

< Specifications (Precautions and Prohibitions) >

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• Precaution for circuit design

1) The products are designed and produced for application in ordinary electronic equipment. (AV equipment, OA equipment, telecommunication equipment, home appliances, amusement equipment, etc.)

If the products are to be used in devices requiring extremely high reliability (medical equipment, transport equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or operational error may endanger human life and body, please consult with the ROHM sales staff in advance.

If product malfunctions may result in serious damage, including that to human life and body, sufficient fail-safe measures must be taken, including the following:

[a] Installation of protection circuits or other protective devices to improve system safety

[b] Installation of redundant circuits in the case of single-circuit failure

2) The products are designed for use in a standard environment and not in any special environments. Application of the products in a special environment can deteriorate product performance. Accordingly, verification and confirmation of product performance, prior to use, is recommended if used under the following conditions:

[a] Use in various types of liquid, including water, oils, chemicals, and organic solvents

[b] Use outdoors where the products are exposed to direct sunlight, or in dusty places

[c] Use in places where the products are exposed to sea winds or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, and NO₂

[d] Use in places where the products are exposed to static electricity or electromagnetic waves

[e] Use in proximity to heat-producing components, plastic cords, or other flammable items

[f] Use involving sealing or coating the products with resin or other coating materials

[g] Use involving unclean solder or use of water or water-soluble cleaning agents for cleaning after soldering

[h] Use the products in places subject to dew condensation

3) The products are not radiation resistant.

4) Verification and confirmation of performance characteristics of products, after on-board mounting, is requested.

5) In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse) is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; since exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.

6) De-rate Power Dissipation (Pd) depending on Ambient temperature (Ta).
When used in sealed area, confirm the actual ambient temperature.

7) Confirm that operation temperature is within the specified range described in product specification.

8) Failure induced under deviant condition from what is defined in the product specification can not be guaranteed.

9) Please change the module for new one if it got short-circuit, as its internal structure should become abnormal by damage.

10) Should you have any doubt about the safety of this product, please immediately inform to ROHM, as well as studying technical counter measure in parallel.

DESIGN

CHECK

APPROVAL

Date 2012. 8. 10

SPECIFICATION No.
Tentative

Rev. E

ROHM Co., Ltd.

Masashi
Yoshizumi
Hiroto
Tomita
Kayuhide
Chun

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• Precaution for Mounting / Circuit board design

- 1) When a highly active halogenous (chlorine, bromine, etc.) flux is used, the remainder of flux may negatively affect product performance and reliability.
- 2) In principle, the hand soldering method must be used to signal pin.
- 3) Do not apply force to a power terminal or signal terminal more than needed.
Thereby, faults, such as disconnection, may be caused.
- 4) When you attach a module to the radiator, please apply the thermal paste for heat conductions.

• Precautions Regarding Application Examples and External Circuits

- 1) If change is made to the constant of an external circuit, allow a sufficient margin due to variations of the characteristics of the products and external components, including transient characteristics, as well as static characteristics.
- 2) The application examples, their constants, and other types of information contained herein are applicable only when the products are used in accordance with standard methods. Therefore, if mass production is intended, sufficient consideration to external conditions must be made.

• Precaution for Electrostatic

This product is Electrostatic sensitive product, which may be damaged due to Electrostatic discharge. Please take proper caution during manufacturing and storing so that voltage exceeding Product maximum rating won't be applied to products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

• Precaution for Storage / Transportation

- 1) Product performance and soldered connections may deteriorate if the products are stored in the following places:

[a] Where the products are exposed to sea winds or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, and NO₂

[b] Where the temperature or humidity exceeds those recommended by the Company
Temperature: 5°C - 40°C, Humidity 30% - 80% (Put condition for individual product)

[c] Storage in direct sunshine or condensation

[d] Storage in high Electrostatic

- 2) Store / transport cartons in the correct direction, which is indicated on a carton as a symbol. Otherwise leads may occur due to excessive stress applied when dropping of a carton.

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- Precaution for disposition

When disposing products please dispose them properly with an industry waste company.

- Prohibitions Regarding Industrial Property

1) These Specifications contain information related to the ROHM industrial property. Any use of them other than pertaining to the usage of appropriate products is not permitted. Duplication of these Specifications and its disclosure to a third party without the Company's permission is prohibited.

2) Information and data on products, including application examples, contained in these specifications are simply for reference; the Company does not guarantee any industrial property rights, intellectual property rights, or any other rights of a third party regarding this information or data. Accordingly, the Company does not bear any responsibility for

[a] infringement of the intellectual property rights of a third party

[b] any problems incurred by the use of the products listed herein.

3) The Company prohibits the purchaser of its products to exercise or use the intellectual property rights, industrial property rights, or any other rights that either belong to or are controlled by the Company, other than the right to use, sell, or dispose of the products.

- Other Matters

1) Please sign these Specifications and return one copy to the Company.

If a copy is not returned within three months after the issued date specified on the front page of these specifications, the Company will consider the Specifications accepted.

2) When you evaluate the performance of the products, be sure to;

- use the products within the absolute maximum rating and apply circuit protection devices to shut down over current

- take adequate safety measure against injury or damage to your property caused by unexpected malfunction of the samples. At worse, the products may explode and may cause serious damage including that to human life, even when you treat them properly

3) If any matter related to these Specifications needs to be clarified, discussions shall be held promptly between the two parties concerned to determine the issue.

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TABLE

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1. PART NUMBER BSM180D12P2C101

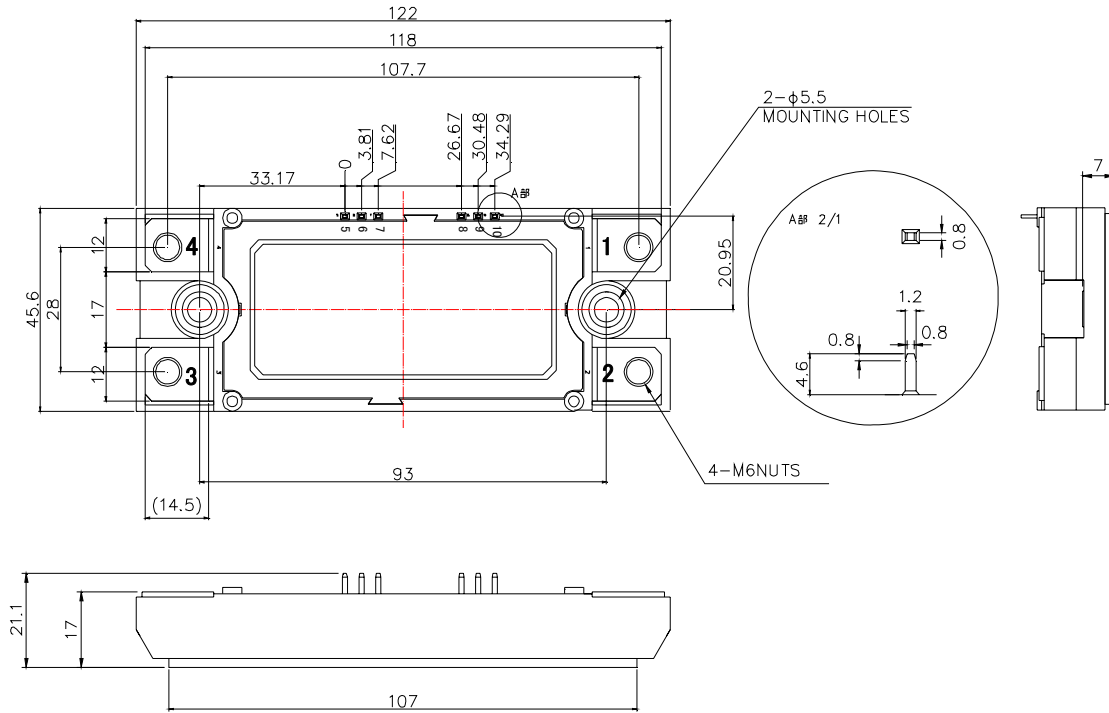
2. STRUCTURE This product is a half bridge module consisting of SiC-DMOS from ROHM.

3. APPLICATION Motor Drive ,etc

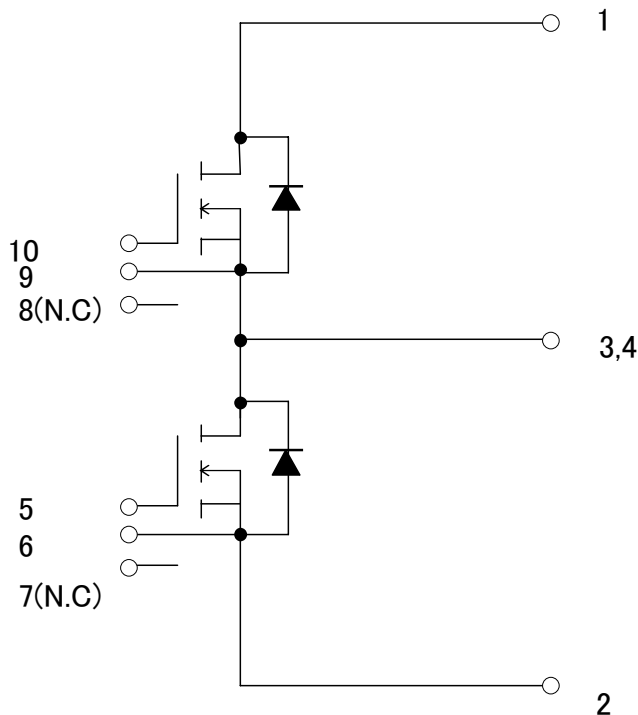
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4. OUTLINE & PIN LAYOUT

Unit: mm



5 . CIRCUIT DIAGRAM



※Do not connect anything to NC pin.

6 . MAXIMUM RATING (Tj=25°C)
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PARAMETER	PIN	SYMBOL	CONDITIONS	RATINGS	UNIT
Drain-Source Voltage	D-S	V _{DS}	G-S short	1200	V
Gate-source Voltage (+)	G-S	V _{GS}	D-S Short	22	V
Gate-source Voltage (-)	G-S	V _{GS}	D-S Short	-6	V
Drain Current Note 1)	D-S	I _D	DC (Tc = 60°C)	180	A
		I _{DRM}	Pulse (Tc = 60°C) 1ms Note 2)	360	A
Total Power Disspation Note 3)	-	Ptot	Tc = 25°C	(1130)	W
Junction Temperature	-	Tj		-40 to 150	°C
Storage Temperature	-	Tstg		-40 to 125	°C
Isolation Voltage	-	Visol	Terminals to baseplate, f=60Hz AC1min. Note 4)	2500	Vrms
Mounting Torque	-	-	Main Terminals : M6 screw	4.5	N · m
			Mounting to heat shink : M5 screw	3.5	N · m

Note 1) Case temperature (Tc) is defined on the surface of base plate just under the chips.

Note 2) Repetition rate should be kept within the range where temperature rise of die should not exceed Tjmax.

Note 3) Tj is less than 150°C

Note 4) Actual measurement is (3000V)/1sec . in accordance with UL1557.

* Values in bracket () is tentative.

7. ELECTRICAL CHARACTERISTICS (T_j =25°C)

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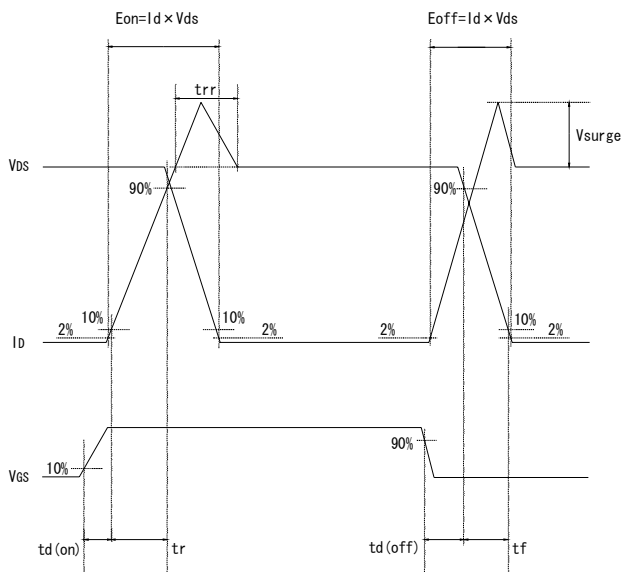
PARAMETER	PIN	SYMBOL	CONDITIONS	RATINGS			UNIT	REMARKS	
				MIN.	TYP.	MAX.			
Static Drain-Source On-state Voltage	D-S	V _{DS(on)}	I _C =180A, V _{GS} =18V	T _j =25°C	-	2.4	-	V	-
				T _j =125°C	-	3.4	-	V	-
Drain Cutoff Current	D-S	I _{DSS}	V _{DS} =1200V, V _{GS} =0V	-	-	(10)	uA	-	
Source-Drain Voltage	S-D	V _{SD}	V _{GS} =0V, I _S =180A	T _j =25°C	-	5.1	-	V	-
				T _j =125°C	-	4.7	-		-
			V _{GS} =18V, I _S =180A	T _j =25°C	-	2.4	-		-
				T _j =125°C	-	3.4	-		-
Gate-Source Threshold Voltage	G-S	V _{GS(th)}	V _{DS} =10V, I _D =35.2mA	(1.6)	2.7	(4.0)	V	-	
Gate-Source Leak Current	G-S	I _{GSS}	V _{GS} =22V, V _{DS} =0V	-	-	(0.5)	uA	-	
			V _{GS} =-6V, V _{DS} =0V	(-0.5)	-	-	uA	-	
Switching characteristics	-	td(on)	V _{GS(on)} =18V, V _{GS(off)} =0V	-	65	-	ns	-	
		tr	V _{DS} =600V	-	70	-	ns	-	
		trr	I _D =180A	-	50	-	ns	-	
		td(off)	R _g =5.6Ω	-	250	-	ns	-	
		tf	inductive load	-	65	-	ns	-	
Input Capacitance	-	C _{iss}	V _{DS} =10V, V _{GS} =0V, 1MHz	-	23	-	nF	-	
Junction-to-Case Thermal Resistance	-	R _{th(j-c)}	DMOS (1/2 module) *Note 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 *Note6	-	0.035	-	°C/W	-	

*Note 5 Measurement of T_c is to be done at the point just beneath the chip.

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

*Values in bracket () is tentative.

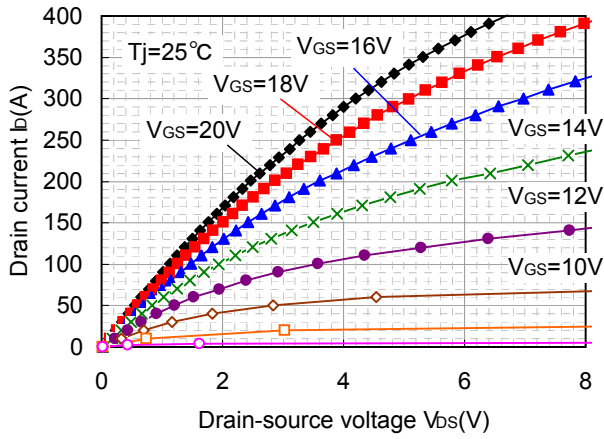
< Wavelength for Switching Test >



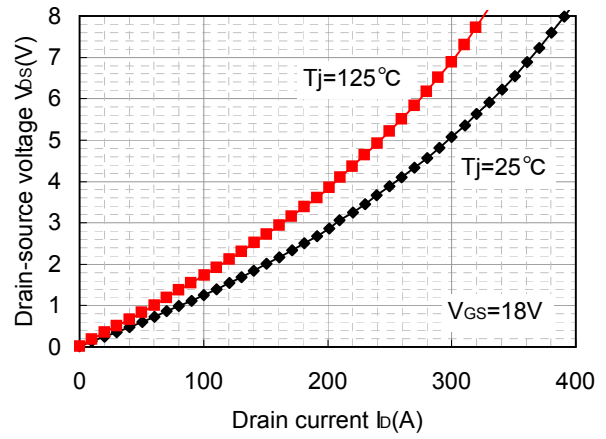
8. ELECTRICAL CHARACTERISTIC CURVE (TYP)

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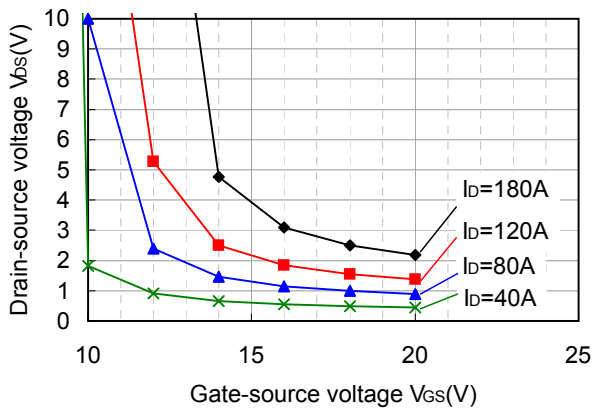
Output characteristic at 25°C (TYP)



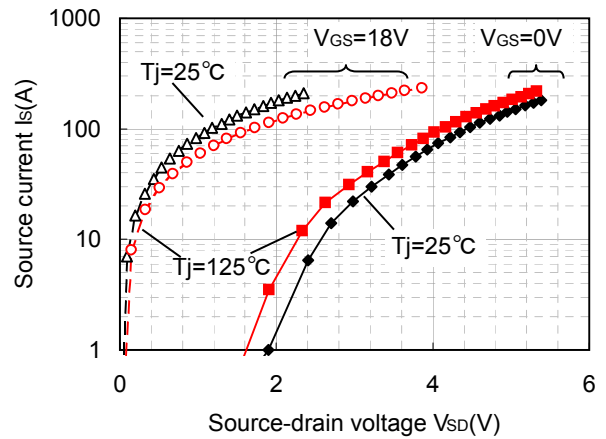
Drain-source voltage characteristic (TYP)



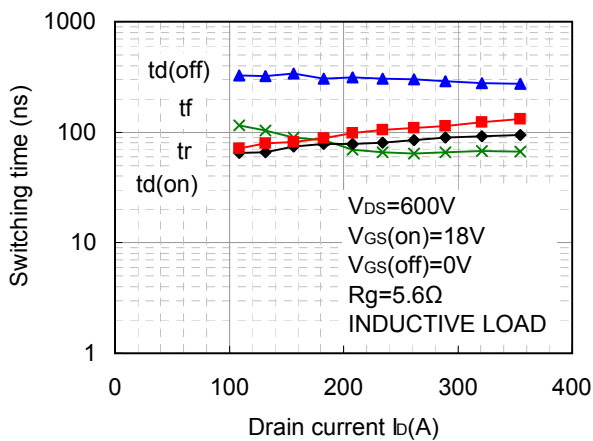
Drain-source voltage characteristic at 25°C (TYP)



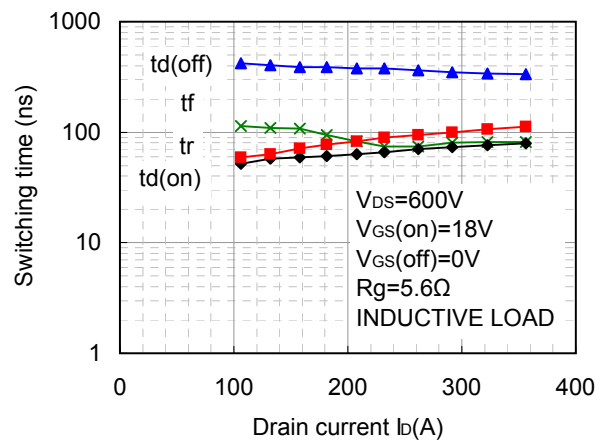
Forward characteristic of diode (TYP)



Switching time vs drain current at 25°C (TYP)

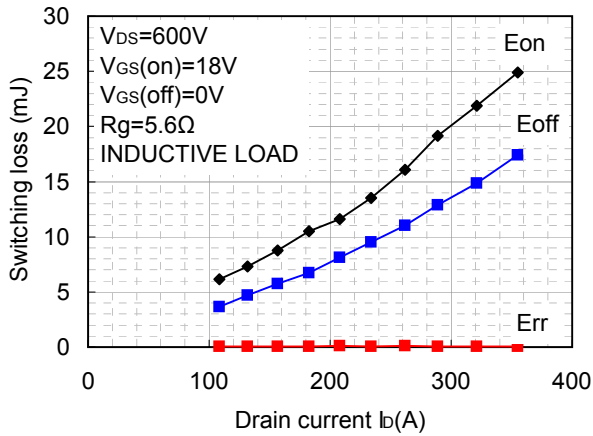


Switching time vs drain current at 125°C (TYP)

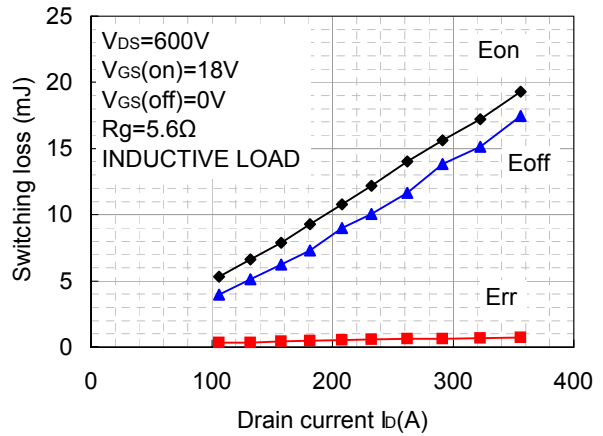


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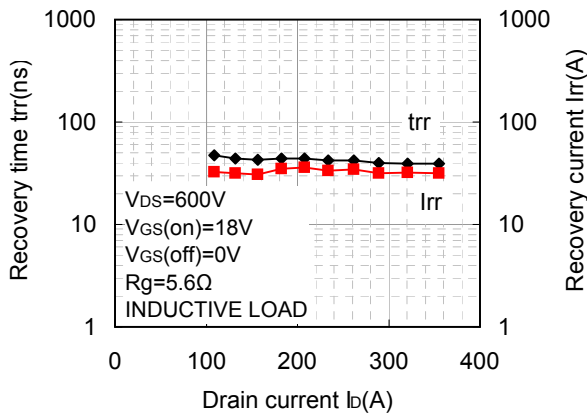
Switching loss vs drain current at 25°C (TYP)



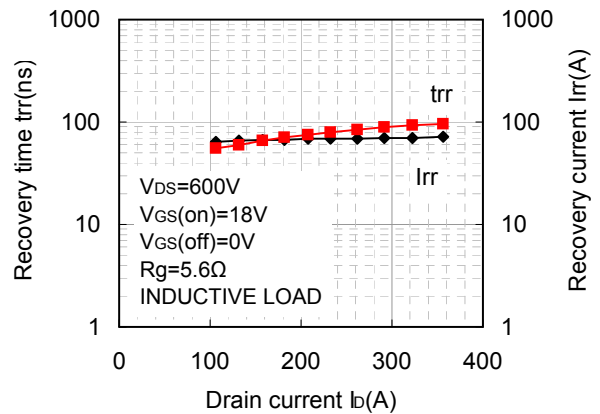
Switching loss vs drain current at 125°C (TYP)



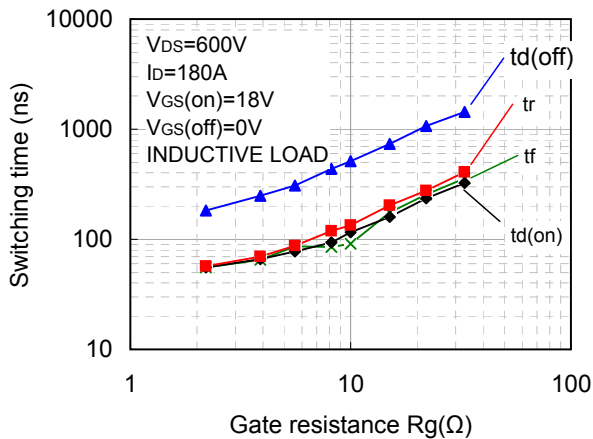
Recovery characteristic vs drain current at 25°C (TYP)



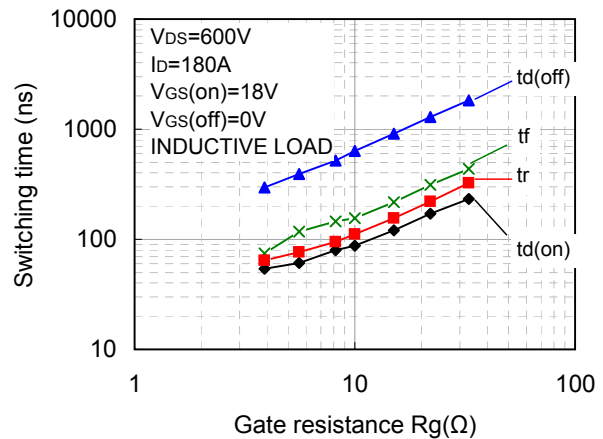
Recovery characteristic vs drain current at 125°C (TYP)



Switching time vs gate resistance at 25°C(TYP)

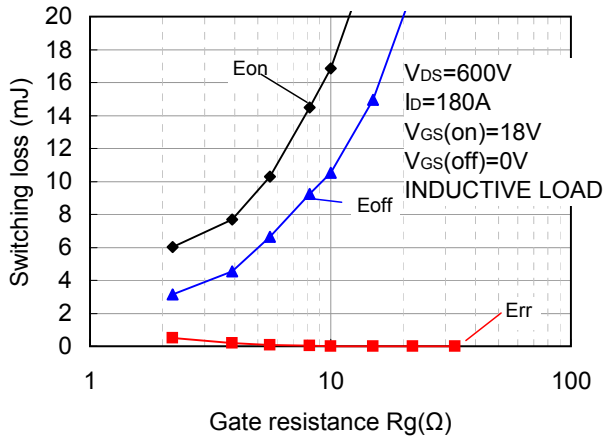


Switching time vs gate resistance at 125°C(TYP)

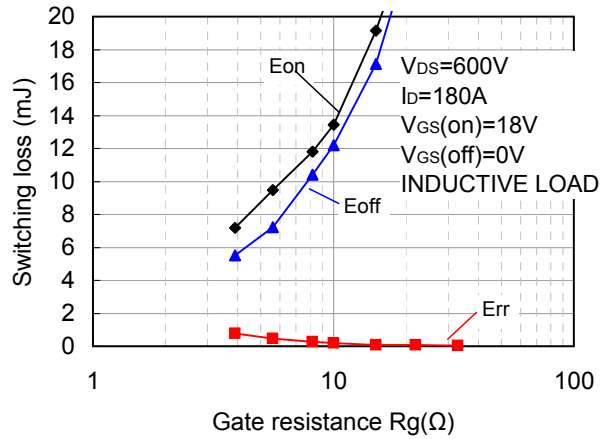


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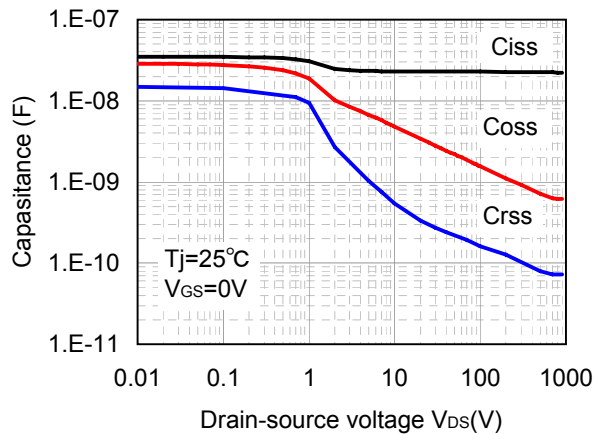
Switching loss vs gate resistance at 25°C (TYP)



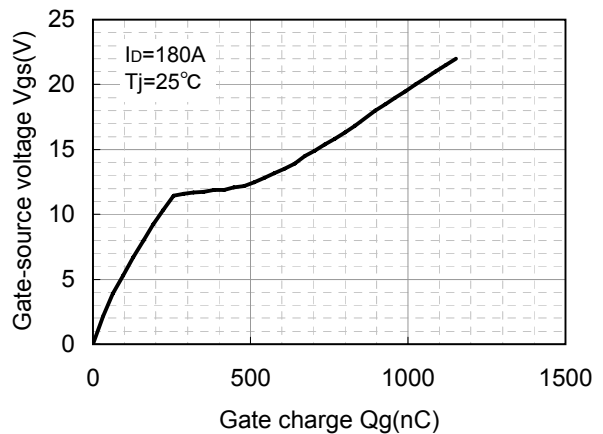
Switching loss vs gate resistance at 125°C (TYP)



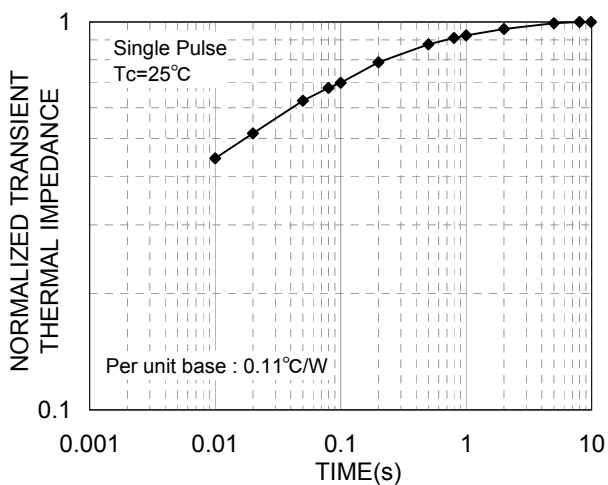
Capacitance vs Drain-Source voltage (TYP)



Gate charge characteristic (TYP)



TRANSIENT THERMAL IMPEDANCE(TYP)



Ron vs Tj(TYP)

