

●Application

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

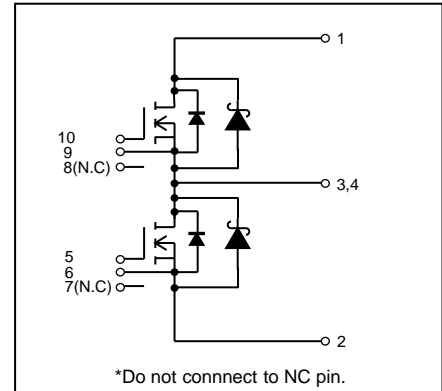
●Features

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

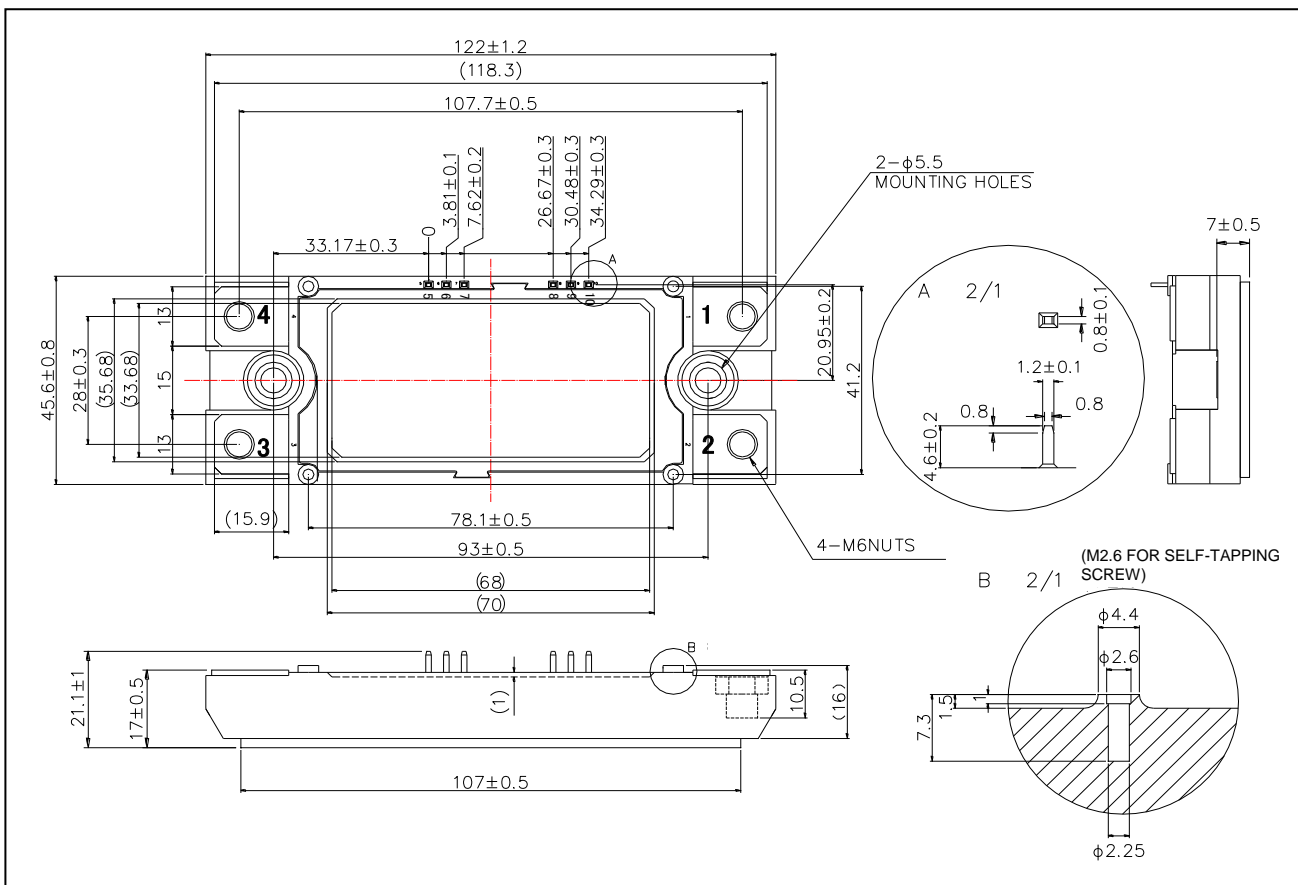
●Construction

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

●Circuit diagram



●Dimensions & Pin layout (Unit : mm)



●Absolute maximum ratings (T_j = 25°C)

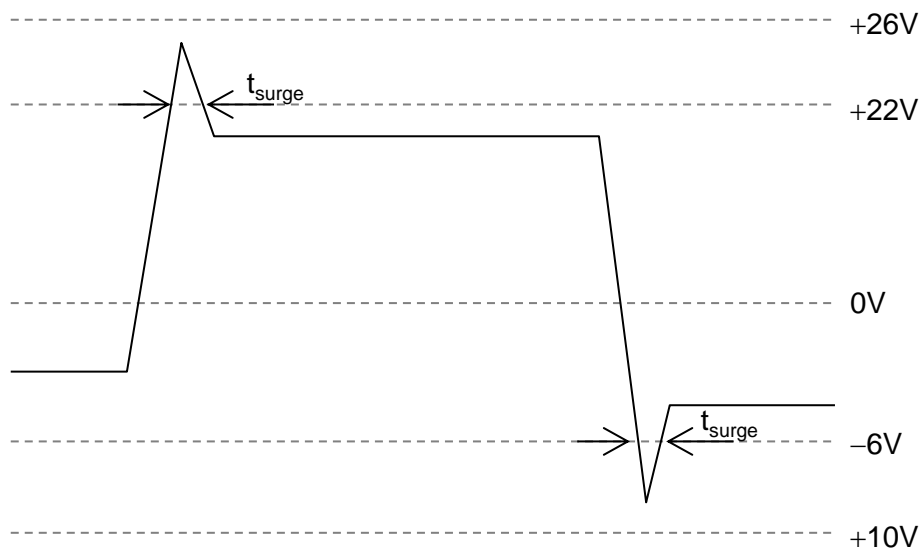
Parameter	Symbol	Conditions	Limit	Unit
Drain-source voltage	V _{DSS}	G-S short	1200	V
Gate-source voltage(+)	V _{GSS}	D-S short	22	
Gate-source voltage(-)			-6	
G - S voltage (t _{surge} <300nsec)	V _{GSSsurge}	D-S short	-10 to 26	
Drain current *1	I _D	DC(T _c =60°C)	80	A
	I _{DRM}	Pulse (T _c =60°C) 1ms *2	160	
Source current *1	I _S	DC(T _c = 60°C) V _{GS} =18V	80	
	I _{SRM}	Pulse (T _c =60°C) 1ms V _{GS} =18V	160	
Total power dissipation *3	P _{tot}	T _c =25°C	600	W
Max junction temperature	T _{jmax}		175	°C
Junction temperature	T _{jop}		-40 to 150	
Storage temperature	T _{stg}		-40 to 125	
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	

(*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



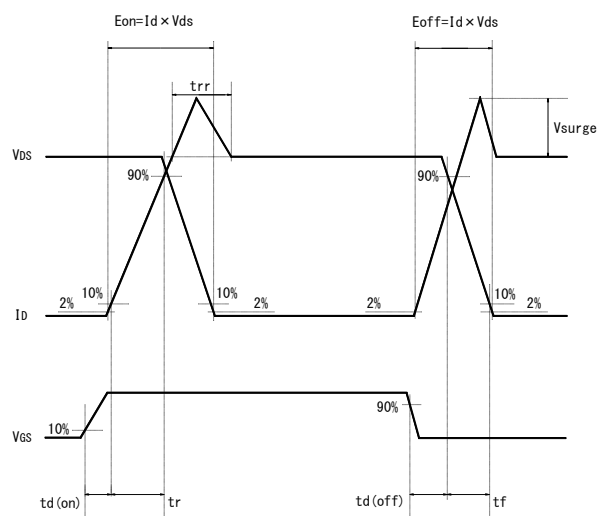
● **Electrical characteristics** (T_j=25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
On-state static Drain-Source Voltage	V _{DS(on)}	I _D =80A, V _{GS} =18V	T _j =25°C	–	2.8	3.5	V
			T _j =125°C	–	4.2	–	
			T _j =150°C	–	4.8	5.5	
Drain cutoff current	I _{DSS}	V _{DS} =1200V, V _{GS} =0V	–	–	1.2	mA	
Source-drain voltage	V _{SD}	V _{GS} =0V, I _S =80A	T _j =25°C	–	1.7	2.0	V
			T _j =125°C	–	2.1	–	
			T _j =150°C	–	2.3	3.3	
		V _{GS} =18V, I _S =80A	T _j =25°C	–	1.4	–	
			T _j =125°C	–	1.7	–	
			T _j =150°C	–	1.8	–	
Gate-source threshold voltage	V _{GS(th)}	V _{DS} =10V, I _D =13.2mA	1.6	–	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	–	–		
Switching characteristics	t _{d(on)}	V _{GS(on)} =18V, V _{GS(off)} =0V	–	20	–	ns	
	t _r	V _{DS} =600V	–	30	–		
	t _{rr}	I _D =80A	–	35	–		
	t _{d(off)}	R _G =0.82Ω	–	80	–		
	t _f	inductive load	–	40	–		
Input capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, f=1MHz	–	8	–	nF	
Gate Resistance	R _{Gint}	T _j =25°C	–	3.0	–	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)}	DMOSFET (1/2 module) *4	–	–	0.25	°C/W	
		SBD (1/2 module) *4	–	–	0.32		
Case-to-heat sink Thermal resistance	R _{th(c-f)}	Case to heat sink, per 1 module, Thermal grease applied *5	–	0.035	–		

(*4) Measurement of T_c 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).

● **Waveform for switching test**



●Electrical characteristic curves (Typical)

Fig.1 Typical Output Characteristics
[$T_j=25^\circ\text{C}$]

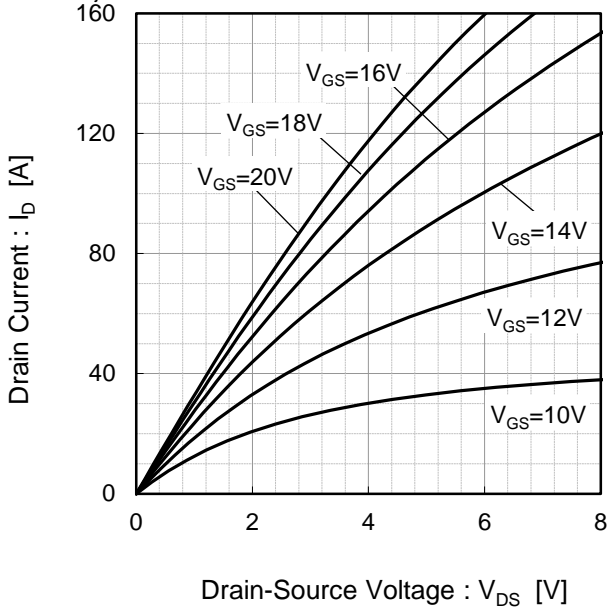


Fig.2 Drain-Source Voltage vs. Drain Current

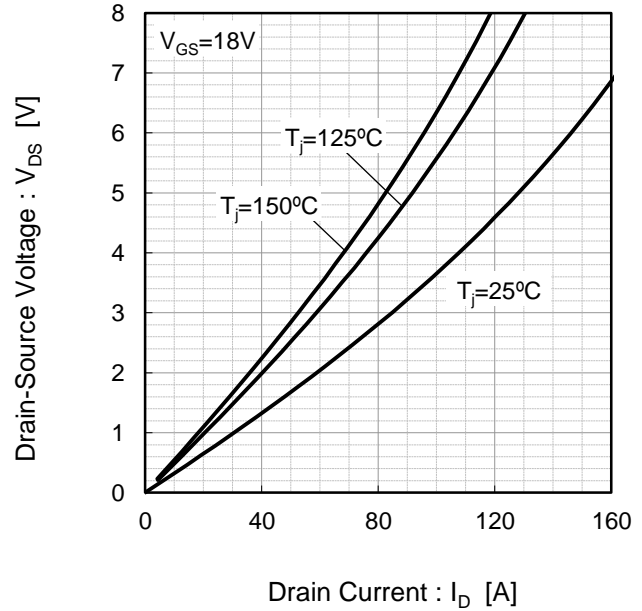


Fig.3 Drain-Source Voltage vs. Gate-Source Voltage [$T_j=25^\circ\text{C}$]

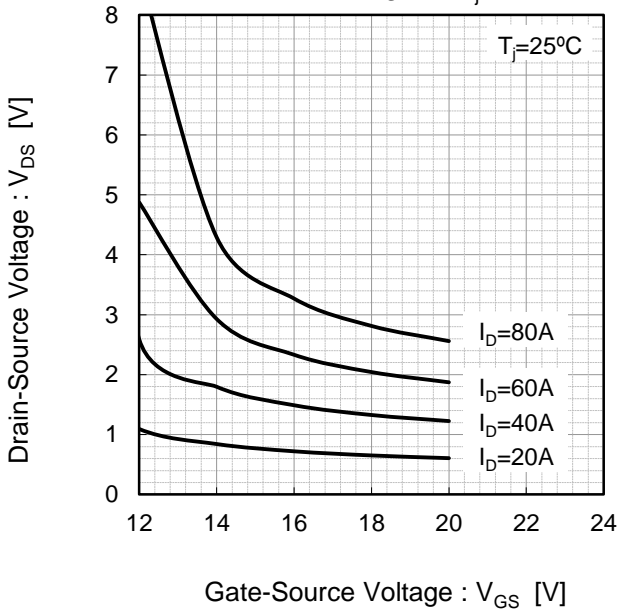
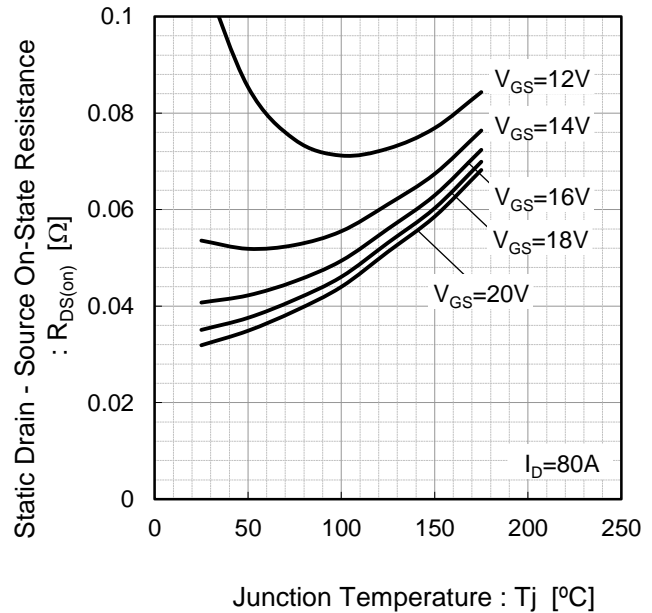


Fig.4 Static Drain - Source On-State Resistance vs. Junction Temperature



●Electrical characteristic curves (Typical)

Fig.5 Forward characteristic of Diode

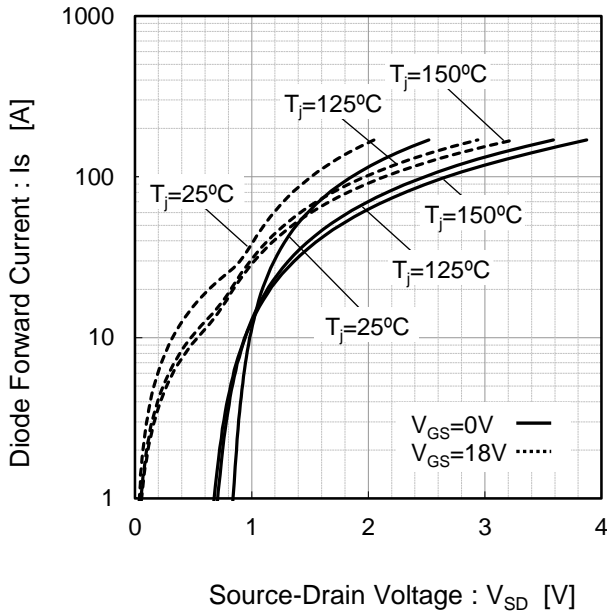


Fig.6 Forward characteristic of Diode

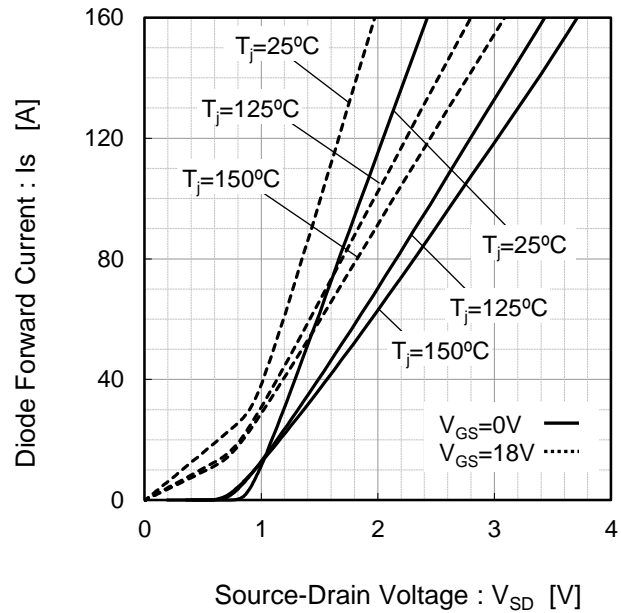


Fig.7 Drain Current vs. Gate-Source Voltage

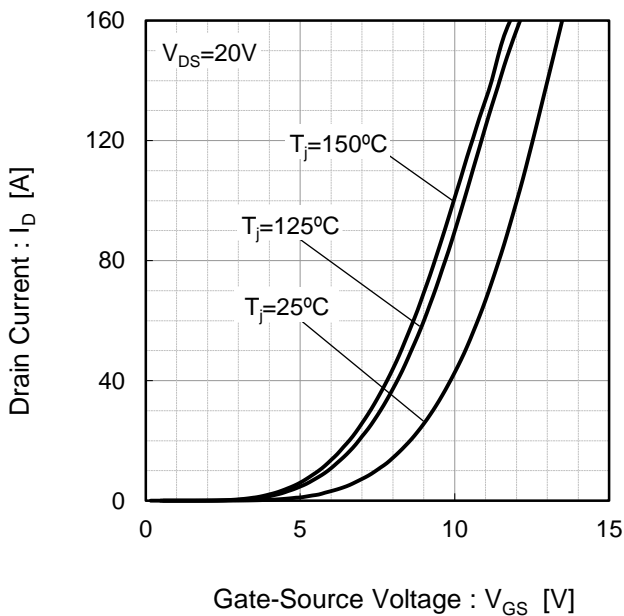
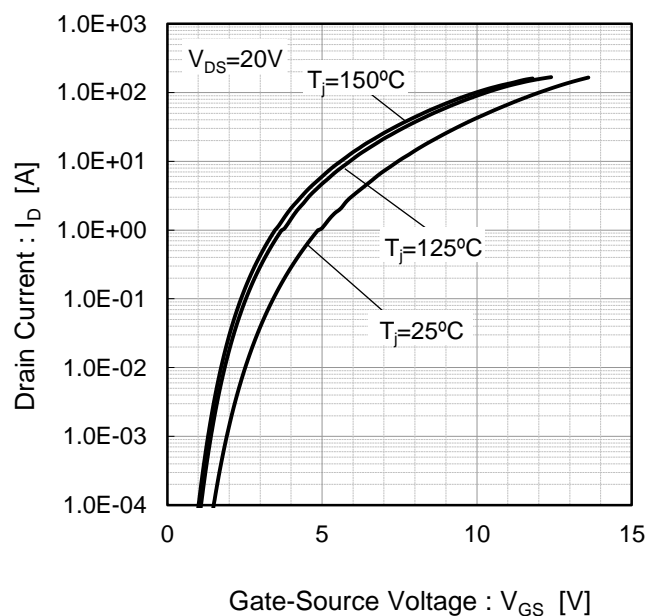


Fig.8 Drain Current vs. Gate-Source Voltage



●Electrical characteristic curves (Typical)

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

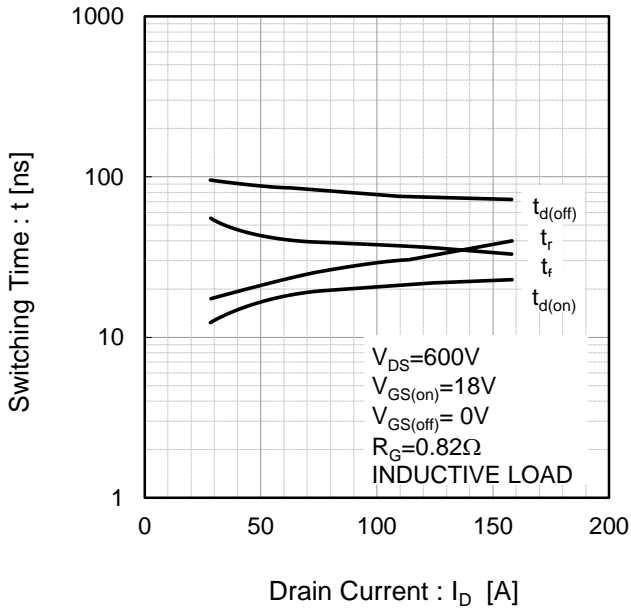


Fig.10 Switching Characteristics [$T_j=125^{\circ}\text{C}$]

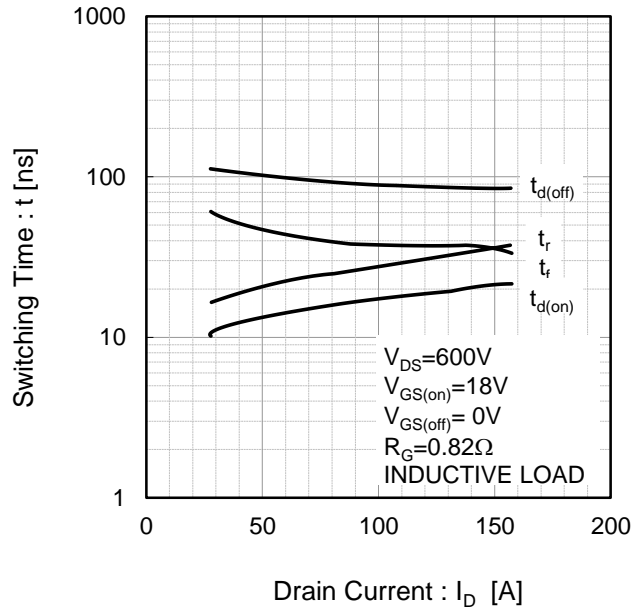


Fig.11 Switching Characteristics [$T_j=150^{\circ}\text{C}$]

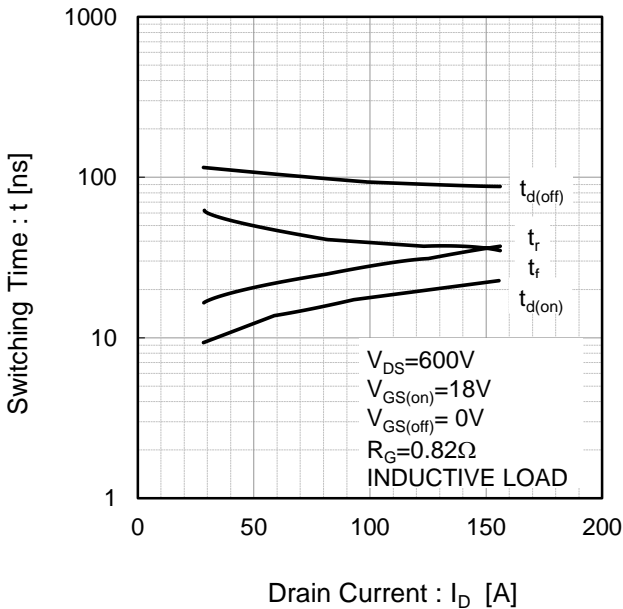
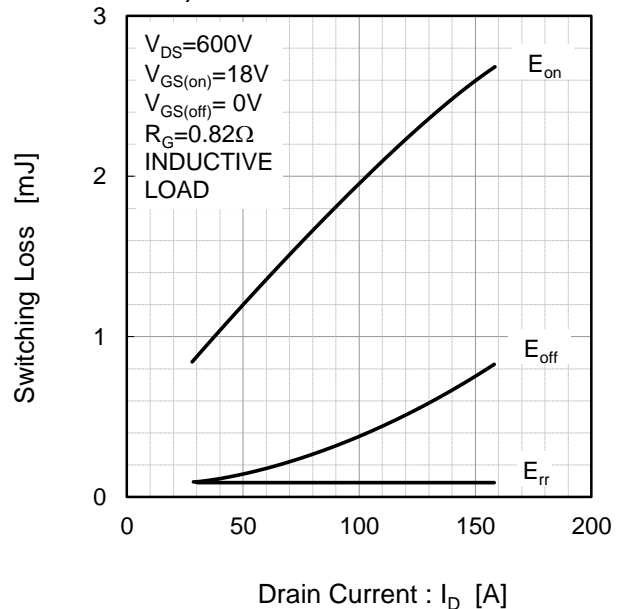


Fig.12 Switching Loss vs. Drain Current [$T_j=25^{\circ}\text{C}$]



●Electrical characteristic curves (Typical)

Fig.13 Switching Loss vs. Drain Current [$T_j=125^{\circ}\text{C}$]

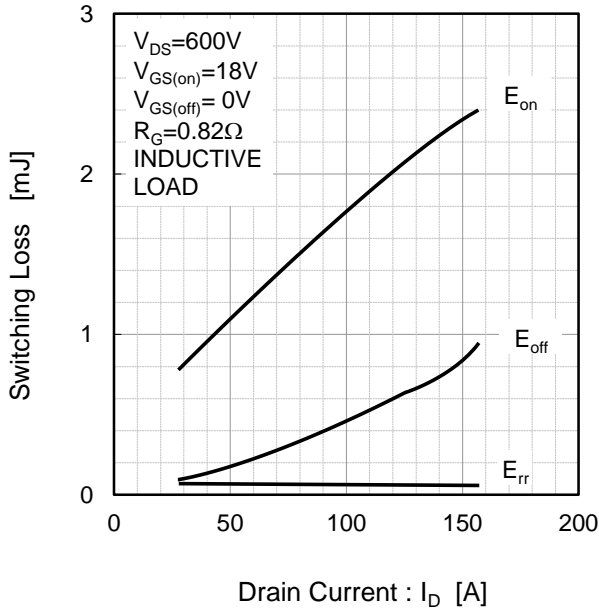


Fig.14 Switching Loss vs. Drain Current [$T_j=150^{\circ}\text{C}$]

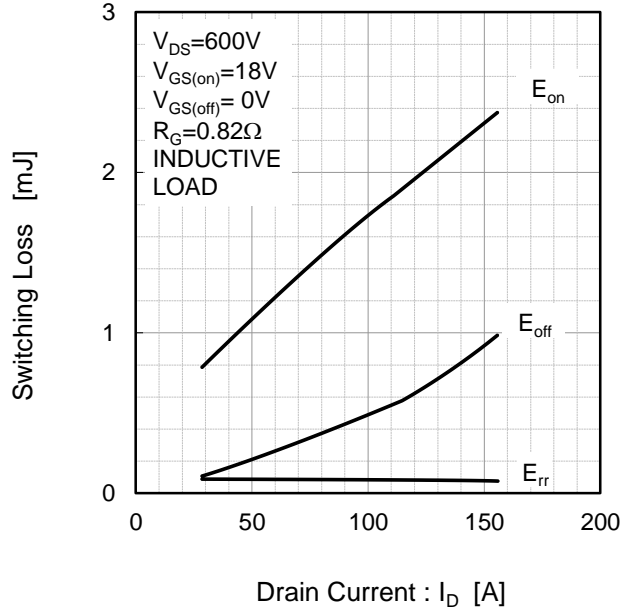


Fig.15 Recovery Characteristics vs. Drain Current [$T_j=25^{\circ}\text{C}$]

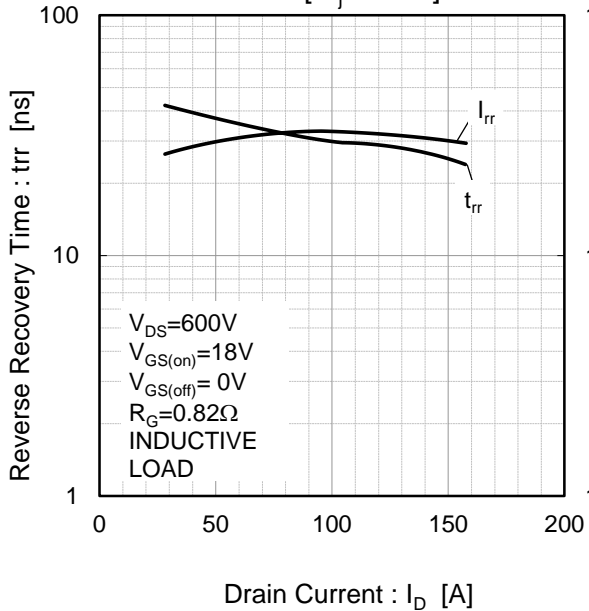
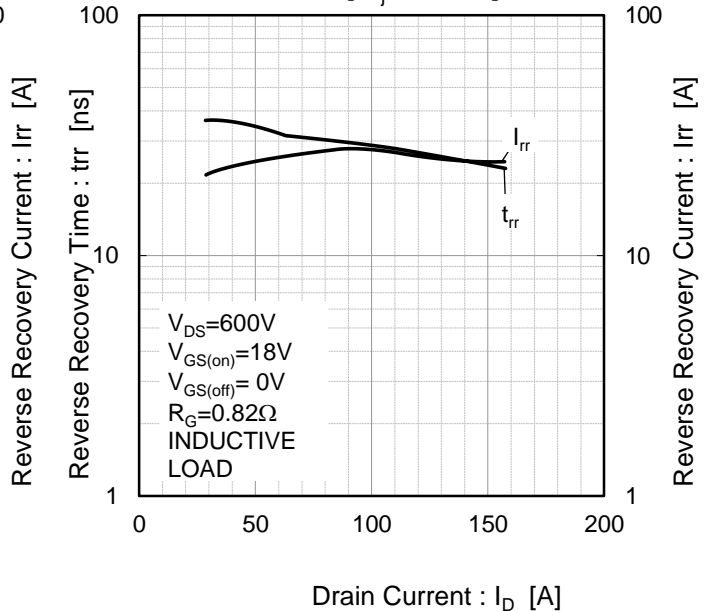


Fig.16 Recovery Characteristics vs. Drain Current [$T_j=125^{\circ}\text{C}$]



●Electrical characteristic curves (Typical)

Fig.17 Recovery Characteristics vs. Drain Current [$T_j=150^\circ\text{C}$]

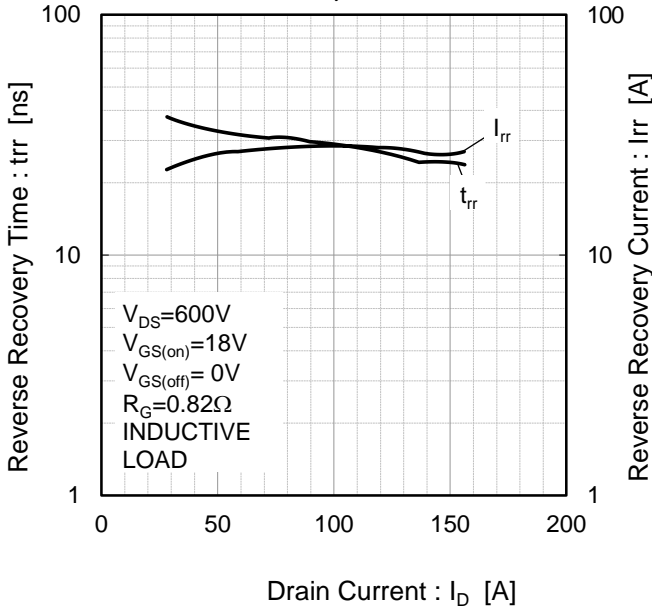


Fig.18 Switching Characteristics vs. Gate Resistance [$T_j=25^\circ\text{C}$]

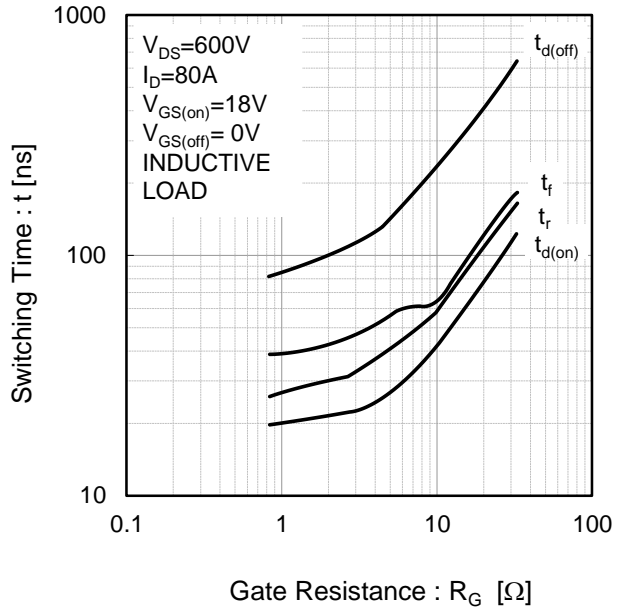


Fig.19 Switching Characteristics vs. Gate Resistance [$T_j=125^\circ\text{C}$]

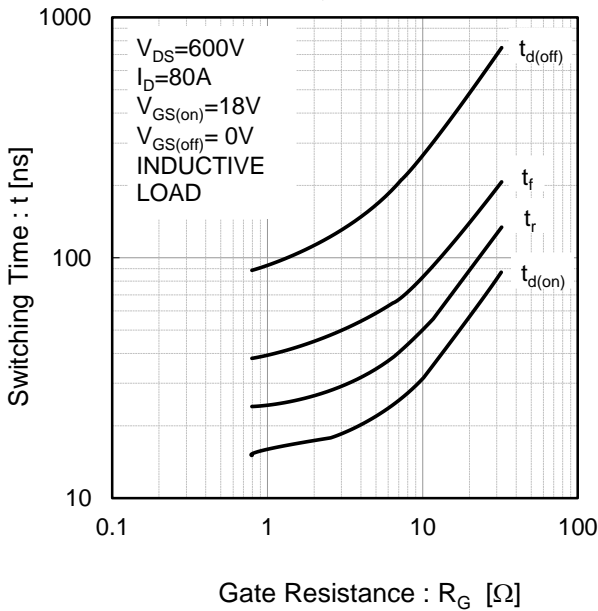
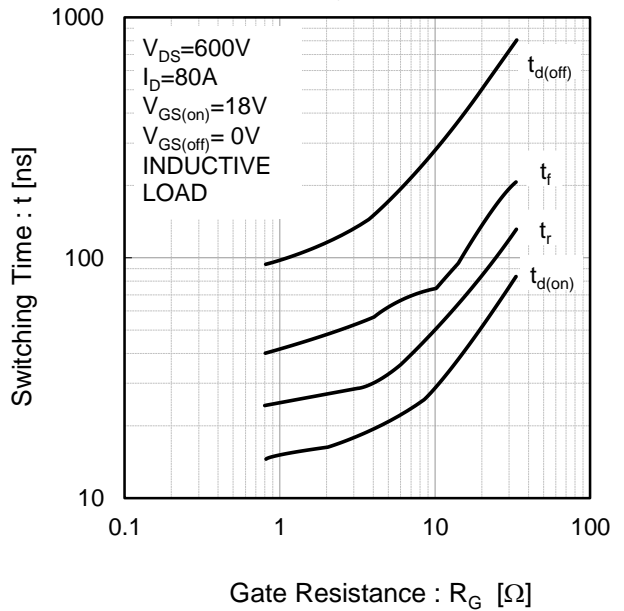


Fig.20 Switching Characteristics vs. Gate Resistance [$T_j=150^\circ\text{C}$]



●Electrical characteristic curves (Typical)

Fig.21 Switching Loss vs. Gate Resistance [$T_j=25^\circ\text{C}$]

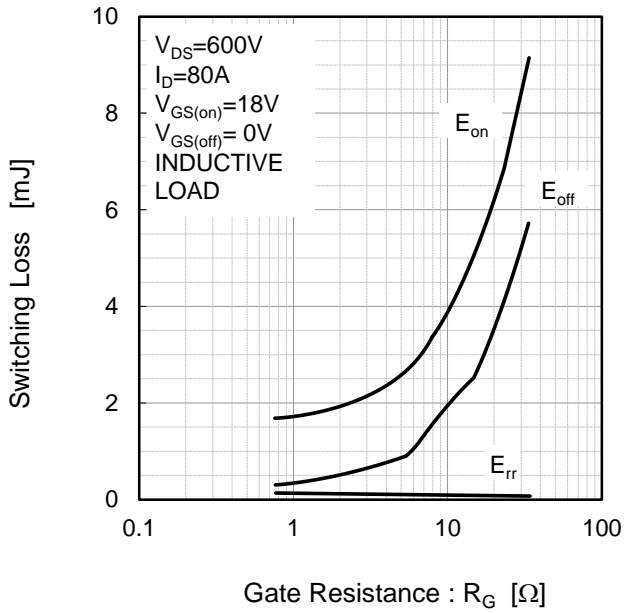


Fig.22 Switching Loss vs. Gate Resistance [$T_j=125^\circ\text{C}$]

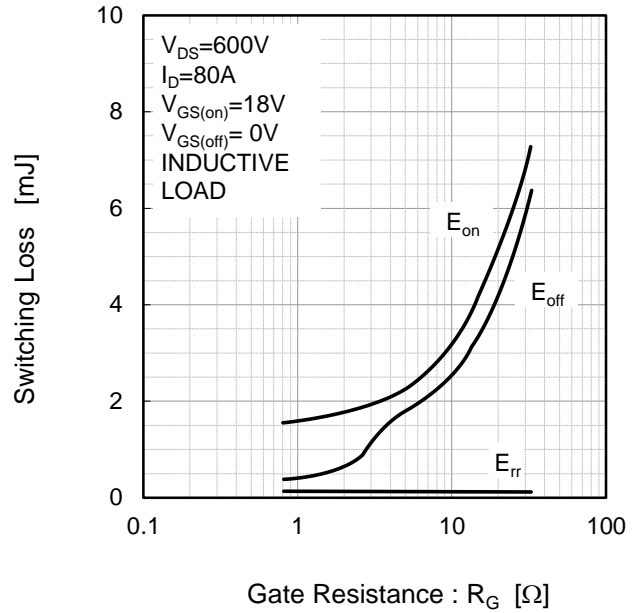
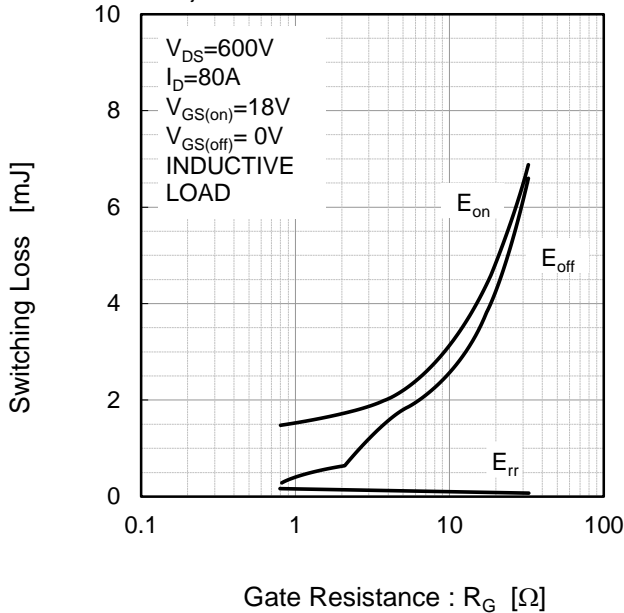


Fig.23 Switching Loss vs. Gate Resistance [$T_j=150^\circ\text{C}$]



●Electrical characteristic curves (Typical)

Fig.24 Typical Capacitance vs. Drain-Source Voltage

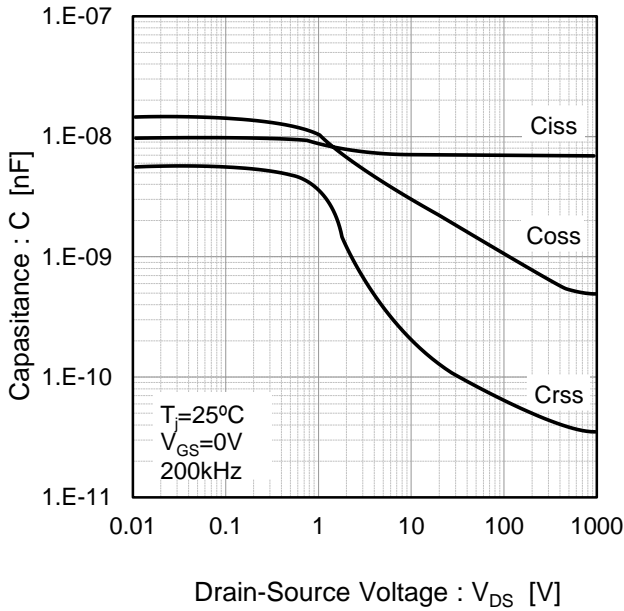


Fig.25 Gate Charge Characteristics [$T_j=25^\circ\text{C}$]

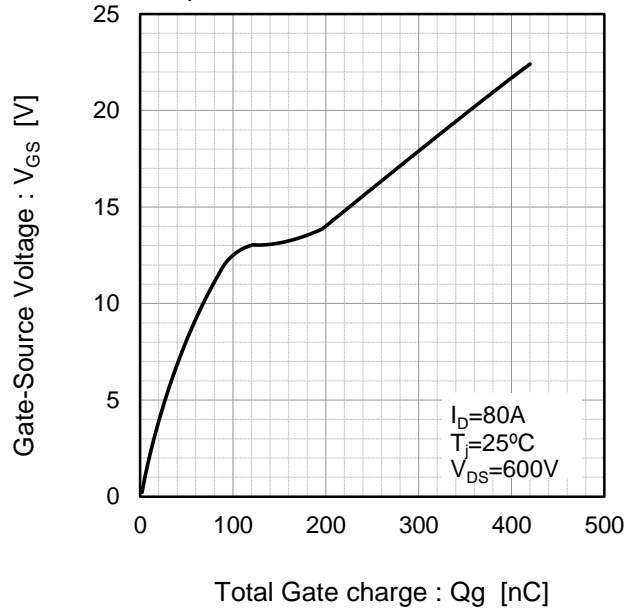
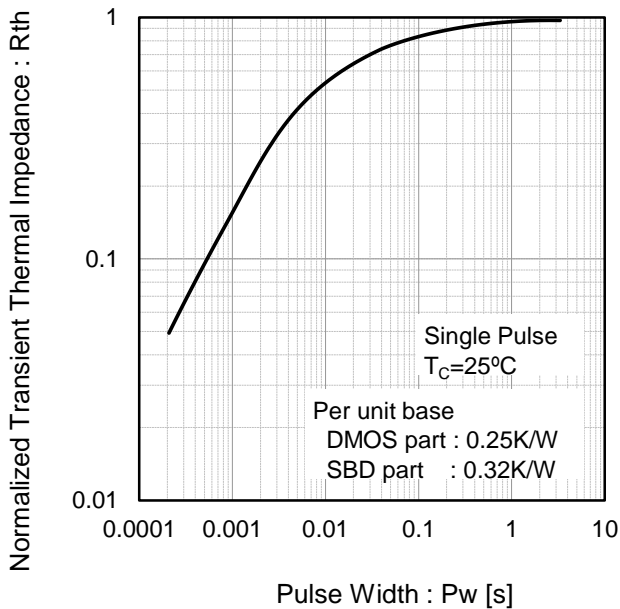


Fig.26 Normalized Transient Thermal Impedance



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Part Number	BSM080D12P2C008
Package	C
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Minimum Package Quantity	12
Packing Type	Tray
Constitution Materials List	inquiry
RoHS	Yes