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●Application

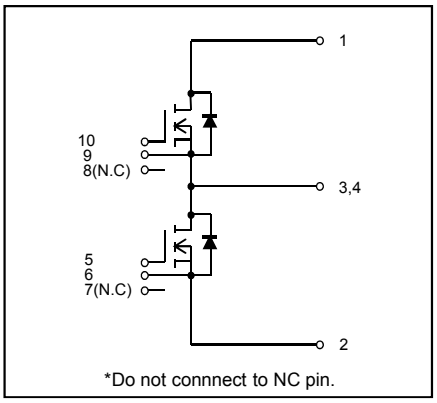
· Motor drive

· Inverter, Converter

· Photovoltaics, wind power generation.

· Induction heating equipment.

●Circuit diagram



●Features

1) Low surge, low switching loss.

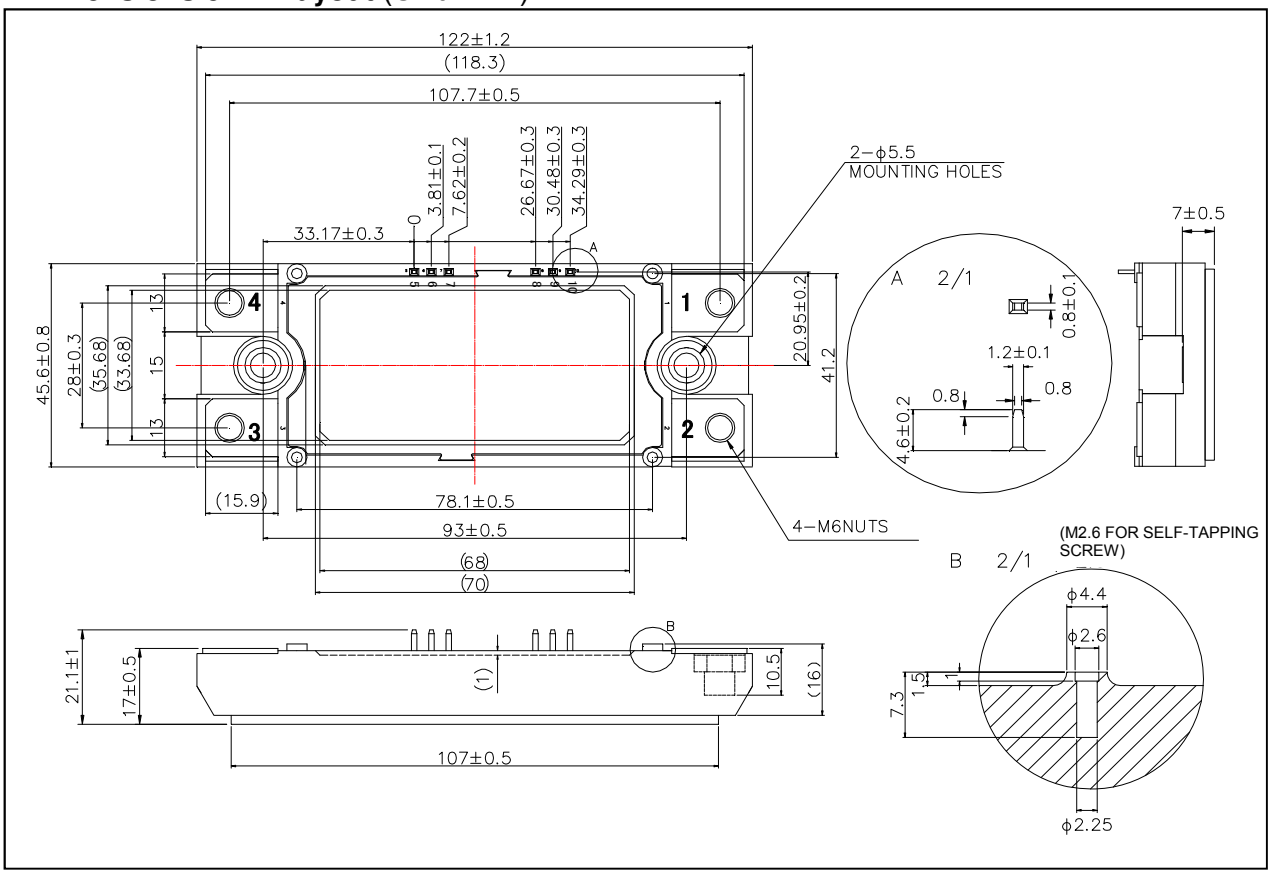
2) High-speed switching possible.

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)

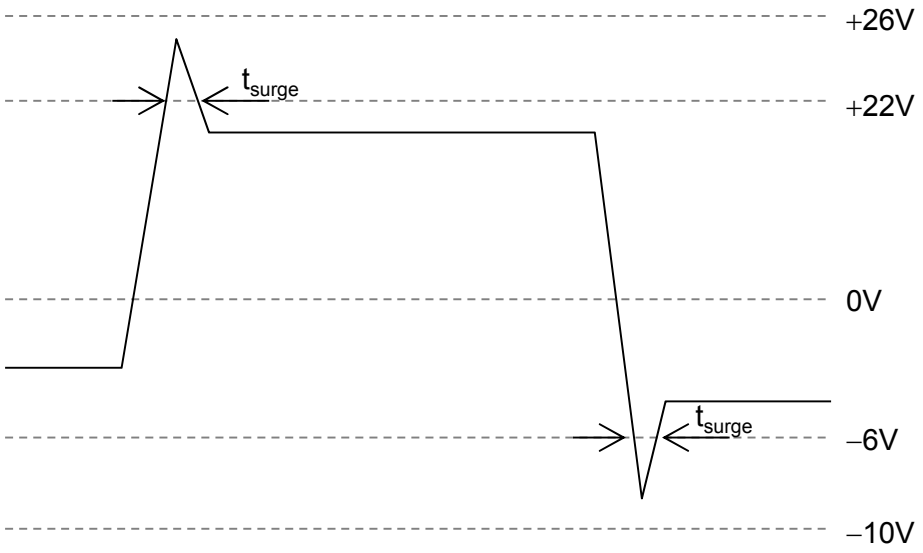
Parameter	Symbol	Conditions	Limit	Unit
Drain-source voltage	V_{DSS}	G-S short	1200	V
Gate-source voltage(+)	V_{GSS}	D-S short	22	V
Gate-source voltage(−)		D-S short	−6	V
G - S Voltage (tsurge<300nsec	$V_{GSSsurge}$	D-S short	−10 to +26	°C
Drain current *1	I_D	DC(Tc=60°C)	204	A
	I_{DRM}	Pulse (Tc=60°C) 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	1360	A
Total power disspation *4	Ptot	Tc=25°C	175	W
Max Junction Temperature	Tjmax		−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 (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 VGS waveform



●Electrical characteristics (Tj=25°C)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Static drain-source on-state voltage	$V_{DS(on)}$	I_C=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		-	80	-	ns
	tr	V_{DS}=600V		-	90	-	
	trr	I_D=180A		-	50	-	
	td(off)	R_G=5.6Ω		-	300	-	
	tf	inductive load		-	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) *5		-	-	0.11	°C/W
Case-to-heat sink Thermal resistance	Rth(c-f)	Case to heat sink, per 1 module, Thermal grease appied *6		-	0.035	-	

(*4) In order to prevent self turn-on, it is recommended to apply negative gate bias.

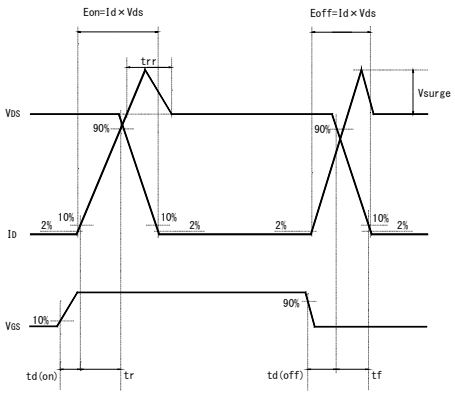
(*5) Measurement of Tc is to be done at the point just under the chip.

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

(*7) SiC devices have lower short cuicuit withstand capability due to high current density. Please be advised to pay careful attention to short cuicuit accident and try to adjust protection time to shutdown them as short as possible.

(*8) 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

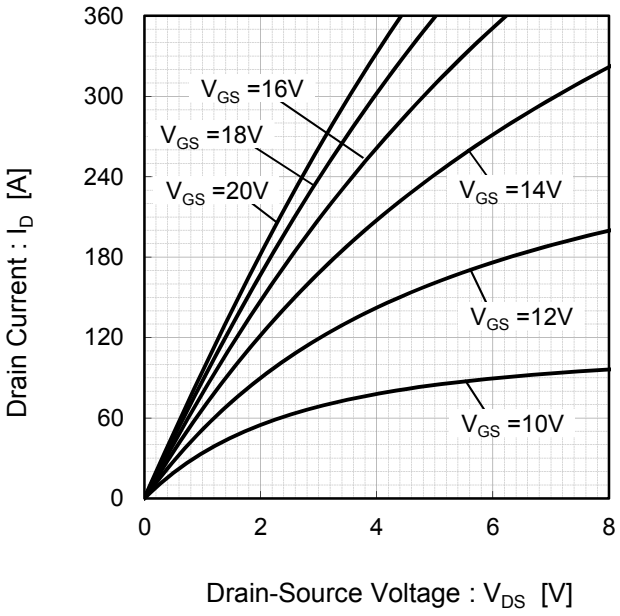


Fig.2 Drain-Source Voltage vs. Drain Current

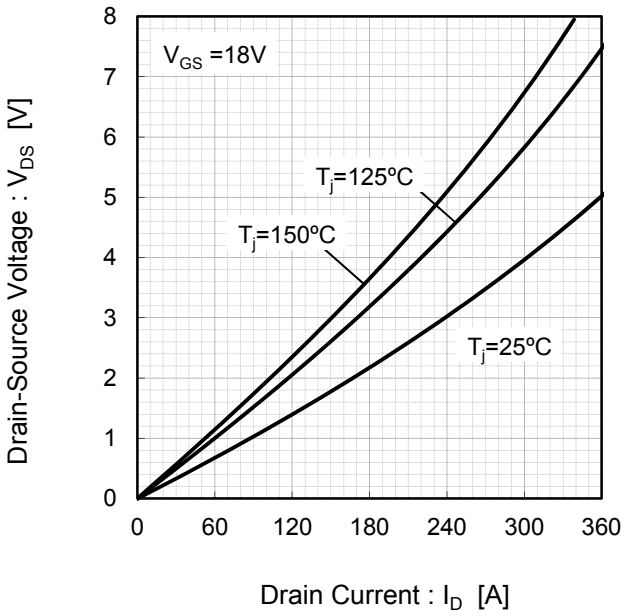


Fig.3 Drain-Source Voltage vs. Gate-Source Voltage

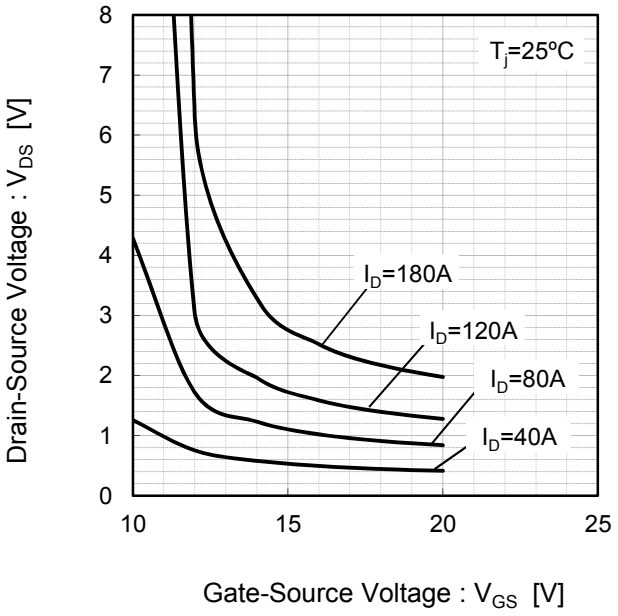
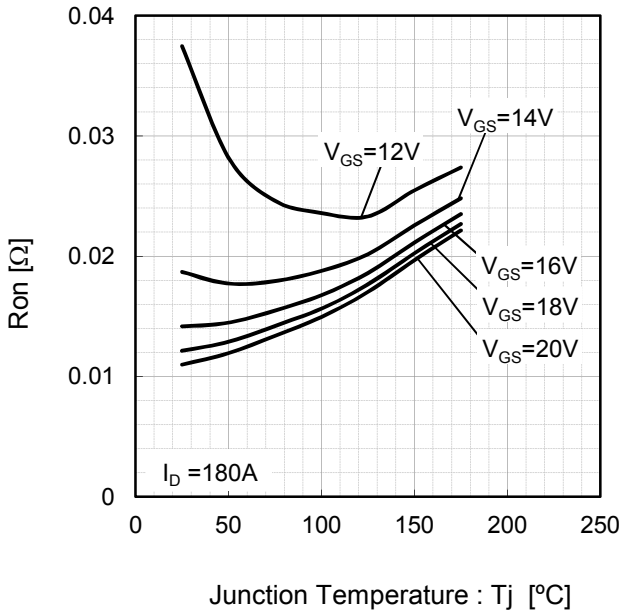


Fig.4 Ron vs Junction Temperature



●Electrical characteristic curves (Typical)

Fig.5 Drain Current vs. Gate-Source Voltage

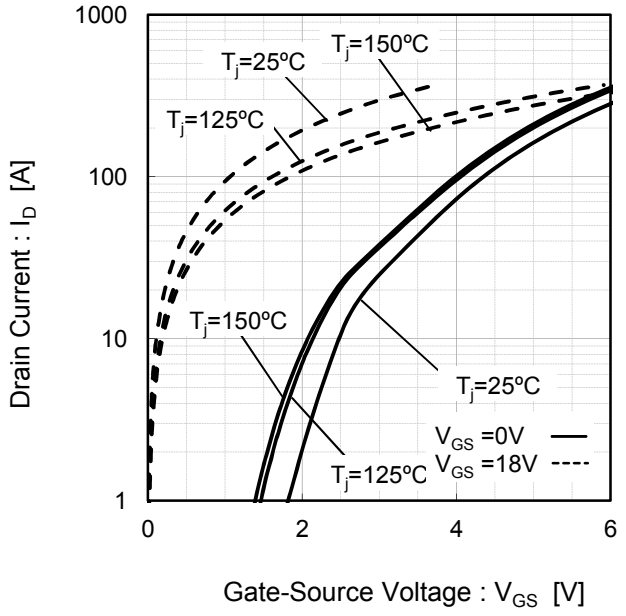


Fig.6 Drain Current vs. Gate-Source Voltage

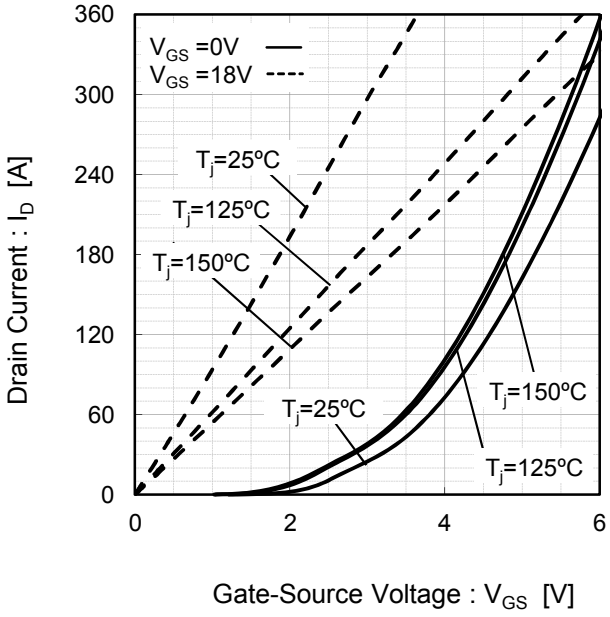


Fig.7 Drain Current vs. Gate-Source Voltage

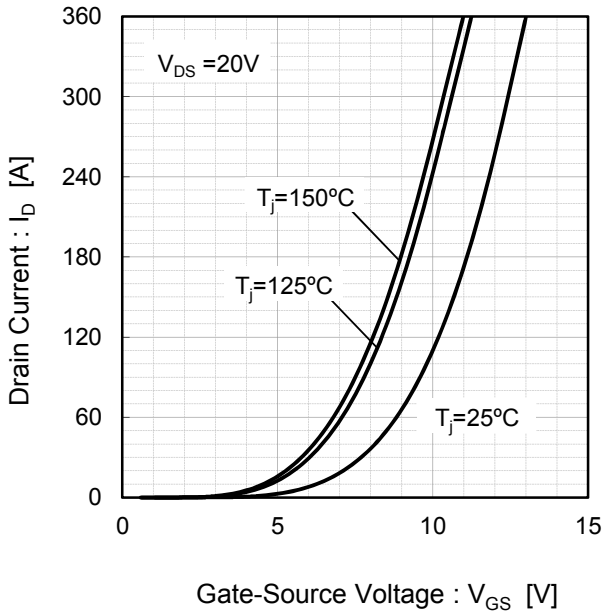
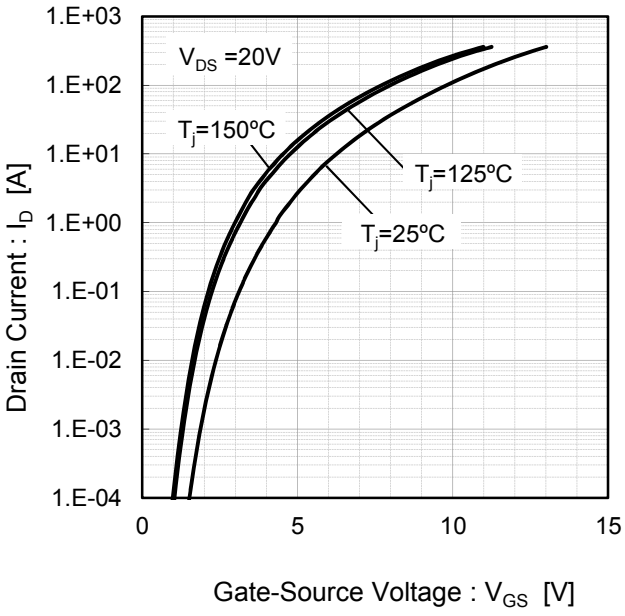


Fig.8 Drain Current vs. Gate-Source Voltage



●Electrical characteristic curves (Typical)

Fig.9 Switching Characteristics [Tj=25ºC]

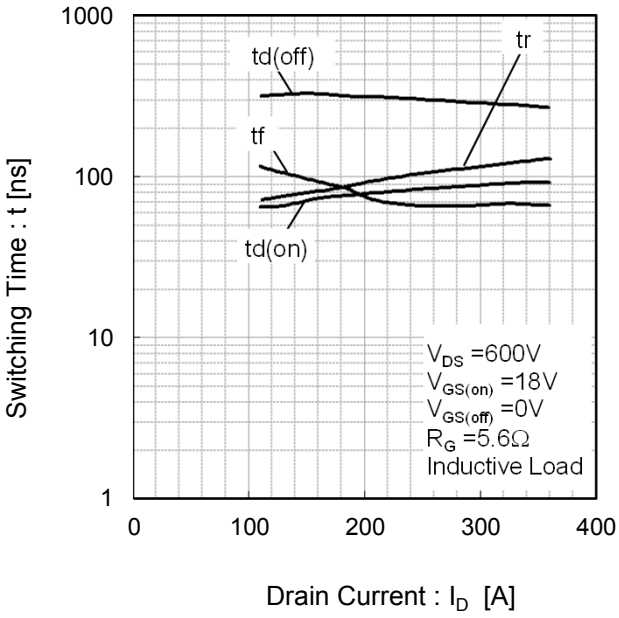


Fig.10 Switching Characteristics [Tj=125ºC]

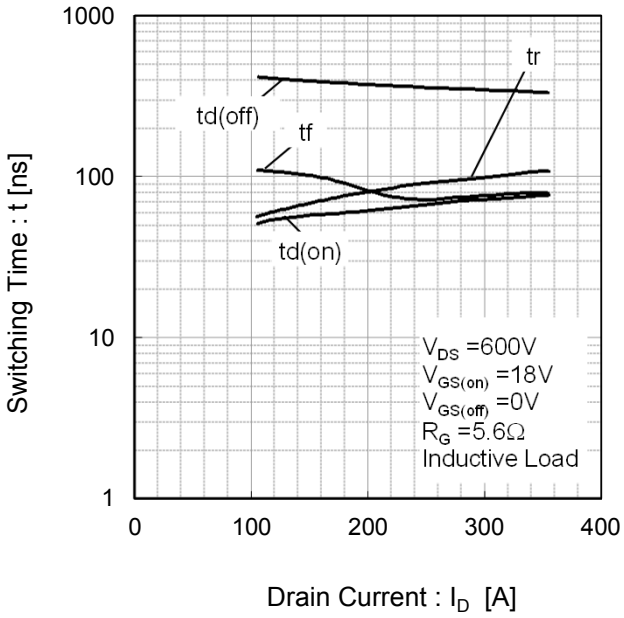


Fig.11 Switching Loss vs. Drain Current [Tj=25ºC]

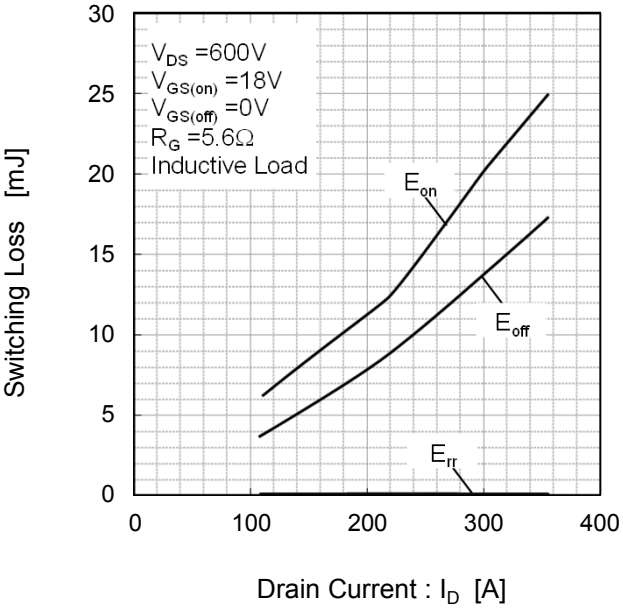
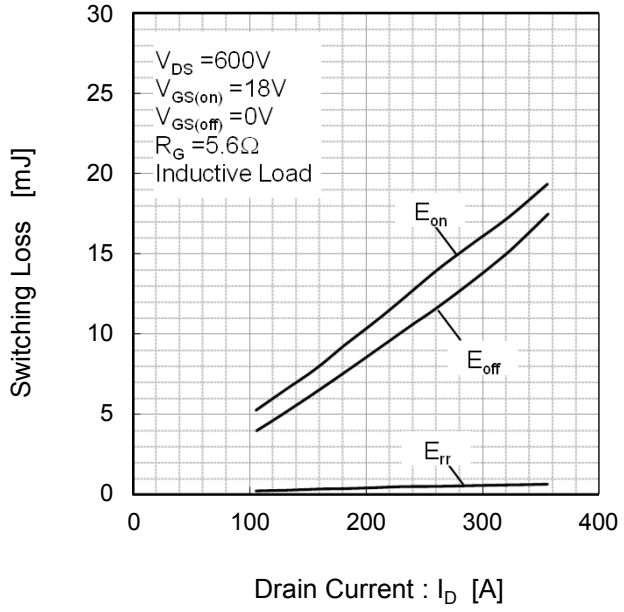


Fig.12 Switching Loss vs. Drain Current [Tj=125ºC]



●Electrical characteristic curves (Typical)

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

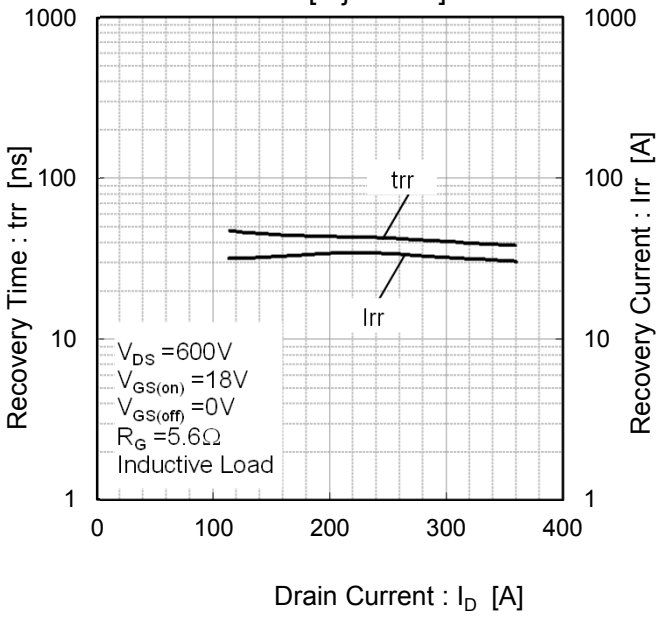


Fig.142 Recovery Characteristics vs. Drain Current [Tj=125ºC]

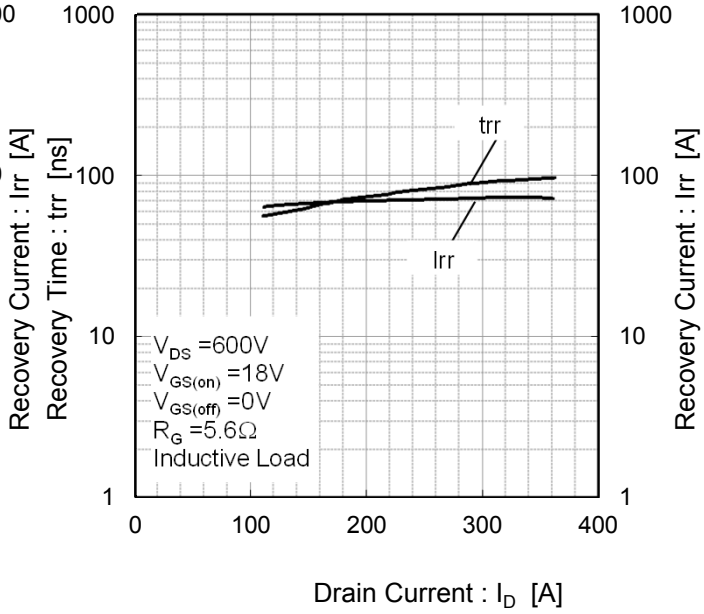


Fig.15 Switching Characteristics vs. Gate Resistance [Tj=25ºC]

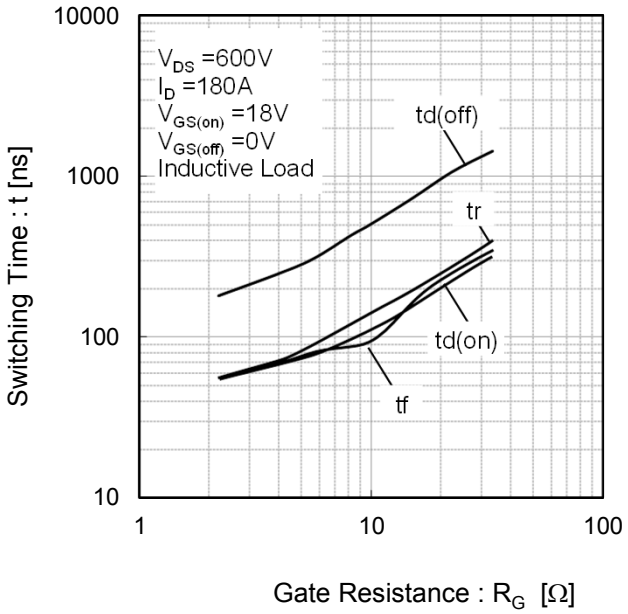
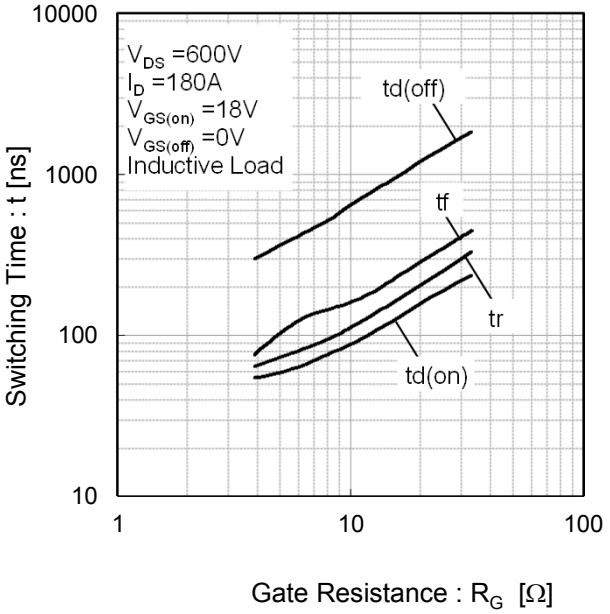


Fig.16 Switching Characteristics vs. Gate Resistance [Tj=125ºC]



●Electrical characteristic curves (Typical)

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

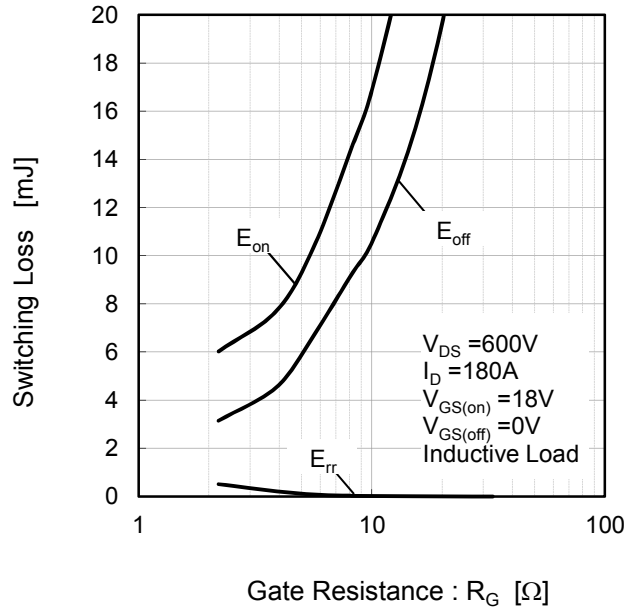


Fig.18 Switching Loss vs. Gate Resistance
[Tj=125ºC]

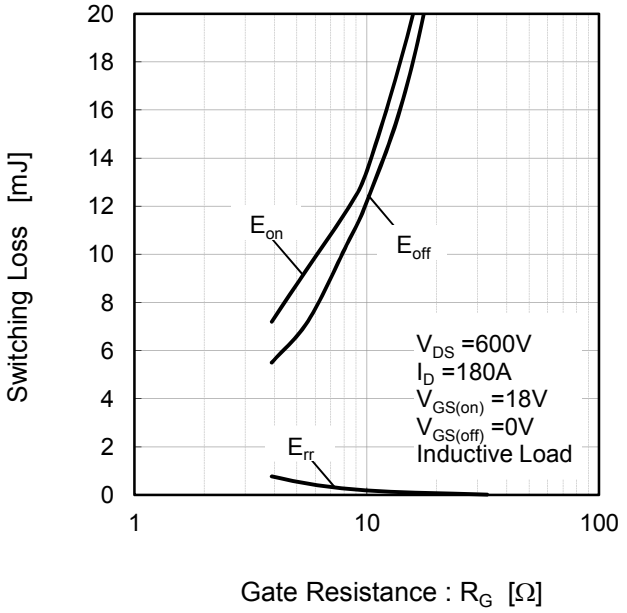


Fig.19 Typical Capacitance vs. Drain-Source Voltage

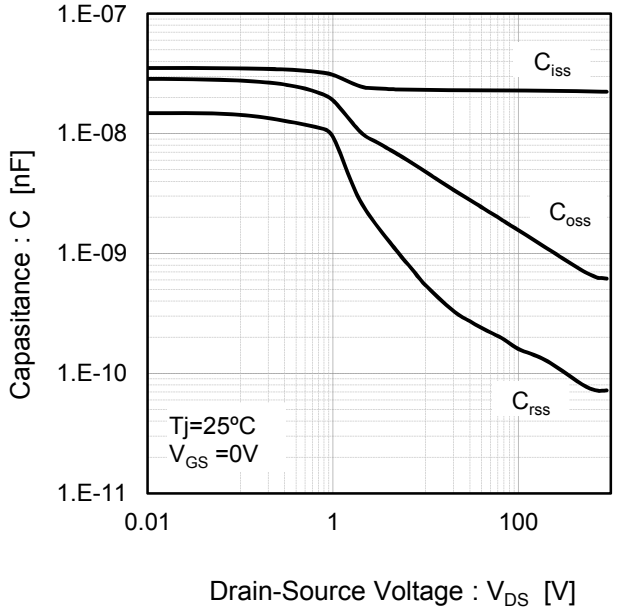
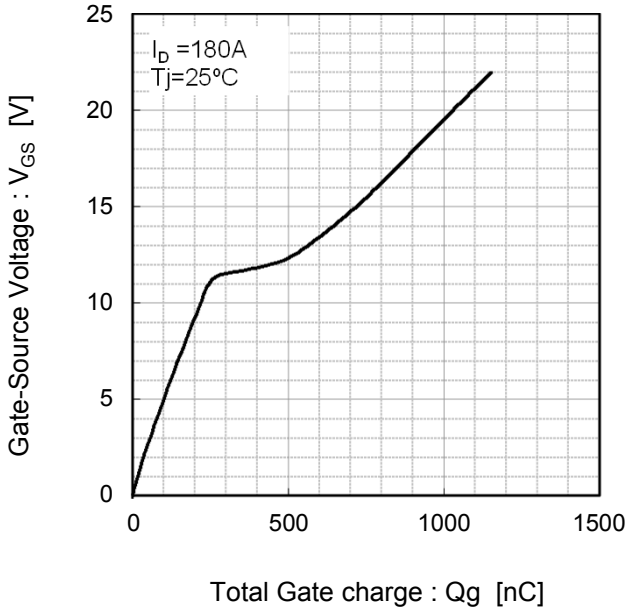
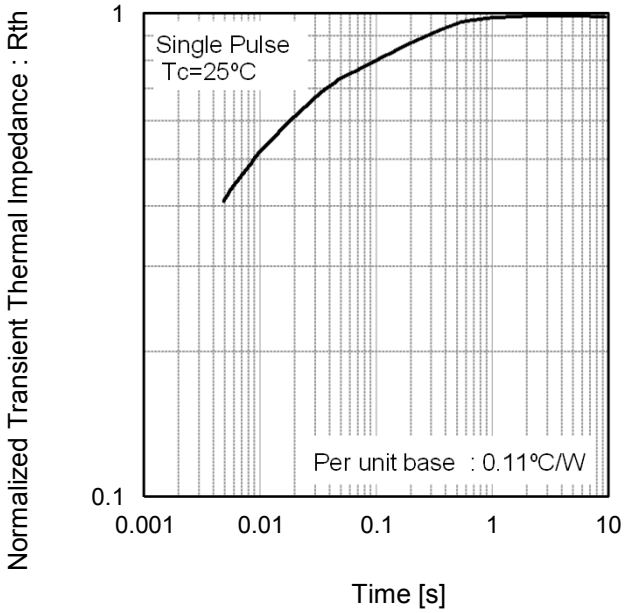


Fig.20 Gate Charge Characteristics
[Tj=25ºC]



●Electrical characteristic curves (Typical)

Fig.21 Normalized Transient Thermal Impedance



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