RQ3E100GN

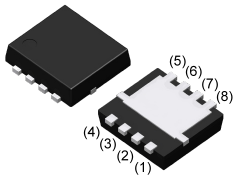
Nch 30V 10A Middle Power MOSFET

Datasheet

V_{DSS}	30V
$R_{DS(on)}$(Max.)	11.7mΩ
I_D	±10A
P_D	2W

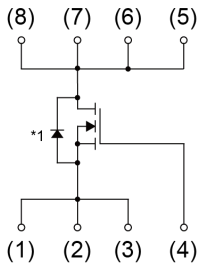
●Outline

HSMT8



●Inner circuit

(1) Source
(2) Source
(3) Source
(4) Gate
(5) Drain
(6) Drain
(7) Drain
(8) Drain
*1 Body Diode



●Features

1) Low on - resistance.
2) High power package (HSMT8).
3) Pb-free lead plating ; RoHS compliant
4) Halogen free
5) 100% Rg and UIS tested.

●Packaging specifications

Type	Packing	Embossed Tape
	Reel size (mm)	330
	Tape width (mm)	12
	Basic ordering unit (pcs)	3000
	Taping code	TB
	Marking	E100GN

●Application

Switching

●Absolute maximum ratings (T_a = 25°C)

Parameter		Symbol	Value	Unit
Drain - Source voltage		V_{DSS}	30	V
Continuous drain current	T_c = 25°C	I_D*1	±14	A
	T_a = 25°C	I_D	±10	A
Pulsed drain current		$I_{D,pulse}$*2	±40	A
Gate - Source voltage		V_{GSS}	±20	V
Avalanche energy, single pulse		E_{AS}*3	7.6	mJ
Avalanche current		I_{AS}*3	10	A
Power dissipation		P_D*1	15	W
		P_D*4	2	W
Junction temperature		T_j	150	℃
Range of storage temperature		T_{stg}	-55 to +150	℃

●Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - ambient	R_{thJA} *4	-	-	62.5	℃/W
Thermal resistance, junction - case	R_{thJC} *1	-	-	8.2	℃/W

●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	30	-	-	V
Breakdown voltage temperature coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_j}$	I_D = 1mA referenced to 25℃	-	28	-	mV/℃
Zero gate voltage drain current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V	-	-	1	μA
Gate - Source leakage current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 1mA	1.2	-	2.5	V
Gate threshold voltage temperature coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_j}$	I_D = 1mA referenced to 25℃	-	-3.87	-	mV/℃
Static drain - source on - state resistance	$R_{DS(on)}$ *5	V_{GS} = 10V, I_D = 10A	-	8.9	11.7	mΩ
		V_{GS} = 4.5V, I_D = 10A	-	12.0	15.7	
Gate input resistance	R_G	f=1MHz, open drain	-	2.4	-	Ω
Forward Transfer Admittance	$\|Y_{fs}\|$ *5	V_{DS} = 5V, I_D = 10A	8	-	-	S

*1 Tc = 25℃

*2 Pw≦10μs , Duty cycle≦1%

*3 L ≒ 0.1mH, V_{DD} = 15V, R_G = 25Ω, STARTING T_j = 25℃ Fig.3-1,3-2

*4 Mounted on a ceramic board (30×30×0.8mm)

*5 Pulsed

●Electrical characteristics (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{iss}	V_{GS} = 0V	-	420	-	pF
Output capacitance	C_{oss}	V_{DS} = 15V	-	120	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	32	-	
Turn - on delay time	$t_{d(on)}$ *5	V_{DD} ≃ 15V,V_{GS} = 10V	-	8.4	-	ns
Rise time	t_r *5	I_D = 5A	-	4.3	-	
Turn - off delay time	$t_{d(off)}$ *5	R_L ≃ 3Ω	-	22.4	-	
Fall time	t_f *5	R_G = 10Ω	-	3.1	-	

●Gate charge characteristics (T_a = 25°C)

Parameter	Symbol	Conditions		Values			Unit
				Min.	Typ.	Max.	
Total gate charge	Q_g *5	V_{DD} ≃ 15V I_D = 10A	V_{GS} = 10V	-	7.9	-	nC
			V_{GS} = 4.5V	-	3.9	-	
Gate - Source charge	Q_{gs} *5			-	2.1	-	
Gate - Drain charge	Q_{gd} *5			-	0.8	-	

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Body diode continuous forward current	I_S	T_a = 25℃	-	-	1.67	A
Body diode pulse current	I_{SP} *2		-	-	40	A
Forward voltage	V_{SD} *5	V_{GS} = 0V, I_S = 1.67A	-	-	1.2	V
Reverse recovery time	t_{rr} *5	I_S = 10A, V_{GS}=0V di/dt = 100A/μs	-	18.5	-	ns
Reverse recovery charge	Q_{rr} *5		-	8.9	-	nC

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

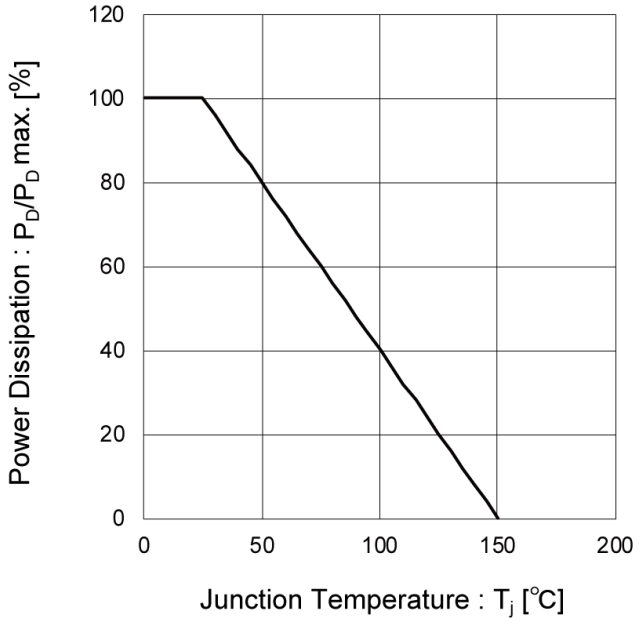


Fig.2 Maximum Safe Operating Area

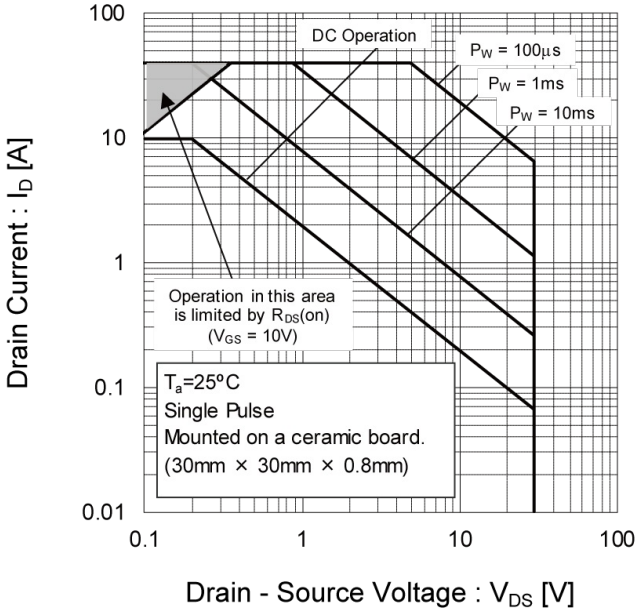


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width

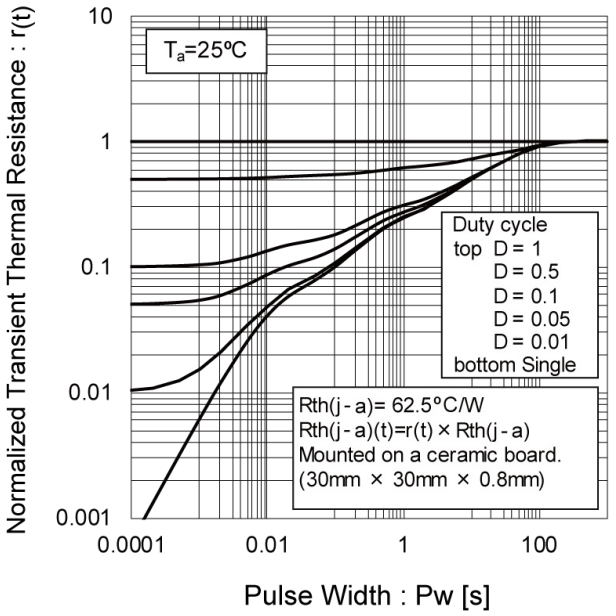
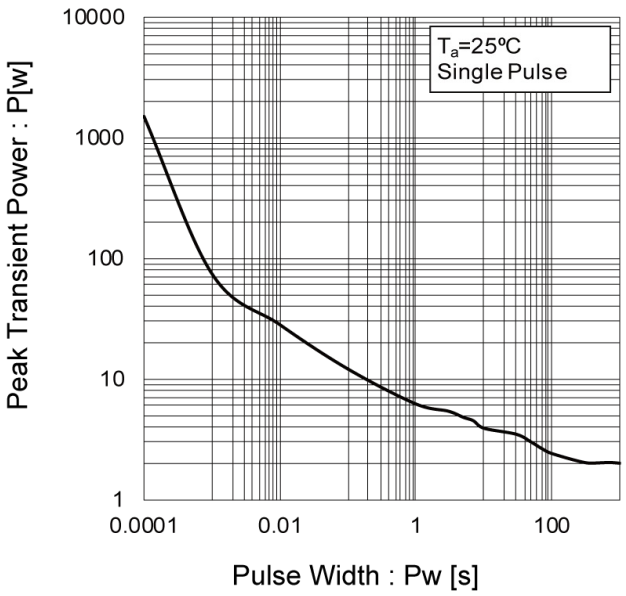


Fig.4 Single Pulse Maximum Power dissipation



●Electrical characteristic curves

Fig.5 Typical Output Characteristics(I)

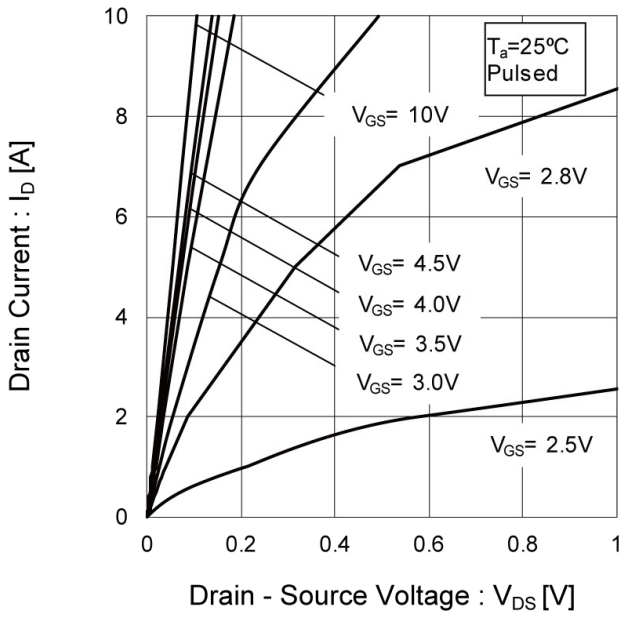


Fig.6 Typical Output Characteristics(II)

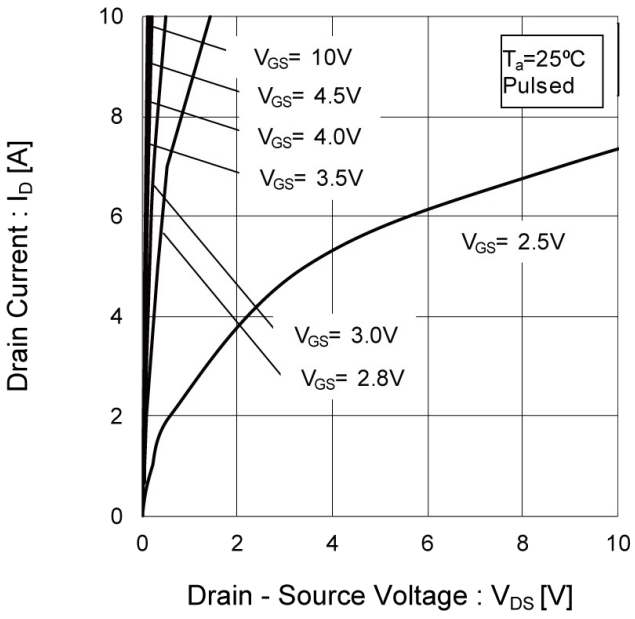


Fig.7 Breakdown Voltage vs. Junction Temperature

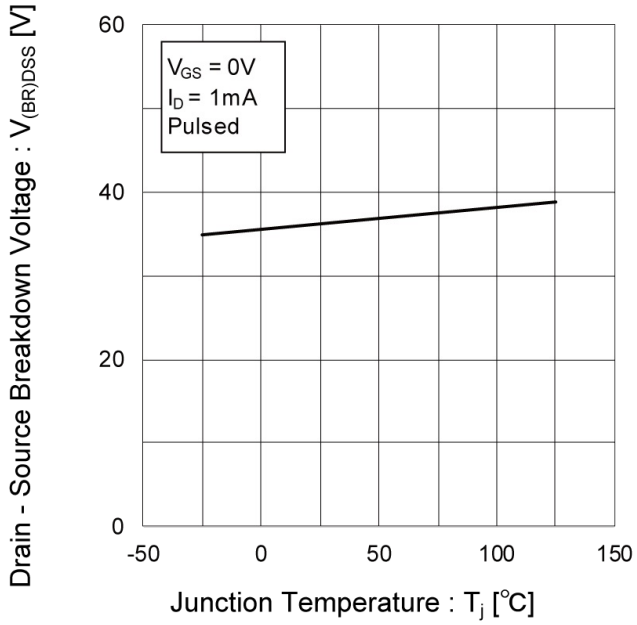
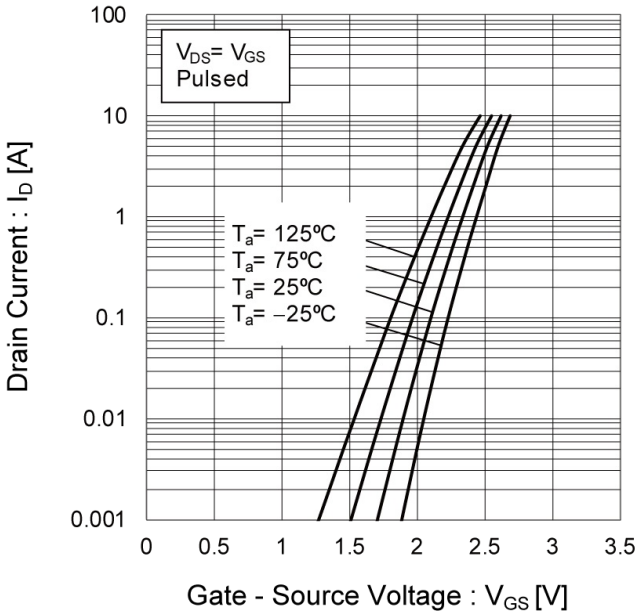


Fig.8 Typical Transfer Characteristics



●Electrical characteristic curves

Fig.9 Gate Threshold Voltage vs. Junction Temperature

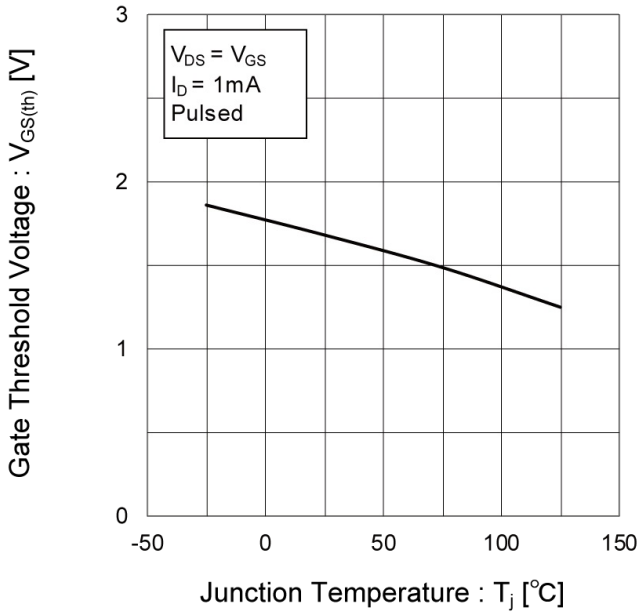


Fig.10 Forward Transfer Admittance vs. Drain Current

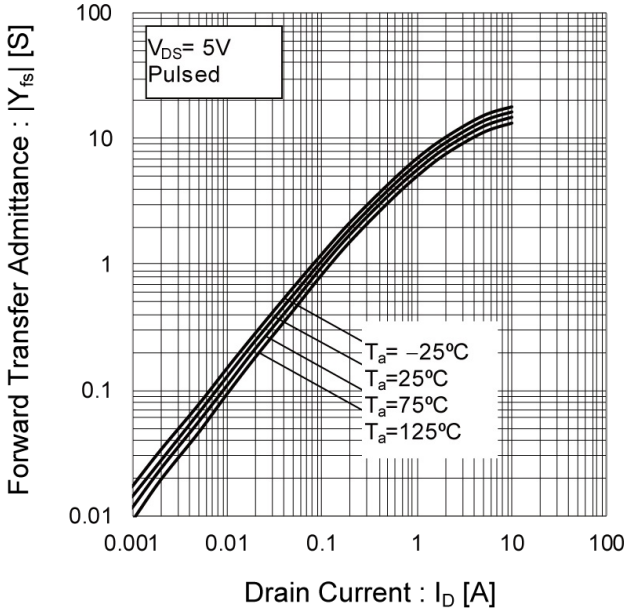


Fig.11 Drain Current Derating Curve

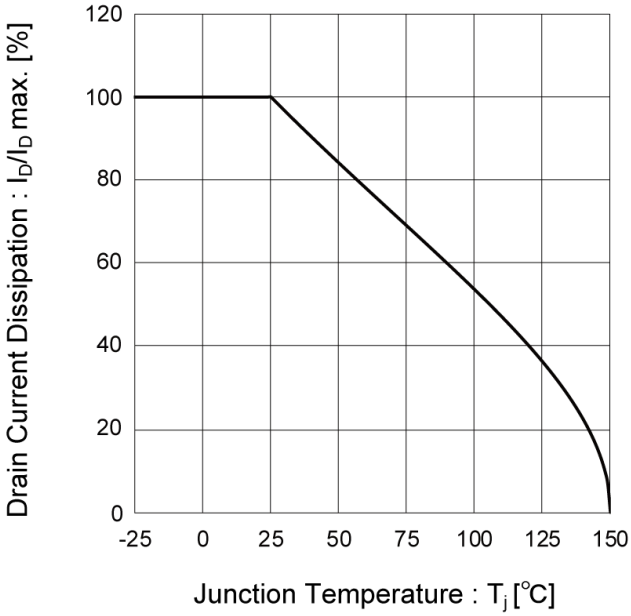
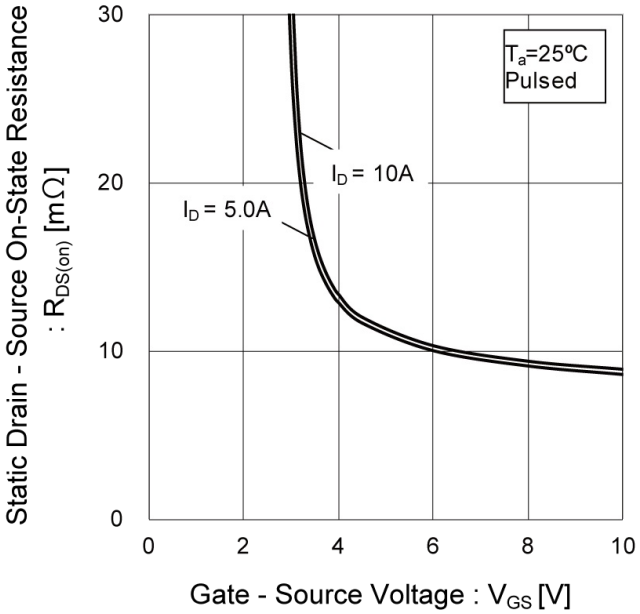


Fig.12 Static Drain - Source On - State Resistance vs. Gate Source Voltage



●Electrical characteristic curves

Fig.13 Static Drain - Source On - State Resistance vs. Junction Temperature

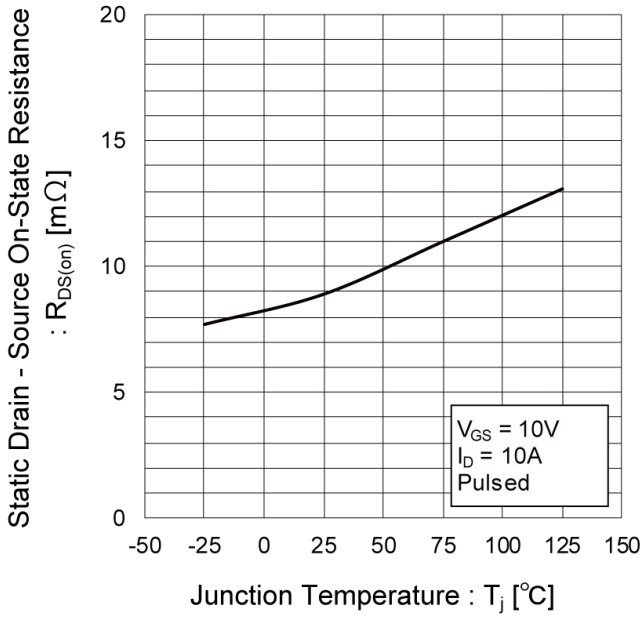


Fig.14 Static Drain - Source On - State Resistance vs. Drain Current (I)

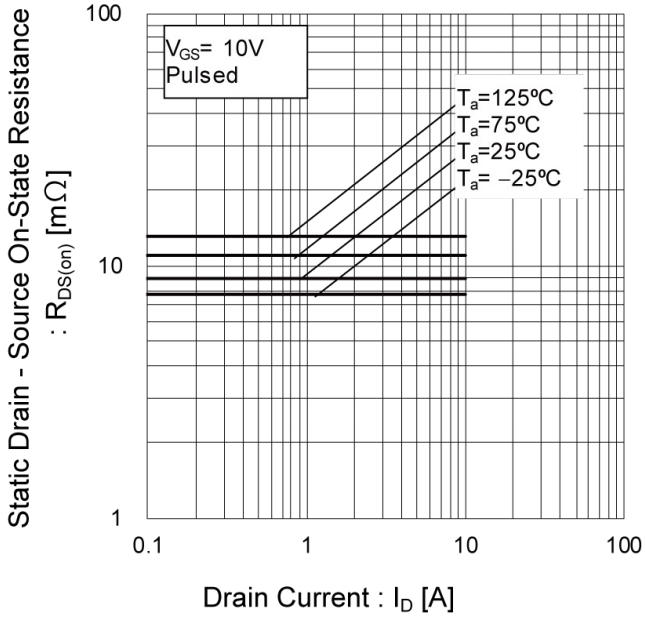
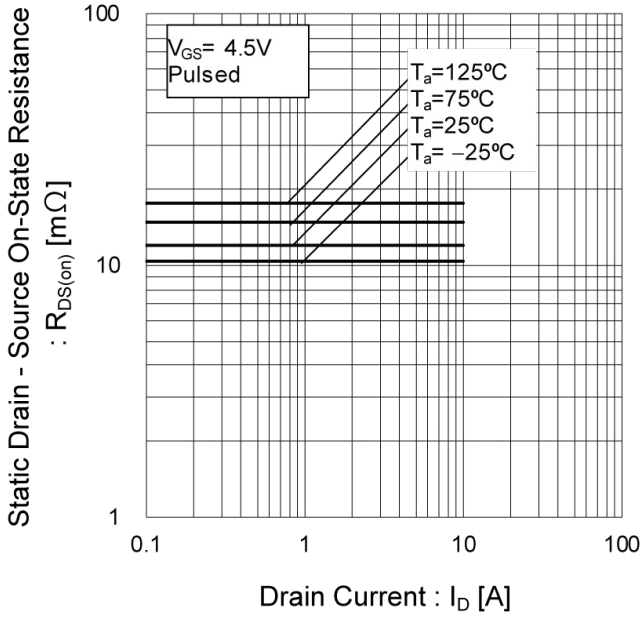


Fig.15 Static Drain - Source On - State Resistance vs. Drain Current (II)



●Electrical characteristic curves

Fig.16 Typical Capacitance vs. Drain - Source Voltage

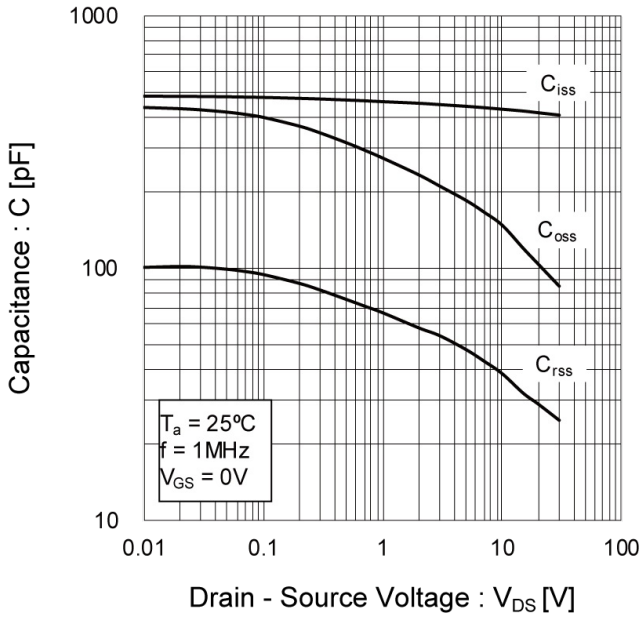


Fig.17 Switching Characteristics

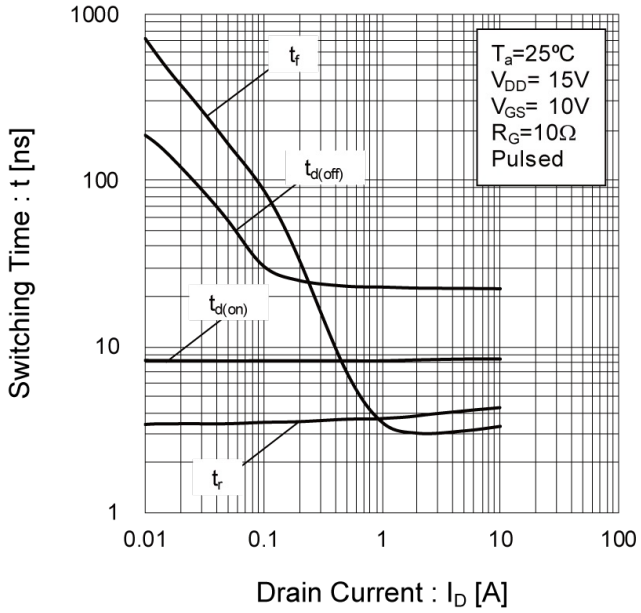


Fig.18 Dynamic Input Characteristics

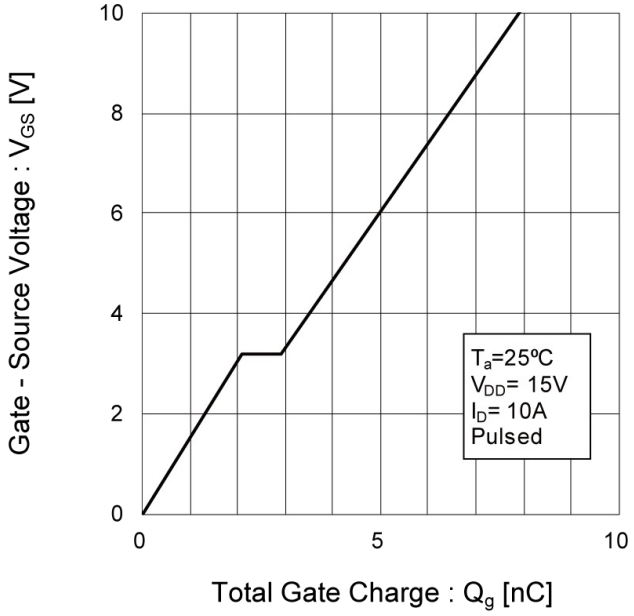
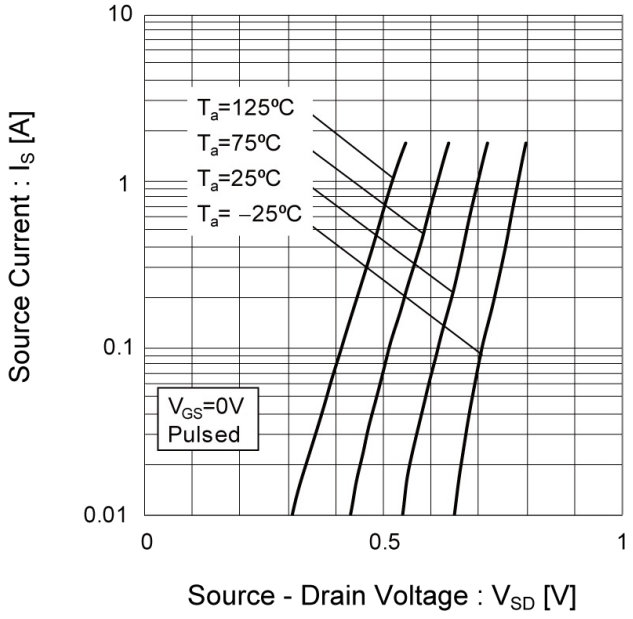


Fig.19 Source Current vs. Source Drain Voltage



●Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

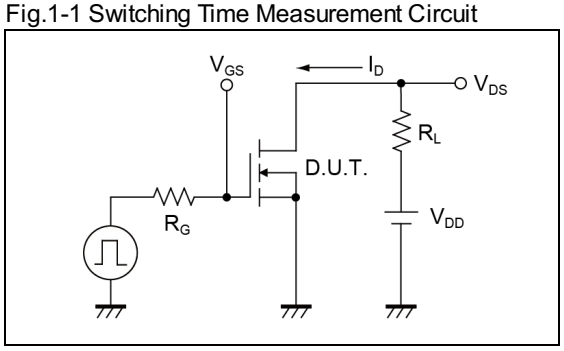


Fig.1-2 Switching Waveforms

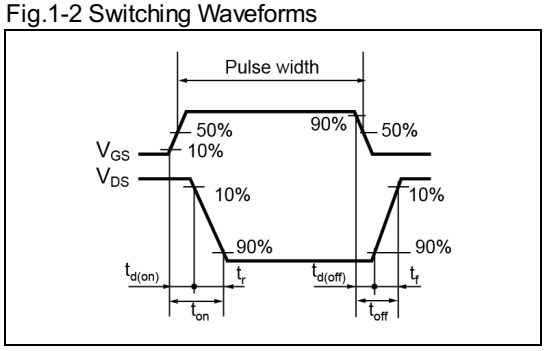


Fig.2-1 Gate Charge Measurement Circuit

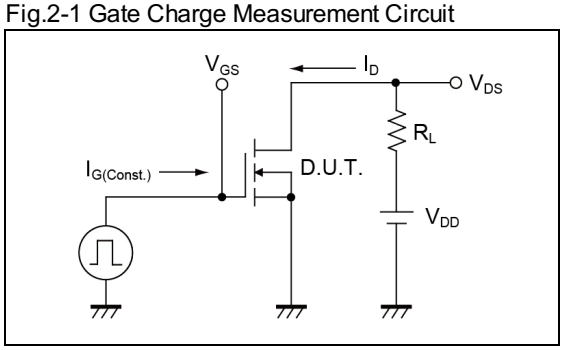


Fig.2-2 Gate Charge Waveform

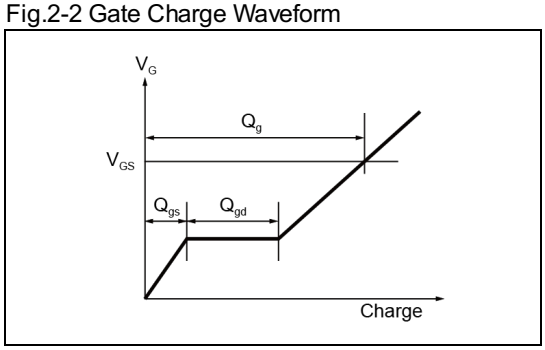


Fig.3-1 Avalanche Measurement Circuit

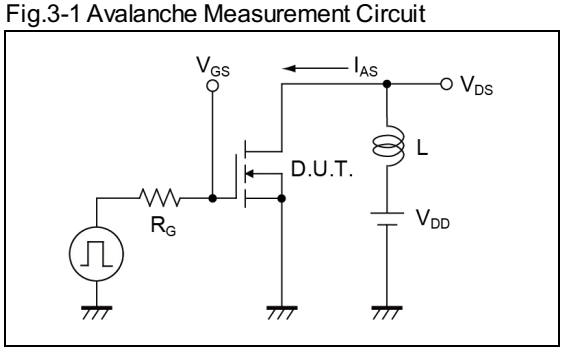
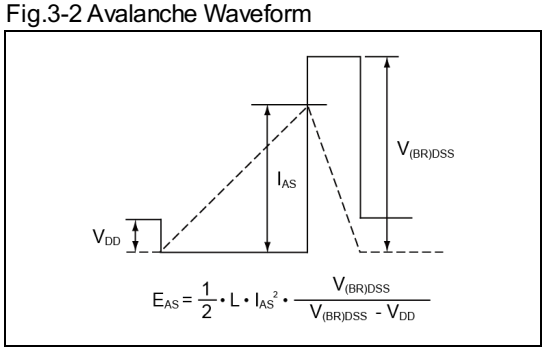


Fig.3-2 Avalanche Waveform



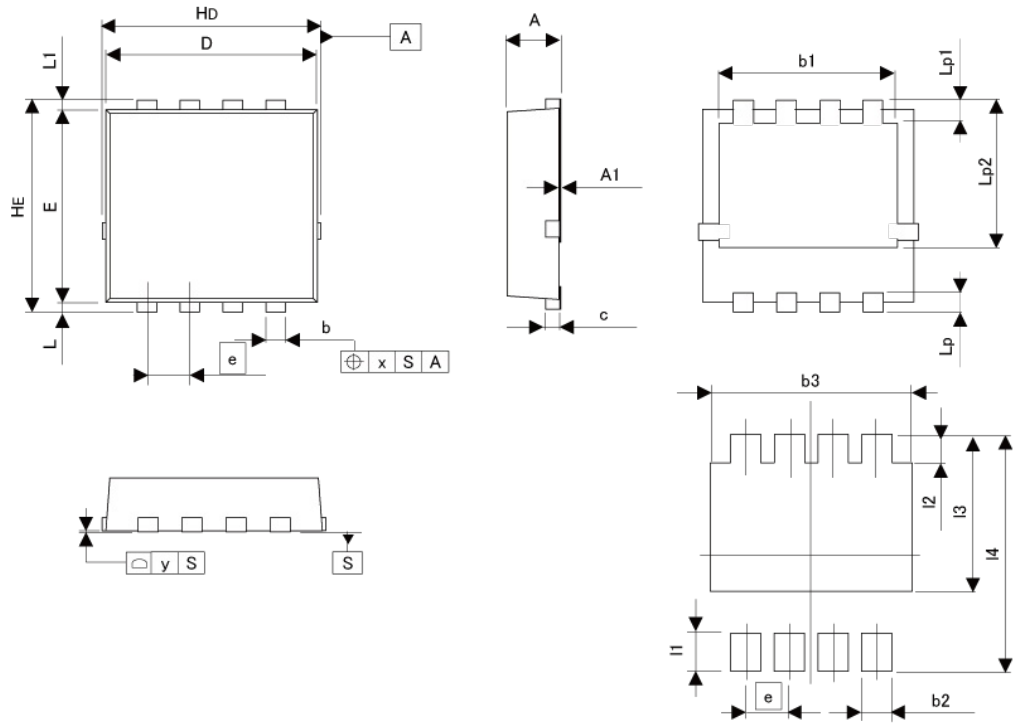
●Notice

This product might cause chip aging and breakdown under the large electrified environment.
Please consider to design ESD protection circuit.

●Dimensions

HSMT8

(3.3x3.3)



Pattern of terminal position areas
[Not a pattern of soldering pads]

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.90	0.028	0.035
A1	0.00	0.05	0.000	0.002
b	0.27	0.37	0.011	0.015
b1	2.50	2.70	0.098	0.106
c	0.10	0.30	0.004	0.012
D	3.10	3.30	0.122	0.130
E	2.90	3.10	0.114	0.122
e	0.65		0.026	
HD	3.20	3.40	0.126	0.134
HE	3.20	3.40	0.126	0.134
L	0.07	0.25	0.003	0.010
L1	0.07	0.25	0.003	0.010
Lp	0.20	0.40	0.008	0.016
Lp1	0.25	0.45	0.010	0.018
Lp2	2.20	2.40	0.087	0.094
x	-	0.10	-	0.004
y	-	0.10	-	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	-	0.47	-	0.019
b3	-	2.70	-	0.106
l1	-	0.50	-	0.020
l2	-	0.55	-	0.022
l3	-	2.40	-	0.094
l4	-	3.40	-	0.134

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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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.

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