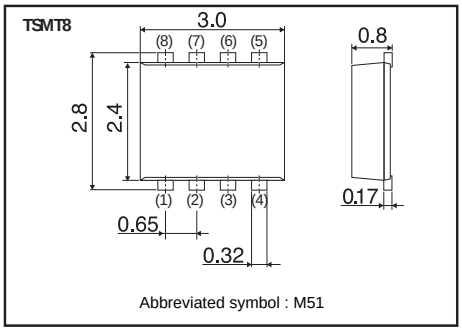
4V Drive Nch + Pch MOSFET

QS8M51

● Structure
Silicon N-channel MOSFET/
Silicon P-channel MOSFET

● Features
1) Low on-resistance.
2) Low voltage drive (4V drive).
3) Small surface mount package (TSMT8).

● Dimensions (Unit : mm)

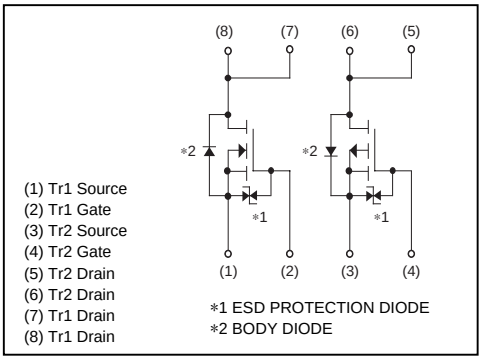


● Application
Switching

● Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
QS8M51		○

● Inner circuit



● Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Limits		Unit
			Tr1 : N-ch	Tr2 : P-ch	
Drain-source voltage		V_{DSS}	100	−100	V
Gate-source voltage		V_{GSS}	±20	±20	V
Drain current	Continuous	I_D	±2	±1.5	A
	Pulsed	I_{DP} *1	±6	±6	A
Source current (Body Diode)	Continuous	I_S	1.0	−1.0	A
	Pulsed	I_{SP} *1	6	−6	A
Power dissipation		P_D *2	1.5		W / TOTAL
			1.25		W / ELEMENT
Channel temperature		Tch	150		°C
Range of storage temperature		Tstg	−55 to +150		°C

*1 Pw≤10μs, Duty cycle≤1%

*2 Mounted on a ceramic board.

● **Electrical characteristics** (Ta = 25°C)

<Tr1(Nch)>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	±10	μA	V_{GS}=±20V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)DSS}$	100	-	-	V	I_D=1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	V_{DS}=100V, V_{GS}=0V
Gate threshold voltage	$V_{GS(th)}$	1	-	2.5	V	V_{DS}=10V, I_D=1mA
Static drain-source on-state resistance	$R_{DS(on)}$ *	-	240	325	mΩ	I_D=2A, V_{GS}=10V
		-	250	340		I_D=2A, V_{GS}=4.5V
			260	355		I_D=2A, V_{GS}=4V
Forward transfer admittance	$\|Y_{fs}\|$*	1.9	-	-	S	V_{DS}=10V, I_D=2A
Input capacitance	C_{iss}	-	290	-	pF	V_{DS}=25V
Output capacitance	C_{oss}	-	30	-	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	-	20	-	pF	f=1MHz
Turn-on delay time	$t_{d(on)}$ *	-	10	-	ns	V_{DD}≒ 50V, I_D=1A
Rise time	t_r *	-	10	-	ns	V_{GS}=10V
Turn-off delay time	$t_{d(off)}$ *	-	30	-	ns	R_L=50Ω, R_G=10Ω
Fall time	t_f *	-	15	-	ns	
Total gate charge	Q_g *	-	4.7	-	nC	V_{DD}≒ 50V, I_D=2A
Gate-source charge	Q_{gs} *	-	1.2	-	nC	V_{GS}=5V
Gate-drain charge	Q_{gd} *	-	1.8	-	nC	

*Pulsed

●**Body diode characteristics** (Source-Drain)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD}*	-	-	1.2	V	I_s=2A, V_{GS}=0V

*Pulsed

● **Electrical characteristics** (Ta = 25°C)

<Tr2(Pch)>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	±10	μA	V_{GS}=±20V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)DSS}$	−100	-	-	V	I_D=−1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	-	-	−1	μA	V_{DS}=−100V, V_{GS}=0V
Gate threshold voltage	$V_{GS(th)}$	−1	-	−2.5	V	V_{DS}=−10V, I_D=−1mA
Static drain-source on-state resistance	$R_{DS(on)}$*	-	350	470	mΩ	I_D=−1.5A, V_{GS}=−10V
		-	380	510		I_D=−0.75A, V_{GS}=−4.5V
			400	540		I_D=−0.75A, V_{GS}=−4V
Forward transfer admittance	$\|Y_{fs}\|$*	1.5	-	-	S	V_{DS}=−10V, I_D=−1.5A
Input capacitance	C_{iss}	-	950	-	pF	V_{DS}=−25V
Output capacitance	C_{oss}	-	45	-	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	-	20	-	pF	f=1MHz
Turn-on delay time	$t_{d(on)}$*	-	10	-	ns	V_{DD}≒−50V, I_D=−0.75A
Rise time	t_r *	-	15	-	ns	V_{GS}=−10V
Turn-off delay time	$t_{d(off)}$*	-	60	-	ns	R_L=66Ω, R_G=10Ω
Fall time	t_f *	-	10	-	ns	
Total gate charge	Q_g *	-	17	-	nC	V_{DD}≒−50V, I_D=−1.5A
Gate-source charge	Q_{gs} *	-	4.5	-	nC	V_{GS}=−5V
Gate-drain charge	Q_{gd} *	-	5	-	nC	

*Pulsed

●**Body diode characteristics** (Source-Drain)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD}*	-	-	−1.2	V	I_s=−0.75A, V_{GS}=0V

*Pulsed

●Electrical characteristic curves (Ta=25°C)

〈Tr.1(Nch)〉

Fig.1 Typical Output Characteristics (Ⅰ)

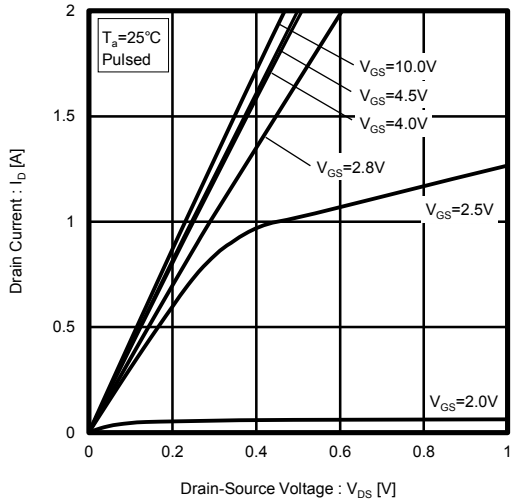


Fig.2 Typical Output Characteristics (Ⅱ)

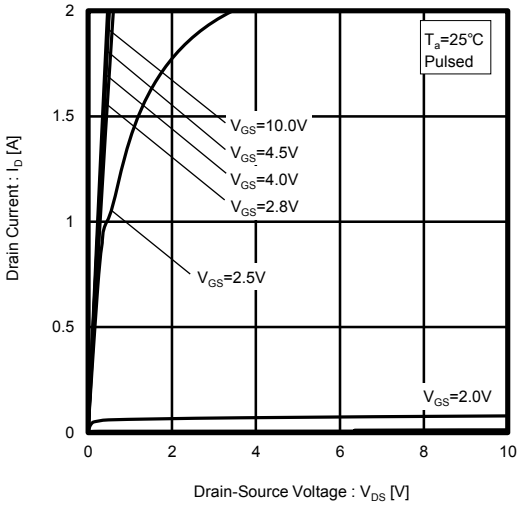


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

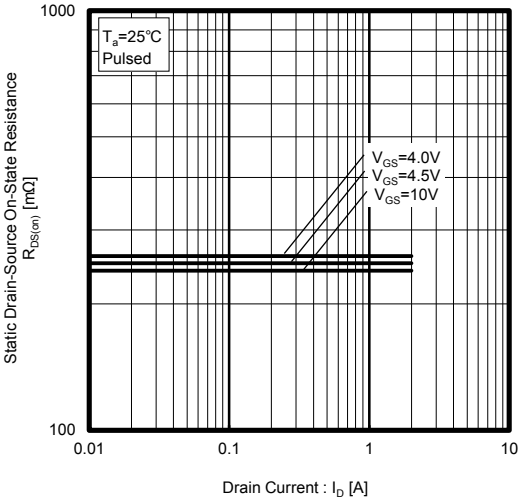


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

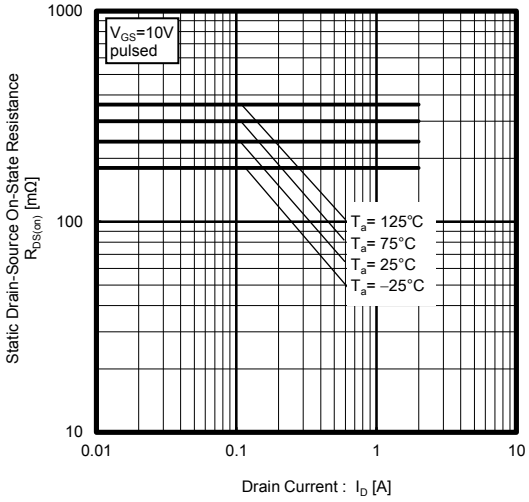


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

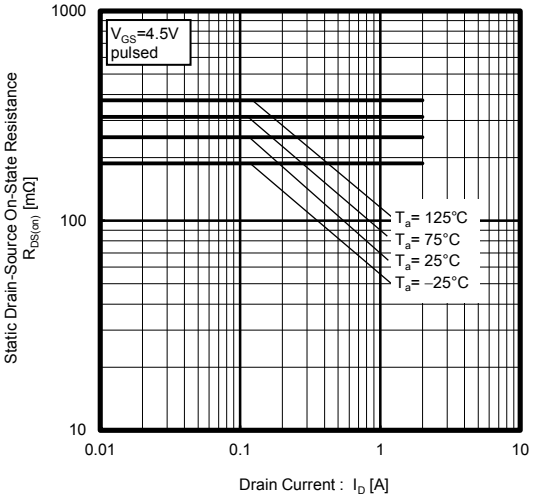


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

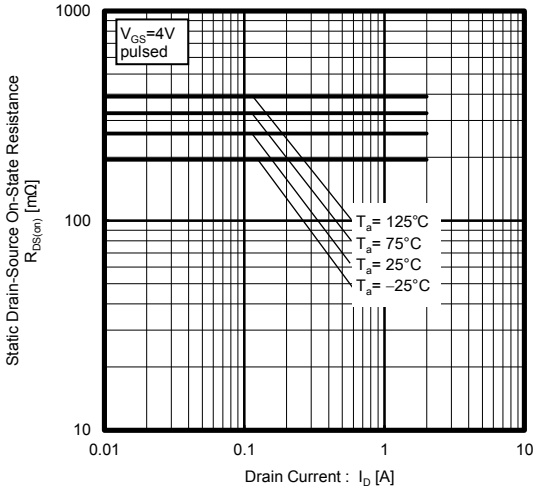


Fig.7 Forward Transfer Admittance vs. Drain Current

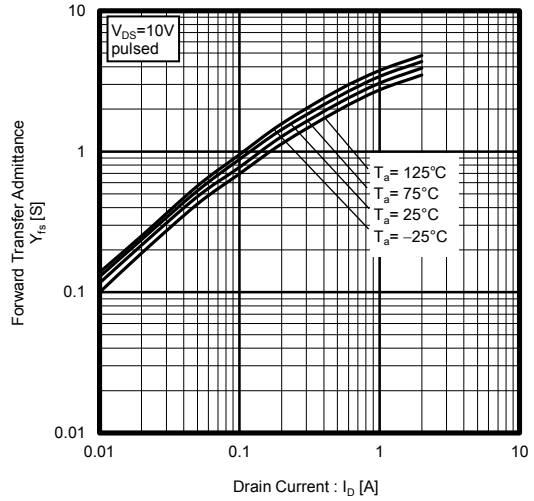


Fig.8 Typical Transfer Characteristics

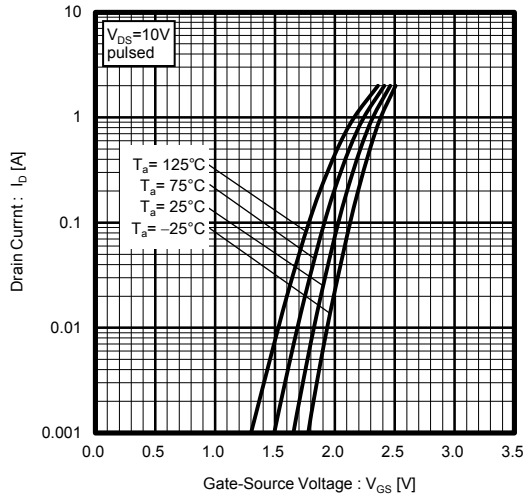


Fig.9 Source Current vs. Source-Drain Voltage

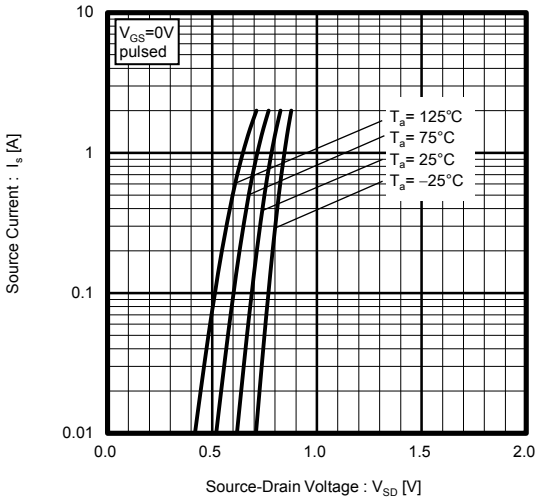


Fig.10 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

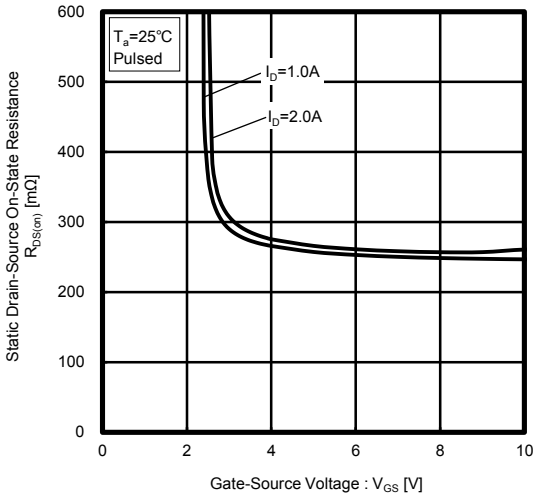


Fig.11 Switching Characteristics

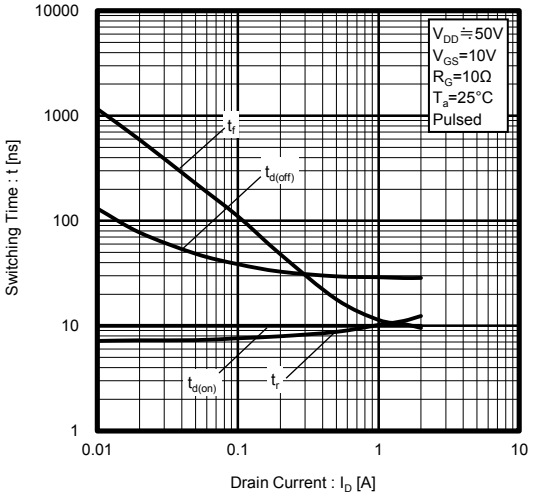


Fig.12 Dynamic Input Characteristics

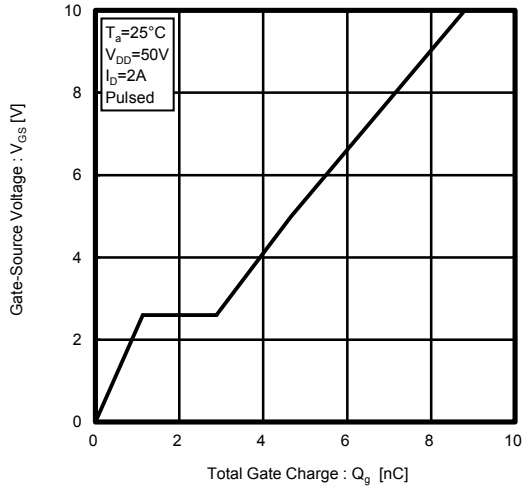


Fig.13 Typical Capacitance vs. Drain-Source Voltage

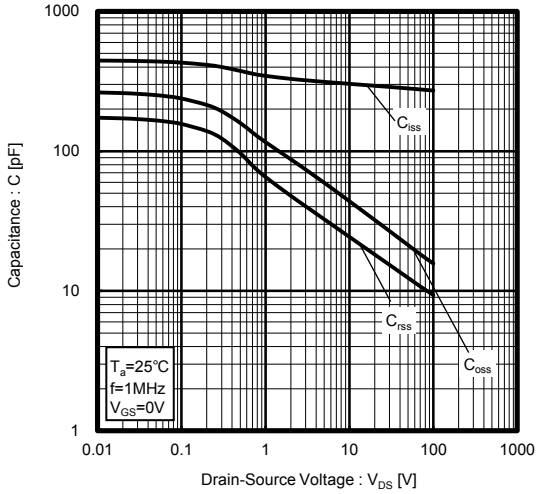


Fig.14 Normalized Transient Thermal Resistance v.s. Pulse Width

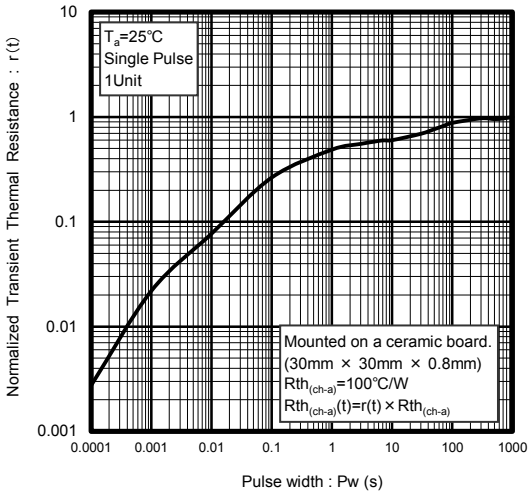
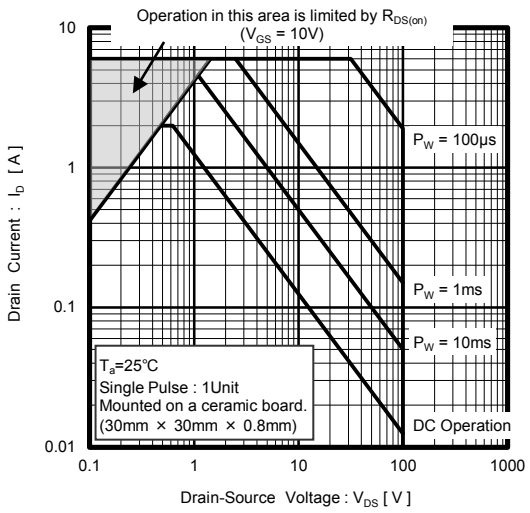


Fig.15 Maximum Safe Operating Area



〈Tr.2(Pch)〉

Fig.1 Typical Output Characteristics (Ⅰ)

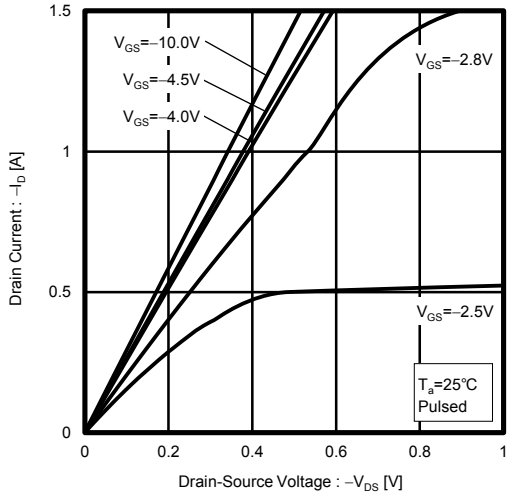


Fig.2 Typical Output Characteristics (Ⅱ)

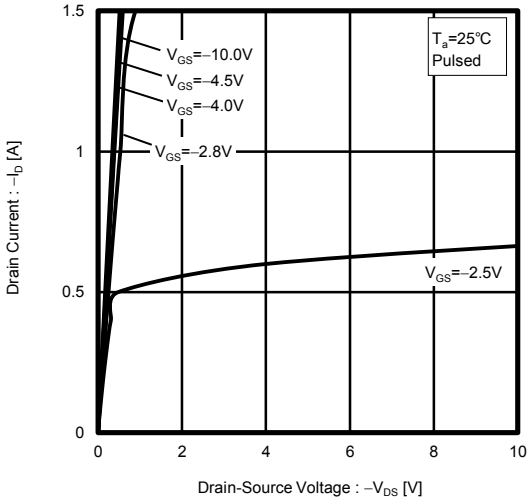


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

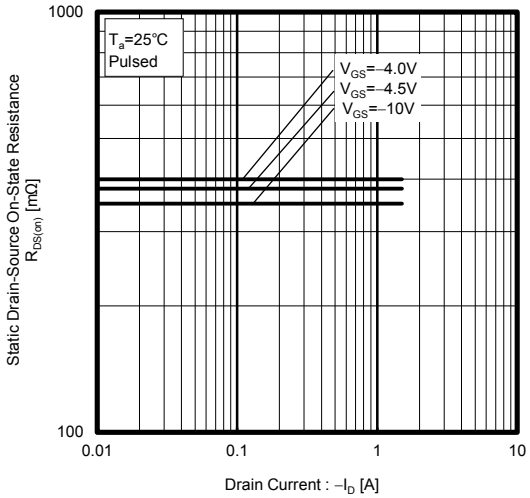


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

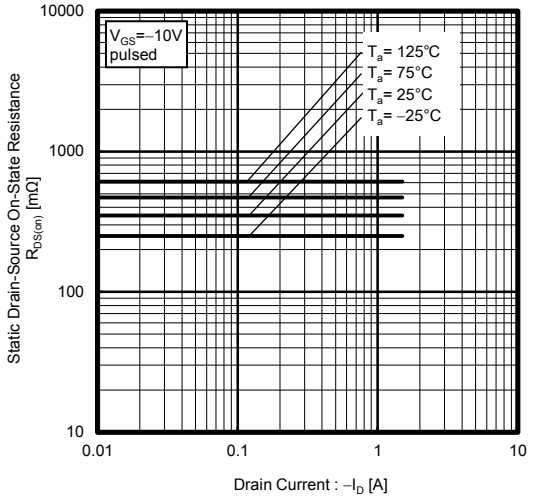


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

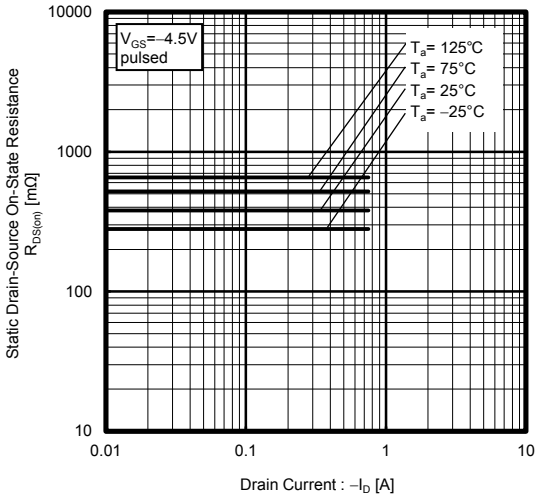


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

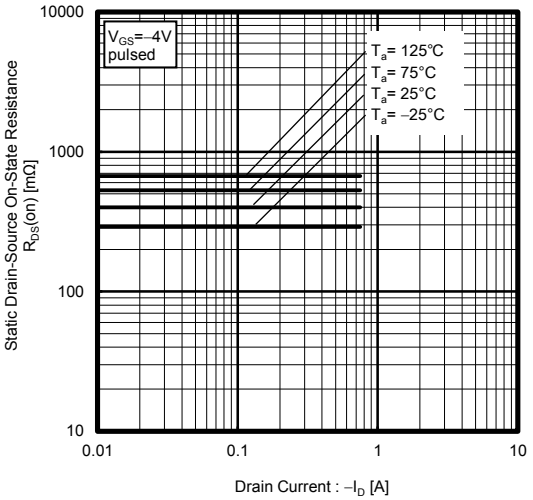


Fig.7 Forward Transfer Admittance vs. Drain Current

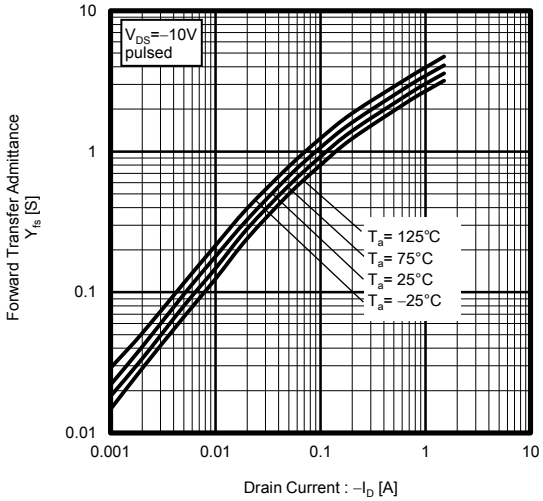


Fig.8 Typical Transfer Characteristics

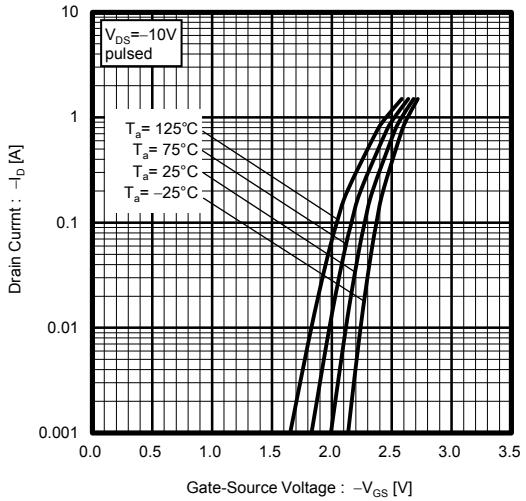


Fig.9 Source Current vs. Source-Drain Voltage

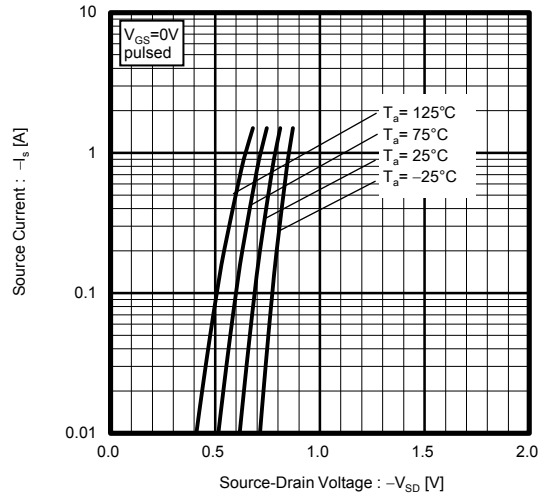


Fig.10 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

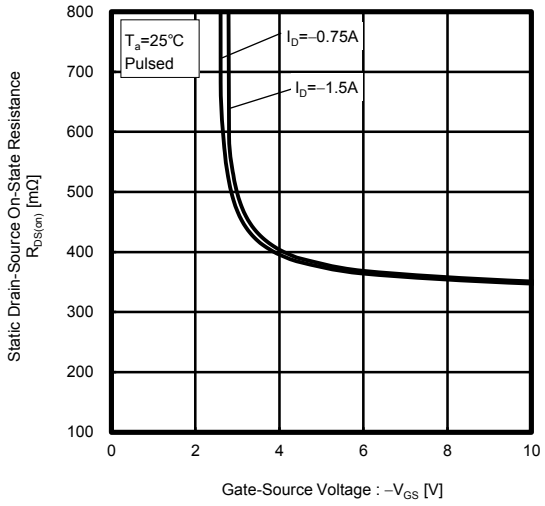


Fig.11 Switching Characteristics

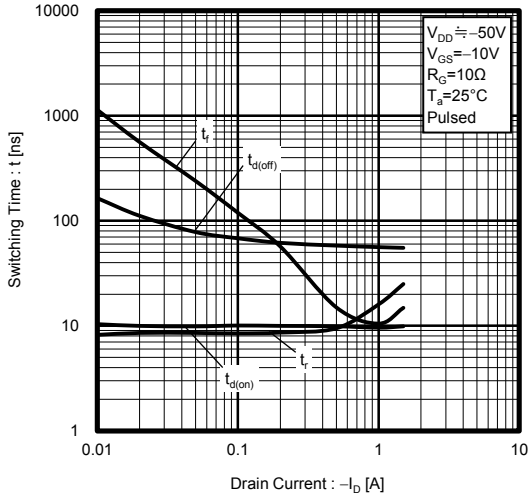


Fig.12 Dynamic Input Characteristics

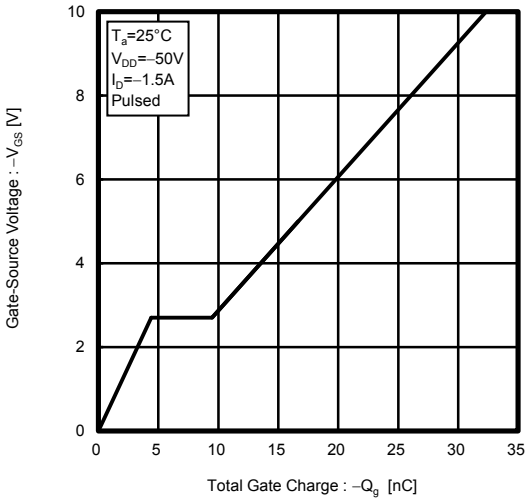


Fig.13 Typical Capacitance vs. Drain-Source Voltage

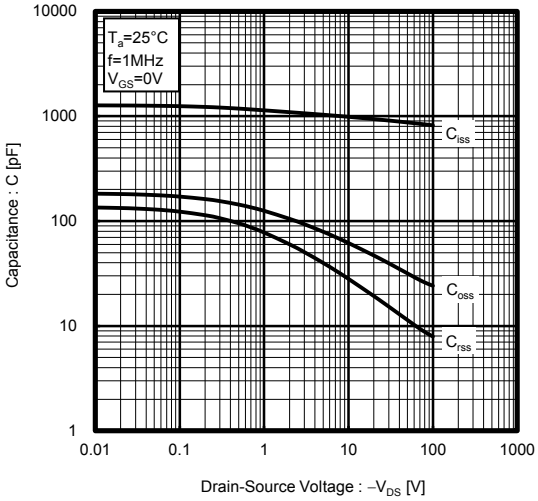


Fig.14 Normalized Transient Thermal Resistance v.s. Pulse Width

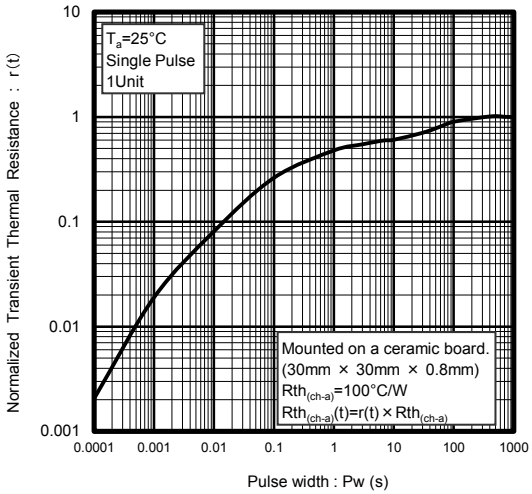
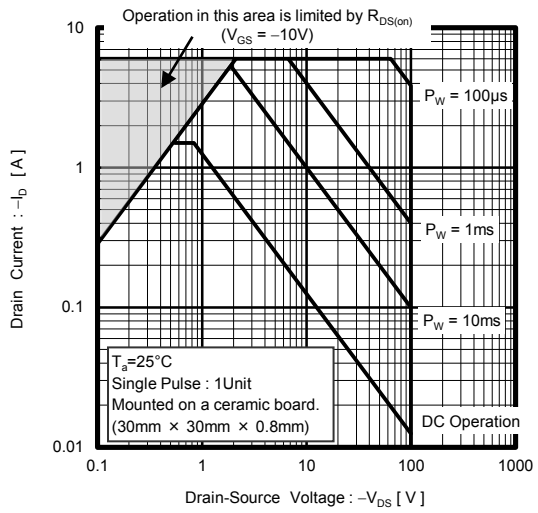


Fig.15 Maximum Safe Operating Area



● Measurement circuits

<Tr1(Nch)>

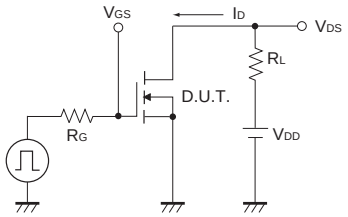


Fig.1-1 Switching Time Measurement Circuit

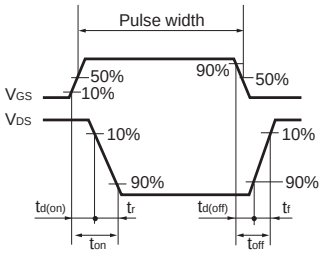


Fig.1-2 Switching Waveforms

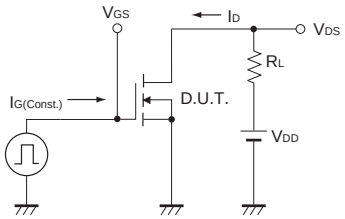


Fig.2-1 Gate Charge Measurement Circuit

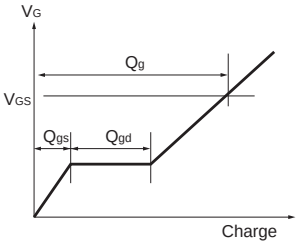


Fig.2-2 Gate Charge Waveform

<Tr2(Pch)>

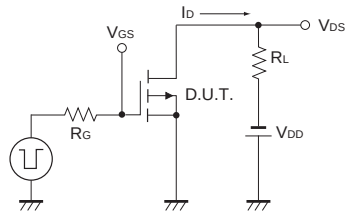


Fig.1-1 Switching Time Measurement Circuit

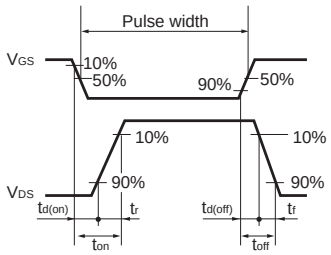


Fig.1-2 Switching Waveforms

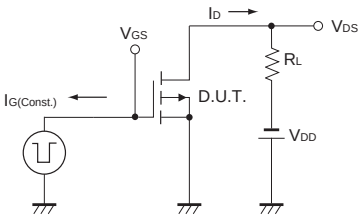


Fig.2-1 Gate Charge Measurement Circuit

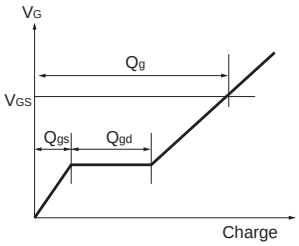


Fig.2-2 Gate Charge Waveform

Notes

No copying or reproduction of this document, in part or in whole, is permitted without the consent of ROHM Co.,Ltd.

The content specified herein is subject to change for improvement without notice.

The content specified herein is for the purpose of introducing ROHM's products (hereinafter "Products"). If you wish to use any such Product, please be sure to refer to the specifications, which can be obtained from ROHM upon request.

Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

Great care was taken in ensuring the accuracy of the information specified in this document. However, should you incur any damage arising from any inaccuracy or misprint of such information, ROHM shall bear no responsibility for such damage.

The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM and other parties. ROHM shall bear no responsibility whatsoever for any dispute arising from the use of such technical information.

The Products specified in this document are intended to be used with general-use electronic equipment or devices (such as audio visual equipment, office-automation equipment, communication devices, electronic appliances and amusement devices).

The Products specified in this document are not designed to be radiation tolerant.

While ROHM always makes efforts to enhance the quality and reliability of its Products, a Product may fail or malfunction for a variety of reasons.

Please be sure to implement in your equipment using the Products safety measures to guard against the possibility of physical injury, fire or any other damage caused in the event of the failure of any Product, such as derating, redundancy, fire control and fail-safe designs. ROHM shall bear no responsibility whatsoever for your use of any Product outside of the prescribed scope or not in accordance with the instruction manual.

The Products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). ROHM shall bear no responsibility in any way for use of any of the Products for the above special purposes. If a Product is intended to be used for any such special purpose, please contact a ROHM sales representative before purchasing.

If you intend to export or ship overseas any Product or technology specified herein that may be controlled under the Foreign Exchange and the Foreign Trade Law, you will be required to obtain a license or permit under the Law.

ROHM SEMICONDUCTOR

Thank you for your accessing to ROHM product informations.
More detail product informations and catalogs are available, please contact us.

ROHM Customer Support System

http://www.rohm.com/contact/