

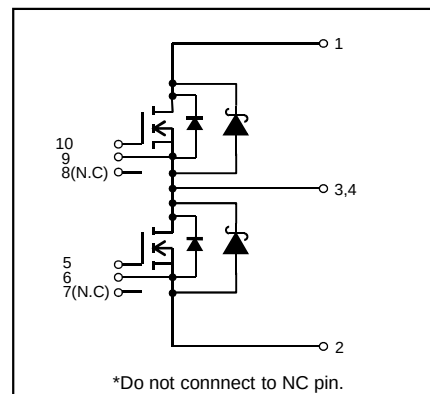
●Application

- 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.

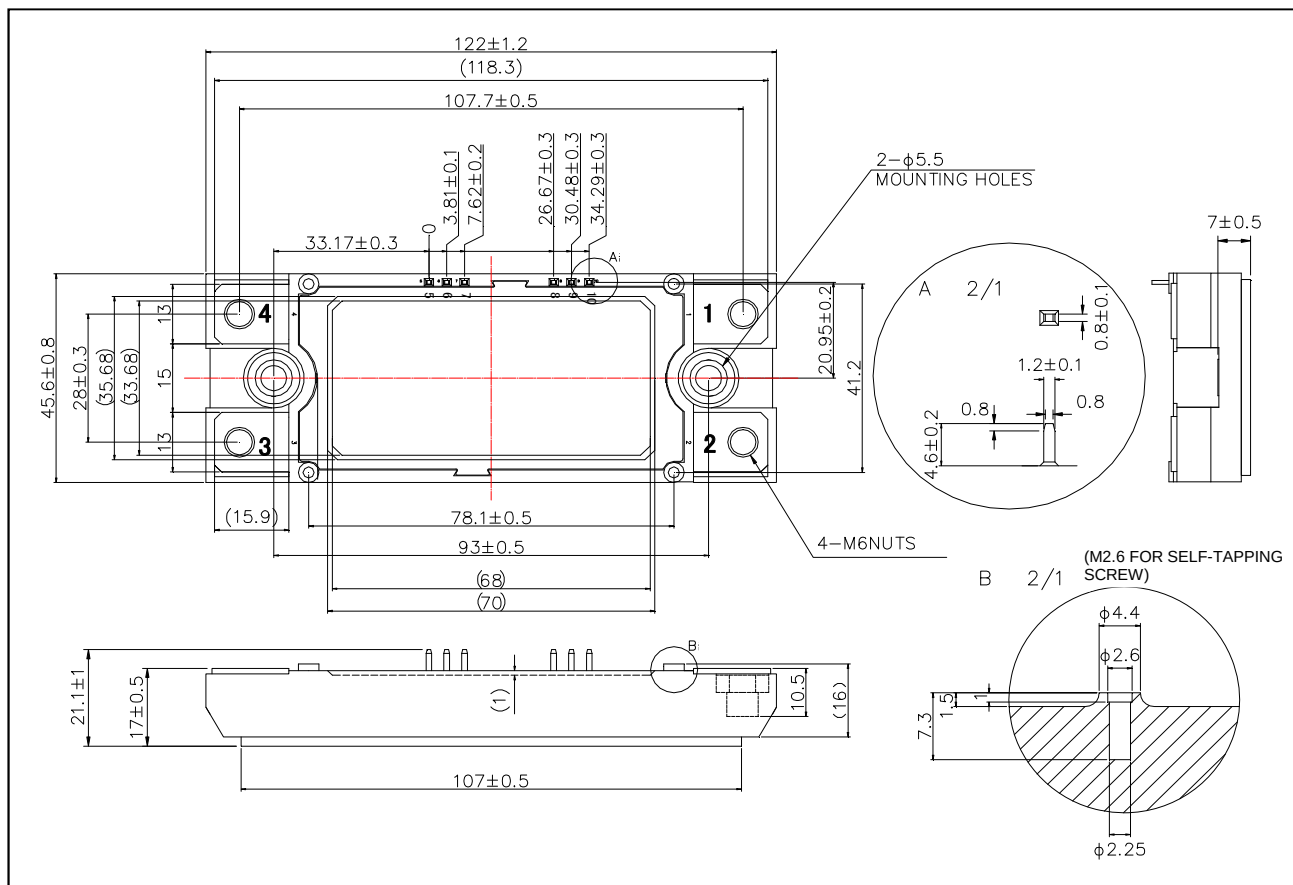
●Circuit diagram



●Construction

This product is a half bridge module consisting of SiC-DMOS and SiC SBD 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)	120	A
	I _{DRM}	Pulse (Tc=60°C) 1ms * ²	240	A
Source current * ¹	I _S	Tc=60°C	120	A
	I _{SRM}	Pulse (Tc=60°C) 1ms * ²	240	A
Total power dissipation * ³	P _{tot}	Tc=25°C	780	W
Junction temperature	T _j		-40 to 150	°C
Storage temperature	T _{stg}		-40 to 125	°C
Isolation voltage* ⁴	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) Tj is less than 150°C (*4) Actual measurement is 3000V/1sec . in accordance with UL1557.

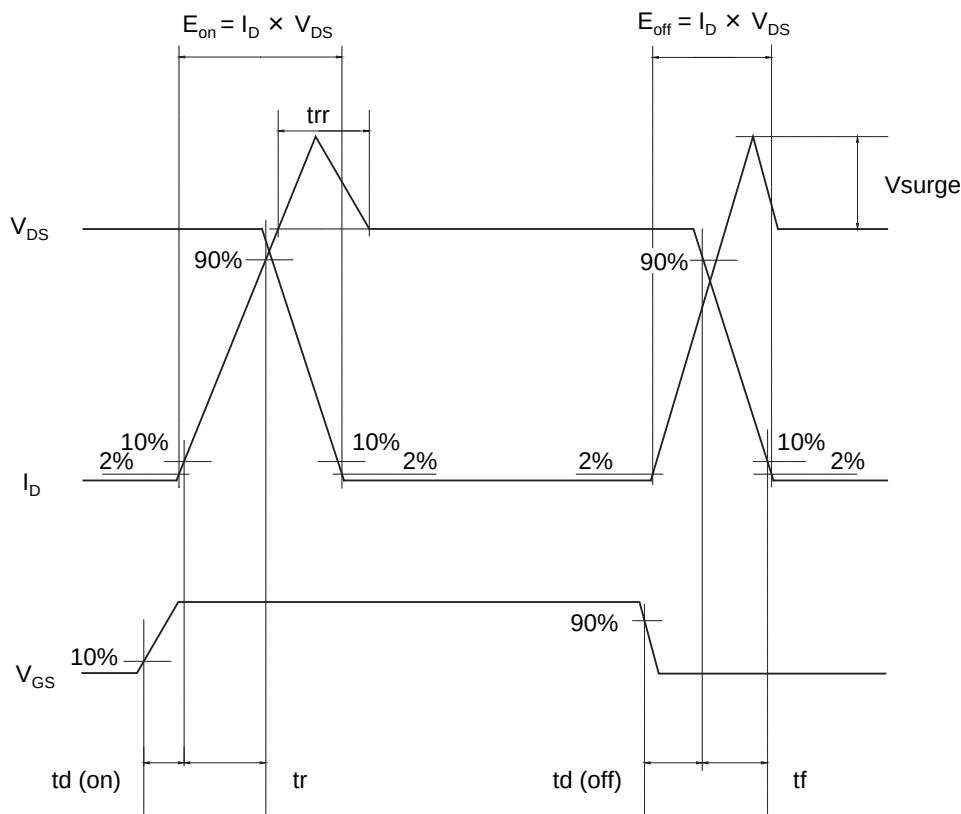
●Electrical characteristics (Tj=25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static drain-source on-state voltage	V _{DS(on)}	I _D =120A, V _{GS} =18V	Tj=25°C	—	2.4	3.2 V
			Tj=125°C	—	3.5	4.6 V
Drain cutoff current	I _{DSS}	V _{DS} =1200V, V _{GS} =0V	—	—	2	mA
Source-drain voltage	V _{SD}	V _{GS} =0V, I _S =120A	Tj=25°C	—	1.7	2.1 V
			Tj=125°C	—	2.2	2.7 V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} =10V, I _D =22mA	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	—	45	—	ns
	tr	V _{DS} =600V	—	50	—	ns
	trr	I _D =120A	—	30	—	ns
	td(off)	R _G =3.9Ω	—	170	—	ns
	tr	inductive load	—	60	—	ns
Input capacitance	Ciss	V _{DS} =10V, V _{GS} =0V, f=1MHz	—	14	—	nF
Junction-to-case thermal resistance	Rth(j-c)	DMOS (1/2 module) * ⁵	—	—	0.16	°C/W
		SBD (1/2 module) * ⁵	—	—	0.21	°C/W
Case-to-heat sink Thermal resistance	Rth(c-f)	Case to heat sink, per 1 module, Thermal grease applied * ⁶	—	0.04	—	°C/W

(*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

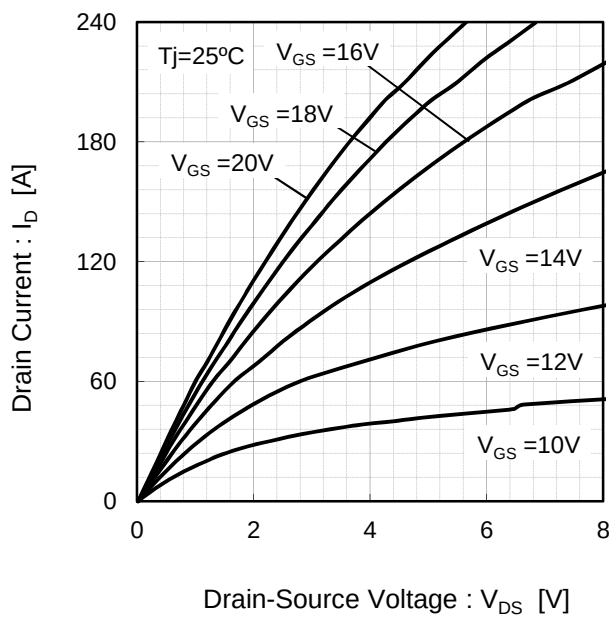


Fig.2 Drain-Source Voltage vs. Drain Current

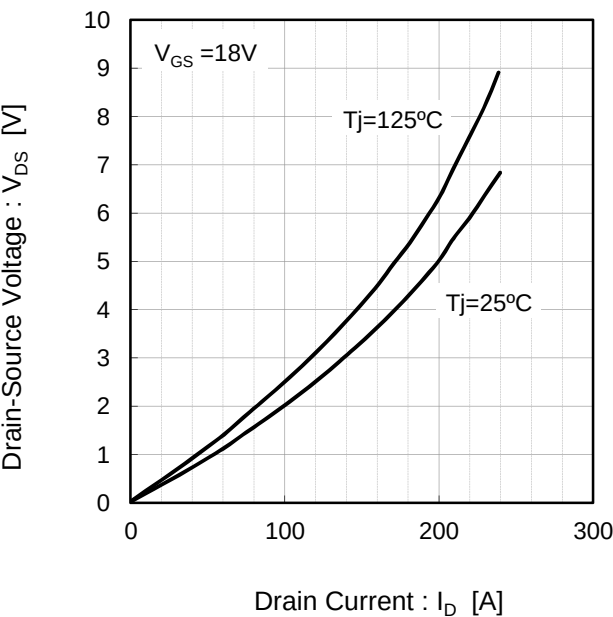


Fig.3 Drain-Source Voltage vs. Gate-Source Voltage

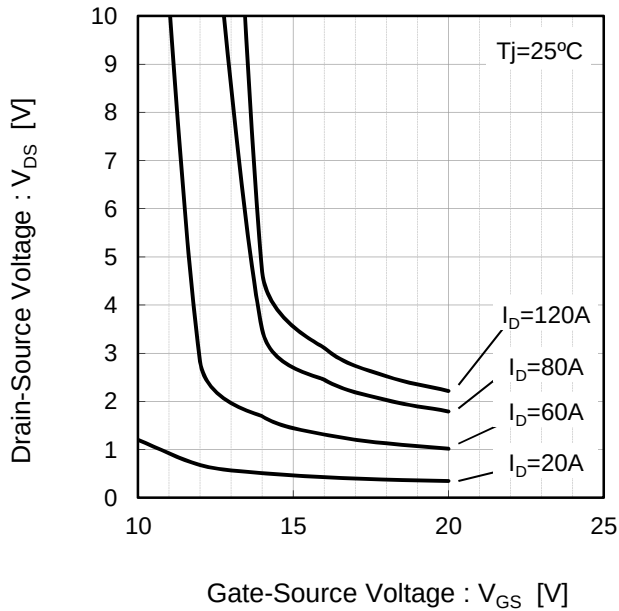
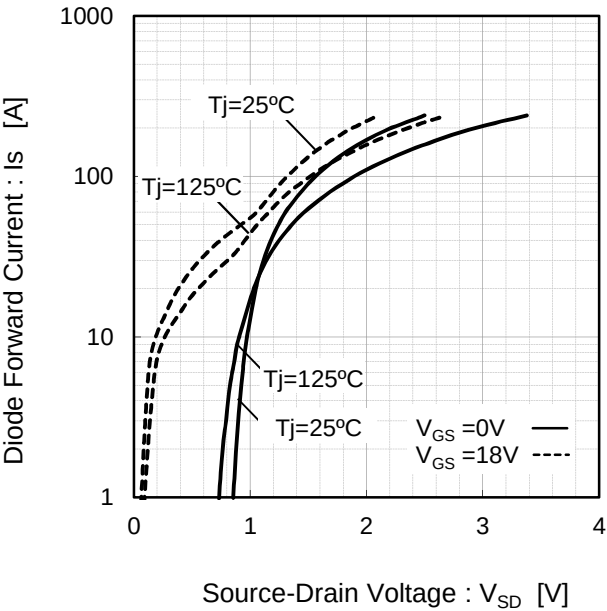


Fig.4 Forward characteristic of Diode-inverter



●Electrical characteristic curves (Typical)

Fig.5 Drain Current vs. Gate-Source Voltage

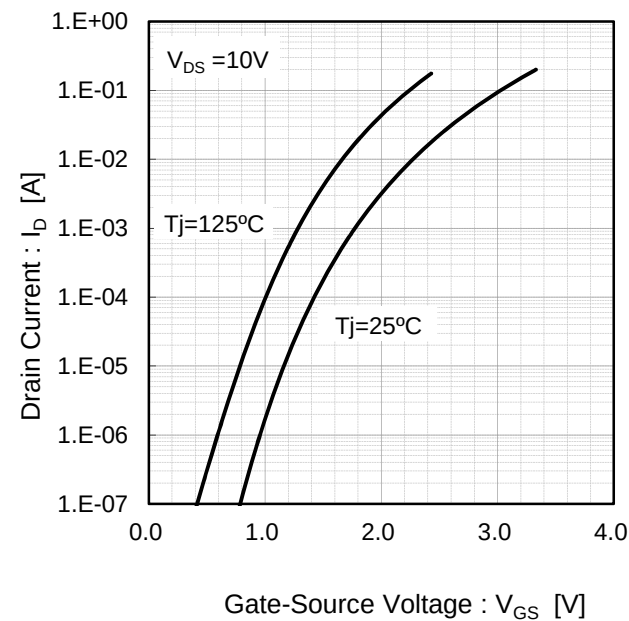


Fig.6 Drain Current vs. Gate-Source Voltage

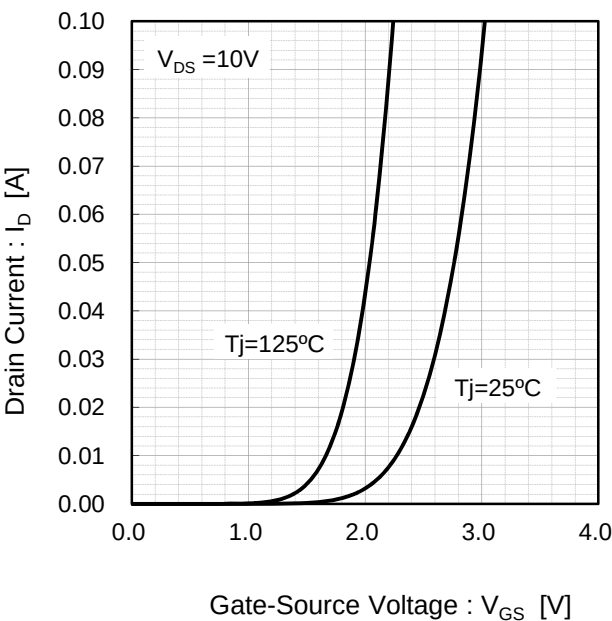


Fig.7 Switching Characteristics [$T_j=25^\circ C$]

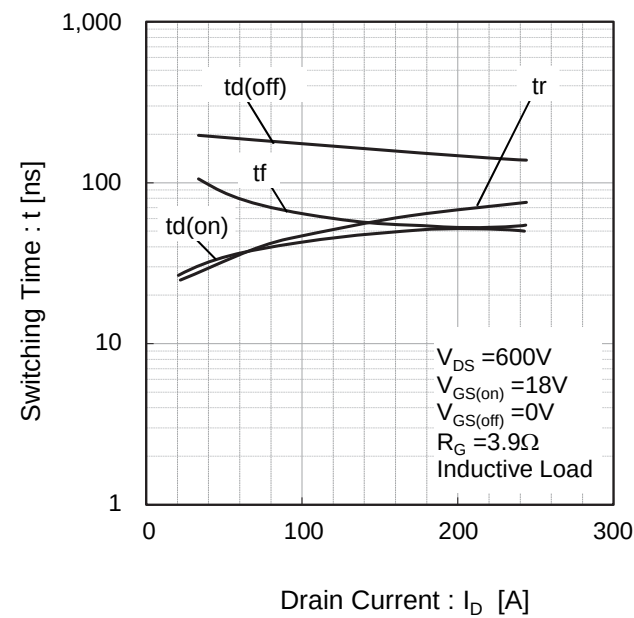
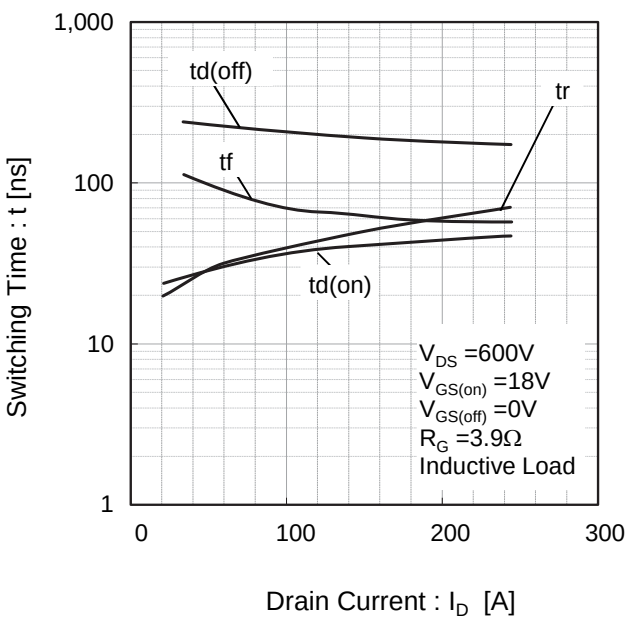


Fig.8 Switching Characteristics [$T_j=125^\circ C$]



●Electrical characteristic curves (Typical)

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

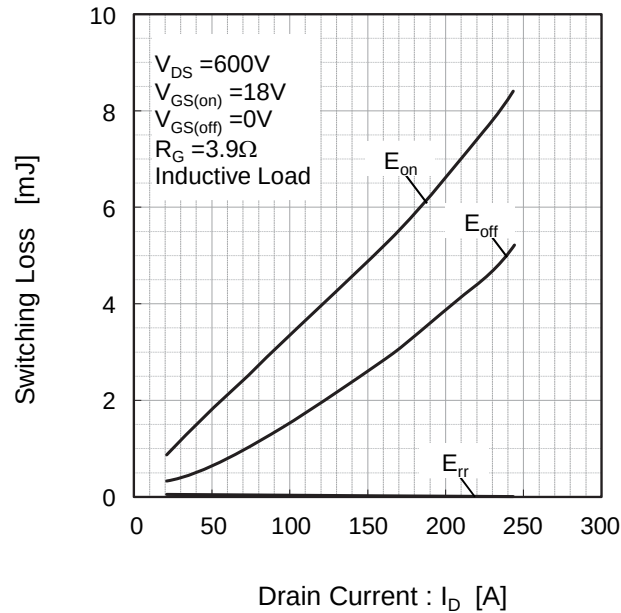


Fig.10 Switching Loss vs. Drain current
[Tj=125°C]

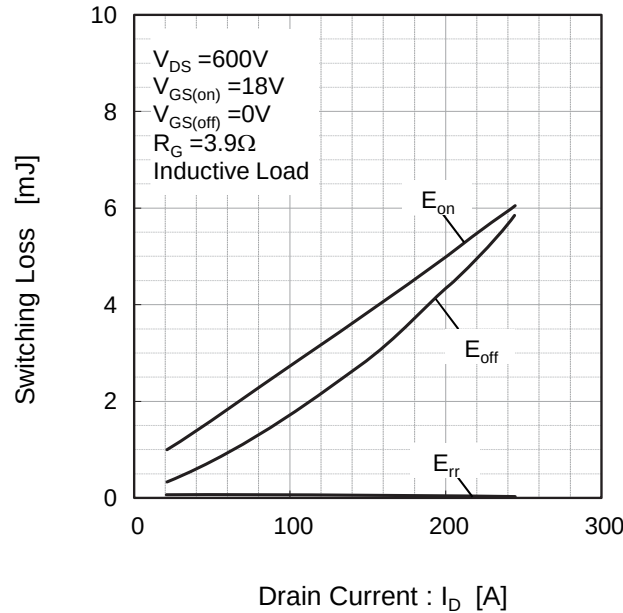


Fig.11 Reverse Recovery Characteristics vs.
Drain Current [Tj=25°C]

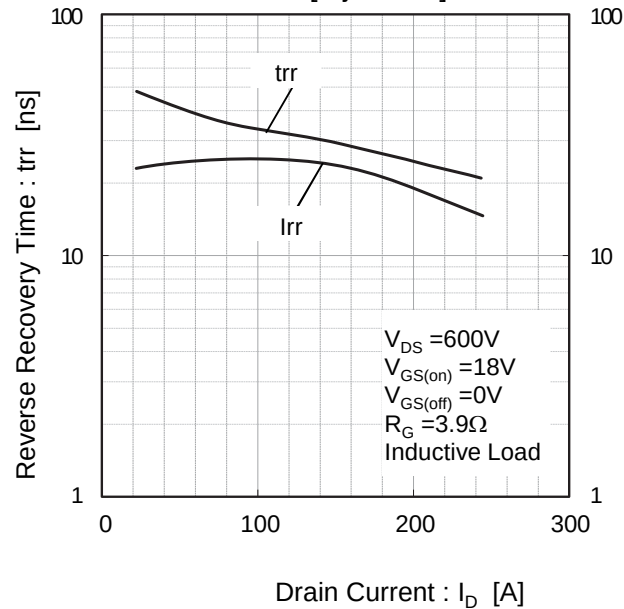
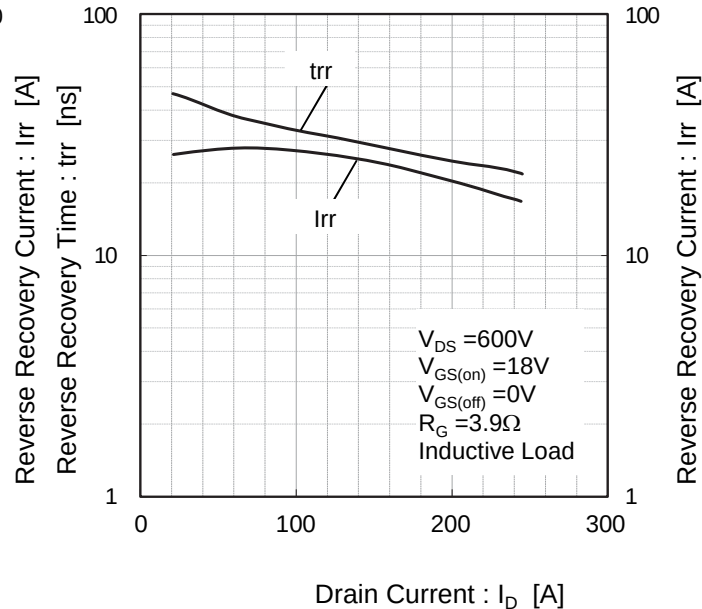


Fig.12 Reverse Recovery Characteristics vs.
Drain Current [Tj=125°C]



●Electrical characteristic curves (Typical)

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

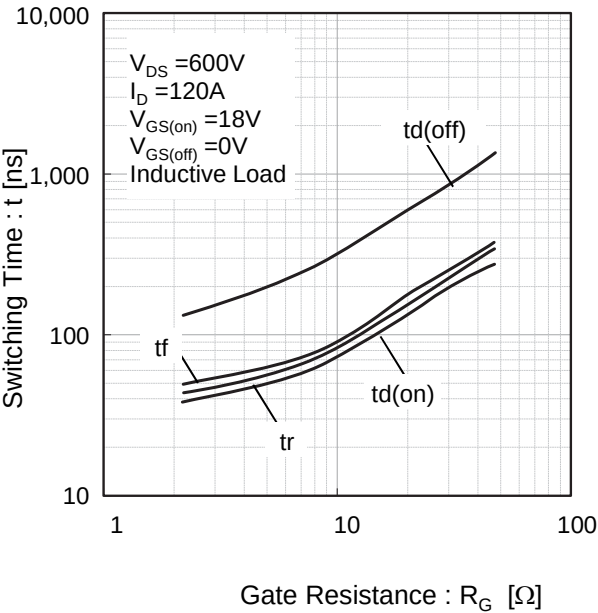


Fig.14 Switching Characteristics vs. Gate Resistance [Tj=125°C]

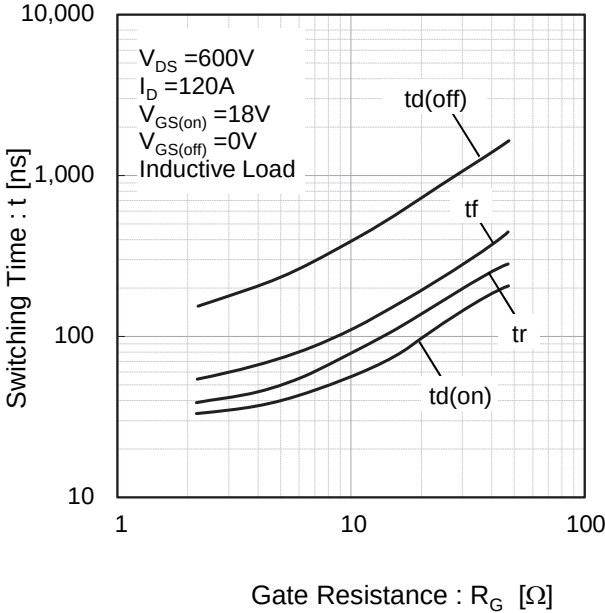


Fig.15 Switching Loss vs. Gate Resistance [Tj=25°C]

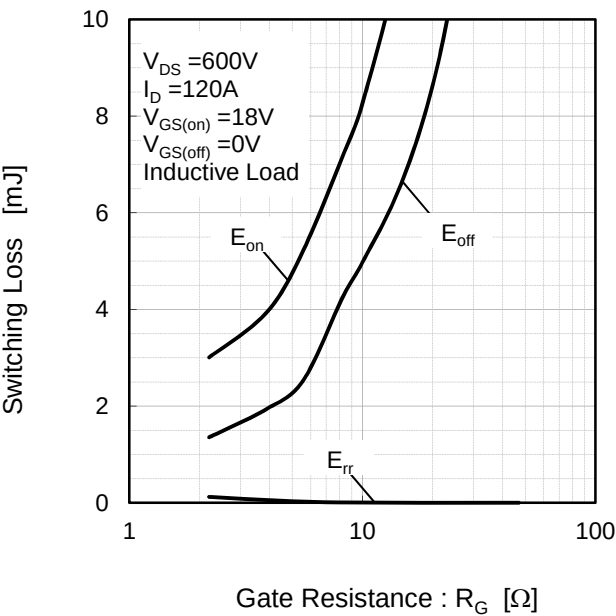
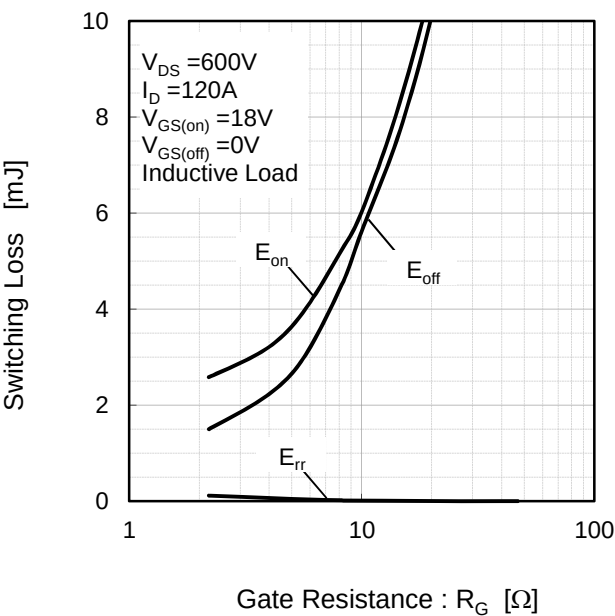


Fig.16 Switching Loss vs. Gate Resistance [Tj=125°C]



●Electrical characteristic curves (Typical)

Fig.17 Typical Capacitance vs. Drain-Source Voltage

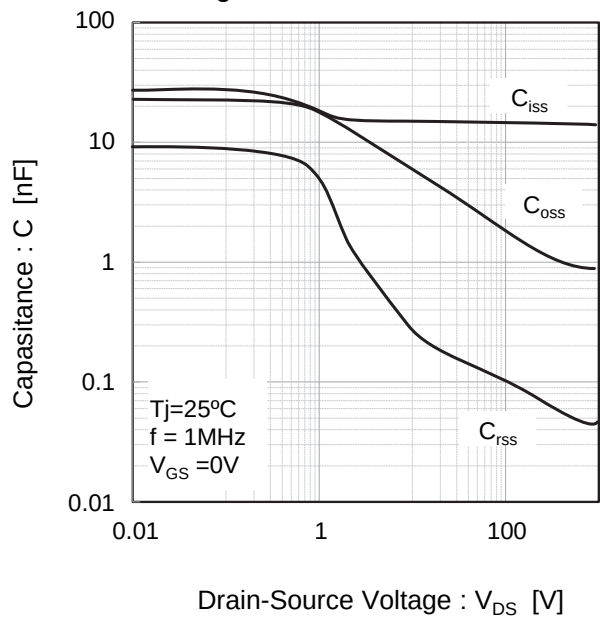


Fig.18 Gate Charge Characteristics
[$T_j=25^{\circ}\text{C}$]

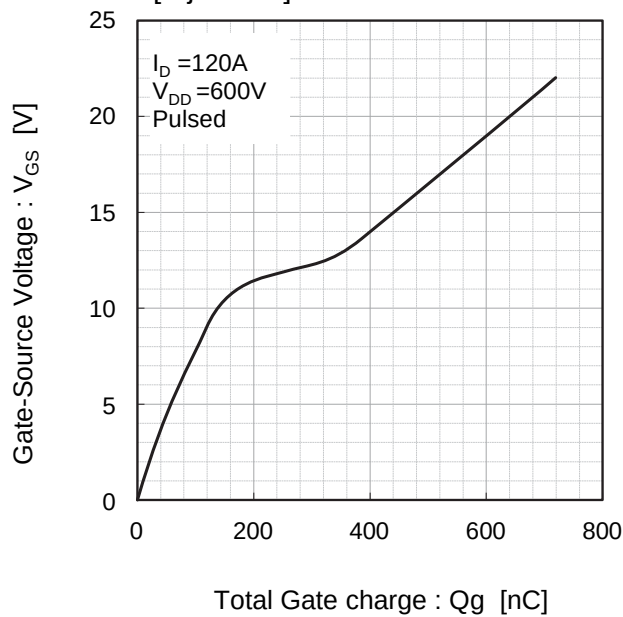


Fig.19 Normalized Transient Thermal Impedance vs. Pulse Width

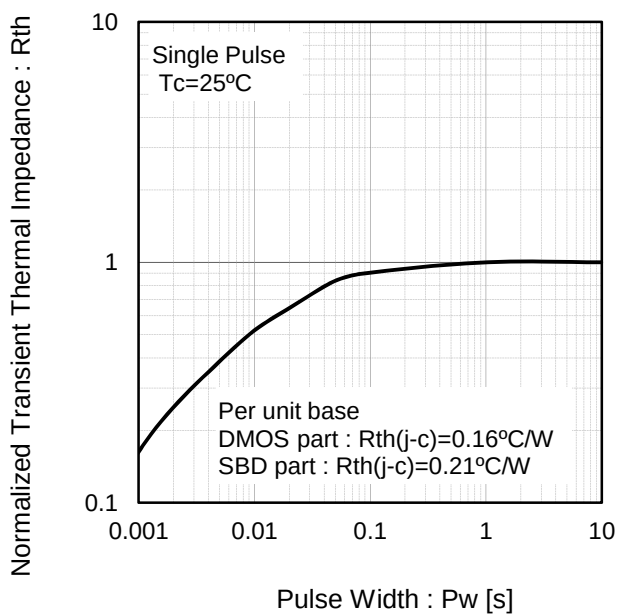
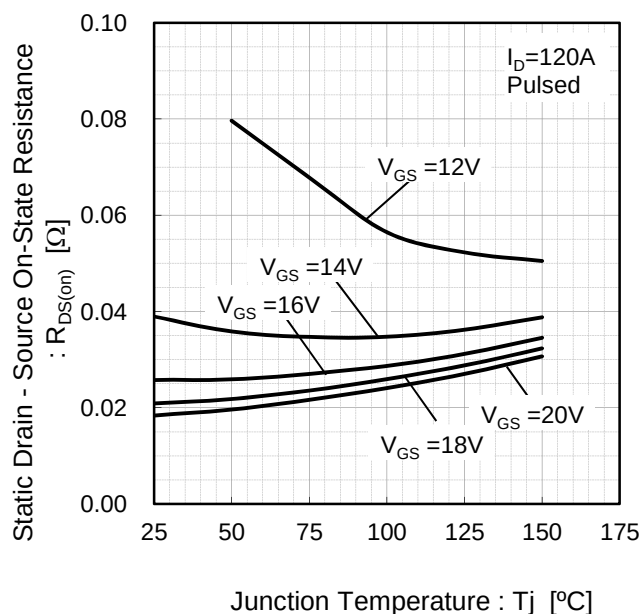


Fig.20 Static Drain - Source On-State Resistance vs. Junction Temperature



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