RV2C010UN

Nch 20V 1A Power MOSFET

Datasheet

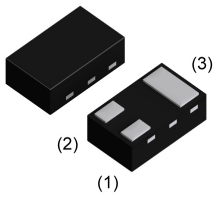
V_{DSS}	20V
$R_{DS(on)}$(Max.)	470mΩ
I_D	±1.0A
P_D	400mW

●Outline

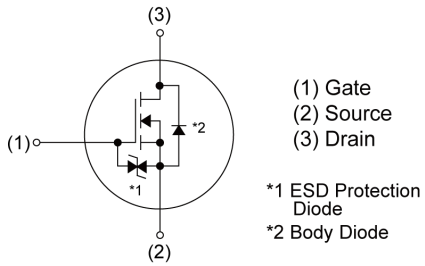
VML1006

SC-101

DFN1006-3



●Inner circuit



●Features

1) Low on - resistance.
2) High Power small mold Package (VML1006).
3) Pb-free lead plating ; RoHS compliant.
4) Halogen Free.
5) ESD protection up to 200V (MM).
up to 2kV (HBM).

●Application

Switching

●Packaging specifications

Type	Packing	Embossed Tape
	Reel size (mm)	180
	Tape width (mm)	8
	Basic ordering unit (pcs)	8000
	Taping code	T2L
	Marking	TJ

●Absolute maximum ratings (T_a = 25°C)

Parameter	Symbol	Value	Unit
Drain - Source voltage	V_{DSS}	20	V
Continuous drain current	I_D	±1.0	A
Pulsed drain current	$I_{D,pulse}$ *1	±2.0	A
Gate - Source voltage	V_{GSS}	±8	V
Power dissipation	P_D *2	400	mW
Junction temperature	T_j	150	℃
Range of storage temperature	T_{stg}	-55 to +150	℃

●Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - ambient	R_{thJA} *2	-	312.5	-	℃/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
Breakdown voltage temperature coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_j}$	I_D = 1mA referenced to 25℃	-	29	-	mV/℃
Zero gate voltage drain current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V	-	-	1	μA
Gate - Source leakage current	I_{GSS}	V_{GS} = ±8V, V_{DS} = 0V	-	-	±10	μA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = 10V, I_D = 1mA	0.3	-	1.0	V
Gate threshold voltage temperature coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_j}$	I_D = 1mA referenced to 25℃	-	-1.6	-	mV/℃
Static drain - source on - state resistance	$R_{DS(on)}$ *3	V_{GS} = 4.5V, I_D = 500mA	-	340	470	mΩ
		V_{GS} = 2.5V, I_D = 500mA	-	400	560	
		V_{GS} = 1.8V, I_D = 250mA	-	470	650	
		V_{GS} = 1.5V, I_D = 100mA	-	540	810	
		V_{GS} = 1.2V, I_D = 50mA	-	700	1050	
Transconductance	g_{fs} *3	V_{DS} = 10V, I_D = 100mA	0.4	-	-	S

*1 Pw≦10μs , Duty cycle≦1%

*2 EACH TERMINAL MOUNTED ON A REFFERENCE LAND、Pw≦1s

*3 Pulsed

●Electrical characteristics (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{iss}	V_{GS} = 0V	-	40	-	pF
Output capacitance	C_{oss}	V_{DS} = 10V	-	15	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	8	-	
Turn - on delay time	$t_{d(on)}$ *3	V_{DD} ≃ 10V, V_{GS} = 4.0V	-	5	-	ns
Rise time	t_r *3	I_D = 250mA	-	15	-	
Turn - off delay time	$t_{d(off)}$ *3	R_L ≃ 40Ω	-	15	-	
Fall time	t_f *3	R_G = 10Ω	-	10	-	

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Body diode continuous forward current	I_S	T_a = 25℃	-	-	0.1	A
Body diode pulse current	I_{SP} *1		-	-	2.0	A
Forward voltage	V_{SD} *3	V_{GS} = 0V, I_S = 100mA	-	-	1.2	V

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

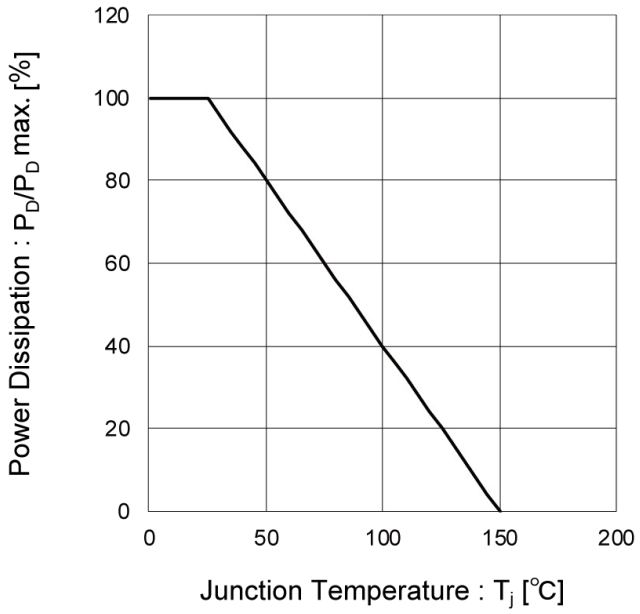


Fig.2 Maximum Safe Operating Area

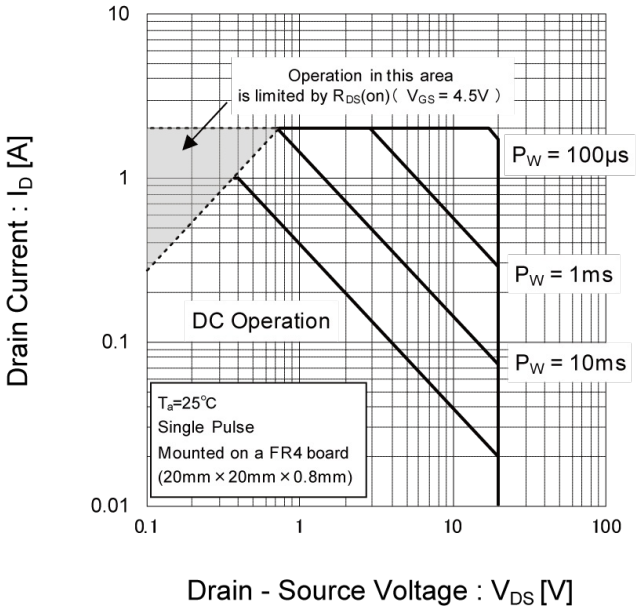


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width

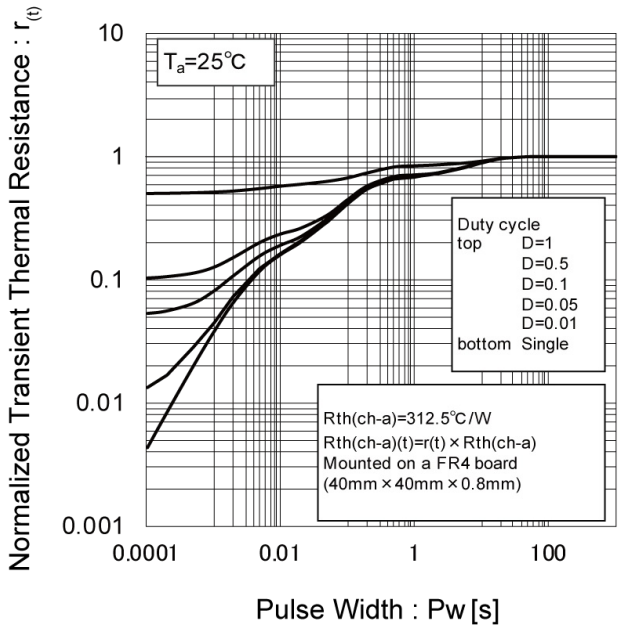
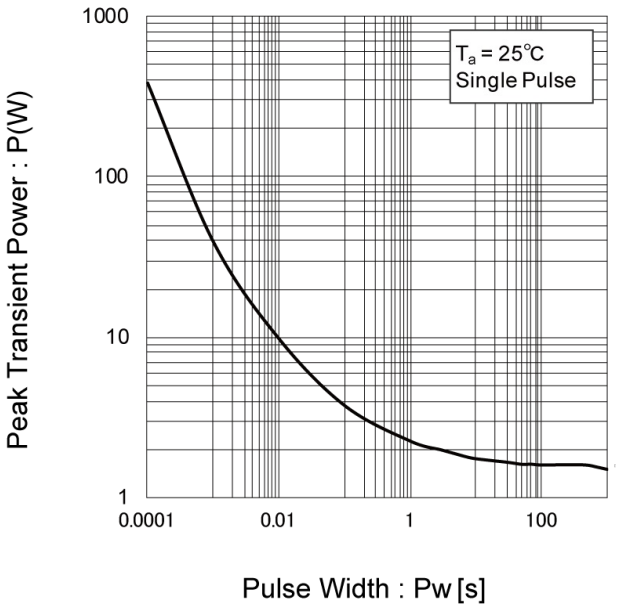


Fig.4 Single Pulse Maximum Power dissipation



●Electrical characteristic curves

Fig.5 Typical Output Characteristics(I)

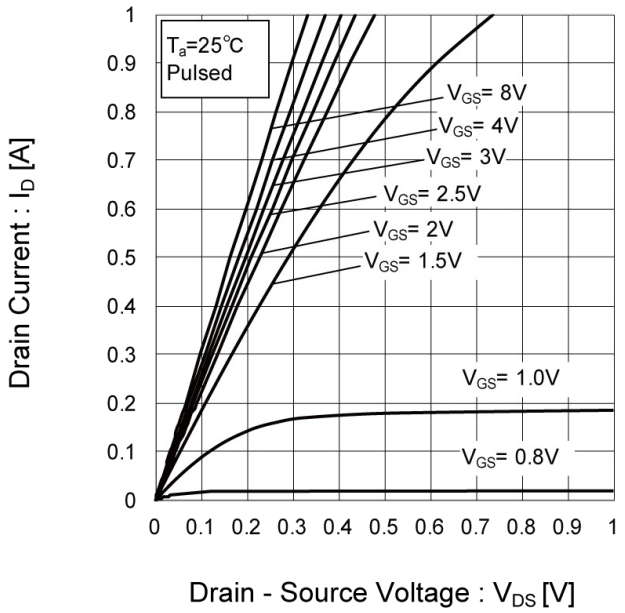


Fig.6 Typical Output Characteristics(II)

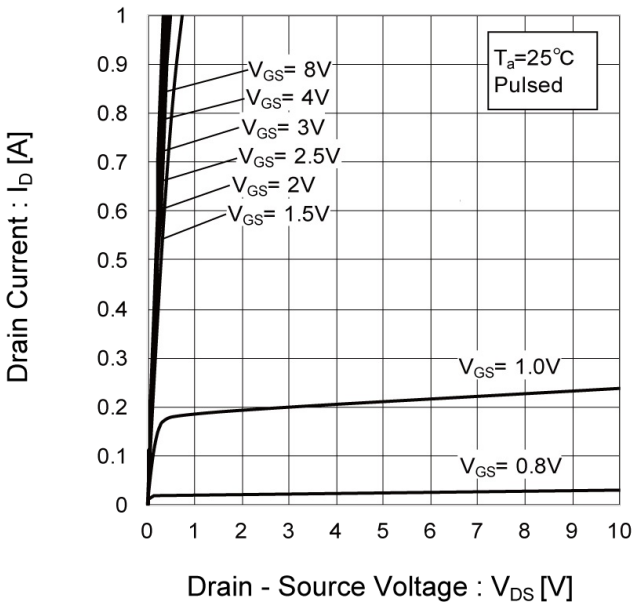


Fig.7 Breakdown Voltage vs. Junction Temperature

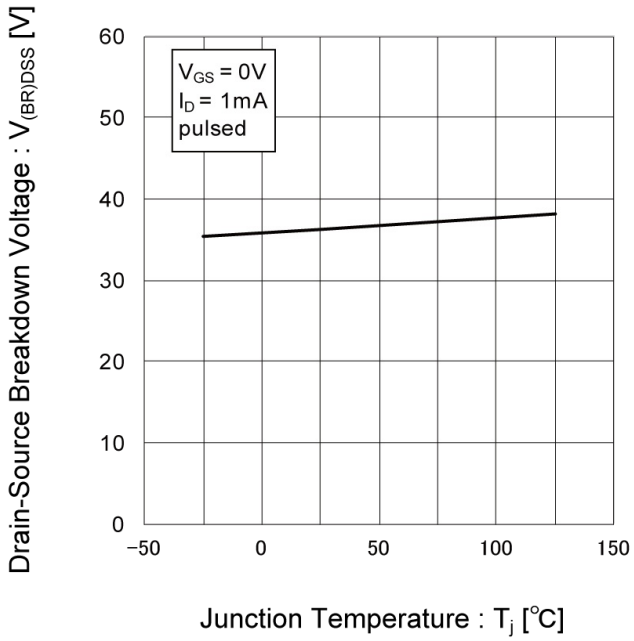
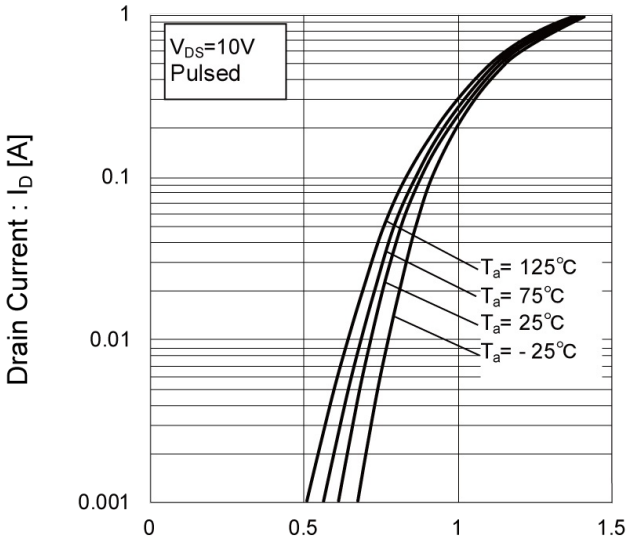


Fig.8 Typical Transfer Characteristics



●Electrical characteristic curves

Fig.9 Gate Threshold Voltage vs. Junction Temperature

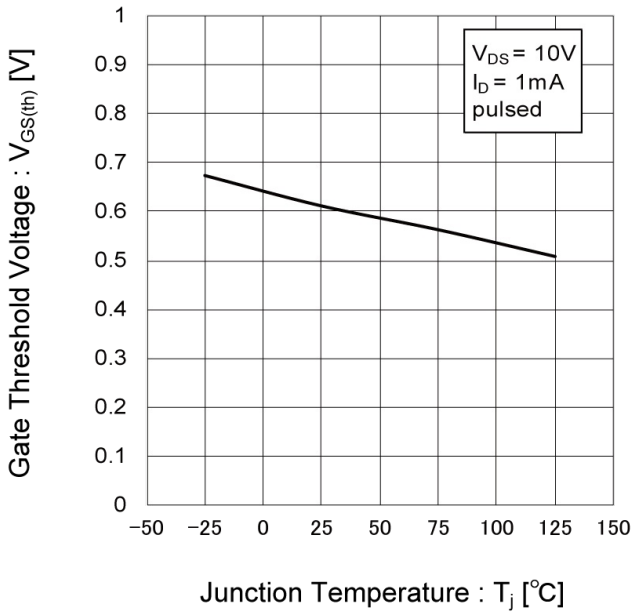


Fig.10 Tranceconductance vs. Drain Current

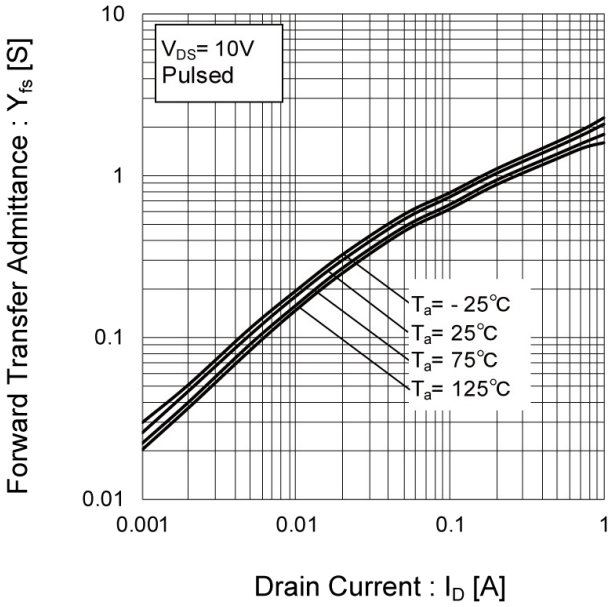


Fig.11 Drain Current Derating Curve

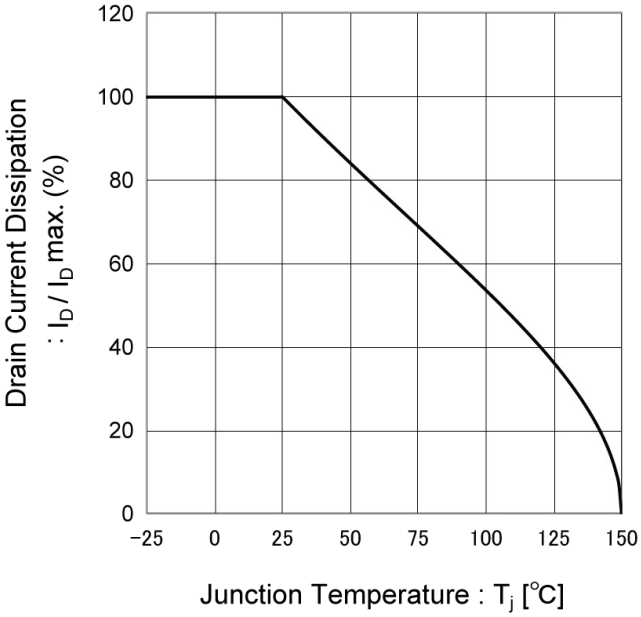
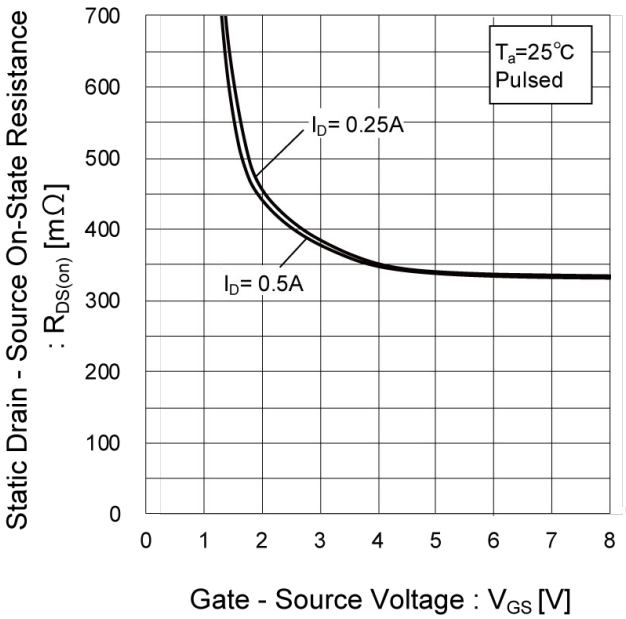


Fig.12 Static Drain - Source On - State Resistance vs. Gate Source Voltage



●Electrical characteristic curves

Fig.13 Static Drain - Source On - State Resistance vs. Junction Temperature

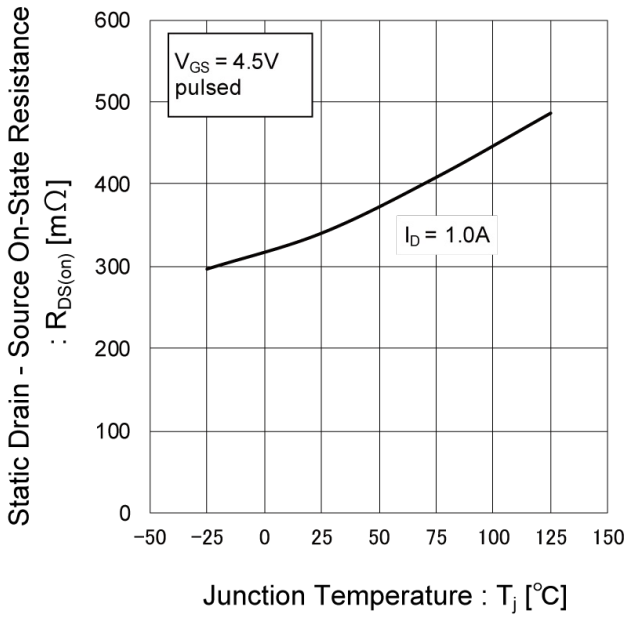


Fig.14 Static Drain - Source On - State Resistance vs. Drain Current(I)

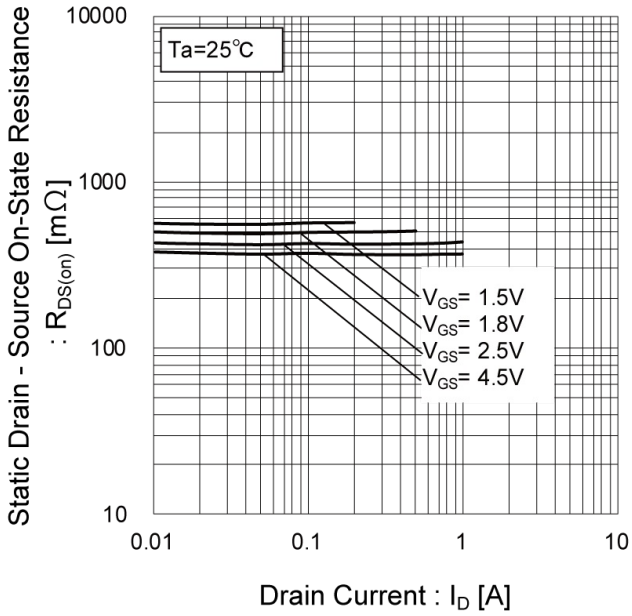


Fig.15 Static Drain - Source On - State Resistance vs. Drain Current(II)

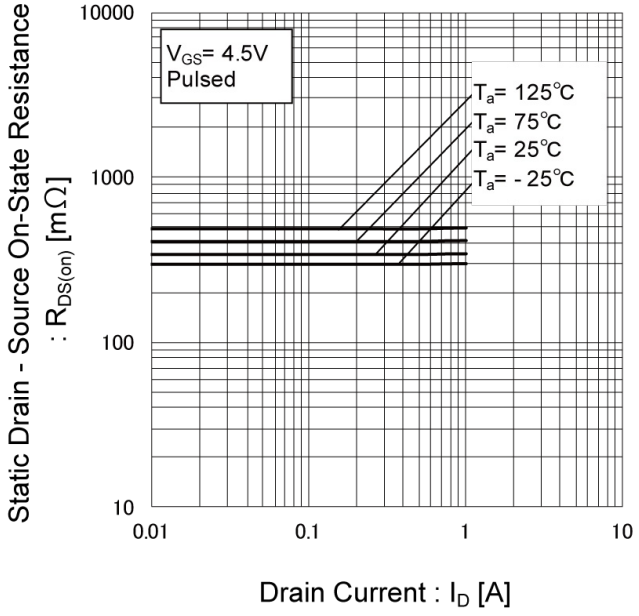
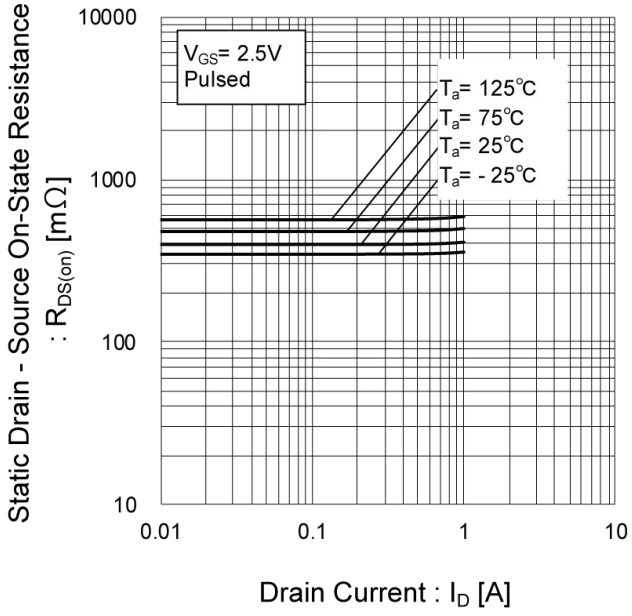


Fig.16 Static Drain - Source On - State Resistance vs. Drain Current(III)



●Electrical characteristic curves

Fig.17 Static Drain - Source On - State Resistance vs. Drain Current(Ⅳ)

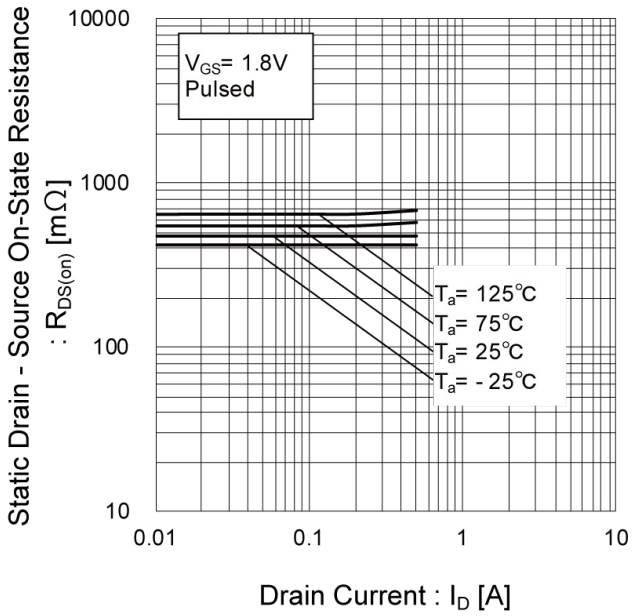


Fig.18 Static Drain - Source On - State Resistance vs. Drain Current(Ⅴ)

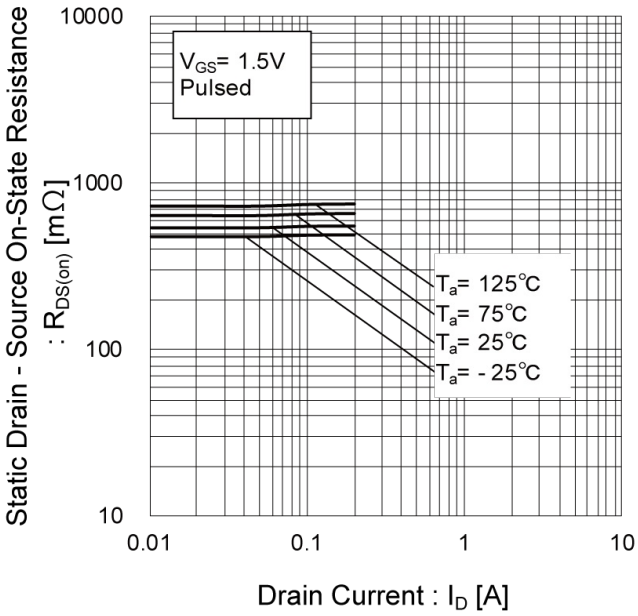


Fig.19 Typical Capacitance vs. Drain - Source Voltage

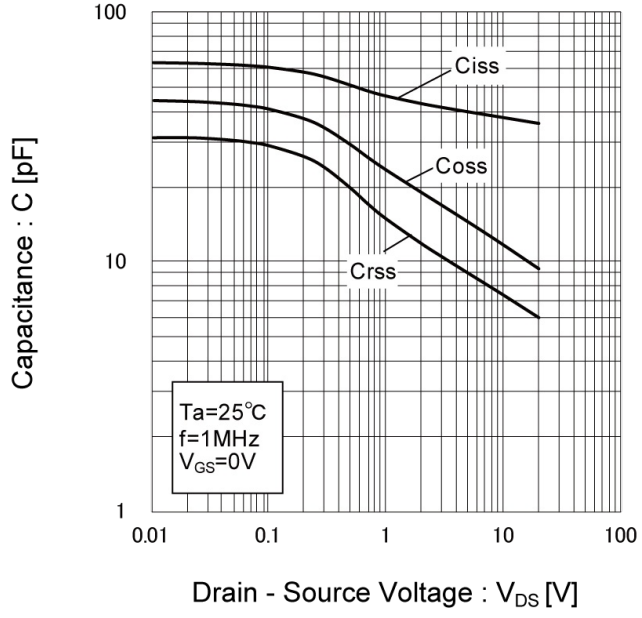
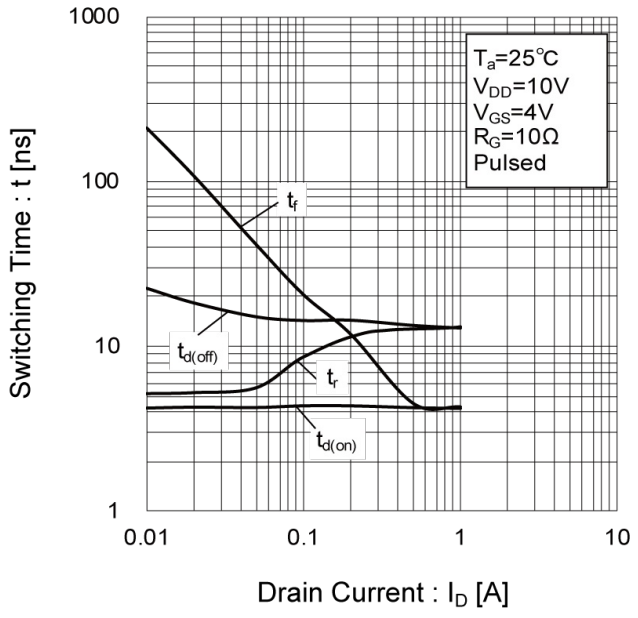


Fig.20 Switching Characteristics



●Electrical characteristic curves

Fig.21 Dynamic Input Characteristics

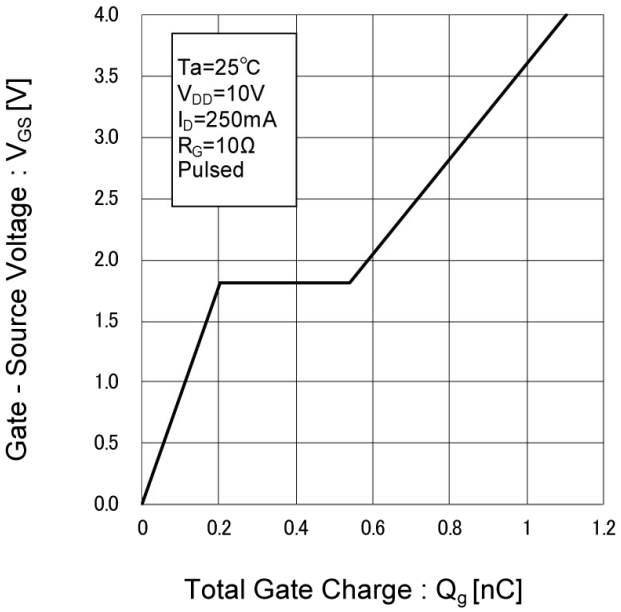
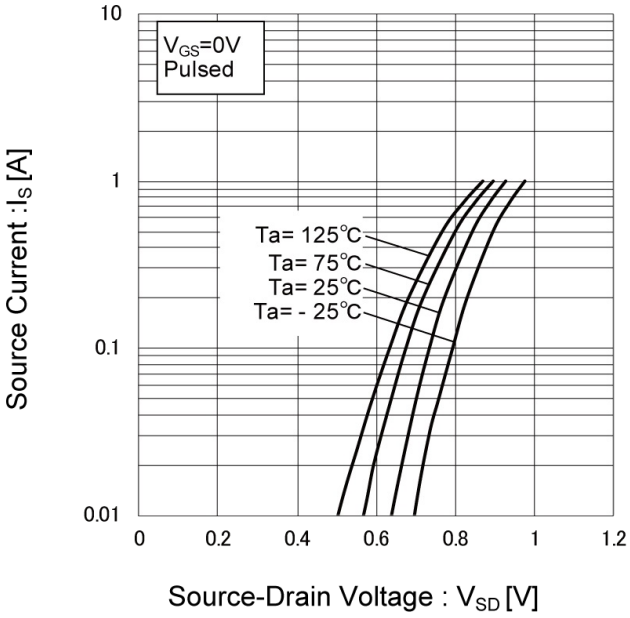


Fig.22 Source Current vs. Source Drain Voltage



●Measurement circuits

Fig.1-1 SWITCHING TIME MEASUREMENT CIRCUIT

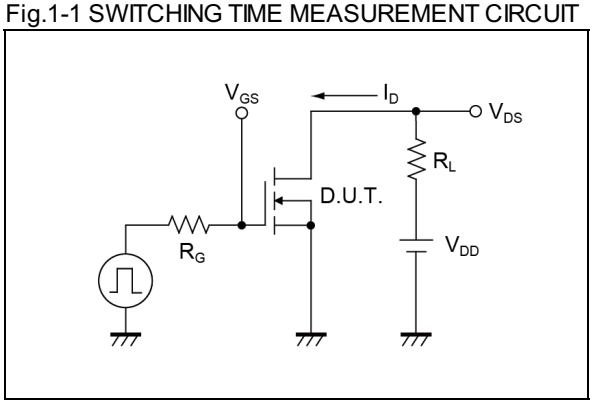
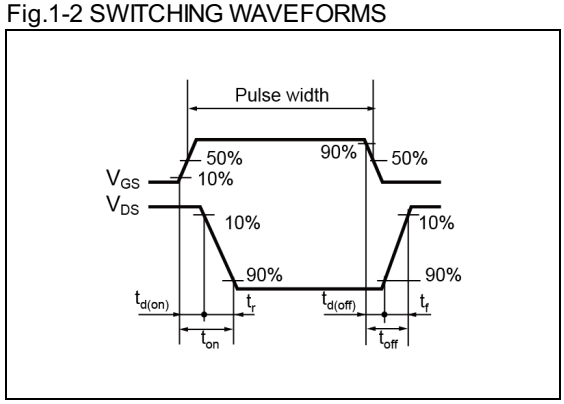


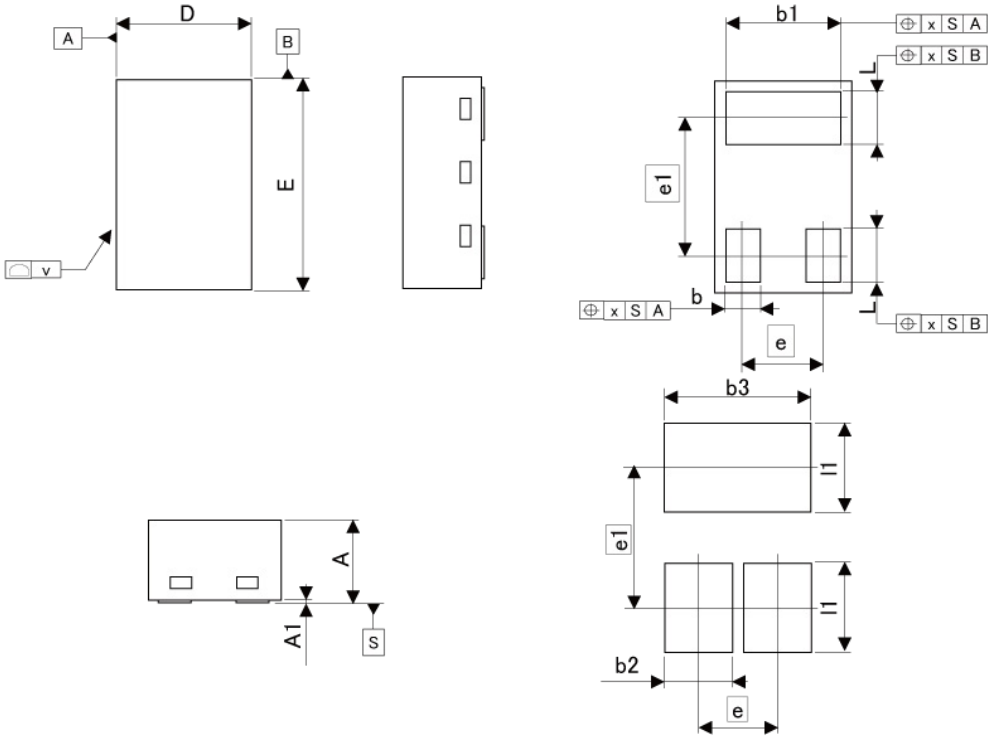
Fig.1-2 SWITCHING WAVEFORMS



●Dimensions

VML1006

< DFN1006-3 >



Pattern of terminal position areas
[Not a 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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