

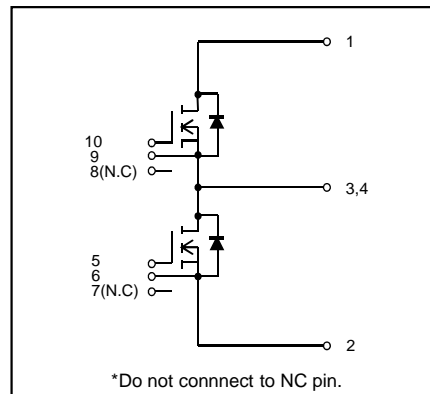
### ●Application

- Motor drive
- Inverter, Converter
- Photovoltaics, wind power generation.
- Induction heating equipment.

### ●Features

- 1) Low surge, low switching loss.
- 2) High-speed switching possible.
- 3) Reduced temperature dependence.

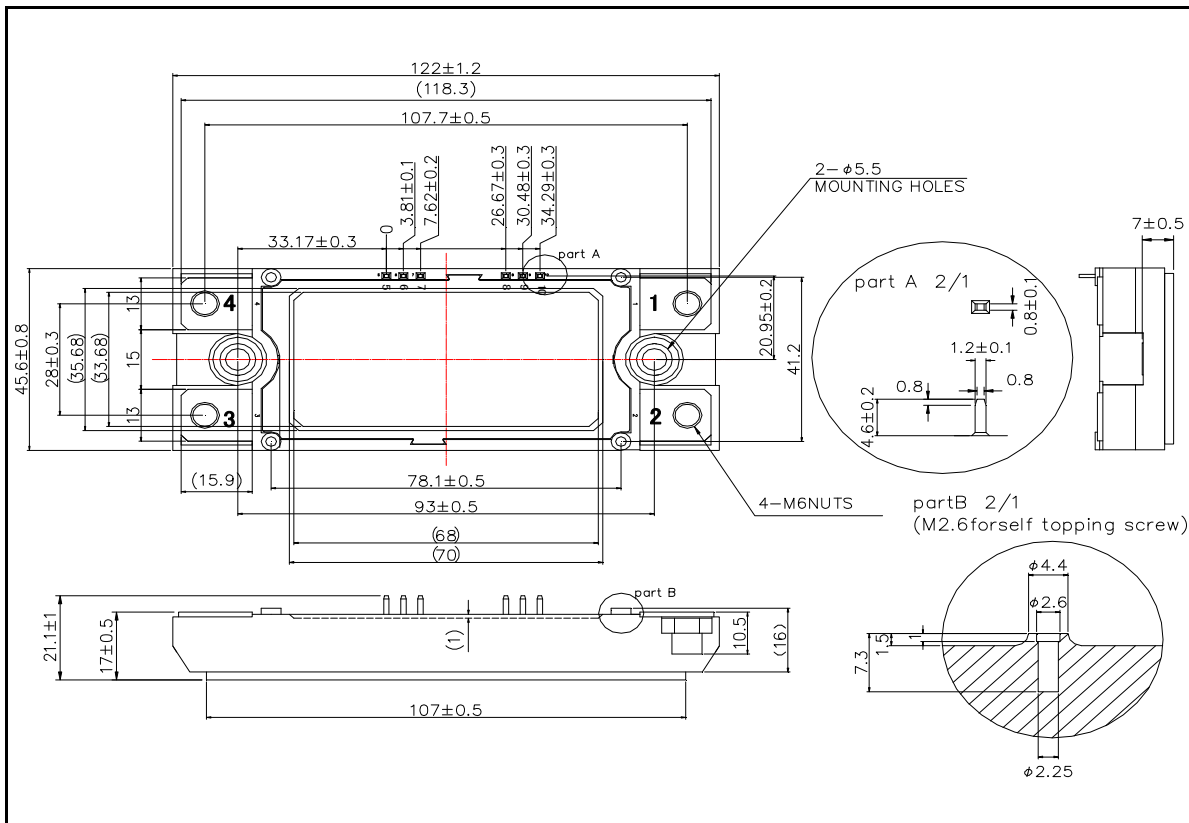
### ●Circuit diagram



### ●Construction

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

### ●Dimensions & Pin layout (Unit : mm)



●Absolute maximum ratings (T<sub>j</sub> = 25°C)

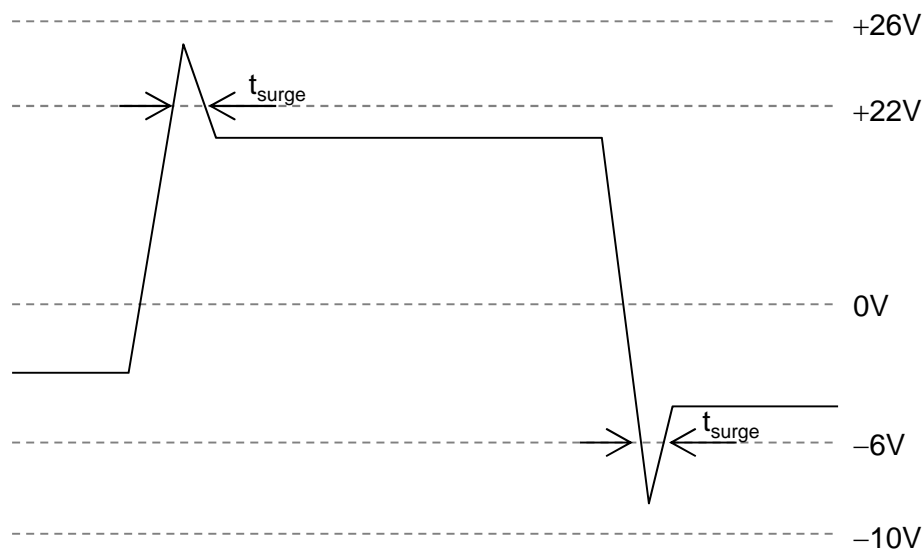
Parameter	Symbol	Conditions	Limit	Unit
Drain-source voltage	V <sub>DSS</sub>	G-S short	1200	V
Gate-source voltage(+)	V <sub>GSS</sub>	D-S short	22	V
Gate-source voltage(-)		D-S short	-6	V
G - S Voltage (tsurge<300ns)	V <sub>GSSsurge</sub>	D-S short	-10 to +26	°C
Drain current *1	I <sub>D</sub>	DC(Tc=60°C)	204	A
	I <sub>DRM</sub>	Pulse (Tc=60°C) 1ms *2	360	A
Source current *1	I <sub>S</sub>	Tc=60°C V <sub>GS</sub> =18V	204	A
		Pulse (Tc=60°C) 1ms V <sub>GS</sub> =18V *2	360	A
	I <sub>SRM</sub>	Pulse (Tc=60°C) 10μs V <sub>GS</sub> =0V *2	360	A
Total power dissipation *3	P <sub>tot</sub>	Tc=25°C	1360	W
Max Junction Temperature	T <sub>jmax</sub>		175	°C
Junction Temperature	T <sub>jop</sub>		-40 to 150	°C
Storage temperature	T <sub>stg</sub>		-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 sink : M5 screw	3.5	N · m

(\*1) Case temperature (T<sub>c</sub>) 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<sub>jmax</sub>.

(\*3) T<sub>j</sub> is less than 175°C

Example of acceptable V<sub>GS</sub> waveform



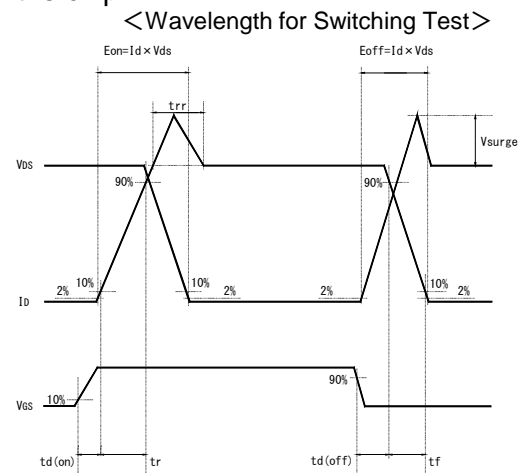
### ●Electrical characteristics (T<sub>j</sub>=25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Static drain-source on-state voltage	V <sub>DS(on)</sub>	I <sub>D</sub> =180A, V <sub>GS</sub> =18V	T <sub>j</sub> =25°C	-	2.3	3.2	V
			T <sub>j</sub> =125°C	-	3.3	4.4	
			T <sub>j</sub> =150°C	-	3.6	5	
Drain cutoff current	I <sub>DSS</sub>	V <sub>DS</sub> =1200V, V <sub>GS</sub> =0V	-	-	10	μA	
Source-drain voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =180A	T <sub>j</sub> =25°C	-	5.4	-	V
			T <sub>j</sub> =125°C	-	5.1	-	
			T <sub>j</sub> =150°C	-	4.8	-	
		V <sub>GS</sub> =18V, I <sub>S</sub> =180A	T <sub>j</sub> =25°C	-	2.3	-	
			T <sub>j</sub> =125°C	-	3.3	-	
			T <sub>j</sub> =150°C	-	3.5	-	
Gate-source threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =35.2mA	1.6	2.7	4	V	
Gate-source leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =22V, V <sub>DS</sub> =0V	-	-	0.5	μA	
		V <sub>GS</sub> =-6V, V <sub>DS</sub> =0V	-0.5	-	-		
Switching characteristics	td(on)	V <sub>GS(on)</sub> =18V, V <sub>GS(off)</sub> =0V	-	80	-	ns	
	tr	V <sub>DS</sub> =600V	-	90	-		
	trr	I <sub>D</sub> =180A	-	50	-		
	td(off)	R <sub>G</sub> =5.6Ω	-	300	-		
	tf	inductive load	-	90	-		
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz	-	23	-	nF	
Internal gate resistor	R <sub>Gint</sub>	T <sub>j</sub> =25°C	-	1.15	-	Ω	
Stray Inductance	L <sub>s</sub>		-	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	R <sub>th(j-c)</sub>	DMOS (1/2 module) *4	-	-	0.11	°C/W	
Case-to-heat sink Thermal resistance	R <sub>th(c-f)</sub>	Case to heat sink, per 1 module, Thermal grease applied *5	-	0.035	-		

(\*4) Measurement of T<sub>c</sub> 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 damaged, please replace such Product with a new one.



●Electrical characteristic curves (Typical)

Fig.1 Typical Output Characteristics

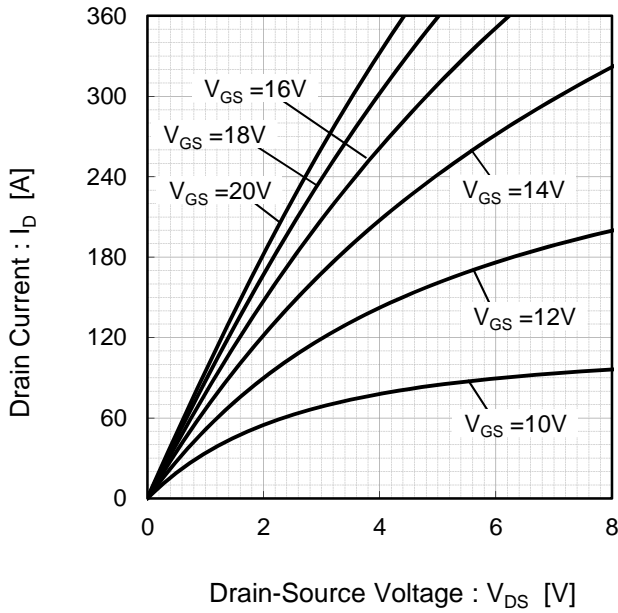


Fig.2 Drain-Source Voltage vs. Drain Current

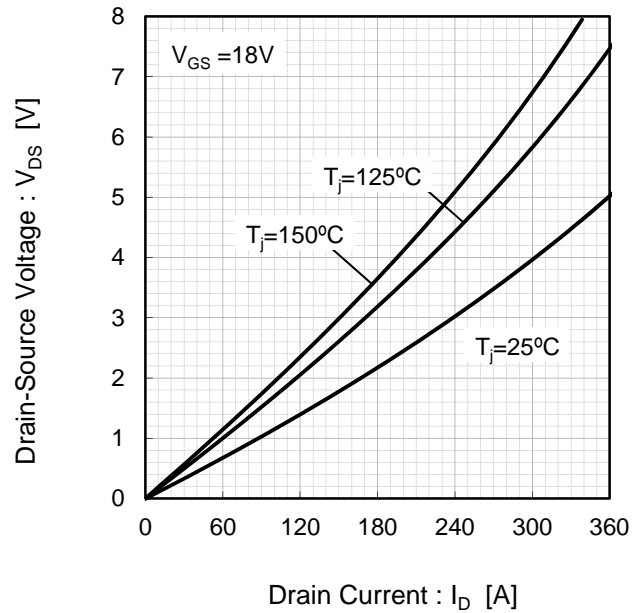


Fig.3 Drain-Source Voltage vs. Gate-Source Voltage

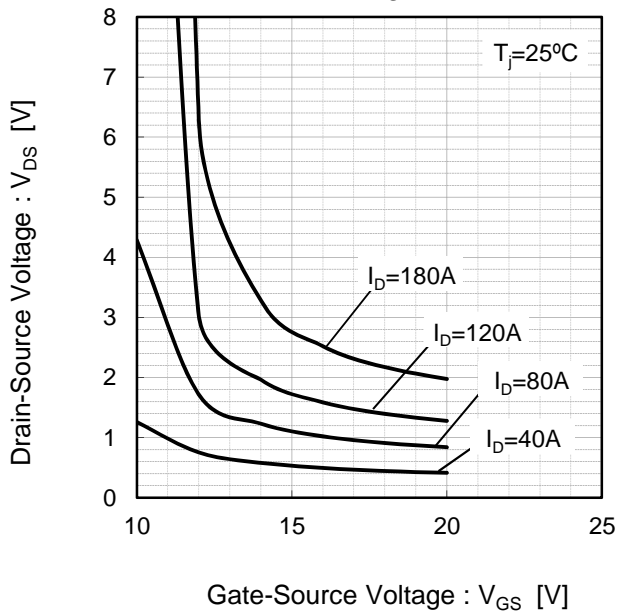
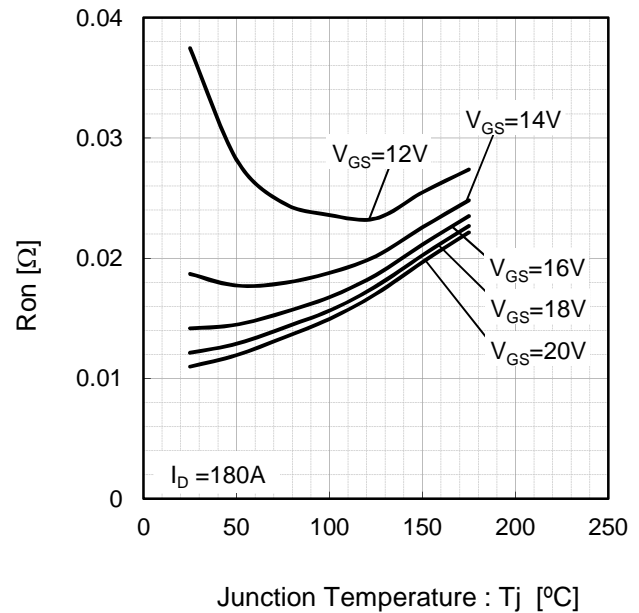


Fig.4 Ron vs Junction Temperature



●Electrical characteristic curves (Typical)

Fig.5 Forward characteristic of Diode

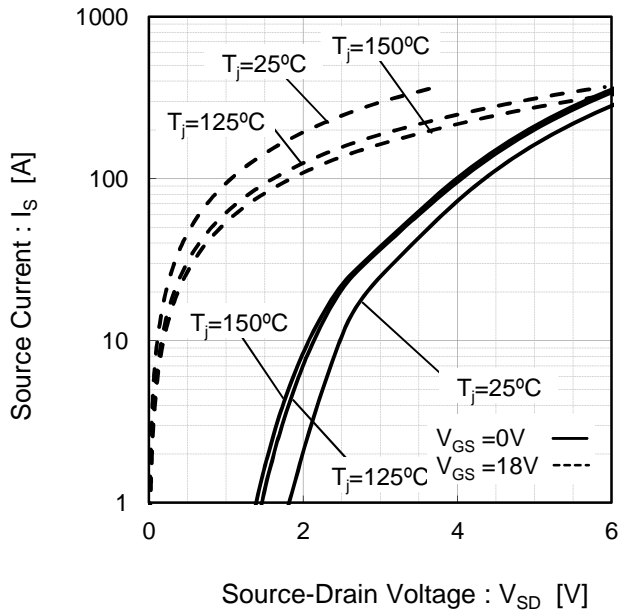


Fig.6 Forward characteristic of Diode

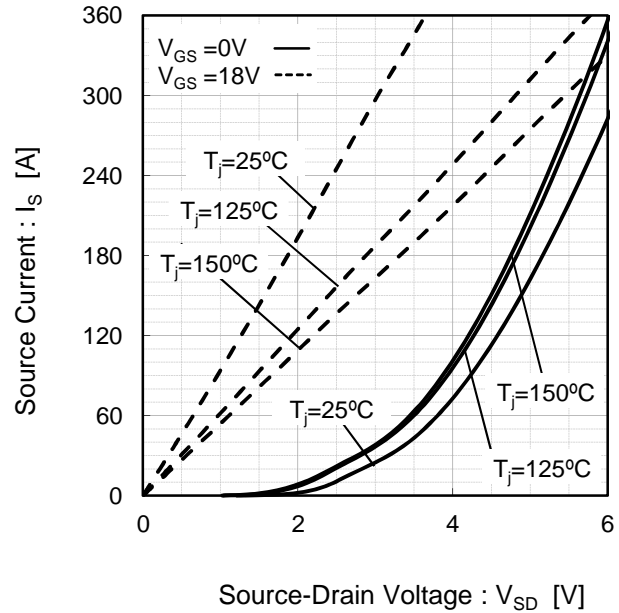


Fig.7 Drain Current vs. Gate-Source Voltage

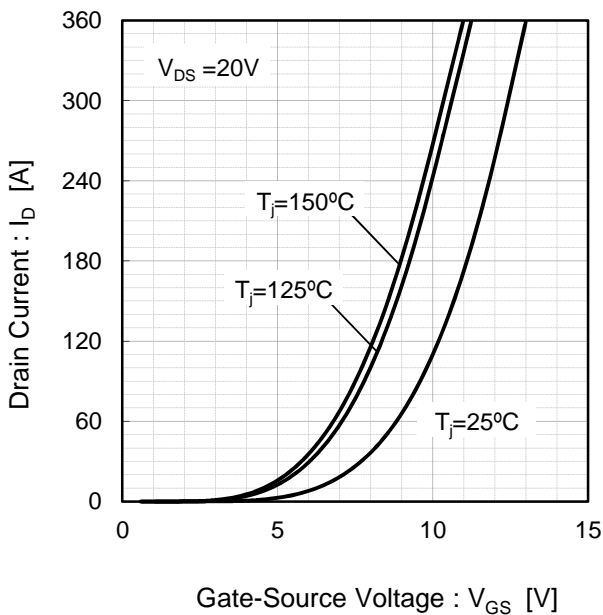
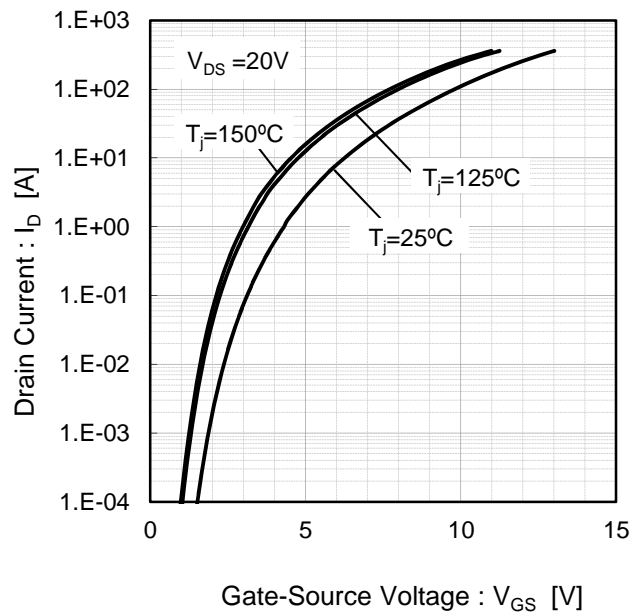


Fig.8 Drain Current vs. Gate-Source Voltage



●Electrical characteristic curves (Typical)

Fig.9 Switching Characteristics [  $T_j=25^\circ\text{C}$  ]

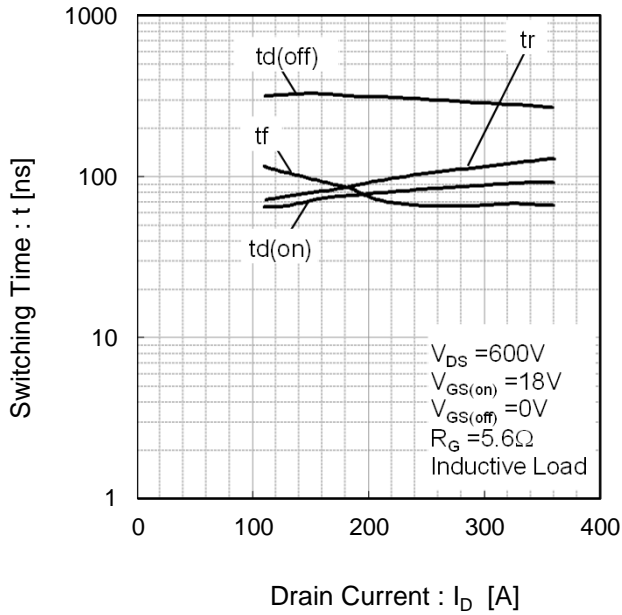


Fig.10 Switching Characteristics [  $T_j=125^\circ\text{C}$  ]

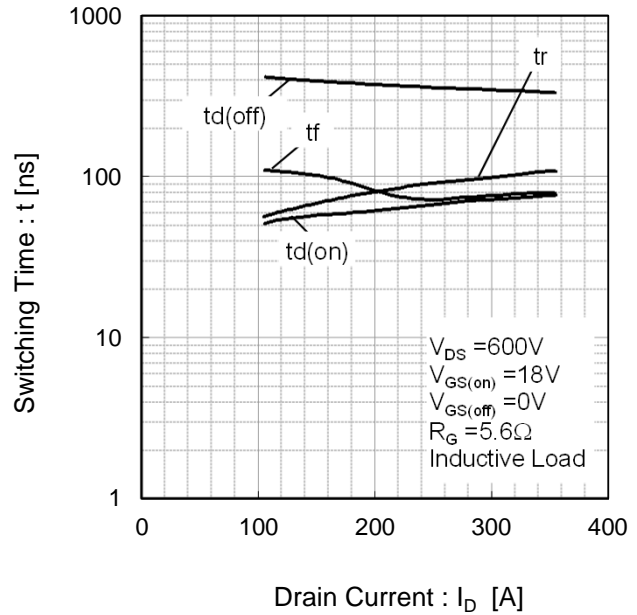


Fig.11 Switching Loss vs. Drain Current [  $T_j=25^\circ\text{C}$  ]

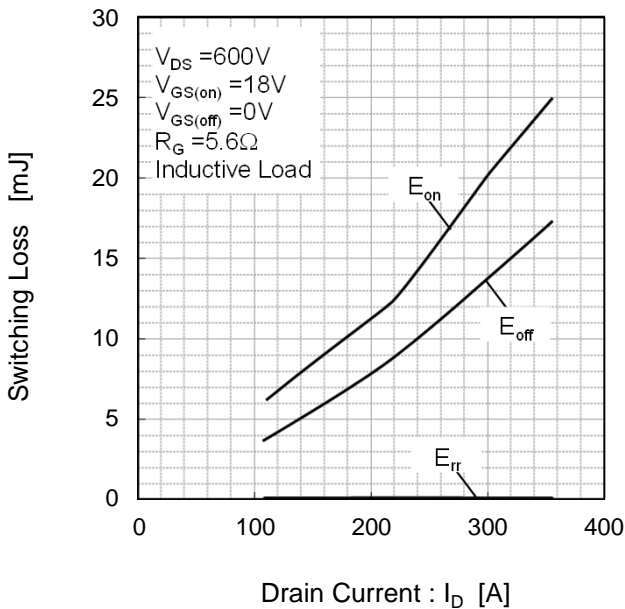
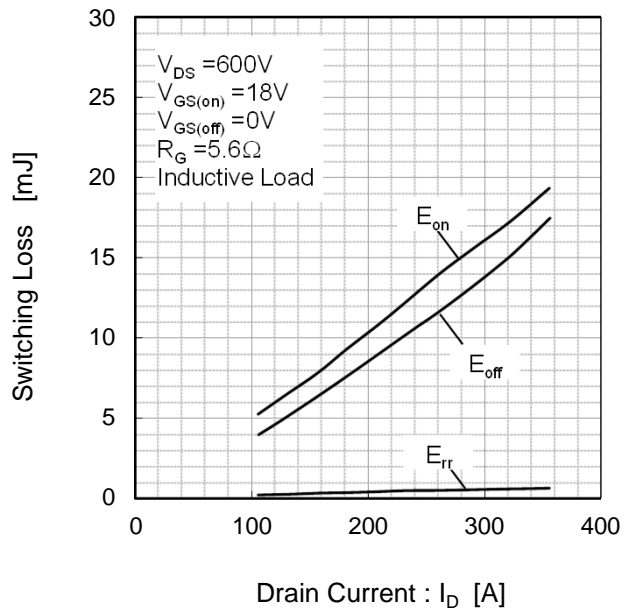


Fig.12 Switching Loss vs. Drain Current [  $T_j=125^\circ\text{C}$  ]



●Electrical characteristic curves (Typical)

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

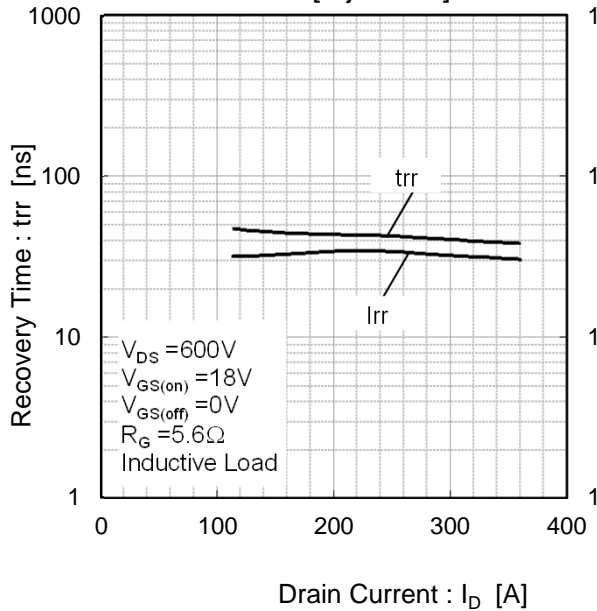


Fig.142 Recovery Characteristics vs. Drain Current [ Tj=125°C ]

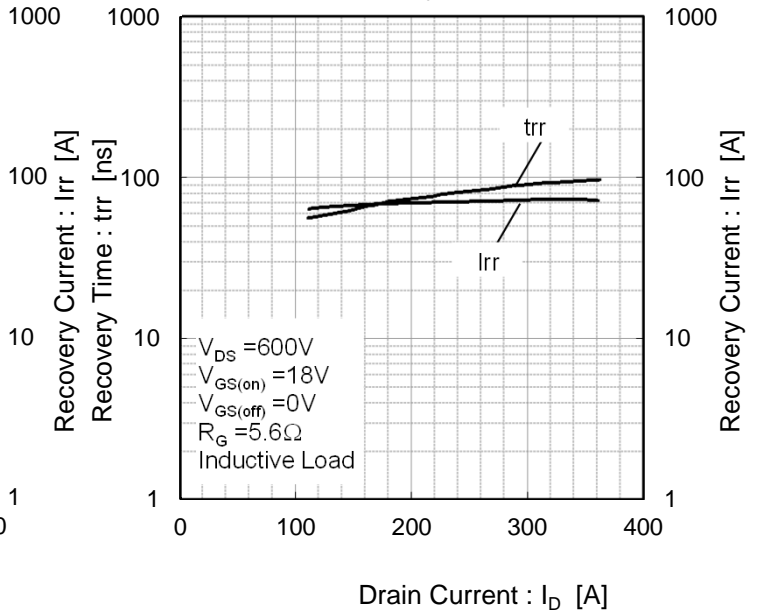


Fig.15 Switching Characteristics vs. Gate Resistance [ Tj=25°C ]

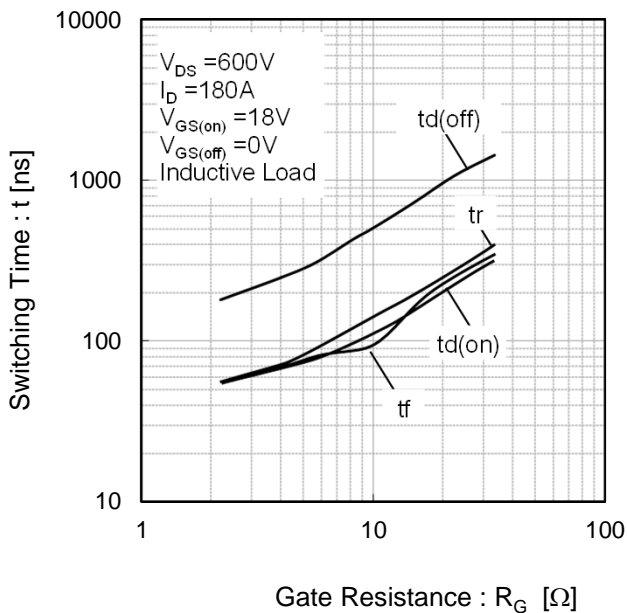
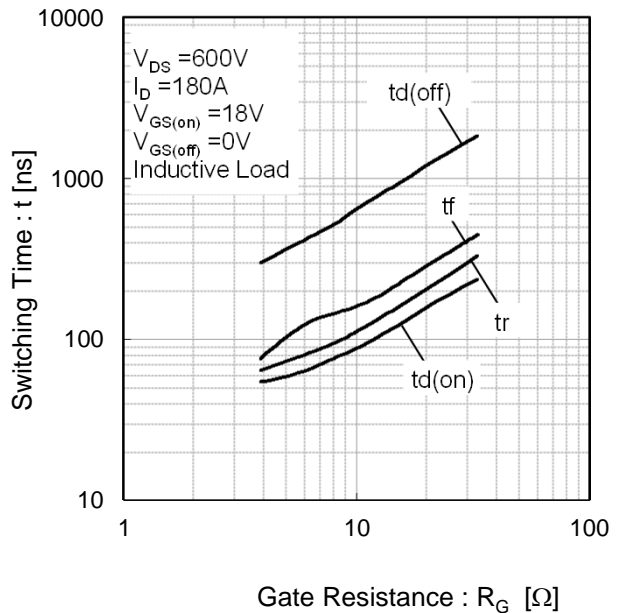


Fig.16 Switching Characteristics vs. Gate Resistance [ Tj=125°C ]



●Electrical characteristic curves (Typical)

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

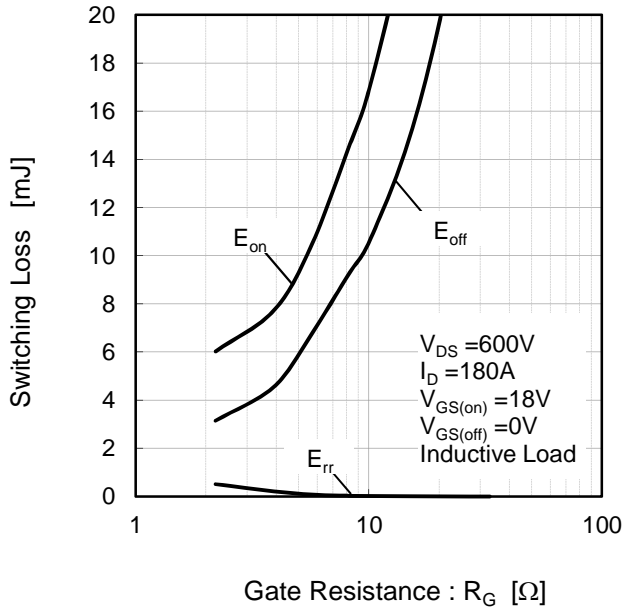


Fig.18 Switching Loss vs. Gate Resistance [ Tj=125°C ]

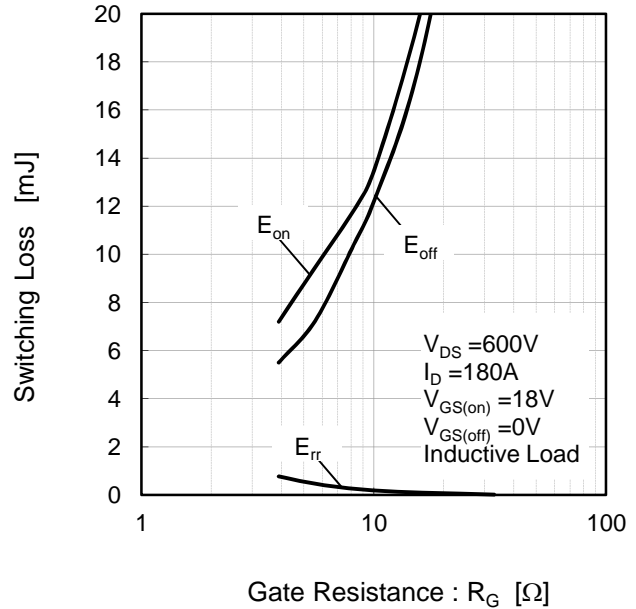


Fig.19 Typical Capacitance vs. Drain-Source Voltage

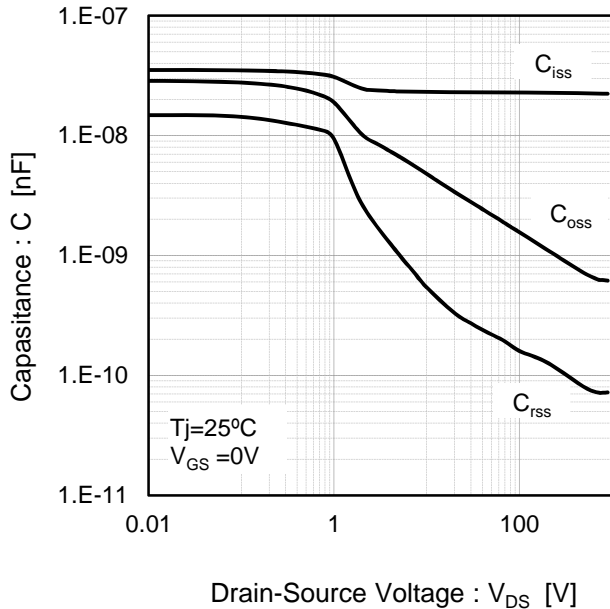
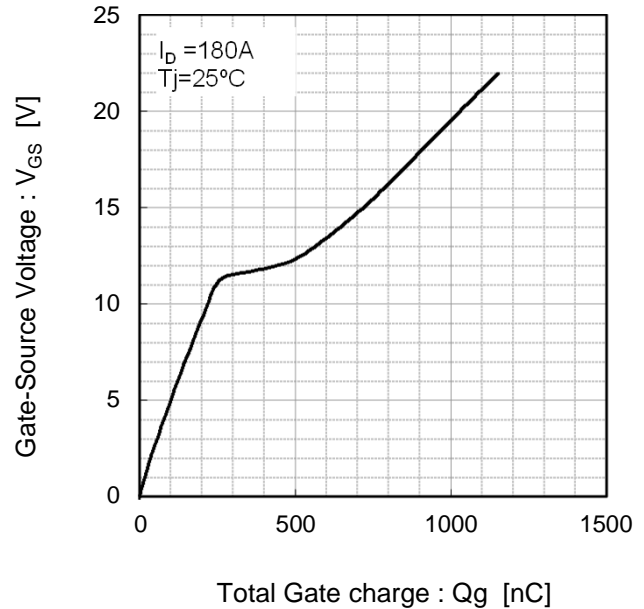


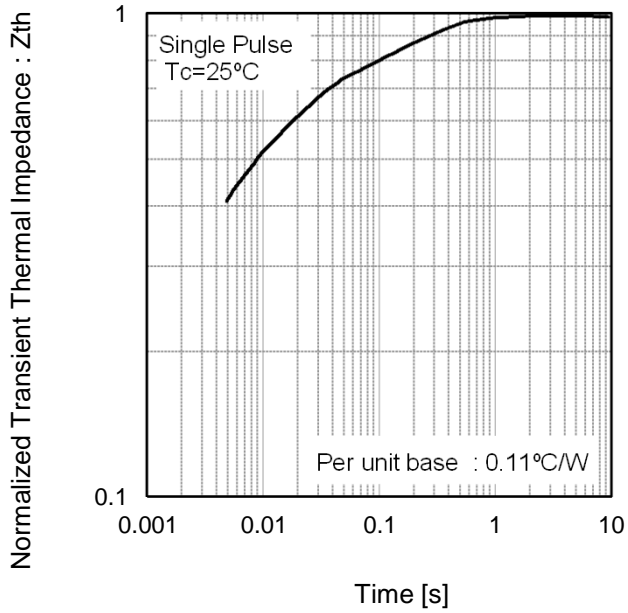
Fig.20 Gate Charge Characteristics [ Tj=25°C ]





●Electrical characteristic curves (Typical)

Fig.21 Normalized Transient Thermal Impedance



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