R6030KNZ1

Nch 600V 30A Power MOSFET

Datasheet

V_{DSS}	600V
$R_{DS(on)}$(Max.)	0.130Ω
I_D	±30A
P_D	305W

●Outline

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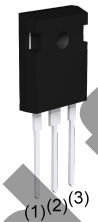
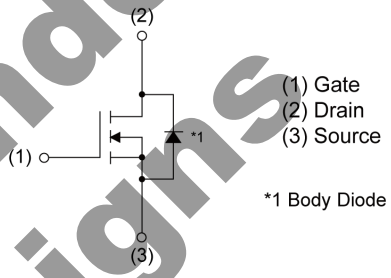


●Inner circuit



●Features

1) Low on-resistance.
2) Ultra fast switching speed.
3) Parallel use is easy.
4) Pb-free lead plating ; RoHS compliant

●Packaging specifications

Type	Packing	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	450
	Taping code	C9
	Marking	R6030KNZ1

●Application

Switching

●Absolute maximum ratings (T_a = 25°C ,unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain - Source voltage		V_{DSS}	600	V
Continuous drain current (T_c = 25°C)		I_D *1	±30	A
Pulsed drain current		I_{DP} *2	±90	A
Gate - Source voltage	static	V_{GSS}	±20	V
	AC(f＞1Hz)		±30	V
Avalanche current, single pulse		I_{AS}	5.2	A
Avalanche energy, single pulse		E_{AS} *3	636	mJ
Power dissipation (T_c = 25°C)		P_D	305	W
Junction temperature		T_j	150	℃
Operating junction and storage temperature range		T_{stg}	-55 to +150	℃

●Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - case	R_{thJC} *4	-	-	0.41	℃/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	30	℃/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	℃

●Electrical characteristics (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 1mA	600	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} = 600V, V_{GS} = 0V T_j = 25°C T_j = 125°C	- -	- -	100 1000	μA
Gate - Source leakage current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = 10V, I_D = 1mA	3	-	5	V
Static drain - source on - state resistance	$R_{DS(on)}$ *5	V_{GS} = 10V, I_D = 14.5A T_j = 25°C T_j = 125°C	- -	0.115 0.24	0.130 -	Ω
Gate resistance	R_G	f = 1MHz, open drain	-	2.1	-	Ω

●Electrical characteristics (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Forward Transfer Admittance	$\|Y_{fs}\|$*5	V_{DS} = 10V, I_D = 15A	10	20	-	S
Input capacitance	C_{iss}	V_{GS} = 0V	-	2350	-	pF
Output capacitance	C_{oss}	V_{DS} = 25V	-	2000	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	140	-	
Turn - on delay time	$t_{d(on)}$*5	V_{DD} ≃ 300V, V_{GS} = 10V	-	36	-	ns
Rise time	t_r*5	I_D = 15A	-	75	-	
Turn - off delay time	$t_{d(off)}$*5	R_L ≃ 20Ω	-	90	-	
Fall time	t_f*5	R_G = 10Ω	-	45	-	

●Gate charge characteristics (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Total gate charge	Q_g*5	V_{DD} ≃ 300V	-	56	-	nC
Gate - Source charge	Q_{gs}*5	I_D = 30A	-	18	-	
Gate - Drain charge	Q_{gd}*5	V_{GS} = 10V	-	23	-	
Gate plateau voltage	$V_{(plateau)}$	V_{DD} ≃ 300V, I_D = 30A	-	6.3	-	V

*1 Limited only by maximum channel temperature allowed.

*2 Pw ≤ 10μs, Duty cycle ≤ 1%

*3 L ≒ 50mH, V_{DD}=50V, R_G=25Ω, STARTING T_j=25℃

*4 T_C=25℃

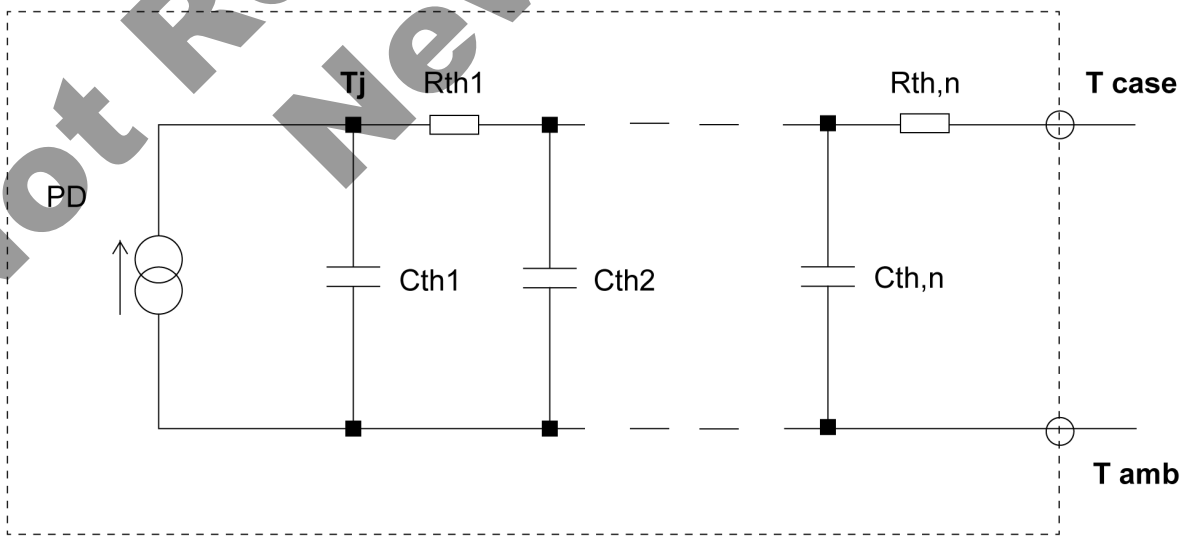
*5 Pulsed

●Body diode electrical characteristics (Source-Drain) (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Continuous forward current	I_S *1	T_C = 25℃	-	-	30	A
Pulse forward current	I_{SP} *2		-	-	90	A
Forward voltage	V_{SD} *5	V_{GS} = 0V, I_S = 30A	-	-	1.5	V
Reverse recovery time	t_{rr}	I_S = 30A di/dt = 100A/μs	-	517	-	ns
Reverse recovery charge	Q_{rr}		-	9.6	-	μC
Peak reverse recovery current	I_{rrm}		-	37	-	A

●Typical transient thermal characteristics

Symbol	Value	Unit	Symbol	Value	Unit
R_{th1}	0.190	K/W	C_{th1}	0.0143	Ws/K
R_{th2}	0.429		C_{th2}	0.322	
R_{th3}	0.250		C_{th3}	14.7	



●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

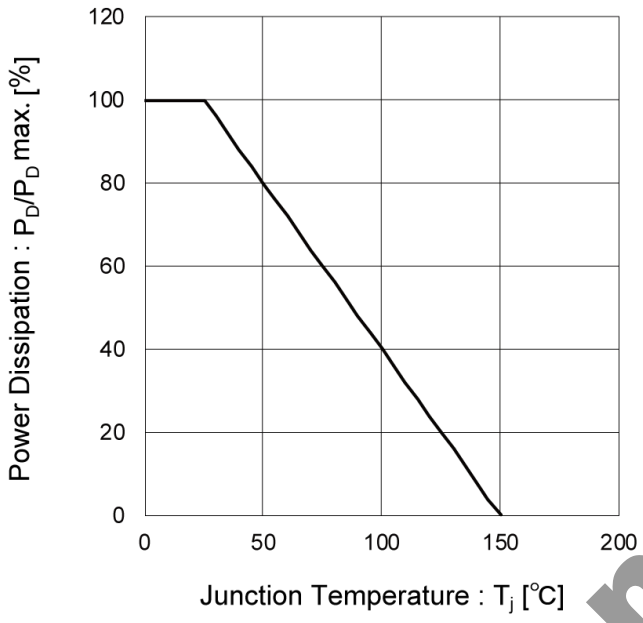


Fig.2 Maximum Safe Operating Area

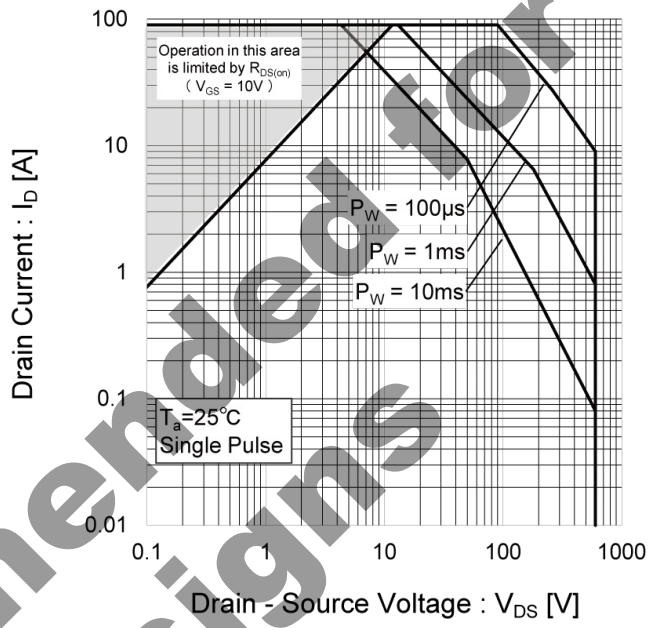
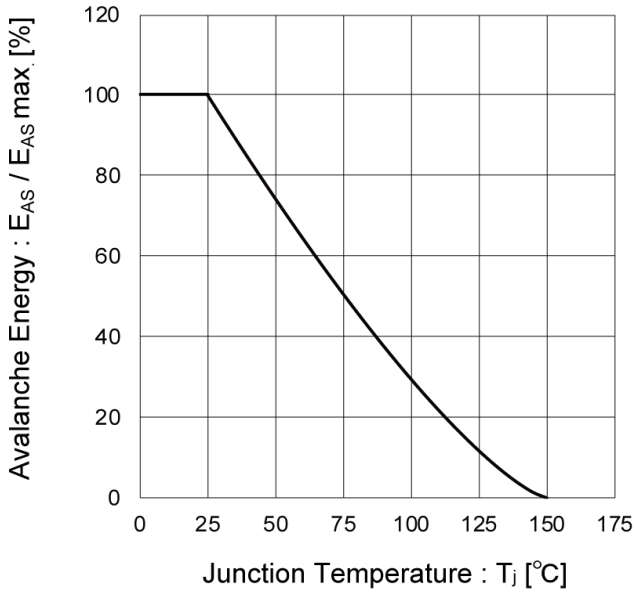


Fig.3 Avalanche Energy Derating Curve vs. Junction Temperature



●Electrical characteristic curves

Fig.4 Typical Output Characteristics(I)

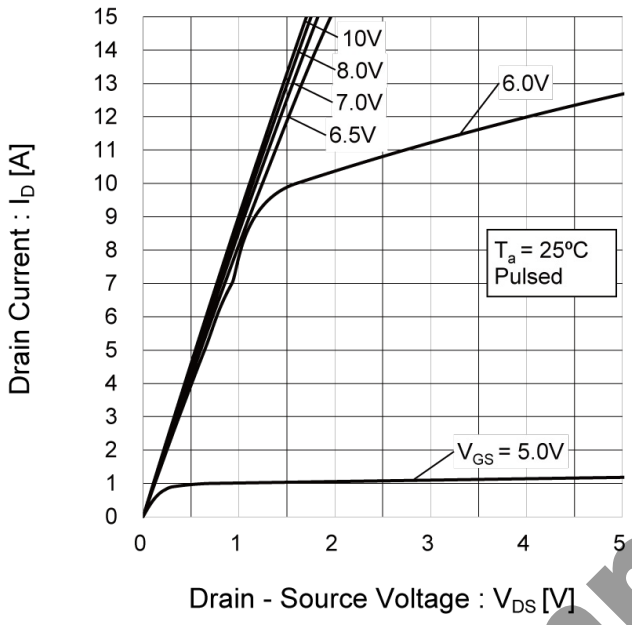
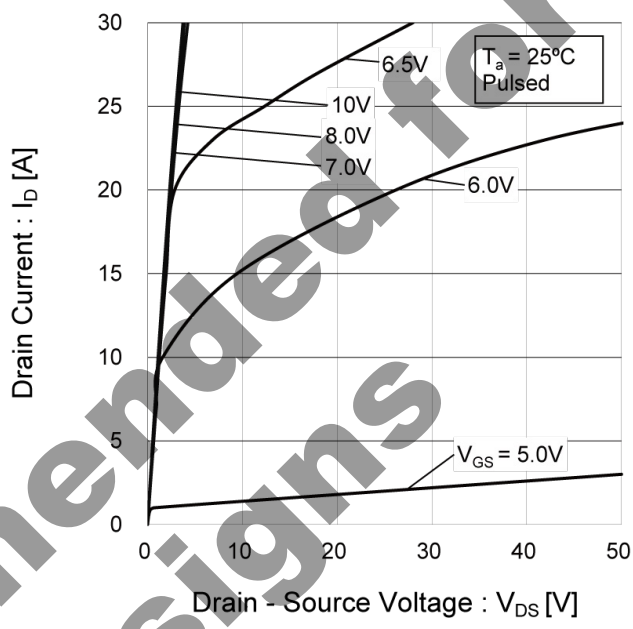


Fig.5 Typical Output Characteristics(II)



●Electrical characteristic curves

Fig.6 Breakdown Voltage vs. Junction Temperature

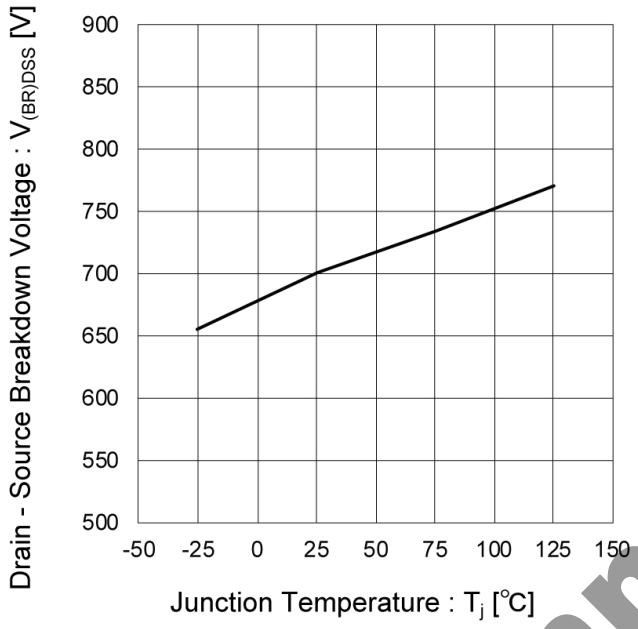


Fig.7 Typical Transfer Characteristics

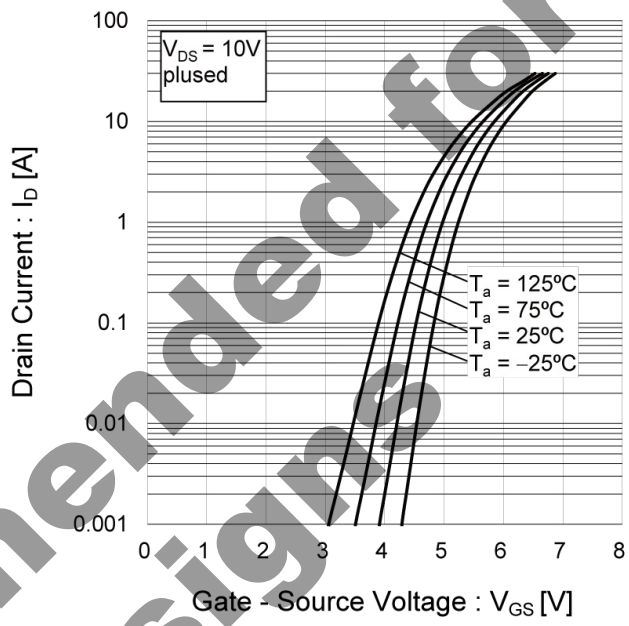


Fig.8 Gate Threshold Voltage vs. Junction Temperature

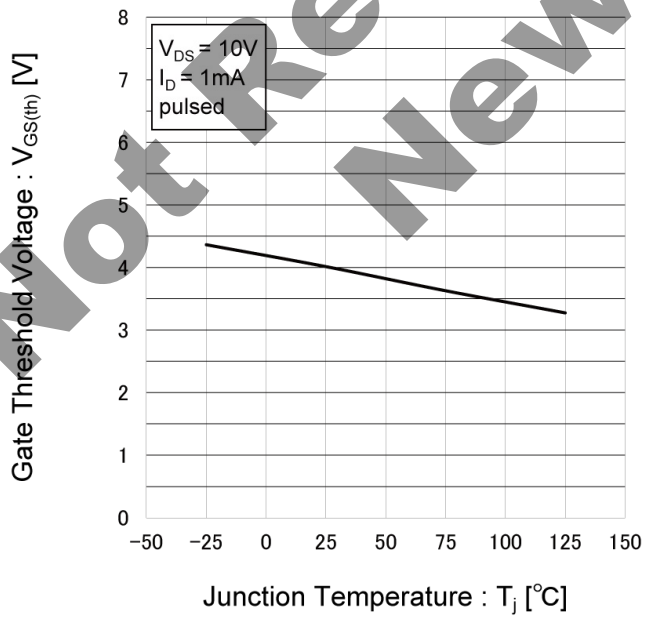
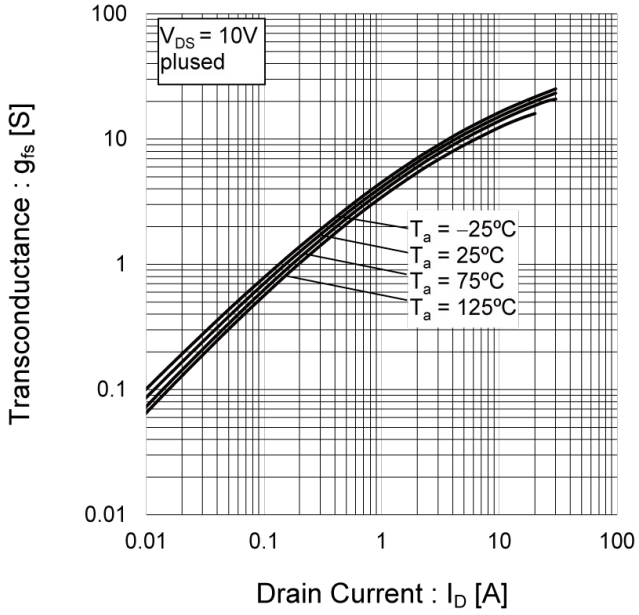


Fig.9 Forward Transfer Admittance vs. Drain Current



●Electrical characteristic curves

Fig.10 Static Drain - Source On - State Resistance vs. Gate Source Voltage

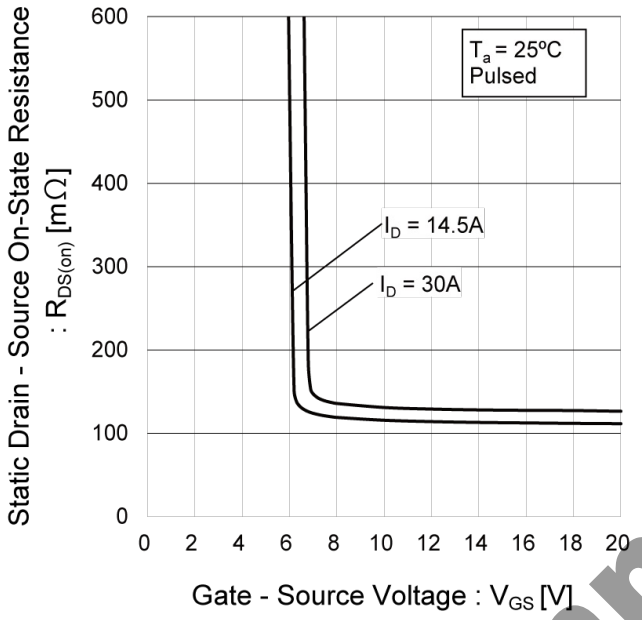


Fig.11 Static Drain - Source On - State Resistance vs. Junction Temperature

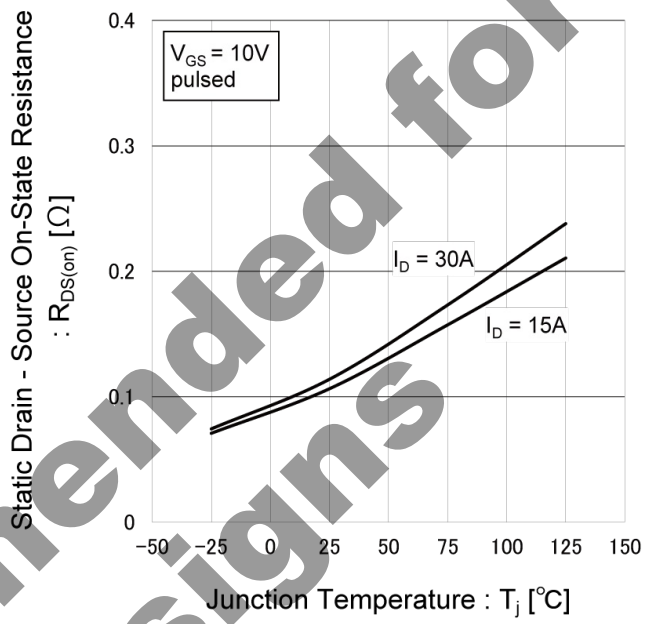
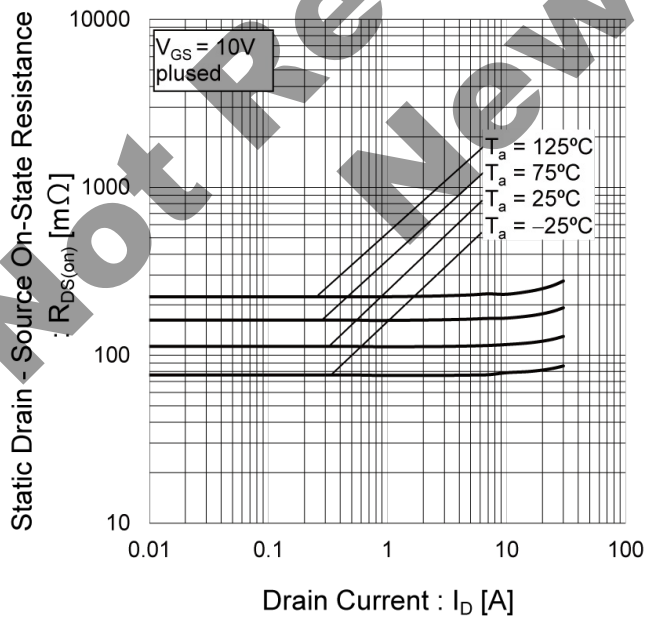


Fig.12 Static Drain - Source On - State Resistance vs. Drain Current(I)



●Electrical characteristic curves

Fig.13 Typical Capacitance vs. Drain - Source Voltage

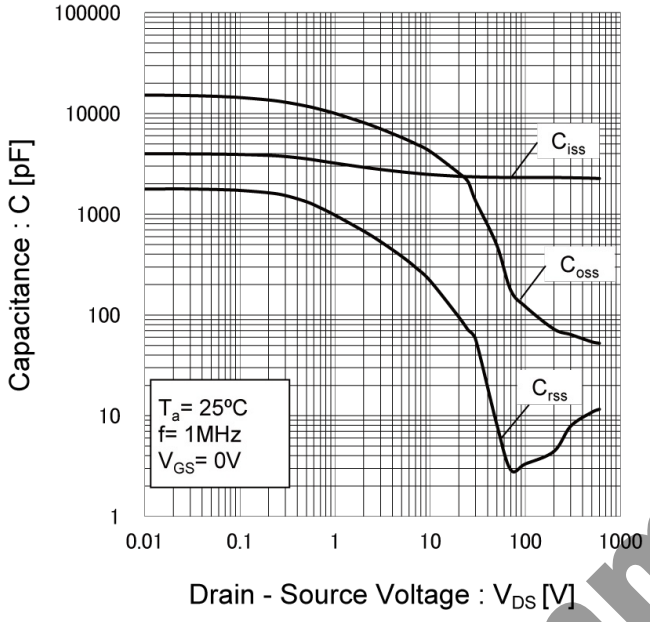


Fig.14 Switching Characteristics

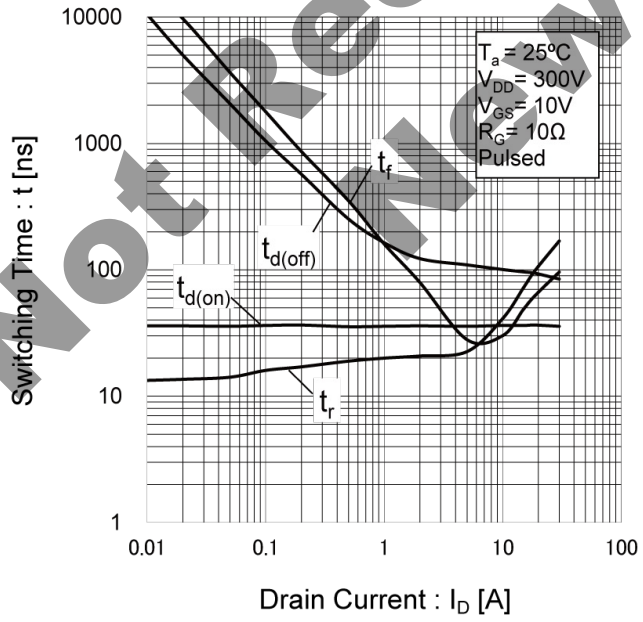
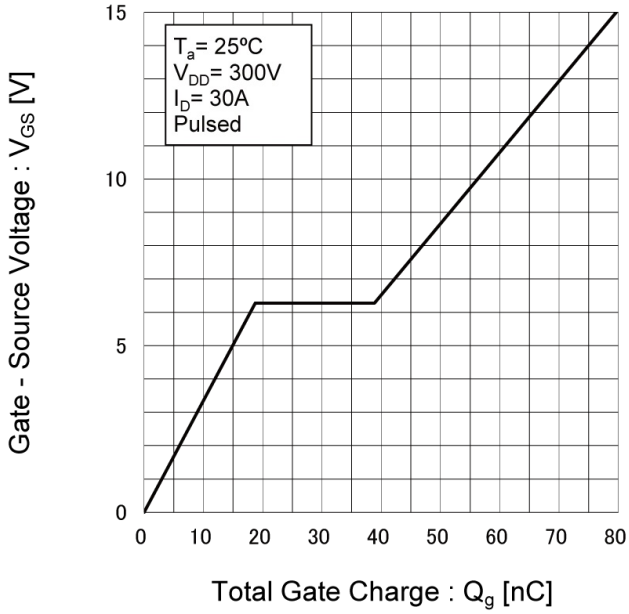


Fig.15 Dynamic Input Characteristics



●Electrical characteristic curves

Fig.16 Inverse Diode Forward Current vs. Source - Drain Voltage

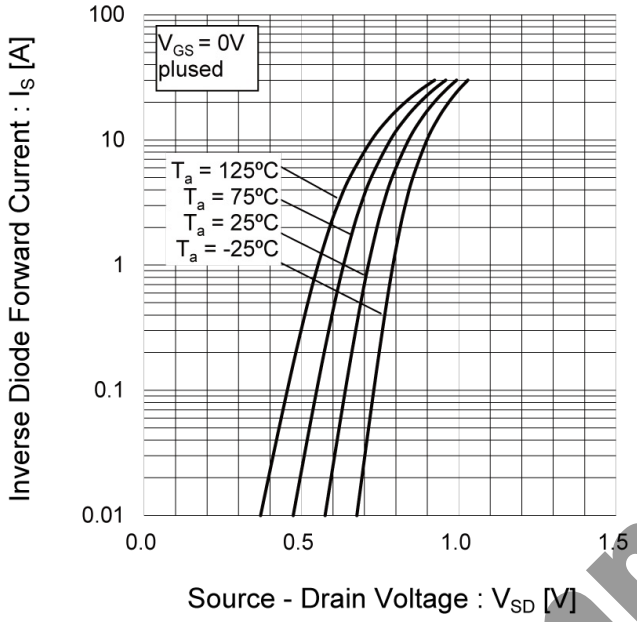
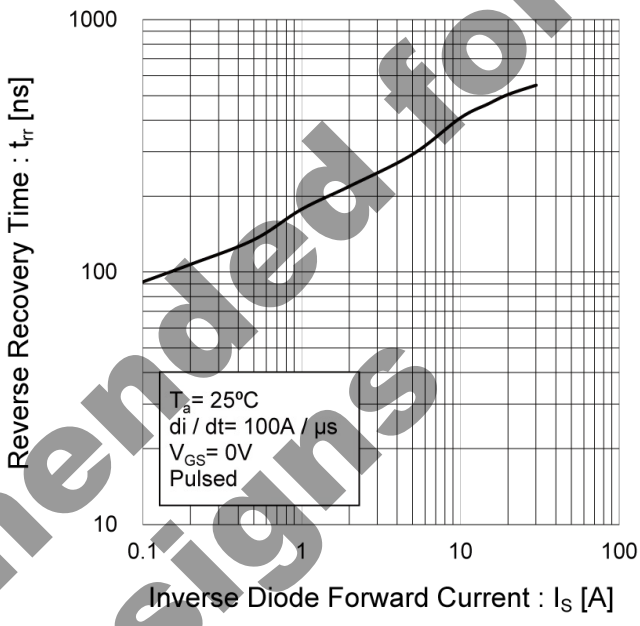


Fig.17 Reverse Recovery Time vs. Inverse Diode Forward Current



●Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

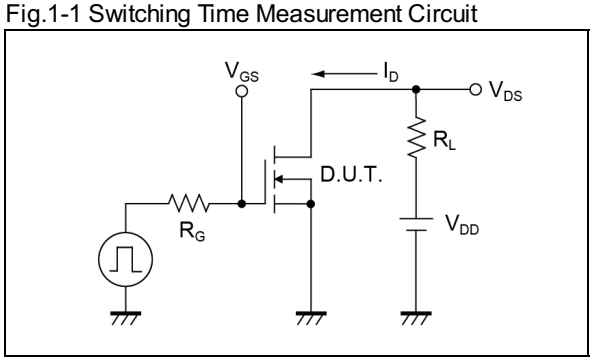


Fig.1-2 Switching Waveforms

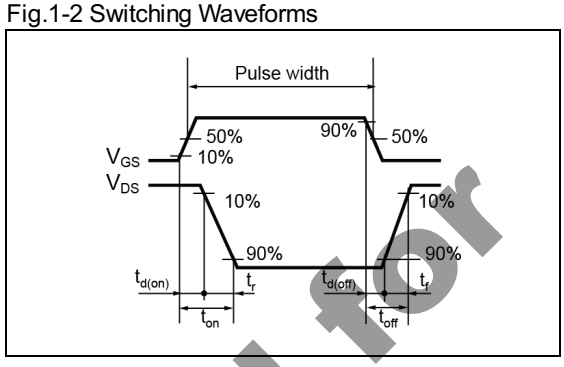


Fig.2-1 Gate Charge Measurement Circuit

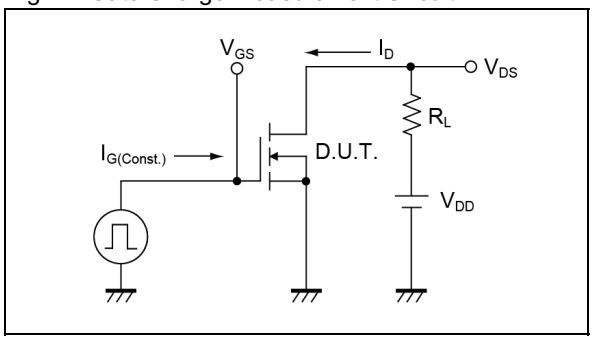


Fig.2-2 Gate Charge Waveform

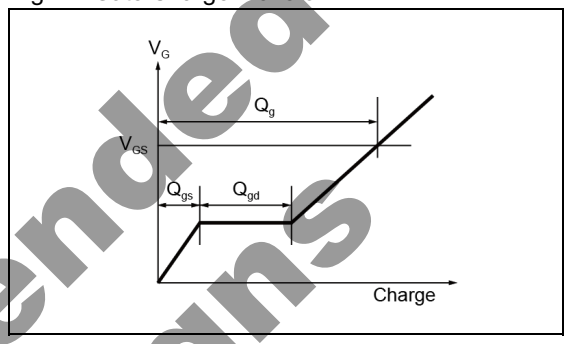


Fig.3-1 Avalanche Measurement Circuit

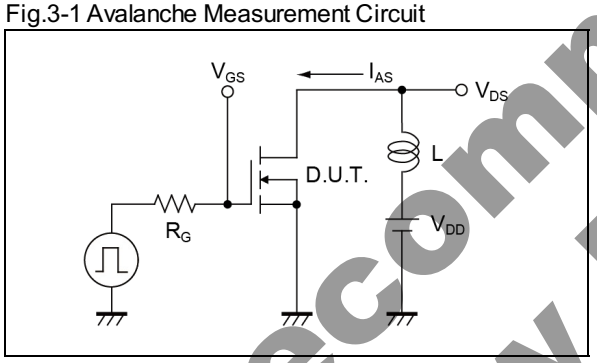


Fig.3-2 Avalanche Waveform

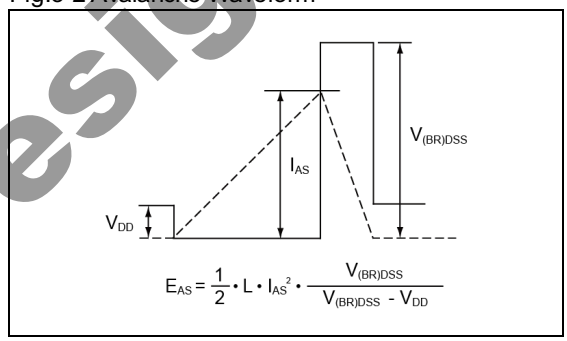


Fig.4-1 dv/dt Measurement Circuit

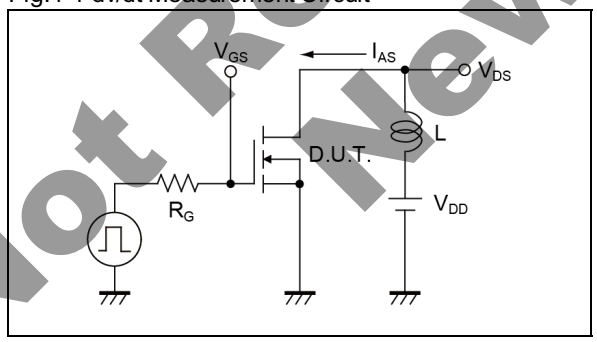


Fig.4-2 dv/dt Waveform

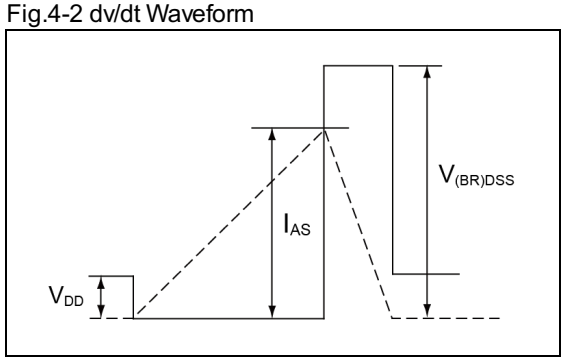


Fig.5-1 dv/dt Measurement Circuit

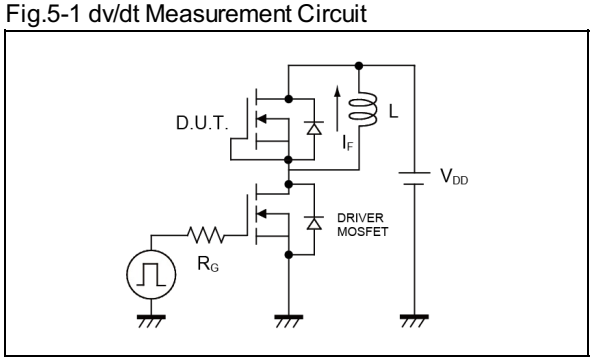
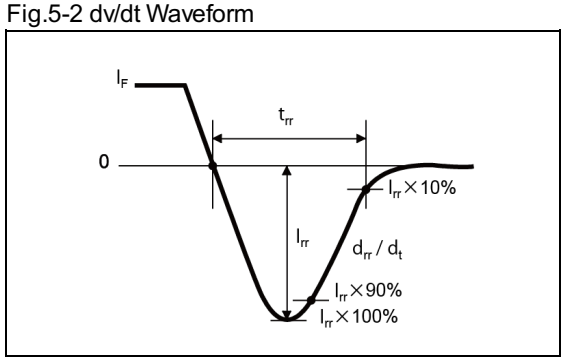


Fig.5-2 dv/dt Waveform



●Dimensions

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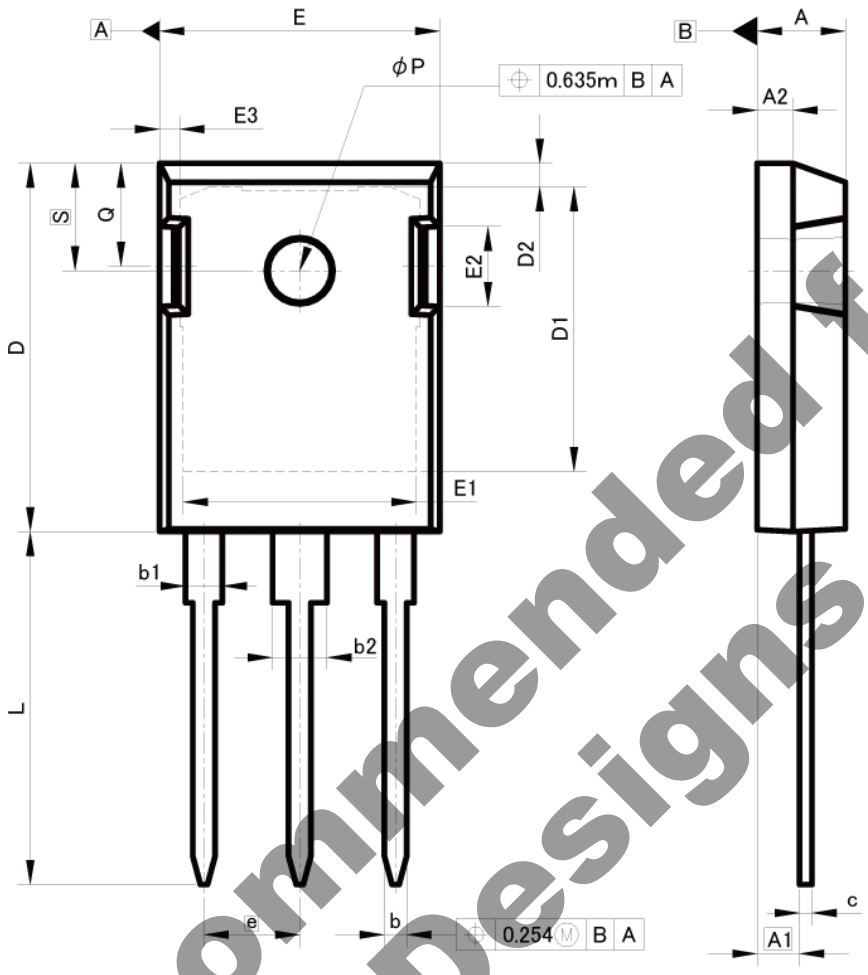

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	0.19	0.205
A1	2.29	2.54	0.09	0.1
A2	1.91	2.16	0.075	0.085
b	1.14	1.40	0.045	0.055
b1	1.91	2.20	0.075	0.087
b2	2.92	3.20	0.115	0.126
c	0.61	0.80	0.024	0.031
D	20.80	21.34	0.819	0.84
D1	17.43	17.83	0.686	0.702
E	15.75	16.13	0.62	0.635
e	5.45		0.22	
N	3		3	
L	19.81	20.57	0.78	0.81
L1	3.81	4.07	0.15	0.16
ΦP	3.55	3.65	0.14	0.144
Q	5.59	6.20	0.22	0.244
S	6.15		0.24	

Dimension in mm/inches

Notes

1) The information contained herein is subject to change without notice.

2) Before you use our Products, please contact our sales representative and verify the latest specifications :

3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
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5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.

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7) The Products specified in this document are not designed to be radiation tolerant.

8) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.

9) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.

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- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

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