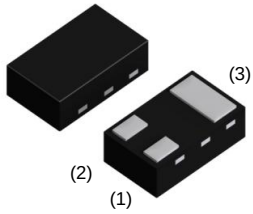
RV2C001ZP

Pch -20V -100mA Small Signal MOSFET Datasheet

V_{DSS}	−20V
$R_{DS(on)}$ (Max.)	3.8Ω
I_D	−100mA
P_D	100mW

●Outline

VML1006



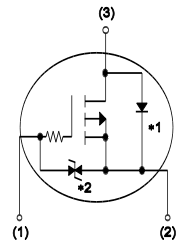
●Features

1) Low voltage drive(−1.2V) makes this device ideal for partable equipment.

2) Drive circuits can be simple.

3) Built-in ESD Protection Diode.

●Inner circuit



(1) Gate
(2) Source
(3) Drain

∗1 BODY DIODE
∗2 ESD PROTECTION DIODE

●Application

Switching

●Packaging specifications

Type	Packaging	Taping
	Reel size (mm)	180
	Tape width (mm)	8
	Basic ordering unit (pcs)	8,000
	Taping code	T2L
	Marking	RX

●Absolute maximum ratings(T_a = 25°C)

Parameter	Symbol	Value	Unit
Drain - Source voltage	V_{DSS}	−20	V
Continuous drain current	I_D *1	±100	mA
Pulsed drain current	$I_{D,pulse}$ *2	±400	mA
Gate - Source voltage	V_{GSS}	±10	V
Power dissipation	P_D *3	100	mW
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	-	-	1250	°C/W

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = −1mA	−20	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} = −20V, V_{GS} = 0V	-	-	−1	μA
Gate - Source leakage current	I_{GSS}	V_{GS} = ±10V, V_{DS} = 0V	-	-	±10	μA
Gate threshold voltage	$V_{GS\ (th)}$	V_{DS} = −10V, I_D = −100μA	−0.3	-	−1	V
Static drain - source on - state resistance	$R_{DS(on)}$ *4	V_{GS}= −4.5V, I_D= −100mA	-	2.5	3.8	Ω
		V_{GS}= −2.5V, I_D= −50mA	-	3.4	5.1	
		V_{GS}= −1.8V, I_D= −20mA	-	4.8	8.2	
		V_{GS}= −1.5V, I_D= −10mA	-	6.0	13.2	
		V_{GS}= −1.2V, I_D= −1mA	-	10.0	40.0	
		V_{GS}= −4.5V, I_D= −100mA, T_j=125°C	-	3.3	6.6	
Transconductance	g_{fs} *4	V_{DS}= −10V, I_D= −100mA	120	-	-	mS

*1 Limited only by maximum temperature allowed.

*2 Pw ≤ 10μs, Duty cycle ≤ 1%

*3 Each therminal mounted on a recommended land

*4 Pulsed

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{iss}	V_{GS} = 0V	-	15.0	-	pF
Output capacitance	C_{oss}	V_{DS} = −10V	-	4.0	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	1.5	-	
Turn - on delay time	$t_{d(on)}$ *4	$V_{DD} \simeq$ −10V, V_{GS} = −4.5V	-	46	-	ns
Rise time	t_r *4	I_D = −50mA	-	62	-	
Turn - off delay time	$t_{d(off)}$ *4	R_L = 200Ω	-	325	-	
Fall time	t_f *4	R_G = 10Ω	-	137	-	

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Continuous source current	I_S *1	T_a = 25°C	-	-	−80	mA
Pulsed source current	I_{SM} *2		-	-	−400	mA
Forward voltage	V_{SD} *4	V_{GS} = 0V, I_s = −100mA	-	-	−1.2	V

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

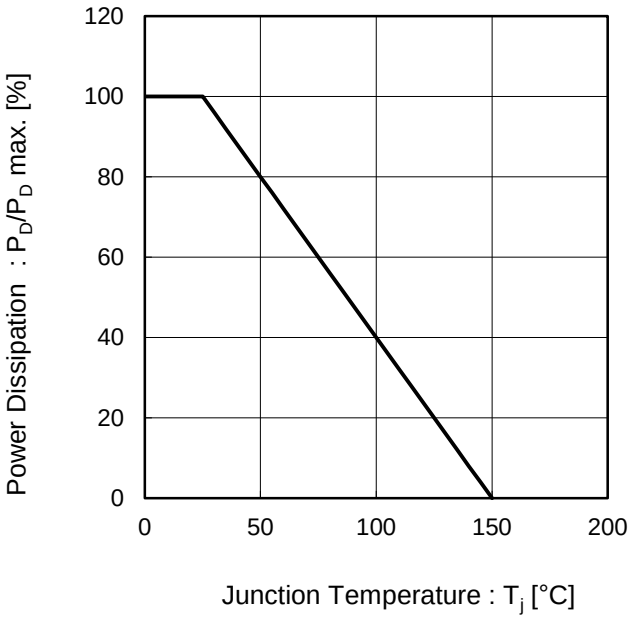


Fig.2 Drain Current Derating Curve

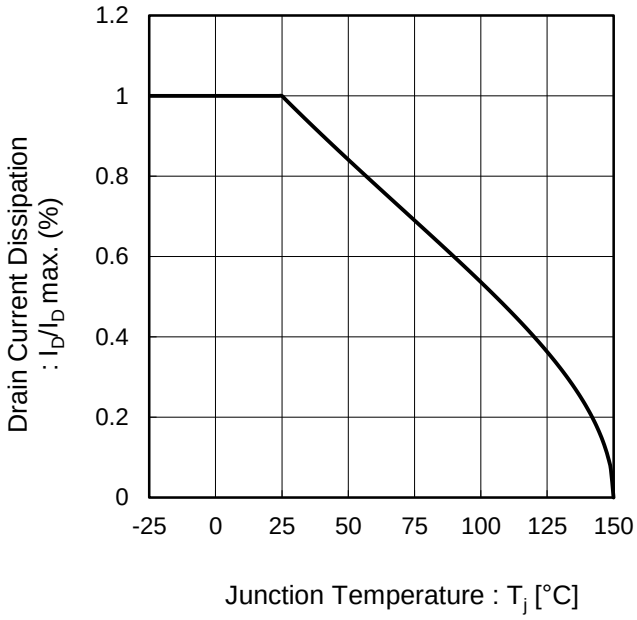


Fig.3 Typical Output Characteristics(I)

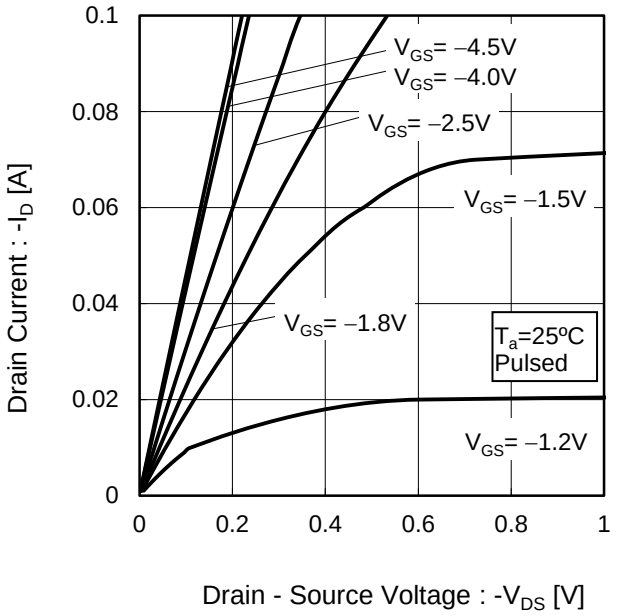
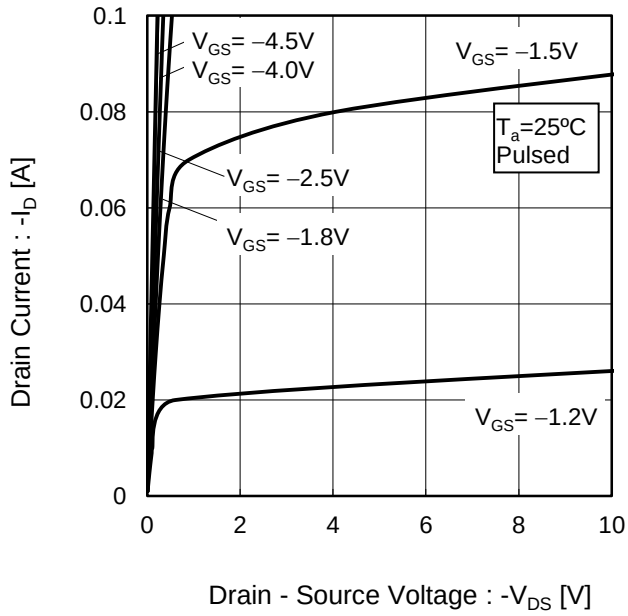


Fig.4 Typical Output Characteristics(II)



●Electrical characteristic curves

Fig.5 Breakdown Voltage vs. Junction Temperature

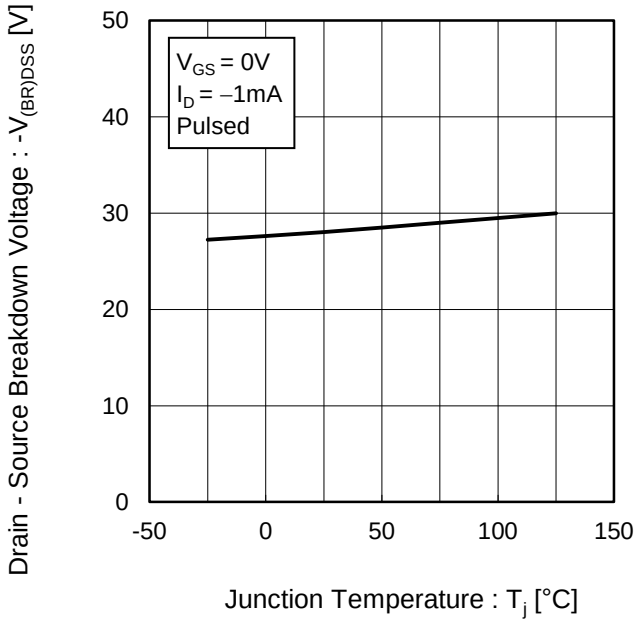


Fig.6 Typical Transfer Characteristics

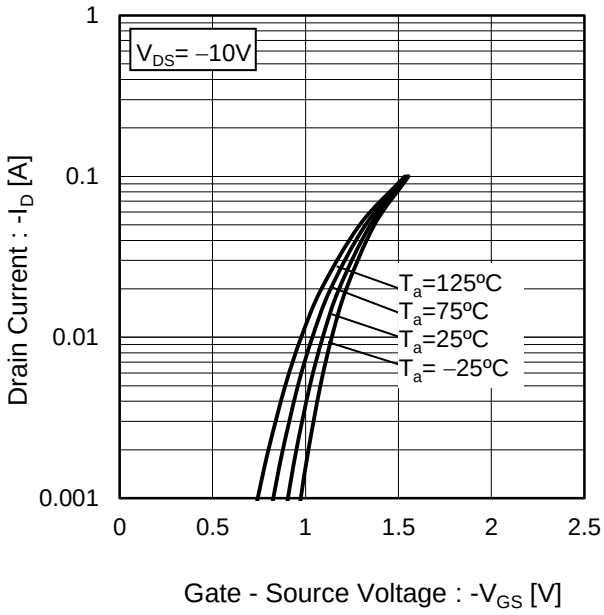


Fig.7 Gate Threshold Voltage vs. Junction Temperature

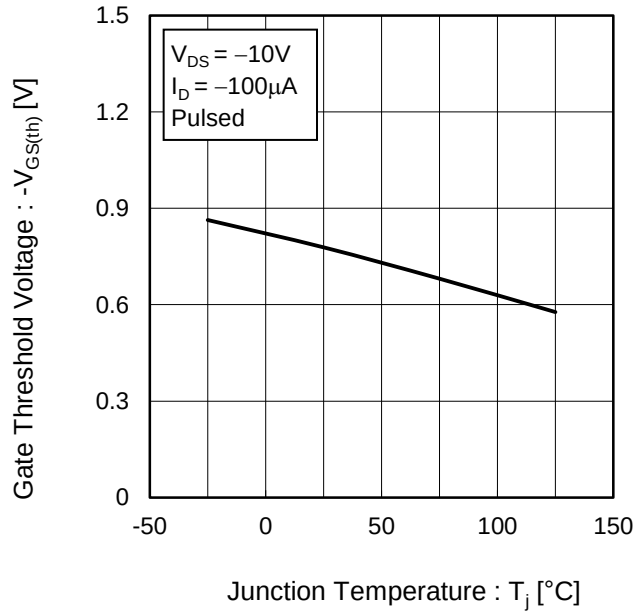
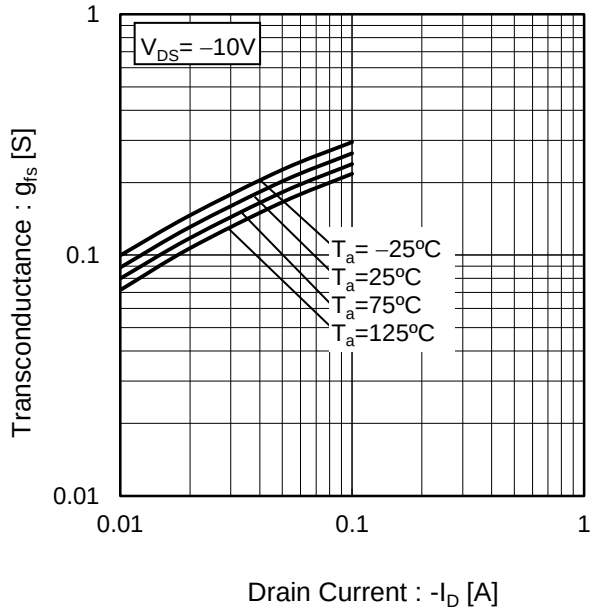


Fig.8 Transconductance vs. Drain Current



●Electrical characteristic curves

Fig.9 Static Drain - Source On - State Resistance vs. Gate Source Voltage

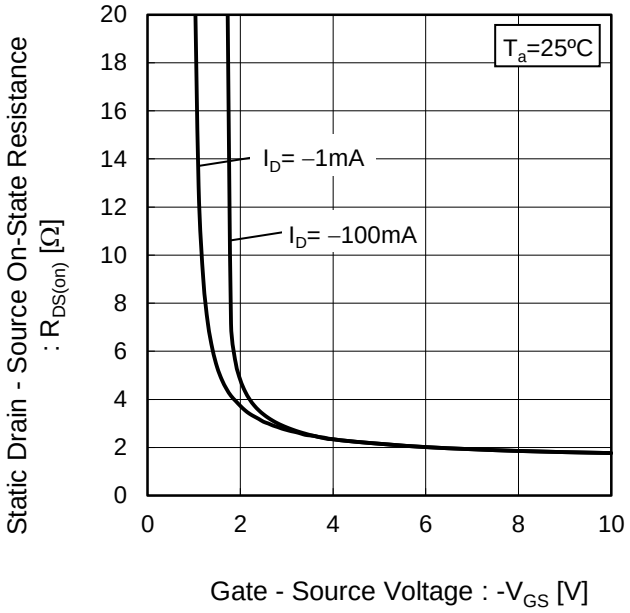


Fig.10 Static Drain - Source On - State Resistance vs. Drain Current(I)

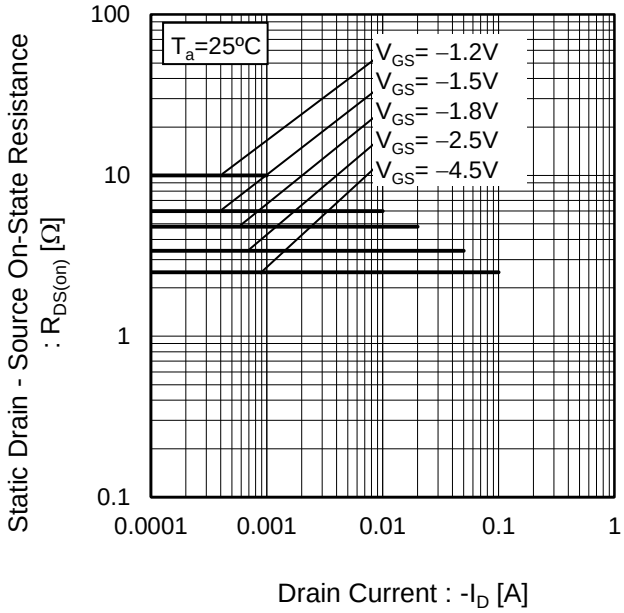


Fig.11 Static Drain - Source On - State Resistance vs. Junction Temperature

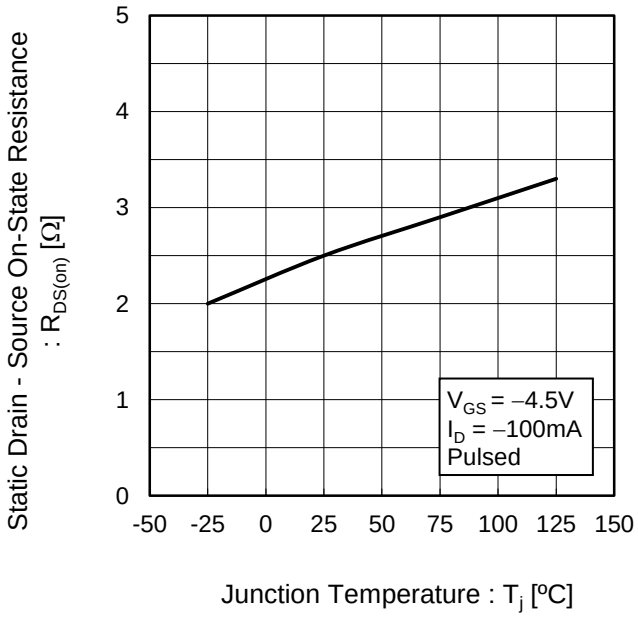
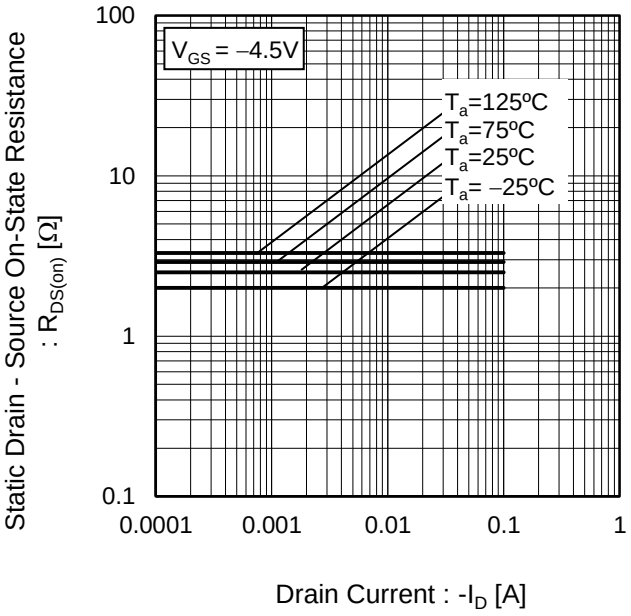


Fig.12 Static Drain - Source On - State Resistance vs. Drain Current(II)



●Electrical characteristic curves

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

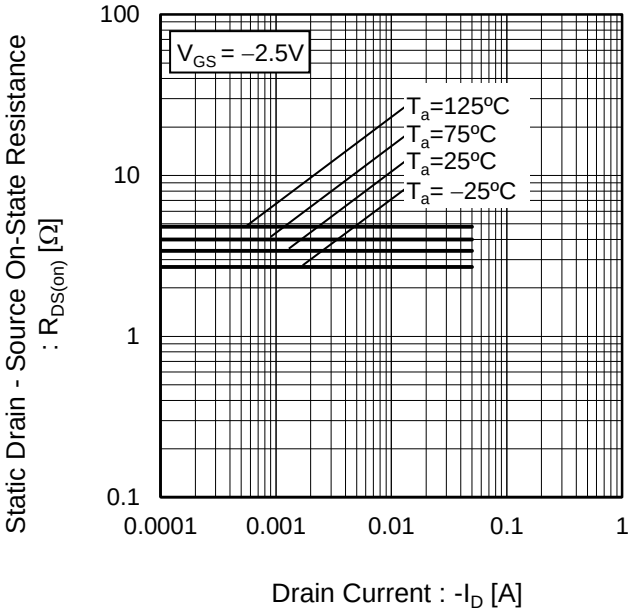


Fig.14 Static Drain - Source On - State Resistance vs. Drain Current(IV)

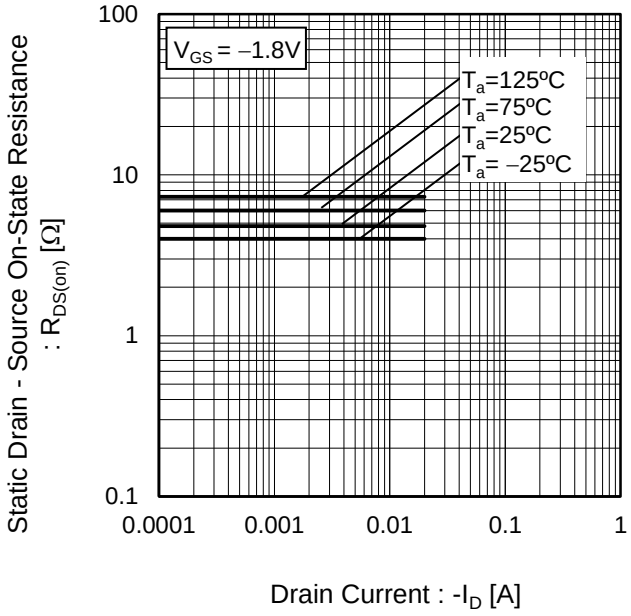


Fig.15 Static Drain - Source On - State Resistance vs. Drain Current(V)

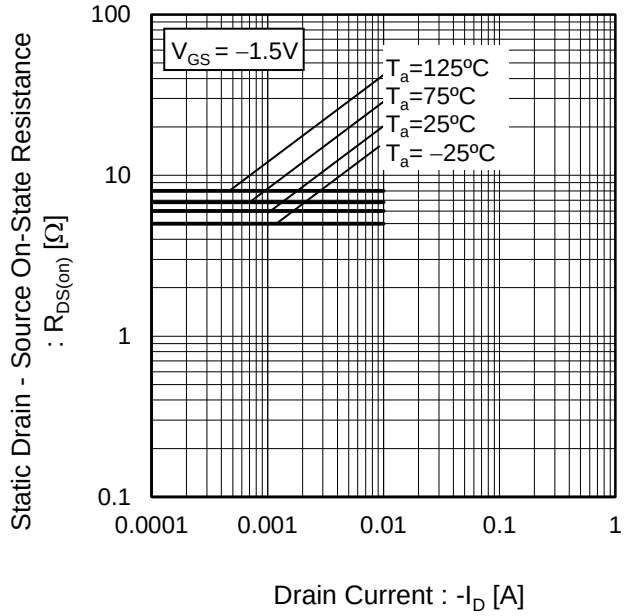
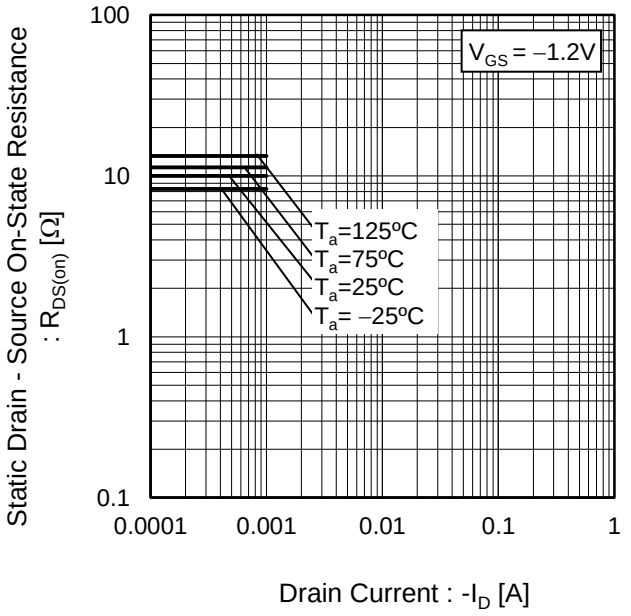


Fig.16 Static Drain - Source On - State Resistance vs. Drain Current(VI)



●Electrical characteristic curves

Fig.17 Typical Capacitance vs. Drain - Source Voltage

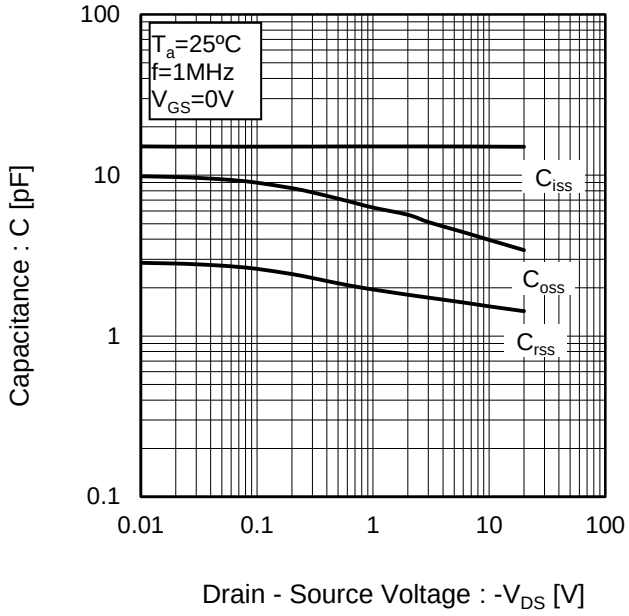


Fig.18 Switching Characteristics

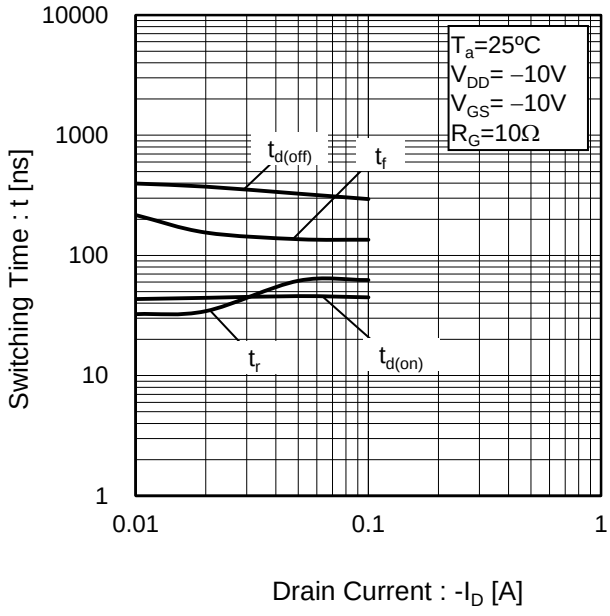
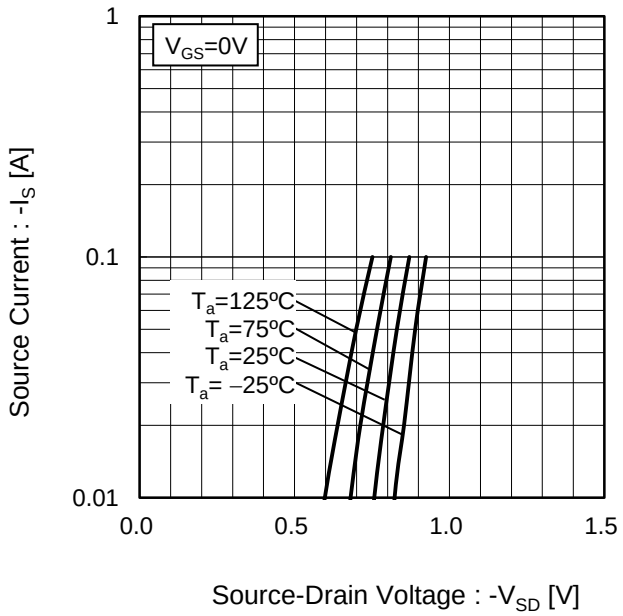


Fig.19 Source Current vs. Source Drain Voltage



●Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

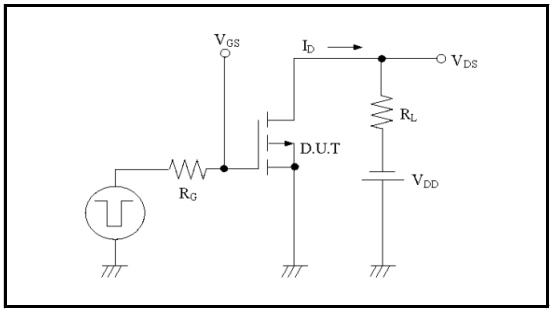
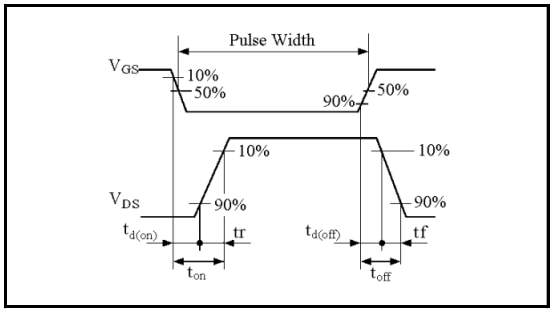


Fig.1-2 Switching Waveforms



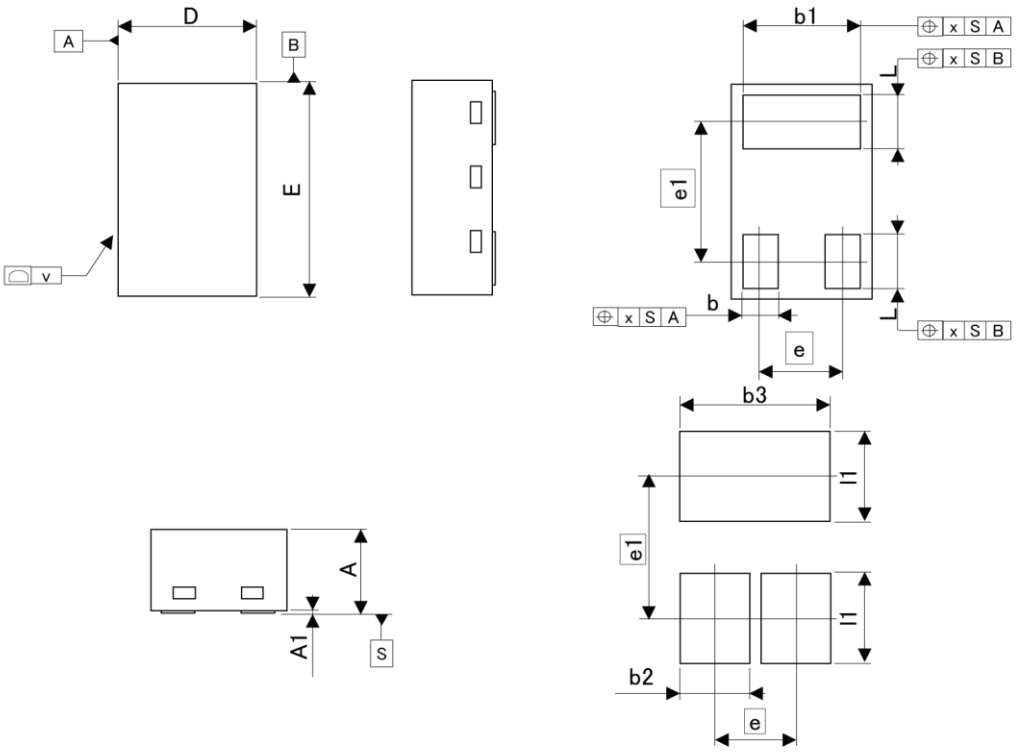
●Notice

This product might cause chip aging and breakdown under the large electrified environment.

Please consider to design ESD protection circuit.

●**Dimensions** (Unit : mm)

VML1006



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

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.34	0.40	0.013	0.016
A1	0.00	0.05	0.000	0.002
b	0.10	0.20	0.004	0.008
b1	0.45	0.55	0.018	0.022
D	0.55	0.65	0.022	0.026
E	0.95	1.05	0.037	0.041
e	0.35		0.014	
e1	0.65		0.026	
L	0.20	0.30	0.008	0.012
x	-	0.10	-	0.004
v	-	0.05	-	0.002

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	-	0.3	-	0.012
b3	-	0.65	-	0.026
l1	-	0.40	-	0.016

Dimension in mm/inches

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