QS8J5

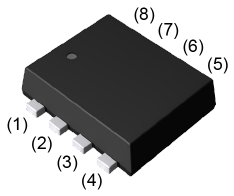
-30V Pch + Pch Middle Power MOSFET

Datasheet

V_{DSS}	-30V
$R_{DS(on)}$(Max.)	39mΩ
I_D	±5A
P_D	1.5W

●Outline

TSMT8

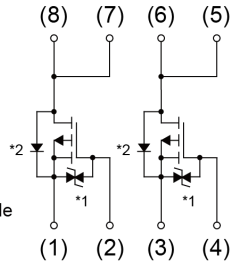


●Features

1) Low on - resistance.
2) Built-in G-S protection diode.
3) Small surface mount package(TSMT8)
4) Pb-free lead plating ; RoHS compliant

●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 ESD Protection Diode
*2 Body Diode



●Packaging specifications

Type	Packing	Embossed Tape
	Reel size (mm)	180
	Tape width (mm)	8
	Basic ordering unit (pcs)	3000
	Taping code	TR
	Marking	J05

●Application

Switching

●Absolute maximum ratings (T_a = 25°C) <It is the same ratings for the Tr1 and Tr2>

Parameter		Symbol	Value	Unit
Drain - Source voltage		V_{DSS}	-30	V
Continuous drain current		I_D	±5	A
Pulsed drain current		$I_{D,pulse}$ *1	±20	A
Gate - Source voltage		V_{GSS}	±20	V
Power dissipation	total	P_D *2	1.5	W
	element		1.25	
	total	P_D *3	0.7	
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	total	R_{thJA}*2	-	-	83.3	℃/W
	element		-	-	100	
	total	R_{thJA}*3	-	-	178	

●Electrical characteristics (T_a = 25°C) <It is the same characteristics for the Tr1 and Tr2>

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -1mA	-30	-	-	V
Breakdown voltage temperature coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_j}$	I_D = -1mA referenced to 25℃	-	-24.1	-	mV/℃
Zero gate voltage drain current	I_{DSS}	V_{DS} = -30V, V_{GS} = 0V	-	-	-1	μA
Gate - Source leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±10	μA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = -10V, I_D = -1mA	-1.0	-	-2.5	V
Gate threshold voltage temperature coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_j}$	I_D = -1mA referenced to 25℃	-	3.3	-	mV/℃
Static drain - source on - state resistance	$R_{DS(on)}$*4	V_{GS} = -10V, I_D = -5A	-	28	39	mΩ
		V_{GS} = -4.5V, I_D = -2.5A	-	40	56	
		V_{GS} = -4V, I_D = -2.5A	-	45	63	
Gate input resistance	R_G	f = 1MHz, open drain	-	15	-	Ω
Forward Transfer Admittance	$\|Y_{fs}\|$*4	V_{DS} = -10V, I_D = -5A	3	-	-	S

●**Electrical characteristics** (T_a = 25°C) <It is the same characteristics for the Tr1 and Tr2>

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{iss}	V_{GS} = 0V	-	1100	-	pF
Output capacitance	C_{oss}	V_{DS} = -10V	-	150	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	130	-	
Turn - on delay time	$t_{d(on)}$ *4	V_{DD} ≃ -15V, V_{GS} = -10V	-	9	-	ns
Rise time	t_r *4	I_D = -2.5A	-	40	-	
Turn - off delay time	$t_{d(off)}$ *4	R_L = 6Ω	-	90	-	
Fall time	t_f *4	R_G = 10Ω	-	55	-	

●**Gate charge characteristics** (T_a = 25°C) <It is the same characteristics for the Tr1 and Tr2>

Parameter	Symbol	Conditions		Values			Unit
				Min.	Typ.	Max.	
Total gate charge	Q_g *4	V_{DD} ≃ -15V I_D = -5A	V_{GS} = -10V	-	19	-	nC
				-	10.0	-	
Gate - Source charge	Q_{gs} *4		V_{GS} = -5V	-	3.6	-	
Gate - Drain charge	Q_{gd} *4			-	3.0	-	

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

<It is the same characteristics for the Tr1 and Tr2>

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Body diode continuous forward current	I_S	T_a = 25°C	-	-	-1	A
Body diode pulse current	I_{SP} *1		-	-	-20	
Forward voltage	V_{SD} *4	V_{GS} = 0V, I_S = -5A	-	-	-1.2	V

*1 Pw≦10μs , Duty cycle≦1%

*2 Mounted on a ceramic board (30×30×0.8mm)

*3 Mounted on a FR4 (20×20×0.8mm)

*4 Pulsed

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

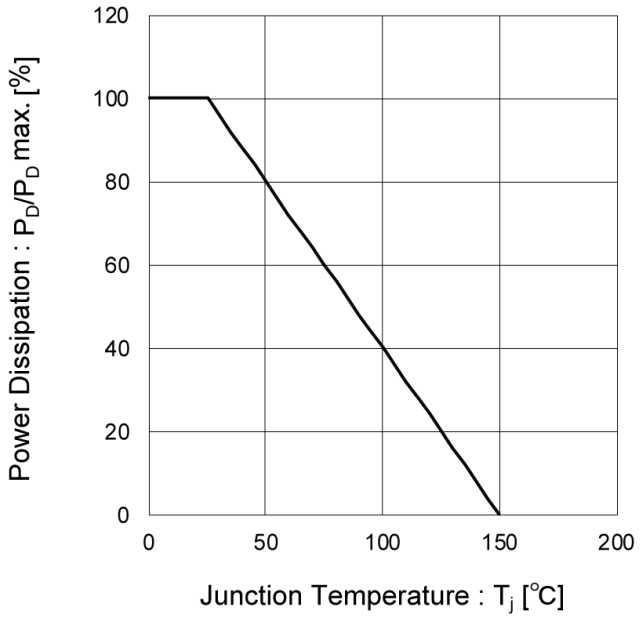


Fig.2 Maximum Safe Operating Area

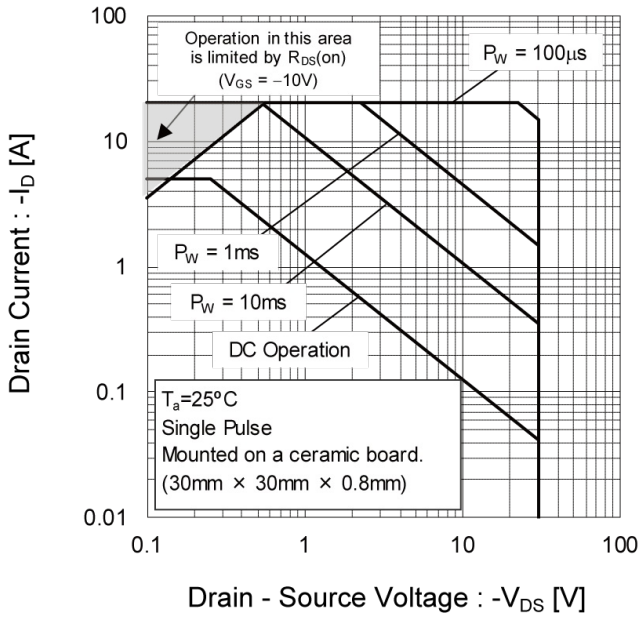


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width

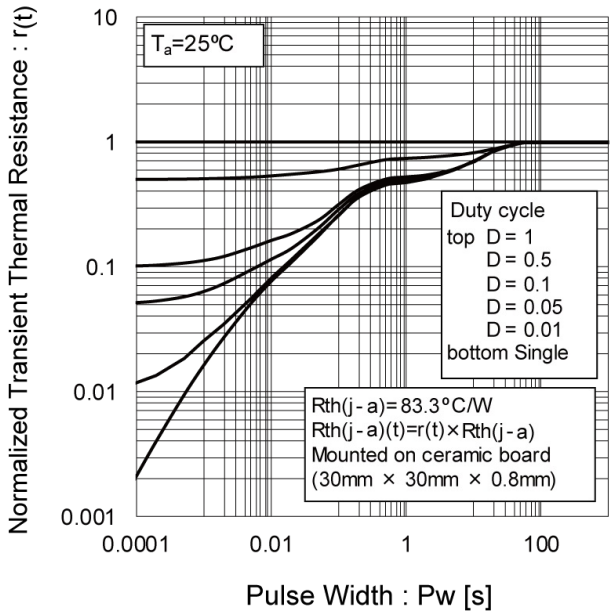
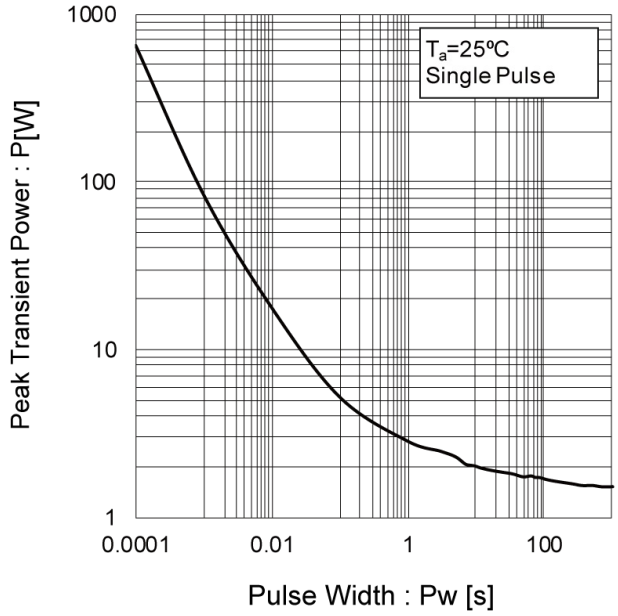


Fig.4 Single Pulse Maximum Power dissipation



●Electrical characteristic curves

Fig.5 Typical Output Characteristics(I)

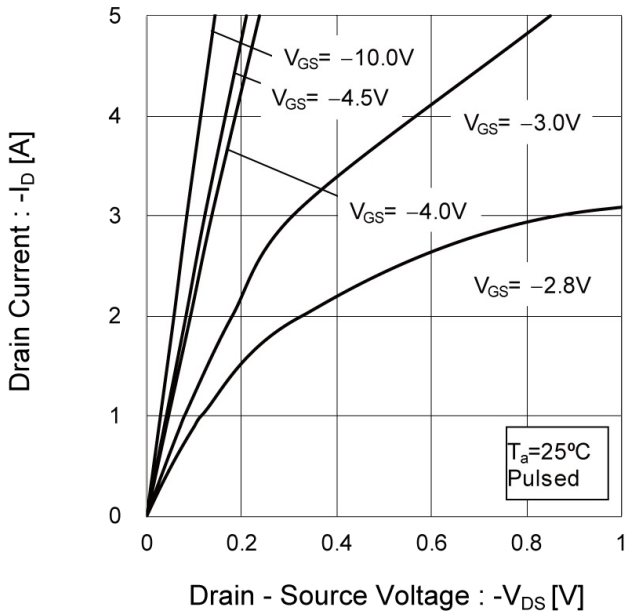


Fig.6 Typical Output Characteristics(II)

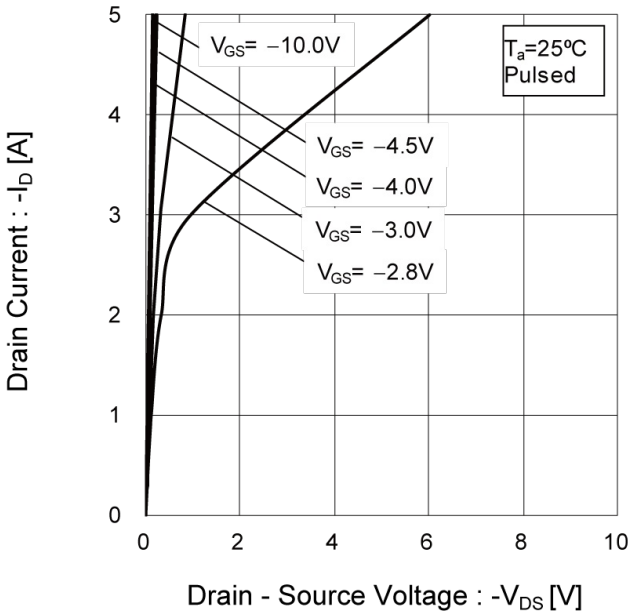


Fig.7 Breakdown Voltage vs. Junction Temperature

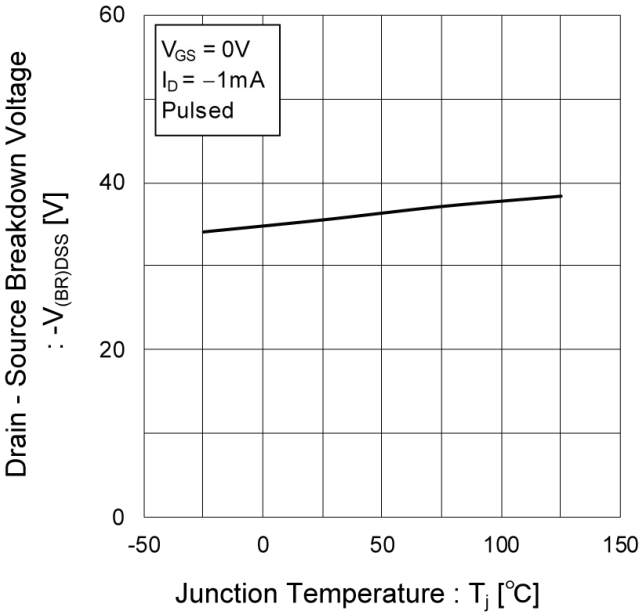
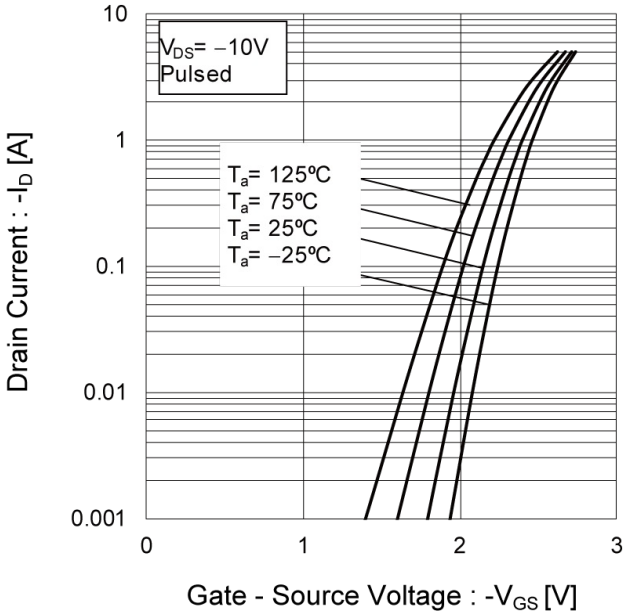


Fig.8 Typical Transfer Characteristics



●Electrical characteristic curves

Fig.9 Gate Threshold Voltage vs. Junction Temperature

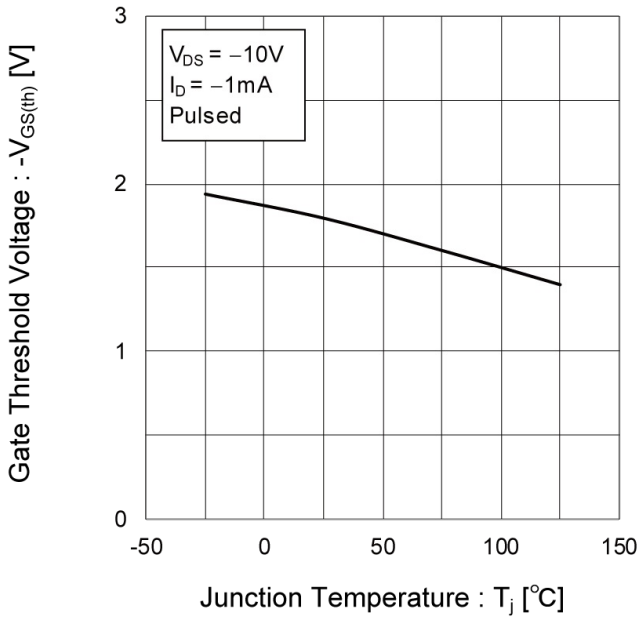


Fig.10 Forward Transfer Admittance vs. Drain Current

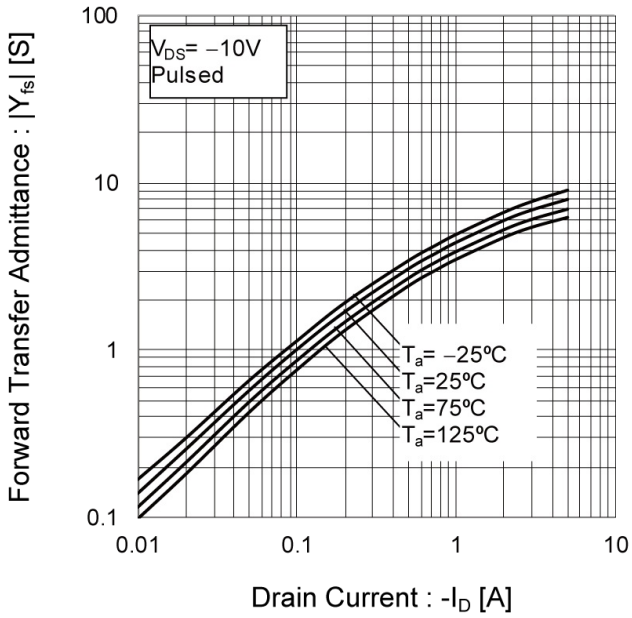


Fig.11 Drain Current Derating Curve

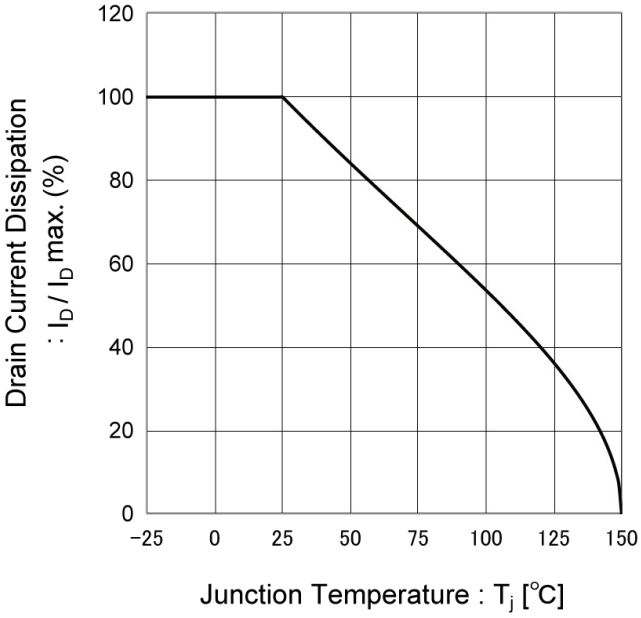
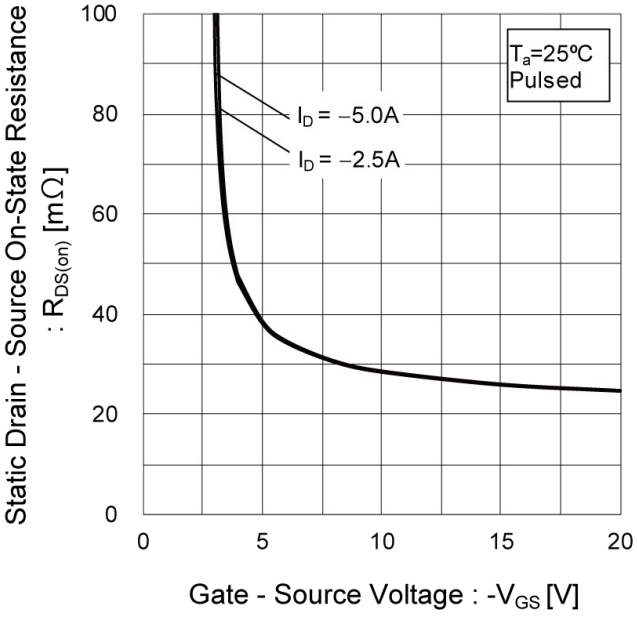


Fig.12 Static Drain - Source On - State Resistance vs. Gate Source Voltage



●Electrical characteristic curves

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

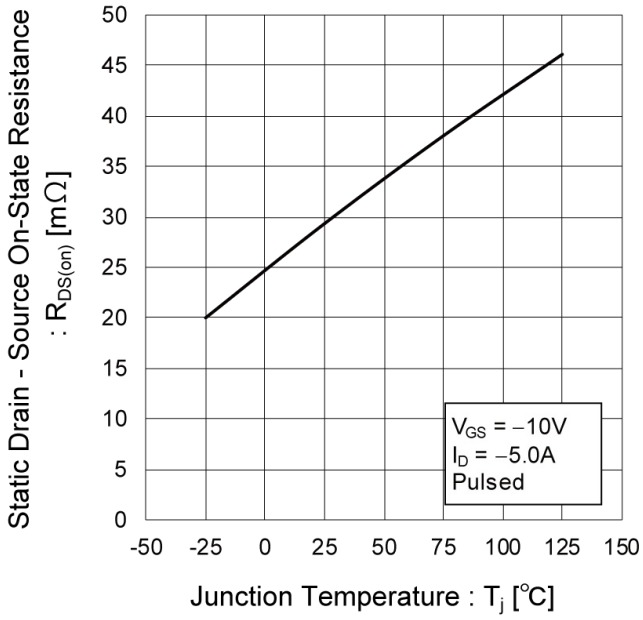
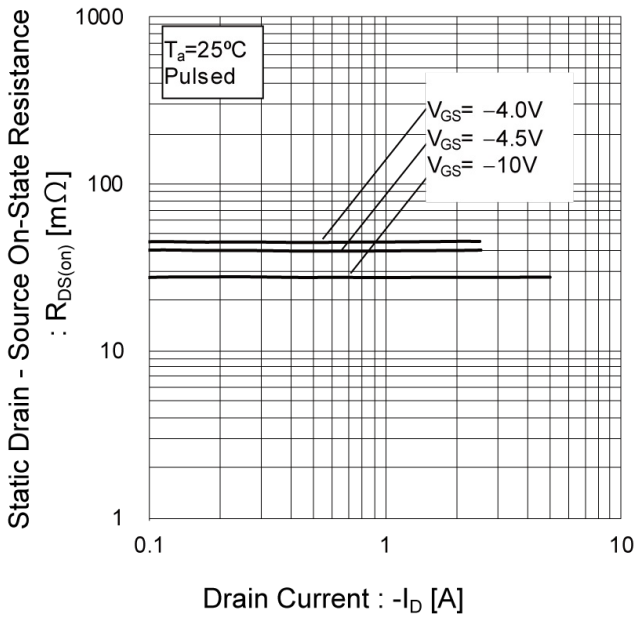


Fig.14 Static Drain - Source On - State Resistance vs. Drain Current (I)



●Electrical characteristic curves

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

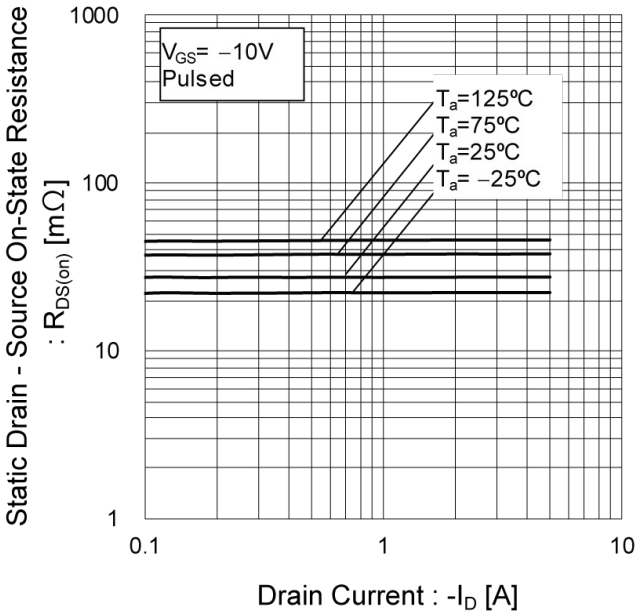


Fig.16 Static Drain - Source On - State Resistance vs. Drain Current (III)

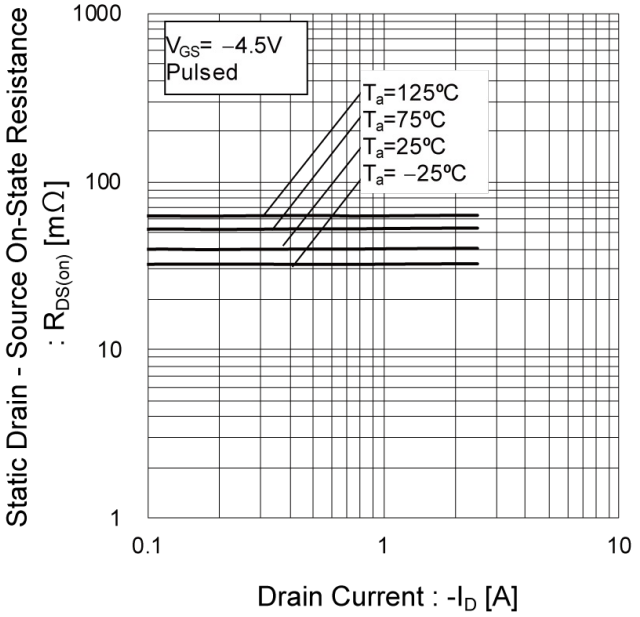
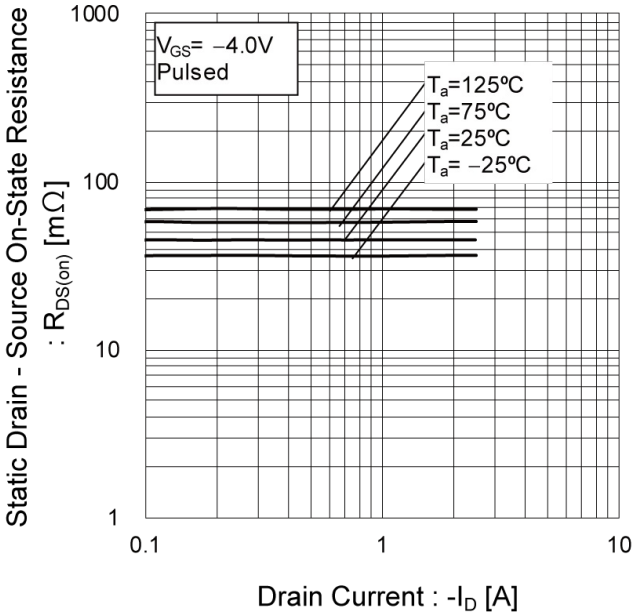


Fig.17 Static Drain - Source On - State Resistance vs. Drain Current (IV)



●Electrical characteristic curves

Fig.18 Typical Capacitance vs. Drain - Source Voltage

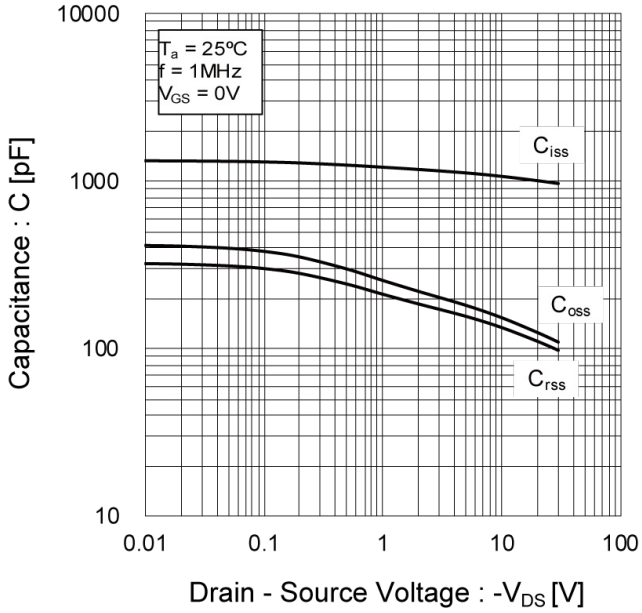


Fig.19 Switching Characteristics

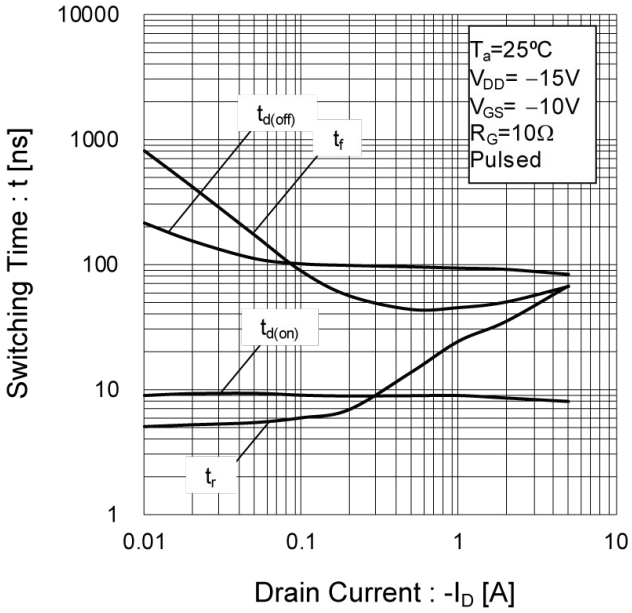


Fig.20 Dynamic Input Characteristics

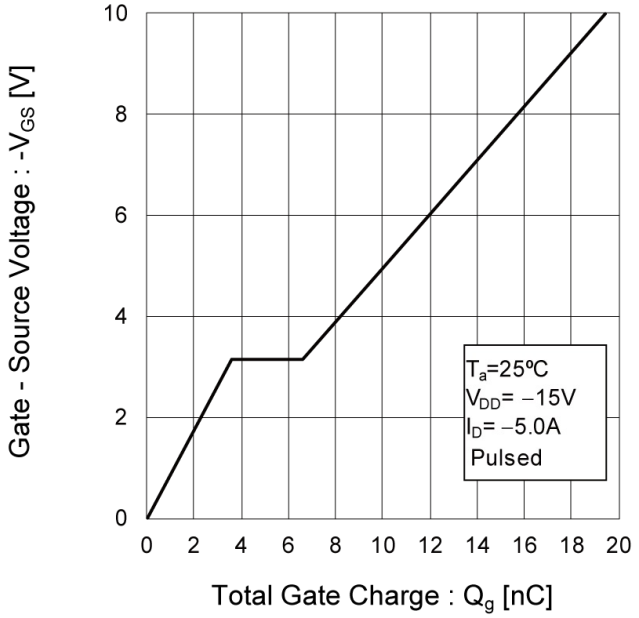
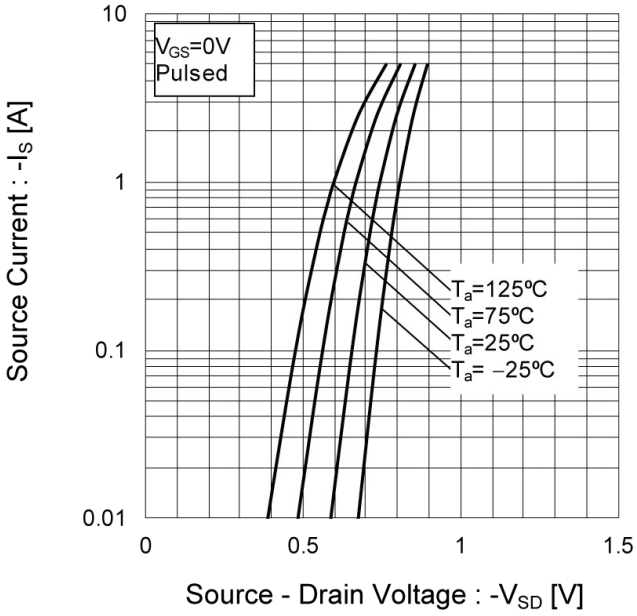


Fig.21 Source Current vs. Source Drain Voltage



●Measurement circuits <It is the same for the Tr1 and Tr2>

Fig. 1-1 SWITCHING TIME MEASUREMENT CIRCUIT

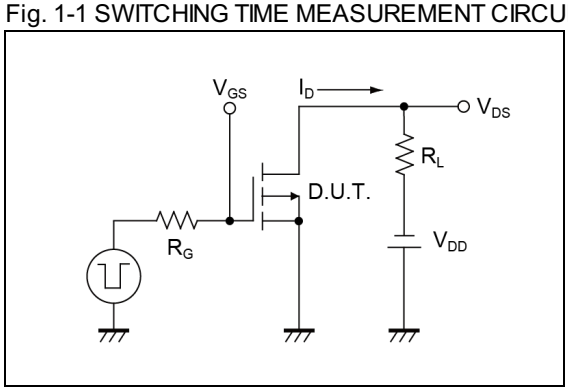


Fig. 1-2 SWITCHING WAVEFORMS

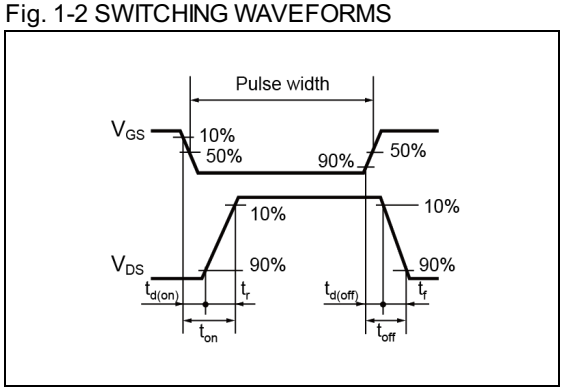


Fig. 2-1 GATE CHARGE MEASUREMENT CIRCUIT

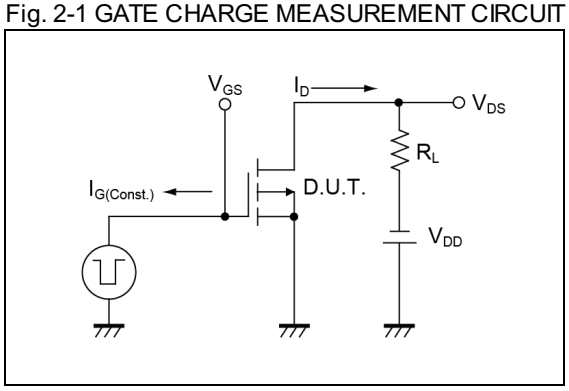
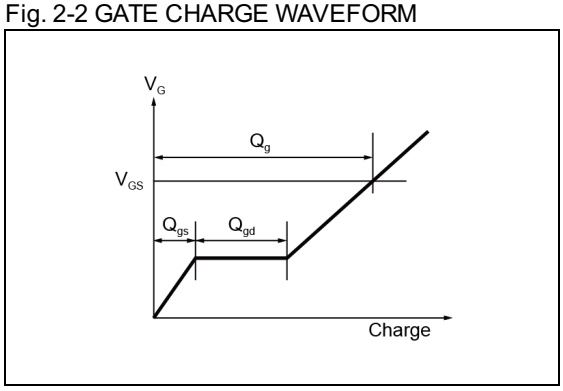
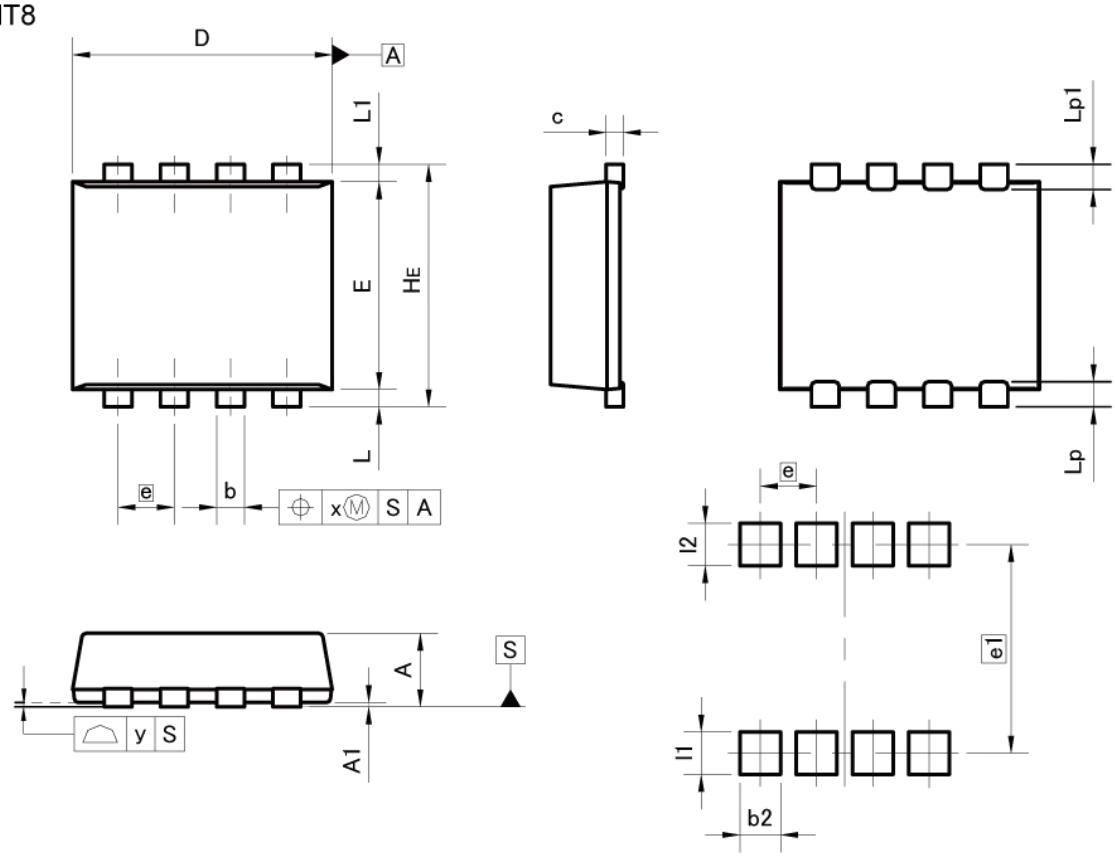


Fig. 2-2 GATE CHARGE WAVEFORM



●Dimensions

TSMT8



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

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.75	0.85	0.030	0.033
A1	0.00	0.05	0.000	0.002
b	0.27	0.37	0.011	0.015
c	0.12	0.22	0.005	0.009
D	2.90	3.10	0.114	0.122
E	2.30	2.50	0.091	0.098
e	0.65		0.026	
HE	2.70	2.90	0.106	0.114
L	0.10	0.30	0.004	0.012
L1	0.10	0.30	0.004	0.012
Lp	0.19	0.39	0.007	0.015
Lp1	0.19	0.39	0.007	0.015
x	–	0.10	–	0.004
y	–	0.10	–	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	–	0.47	–	0.019
e1	2.41		0.095	
l1	–	0.49	–	0.019
l2	–	0.49	–	0.019

Dimension in mm/inches

Notes

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2) Before you use our Products, please contact our sales representative and verify the latest specifications :

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

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