDS(on) – Ta
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT09384
ID=0.5A, VGS=1.8V
ID=1.5A, VGS=2.5V
ID=3.0A, VGS=4.5V

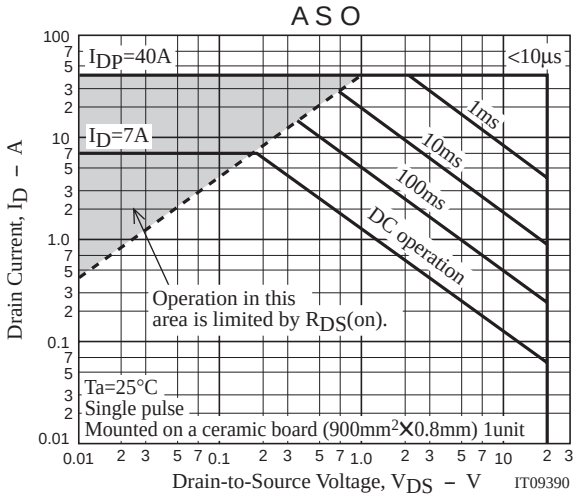

|yfs| – ID
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT09385
VDS=10V
Ta= –25°C
75°C
25°C

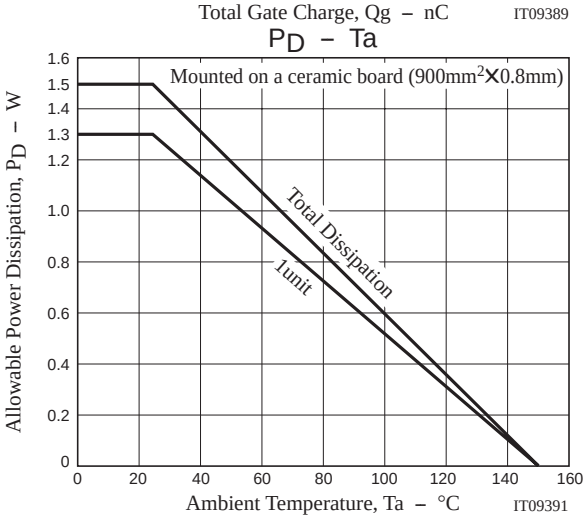

IS – VSD
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT09386
VGS=0V
Ta=75°C
25°C
–25°C


SW Time – ID
Switching Time, SW Time – ns
Drain Current, ID – A
IT09387
VDD=10V
VGS=4.5V
td(off)
tf
tr
td(on)


Ciss, Coss, Crss – VDS
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT09388
f=1MHz
Ciss
Coss
Crss







Note on usage : Since the ECH8612 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.