SCT4018KE

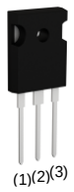
N-channel SiC power MOSFET

Datasheet

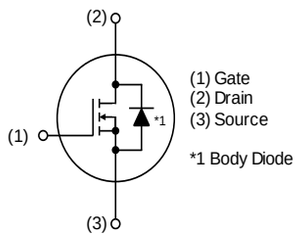
V_{DSS}	1200V
$R_{DS(on)}$ (Typ.)	18mΩ
I_D *1	81A
P_D	312W

●Outline

TO-247N



●Inner circuit



● Features

1) Low on-resistance
2) Fast switching speed
3) Fast reverse recovery
4) Easy to parallel
5) Simple to drive
6) Pb-free lead plating ; RoHS compliant

● Application

- Solar inverters
- DC/DC converters
- Switch mode power supplies
- Induction heating
- Motor drives

●Packaging specifications

Type	Packing	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	30
	Taping code	C11
	Marking	SCT4018KE

●Absolute maximum ratings (T_c = 25°C)

Parameter		Symbol	Value	Unit
Drain - source voltage		V_{DSS}	1200	V
Continuous drain and source current	$V_{GS} = V_{GS\_on}$	I_D, I_S *1	81	A
T_c = 100°C			57	A
Pulsed drain current	$V_{GS} = V_{GS\_on}$	$I_{D,pulse}$ *2	179	A
Body diode pulsed forward current	V_{GS} = 0 V	$I_{S,pulse}$ *3	81	A
Body diode surge forward current	V_{GS} = 0 V	$I_{S,pulse}$ *4	179	A
Gate - source voltage (DC)		V_{GSS_DC}	-4 to +21	V
Gate - source surge voltage (t_{surge} < 300ns)		V_{GSS_surge} *5	-4 to +23	V
Recommended turn-on gate - source drive voltage		V_{GS_on} *6	+15 to +18	V
Recommended turn-off gate - source drive voltage		V_{GS_off}	0	V
Virtual junction temperature		T_{vj}	175	°C
Range of storage temperature		T_{stg}	-40 to +175	°C

©2022 ROHM Co., Ltd. All rights reserved.

●Electrical characteristics (T_{vj} = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 18.6mA T_{vj} = 25°C	1200	-	-	V
Zero Gate voltage Drain current	I_{DSS}	V_{GS} = 0 V, V_{DS} =1200V T_{vj} = 25°C T_{vj} = 150°C	- -	1 10	80 -	μA
Gate - Source leakage current	I_{GSS+}	V_{GS} = +21V , V_{DS} = 0V	-	-	100	nA
Gate - Source leakage current	I_{GSS-}	V_{GS} = -4V , V_{DS} = 0V	-	-	-100	nA
Gate threshold voltage	$V_{GS(th)}$ *7	V_{DS} = 10V, I_D = 22.2mA	2.8	-	4.8	V
Static Drain - Source on - state resistance	$R_{DS(on)}$ *8	V_{GS} = 18V, I_D = 42A T_{vj} = 25°C T_{vj} = 150°C	- -	18.0 36.0	23.4 -	mΩ
Gate input resistance	R_G	f = 1MHz, open drain	-	1	-	Ω

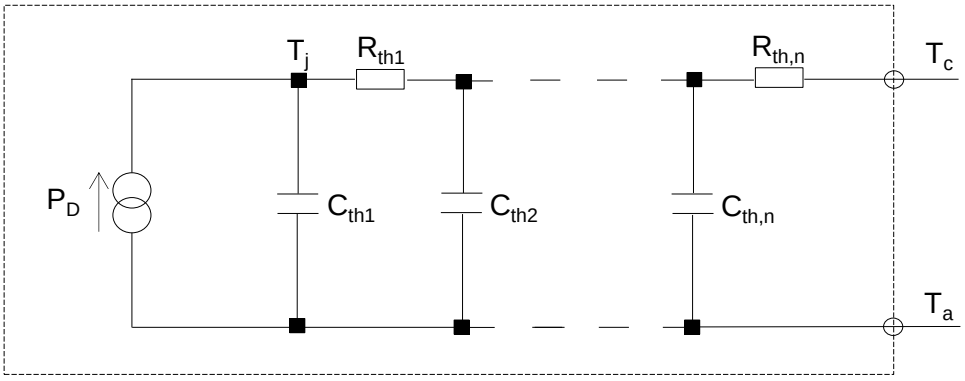
●Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - case	R_{thJC} *9	-	0.37	0.48	K/W

●Typical Transient Thermal Characteristics

Symbol	Value	Unit
R_{th1}	1.1 ×10 $^{-1}$	K/W
R_{th2}	1.3 ×10 $^{-1}$	
R_{th3}	1.3 ×10 $^{-1}$	

Symbol	Value	Unit
C_{th1}	7.8 ×10 $^{-4}$	Ws/K
C_{th2}	3.1 ×10 $^{-3}$	
C_{th3}	3.8 ×10 $^{-3}$	



©2022 ROHM Co., Ltd. All rights reserved.

●**Electrical characteristics** (T_{vj} = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Transconductance	g_{fs} *8	V_{DS} = 10V, I_D = 42A	-	22	-	S
Input capacitance	C_{iss}	V_{GS} = 0V	-	4532	-	pF
Output capacitance	C_{oss}	V_{DS} = 800V	-	129	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	9	-	
Effective output capacitance, energy related	$C_{o(er)}$	V_{GS} = 0V V_{DS} = 0V to 800V	-	156	-	pF
Total Gate charge	Q_g *8	V_{DS} = 800V I_D = 42A V_{GS} = 18V See Fig. 1-1, 1-2.	-	170	-	nC
Gate - Source charge	Q_{gs} *8		-	32	-	
Gate - Drain charge	Q_{gd} *8		-	52	-	
Turn - on delay time	$t_{d(on)}$ *8	V_{DS} = 800V I_D = 42A V_{GS} = +18V / 0V R_G = 3.3Ω, L = 250μH E_{on} includes diode reverse recovery L_σ = 50nH, C_σ = 10pF See Fig. 2-1, 2-2, 2-3.	-	15	-	ns
Rise time	t_r *8		-	43	-	
Turn - off delay time	$t_{d(off)}$ *8		-	50	-	
Fall time	t_f *8		-	14	-	
Turn - on switching loss	E_{on} *8		-	1100	-	μJ
Turn - off switching loss	E_{off} *8		-	180	-	

©2022 ROHM Co., Ltd. All rights reserved.

●**Body diode electrical characteristics** (Source-Drain) (T_{vj} = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Forward voltage	V_{SD} *8	V_{GS} = 0V, I_D = 42A	-	3.3	-	V
Reverse recovery time	t_{rr} *8	I_F = 42A V_R = 800V di/dt = 2400A/μs	-	37	-	ns
Reverse recovery charge	Q_{rr} *8		-	320	-	nC
Peak reverse recovery current	I_{rrm} *8	L_σ = 50nH, C_σ = 10pF See Fig. 3-1, 3-2.	-	17	-	A

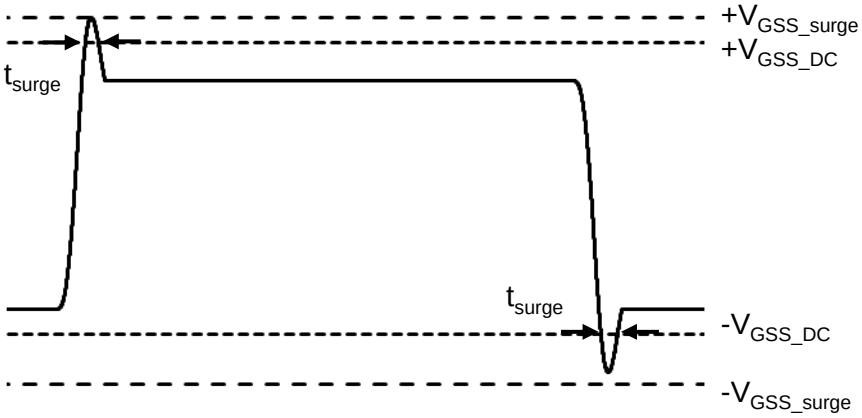
*1 Limited by maximum T_{vj} and for Max. R_{thJC}.

*2 PW ≤ 10μs, Duty cycle ≤ 1%

*3 Only for body-diode, Repititive pulse, PW ≤ 500ns, Duty cycle ≤ 5%

*4 When used as a protective function, PW ≤ 10μs

*5 Example of acceptable V_{GS} waveform



*6 Please be advised not to use SiC-MOSFETs with V_{GS} below 10V as doing so may cause thermal runaway.

*7 Tested after applying V_{GS} = 21V for 100ms.

*8 Pulsed

*9 Measured conformable to JESD51-14.

See the application note "rthjc_measurement_and_usage_an-e.pdf". Link

URL: https://fscdn.rohm.com/en/products/databook/applinote/discrete/common/rthjc_measurement_and_usage_an-e.pdf

©2022 ROHM Co., Ltd. All rights reserved.

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

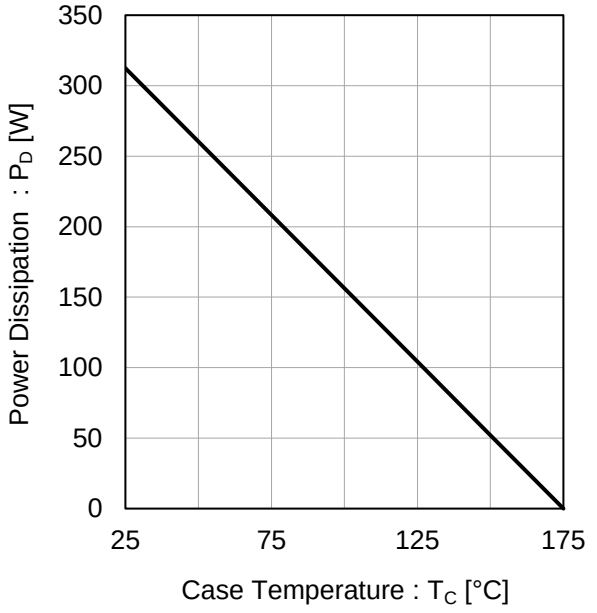


Fig.2 Maximum Safe Operating Area

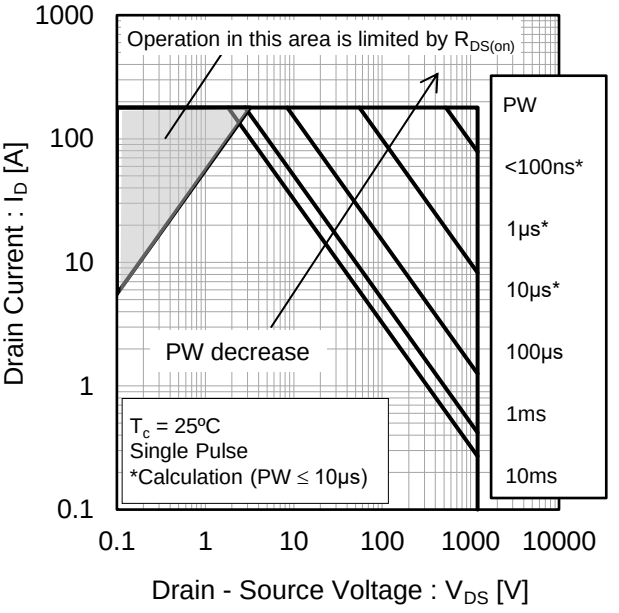
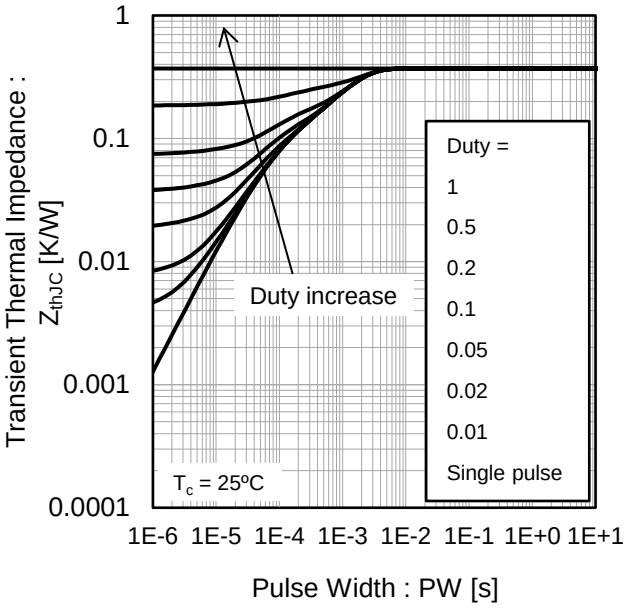


Fig.3 Typical Transient Thermal Impedance vs. Pulse Width



©2022 ROHM Co., Ltd. All rights reserved.

●Electrical characteristic curves

Fig.4 T_{vj} = 25ºC Typical Output Characteristics(I)

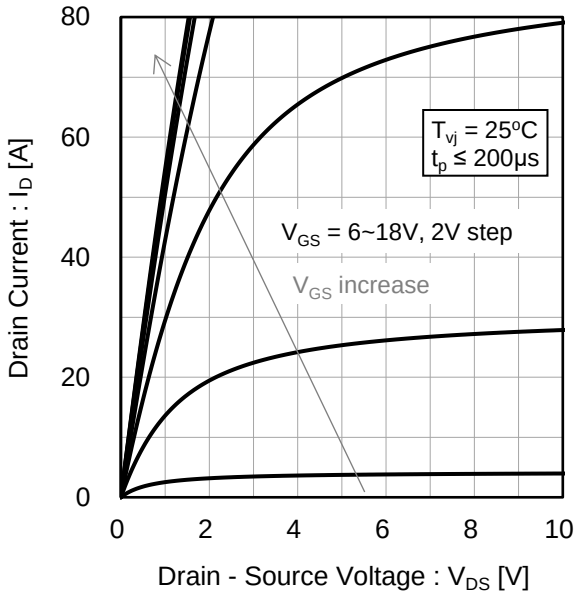


Fig.5 T_{vj} = 25ºC Typical Output Characteristics(II)

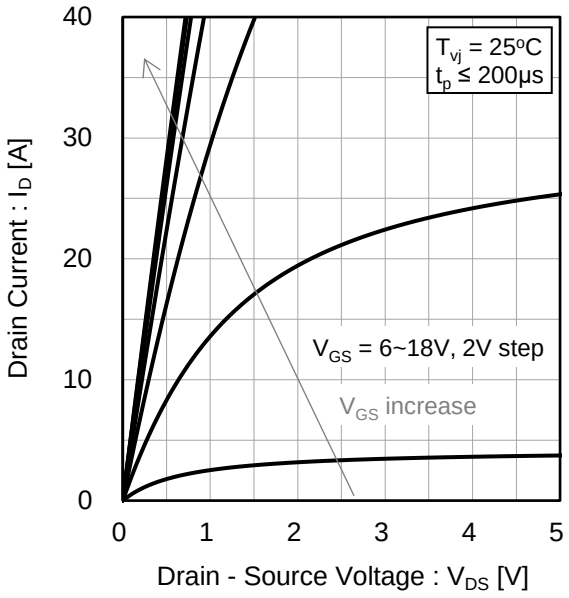
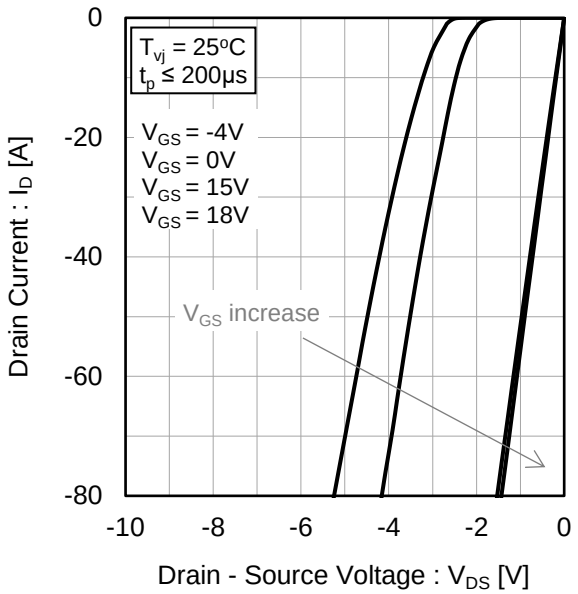


Fig.6 T_{vj} = 25ºC 3rd Quadrant Characteristics



©2022 ROHM Co., Ltd. All rights reserved.

●Electrical characteristic curves

Fig.7 T_{vj} = 150ºC Typical Output Characteristics(I)

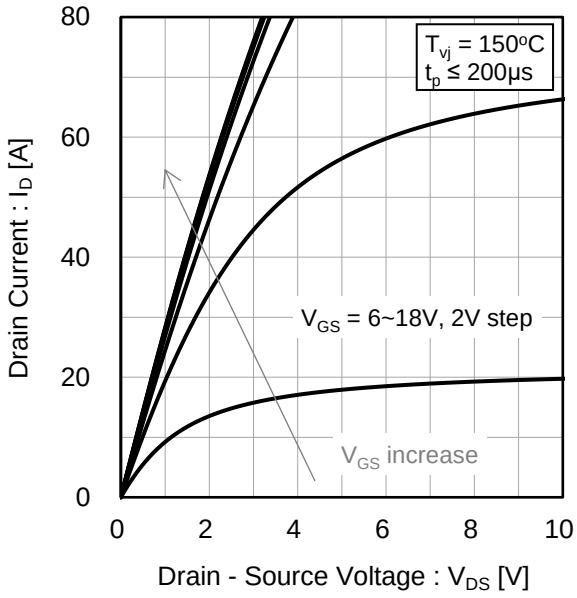


Fig.8 T_{vj} = 150ºC Typical Output Characteristics(II)

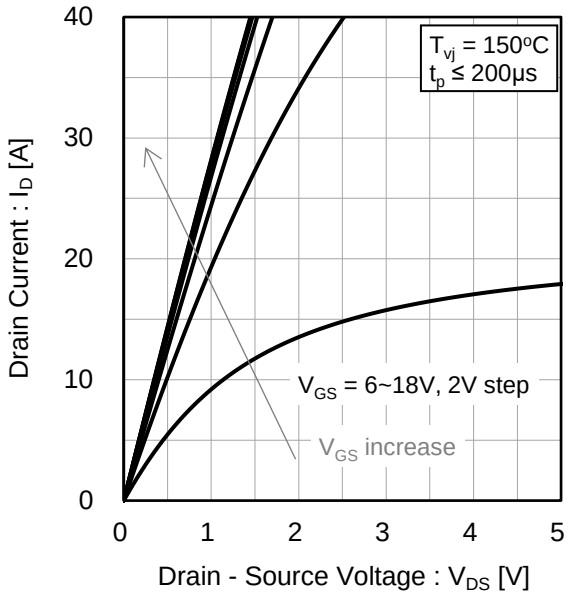


Fig.9 T_{vj} = 150ºC 3rd Quadrant Characteristics

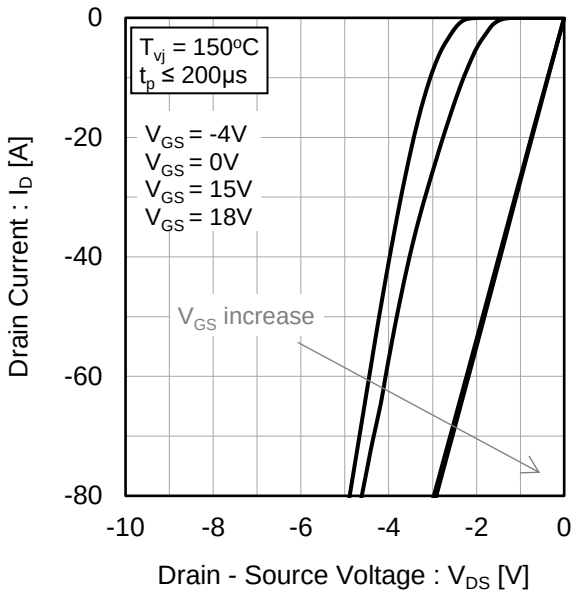
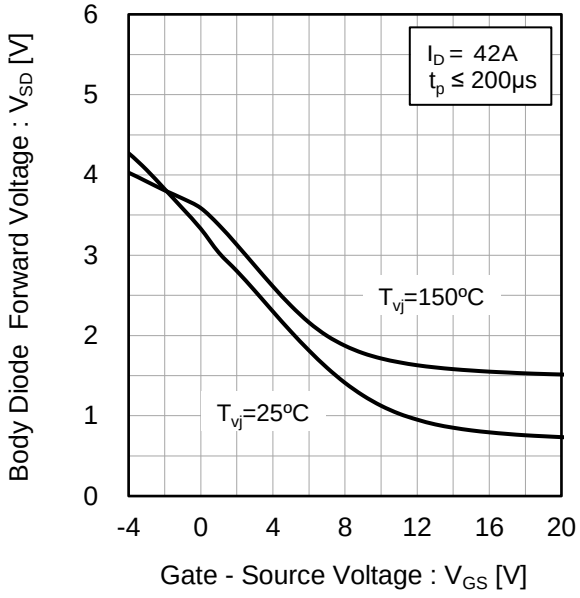


Fig.10 Body Diode Forward Voltage vs. Gate - Source Voltage



©2022 ROHM Co., Ltd. All rights reserved.

●Electrical characteristic curves

Fig.11 Typical Transfer Characteristics (I)

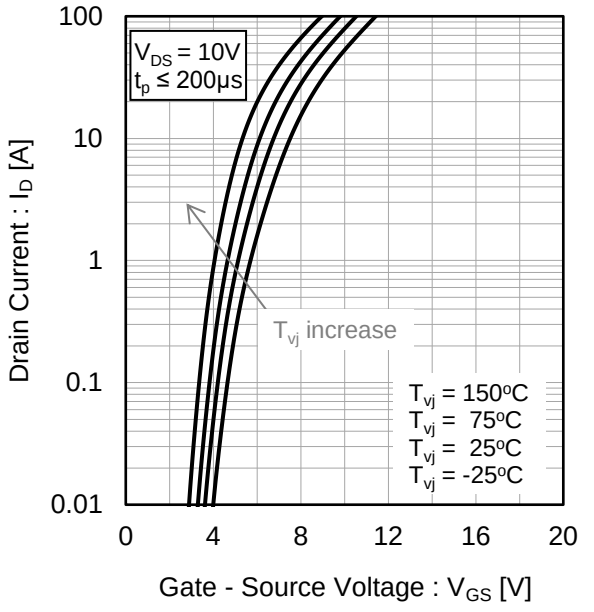


Fig.12 Typical Transfer Characteristics (II)

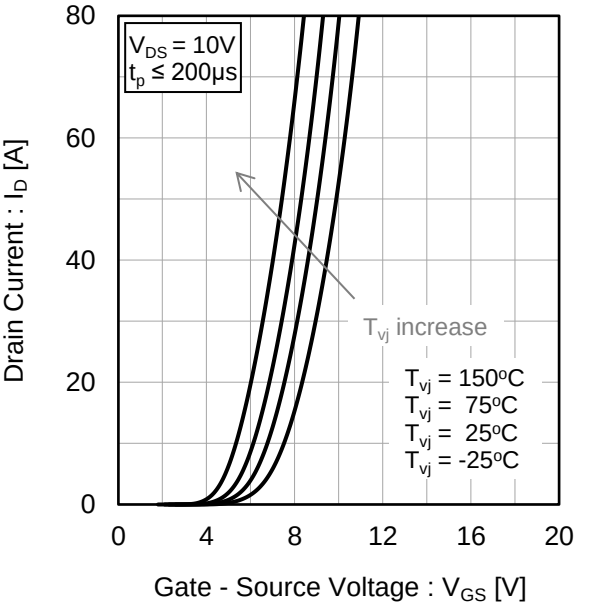


Fig.13 Gate Threshold Voltage vs. Virtual Junction Temperature

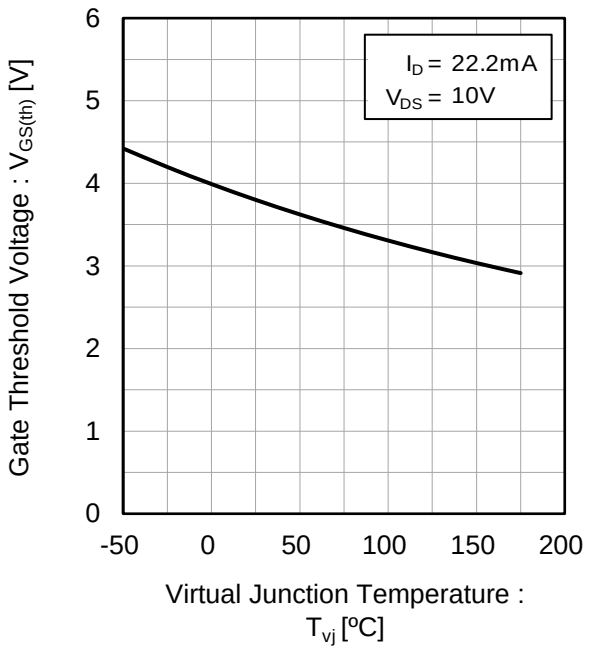
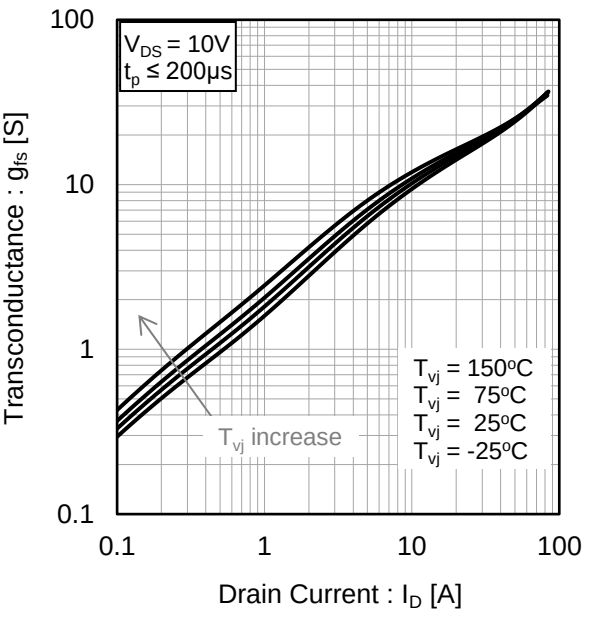


Fig.14 Transconductance vs. Drain Current



©2022 ROHM Co., Ltd. All rights reserved.

●Electrical characteristic curves

Fig.15 Static Drain - Source On - State Resistance vs. Gate - Source Voltage

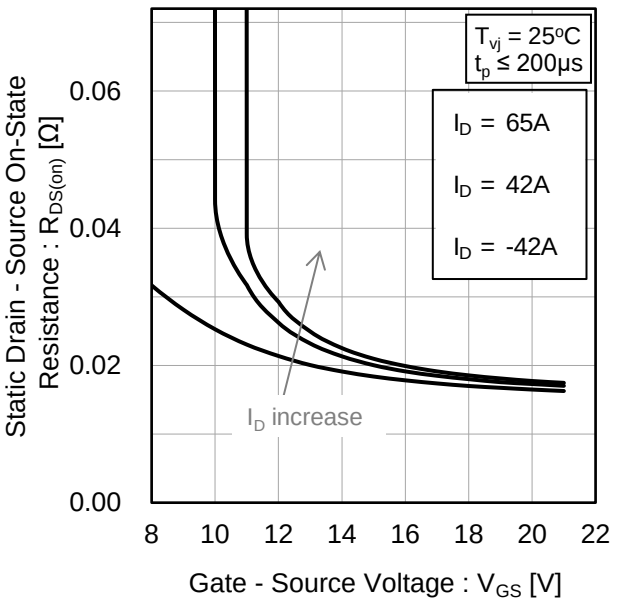


Fig.16 Static Drain - Source On - State Resistance vs. Virtual Junction Temperature

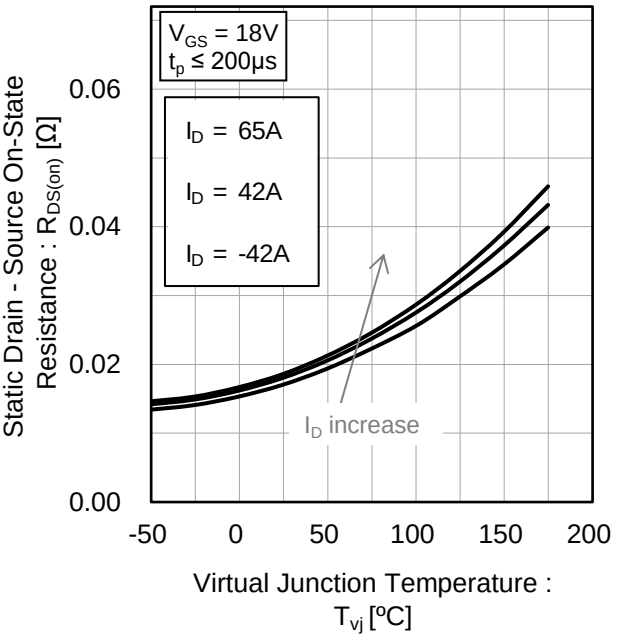


Fig.17 Static Drain - Source On - State Resistance vs. Drain Current

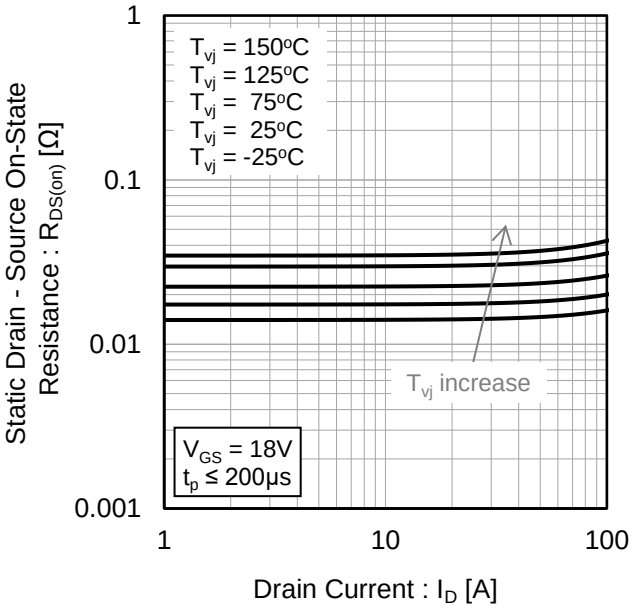
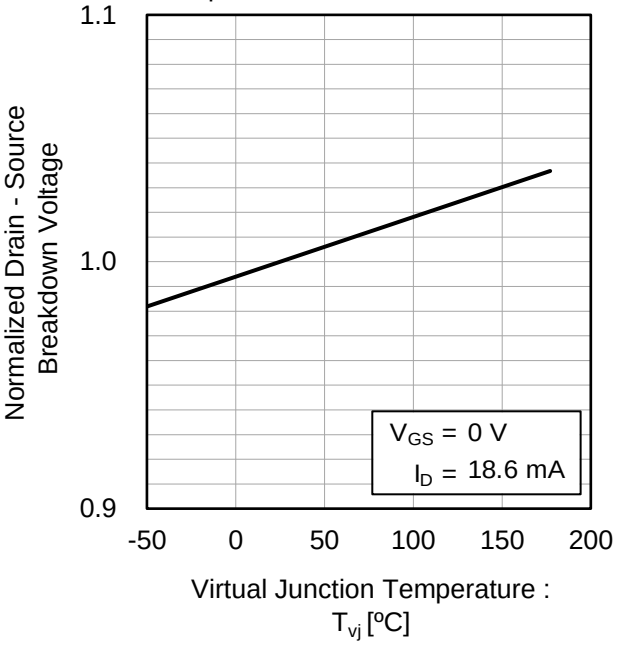


Fig.18 Normalized Drain - Source Breakdown Voltage vs. Virtual Junction Temperature



©2022 ROHM Co., Ltd. All rights reserved.

●Electrical characteristic curves

Fig.19 Typical Capacitance vs. Drain - Source Voltage

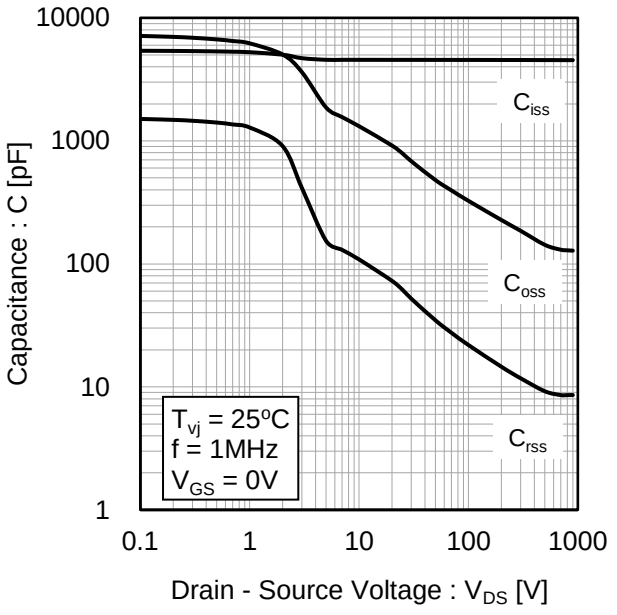


Fig.20 C_{oss} Stored Energy

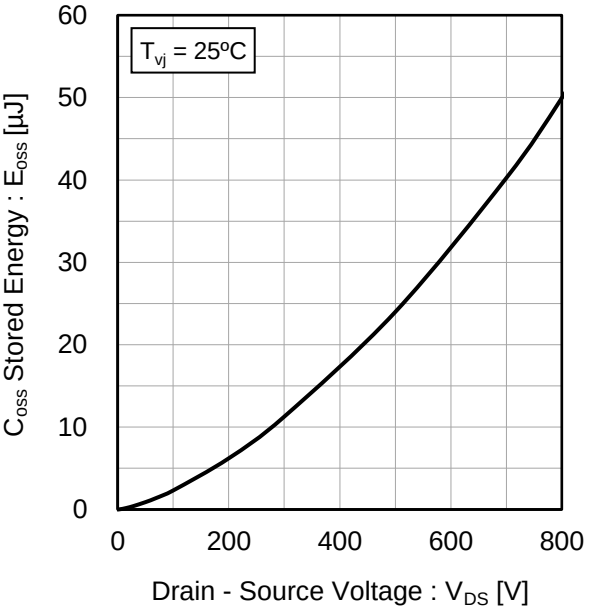
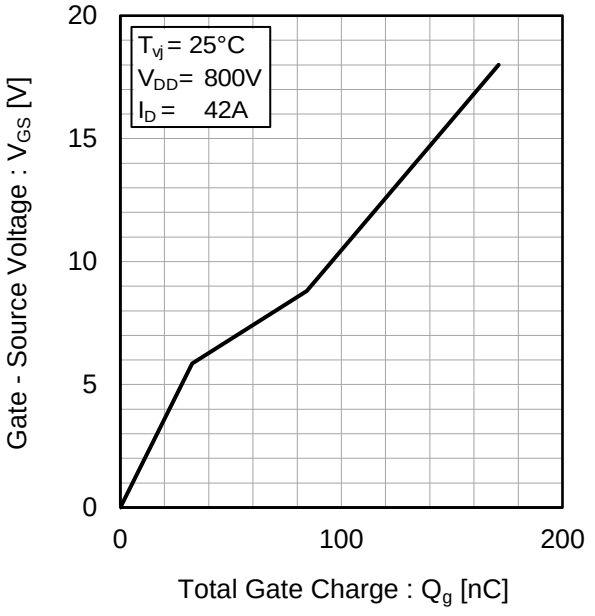


Fig.21 Dynamic Input Characteristics



©2022 ROHM Co., Ltd. All rights reserved.

●Electrical characteristic curves

Fig.22 Typical Switching Time vs. External Gate Resistance

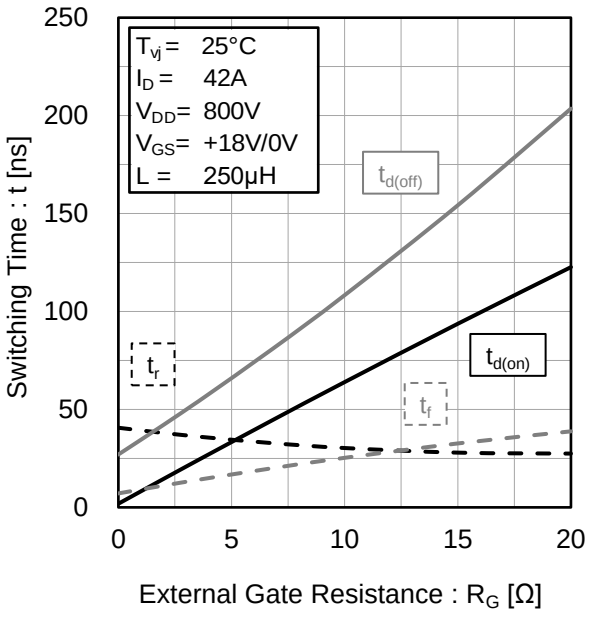


Fig.23 Typical Switching Loss vs. Drain - Source Voltage

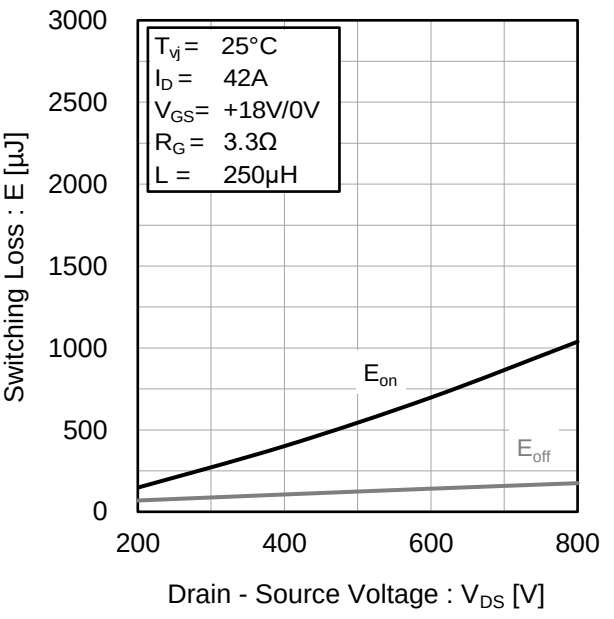


Fig.24 Typical Switching Loss vs. Drain Current

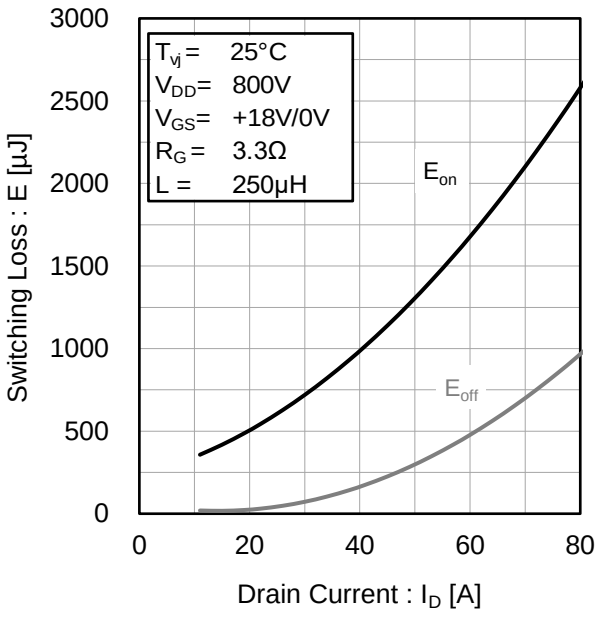
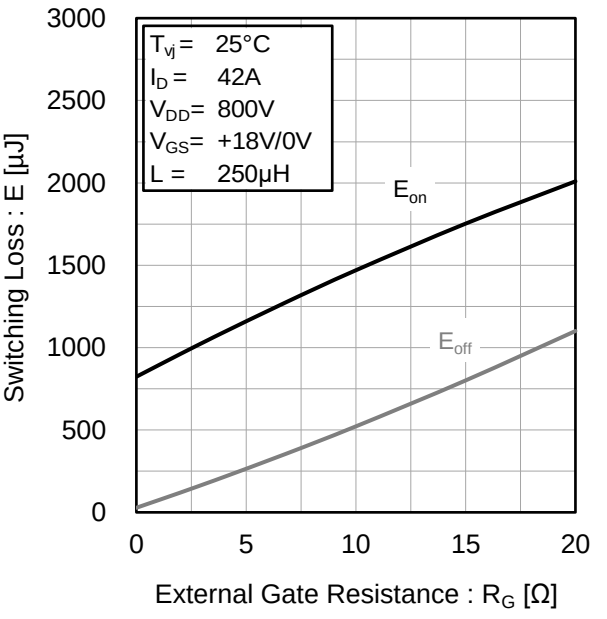


Fig.25 Typical Switching Loss vs. External Gate Resistance



©2022 ROHM Co., Ltd. All rights reserved.

●Measurement circuits and waveforms

Fig.1-1 Gate Charge Measurement Circuit

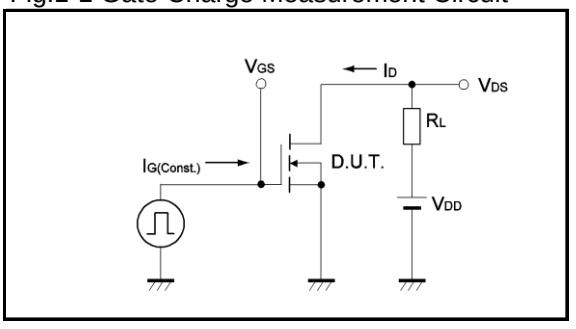


Fig.1-2 Gate Charge Waveform

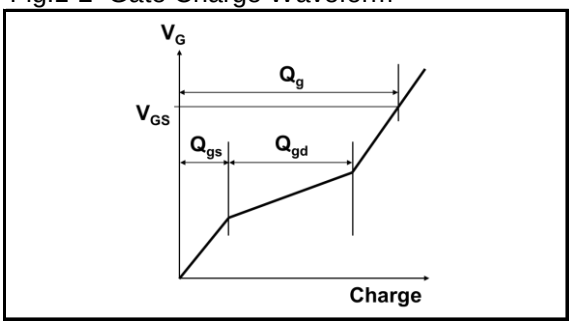


Fig.2-1 Switching Characteristics Measurement Circuit

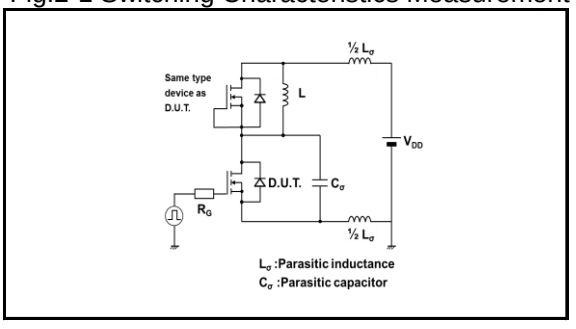


Fig.2-2 Waveforms for Switching Time

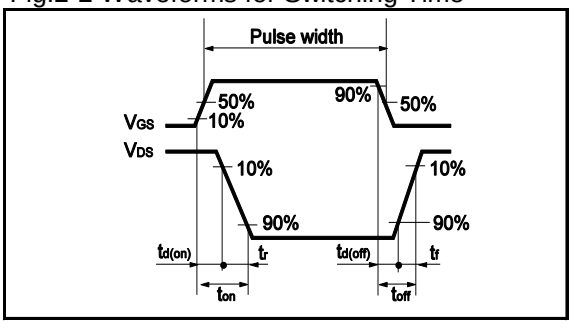


Fig.2-3 Waveforms for Switching Energy Loss

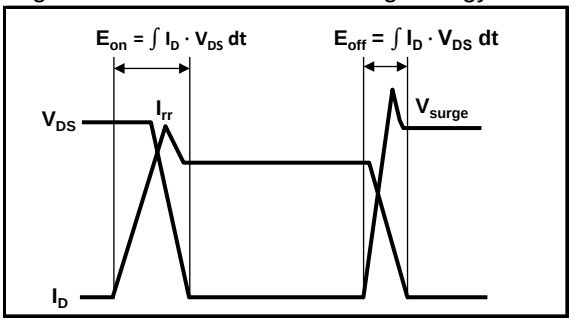


Fig.3-1 Reverse Recovery Time Measurement Circuit

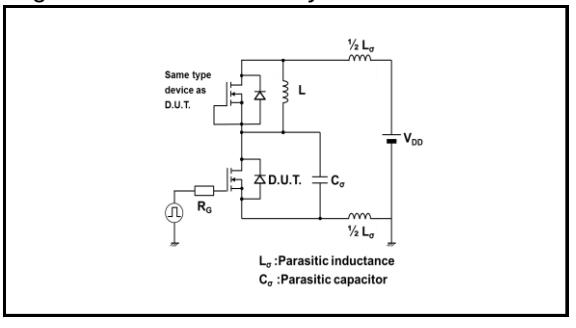
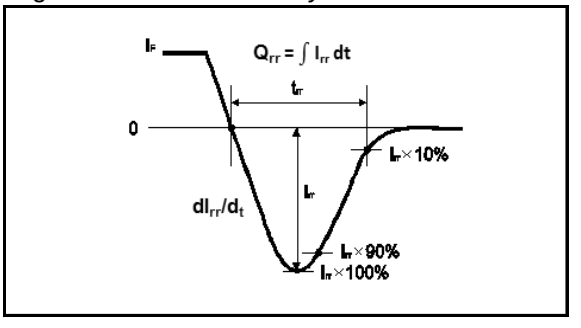
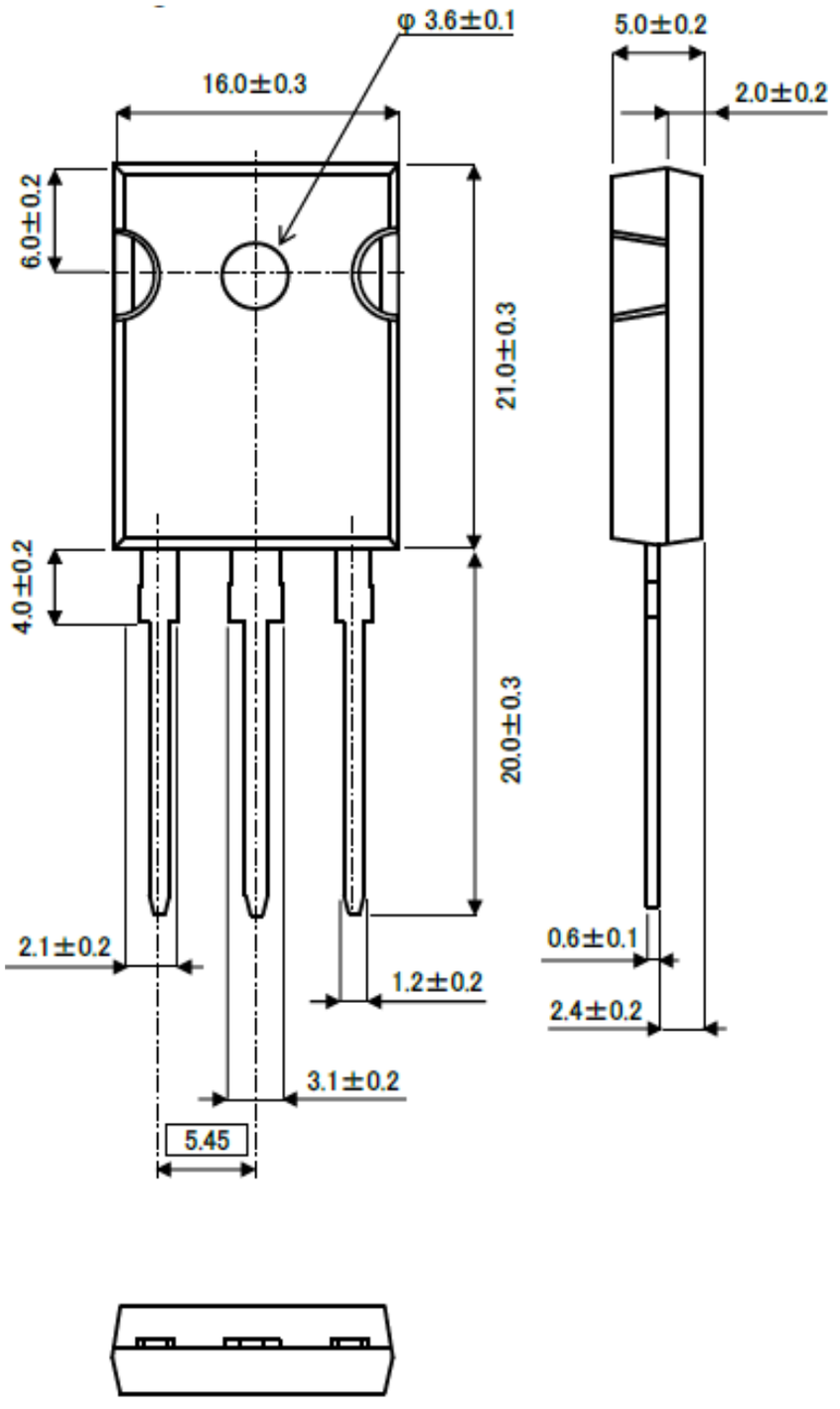


Fig.3-2 Reverse Recovery Waveform



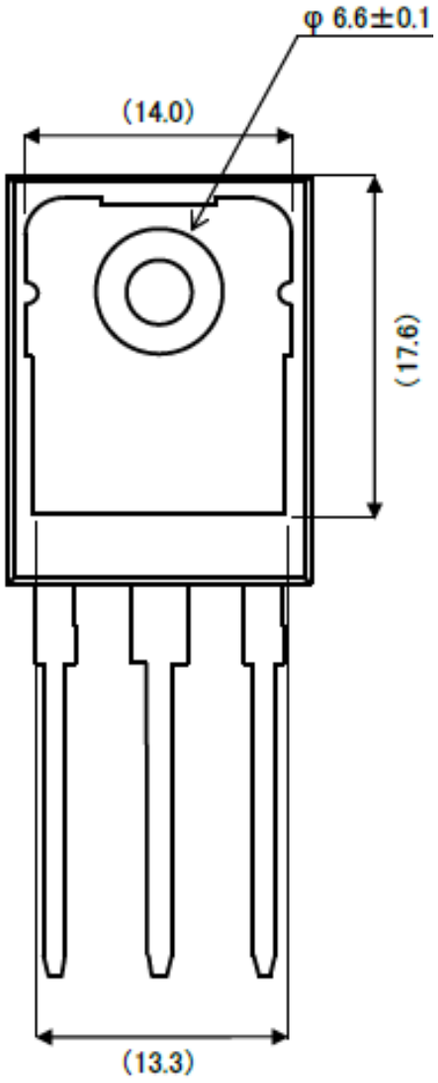
©2022 ROHM Co., Ltd. All rights reserved.

●Package Dimensions



Unit: mm

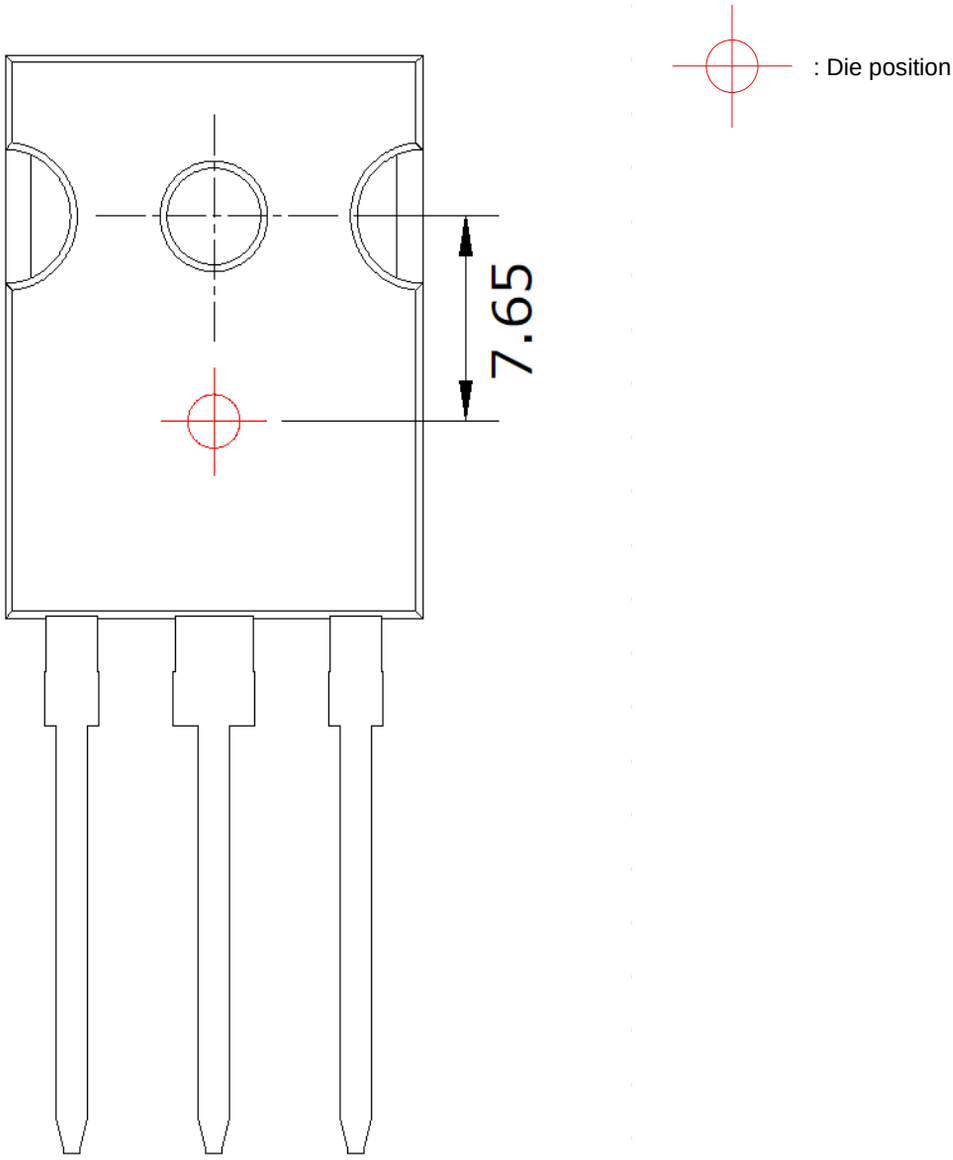
©2022 ROHM Co., Ltd. All rights reserved.



Unit: mm

©2022 ROHM Co., Ltd. All rights reserved.

●Die Bonding Layout



・Front view of the packaging.

・Dimensions are design values.

・If the heat sink is to be installed, it should be in contact with the die bonding point.

Unit: mm

©2022 ROHM Co., Ltd. All rights reserved.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for SiC MOSFETs ***category:***

Click to view products by ROHM ***manufacturer:***

Other Similar products are found below :

NTC040N120SC1 HC3M001K170J IMBG65R048M1HXTMA1 IMW120R045M1 SCT3080ALGC11 C3M0120100K C2M1000170J C3M0120090J C3M0065090J C3M0280090J SCT2750NYTB SCT2H12NYTB C3M0021120D C3M0016120K C3M0045065D C3M0045065K E3M0120090J C3M0065090J-TR C3M0120100J C3M0075120J DMWS120H100SM4 DMWSH120H28SM4 DMWSH120H90SM4 DMWSH120H90SM4Q DMWSH120H28SM4Q DMWSH120H90SCT7Q DMWSH120H28SM3 DMWSH120H43SM3 DMWSH120H90SM3 DMWSH120H28SM3Q DMWSH120H90SM3Q DIF120SIC053-AQ DIW120SIC059-AQ G2R1000MT17D G3R60MT07K G2R50MT33K G3R12MT12K G3R160MT12D G3R160MT12J-TR G3R160MT17D G3R160MT17J-TR G3R20MT12K G3R20MT12N G3R20MT17K G3R20MT17N G3R30MT12J-TR G3R30MT12K G3R350MT12D G3R40MT12D G3R40MT12J