Ordering number : ENA1011

SANYO Semiconductors
DATA SHEET

N-Channel Silicon MOSFET

ECH8655R — 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		9	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	60	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (900mm²×0.8mm) 1unit	1.4	W
Total Dissipation	P_T	When mounted on ceramic substrate (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	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=4.5A	4.8	8		S

Marking : TA

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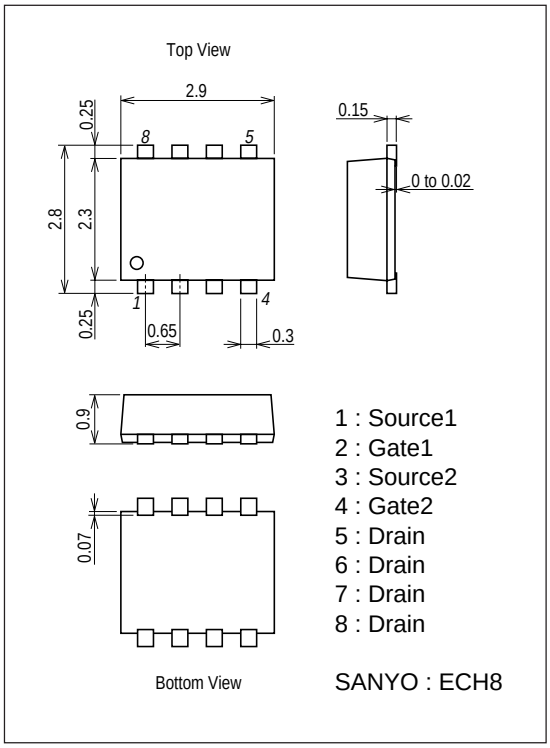
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Static Drain-to-Source On-State Resistance	$R_{DS}(on)1$	I_D=4.5A, V_{GS}=4.5V	9	13	17	mΩ
	$R_{DS}(on)2$	I_D=4.5A, V_{GS}=4.0V	9	13.5	18	mΩ
	$R_{DS}(on)3$	I_D=4.5A, V_{GS}=3.1V	9.2	15	21	mΩ
	$R_{DS}(on)4$	I_D=2A, V_{GS}=2.5V	10.5	18	25.5	mΩ
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit.		320		ns
Rise Time	t_r	See specified Test Circuit.		1100		ns
Turn-OFF Delay Time	$t_d(off)$	See specified Test Circuit.		2400		ns
Fall Time	t_f	See specified Test Circuit.		2100		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=10V, I_D=9A		16.8		nC
Gate-to-Source Charge	Qgs	V_{DS}=10V, V_{GS}=10V, I_D=9A		1.6		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=10V, V_{GS}=10V, I_D=9A		4.8		nC
Diode Forward Voltage	V_{SD}	I_S=9A, V_{GS}=0V		0.8	1.2	V

Package Dimensions

unit : mm (typ)

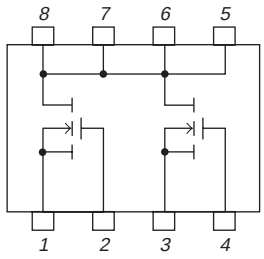
7011A-003



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

SANYO : ECH8

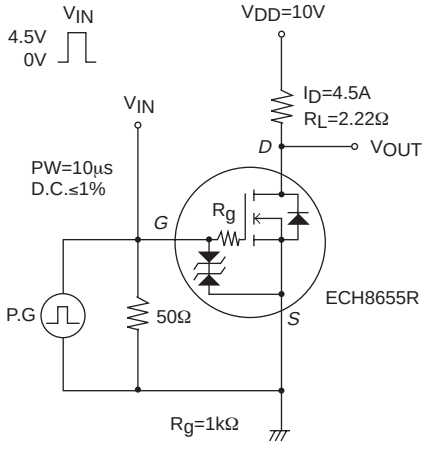
Electrical Connection

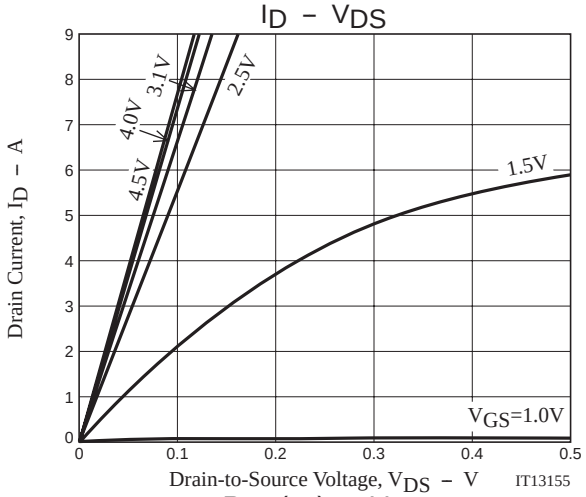


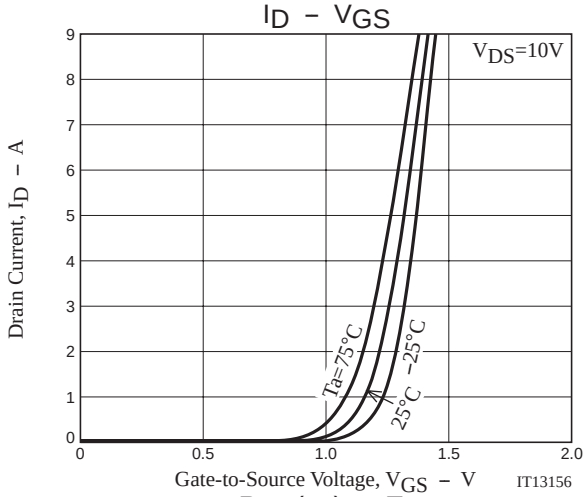
1 : Source1
2 : Gate1
3 : Source2
4 : Gate2
5 : Drain
6 : Drain
7 : Drain
8 : Drain

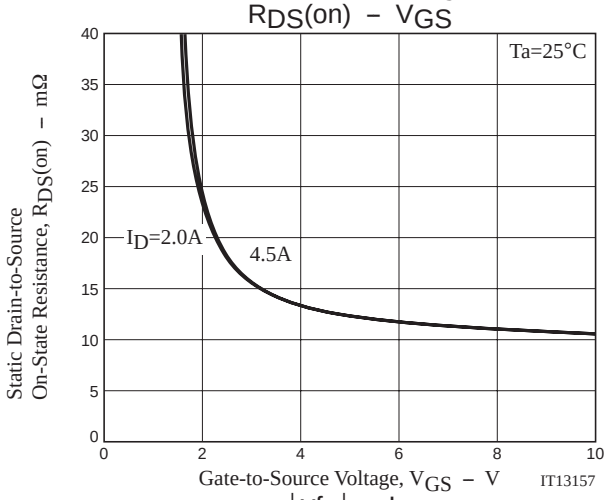
Top view

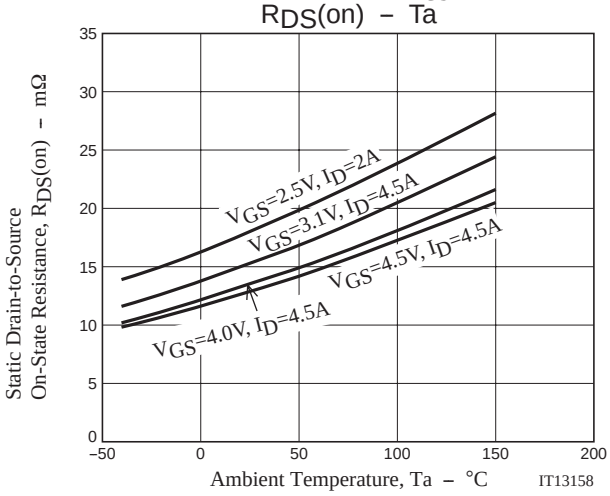
Switching Time Test Circuit

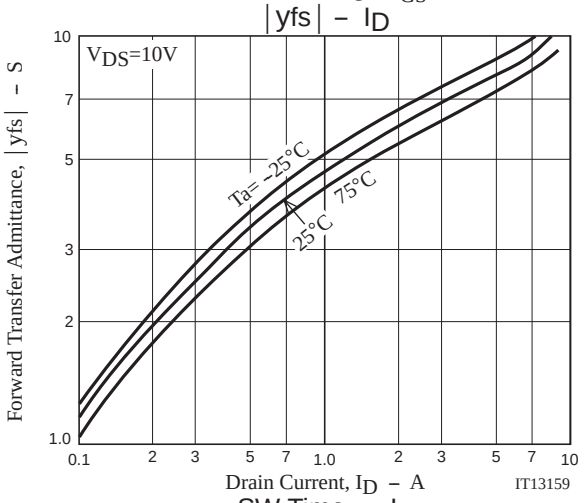


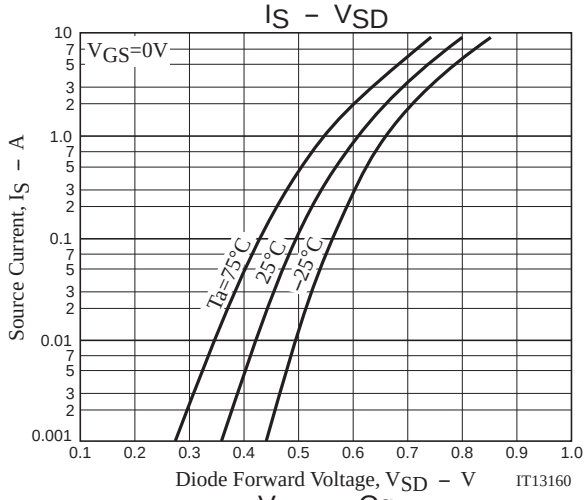

ID – VDS
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT13155
4.0V
3.1V
2.5V
4.5V
1.5V
VGS=1.0V

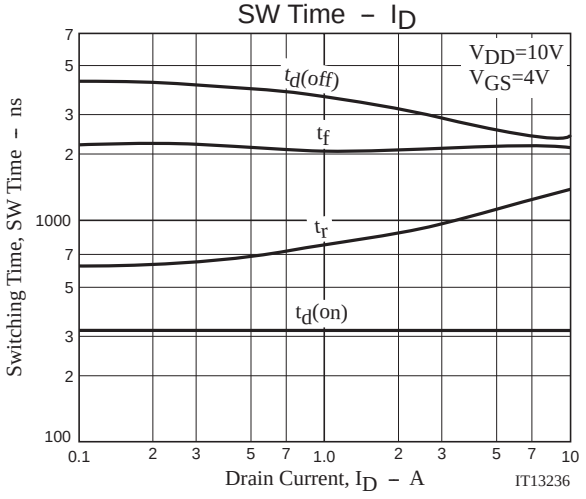

ID – VGS
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT13156
VDS=10V
Ta=75°C
25°C
–25°C

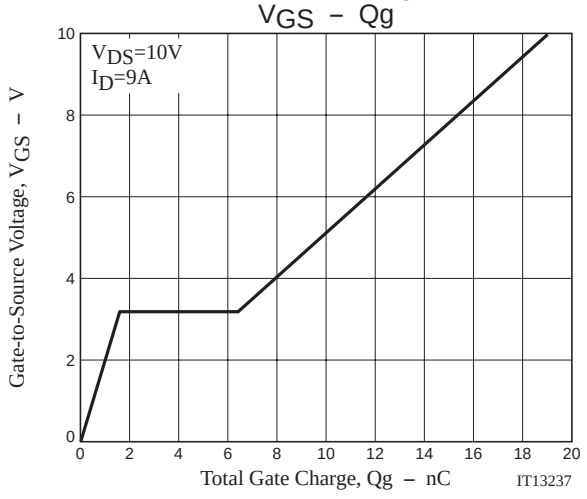

RDS(on) – VGS
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT13157
Ta=25°C
ID=2.0A
4.5A

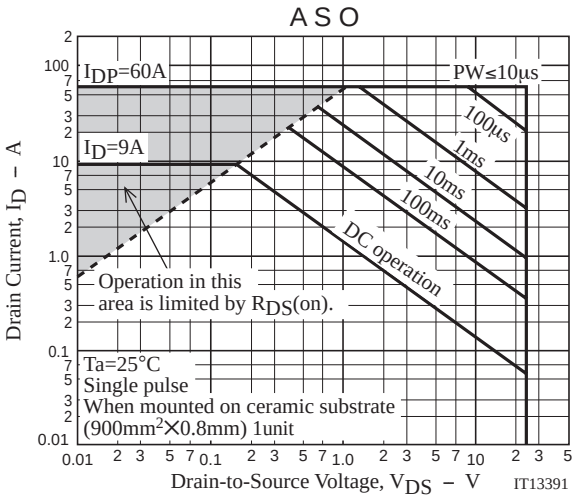

RDS(on) – Ta
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT13158
VGS=2.5V, ID=2A
VGS=3.1V, ID=4.5A
VGS=4.5V, ID=4.5A
VGS=4.0V, ID=4.5A

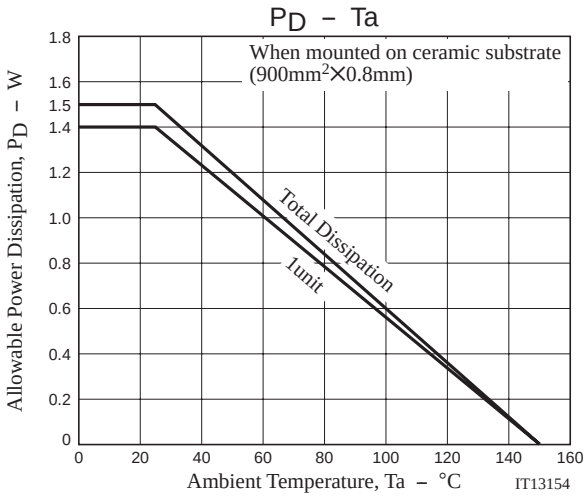

|yfs| – ID
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT13159
VDS=10V
Ta= –25°C
25°C
75°C


IS – VSD
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT13160
VGS=0V
Ta=75°C
25°C
–25°C


SW Time – ID
Switching Time, SW Time – ns
Drain Current, ID – A
IT13236
VDD=10V
VGS=4V
td(off)
tf
tr
td(on)


VGS – Qg
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT13237
VDS=10V
ID=9A





Note on usage : Since the ECH8655R is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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