Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

SP8M70

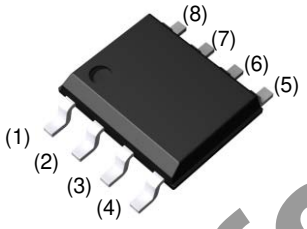
Dual N & Pch Power MOSFET

Datasheet

Symbol	Tr1: Nch	Tr2: Pch
V_{DSS}	250V	−250V
$R_{DS(on)}$ (Max.)	1.63Ω	2.8Ω
I_D	3.0A	−2.5A
P_D	2.0W	

●Outline

SOP8



●Features

1) Low on-resistance.

2) Fast switching speed.

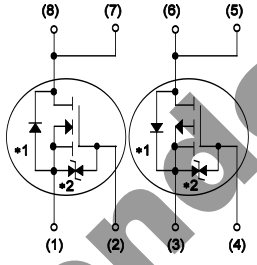
3) Drive circuits can be simple.

4) Parallel use is easy.

5) Pb-free lead plating ; RoHS compliant

6) Small Surface Mount Package (SOP8).

●Inner circuit



(1) Tr1 Source
(2) Tr1 Gate
(3) Tr2 Source
(4) Tr2 Gate
(5) Tr2 Drain
(6) Tr2 Drain
(7) Tr1 Drain
(8) Tr1 Drain

∗1 BODY DIODE
∗2 ESD PROTECTION DIODE

●Application

Switching Power Supply

●Packaging specifications

Type	Packaging	Taping
	Reel size (mm)	330
	Tape width (mm)	12
	Basic ordering unit (pcs)	2,500
	Taping code	TB1
	Marking	SP8M70

●Absolute maximum ratings (T_a = 25°C) ,unless otherwise specified

Parameter	Symbol	Value		Unit
		Tr1: Nch	Tr2: Pch	
Drain - Source voltage	V_{DSS}	250	−250	V
Continuous drain current	I_D *1	±3.0	±2.5	A
Pulsed drain current	$I_{D,pulse}$ *2	±12	±10	A
Gate - Source voltage	V_{GSS}	±30	±20	V
Power dissipation	P_D *3	2.0		W / total
		1.4		W / element
Power dissipation	P_D *4	0.65		W / total
Junction temperature	T_j	150		°C
Range of storage temperature	T_{stg}	−55 to +150		°C

●Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - ambient	R_{thJA} *3	-	-	62.5	°C/W
Thermal resistance, junction - ambient	R_{thJA} *4	-	-	192.3	°C/W

●Electrical characteristics (T_a = 25°C) ,unless otherwise specified

Parameter	Symbol	Type	Conditions	Values			Unit
				Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	N	V_{GS} = 0V, I_D = 1mA	250	-	-	V
		P	V_{GS} = 0V, I_D = −1mA	−250	-	-	
Zero gate voltage drain current	I_{DSS}	N	V_{DS} = 250V, V_{GS} = 0V Tj = 25°C	-	-	25	μA
		P	V_{DS} = −250V, V_{GS} = 0V Tj = 25°C	-	-	−25	
		N	V_{DS} = 250V, V_{GS} = 0V T_j = 125°C	-	-	100	
		P	V_{DS} = −250V, V_{GS} = 0V T_j = 125°C	-	-	−100	
Gate - Source leakage current	I_{GSS}	N	V_{GS} = ±25V, V_{DS} = 0V	-	-	±10	μA
		P	V_{GS} = ±15V, V_{DS} = 0V	-	-	±10	
Gate threshold voltage	$V_{GS\ (th)}$	N	V_{DS} = 10V, I_D = 1mA	2.0		4.0	V
		P	V_{DS} = −10V, I_D = −1mA	−2.0	-	−4.0	
Static drain - source on - state resistance	$R_{DS(on)}$ *5	N	V_{GS}=10V, I_D=1.5A	-	1.25	1.63	Ω
			V_{GS}=10V, I_D=1.5A T_j=125°C	-	2.50	3.30	
		P	V_{GS}=−10V, I_D=−1.25A	-	2.20	2.80	Ω
			V_{GS}=−10V, I_D=−1.25A T_j=125°C	-	3.90	5.00	
Forward transfer admittance	g_{fs} *5	N	V_{DS} = 10V, I_D = 1.5A	0.75	1.5	-	S
		P	V_{DS} = −10V, I_D = −1.25A	1.0	2.0	-	

●Electrical characteristics (T_a = 25°C)

Parameter	Symbol	Type	Conditions	Values			Unit
				Min.	Typ.	Max.	
Input capacitance	C_{iss}	N	N V_{GS} = 0V, V_{DS} = 25V f = 1MHz P V_{GS} = 0V, V_{DS} = −25V f = 1MHz	-	180	-	pF
		P		-	250	-	
Output capacitance	C_{oss}	N		-	70	-	
		P		-	40	-	
Reverse transfer capacitance	C_{rss}	N		-	20	-	
		P		-	10	-	
Turn - on delay time	$t_{d(on)}$ *5	N	N V_{DD} ≃ 125V V_{GS} = 10V I_D = 1.5A, R_L = 83Ω R_G = 10Ω P V_{DD} ≃ −125V V_{GS} = −10V I_D = −1.25A, R_L = 100Ω R_G = 10Ω	-	10	-	ns
		P		-	9	-	
Rise time	t_r *5	N		-	20	-	
		P		-	15	-	
Turn - off delay time	$t_{d(off)}$ *5	N		-	20	-	
		P		-	30	-	
Fall time	t_f *5	N		-	25	-	
		P		-	20	-	

●Gate Charge characteristics (T_a = 25°C)

Parameter	Symbol	Type	Conditions	Values			Unit
				Min.	Typ.	Max.	
Total gate charge	Q_g *5	N	N V_{DD} ≃ 125V I_D = 3A V_{GS} = 10V P V_{DD} ≃ −125V I_D = −2.5A V_{GS} = −10V	-	5.2	-	nC
		P		-	8.0	-	
Gate - Source charge	Q_{gs} *5	N		-	2.1	-	
		P		-	2.5	-	
Gate - Drain charge	Q_{gd} *5	N		-	1.2	-	
		P		-	2.8	-	
Gate plateau voltage	V(plateau)	N	N V_{DD} ≃ 125V I_D = 3A	-	7.0	-	V
		P	P V_{DD} ≃ −125V I_D = −2.5A	-	6.0	-	

●**Body diode electrical characteristics** (Source-Drain) (T_a = 25°C)

Parameter	Symbol	Type	Conditions	Values			Unit
				Min.	Typ.	Max.	
Continuous source current	I_S *1	N	T_a = 25°C	-	-	1	A
		P		-	-	–1	
Pulsed source current	I_{SM} *2	N		-	-	12	A
		P		-	-	–10	
Forward voltage	V_{SD} *5	N	V_{GS} = 0V, I_s = 3.0A	-	-	1.5	V
		P	V_{GS} = 0V, I_s = –2.5A	-	-	–1.5	
Reverse recovery time	t_{rr} *5	N	N I_S = 1.5A di/dt = 100A / μs	-	85	-	ns
		P		-	100	-	
Reverse recovery charge	Q_{rr} *5	N	P I_S = –1.0A di/dt = 100A / μs	-	190	-	nC
		P		-	370	-	

*1 Limited only by maximum temperature allowed.

*2 Pw ≤ 10μs, Duty cycle ≤ 1%

*3 Mounted on a ceramic board (3.0×3.0×0.8mm)

*4 Mounted on a epoxy PCB FR4(2.0×2.0×0.8mm)

*5 Pulsed

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

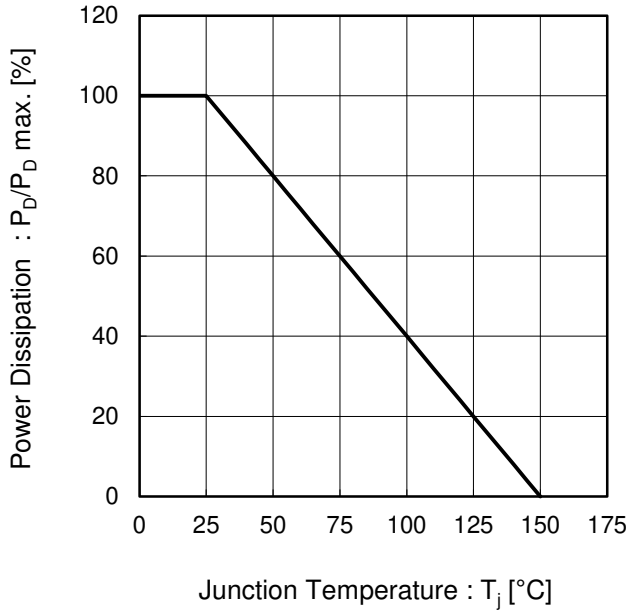


Fig.2 Normalized Transient Thermal Resistance vs. Pulse Width

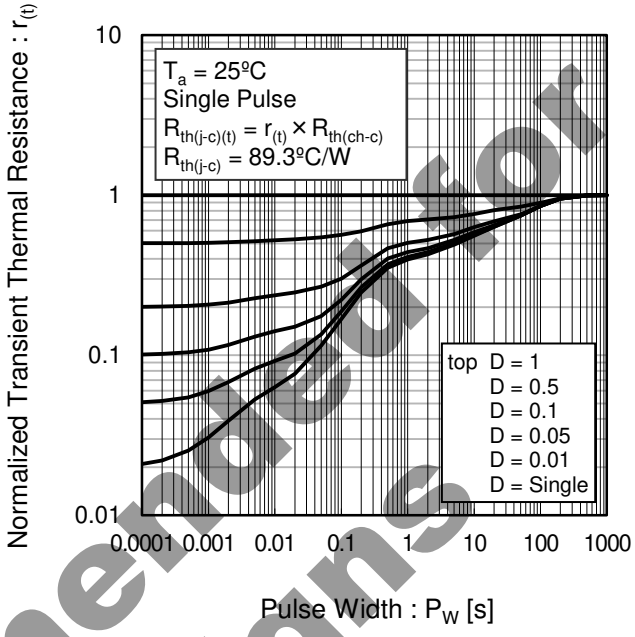
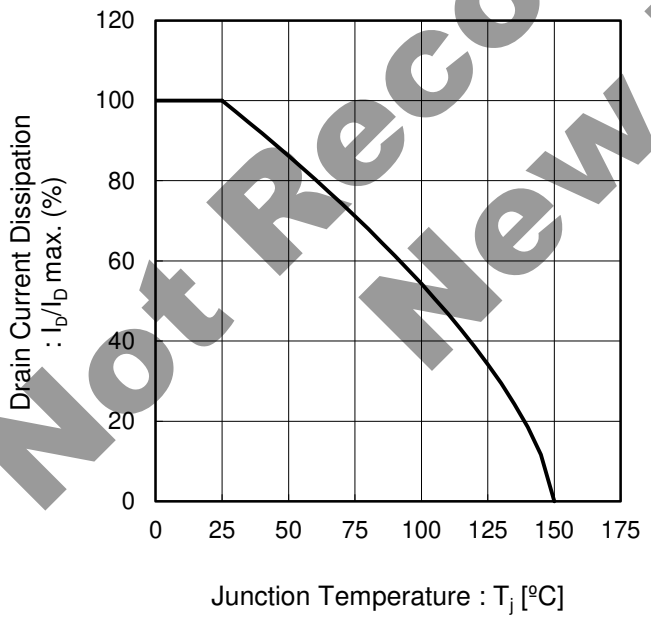


Fig.3 Drain Current Derating Curve



●**Electrical characteristic curves** (N-channel MOSFET)

Fig.4 Typical Output Characteristics(I)

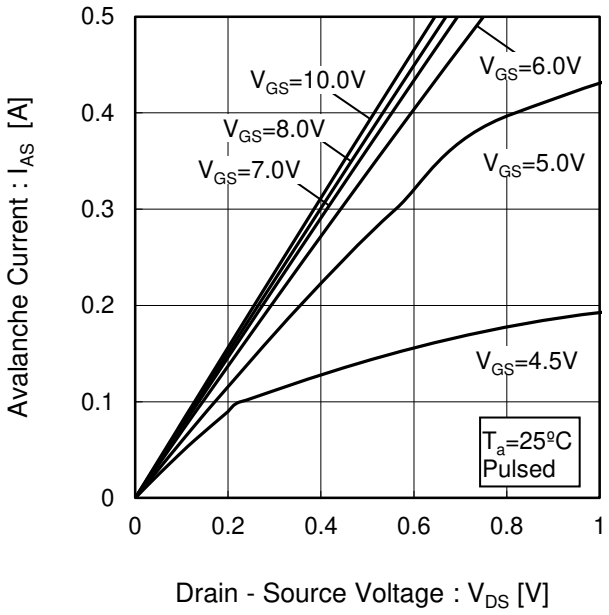
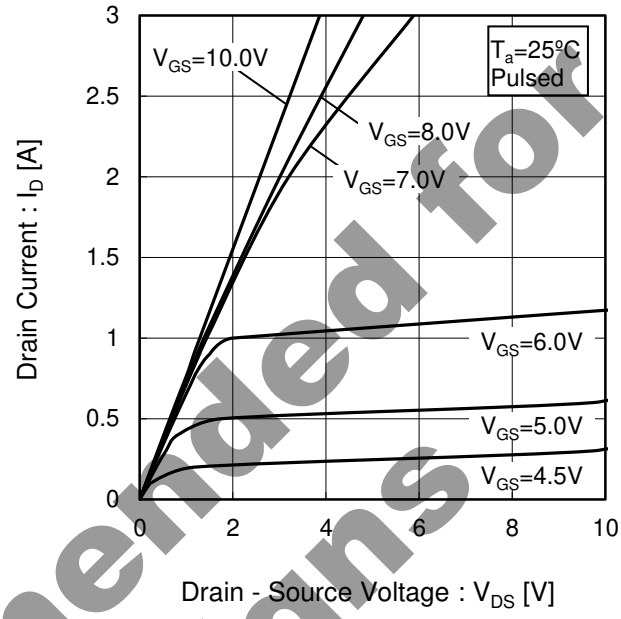


Fig.5 Typical Output Characteristics(II)



●Electrical characteristic curves (N-channel MOSFET)

Fig.6 Breakdown Voltage vs. Junction Temperature

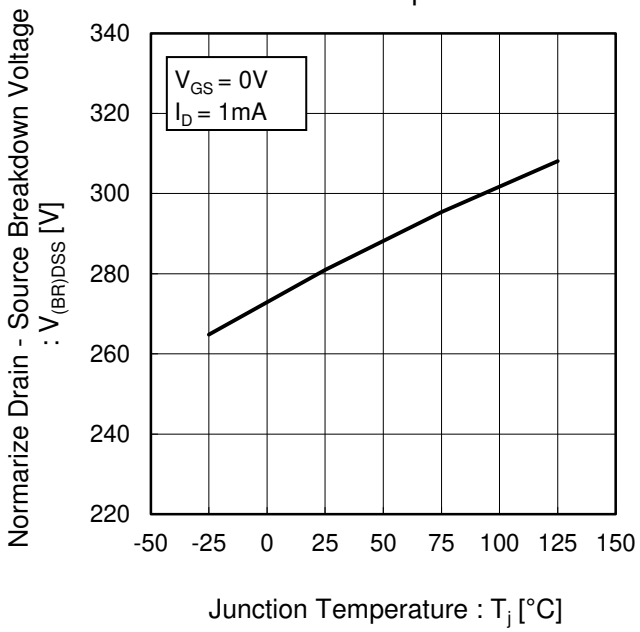


Fig.7 Typical Transfer Characteristics

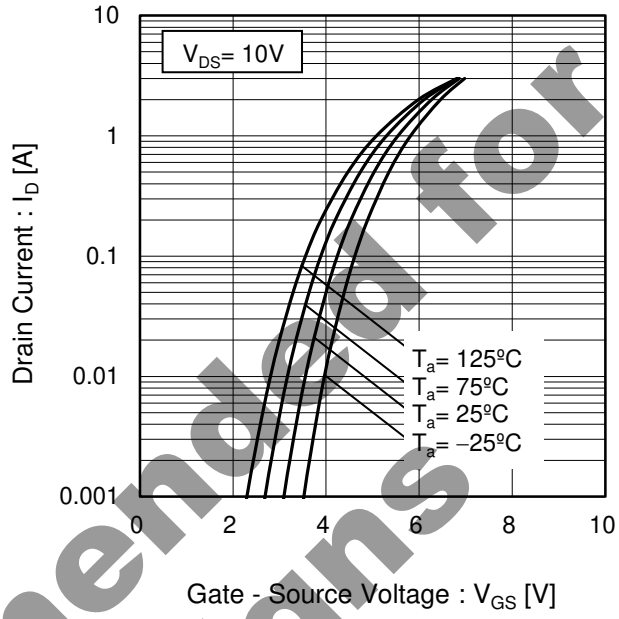


Fig.8 Gate Threshold Voltage vs. Junction Temperature

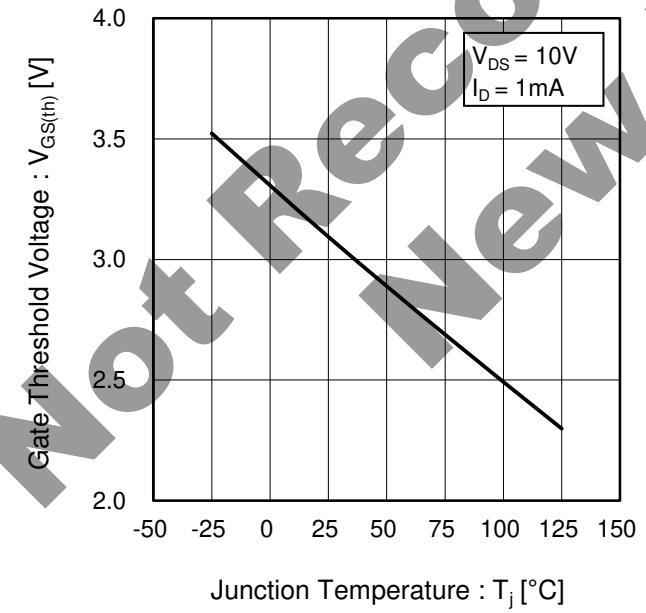
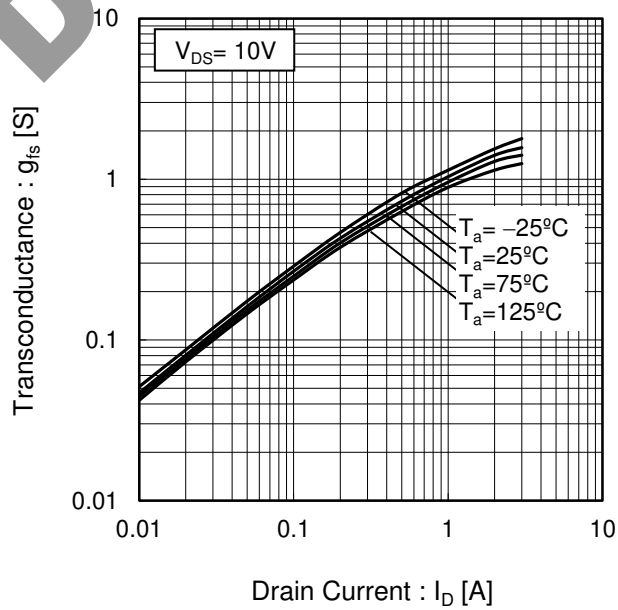


Fig.9 Transconductance vs. Drain Current



●**Electrical characteristic curves** (N-channel MOSFET)

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

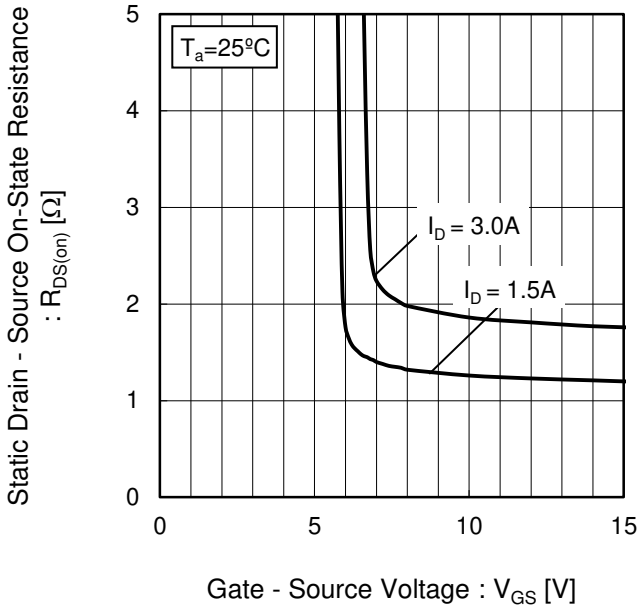


Fig.11 Static Drain - Source On - State Resistance vs. Drain Current(I)

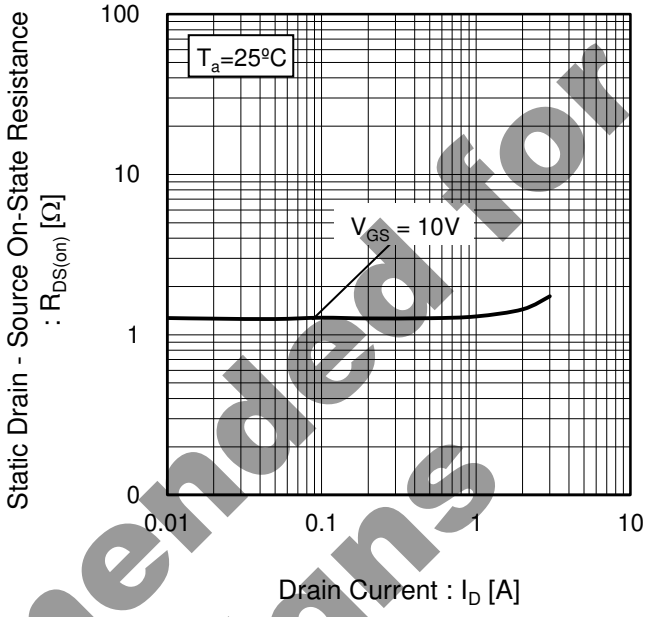


Fig.12 Static Drain - Source On - State Resistance vs. Junction Temperature

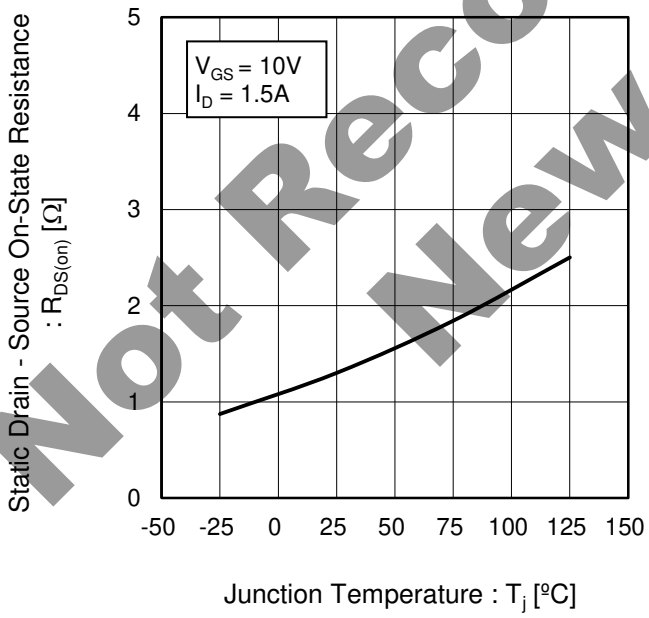
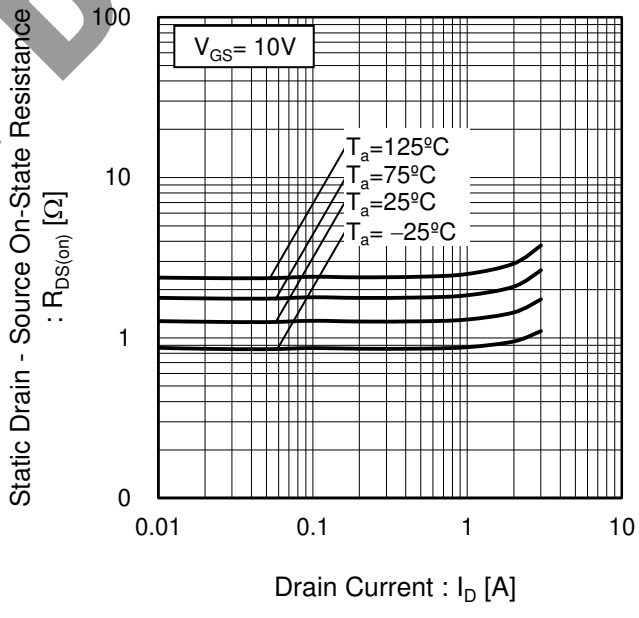


Fig.13 Static Drain - Source On - State Resistance vs. Drain Current(I)



●Electrical characteristic curves (N-channel MOSFET)

Fig.14 Typical Capacitance vs. Drain - Source Voltage

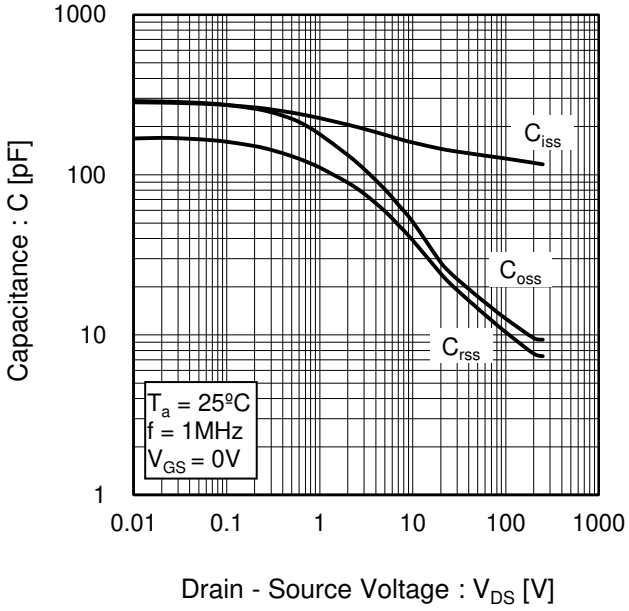


Fig.15 Switching Characteristics

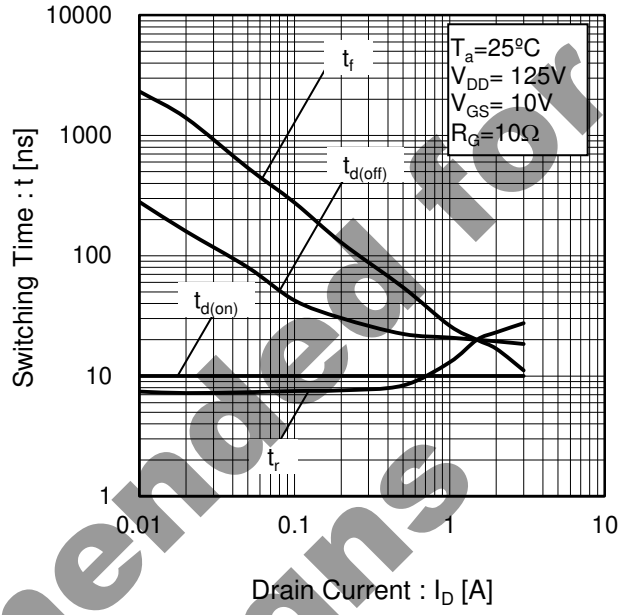
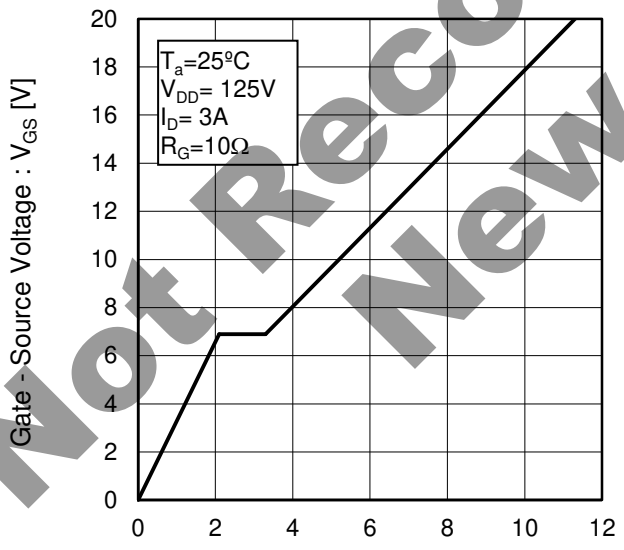


Fig.16 Dynamic Input Characteristics



●**Electrical characteristic curves** (N-channel MOSFET)

Fig.17 Source Current vs. Source - Drain Voltage

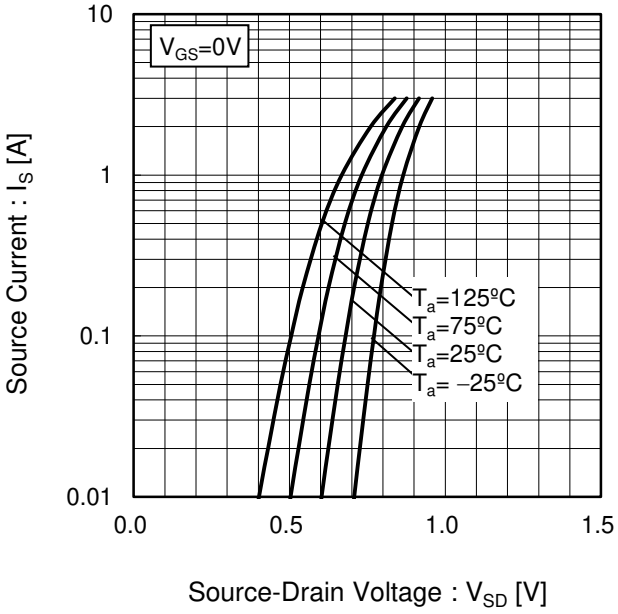
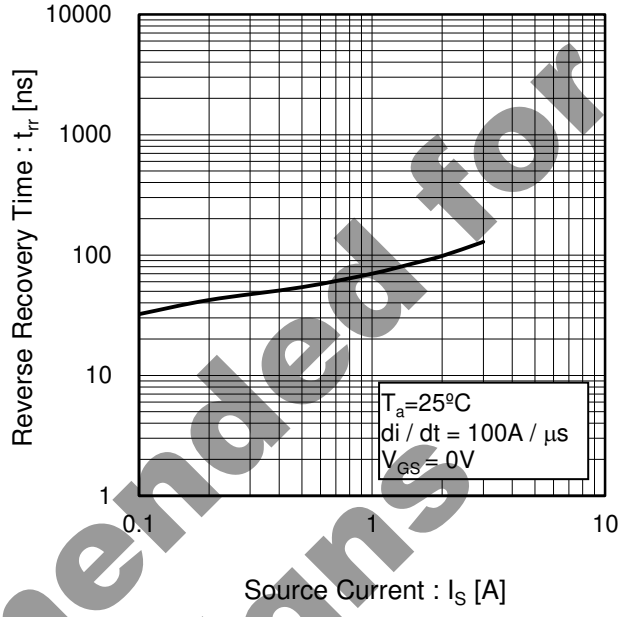


Fig.18 Reverse Recovery Time vs.Source Current



●Electrical characteristic curves (P-channel MOSFET)

Fig.19 Typical Output Characteristics(I)

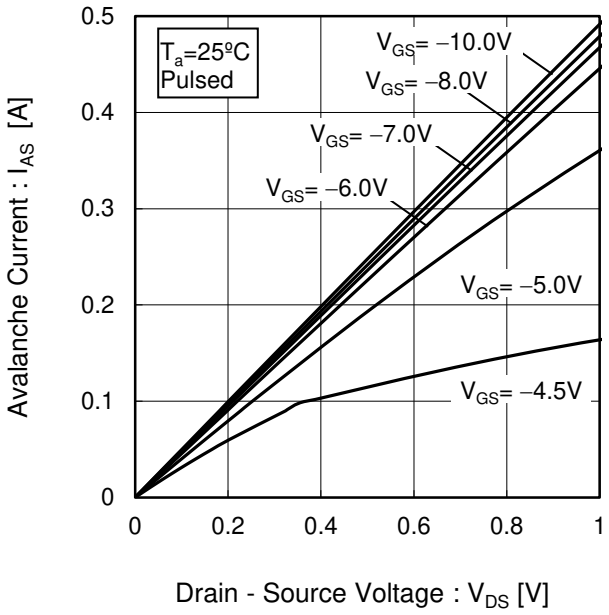
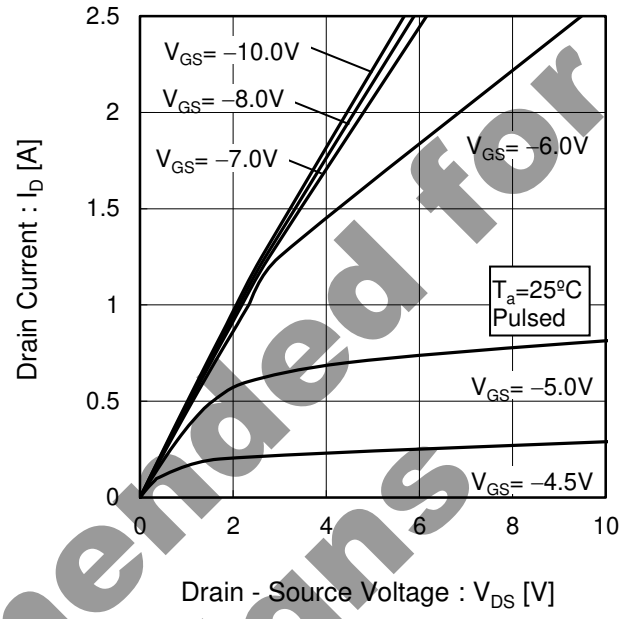


Fig.5 Typical Output Characteristics(II)



●Electrical characteristic curves (P-channel MOSFET)

Fig.6 Breakdown Voltage vs. Junction Temperature

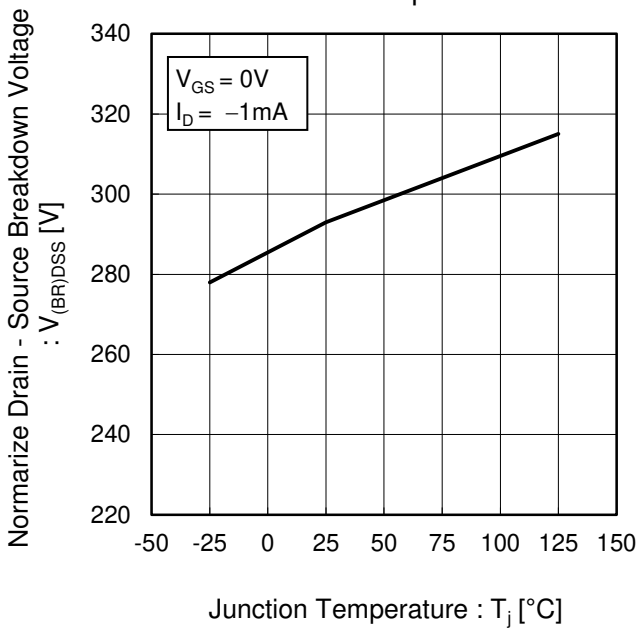


Fig.7 Typical Transfer Characteristics

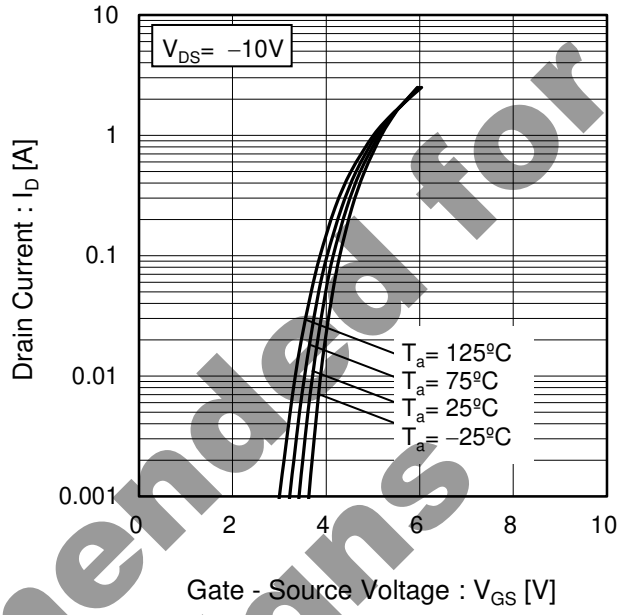


Fig.8 Gate Threshold Voltage vs. Junction Temperature

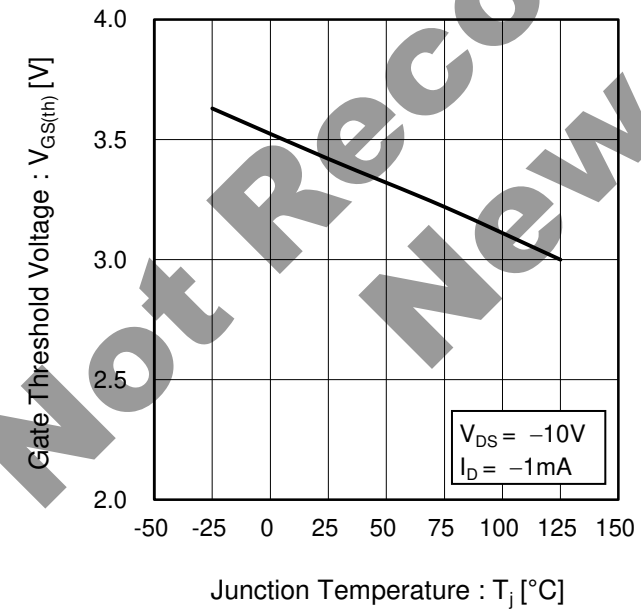
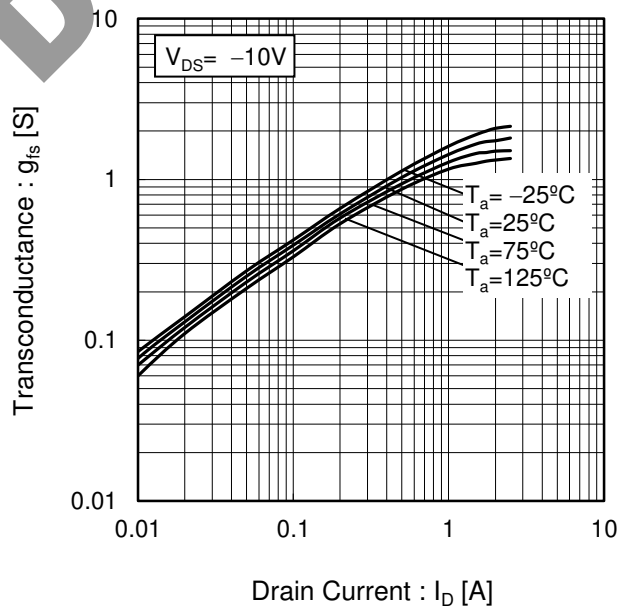


Fig.9 Transconductance vs. Drain Current



●**Electrical characteristic curves** (P-channel MOSFET)

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

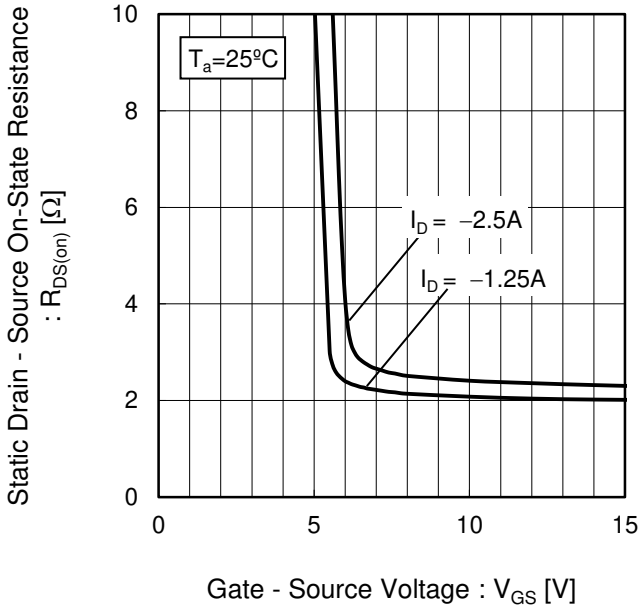


Fig.11 Static Drain - Source On - State Resistance vs. Drain Current(I)

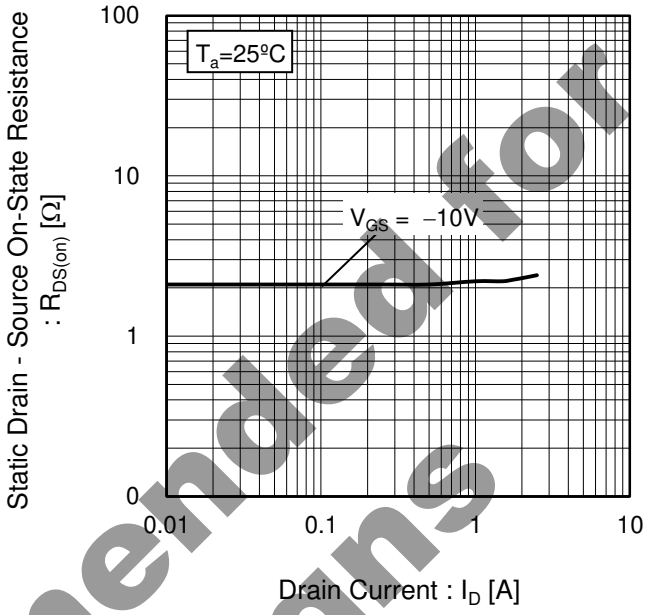


Fig.12 Static Drain - Source On - State Resistance vs. Junction Temperature

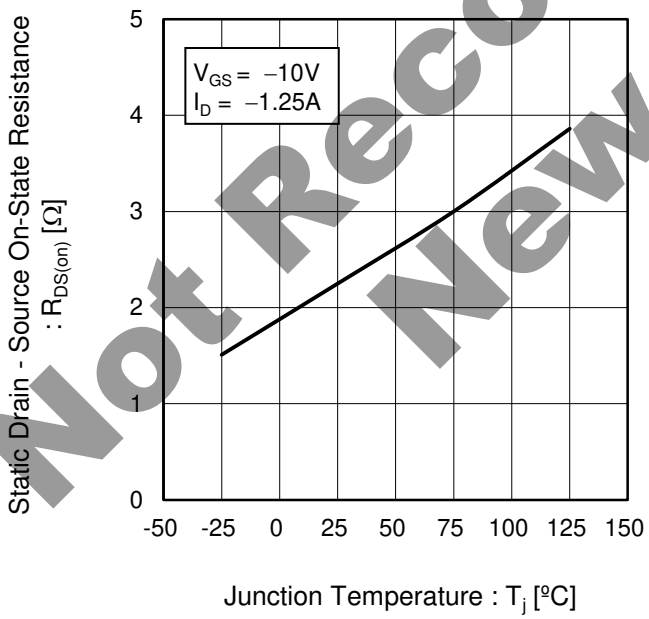
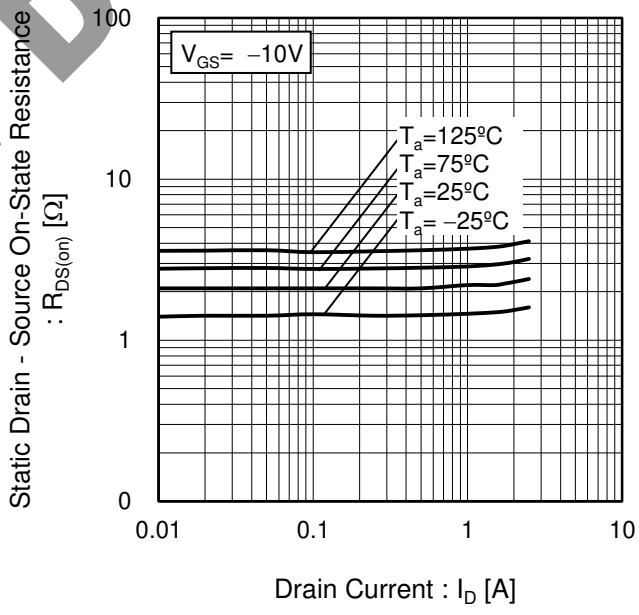


Fig.13 Static Drain - Source On - State Resistance vs. Drain Current(I)



●Electrical characteristic curves (P-channel MOSFET)

Fig.14 Typical Capacitance vs. Drain - Source Voltage

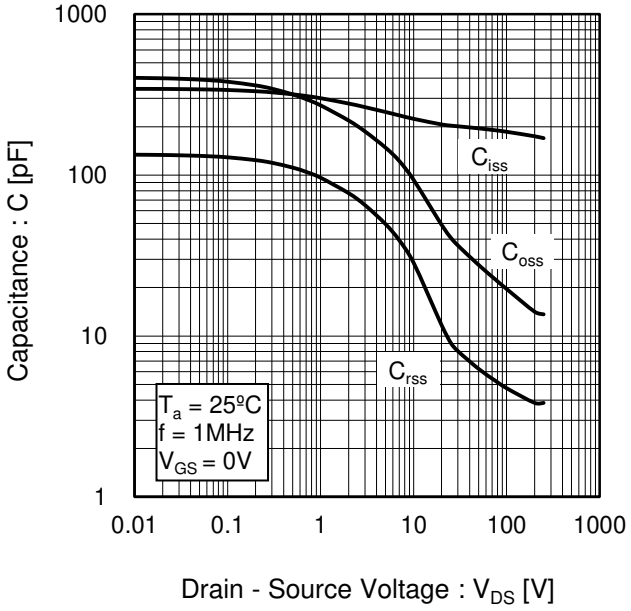


Fig.15 Switching Characteristics

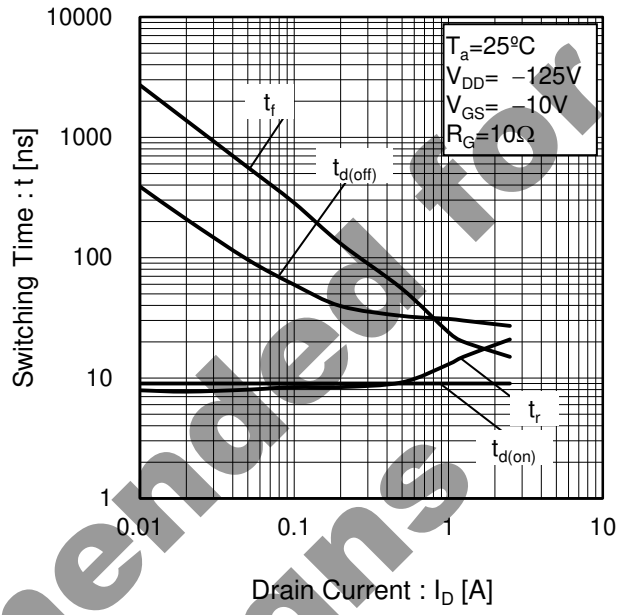
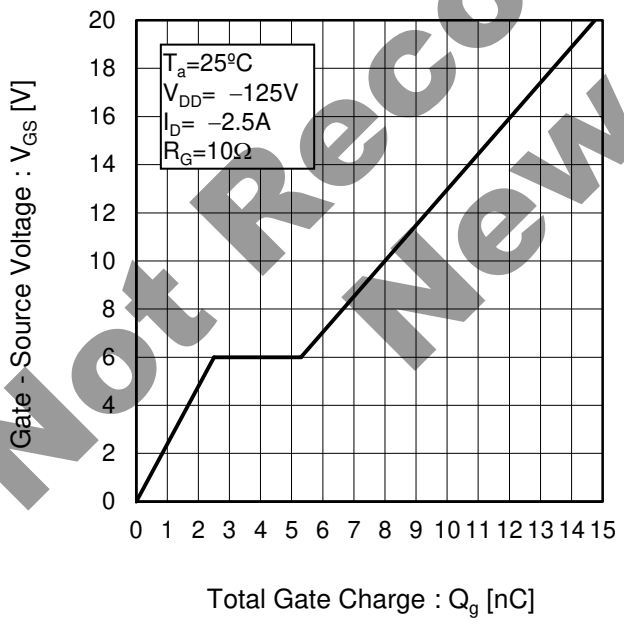


Fig.16 Dynamic Input Characteristics



●Electrical characteristic curves (P-channel MOSFET)

Fig.17 Source Current vs. Source - Drain Voltage

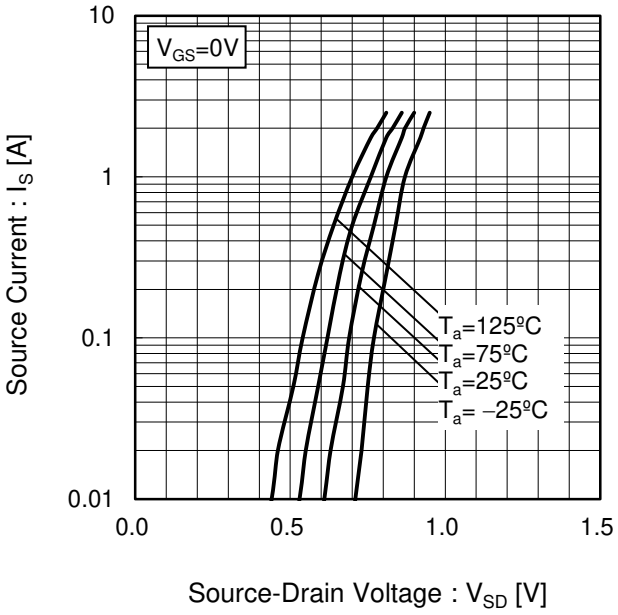
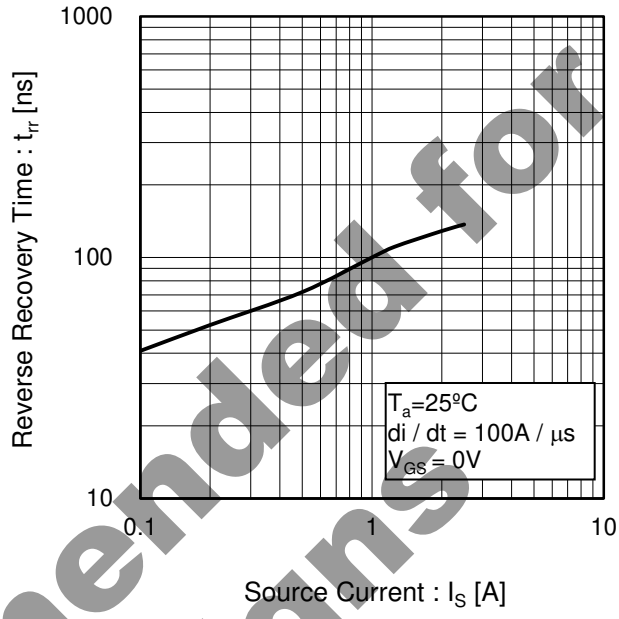


Fig.18 Reverse Recovery Time vs.Source Current



●Measurement circuits (N-Channel MOSFET)

Fig.1-1 Switching Time Measurement Circuit

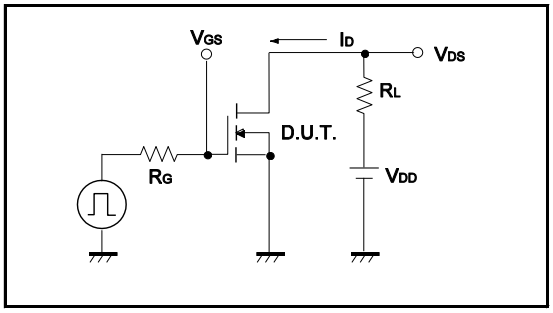


Fig.1-2 Switching Waveforms

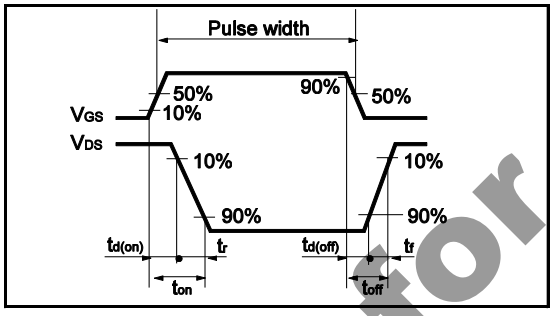


Fig.2-1 Gate Charge Measurement Circuit

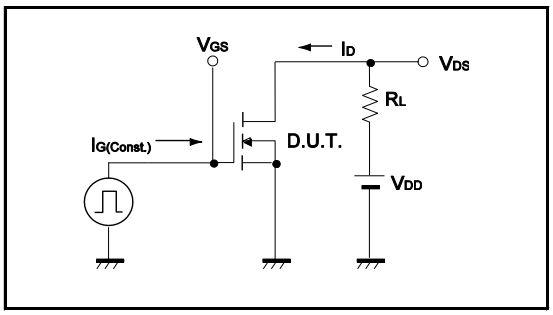
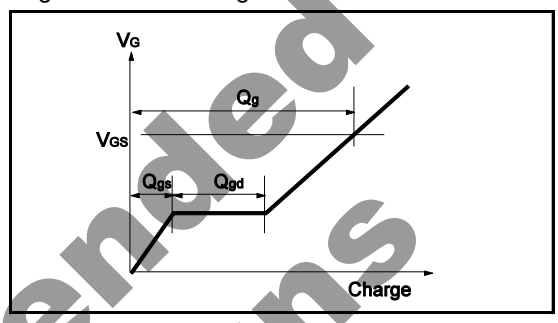


Fig.2-2 Gate Charge Waveform



●Measurement circuits (P-Channel MOSFET)

Fig.3-1 Switching Time Measurement Circuit

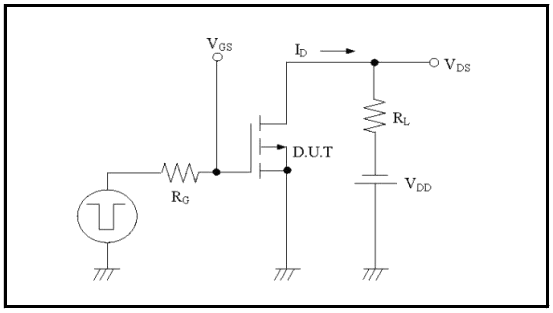


Fig.3-2 Switching Waveforms

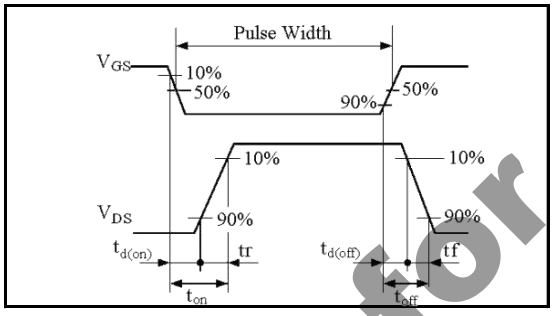


Fig.4-1 Gate Charge Measurement Circuit

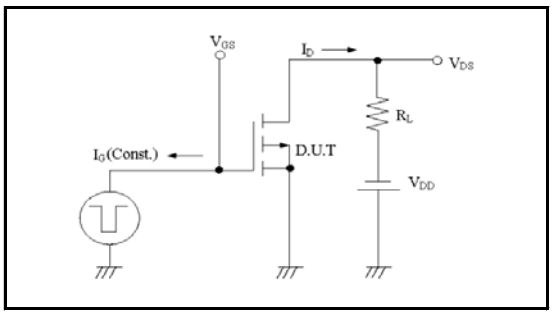
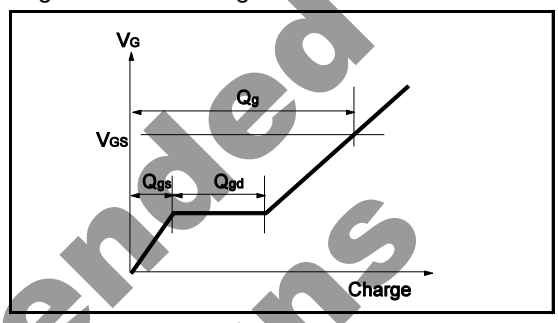
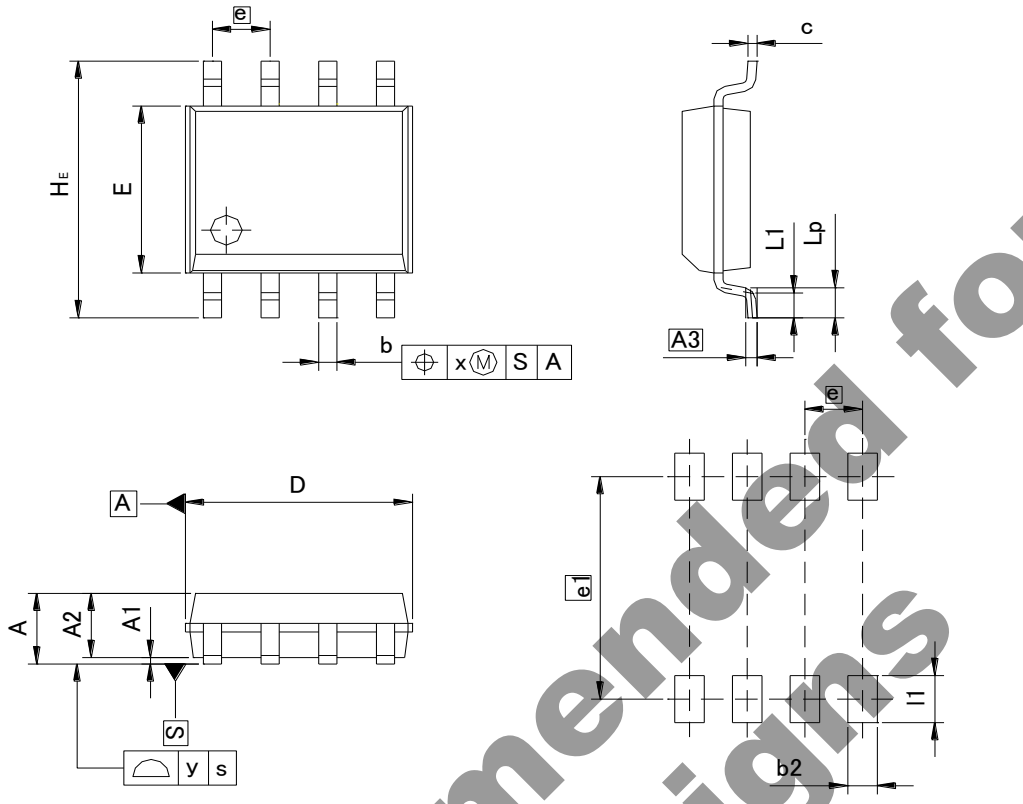


Fig.4-2 Gate Charge Waveform



●**Dimensions** (Unit : mm)

SOP8



Pattern of terminal position areas
[Not a recommended pattern of soldering pads]

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	1.75	–	0.069
A1	0.15		0.006	
A2	1.40	1.60	0.055	0.063
A3	0.25		0.010	
b	0.30	0.50	0.012	0.020
c	0.10	0.30	0.004	0.012
D	4.80	5.20	0.189	0.205
E	3.75	4.05	0.148	0.159
e	1.27		0.050	
HE	5.70	6.30	0.224	0.248
L1	0.50	0.70	0.020	0.028
Lp	0.65	0.85	0.026	0.033
x	0.15		0.006	
y	0.10		0.004	

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	–	0.65	–	0.026
e1	5.15		0.203	
l1	–	1.15	–	0.045

Dimension in mm / inches

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3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
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