

Nch 20V 200mA Small Signall MOSFET

V_{DSS}	20V
$R_{DS(on)(Max.)}$	1.2 Ω
I_D	$\pm 200mA$
P_D	150mW

●Features

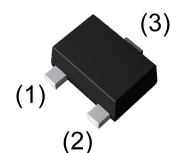
- 1) Small Package (SOT723).
- 2) Ultra Low voltage drive (1.2V drive).
- 3) Pb-free lead plating ; RoHS compliant.
- 4) Halogen Free.

●Application

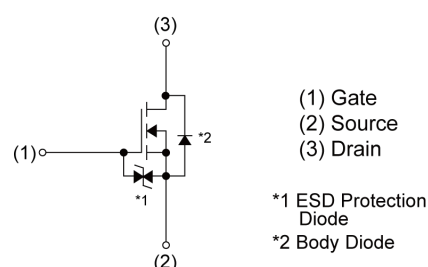
Switching

●Outline

SOT-723



●Inner circuit



●Absolute maximum ratings ($T_a = 25^\circ C$,unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain - Source voltage	V_{DSS}	20	V
Continuous drain current	I_D	± 200	mA
Pulsed drain current	I_{DP}^{*1}	± 400	mA
Gate - Source voltage	V_{GSS}	± 8	V
Power dissipation	P_D^{*2}	150	mW
Junction temperature	T_j	150	$^\circ C$
Operating junction and storage temperature range	T_{stg}	-55 to +150	$^\circ C$

● Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - ambient	R_{thJA}^{*2}	-	-	833	°C/W

● Electrical characteristics ($T_a = 25^\circ\text{C}$)

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°C	-	29.0	-	mV/°C
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 20V, V_{GS} = 0V$	-	-	1	μA
Gate - Source leakage current	I_{GSS}	$V_{GS} = \pm 8V, V_{DS} = 0V$	-	-	±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°C	-	-1.6	-	mV/°C
Static drain - source on - state resistance	$R_{DS(on)}^{*3}$	$V_{GS} = 2.5V, I_D = 200mA$	-	0.8	1.2	Ω
		$V_{GS} = 1.8V, I_D = 200mA$	-	1.0	1.4	
		$V_{GS} = 1.5V, I_D = 40mA$	-	1.2	2.4	
		$V_{GS} = 1.2V, I_D = 20mA$	-	1.6	4.8	
Forward Transfer Admittance	$ Y_{fs} ^{*3}$	$V_{DS} = 10V, I_D = 200mA$	200	-	-	mS

*1 $P_w \leq 10\mu\text{s}$, Duty cycle $\leq 1\%$

*2 Each terminal mounted on a reference land.

*3 Pulsed

● Electrical characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{iss}	$V_{GS} = 0V$	-	25	-	pF
Output capacitance	C_{oss}	$V_{DS} = 10V$	-	10	-	
Reverse transfer capacitance	C_{rss}	$f = 1\text{MHz}$	-	10	-	
Turn - on delay time	$t_{d(on)}^{*3}$	$V_{DD} \approx 10V, V_{GS} = 4.0V$	-	5	-	ns
Rise time	t_r^{*3}	$I_D = 150\text{mA}$	-	10	-	
Turn - off delay time	$t_{d(off)}^{*3}$	$R_L \approx 67\Omega$	-	15	-	
Fall time	t_f^{*3}	$R_G = 10\Omega$	-	10	-	

● Body diode electrical characteristics (Source-Drain) ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Continuous forward current	I_S	$T_a = 25^\circ\text{C}$	-	-	100	mA
Pulse forward current	I_{SP}^{*1}		-	-	400	mA
Forward voltage	V_{SD}^{*3}	$V_{GS} = 0V, I_S = 100\text{mA}$	-	-	1.2	V

● Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

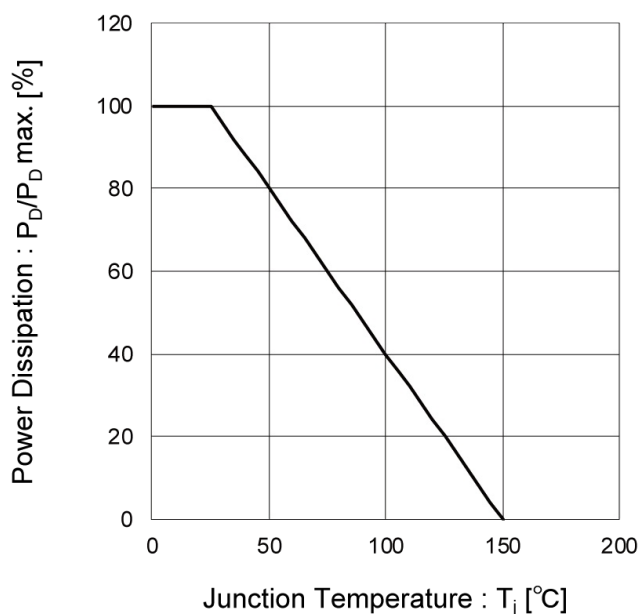


Fig.2 Drain Current Derating Curve

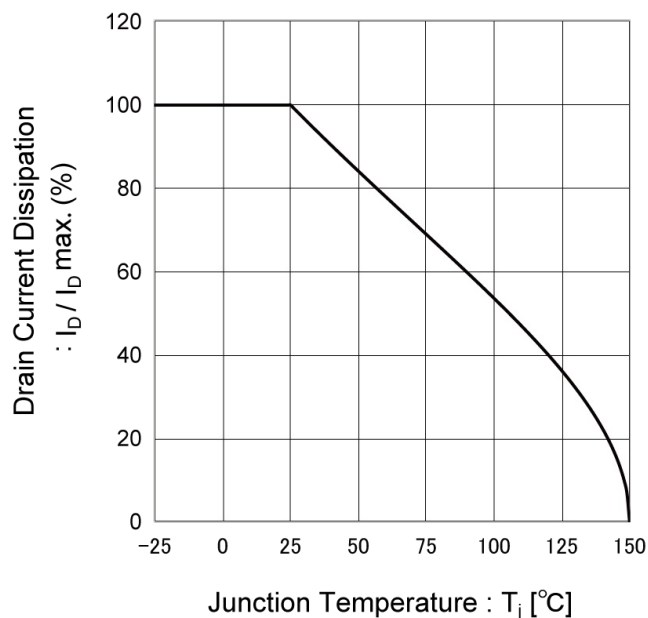


Fig.3 Typical Output Characteristics(I)

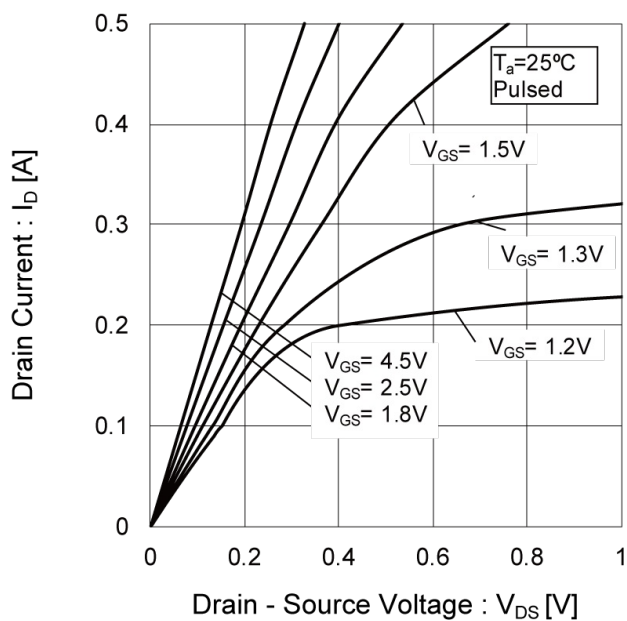
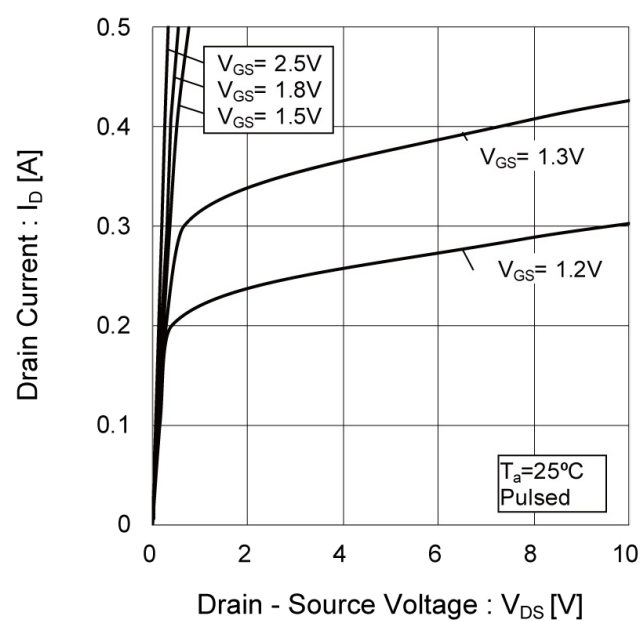


Fig.4 Typical Output Characteristics(II)



● Electrical characteristic curves

Fig.5 Breakdown Voltage vs. Junction Temperature

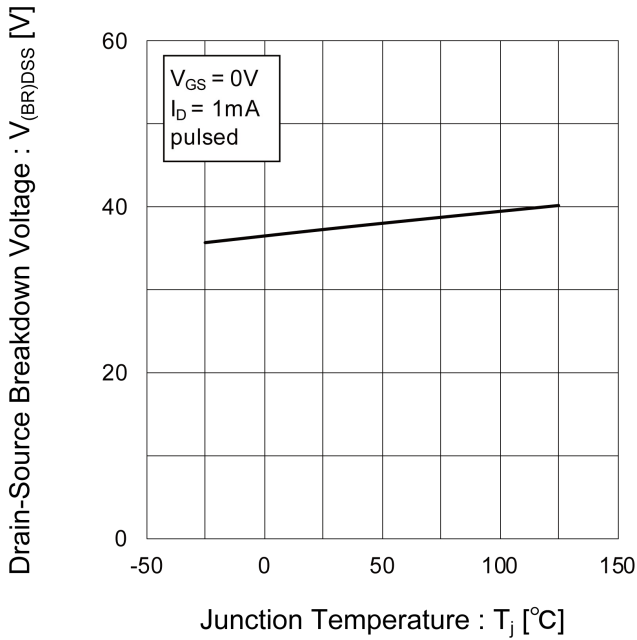


Fig.6 Typical Transfer Characteristics

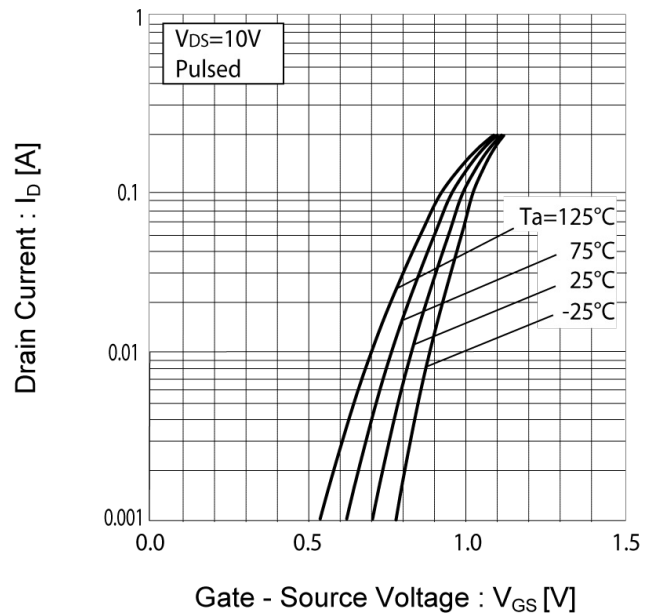


Fig.7 Gate Threshold Voltage vs. Junction Temperature

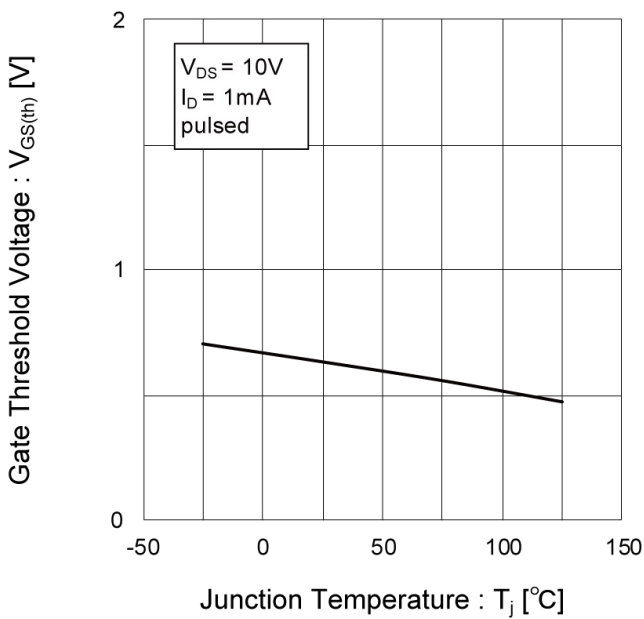
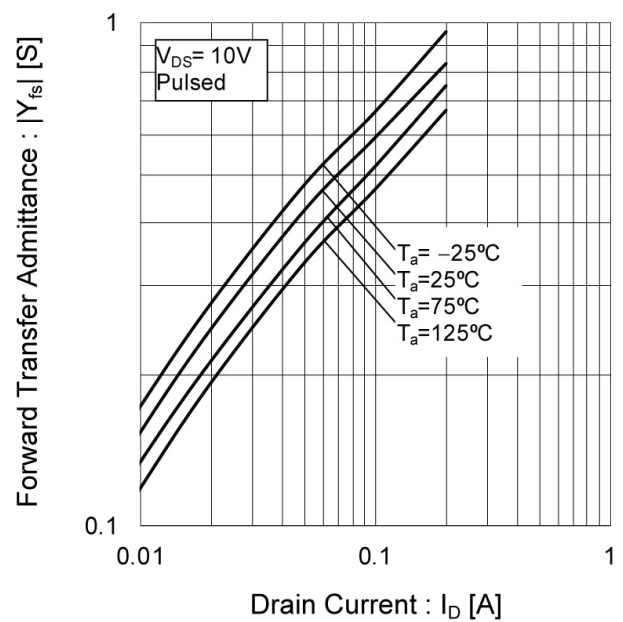


Fig.8 Forward Transfer Admittance vs. Drain Current



● Electrical characteristic curves

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

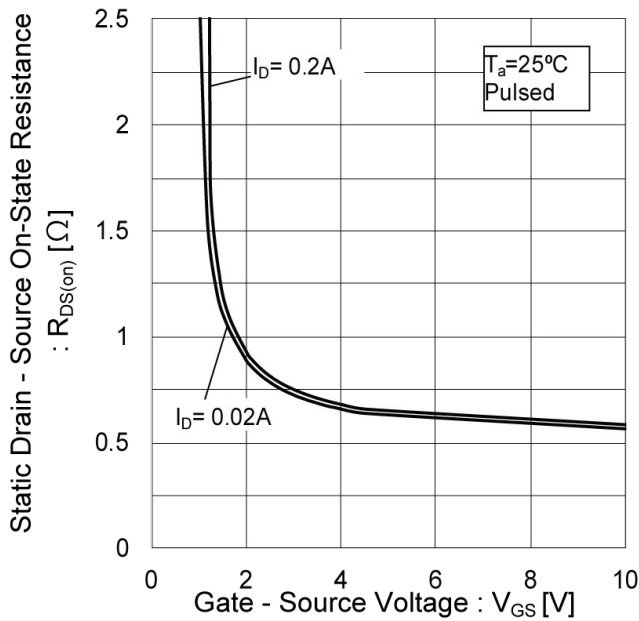


Fig.10 Static Drain - Source On - State Resistance vs. Junction Temperature

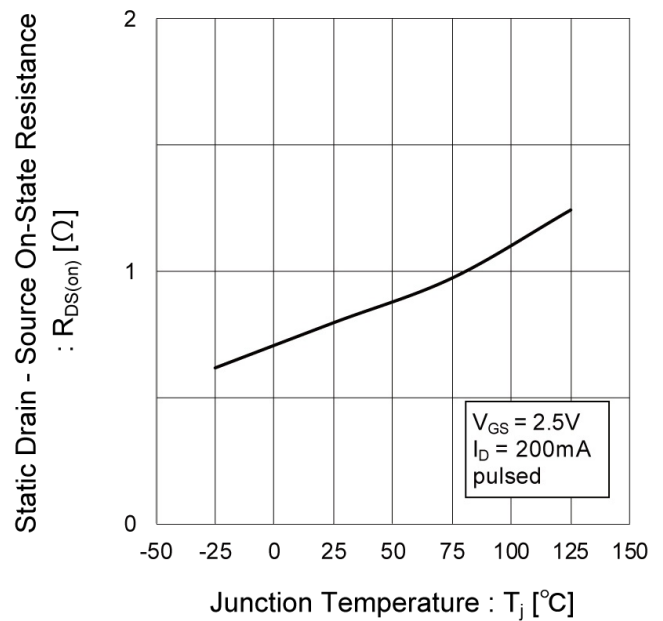
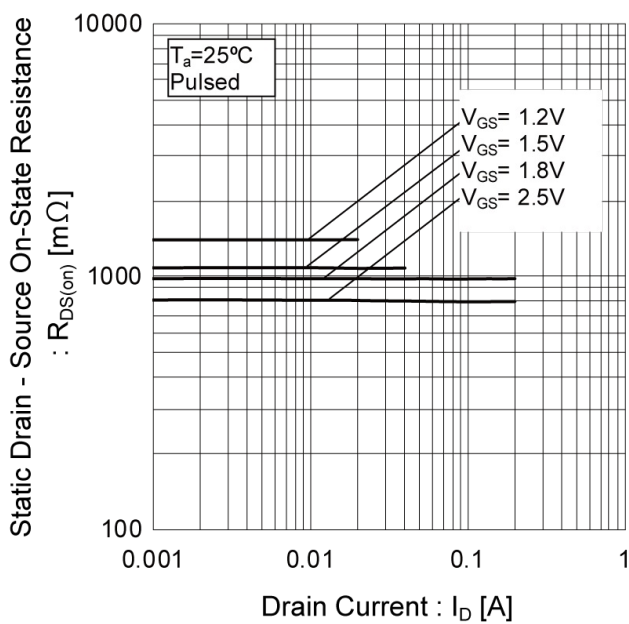


Fig.11 Static Drain - Source On - State Resistance vs. Drain Current (I)



● Electrical characteristic curves

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

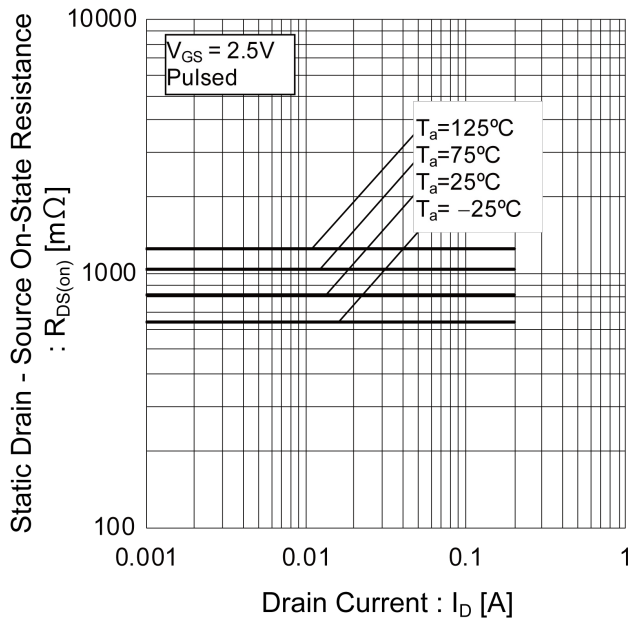


Fig.13 Static Drain - Source On - State Resistance vs. Drain Current (III)

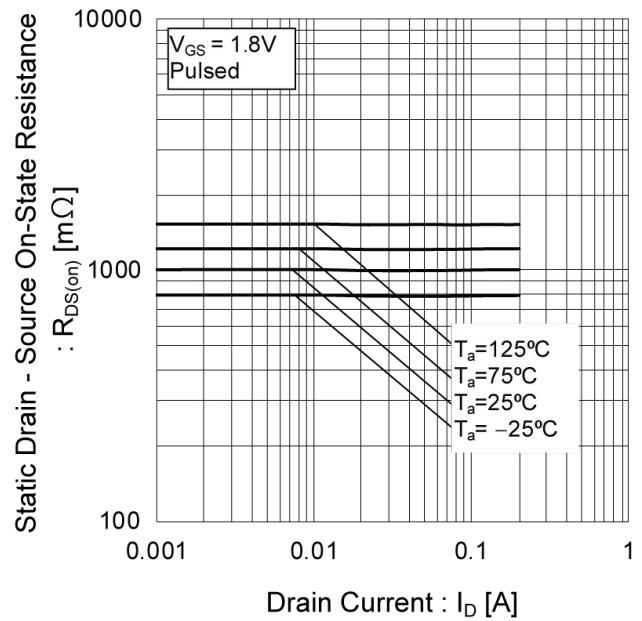


Fig.14 Static Drain - Source On - State Resistance vs. Drain Current (IV)

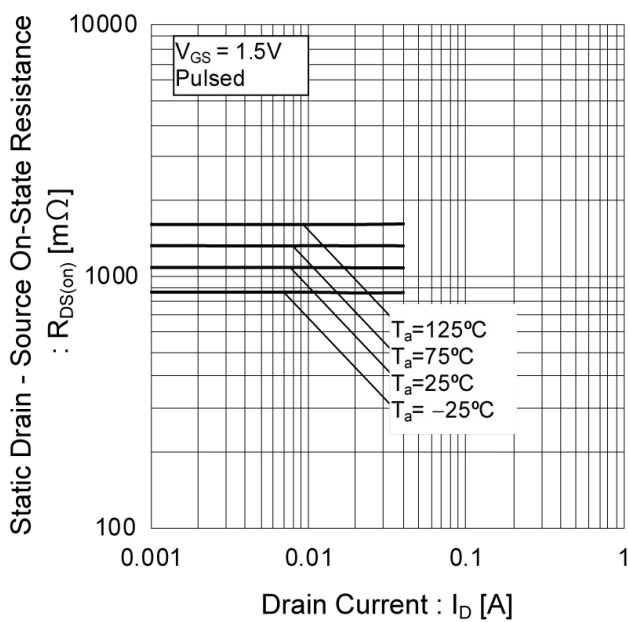
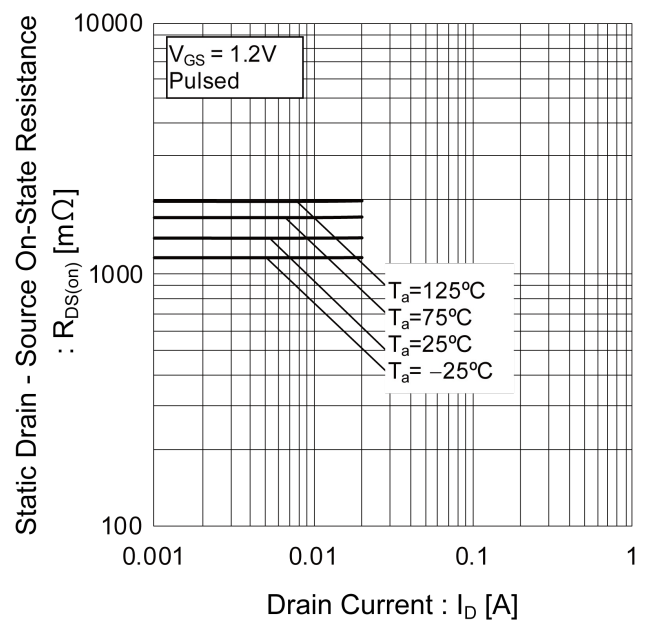


Fig.15 Static Drain - Source On - State Resistance vs. Drain Current (V)



● Electrical characteristic curves

Fig.16 Typical Capacitance vs. Drain - Source Voltage

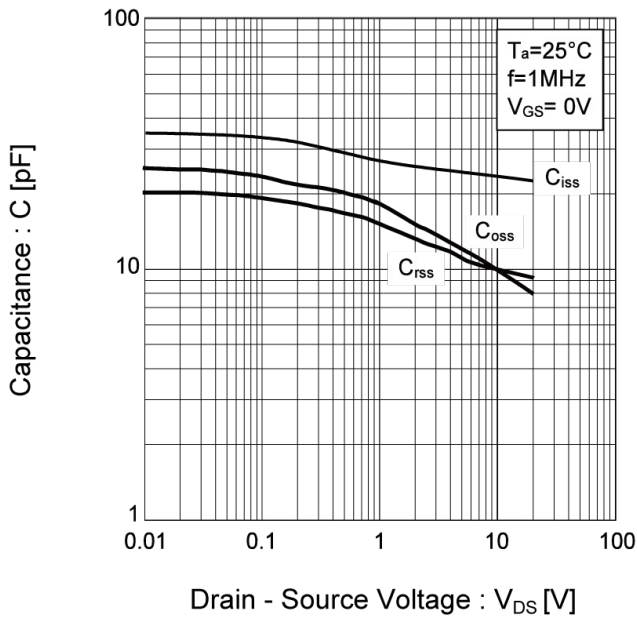


Fig.17 Switching Characteristics

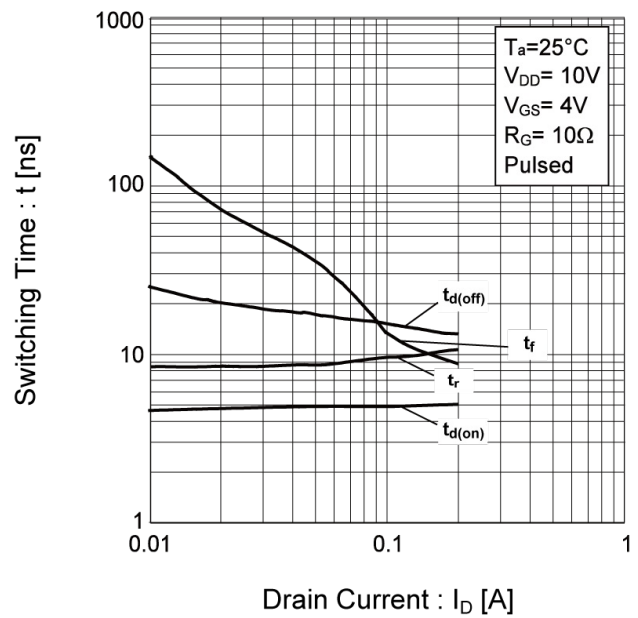
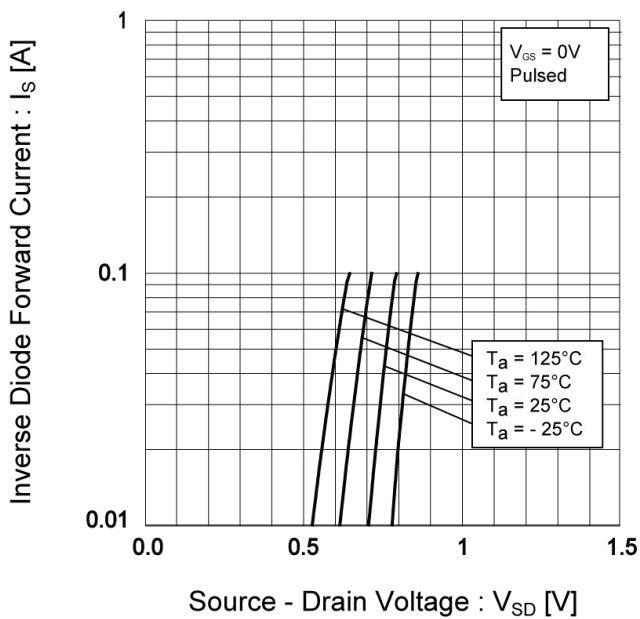


Fig.18 Source Current vs. Source Drain Voltage



● Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

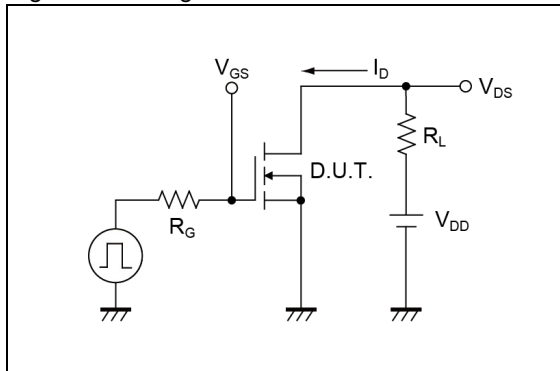
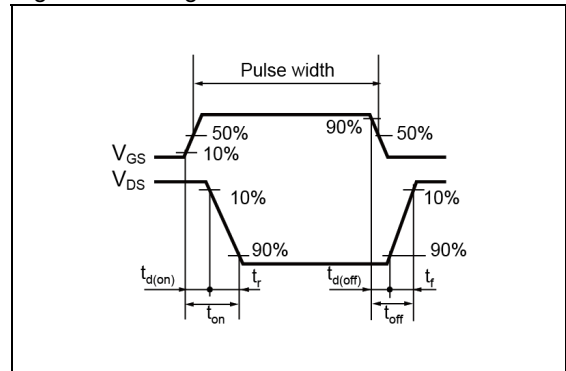
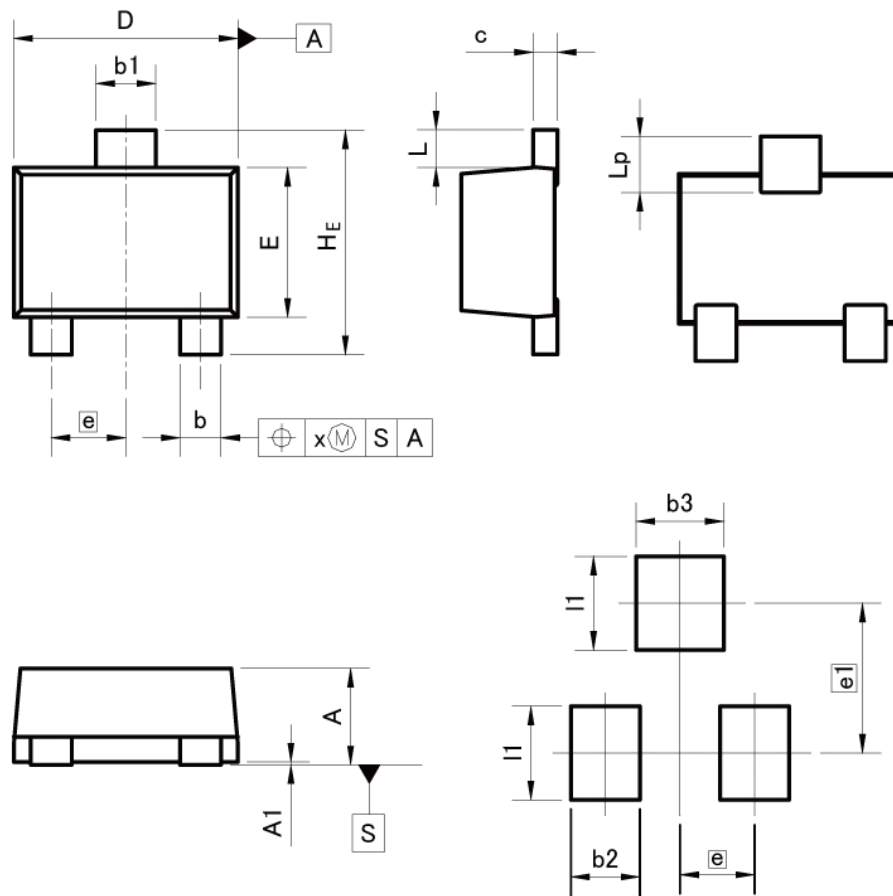


Fig.1-2 Switching Waveforms



● **Dimensions**

SOT-723
SC-105AA
(VMT3)



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

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.45	0.55	0.018	0.022
A1	0.00	0.10	0.000	0.004
b	0.17	0.27	0.007	0.011
b1	0.27	0.37	0.011	0.015
c	0.08	0.18	0.003	0.007
D	1.10	1.30	0.043	0.051
E	0.70	0.90	0.028	0.035
e	0.40		0.02	
HE	1.10	1.30	0.043	0.051
L	0.10	0.30	0.004	0.012
Lp	0.20	0.40	0.008	0.016
x	-	0.10	-	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	-	0.37	-	0.015
b3	-	0.47	-	0.019
e1	0.80		0.031	
I1	-	0.50	-	0.020

Dimension in mm/inches