

●Application

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

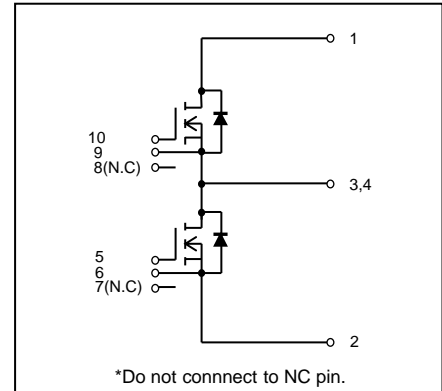
●Features

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

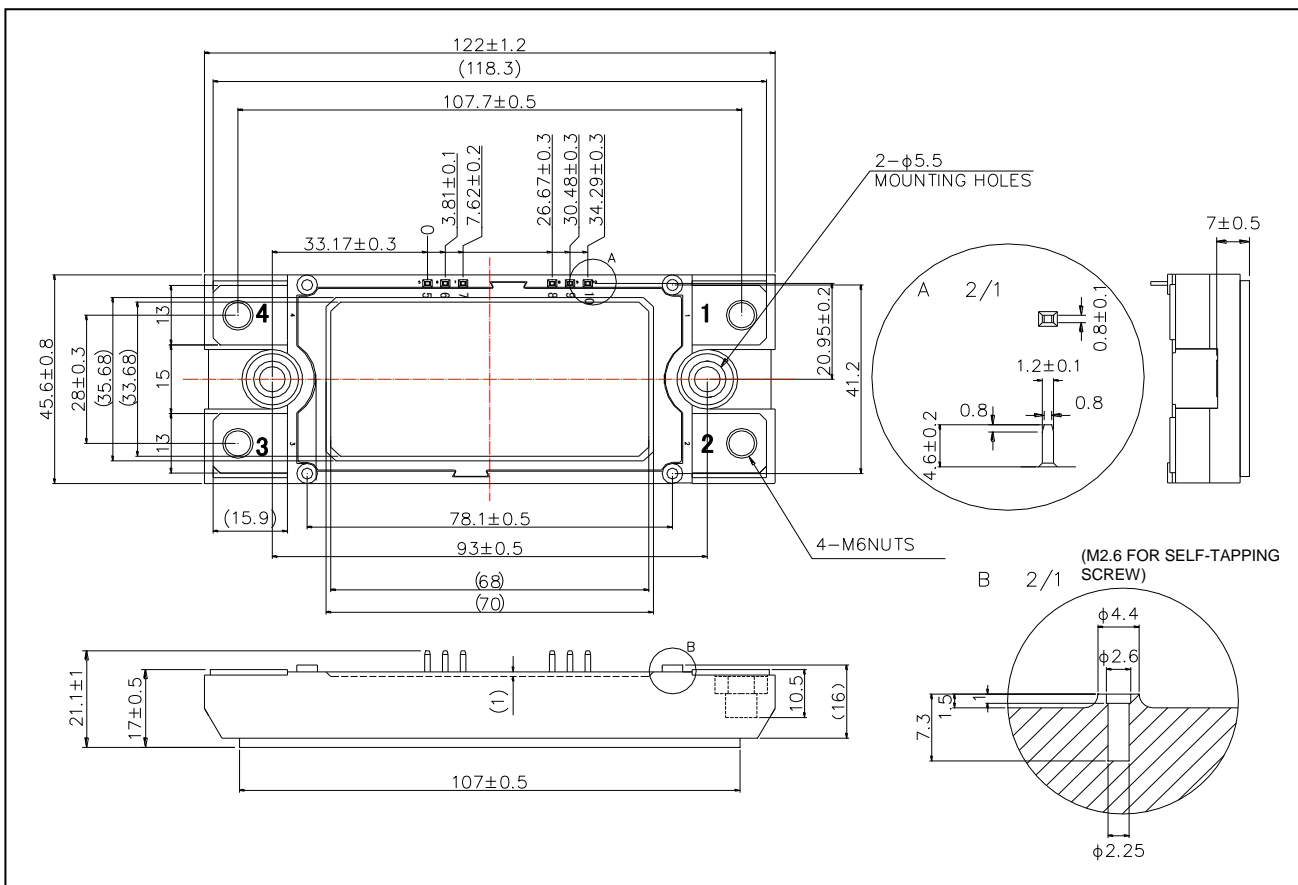
●Construction

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

●Circuit diagram



●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
		Pulse (Tc=60°C) 1ms V _{GS} =18V *2	360	A
	I _{SRM}	Pulse (Tc=60°C) 10μs V _{GS} =0V *2*3	1360	A
Total power dissipation *4	P _{tot}	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

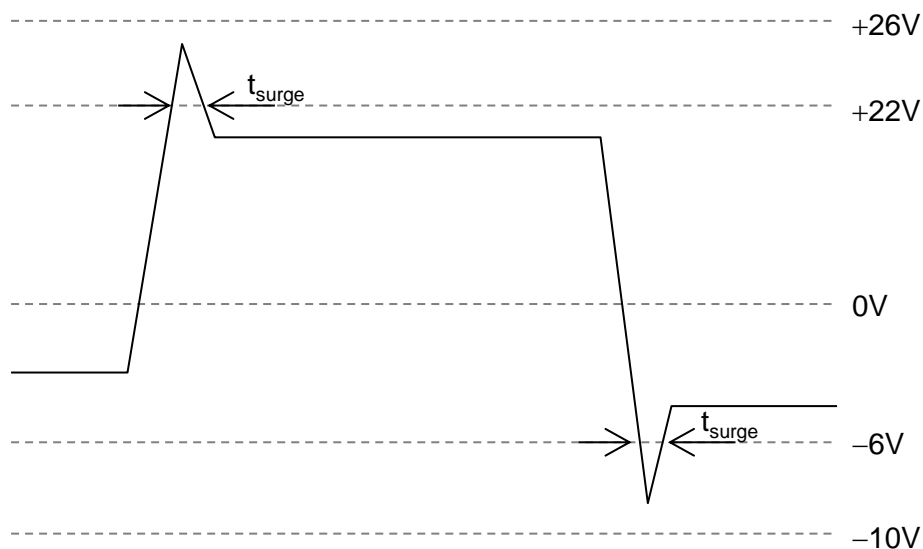
(*1) Measurement of Tc is to be done at the point just under the chip.

(*2) Repetition rate should be kept within the range where temperature rise of die should not exceed Tj max.

(*3) Duration of current conduction at gate-off state should not exceed 10μsec.

(*4) Tj is less than 175°C

Example of acceptable VGS waveform



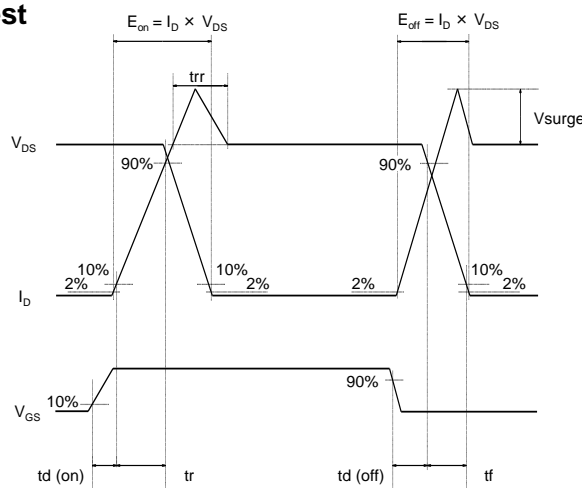
●Electrical characteristics (Tj=25°C)

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	-		
	tr	inductive load	-	90	-		
Input capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, f=1MHz	-	23	-	nF	
Internal gate resistor	R _{Gint}	Tj=25°C	-	1.15	-	Ω	
Stray Inductance	L _s		-	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 _{th(j-c)}	DMOS (1/2 module) *5	-	-	0.11	°C/W	
Case-to-heat sink Thermal resistance	R _{th(c-f)}	Case to heat sink, per 1 module, Thermal grease applied *6	-	0.035	-		

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

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

●Waveform for switching test



●Electrical characteristic curves (Typical)

Fig.1 Typical Output Characteristics

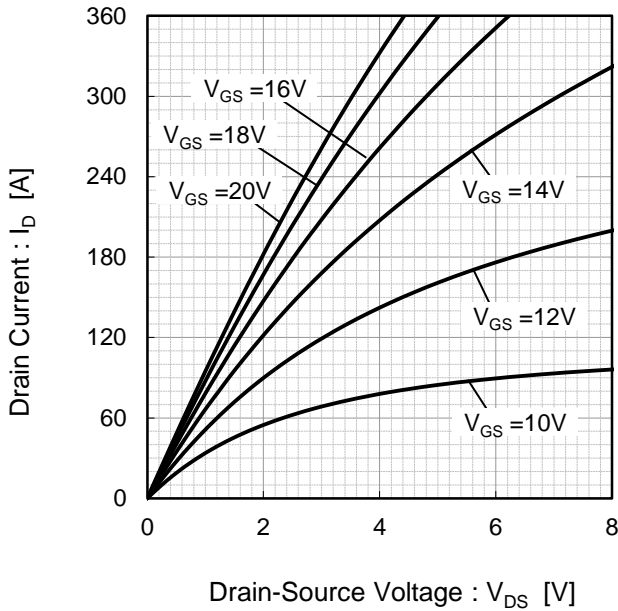


Fig.2 Drain-Source Voltage vs. Drain Current

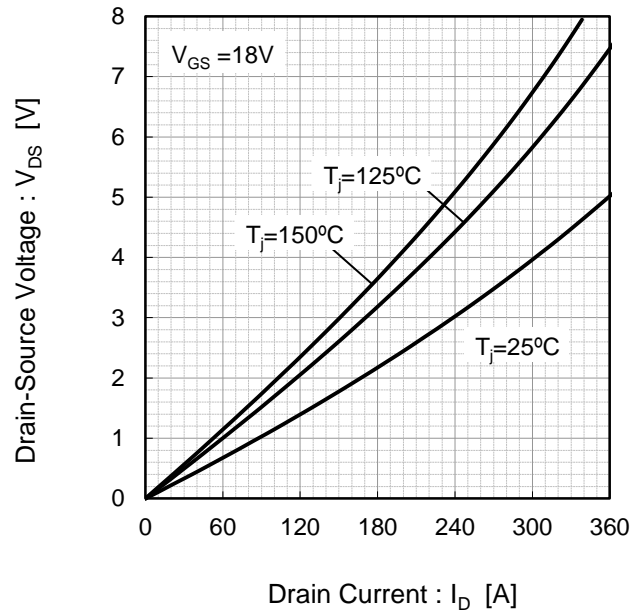


Fig.3 Drain-Source Voltage vs. Gate-Source Voltage

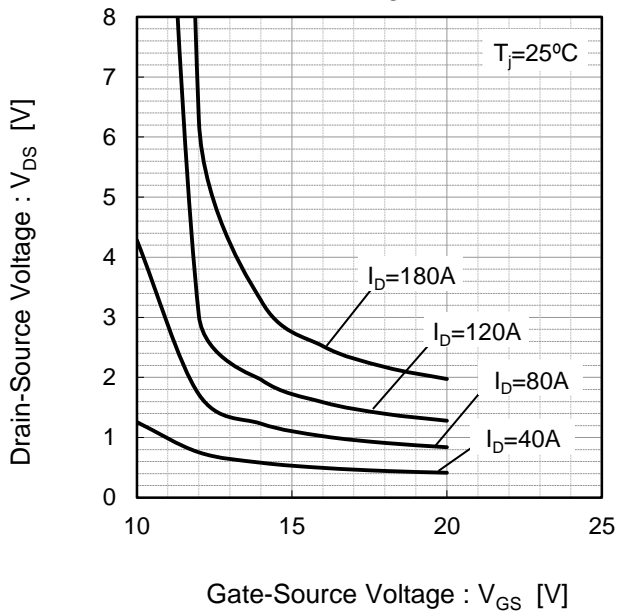
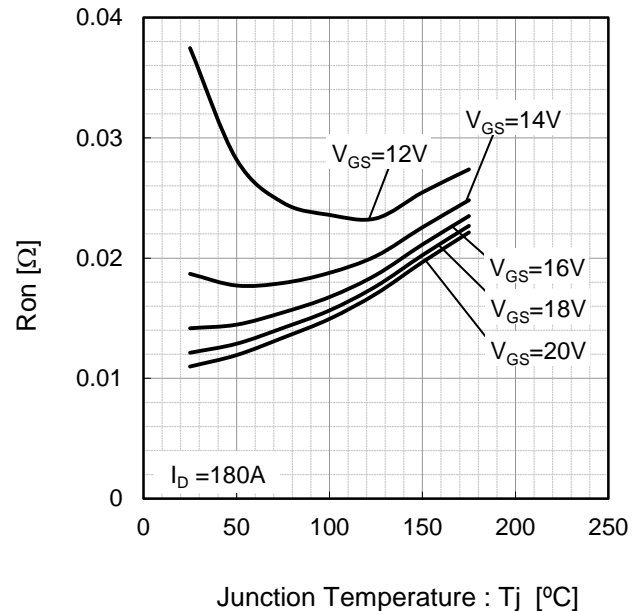


Fig.4 Ron vs Junction Temperature



●Electrical characteristic curves (Typical)

Fig.5 Drain Current vs. Gate-Source Voltage

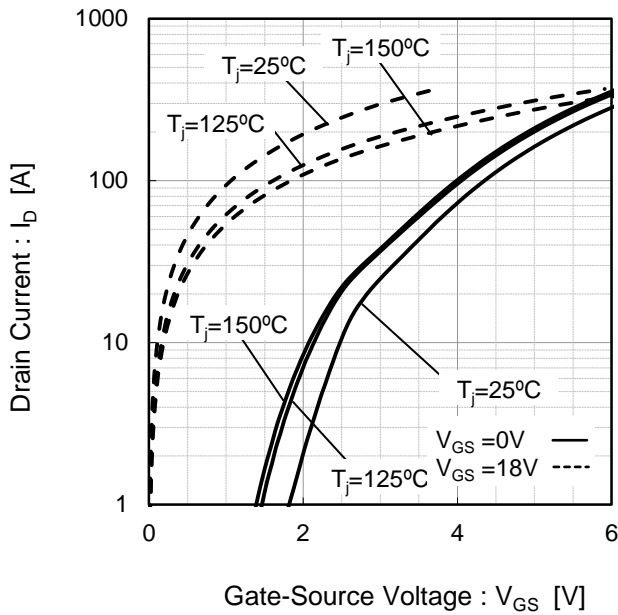


Fig.6 Drain Current vs. Gate-Source Voltage

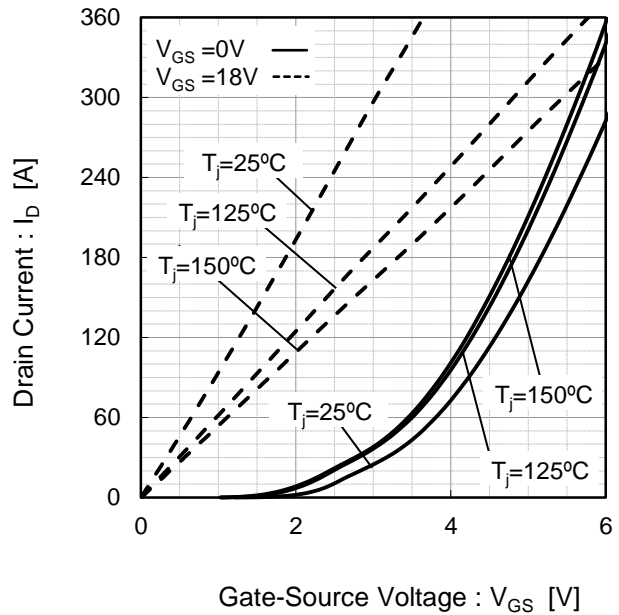


Fig.7 Drain Current vs. Gate-Source Voltage

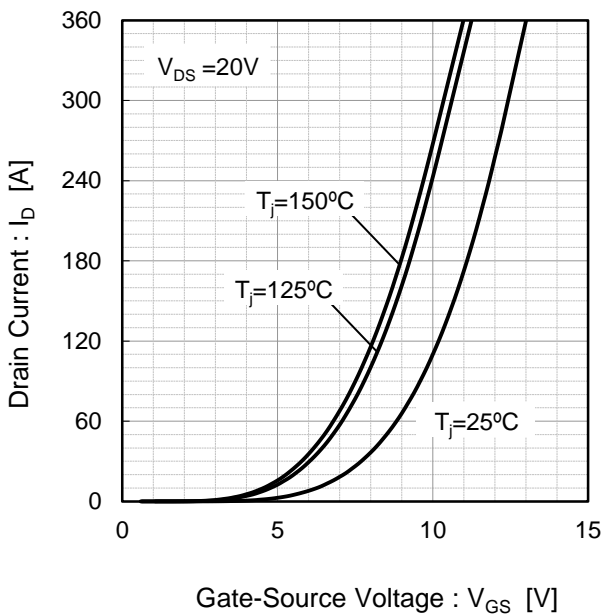
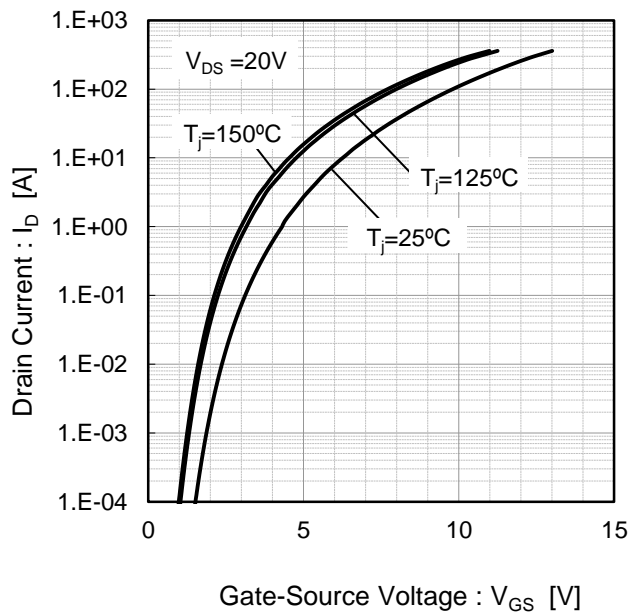


Fig.8 Drain Current vs. Gate-Source Voltage



●Electrical characteristic curves (Typical)

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

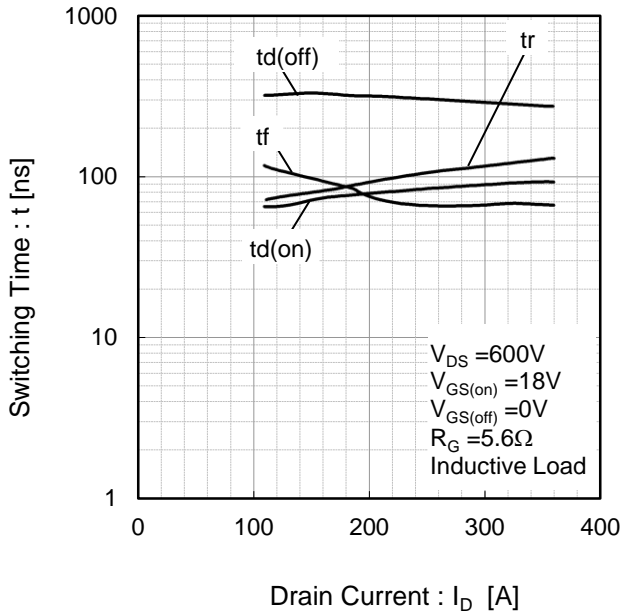


Fig.10 Switching Characteristics [$T_j=125^\circ\text{C}$]

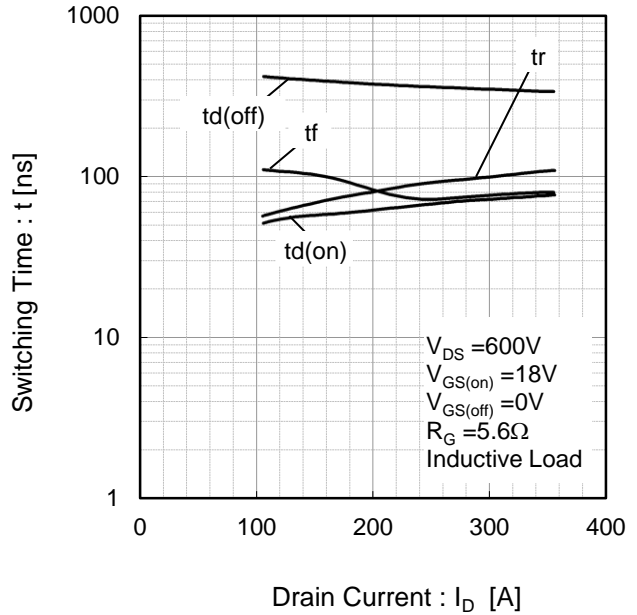


Fig.11 Switching Loss vs. Drain Current [$T_j=25^\circ\text{C}$]

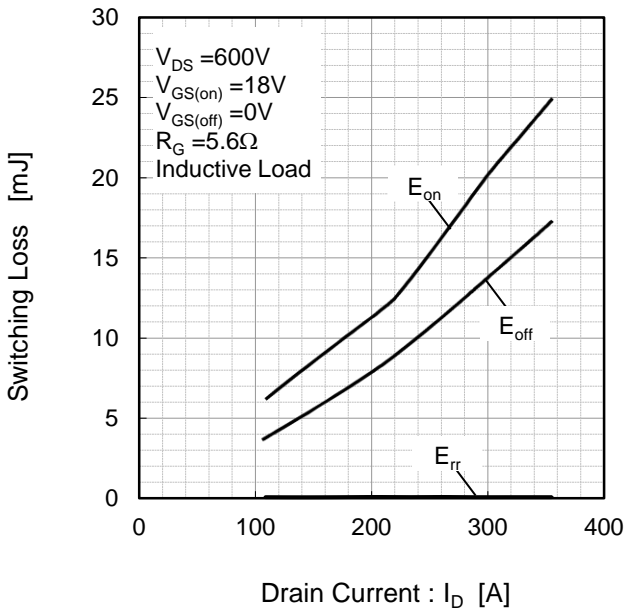
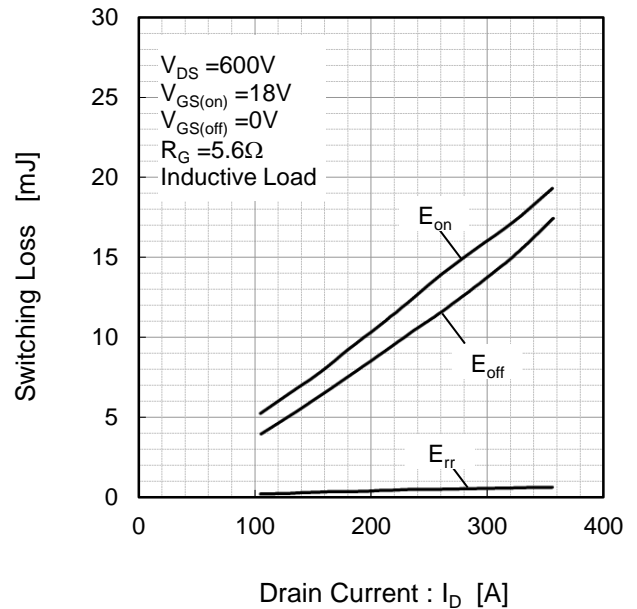


Fig.12 Switching Loss vs. Drain Current [$T_j=125^\circ\text{C}$]



●Electrical characteristic curves (Typical)

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

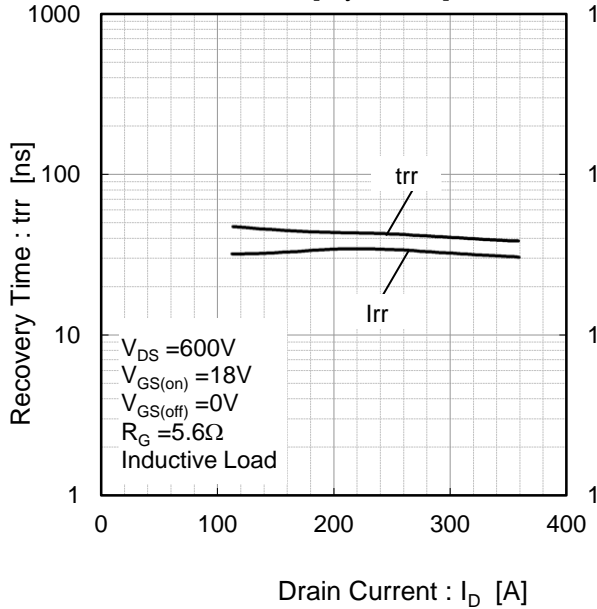


Fig.142 Recovery Characteristics vs. Drain Current [Tj=125°C]

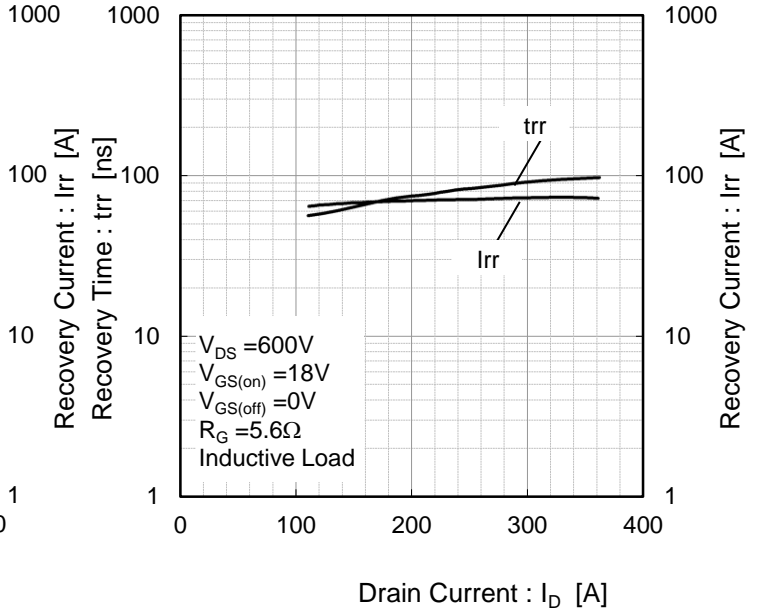


Fig.15 Switching Characteristics vs. Gate Resistance [Tj=25°C]

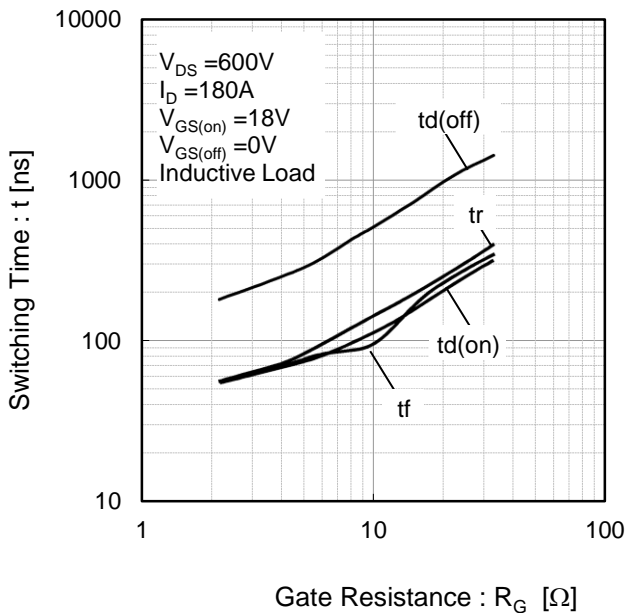
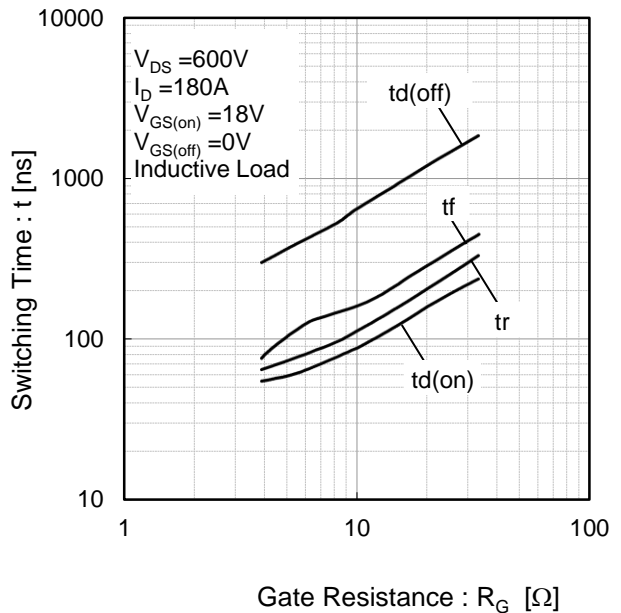


Fig.16 Switching Characteristics vs. Gate Resistance [Tj=125°C]



●Electrical characteristic curves (Typical)

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

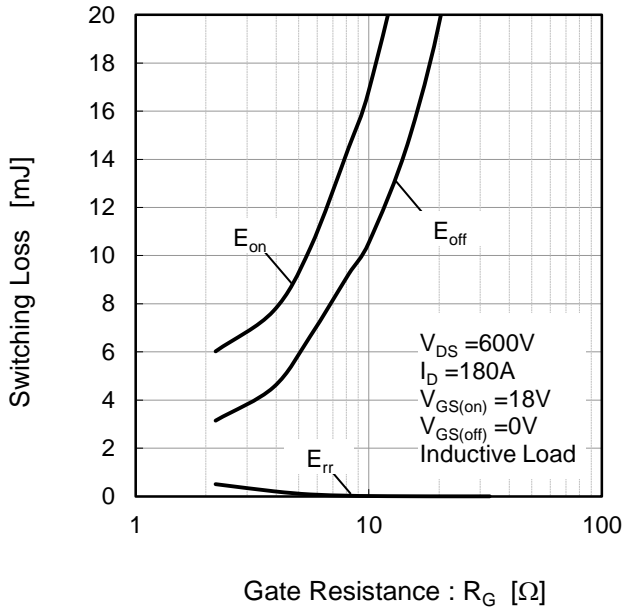


Fig.18 Switching Loss vs. Gate Resistance [Tj=125°C]

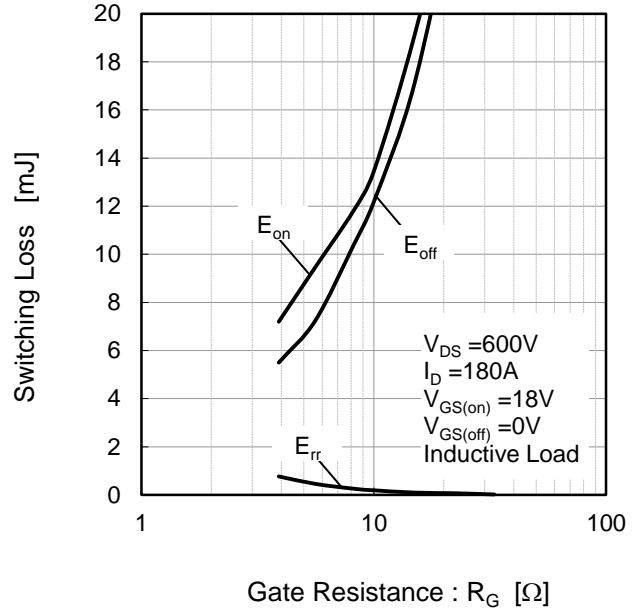


Fig.19 Typical Capacitance vs. Drain-Source Voltage

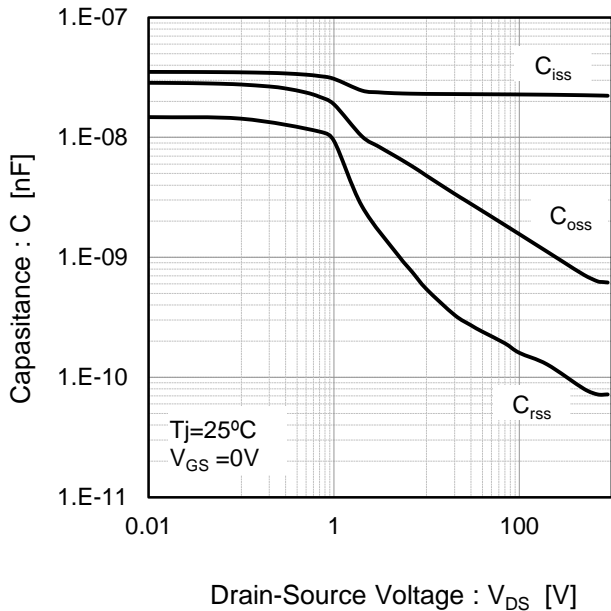
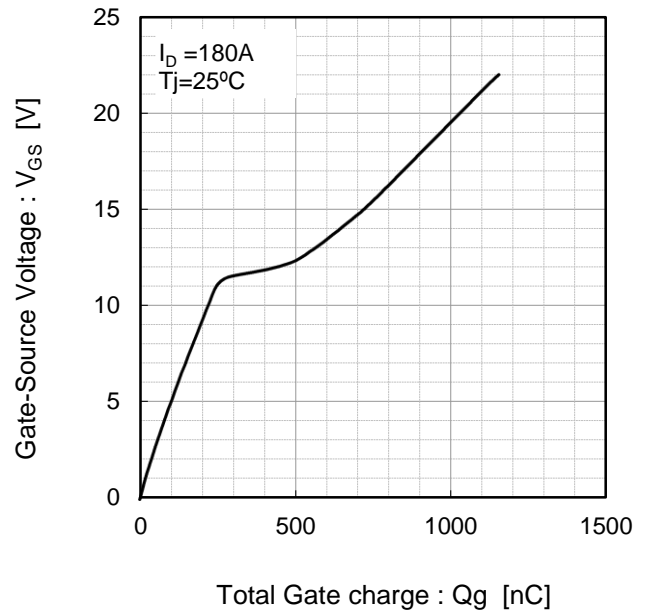
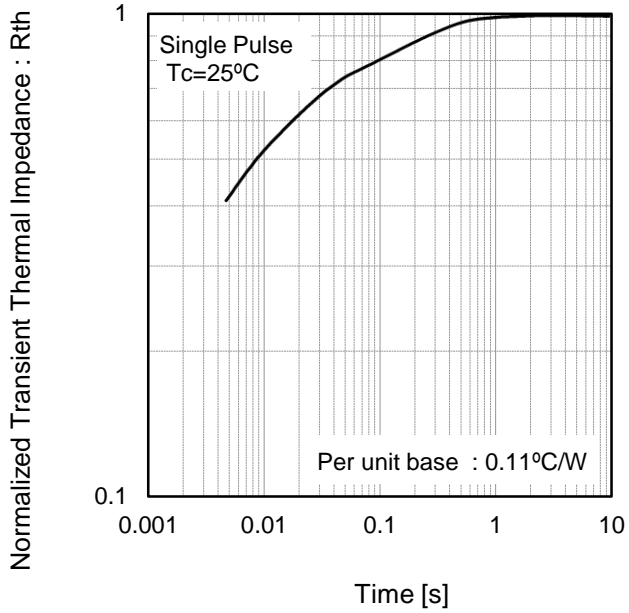


Fig.20 Gate Charge Characteristics [Tj=25°C]



●Electrical characteristic curves (Typical)

Fig.21 Normalized Transient Thermal Impedance



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Part Number	BSM180D12P2C101
Package	C
Unit Quantity	12
Minimum Package Quantity	12
Packing Type	Tray
Constitution Materials List	inquiry
RoHS	Yes