●Application

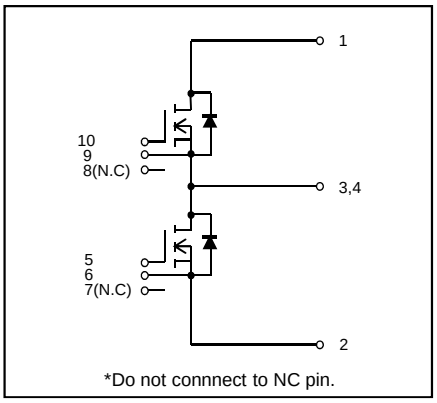
・Motor drive

・Inverter, Converter

・Photovoltaics, wind power generation.

・Induction heating equipment.

●Circuit diagram



●Features

1) Low surge, low switching loss.

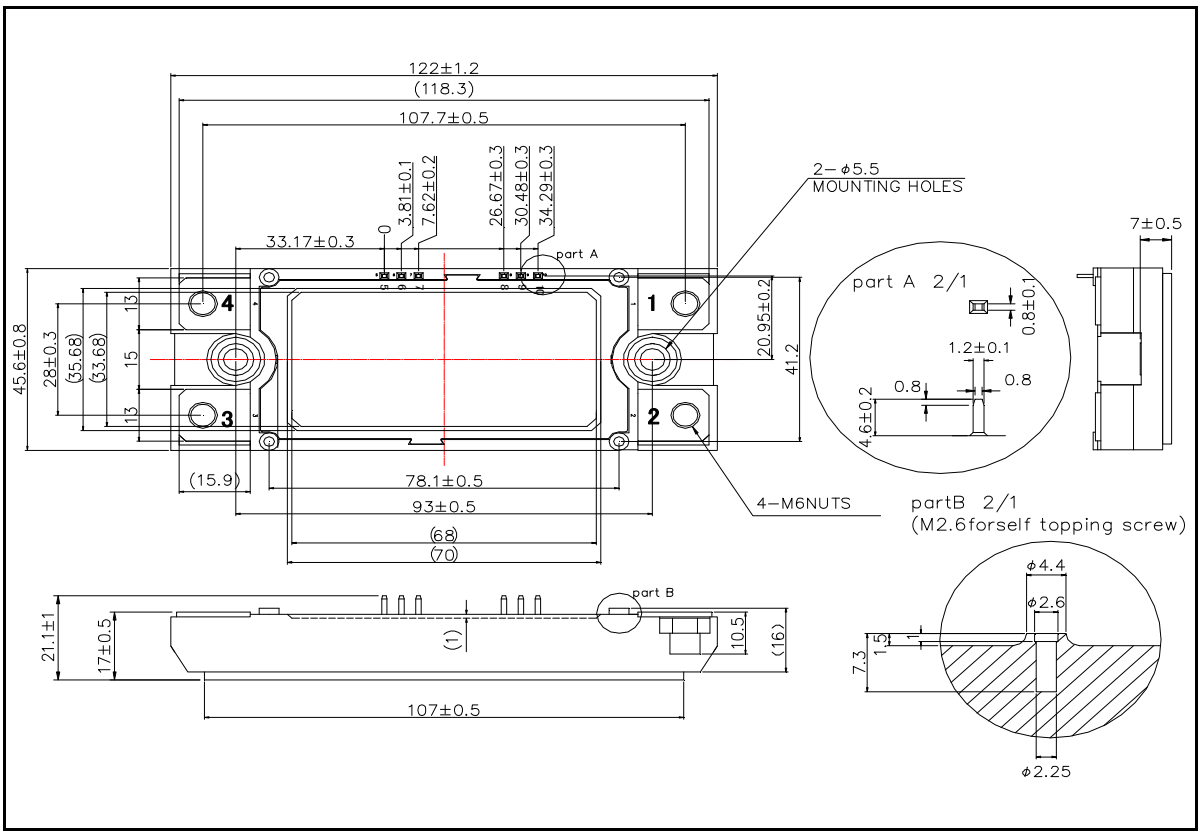
2) High-speed switching possible.

3) Reduced temperature dependence.

●Construction

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

●Dimensions & Pin layout (Unit : mm)



●**Absolute maximum ratings** (Tj = 25°C)

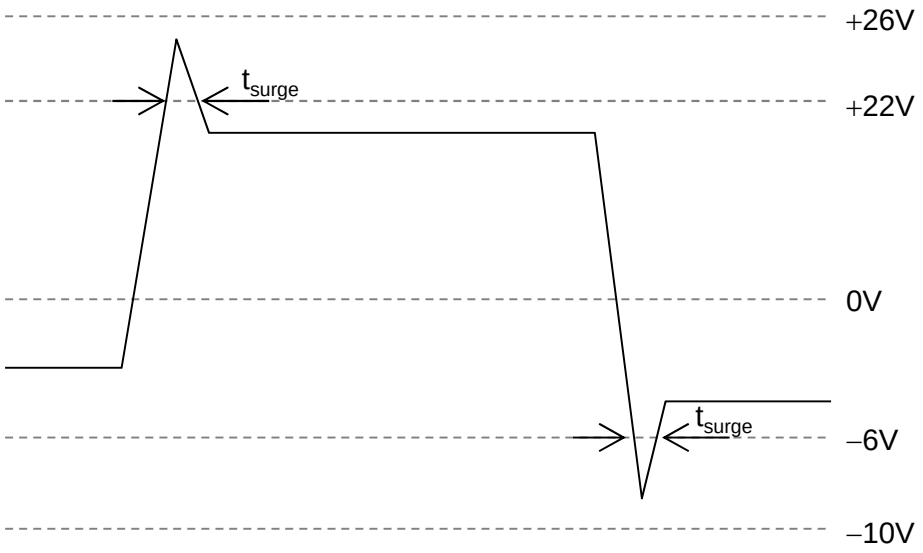
Parameter	Symbol	Conditions	Limit	Unit
Drain-source voltage	V_{DSS}	G-S short	1200	V
Gate-source voltage(+)	V_{GSS}	D-S short	22	V
Gate-source voltage(–)		D-S short	–6	V
G - S Voltage (tsurge<300ns)	$V_{GSSsurge}$	D-S short	–10 to +26	°C
Drain current *1	I_D	DC(Tc=60°C)	204	A
	I_{DRM}	Pulse (Tc=60°C) 1ms *2	360	A
Source current *1	I_S	Tc=60°C V_{GS}=18V	204	A
	I_{SRM}	Pulse (Tc=60°C) 1ms V_{GS}=18V *2	360	A
		Pulse (Tc=60°C) 10μs V_{GS}=0V *2	360	A
Total power disspation *3	Ptot	Tc=25°C	1360	W
Max Junction Temperature	Tjmax		175	°C
Junction Temperature	Tjop		–40 to 150	°C
Storage temperature	Tstg		–40 to 125	°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 (T_c) 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 $T_{jmax.}$

(*3) T_j is less than 175°C

Example of acceptable V_{GS} waveform



●Electrical characteristics (Tj=25°C)

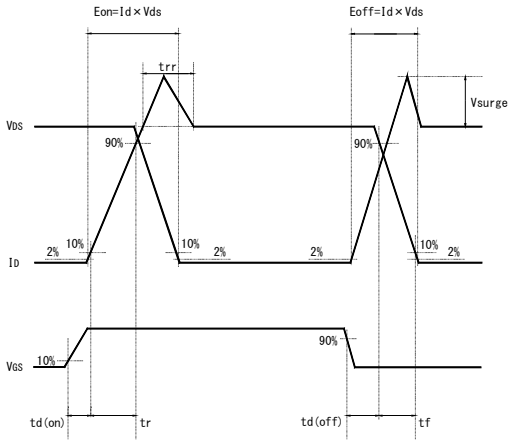
Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Static drain-source on-state voltage	$V_{DS(on)}$	I_D=180A, V_{GS}=18V	Tj=25°C	-	2.3	3.2	V
			Tj=125°C	-	3.3	4.4	
			Tj=150°C	-	3.6	5	
Drain cutoff current	I_{DSS}	V_{DS}=1200V, V_{GS}=0V		-	-	10	μA
Source-drain voltage	V_{SD}	V_{GS}=0V, I_S=180A	Tj=25°C	-	5.4	-	V
			Tj=125°C	-	5.1	-	
			Tj=150°C	-	4.8	-	
		V_{GS}=18V, I_S=180A	Tj=25°C	-	2.3	-	
			Tj=125°C	-	3.3	-	
			Tj=150°C	-	3.5	-	
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS}=10V, I_D=35.2mA		1.6	2.7	4	V
Gate-source leakage current	I_{GSS}	V_{GS}=22V, V_{DS}=0V		-	-	0.5	μA
		V_{GS}= −6V, V_{DS}=0V		−0.5	-	-	
Switching characteristics	td(on)	$V_{GS(on)}$=18V, $V_{GS(off)}$=0V V_{DS}=600V I_D=180A R_G=5.6Ω inductive load		-	80	-	ns
	tr			-	90	-	
	trr			-	50	-	
	td(off)			-	300	-	
	tf			-	90	-	
Input capacitance	Ciss	V_{DS}=10V, V_{GS}=0V, f=1MHz		-	23	-	nF
Internal gate resistor	R_{Gint}	Tj=25°C		-	1.15	-	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		-	-	0.11	°C/W
Case-to-heat sink Thermal resistance	Rth(c-f)	Case to heat sink, per 1 module, Thermal grease applied *5		-	0.035	-	

(*4) Measurement of Tc is to be done at the point just under the chip.

(*5) Typical value is measured by using thermally conductive grease of λ=0.9W/(m・K).

(*6) If the Product is used beyond absolute maximum ratings defined in the Specifications, as its internal structure may be dameged, please replace such Product with a new one.

＜Wavelength for Switching Test＞



●Electrical characteristic curves (Typical)

Fig.1 Typical Output Characteristics

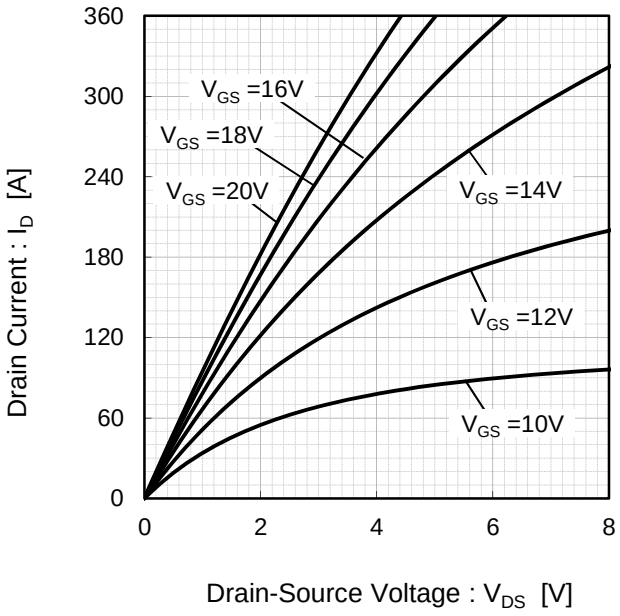


Fig.2 Drain-Source Voltage vs. Drain Current

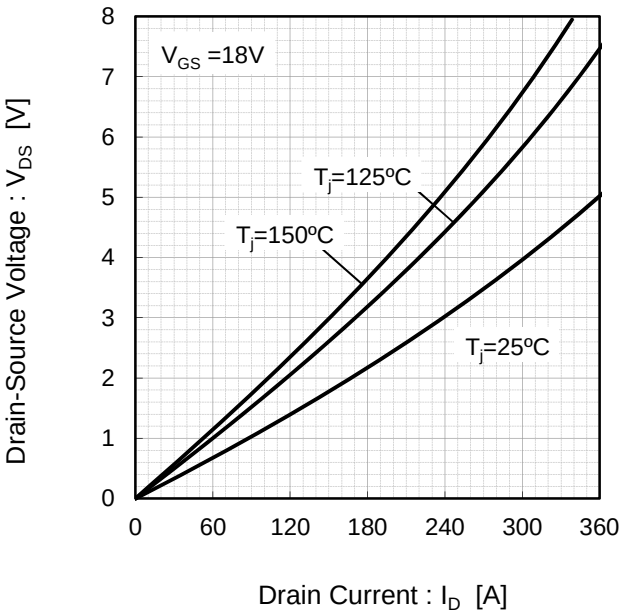


Fig.3 Drain-Source Voltage vs. Gate-Source Voltage

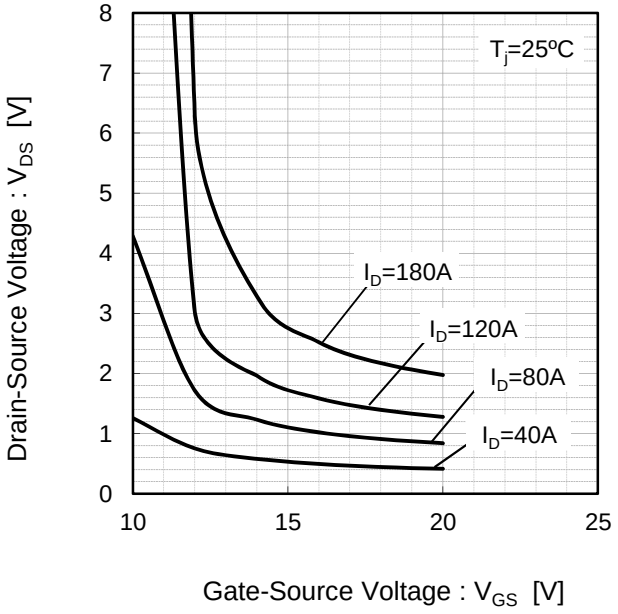
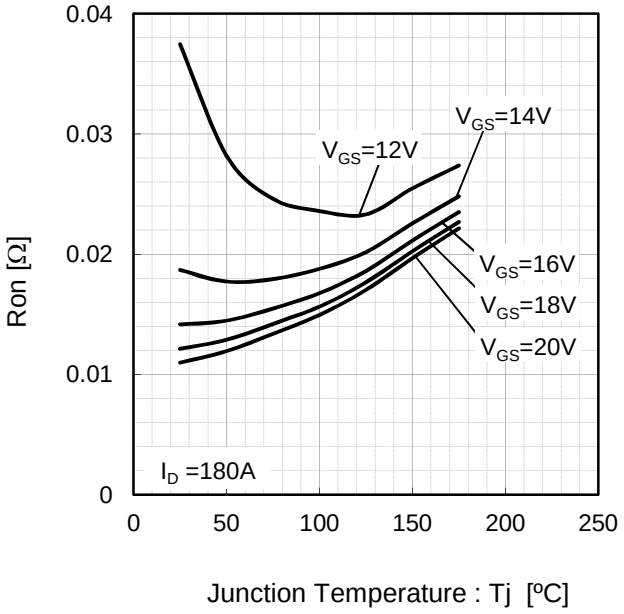


Fig.4 Ron vs Junction Temperature



●Electrical characteristic curves (Typical)

Fig.5 Forward characterstic of Diode

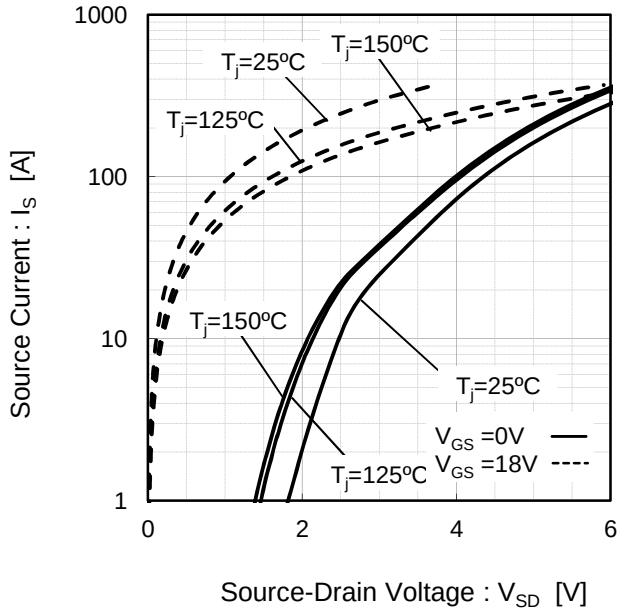


Fig.6 Forward characteristic of Diode

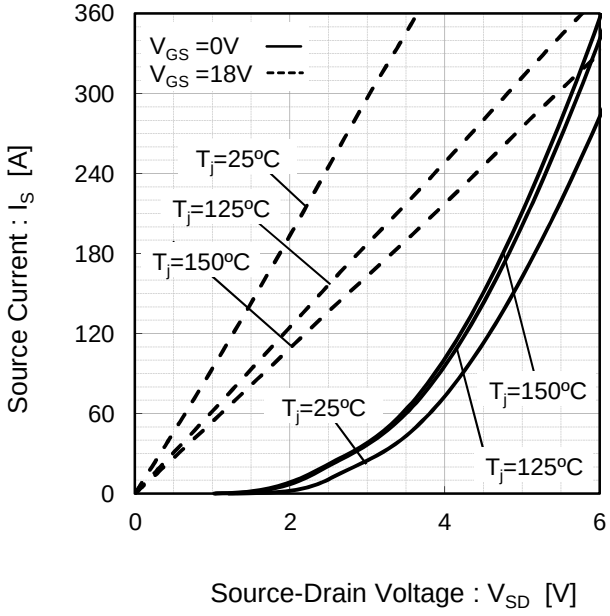


Fig.7 Drain Current vs. Gate-Source Voltage

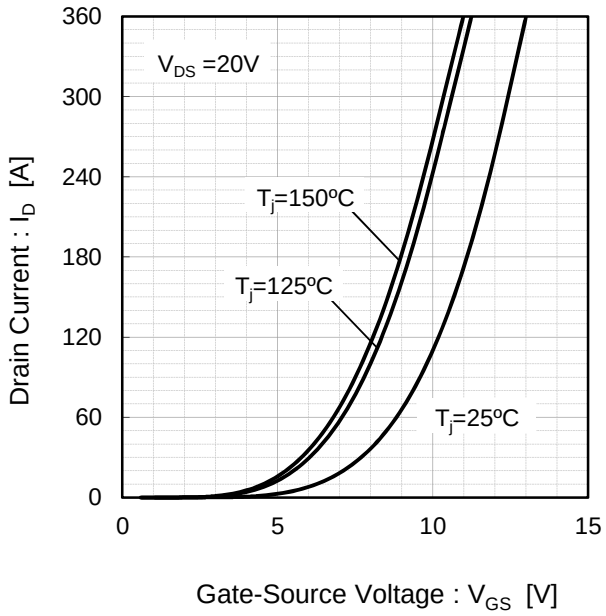
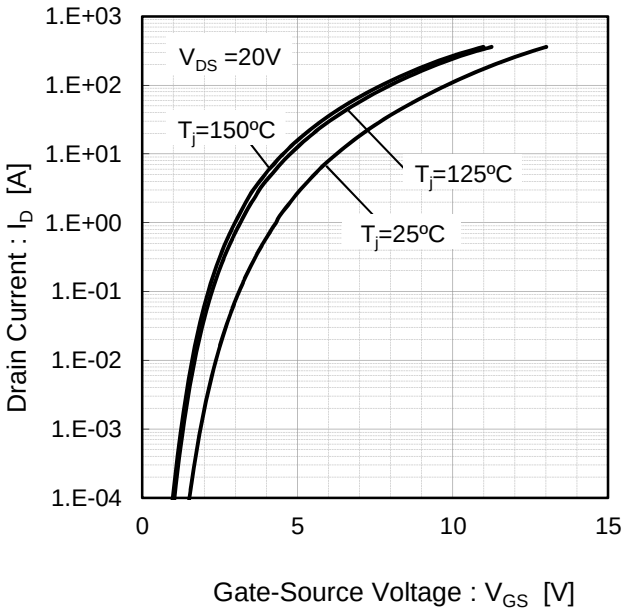


Fig.8 Drain Current vs. Gate-Source Voltage



●Electrical characteristic curves (Typical)

Fig.9 Switching Characteristics [Tj=25ºC]

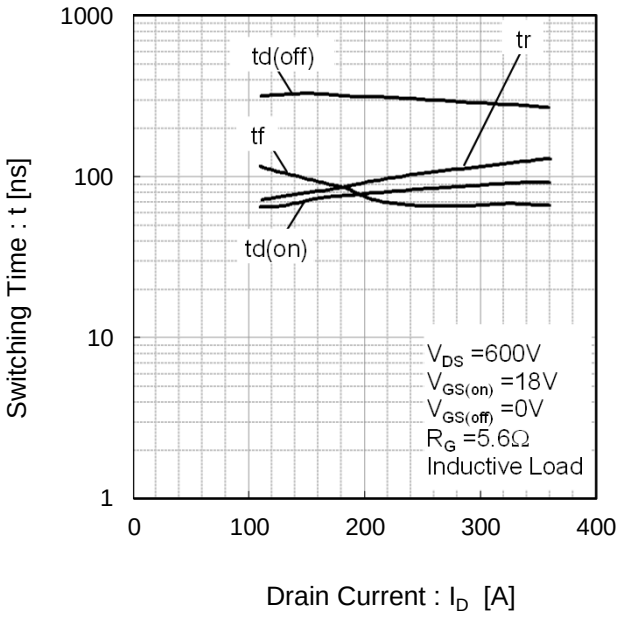


Fig.10 Switching Characteristics [Tj=125ºC]

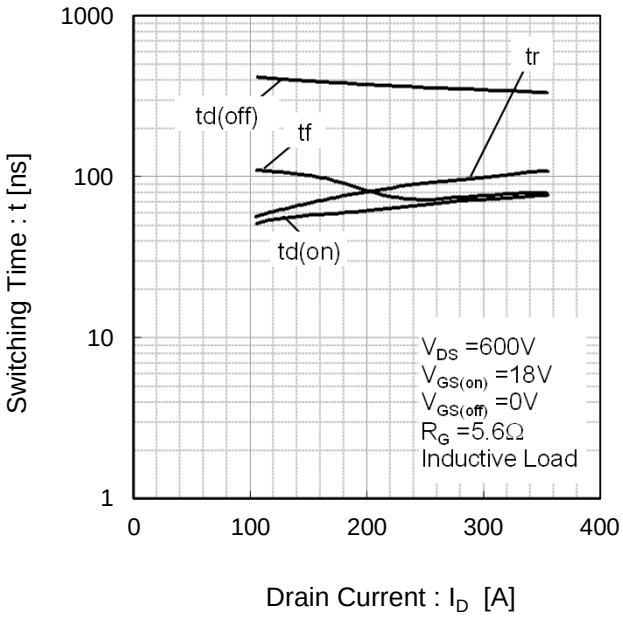


Fig.11 Switching Loss vs. Drain Current [Tj=25ºC]

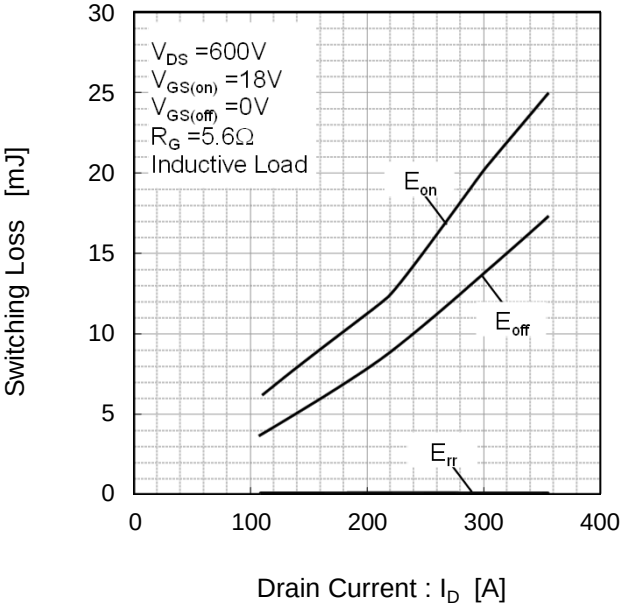
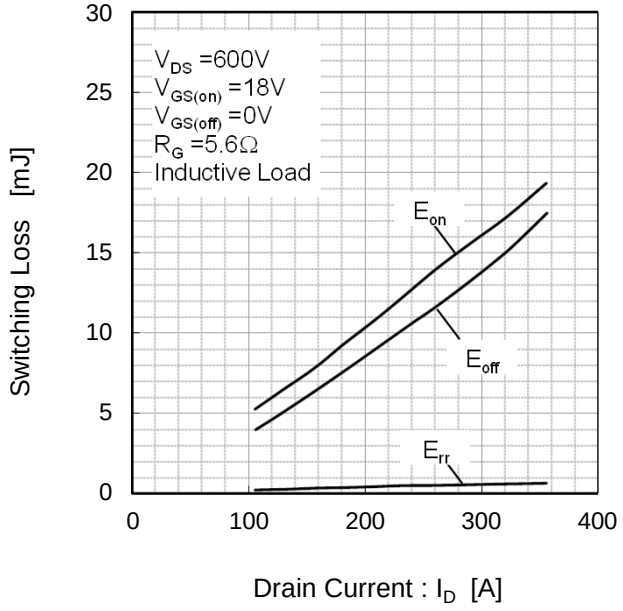


Fig.12 Switching Loss vs. Drain Current [Tj=125ºC]



●Electrical characteristic curves (Typical)

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

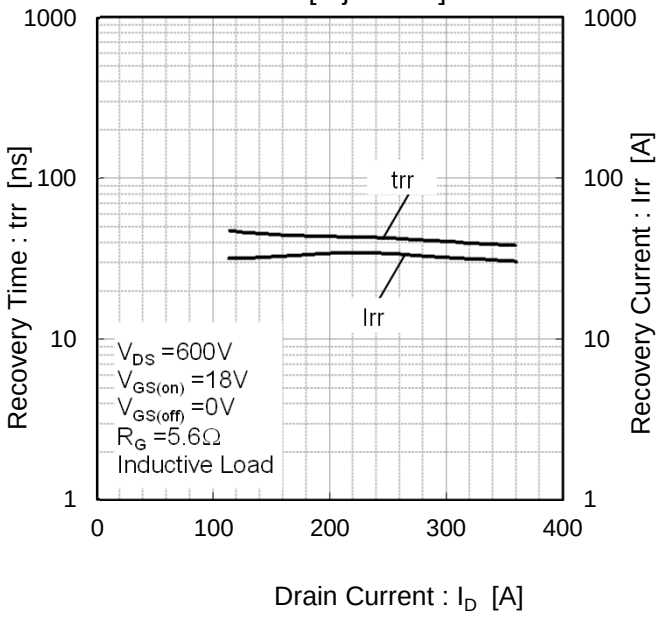


Fig.142 Recovery Characteristics vs. Drain Current [Tj=125ºC]

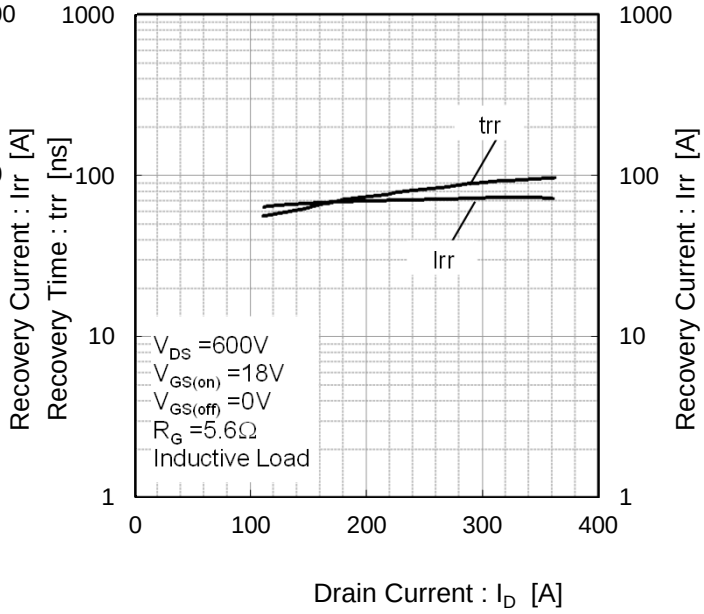


Fig.15 Switching Characteristics vs. Gate Resistance [Tj=25ºC]

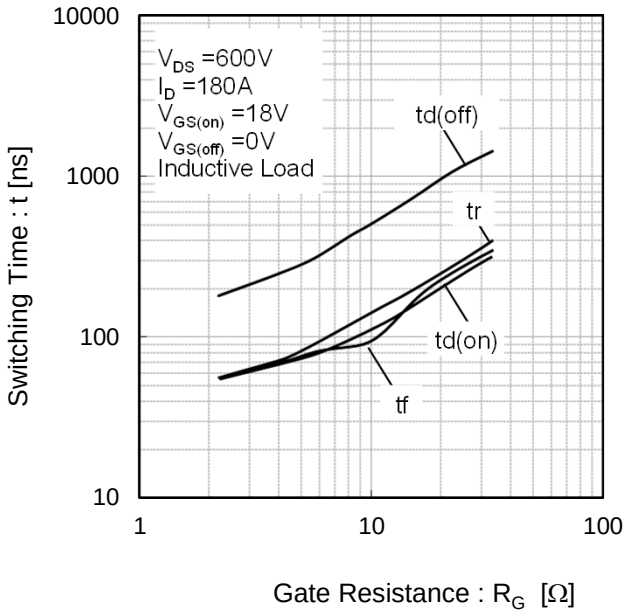
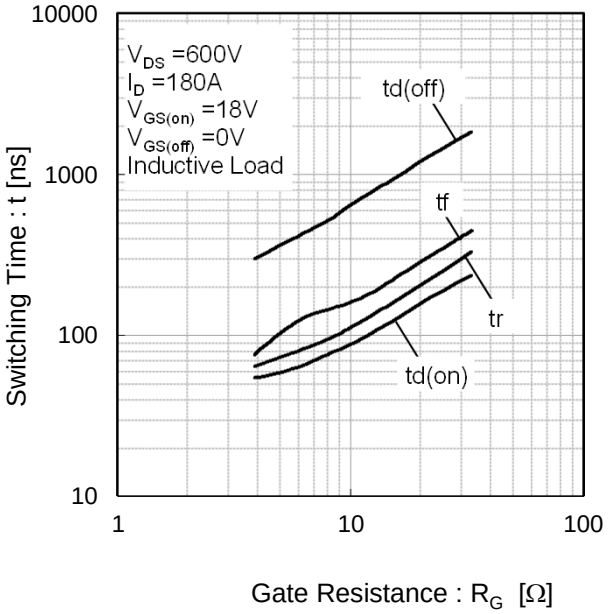


Fig.16 Switching Characteristics vs. Gate Resistance [Tj=125ºC]



●Electrical characteristic curves (Typical)

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

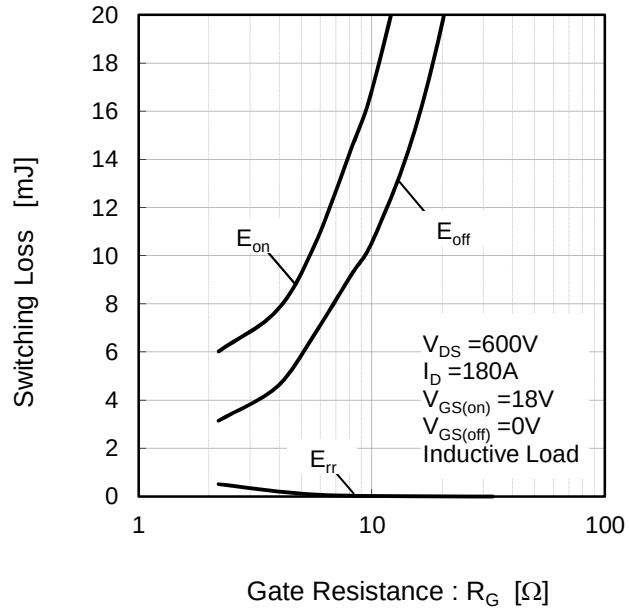


Fig.18 Switching Loss vs. Gate Resistance
[Tj=125ºC]

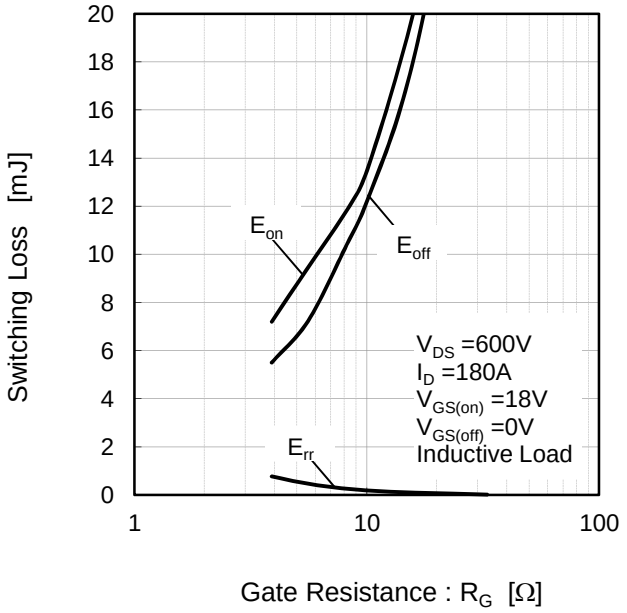


Fig.19 Typical Capacitance vs. Drain-Source Voltage

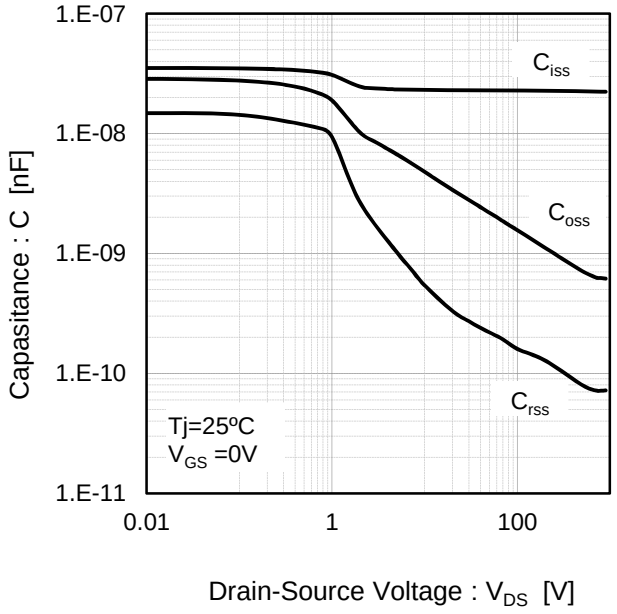
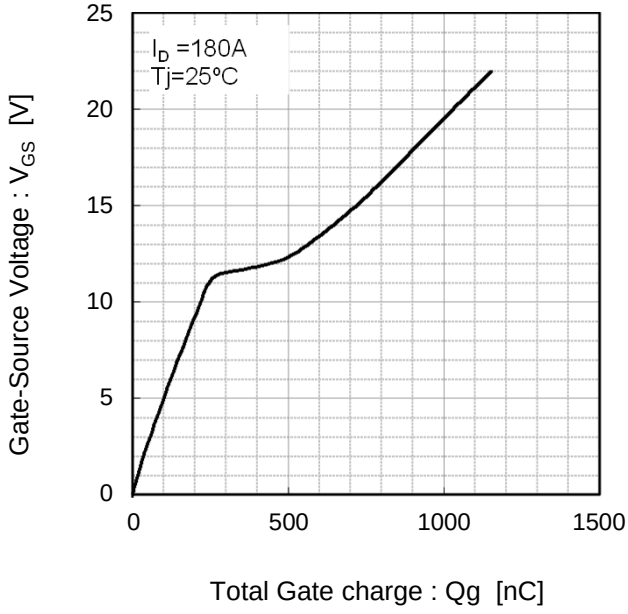
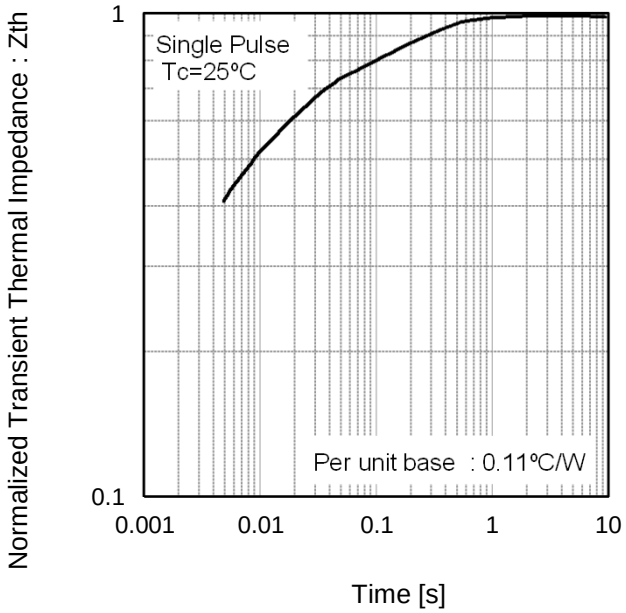


Fig.20 Gate Charge Characteristics
[Tj=25ºC]



●Electrical characteristic curves (Typical)

Fig.21 Normalized Transient Thermal Impedance



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