Ordering number : ENA0103

SANYO Semiconductors
DATA SHEET

N-Channel and P-Channel Silicon MOSFETs

VEC2609 — General-Purpose Switching Device Applications

Features

- The best suited for inverter applications.
- The VEC2609 incorporates an N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance, thereby enabling high-density mounting.
- Low voltage drive.
- Mounting height 0.75mm.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	V_{DSS}		30	−12	V
Gate-to-Source Voltage	V_{GSS}		±20	±8	V
Drain Current (DC)	I_D		1.4	−2	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	5.6	−8	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (900mm²X0.8mm)1unit	0.8		W
Total Dissipation	P_T	Mounted on a ceramic board (900mm²X0.8mm)	1.0		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	
[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=700mA	0.66	1.1		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=700mA, V_{GS}=10V		230	300	mΩ
	R_{DS}(on)2	I_D=400mA, V_{GS}=4V		400	560	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		65		pF
Output Capacitance	Coss	V_{DS}=10V, f=1MHz		14		pF
Reverse Transfer Capacitance	Crss	V_{DS}=10V, f=1MHz		8		pF

Marking : CF

Continued on next page.

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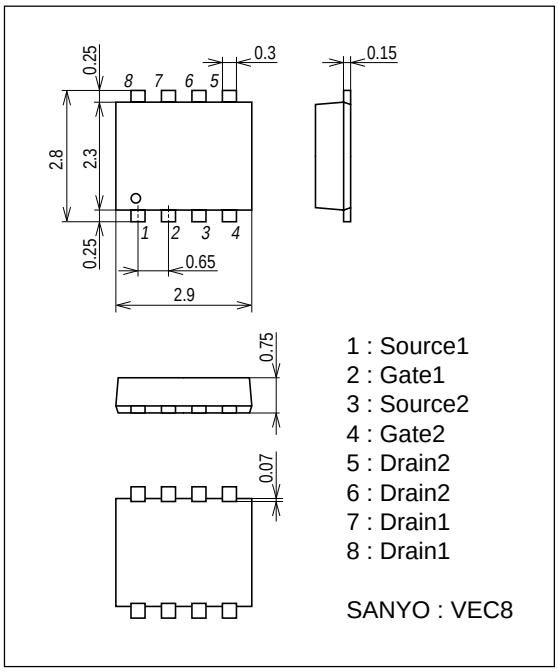
Continued from preceding page.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		5		ns
Rise Time	t_r	See specified Test Circuit.		4		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		11		ns
Fall Time	t_f	See specified Test Circuit.		3		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=10V, I_D=1.4A		2.5		nC
Gate-to-Source Charge	Qgs	V_{DS}=10V, V_{GS}=10V, I_D=1.4A		0.6		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=10V, V_{GS}=10V, I_D=1.4A		0.3		nC
Diode Forward Voltage	V_{SD}	I_S=1.4A, V_{GS}=0V		0.87	1.2	V
[P-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=–1mA, V_{GS}=0V	–12			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=–12V, V_{GS}=0V			–10	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±6.4V, V_{DS}=0V			±10	μA
Cutoff Voltage	$V_{GS(off)}$	V_{DS}=–6V, I_D=–1mA	–0.3		–1.0	V
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=–6V, I_D=–1.5A	2.7	4.5		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	I_D=–1.5A, V_{GS}=–4.5V		87	115	mΩ
	$R_{DS(on)2}$	I_D=–0.8A, V_{GS}=–2.5V		122	172	mΩ
	$R_{DS(on)3}$	I_D=–0.4A, V_{GS}=–1.8V		162	275	mΩ
Input Capacitance	Ciss	V_{DS}=–6V, f=1MHz		450		pF
Output Capacitance	Coss	V_{DS}=–6V, f=1MHz		100		pF
Reverse Transfer Capacitance	Crss	V_{DS}=–6V, f=1MHz		85		pF
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		15		ns
Rise Time	t_r	See specified Test Circuit.		75		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		64		ns
Fall Time	t_f	See specified Test Circuit.		50		ns
Total Gate Charge	Qg	V_{DS}=–6V, V_{GS}=–4.5V, I_D=–2.5A		6.5		nC
Gate-to-Source Charge	Qgs	V_{DS}=–6V, V_{GS}=–4.5V, I_D=–2.5A		0.8		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=–6V, V_{GS}=–4.5V, I_D=–2.5A		2.0		nC
Diode Forward Voltage	V_{SD}	I_S=–2.5A, V_{GS}=0V		–0.85	–1.5	V

Package Dimensions

unit : mm

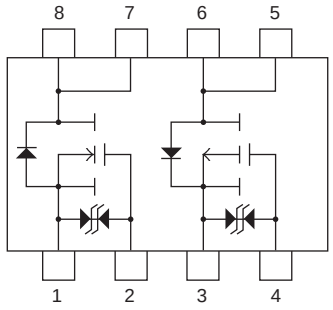
7012-002



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

SANYO : VEC8

Electrical Connection

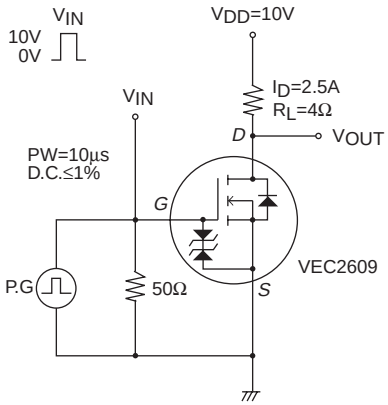


1 : Source1
2 : Gate1
3 : Source2
4 : Gate2
5 : Drain2
6 : Drain2
7 : Drain1
8 : Drain1

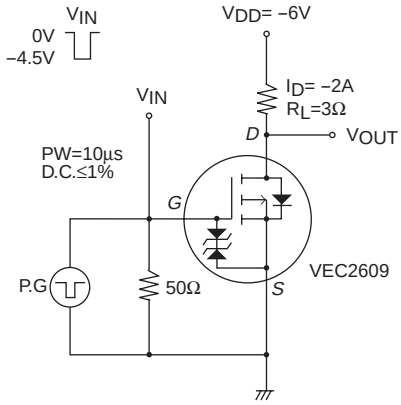
Top view

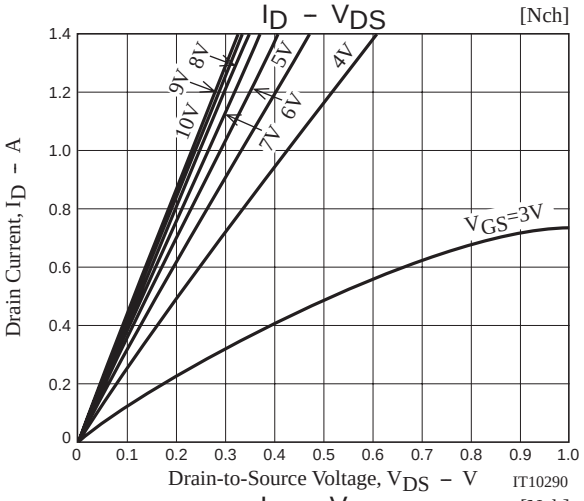
Switching Time Test Circuit

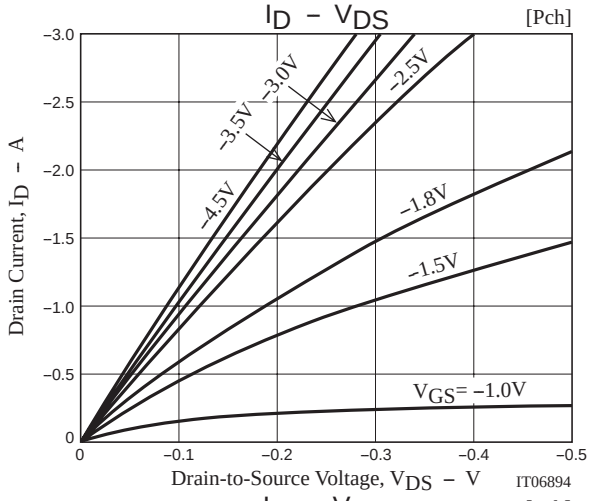
[N-channel]

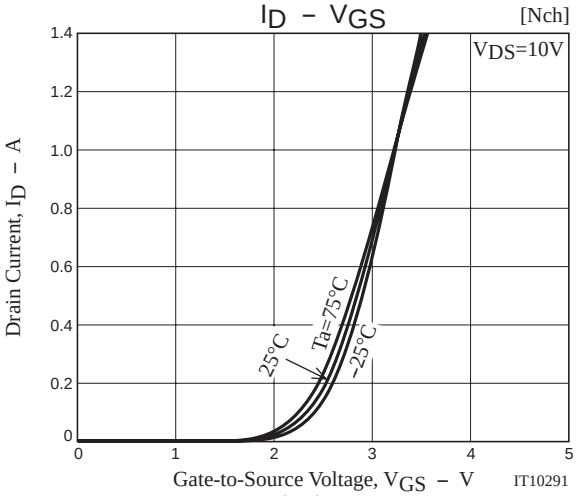


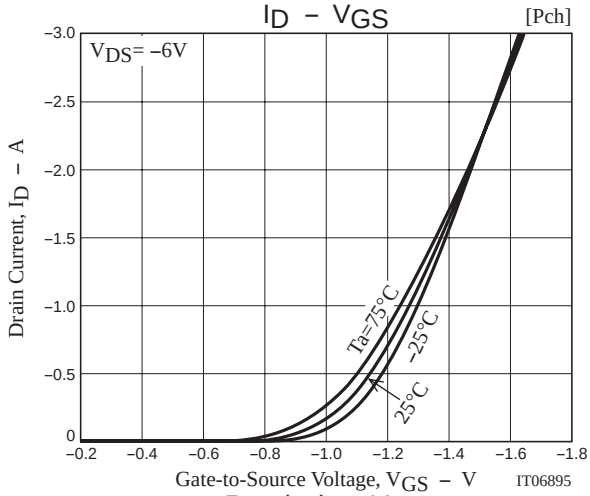
[P-channel]

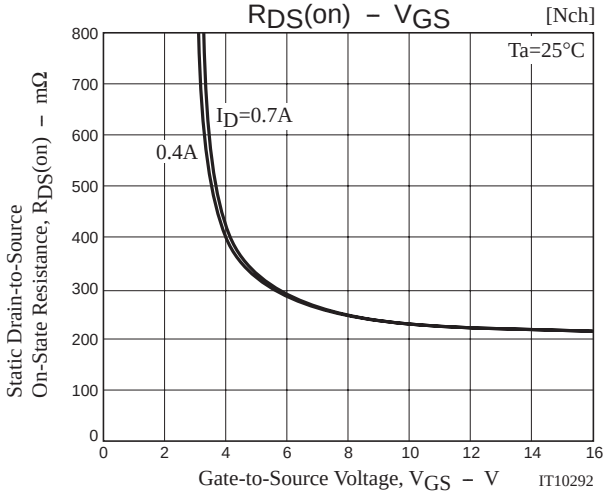


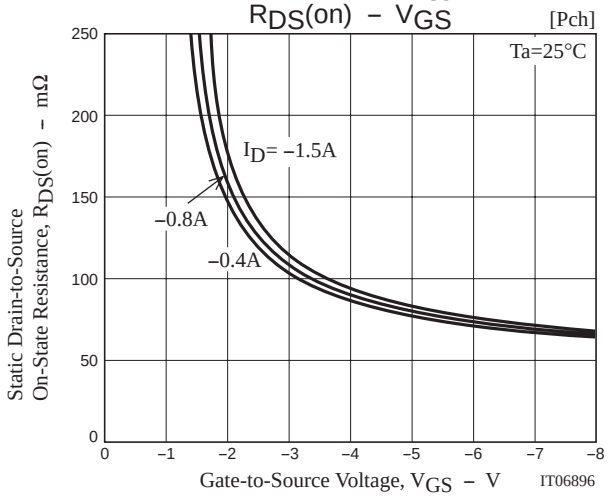


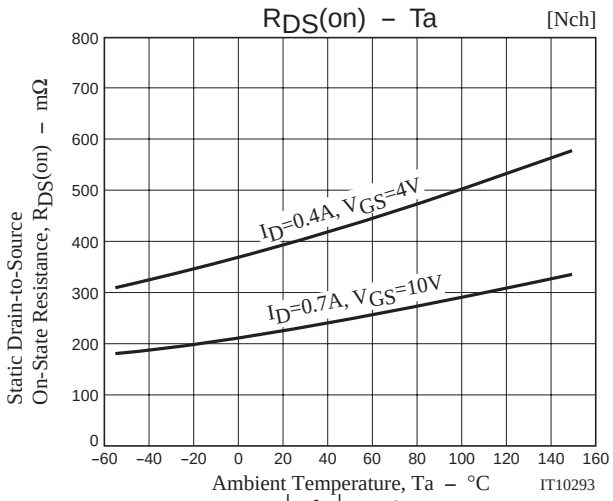


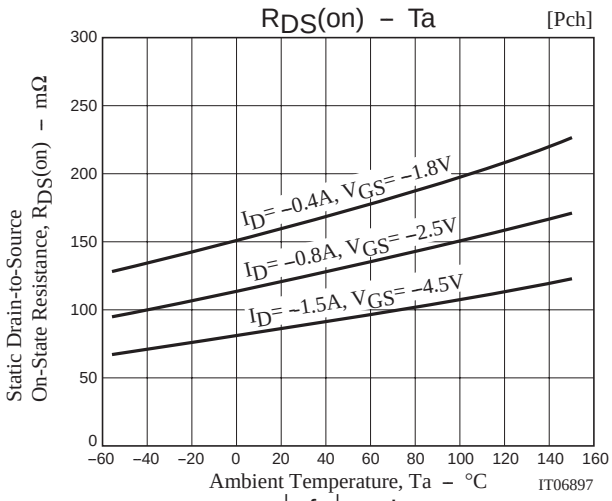


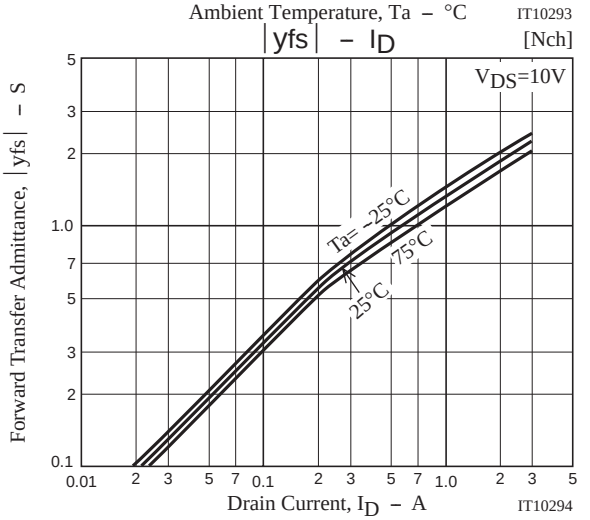


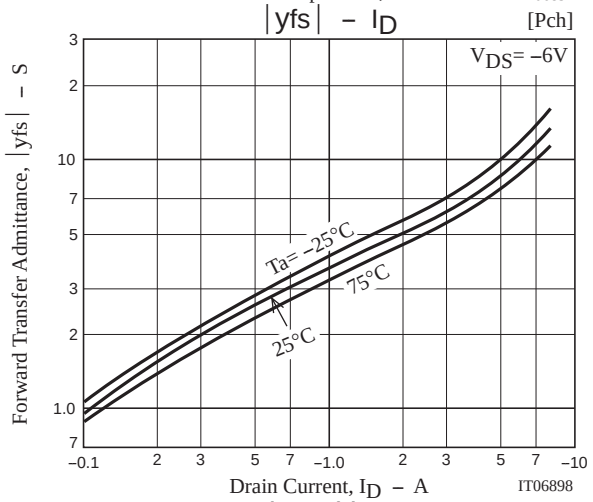


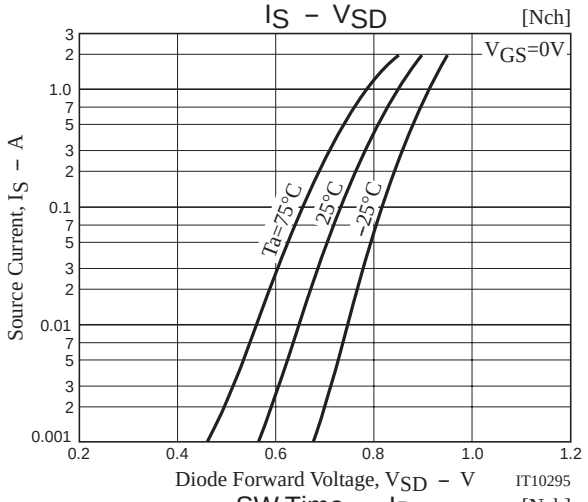


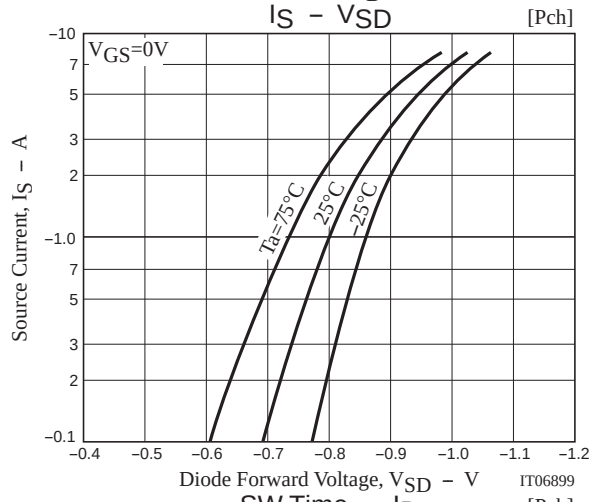

RDS(on) – Ta
[Nch]
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
ID=0.4A, VGS=4V
ID=0.7A, VGS=10V
Ambient Temperature, Ta – °C
IT10293

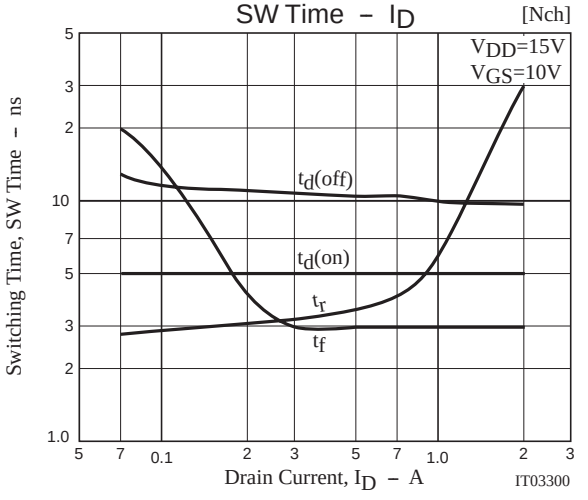

RDS(on) – Ta
[Pch]
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
ID= –0.4A, VGS= –1.8V
ID= –0.8A, VGS= –2.5V
ID= –1.5A, VGS= –4.5V
Ambient Temperature, Ta – °C
IT06897

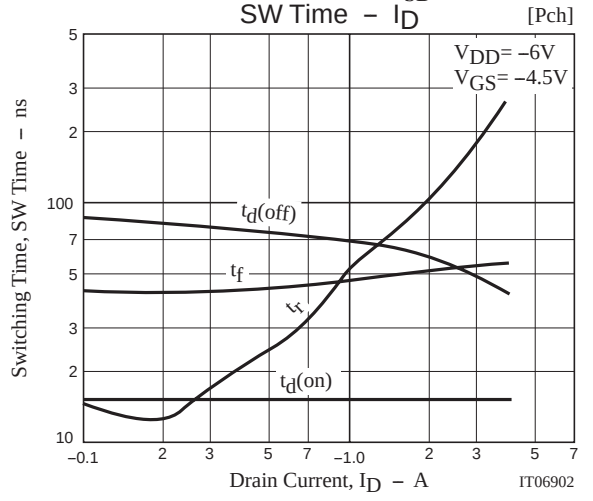

|yfs| – ID
[Nch]
VDS=10V
Forward Transfer Admittance, |yfs| – S
Ta= –25°C
75°C
25°C
Drain Current, ID – A
IT10294


|yfs| – ID
[Pch]
VDS= –6V
Forward Transfer Admittance, |yfs| – S
Ta= –25°C
75°C
25°C
Drain Current, ID – A
IT06898

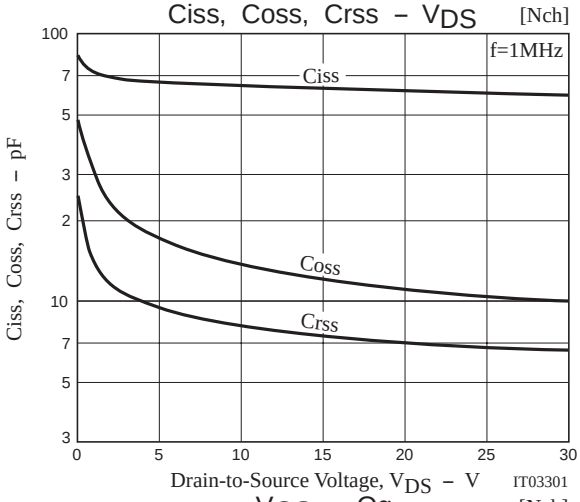

IS – VSD
[Nch]
VGS=0V
Source Current, IS – A
Ta=75°C
25°C
–25°C
Diode Forward Voltage, VSD – V
IT10295


IS – VSD
[Pch]
VGS=0V
Source Current, IS – A
Ta=75°C
25°C
–25°C
Diode Forward Voltage, VSD – V
IT06899

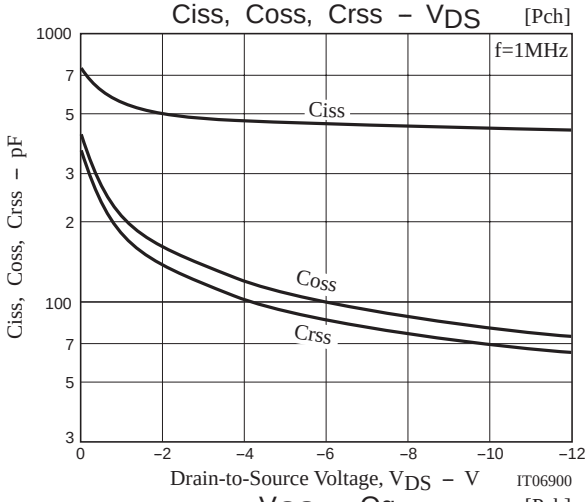

SW Time – ID
[Nch]
VDD=15V
VGS=10V
Switching Time, SW Time – ns
td(off)
td(on)
tr
tf
Drain Current, ID – A
IT03300


SW Time – ID
[Pch]
VDD= –6V
VGS= –4.5V
Switching Time, SW Time – ns
td(off)
tf
tr
td(on)
Drain Current, ID – A
IT06902

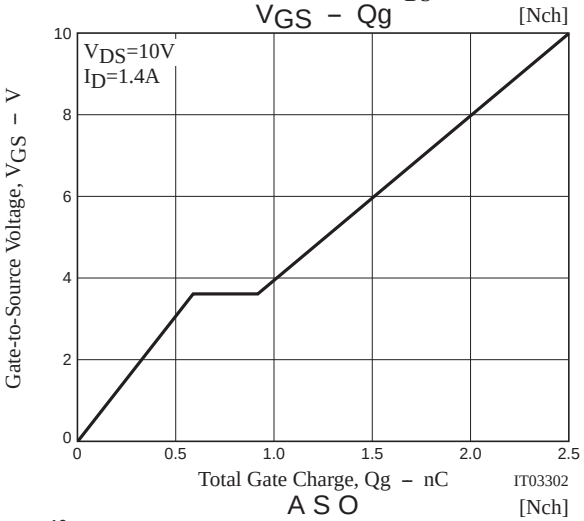
Ciss, Coss, Crss – V_{DS} [Nch]



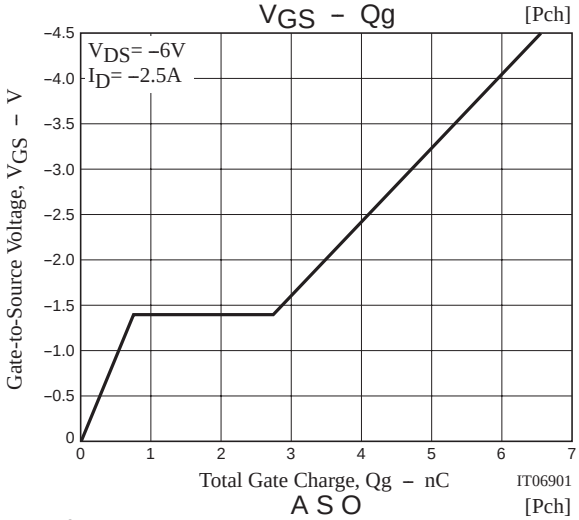
Ciss, Coss, Crss – V_{DS} [Pch]



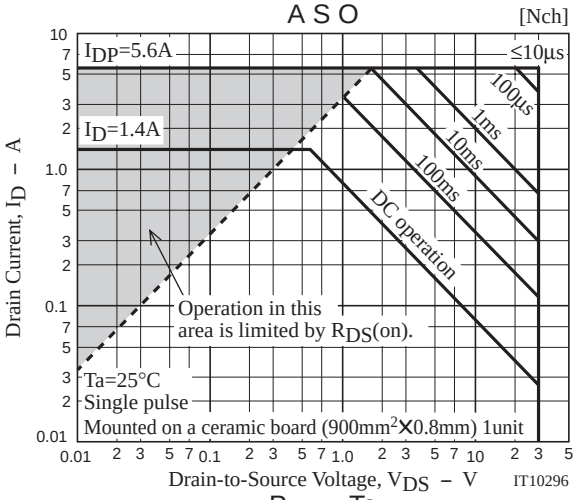
V_{GS} – Qg [Nch]



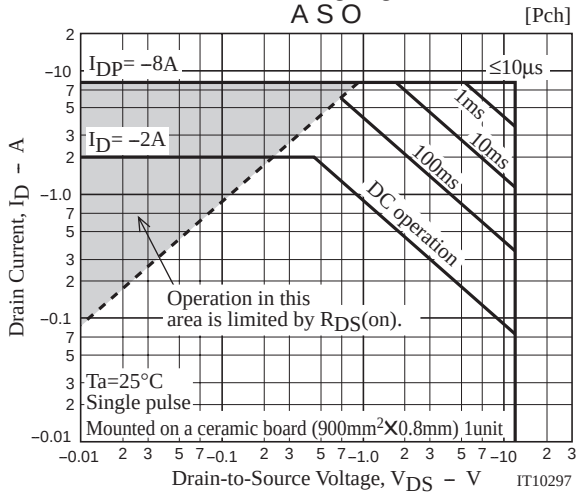
V_{GS} – Qg [Pch]



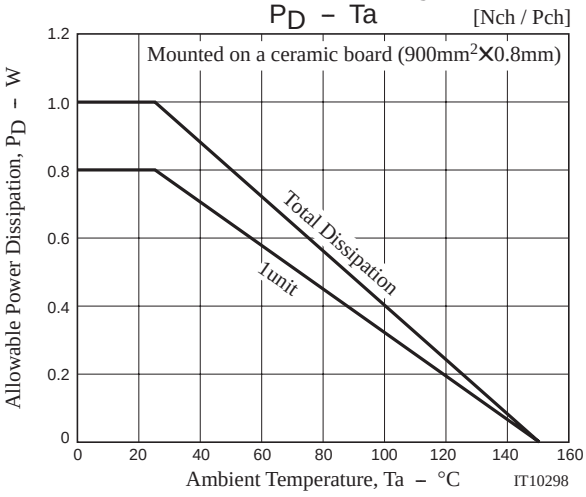
A S O [Nch]



A S O [Pch]



P_D – Ta [Nch / Pch]



Note on usage : Since the VEC2609 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.