●Application

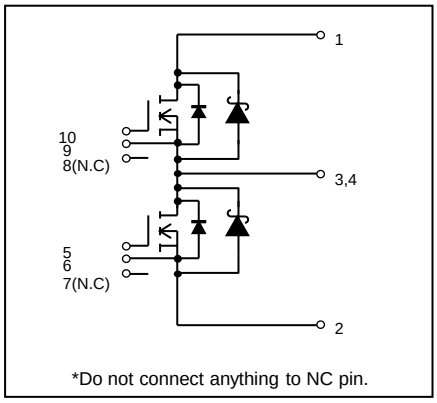
· Motor drive

· Inverter, Converter

· Photovoltaics, wind power generation.

· Induction heating equipment.

●Circuit diagram



●Features

1) Low surge, low switching loss.

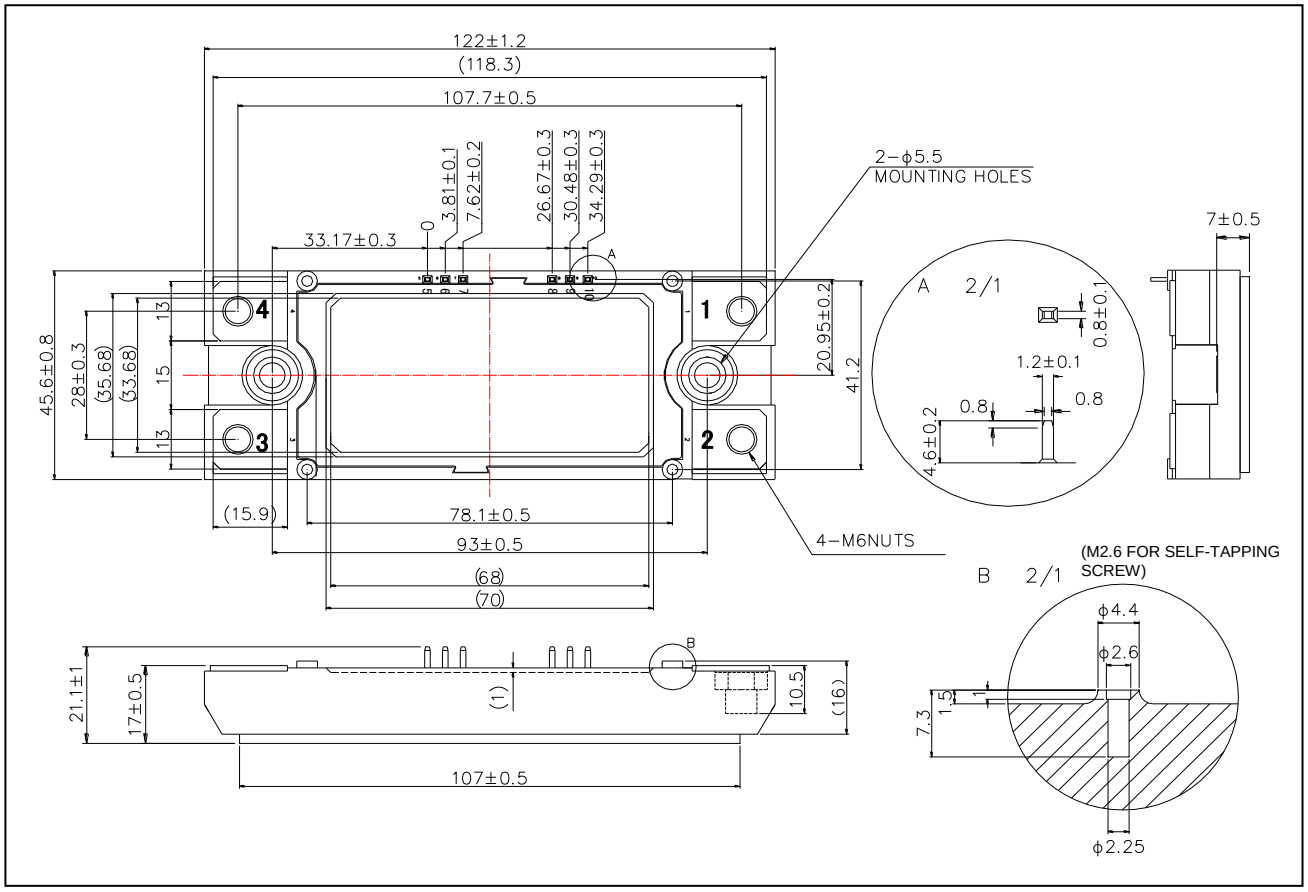
2) High-speed switching possible.

3) Reduced temperature dependence.

●Construction

This product is a half bridge module consisting of SiC-DMOS and SiC-SBD from ROHM.

●Dimensions & Pin layout (Unit : mm)



●Absolute maximum ratings (Tj = 25°C)

Parameter	Symbol	Conditions	Limit	Unit
Drain-source voltage	V_{DSS}	G-S short	1200	V
Gate-source voltage(+)	V_{GSS}	D-S short	22	V
Gate-source voltage(–)			–6	V
G - S voltage (t_{surge}<300nsec)	$V_{GSSsurge}$	D-S short	–10 to 26	V
Drain current *1	I_D	DC(Tc=60°C)	134	A
	I_{DRM}	Pulse (Tc=60°C) 1ms *2	240	A
Source current *1	I_S	DC(Tc =60°C) V_{GS}=18V	134	A
	I_{SRM}	Pulse (Tc=60°C) 1ms V_{GS}=18V *2	240	A
Total power disspation *3	Ptot	Tc=25°C	935	W
Max Junction Temperature	Tjmax		175	°C
Junction temperature	Tj		–40 to150	°C
Storage temperature	Tstg		–40 to125	°C
Isolation voltage	Visol	Terminals to baseplate, f=60Hz AC 1min.	2500	Vrms
Mounting torque	–	Main Terminals : M6 screw	4.5	N · m
		Mounting to heat shink : M5 screw	3.5	N · m

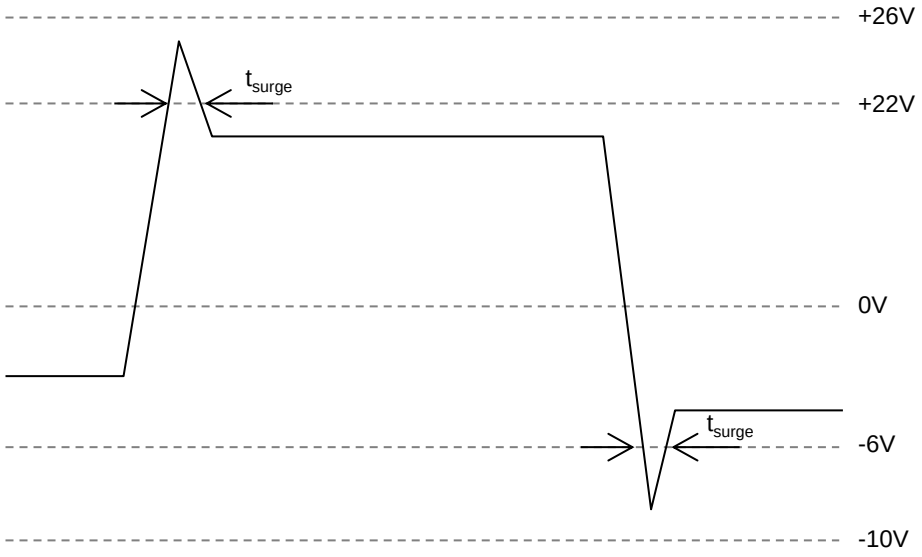
(*1) Case temperature (Tc) is defined on the surface of base plate just under the chips.
(*2) Repetition rate should be kept within the range where temperature rise if die should not exceed Tjmax.
(*3) Tj is less than 175°C

●Electrical characteristics (Tj=25°C)

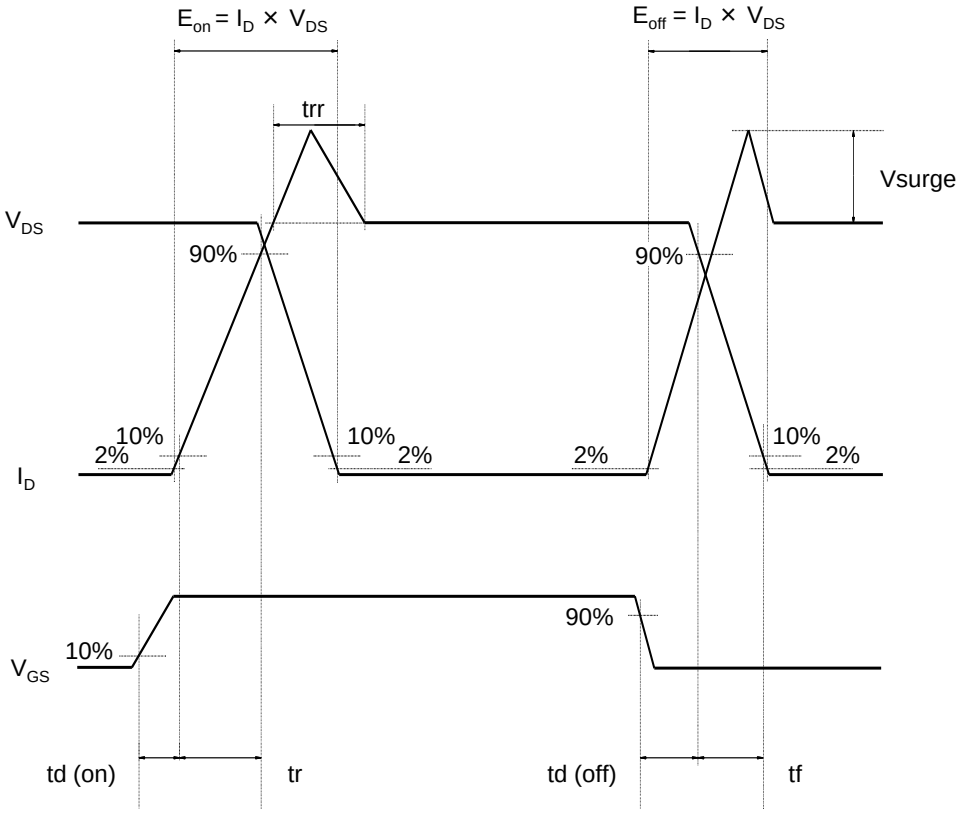
Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
On-state static Drain-Source Voltage	$V_{DS(on)}$	I_C=120A, V_{GS}=18V	Tj=25°C	-	2.1	3.2	V
			Tj=125°C	-	3.1	4.6	V
			Tj=150°C	-	3.4	5.2	V
Drain cutoff current	I_{DSS}	V_{DS}=1200V, V_{GS}=0V		-	-	2	mA
Source-drain voltage	V_{SD}	V_{GS}=0V, I_S=120A	Tj=25°C	-	1.7	2.1	V
			Tj=125°C	-	2.2	2.7	
			Tj=150°C	-	2.4	3.2	
		V_{GS}=18V, I_S=120A	Tj=25°C	-	1.3	-	
			Tj=125°C	-	1.7	-	
			Tj=150°C	-	1.8	-	
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS}=10V, I_D=22mA		1.6	2.3	4	V
Gate-source leak current	I_{GSS}	V_{GS}=22V, V_{DS}=0V		-	-	0.5	μA
		V_{GS}= –6V, V_{DS}=0V		–0.5	-	-	μA
Switching characteristics	td(on)	$V_{GS(on)}$=18V, $V_{GS(off)}$=0V		-	45	-	ns
	tr	V_{DS}=600V		-	50	-	ns
	trr	I_D=120A		-	30	-	ns
	td(off)	R_G=3.9Ω		-	170	-	ns
	tr	inductive load		-	60	-	ns
Input capacitance	Ciss	V_{DS}=10V, V_{GS}=0V, f=1MHz		-	14	-	nF
Gate resistor	R_{Gint}	Tj=25°C		-	1.8	-	Ω
Stray inductance	Ls			-	25	-	nH
Creepage distance	-	Terminal to heat sink		-	11.5	-	mm
		Terminal to terminal		-	19.0	-	mm
Clearance distance	-	Terminal to heat sink		-	9.5	-	mm
		Terminal to terminal		-	13.0	-	mm
Junction-to-case thermal resistance	Rth(j-c)	DMOS (1/2 module) *4		-	-	0.16	°C/W
		SBD (1/2 module) *4		-	-	0.21	
Case-to-heat sink Thermal resistance	Rth(c-f)	Case to heat sink, per 1 module, Thermal grease appied *5		-	0.035	-	°C/W

(*4) Measurement of Tc is to be done at the point just beneath the chip.
(*5) Typical value is measured by using thermally conductive grease of λ=0.9W / (m · K).

Example of acceptable V_{GS} waveform



●Waveform for switching test



●**Electrical characteristic curves** (Typical)

Fig.1 Typical Output Characteristics

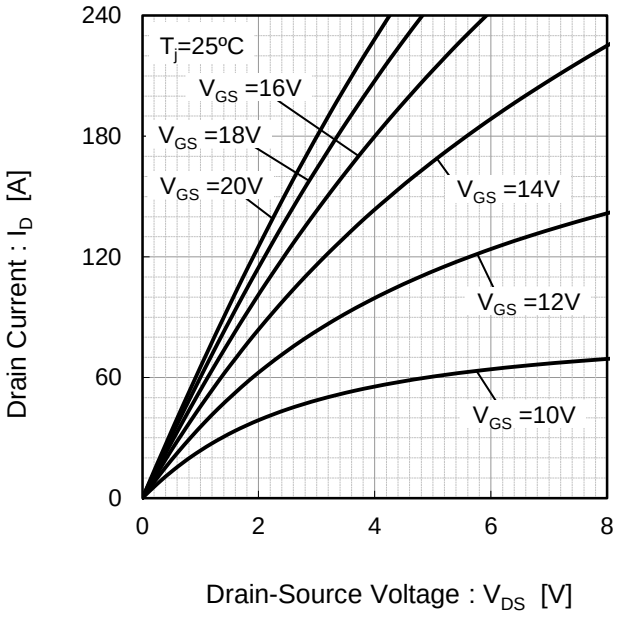


Fig.2 Drain-Source Voltage vs. Drain Current

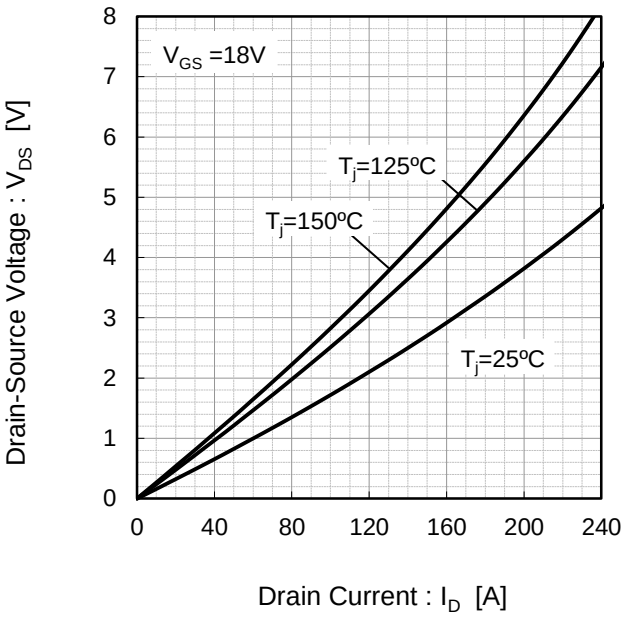


Fig.3 Drain-Source Voltage vs. Gate-Source Voltage

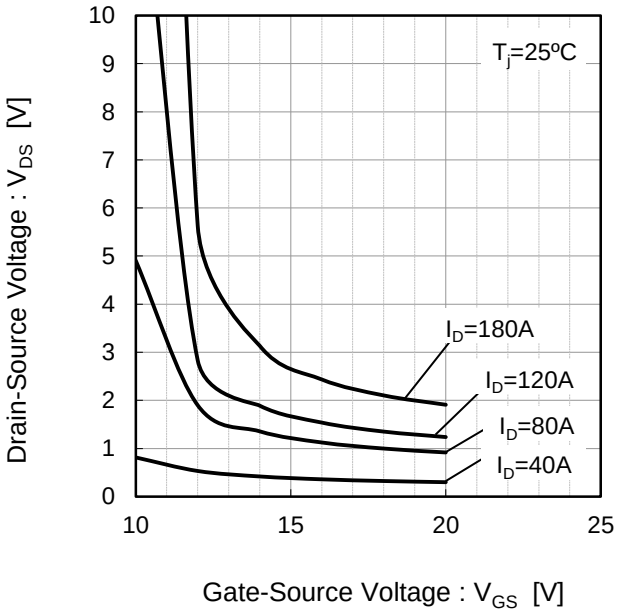
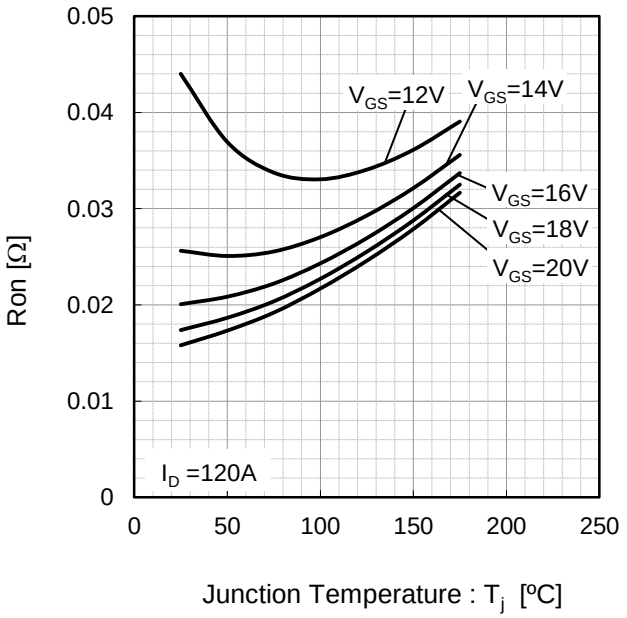


Fig.4 Ron vs Junction Temperature



●**Electrical characteristic curves** (Typical)

Fig.5 Forward characteristic of Diode

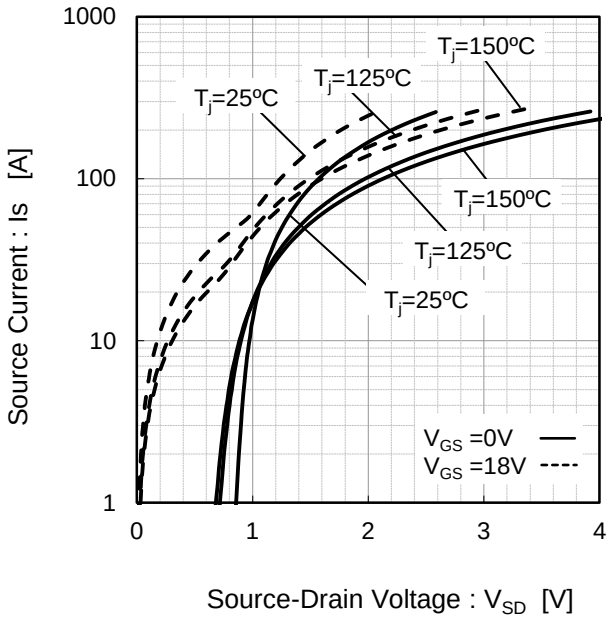


Fig.6 Forward characteristic of Diode

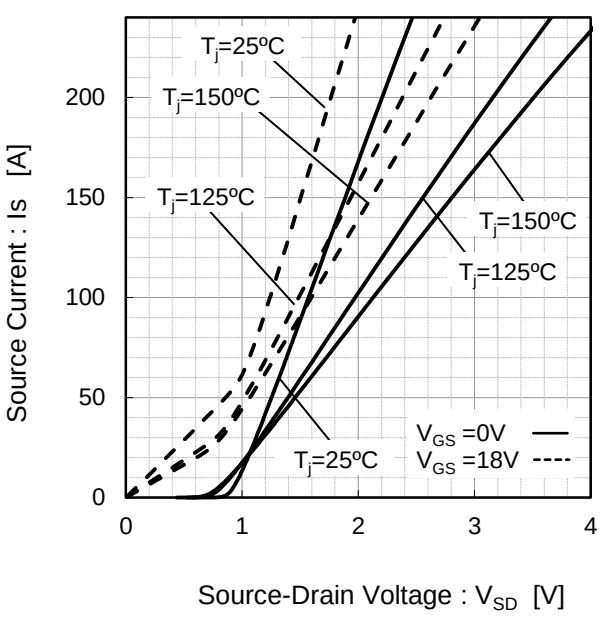


Fig.7 Drain Current vs. Gate-Source Voltage

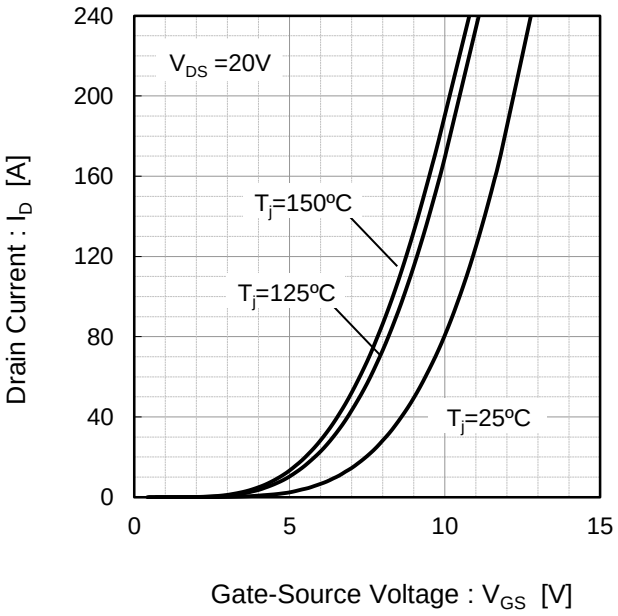
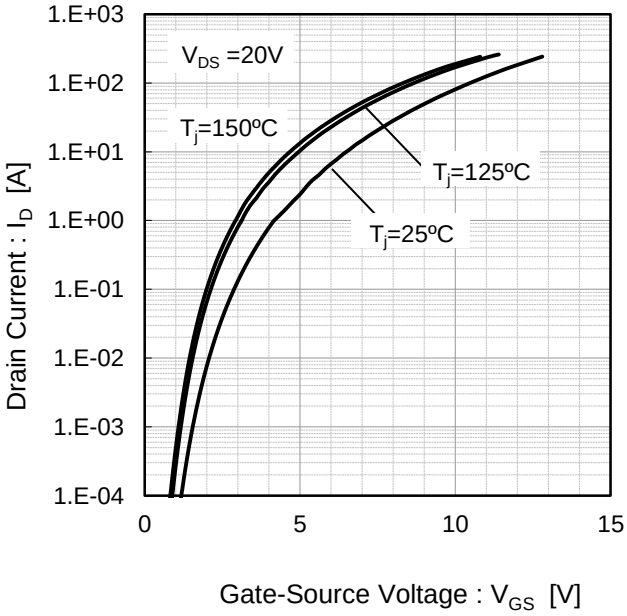


Fig.8 Drain Current vs. Gate-Source Voltage



●**Electrical characteristic curves** (Typical)

Fig.9 Switching Characteristics [T_j=25ºC]

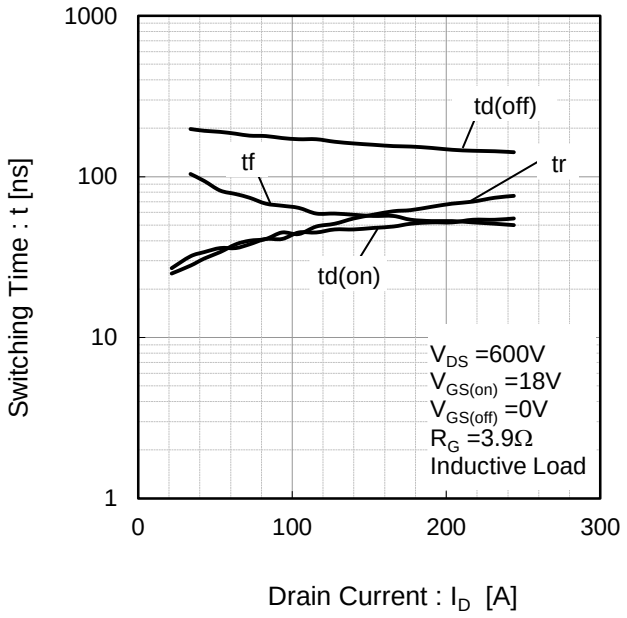


Fig.10 Switching Characteristics [T_j=125ºC]

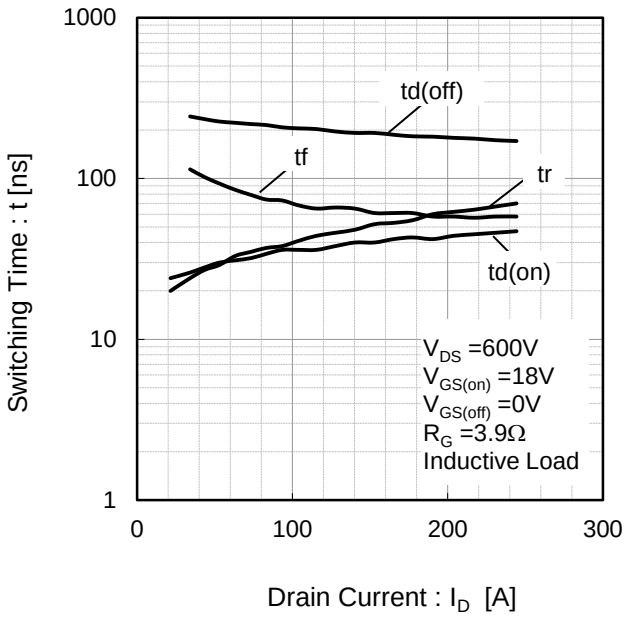


Fig.11 Switching Loss vs. Drain Current [T_j=25ºC]

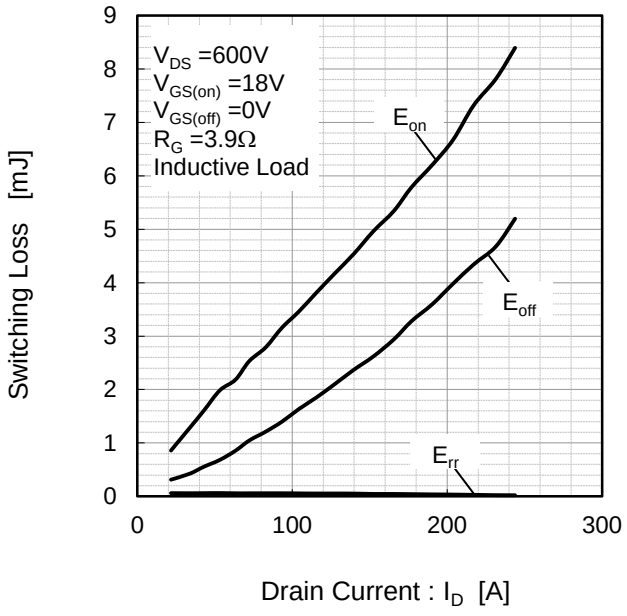
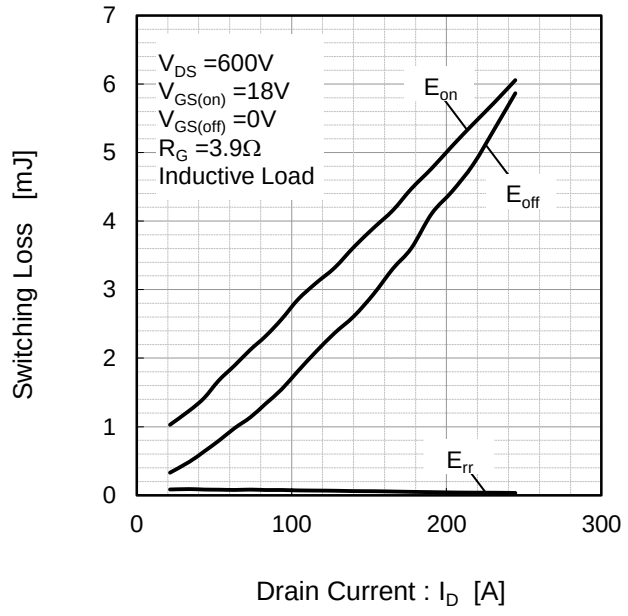


Fig.12 Switching Loss vs. Drain Current [T_j=125ºC]



●**Electrical characteristic curves** (Typical)

Fig.13 Recovery Characteristics vs. Drain Current [T_j=25ºC]

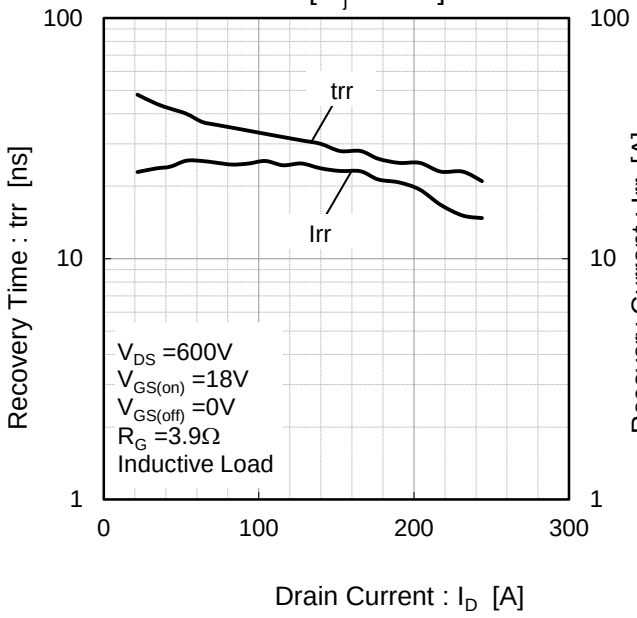


Fig.14 Recovery Characteristics vs. Drain Current [T_j=125ºC]

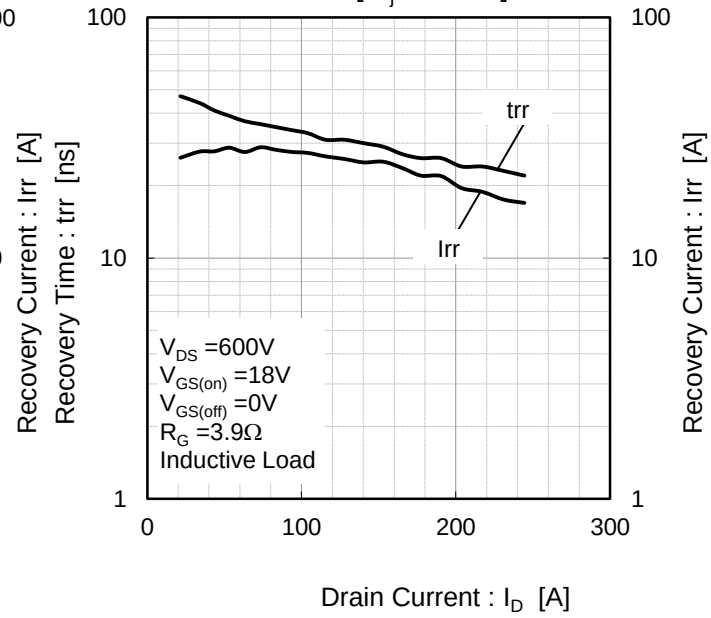


Fig.15 Switching Characteristics vs. Gate Resistance [T_j=25ºC]

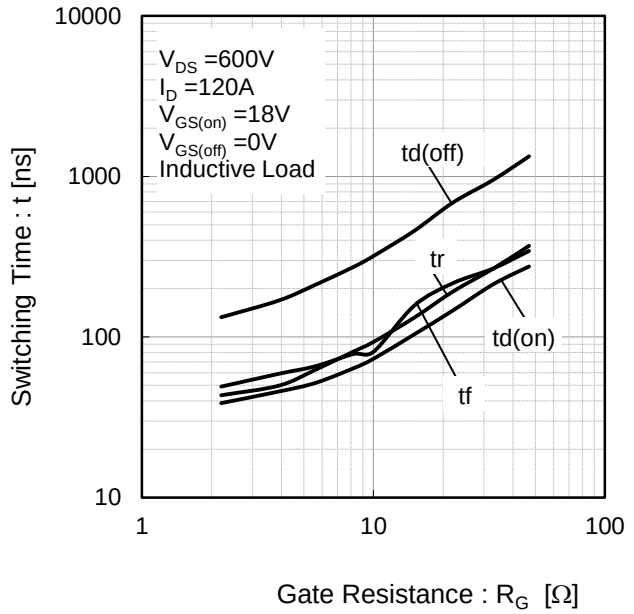
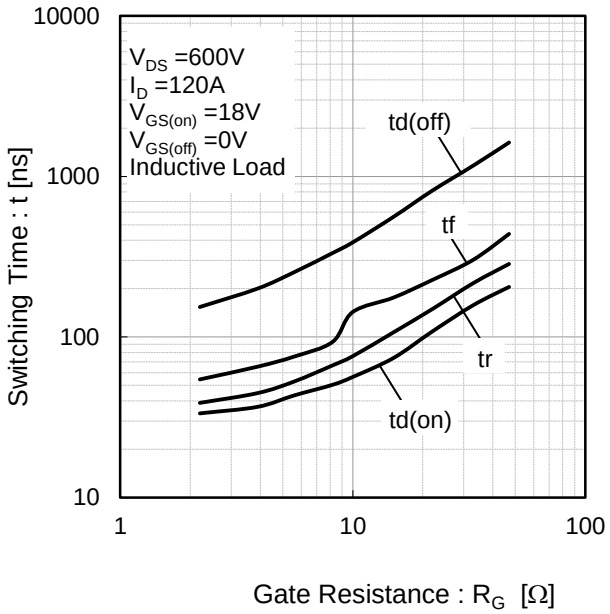


Fig.16 Switching Characteristics vs. Gate Resistance [T_j=125ºC]



●**Electrical characteristic curves** (Typical)

Fig.17 Switching Loss vs. Gate Resistance
[T_j=25ºC]

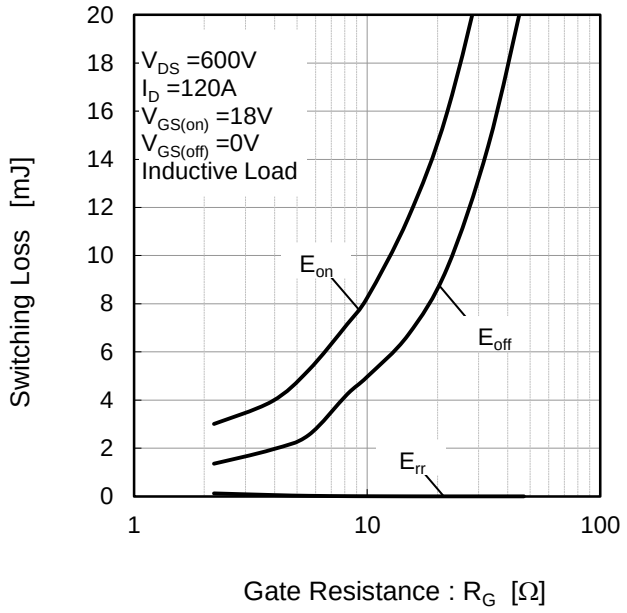


Fig.18 Switching Loss vs. Gate Resistance
[T_j=125ºC]

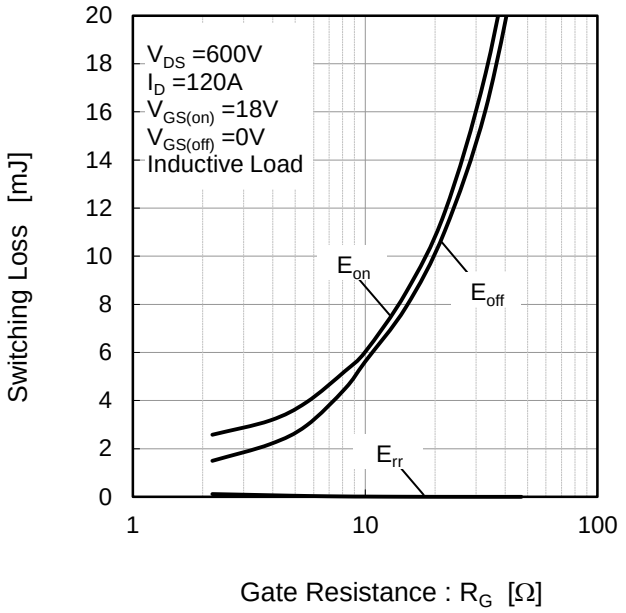


Fig.19 Typical Capacitance vs. Drain-Source Voltage

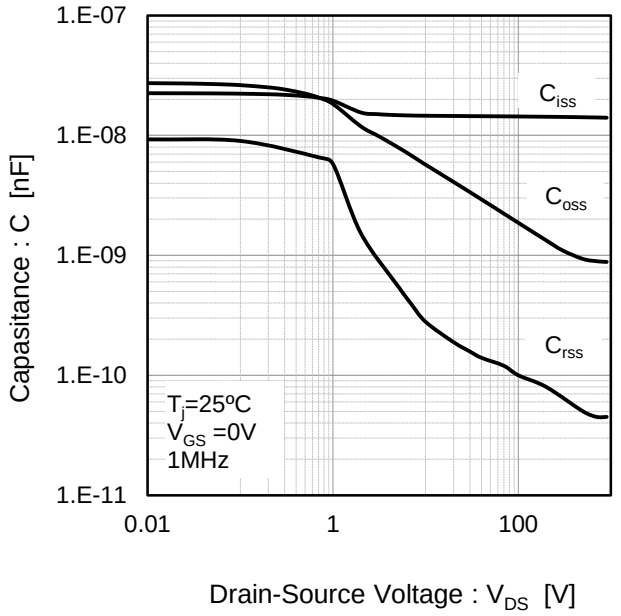
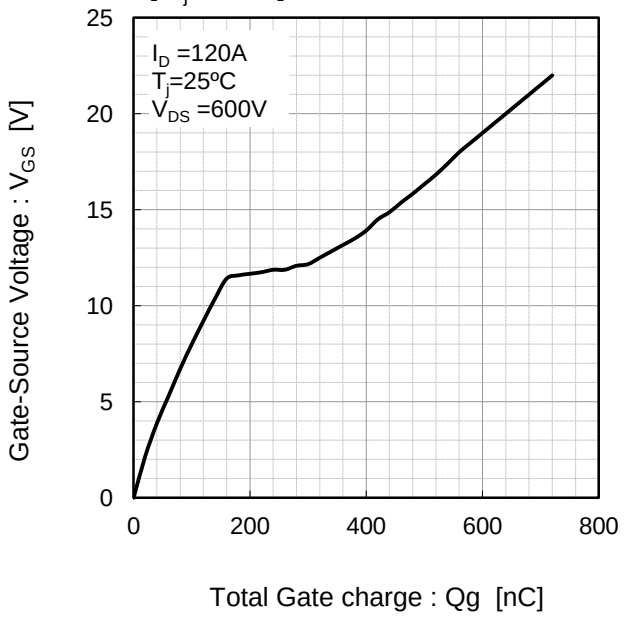
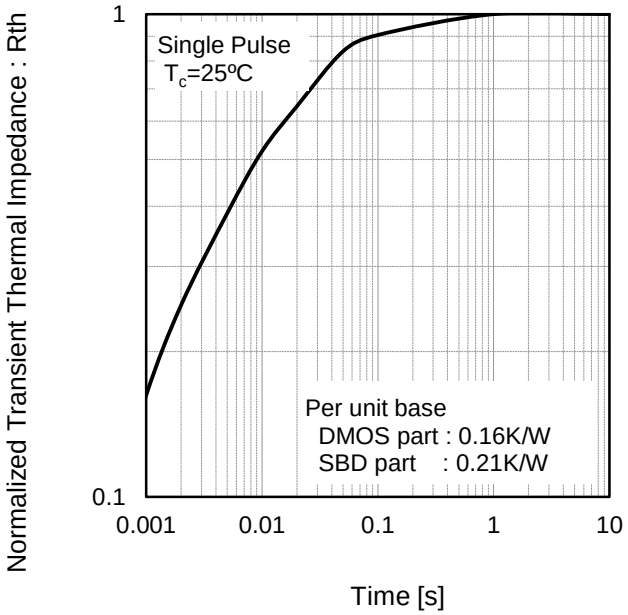


Fig.20 Gate Charge Characteristics
[T_j=25ºC]



●**Electrical characteristic curves** (Typical)

Fig.21 Normalized Transient Thermal Impedance



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