Ordering number : ENA1777

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

N-Channel and P-Channel Silicon MOSFETs

ECH8661 — General-Purpose Switching Device Applications

Features

- ON-resistance Nch: $R_{DS}(on)1$=18mΩ(typ.), Pch: ON-resistance $R_{DS}(on)1$=30mΩ(typ.)
- The ECH8660 incorporates an N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance and high-speed switching , thereby enablimg high-density mounting
- 4V drive
- Halogen free compliance

Specifications

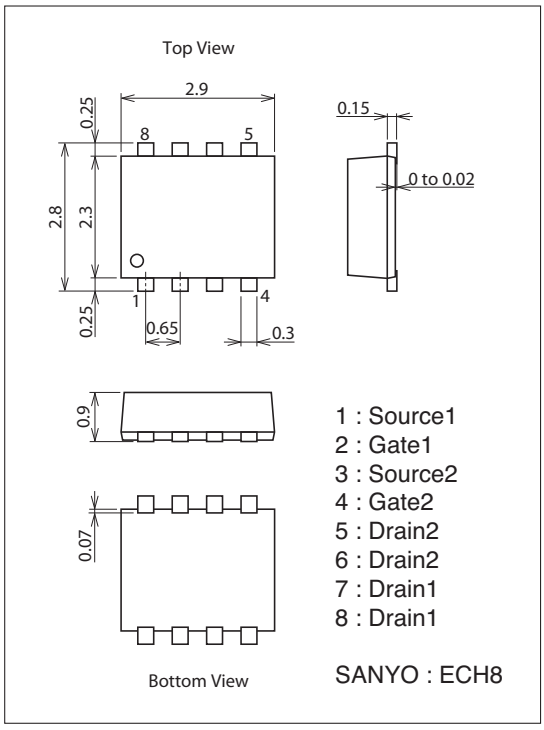
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	V_{DSS}		30	−30	V
Gate-to-Source Voltage	V_{GSS}		±20	±20	V
Drain Current (DC)	I_D		7	−5.5	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	40	−40	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (900mm^2×0.8mm) 1unit	1.3		W
Total Dissipation	P_T	When mounted on ceramic substrate (900mm^2×0.8mm)	1.5		W
Channel Temperature	Tch		150		°C
Storage Temperature	Tstg		−55 to +150		°C

Package Dimensions

unit : mm (typ)

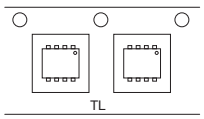
7011A-001



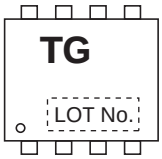
Product & Package Information

- Package : ECH8
- JEITA, JEDEC : -
- Minimum Packing Quantity : 3,000 pcs./reel

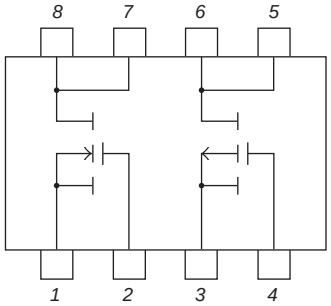
Packing Type : TL



Marking



Electrical Connection

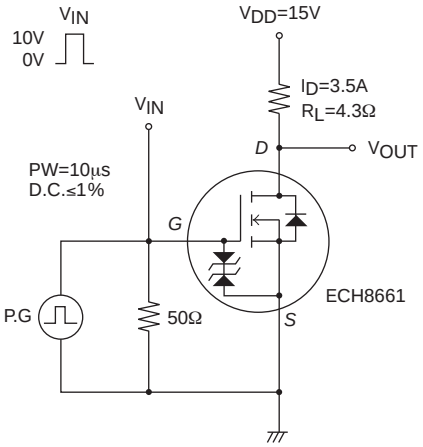


Electrical Characteristics at Ta=25°C

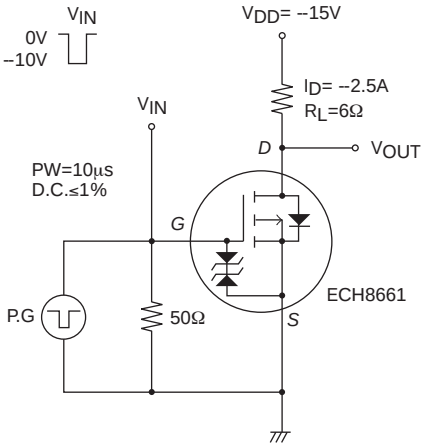
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[N-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	30			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	1.2		2.6	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=3.5A		3.7		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=3.5A, V_{GS}=10V		18	24	mΩ
	R_{DS}(on)2	I_D=2A, V_{GS}=4.5V		29	41	mΩ
	R_{DS}(on)3	I_D=2A, V_{GS}=4V		39	55	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		710		pF
Output Capacitance	Coss	V_{DS}=10V, f=1MHz		120		pF
Reverse Transfer Capacitance	Crss	V_{DS}=10V, f=1MHz		72		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		10		ns
Rise Time	t_r	See specified Test Circuit.		25		ns
Turn-OFF Delay Time	t_d(off)	See specified Test Circuit.		43		ns
Fall Time	t_f	See specified Test Circuit.		25		ns
Total Gate Charge	Qg	V_{DS}=15V, V_{GS}=10V, I_D=7A		11.8		nC
Gate-to-Source Charge	Qgs	V_{DS}=15V, V_{GS}=10V, I_D=7A		2.4		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=15V, V_{GS}=10V, I_D=7A		2.0		nC
Diode Forward Voltage	V_{SD}	I_S=7A, V_{GS}=0V		0.79	1.2	V
[P-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=−1mA, V_{GS}=0V	−30			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=−30V, V_{GS}=0V			−1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=−10V, I_D=−1mA	−1.2		−2.6	V
Forward Transfer Admittance	| yfs |	V_{DS}=−10V, I_D=−2.5A		5.2		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=−2.5A, V_{GS}=−10V		30	39	mΩ
	R_{DS}(on)2	I_D=−1.5A, V_{GS}=−4.5V		55	77	mΩ
	R_{DS}(on)3	I_D=−1.5A, V_{GS}=−4V		58	82	mΩ
Input Capacitance	Ciss	V_{DS}=−10V, f=1MHz		600		pF
Output Capacitance	Coss	V_{DS}=−10V, f=1MHz		145		pF
Reverse Transfer Capacitance	Crss	V_{DS}=−10V, f=1MHz		110		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		7.2		ns
Rise Time	t_r	See specified Test Circuit.		23		ns
Turn-OFF Delay Time	t_d(off)	See specified Test Circuit.		63		ns
Fall Time	t_f	See specified Test Circuit.		42		ns
Total Gate Charge	Qg	V_{DS}=−15V, V_{GS}=−10V, I_D=−5.5A		13		nC
Gate-to-Source Charge	Qgs	V_{DS}=−15V, V_{GS}=−10V, I_D=−5.5A		1.8		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=−15V, V_{GS}=−10V, I_D=−5.5A		3.2		nC
Diode Forward Voltage	V_{SD}	I_S=−5.5A, V_{GS}=0V		−0.82	−1.2	V

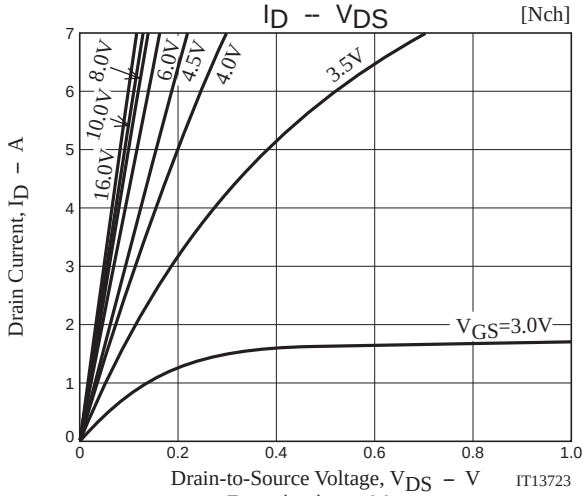
Switching Time Test Circuit

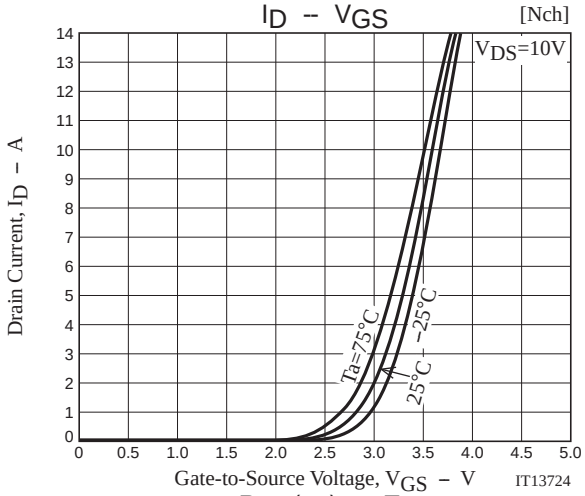
[N-channel]

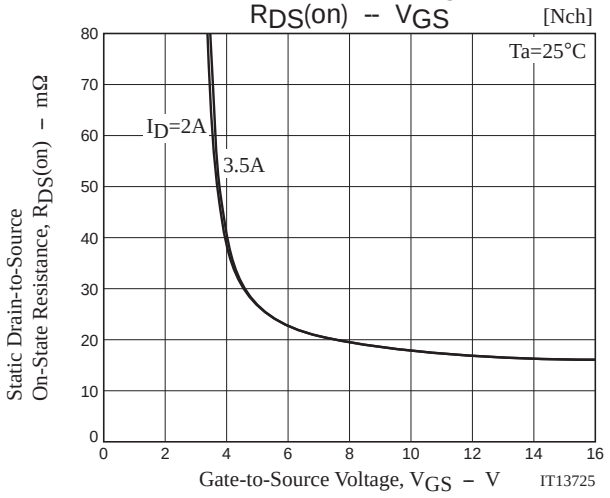


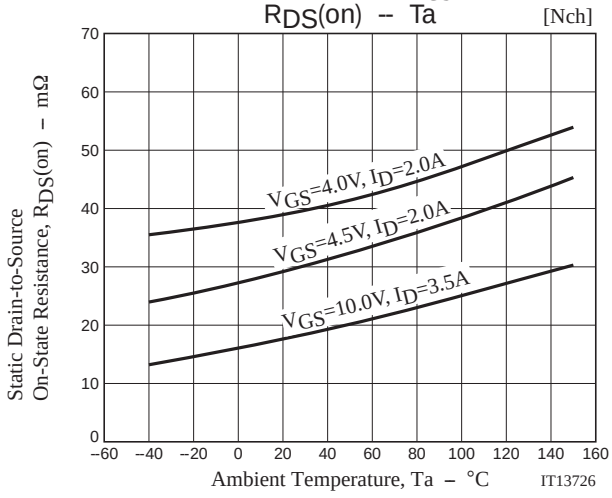
[P-channel]

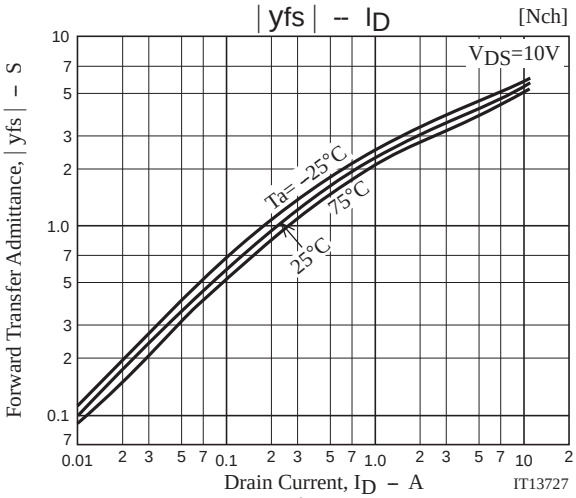


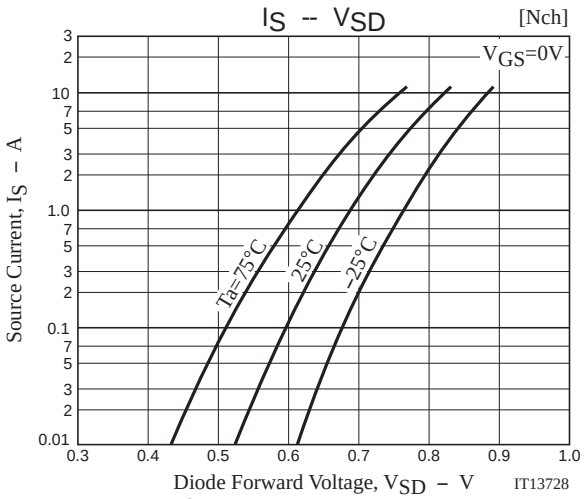


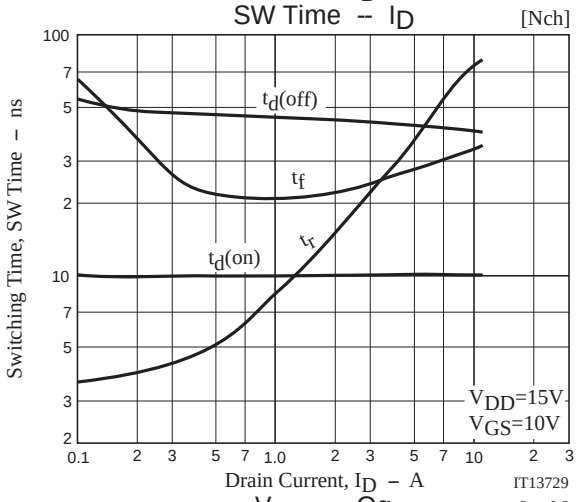


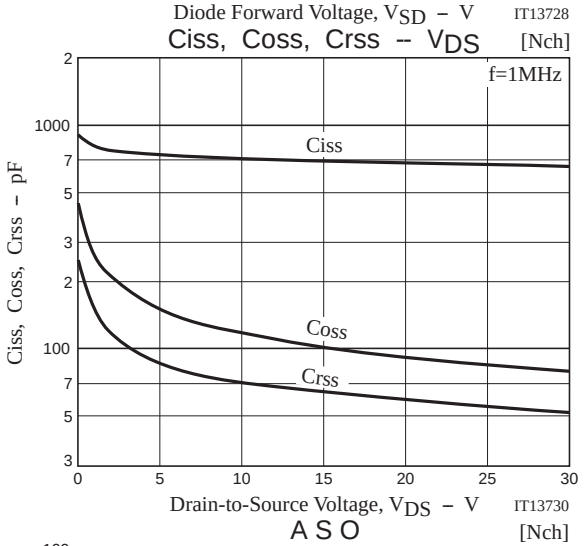


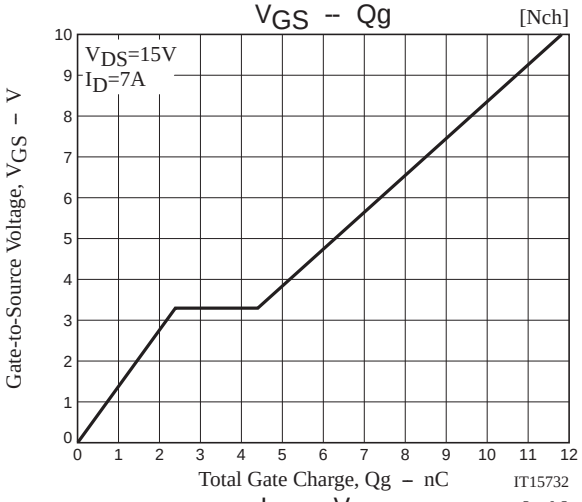


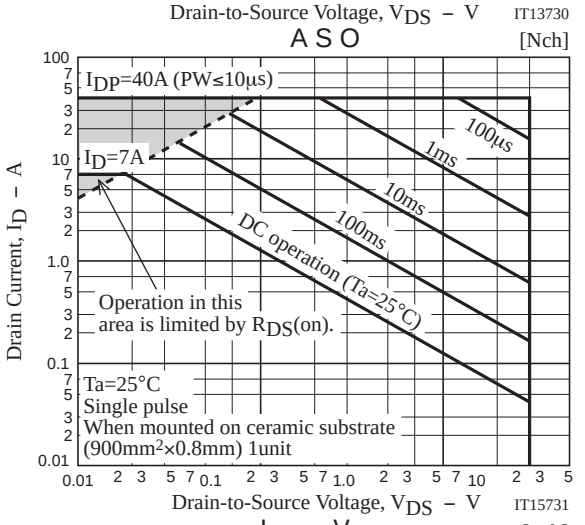

| yfs | -- ID
[Nch]
VDS=10V
Ta= –25°C
75°C
25°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT13727

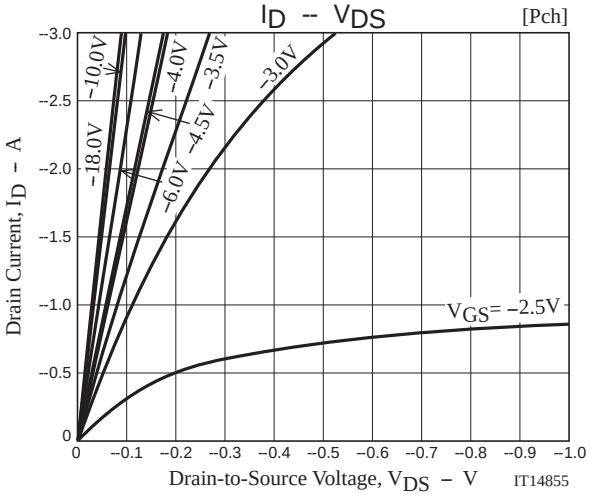

IS -- VSD
[Nch]
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT13728

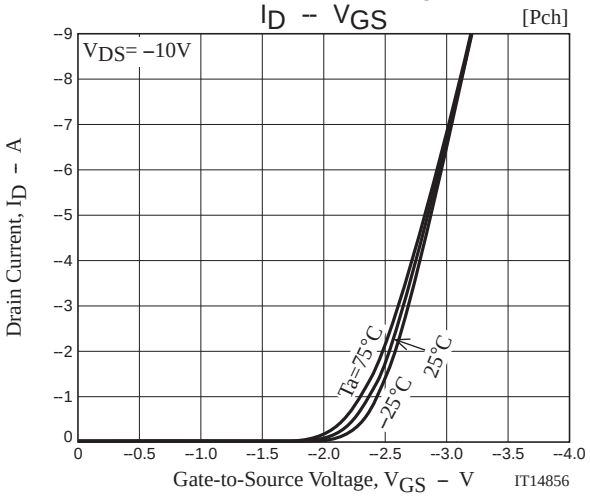

SW Time -- ID
[Nch]
td(off)
tf
tr
td(on)
VDD=15V
VGS=10V
Switching Time, SW Time – ns
Drain Current, ID – A
IT13729

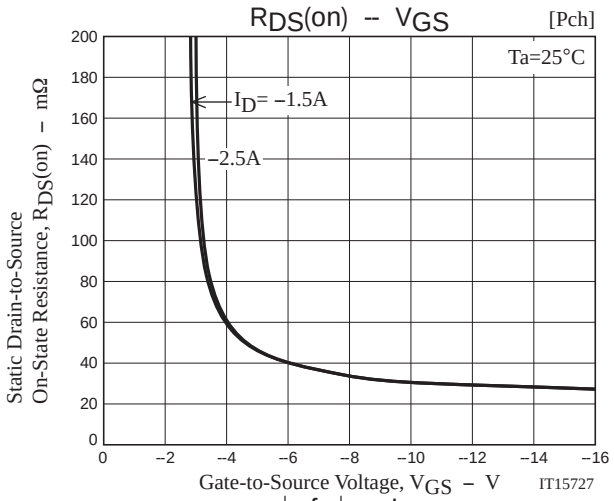

Ciss, Coss, Crss -- VDS
[Nch]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT13730

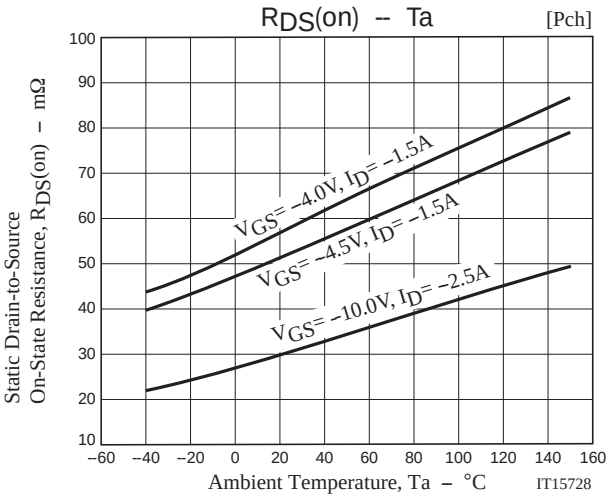

VGS -- Qg
[Nch]
VDS=15V
ID=7A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT15732

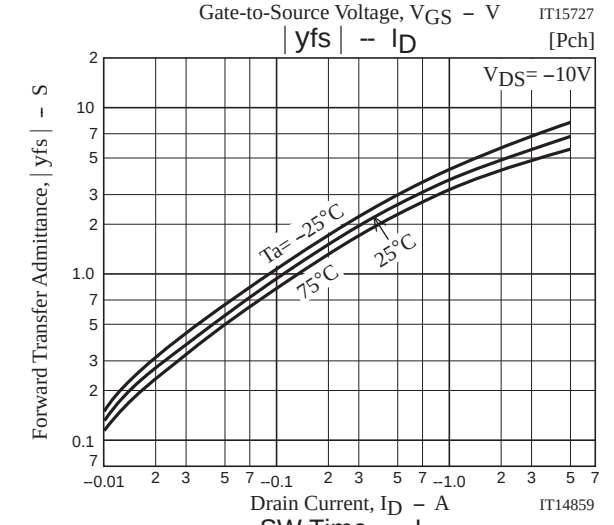

A S O
[Nch]
IDP=40A (PW≤10μs)
ID=7A
100μs
1ms
10ms
100ms
DC operation (Ta=25°C)
Operation in this
area is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate
(900mm2×0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT15731

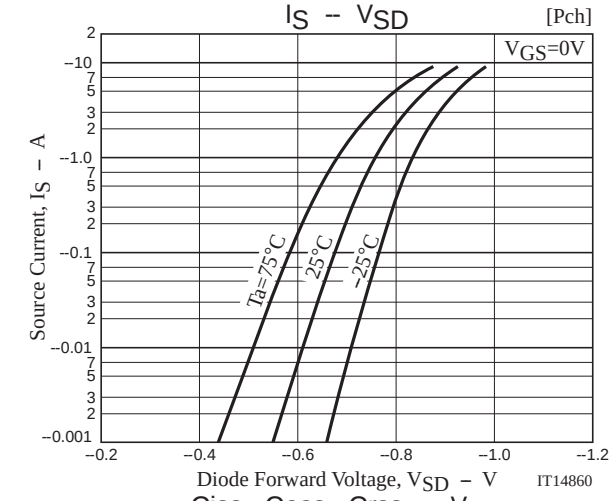

ID -- VDS
[Pch]
–10.0V
–18.0V
–4.0V
–3.5V
–4.5V
–6.0V
–3.0V
VGS= –2.5V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT14855

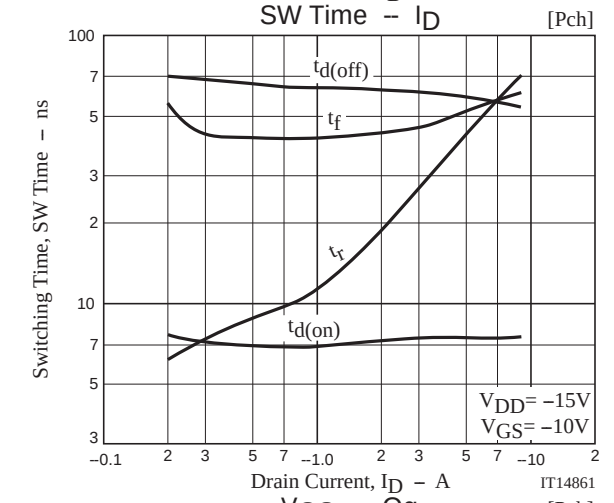

ID -- VGS
[Pch]
VDS= –10V
Ta=75°C
25°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT14856

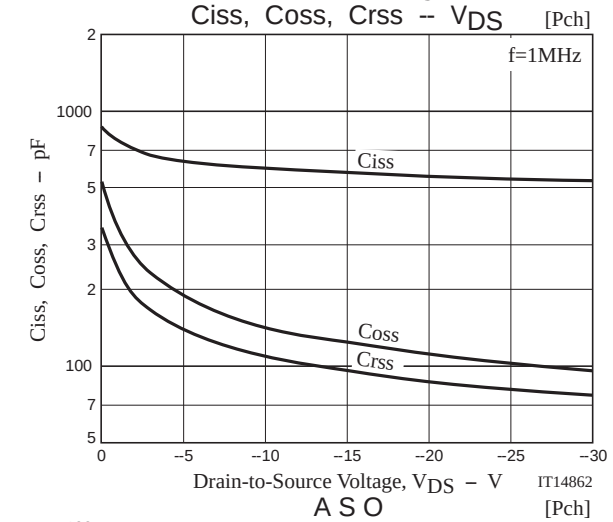

RDS(on) -- VGS
[Pch]
Ta=25°C
ID= –1.5A
–2.5A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT15727

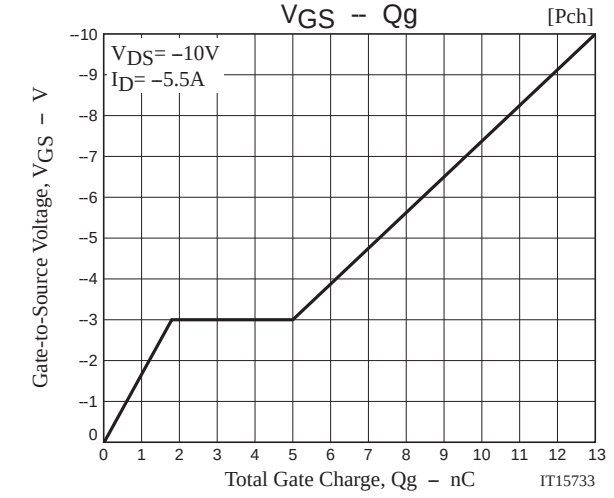

RDS(on) -- Ta
[Pch]
VGS= –4.0V, ID= –1.5A
VGS= –4.5V, ID= –1.5A
VGS= –10.0V, ID= –2.5A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT15728

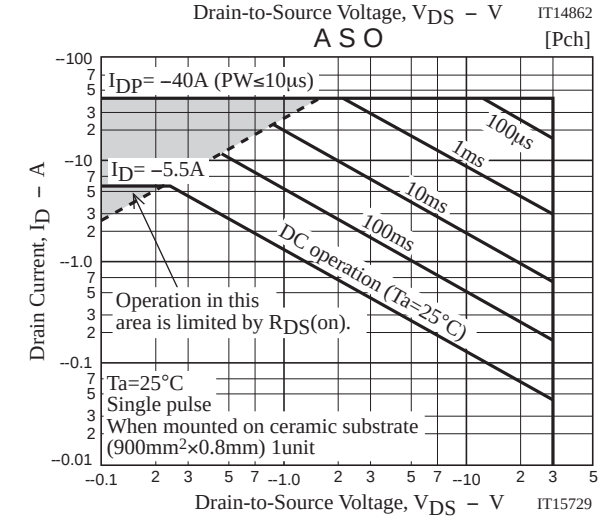

| yfs | -- ID
[Pch]
VDS= –10V
Ta= –25°C
25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT14859

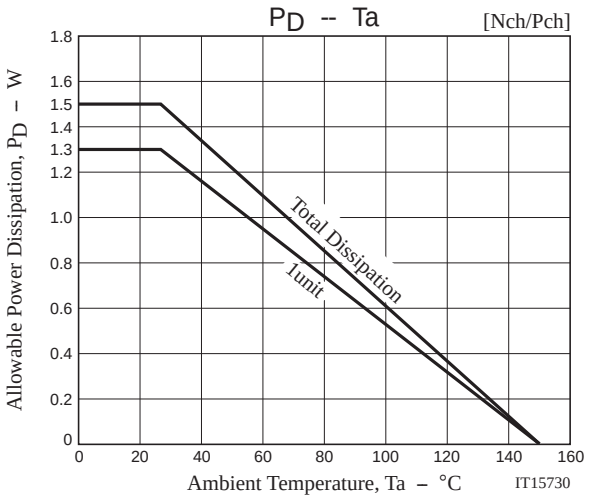

IS -- VSD
[Pch]
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT14860


SW Time -- ID
[Pch]
td(off)
tf
tr
td(on)
VDD= –15V
VGS= –10V
Switching Time, SW Time – ns
Drain Current, ID – A
IT14861


Ciss, Coss, Crss -- VDS
[Pch]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT14862


VGS -- Qg
[Pch]
VDS= –10V
ID= –5.5A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT15733


A S O
[Pch]
IDP= –40A (PW≤10μs)
ID= –5.5A
100μs
1ms
10ms
100ms
DC operation (Ta=25°C)
Operation in this area is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (900mm²×0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT15729



Note on usage : Since the ECH8661 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

This catalog provides information as of July, 2010. Specifications and information herein are subject to change without notice.