Ordering number : ENA1174

SANYO Semiconductors
DATA SHEET

N-Channel Silicon MOSFET

ECH8601M — General-Purpose Switching Device Applications

Features

- Low ON-resistance.
- Built-in gate protection resistor.
- 2.5V drive.
- Best suited for LiB charging and discharging switch.
- Common-drain type.
- Halogen free compliance.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		24	V
Gate-to-Source Voltage	V_{GSS}		±12	V
Drain Current (DC)	I_D		8	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	60	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (1000mm²X0.8mm) 1unit	1.5	W
Total Dissipation	P_T	When mounted on ceramic substrate (1000mm²X0.8mm)	1.6	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	24			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	0.5		1.3	V
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=10V, I_D=4A	3.1	5.3		S

Marking : TL

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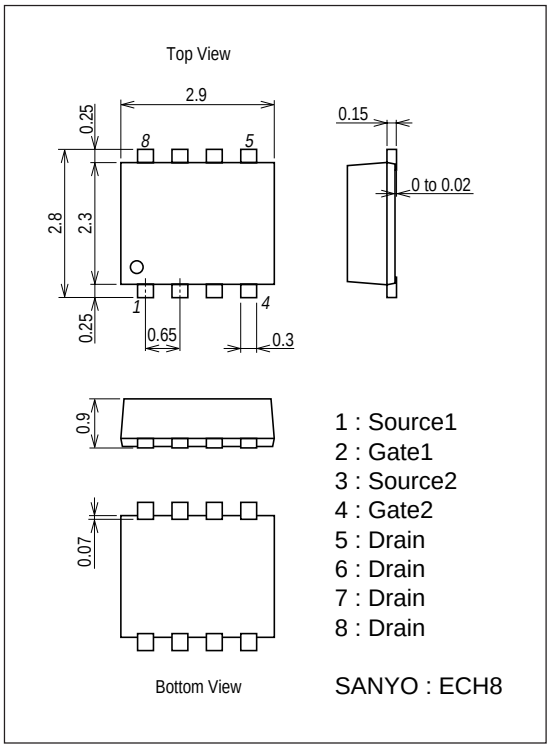
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Static Drain-to-Source On-State Resistance	$R_{DS}(on)1$	I_D=4A, V_{GS}=4.5V	13.5	17	23	mΩ
	$R_{DS}(on)2$	I_D=4A, V_{GS}=4.0V	14	18	24	mΩ
	$R_{DS}(on)3$	I_D=4A, V_{GS}=3.1V	14.5	20	30	mΩ
	$R_{DS}(on)4$	I_D=2A, V_{GS}=2.5V	16	24	35	mΩ
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit.		300		ns
Rise Time	t_r	See specified Test Circuit.		1000		ns
Turn-OFF Delay Time	$t_d(off)$	See specified Test Circuit.		3000		ns
Fall Time	t_f	See specified Test Circuit.		1800		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=4.5V, I_D=8A		7.5		nC
Gate-to-Source Charge	Qgs	V_{DS}=10V, V_{GS}=4.5V, I_D=8A		1.5		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=10V, V_{GS}=4.5V, I_D=8A		2.0		nC
Diode Forward Voltage	V_{SD}	I_S=8A, V_{GS}=0V		0.8	1.2	V

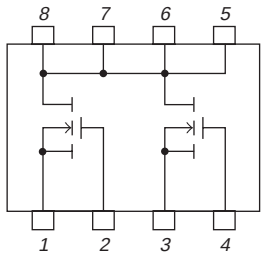
Package Dimensions

unit : mm (typ)

7011A-003



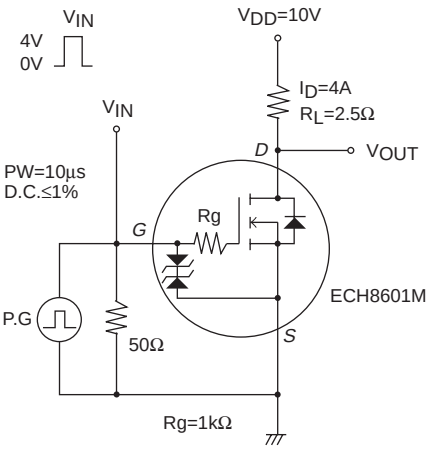
Electrical Connection

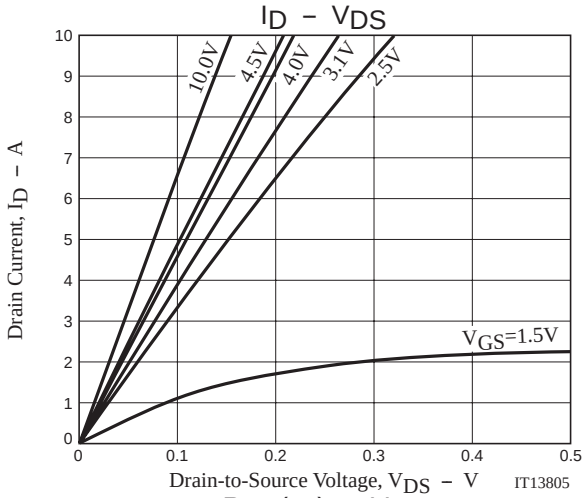


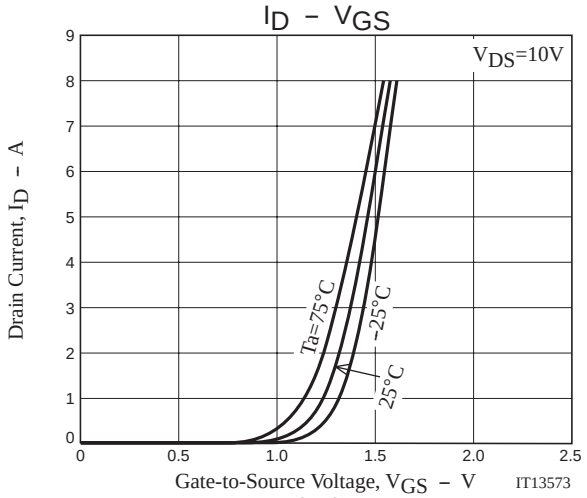
1 : Source1
2 : Gate1
3 : Source2
4 : Gate2
5 : Drain
6 : Drain
7 : Drain
8 : Drain

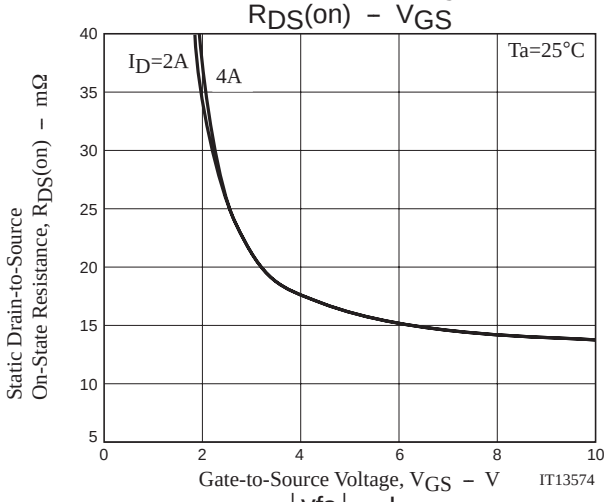
Top view

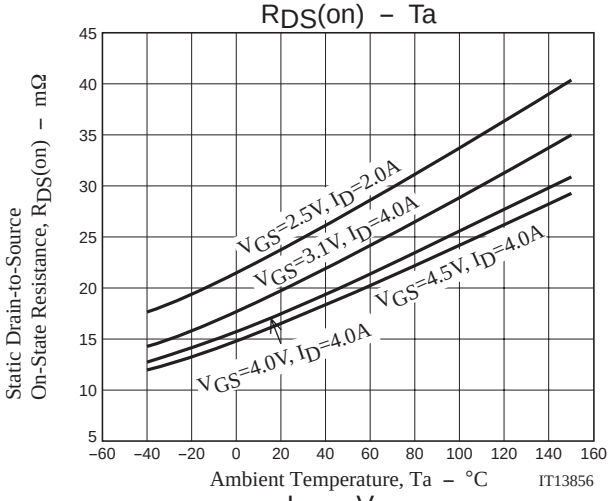
Switching Time Test Circuit

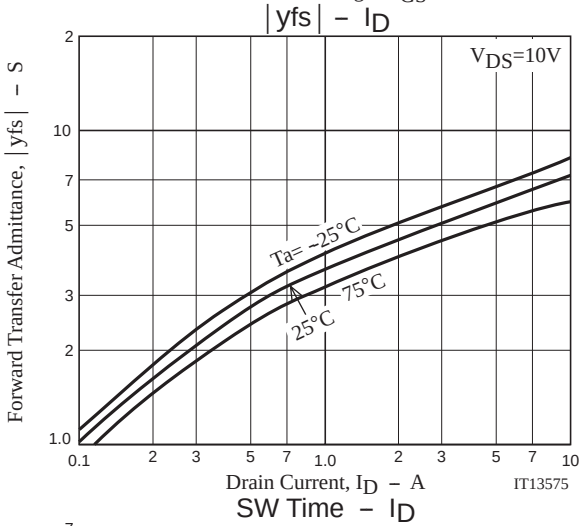


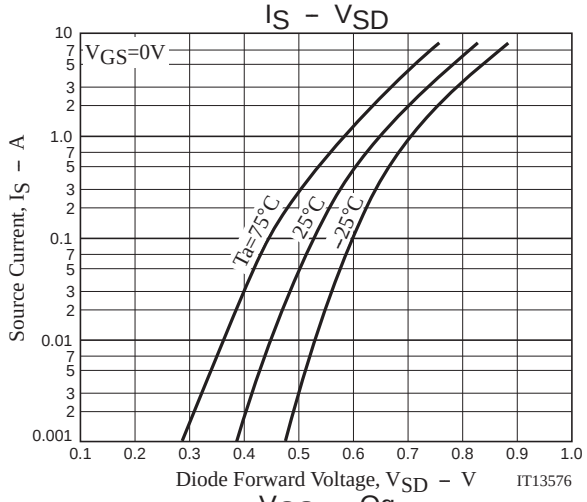

ID – VDS
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT13805
10.0V
4.5V
4.0V
3.1V
2.5V
VGS=1.5V

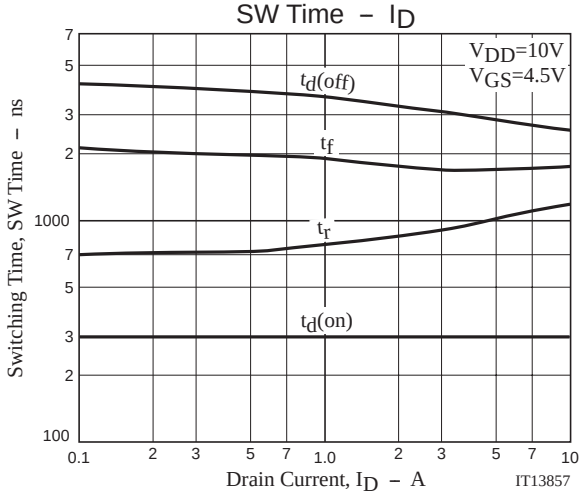

ID – VGS
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT13573
VDS=10V
Ta=75°C
–25°C
25°C

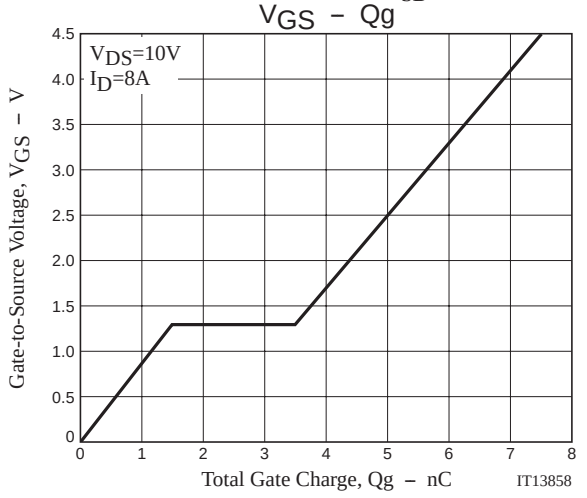

RDS(on) – VGS
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT13574
ID=2A
4A
Ta=25°C

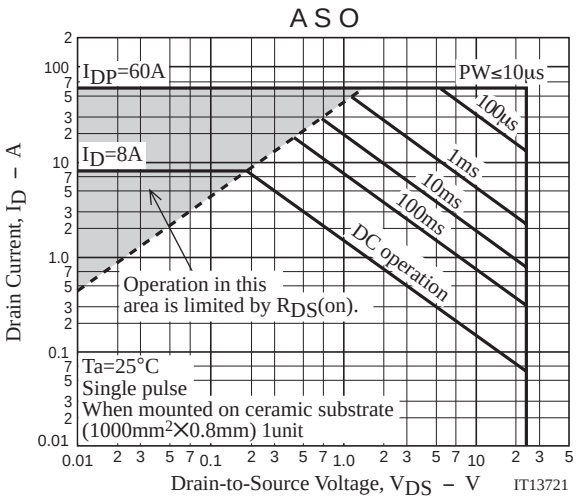

RDS(on) – Ta
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT13856
VGS=2.5V, ID=2.0A
VGS=3.1V, ID=4.0A
VGS=4.5V, ID=4.0A
VGS=4.0V, ID=4.0A

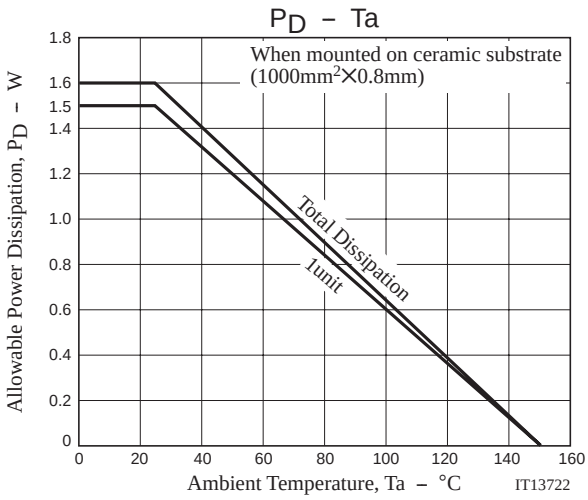

|yfs| – ID
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT13575
VDS=10V
Ta= –25°C
75°C
25°C


IS – VSD
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT13576
VGS=0V
Ta=75°C
25°C
–25°C


SW Time – ID
Switching Time, SW Time – ns
Drain Current, ID – A
IT13857
VDD=10V
VGS=4.5V
td(off)
tf
tr
td(on)


VGS – Qg
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT13858
VDS=10V
ID=8A





Note on usage : Since the ECH8601M is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

This catalog provides information as of July, 2008. Specifications and information herein are subject to change without notice.