

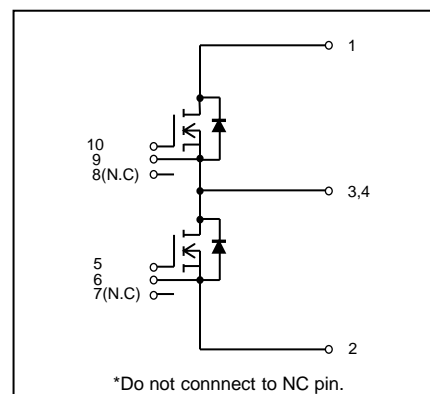
●Application

- 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.

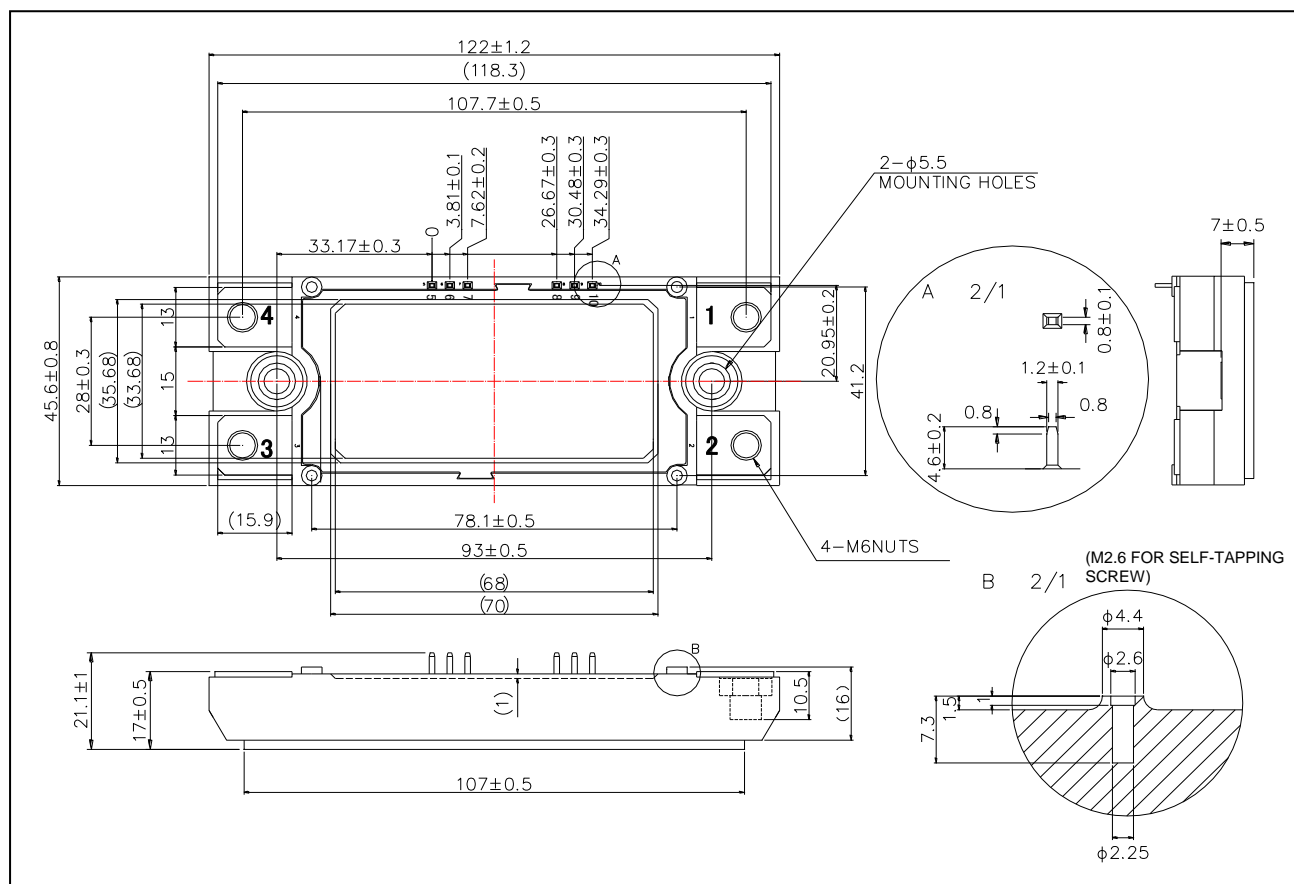
●Circuit diagram



●Construction

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

●Dimensions & Pin layout (Unit : mm)



●Absolute maximum ratings (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(-)			-6	V
Drain current *1	I _D	DC(Tc=60°C)	180	A
	I _{DRM}	Pulse (Tc=60°C) 1ms *2	360	A
Source current *1	I _S	Tc=60°C	180	A
	I _{SRM} *2*3	Pulse (Tc=60°C) 1ms V _{GS} =18V	360	A
		Pulse (Tc=60°C) 10μs V _{GS} =0V	360	A
Total power dissipation *4	P _{tot}	Tc=25°C	1130	W
Junction temperature	Tj		-40 to 150	°C
Storage temperature	Tstg		-40 to 125	°C
Isolation voltage*5	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) 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 150°C (*5) Actual measurement is 3000Vrms/1sec. in accordance with UL1557.

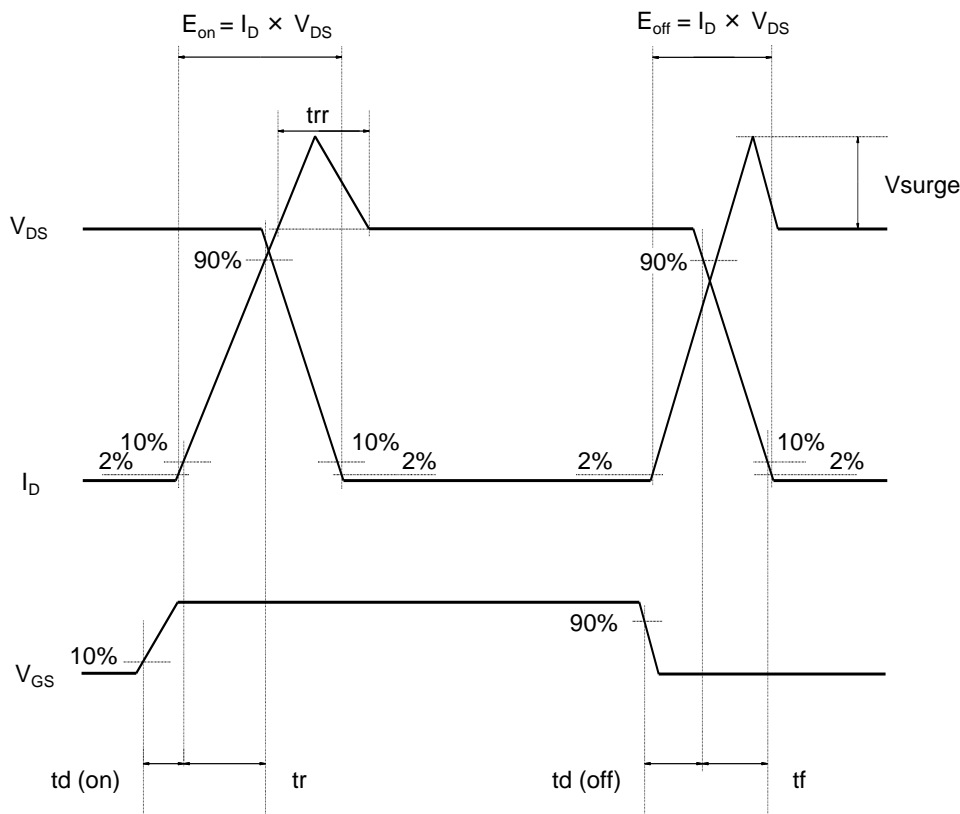
●Electrical characteristics (Tj=25°C)

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	V
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	-	
		V _{GS} =18V, I _S =180A	Tj=25°C	-	2.3	-	
			Tj=125°C	-	3.3	-	
Gate-source threshold voltage	V _{GS(th)}	V _{DS} =10V, I _D =35.2mA		1.6	2.7	4.0	V
Gate-source leakage current	I _{GSS}	V _{GS} =22V, V _{DS} =0V		-	-	0.5	μA
		V _{GS} = -6V, V _{DS} =0V		-0.5	-	-	μA
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	-	ns
	trr			-	50	-	ns
	td(off)			-	300	-	ns
	tr			-	90	-	ns
Input capacitance	Ciss	V _{DS} =10V, V _{GS} =0V, f=1MHz		-	23	-	nF
Internal gate resistor	R _{Gint}	Tj=25°C		-	1.15	-	Ω
Junction-to-case thermal resistance	Rth(j-c)	DMOS (1/2 module) * ⁶		-	-	0.11	°C/W
Case-to-heat sink Thermal resistance	Rth(c-f)	Case to heat sink, per 1 module, Thermal grease applied * ⁷		-	0.035	-	°C/W

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

(*7) 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

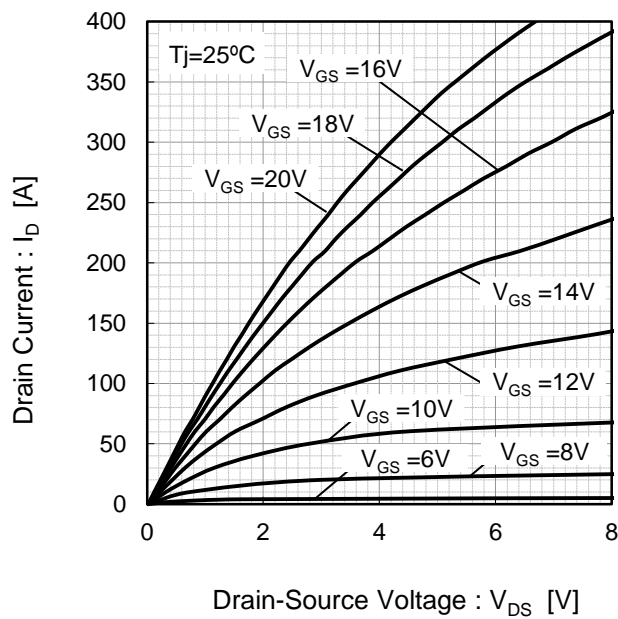


Fig.2 Drain-Source Voltage vs. Drain Current

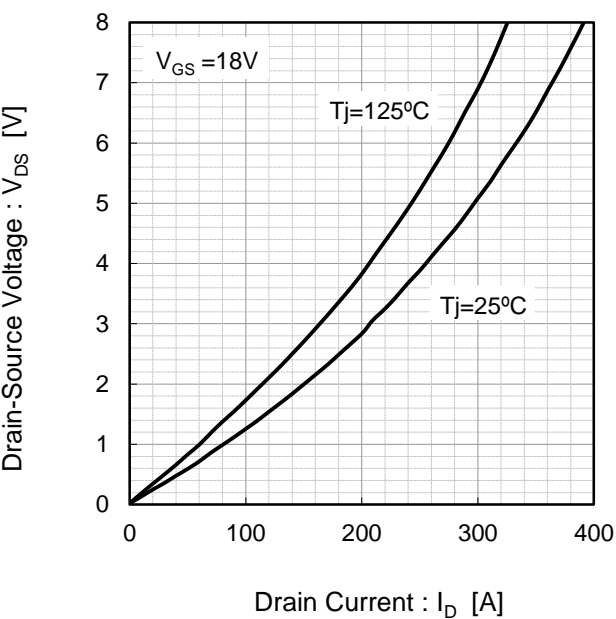


Fig.3 Drain-Source Voltage vs. Gate-Source Voltage

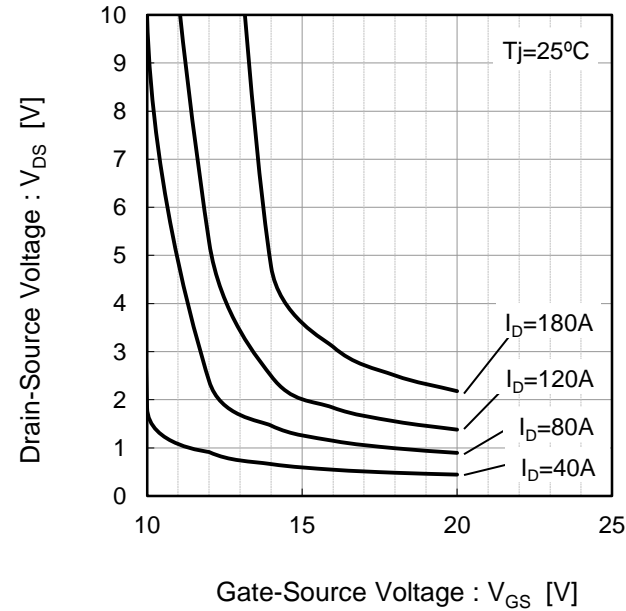
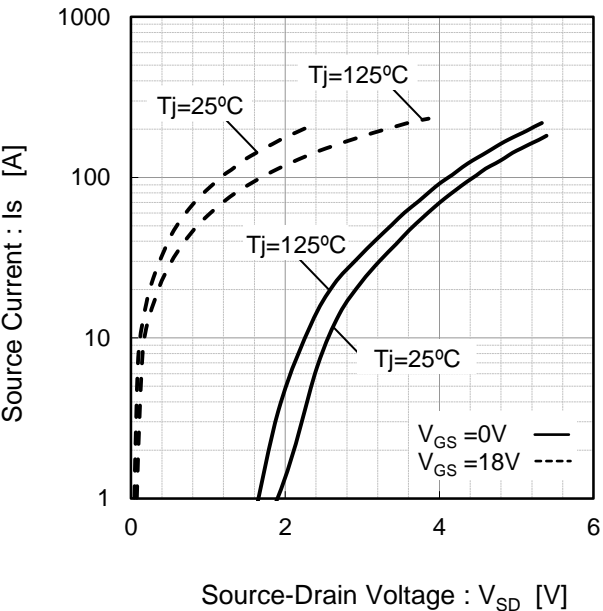


Fig.4 Forward characteristic of Diode



●Electrical characteristic curves (Typical)

Fig.5 Drain Current vs. Gate-Source Voltage

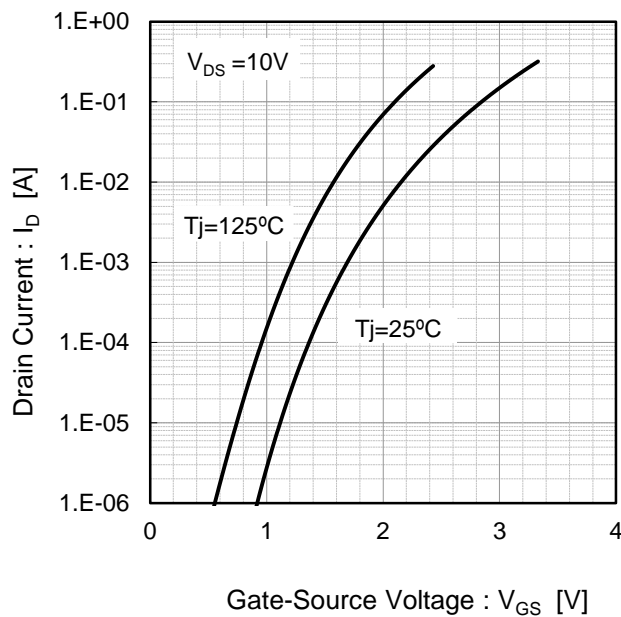


Fig.6 Drain Current vs. Gate-Source Voltage

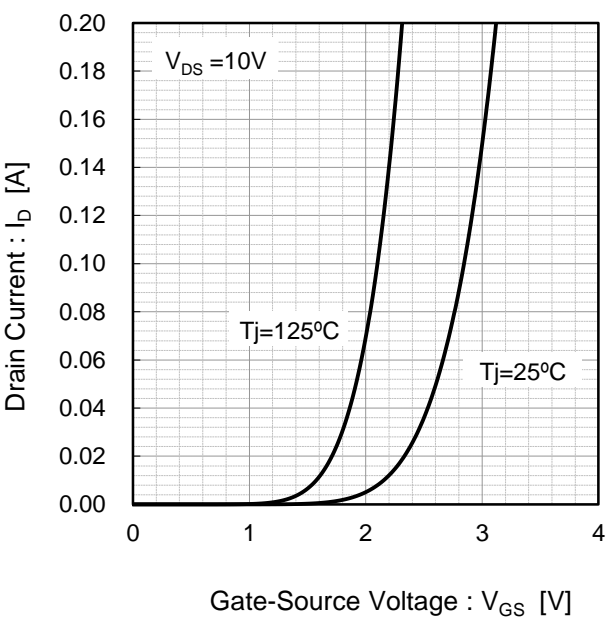


Fig.7 Switching Characteristics [$T_j=25^\circ C$]

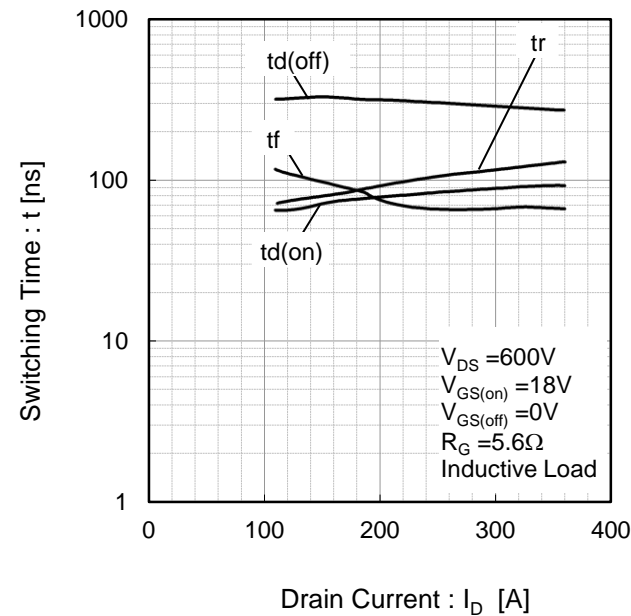
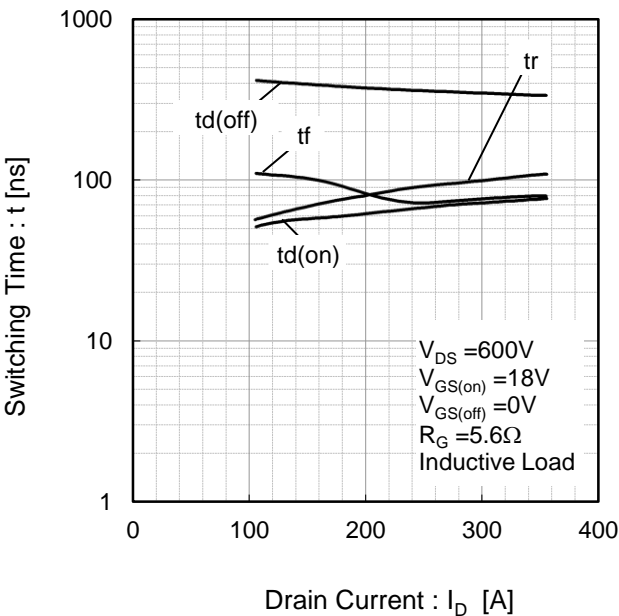


Fig.8 Switching Characteristics [$T_j=125^\circ C$]



●Electrical characteristic curves (Typical)

Fig.9 Switching Loss vs. Drain Current
[Tj=25°C]

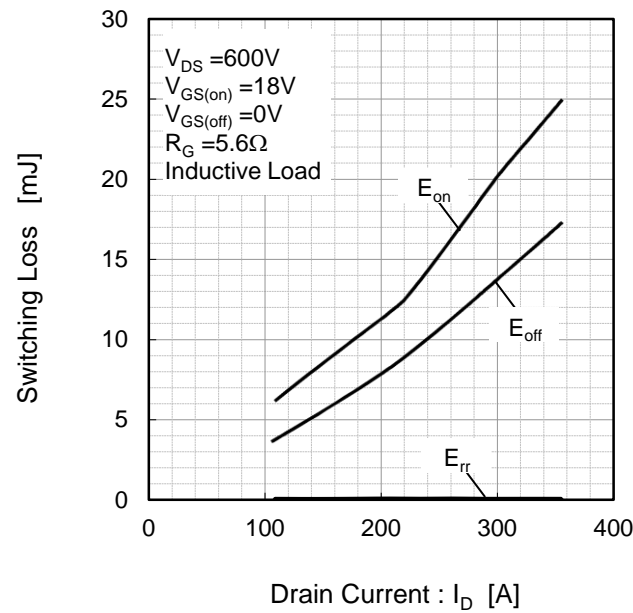


Fig.10 Switching Loss vs. Drain Current
[Tj=125°C]

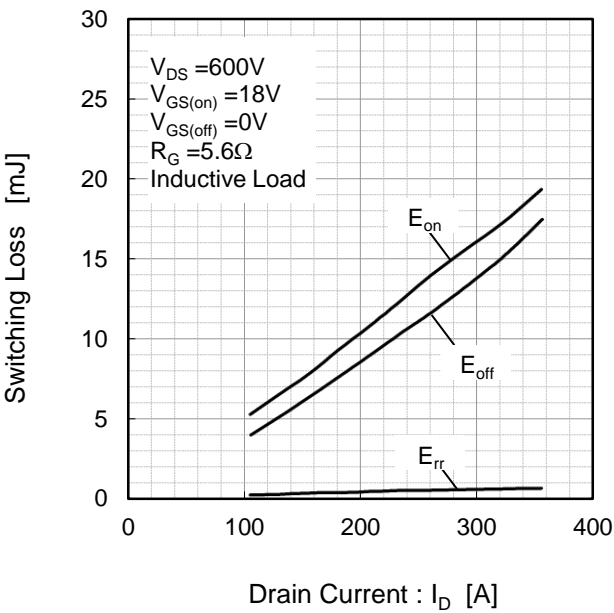


Fig.11 Recovery Characteristics vs.
Drain Current [Tj=25°C]

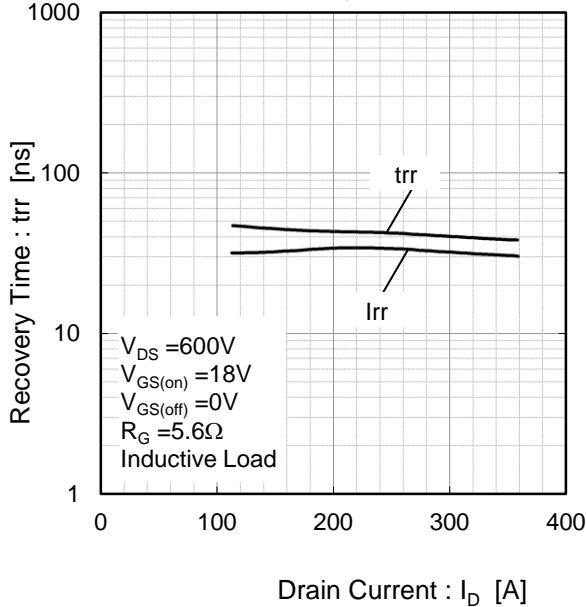
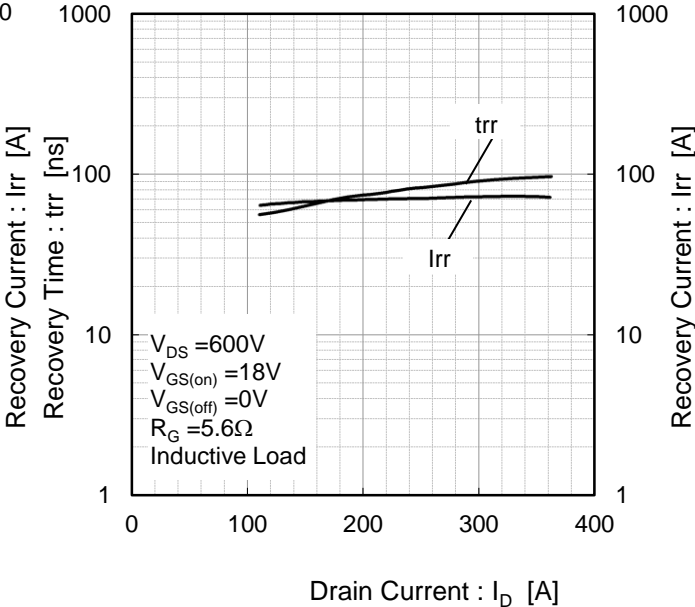


Fig.12 Recovery Characteristics vs.
Drain Current [Tj=125°C]



●Electrical characteristic curves (Typical)

Fig.13 Switching Characteristics vs. Gate Resistance [Tj=25°C]

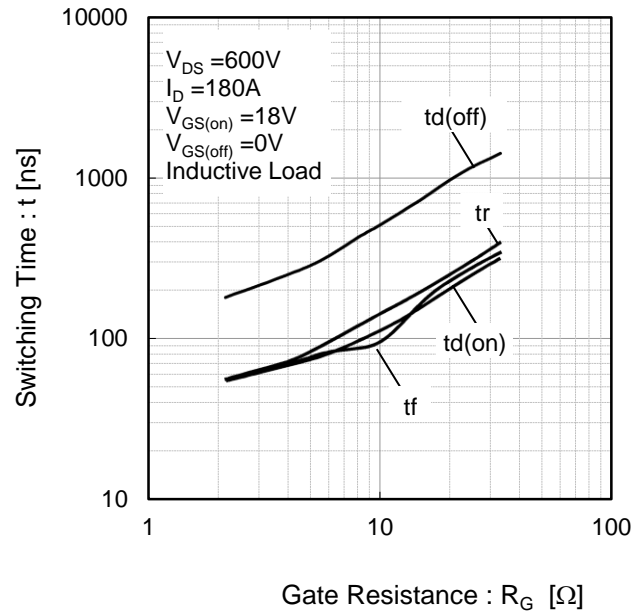


Fig.14 Switching Characteristics vs. Gate Resistance [Tj=125°C]

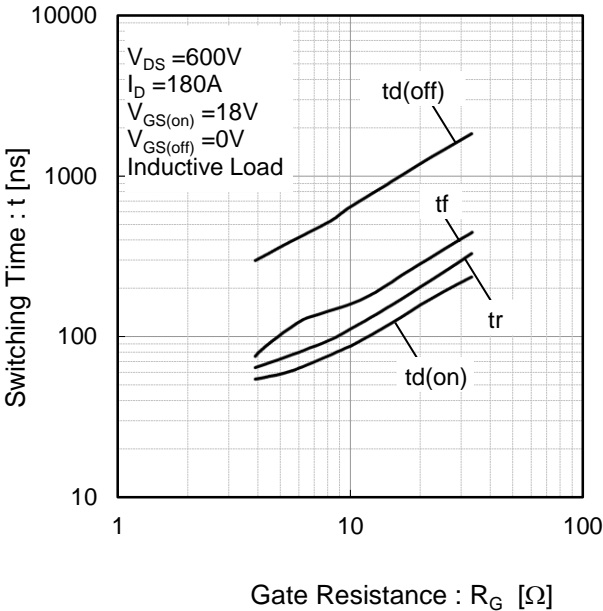


Fig.15 Switching Loss vs. Gate Resistance [Tj=25°C]

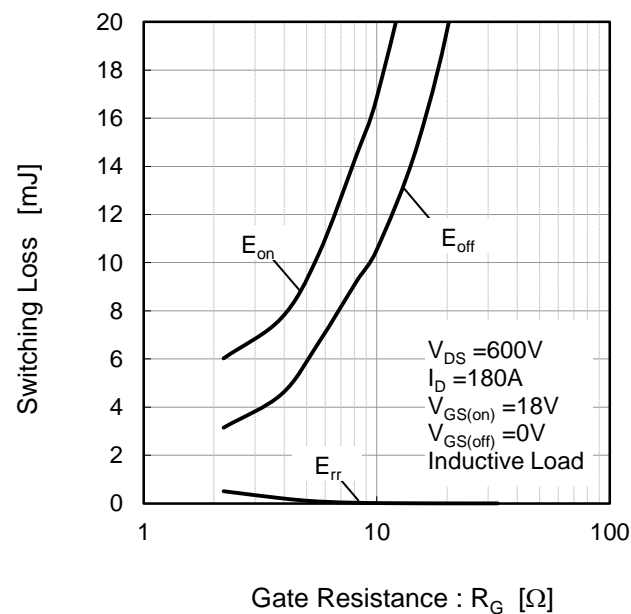
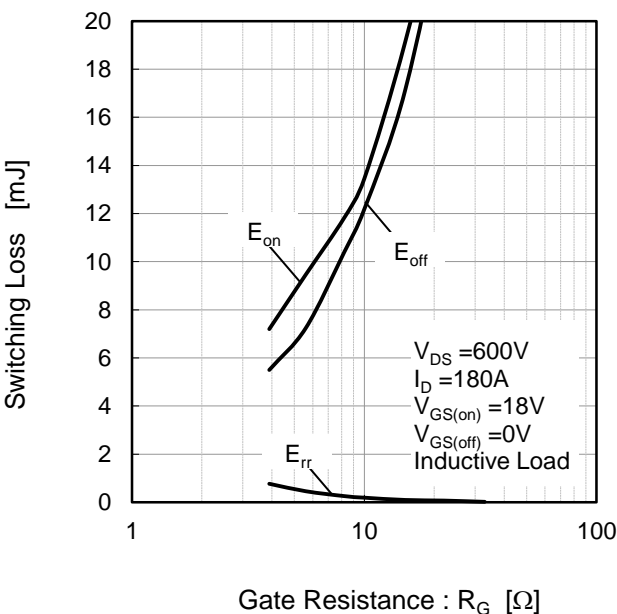


Fig.16 Switching Loss vs. Gate Resistance [Tj=125°C]



●Electrical characteristic curves (Typical)

Fig.17 Typical Capacitance vs. Drain-Source Voltage

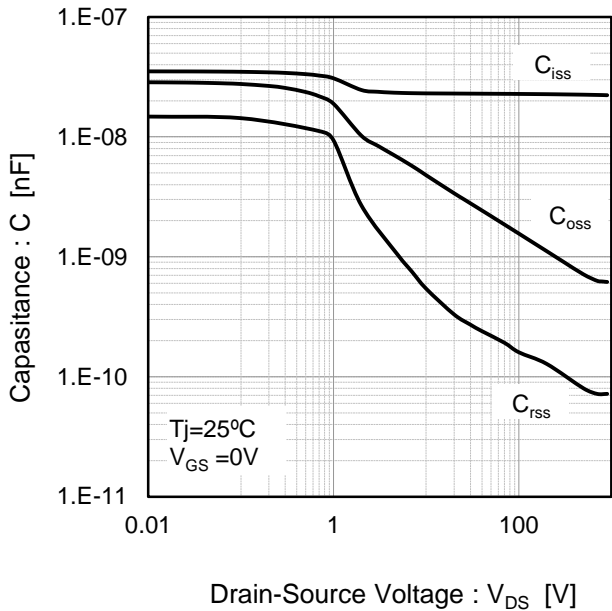


Fig.18 Gate Charge Characteristics [$T_j=25^{\circ}\text{C}$]

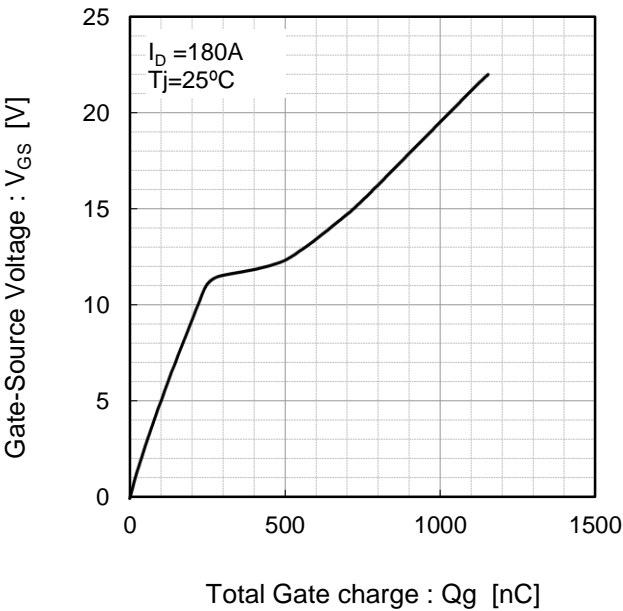


Fig.19 Normalized Transient Thermal Impedance

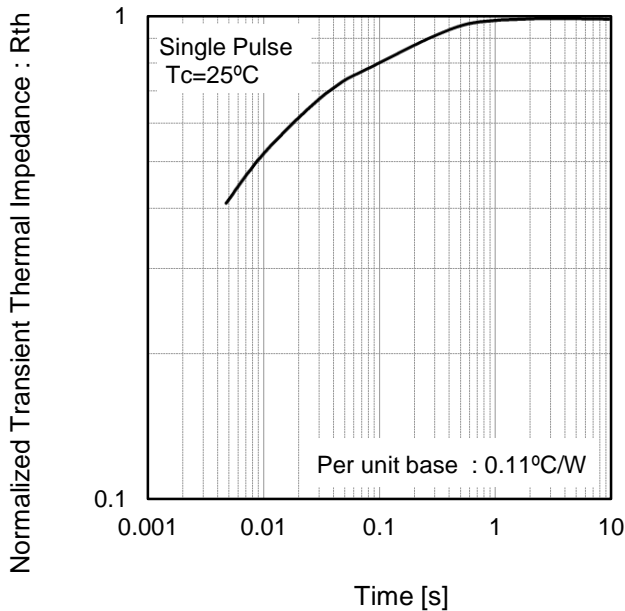
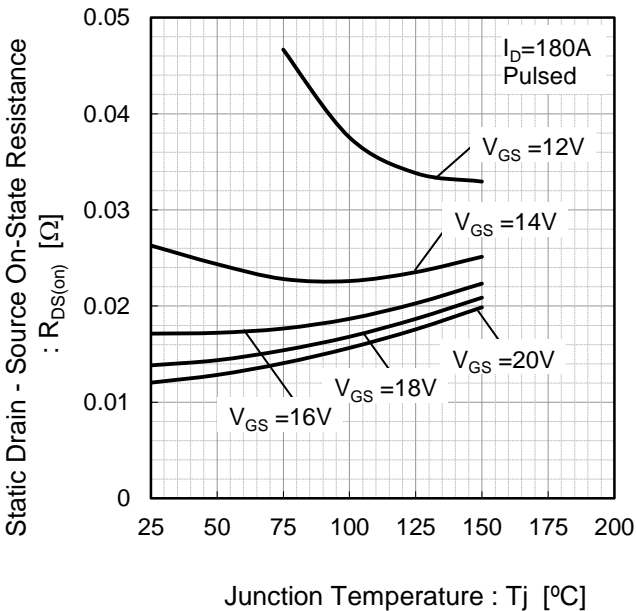


Fig.20 Static Drain - Source On-State Resistance vs. Junction Temperature



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Email amall@ameya360.com

QQ 800077892

Skype ameyasales1 ameyasales2

➤ Customer Service :

Email service@ameya360.com

➤ Partnership :

Tel +86 (21) 64016692-8333

Email mkt@ameya360.com