2.5V Drive Nch MOSFET
1.5V Drive Pch MOSFET

TT8M2

●Structure
Silicon N-channel MOSFET/
Silicon P-channel MOSFET

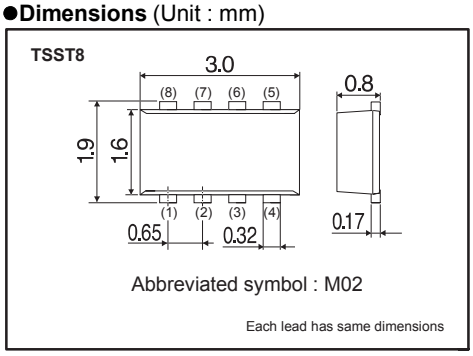
●Features
1) Low on-state resistance.
2) Low voltage drive.
3) High power package.

●Application
Switching

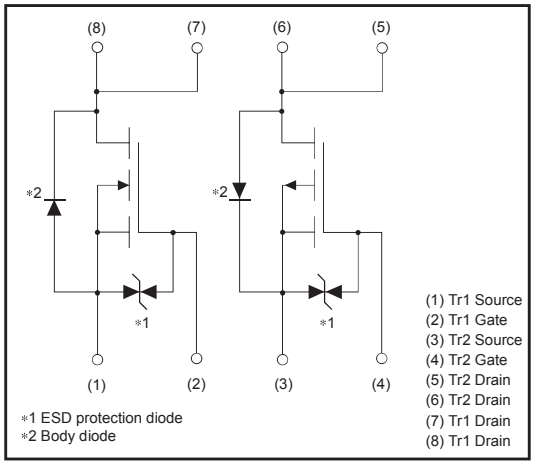
●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
TT8M2		○

●Dimensions (Unit : mm)



●Inner circuit



●Absolute maximum ratings (Ta=25°C)
<Tr1 : Nch>

Parameter		Symbol	Limits	Unit
Drain−source voltage		V_{DSS}	30	V
Gate−source voltage		V_{GSS}	±12	V
Drain current	Continuous	I_D	±2.5	A
	Pulsed	I_{DP} *1	±10	A
Source current (Body diode)	Continuous	I_S	0.8	A
	Pulsed	I_{SP} *1	10	A

*1 Pw≤10μs, Duty cycle≤1%

<Tr2 : Pch>

Parameter		Symbol	Limits	Unit
Drain−source voltage		V_{DSS}	−20	V
Gate−source voltage		V_{GSS}	±10	V
Drain current	Continuous	I_D	±2.5	A
	Pulsed	I_{DP} *1	±10	A
Source current (Body diode)	Continuous	I_S	−0.8	A
	Pulsed	I_{SP} *1	−10	A

*1 Pw≤10μs, Duty cycle≤1%

<Tr1 AND Tr2>

Parameter	Symbol	Limits	Unit
Total power dissipation	P_D *2	1.25	W / TOTAL
		1.0	W / ELEMENT
Channel temperature	Tch	150	°C
Range of Storage temperature	Tstg	−55 to +150	°C

*2 Mounted on a ceramic board

●Electrical characteristics (Ta=25°C)

< Characteristics for the Tr1(Nch).>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	–	–	±10	μA	V_{GS}=±12V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	30	–	–	V	I_D=1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	–	–	1	μA	V_{DS}=30V, V_{GS}=0V
Gate threshold voltage	$V_{GS\ (th)}$	0.5	–	1.5	V	V_{DS}=10V, I_D=1mA
Static drain-source on-state resistance	$R_{DS\ (on)}$ *	–	65	90	mΩ	I_D=2.5A, V_{GS}=4.5V
		–	70	95	mΩ	I_D=2.5A, V_{GS}=4V
		–	95	130	mΩ	I_D=2.5A, V_{GS}=2.5V
Forward transfer admittance	$\|Y_{fs}\|$ *	2.2	–	–	S	V_{DS}=10V, I_D=2.5A
Input capacitance	C_{iss}	–	180	–	pF	V_{DS}=10V
Output capacitance	C_{oss}	–	60	–	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	–	35	–	pF	f=1MHz
Turn-on delay time	$t_{d\ (on)}$ *	–	7	–	ns	V_{DD}≒15V
Rise time	t_r *	–	30	–	ns	I_D=1.2A
Turn-off delay time	$t_{d\ (off)}$ *	–	20	–	ns	V_{GS}=4.5V
Fall time	t_f *	–	20	–	ns	R_L≒12.5Ω
						R_G=10Ω
Total gate charge	Q_g *	–	3.2	–	nC	V_{DD}≒15V, I_D=2.5A
Gate-source charge	Q_{gs} *	–	0.9	–	nC	V_{GS}=4.5V
Gate-drain charge	Q_{gd} *	–	0.4	–	nC	R_L≒6Ω, R_G=10Ω

*Pulsed

●Body diode characteristics (Source-drain) (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD} *	–	–	1.2	V	I_S=2.5A, V_{GS}=0V

*Pulsed

●**Electrical characteristics** (Ta=25°C)
< Characteristics for the Tr2(Pch).>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	–	–	±10	μA	V_{GS}=±10V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	–20	–	–	V	I_D= –1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	–	–	–1	μA	V_{DS}= –20V, V_{GS}=0V
Gate threshold voltage	$V_{GS\ (th)}$	–0.3	–	–1.0	V	V_{DS}= –10V, I_D= –1mA
Static drain-source on-state resistance	$R_{DS\ (on)}$ *	–	49	68	mΩ	I_D= –2.5A, V_{GS}= –4.5V
		–	68	95	mΩ	I_D= –1.2A, V_{GS}= –2.5V
		–	100	150	mΩ	I_D= –1.2A, V_{GS}= –1.8V
		–	140	280	mΩ	I_D= –0.5A, V_{GS}= –1.5V
Forward transfer admittance	$\|Y_{fs}\|$ *	2.5	–	–	S	V_{DS}= –10V, I_D= –2.5A
Input capacitance	C_{iss}	–	1270	–	pF	V_{DS}= –10V
Output capacitance	C_{oss}	–	100	–	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	–	90	–	pF	f=1MHz
Turn-on delay time	$t_{d\ (on)}$ *	–	9	–	ns	V_{DD} ≒ –10V I_D= –1.2A V_{GS}= –4.5V R_L ≒ 8.3Ω R_G=10Ω
Rise time	t_r *	–	30	–	ns	
Turn-off delay time	$t_{d\ (off)}$ *	–	120	–	ns	
Fall time	t_f *	–	85	–	ns	
Total gate charge	Q_g *	–	12	–	nC	V_{DD} ≒ –10V, I_D= –2.5A
Gate-source charge	Q_{gs} *	–	2.5	–	nC	V_{GS}= –4.5V
Gate-drain charge	Q_{gd} *	–	2.0	–	nC	R_L ≒ 4Ω, R_G=10Ω

*Pulsed

●**Body diode characteristics** (Source-drain) (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD} *	–	–	–1.2	V	I_S= –2.5A, V_{GS}=0V

*Pulsed

●Electrical characteristics curves
<Nch>

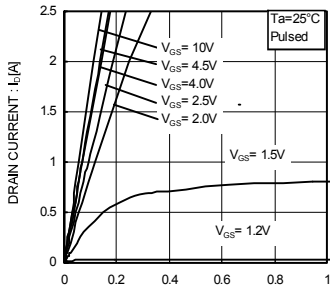


Fig.1 Typical Output Characteristics(Ⅰ)

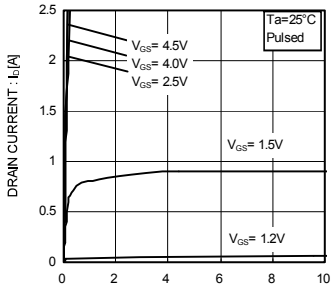


Fig.2 Typical Output Characteristics(Ⅱ)

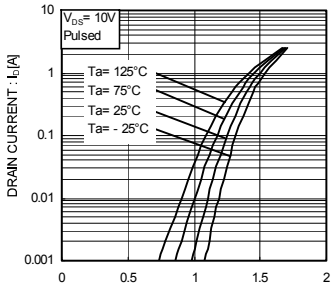


Fig.3 Typical Transfer Characteristics

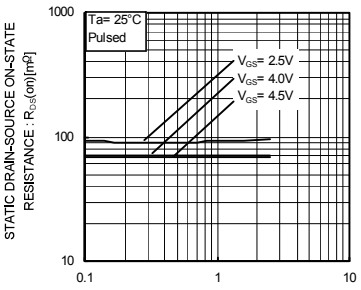


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(Ⅰ)

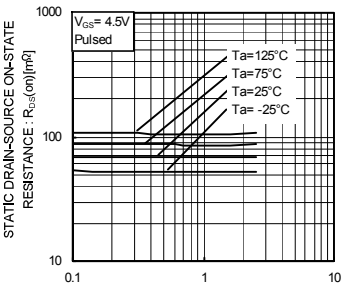


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(Ⅱ)

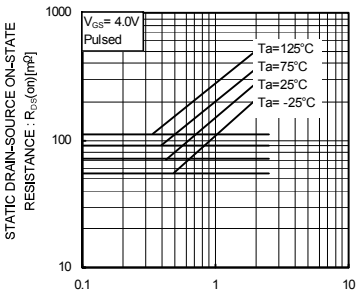


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(Ⅲ)

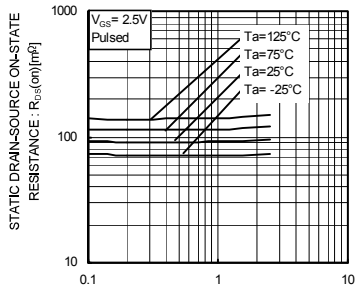


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(Ⅳ)

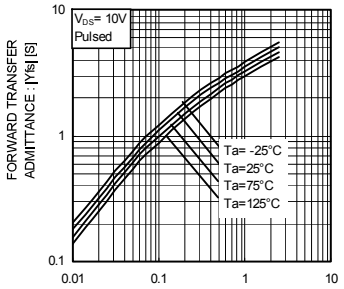


Fig.8 Forward Transfer Admittance vs. Drain Current

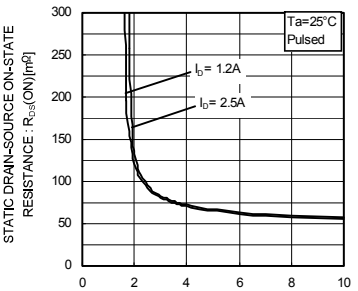


Fig.9 Static Drain-Source On-State Resistance vs. Gate Source Voltage

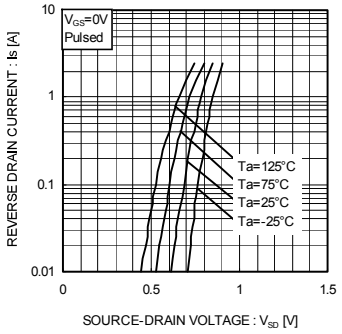


Fig.10 Reverse Drain Current vs. Sourse-Drain Voltage

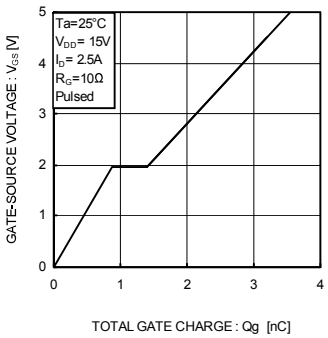


Fig.11 Dynamic Input Characteristics

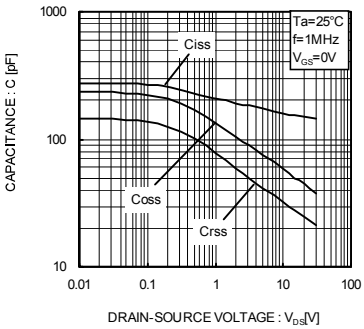


Fig.12 Typical Capacitance vs. Drain-Source Voltage

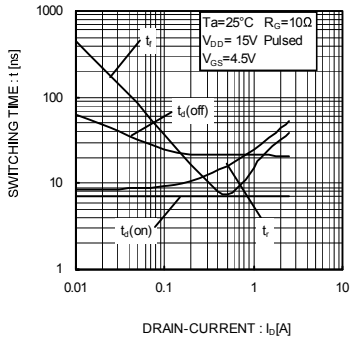


Fig.13 Switching Characteristics

<Pch>

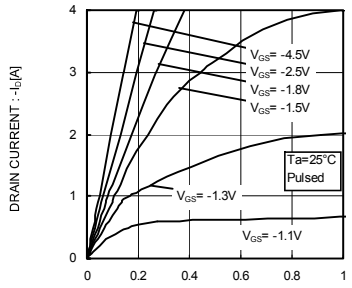


Fig.1 Typical Output Characteristics(Ⅰ)

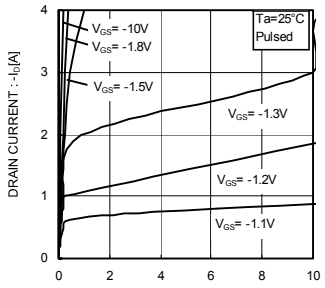


Fig.2 Typical Output Characteristics(Ⅱ)

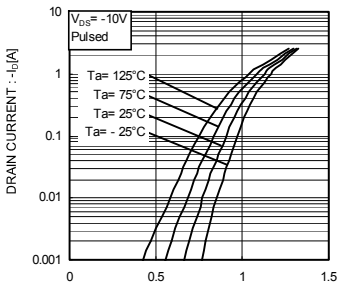


Fig.3 Typical Transfer Characteristics

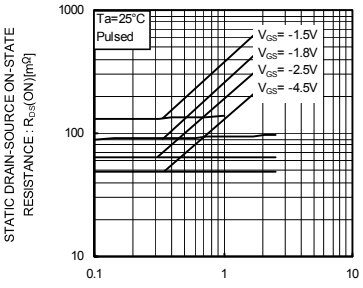


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(Ⅰ)

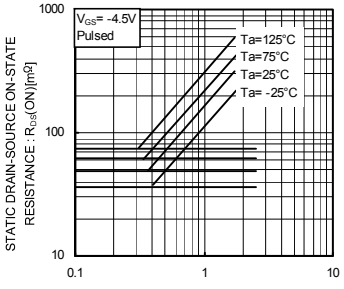


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(Ⅱ)

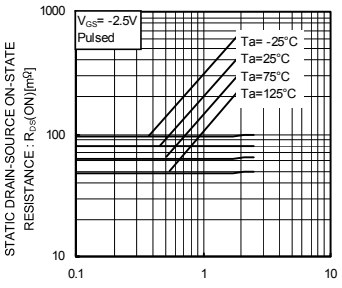


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(Ⅲ)

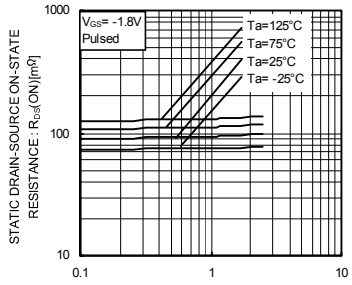


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(Ⅳ)

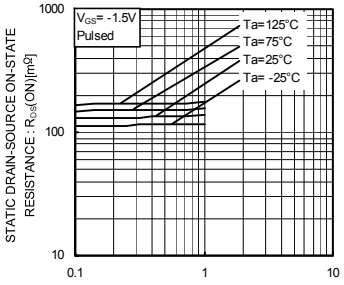


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current(Ⅳ)

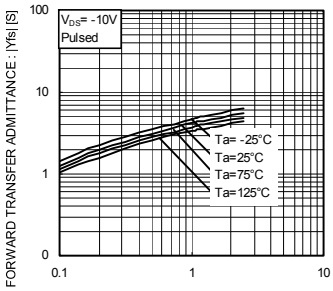


Fig.9 Forward Transfer Admittance vs. Drain Current

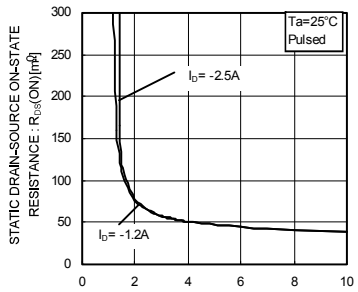


Fig.10 Static Drain-Source On-State Resistance vs. Gate Source Voltage

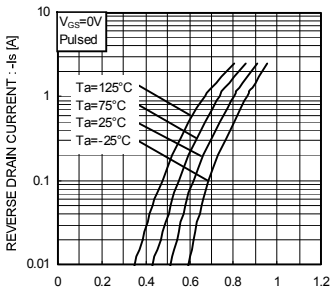


Fig.11 Reverse Drain Current vs. Sourse-Drain Voltage

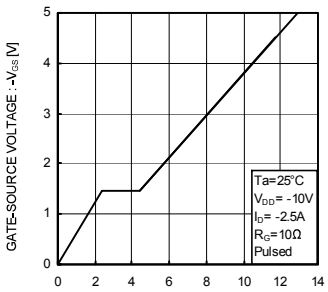


Fig.12 Dynamic Input Characteristics

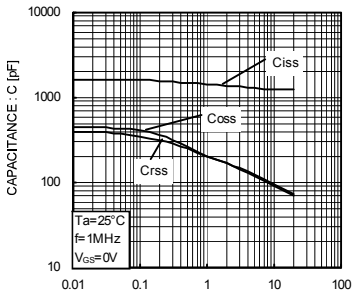


Fig.13 Typical Capacitance vs. Drain-Source Voltage

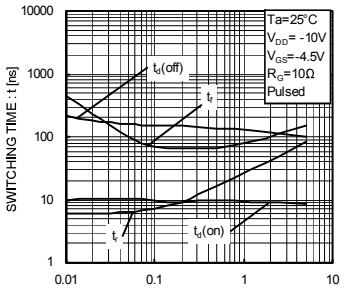


Fig.14 Switching Characteristics

●Measurement circuits

< Nch >

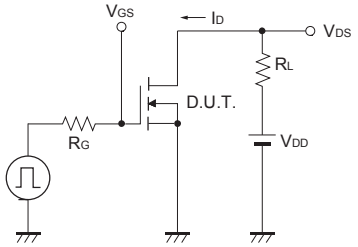


Fig.1-1 Switching Time Measurement Circuit

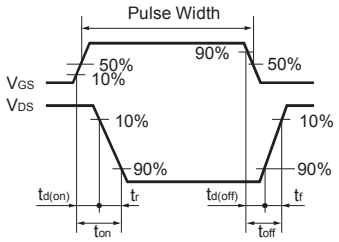


Fig.1-2 Switching Waveforms

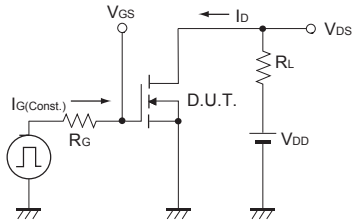


Fig.2-1 Gate charge measurement circuit

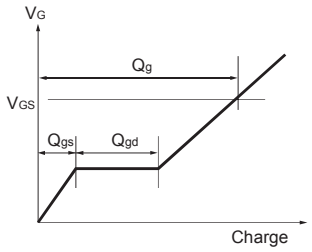


Fig.2-2 Gate Charge Waveform

< Pch >

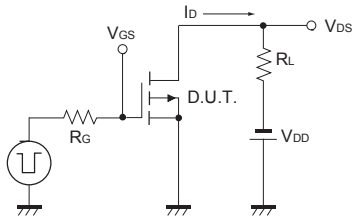


Fig.3-1 Switching time measurement circuit

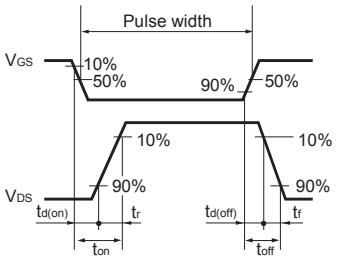


Fig.3-2 Switching waveforms

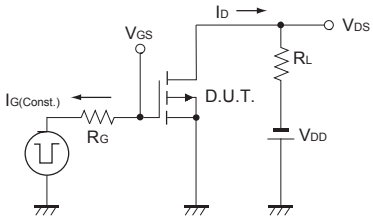


Fig.4-1 Gate charge measurement circuit

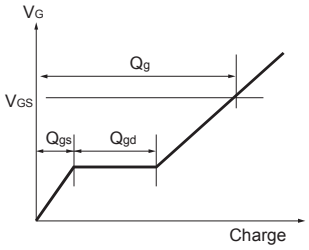


Fig.4-2 Gate charge waveform

●Notice

This product might cause chip aging and breakdown under the large electrified environment.
Please consider to design ESD protection circuit.

Notes

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