ROHM SEMICONDUCTOR

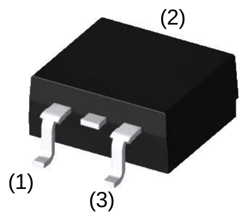
RCJ050N25

Nch 250V 5.0A Power MOSFET Datasheet

V_{DSS}	250V
$R_{DS(on)}$ (Max.)	1360mΩ
I_D	5.0A
P_D	30W

●Outline

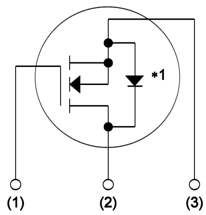
LPT(S)
(SC-83)
TO-263(D2PAK)



●Features

1) Low on-resistance.
2) Fast switching speed.
3) Drive circuits can be simple.
4) Parallel use is easy.
5) Pb-free lead plating ; RoHS compliant
6) 100% Avalanche tested

●Inner circuit



(1) Gate
(2) Drain
(3) Source

∗1 BODY DIODE

●Application

Switching Power Supply

Automotive Motor Drive

Automotive Solenoid Drive

●Packaging specifications

Type	Packaging	Taping
	Reel size (mm)	330
	Tape width (mm)	24
	Basic ordering unit (pcs)	1,000
	Taping code	TL
	Marking	RCJ050N25

●Absolute maximum ratings (T_a = 25°C)

Parameter		Symbol	Value	Unit
Drain - Source voltage		V_{DSS}	250	V
Continuous drain current	T_c = 25°C	I_D *1	±5.0	A
	T_c = 100°C	I_D *1	±2.7	A
Pulsed drain current		$I_{D,pulse}$ *2	±20	A
Gate - Source voltage		V_{GSS}	±30	V
Avalanche energy, single pulse		E_{AS} *3	1.82	mJ
Avalanche current		I_{AR} *3	2.5	A
Power dissipation	T_c = 25°C	P_D	30	W
	T_a = 25°C *4	P_D	1.56	W
Junction temperature		T_j	150	°C
Range of storage temperature		T_{stg}	–55 to +150	°C

●Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - case	R_{thJC}	-	-	4.16	°C/W
Thermal resistance, junction - ambient [*4]	R_{thJA}	-	-	80	°C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	°C

●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	250	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} = 250V, V_{GS} = 0V T_j = 25°C	-	-	10	μA
Gate - Source leakage current	I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V	-	-	±10	nA
Gate threshold voltage	$V_{GS (th)}$	V_{DS} = 10V, I_D = 1mA	3.5	-	5.5	V
Static drain - source on - state resistance	$R_{DS(on)}$ [*5]	V_{GS} = 10V, I_D = 2.5A	-	970	1360	mΩ
		V_{GS} = 10V, I_D = 2.5A T_j = 125°C	-	2100	2950	mΩ
Forward transfer admittance	g_{fs}	V_{DS} = 10V, I_D = 2.5A	1.25	2.50	-	S

●Electrical characteristics (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{iss}	V_{GS} = 0V	-	350	-	pF
Output capacitance	C_{oss}	V_{DS} = 25V	-	30	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	15	-	
Turn - on delay time	$t_{d(on)}$ *5	V_{DD} ≃ 125V, V_{GS} = 10V	-	15	-	ns
Rise time	t_r *5	I_D = 2.5A	-	16	-	
Turn - off delay time	$t_{d(off)}$ *5	R_L = 49.9Ω	-	18	-	
Fall time	t_f *5	R_G = 10Ω	-	10	-	

●Gate Charge characteristics (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Total gate charge	Q_g *5	V_{DD} ≃ 125V	-	8.5	-	nC
Gate - Source charge	Q_{gs} *5	I_D = 5.0A	-	3.5	-	
Gate - Drain charge	Q_{gd} *5	V_{GS} = 10V	-	3.5	-	
Gate plateau voltage	$V_{(plateau)}$	V_{DD} ≃ 125V, I_D = 5.0A	-	8.0	-	V

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Continuous source current	I_S *1	T_c = 25°C	-	-	5.0	A
Pulsed source current	I_{SM} *2		-	-	20	A
Forward voltage	V_{SD} *5	V_{GS} = 0V, I_S = 5.0A	-	-	1.5	V
Reverse recovery time	t_{rr} *5	I_S = 2.5A, di/dt = 100A/μs	-	90	-	ns
Reverse recovery charge	Q_{rr} *5		-	225	-	nC

*1 Limited only by maximum temperature allowed.

*2 Pw ≤ 10μs, Duty cycle ≤ 1%

*3 L ≃ 500μH, V_{DD} = 50V, Rg = 25Ω, starting T_j = 25°C

*4 Mounted on a epoxy PCB FR4 (25mm × 27mm × 0.8mm)

*5 Pulsed

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

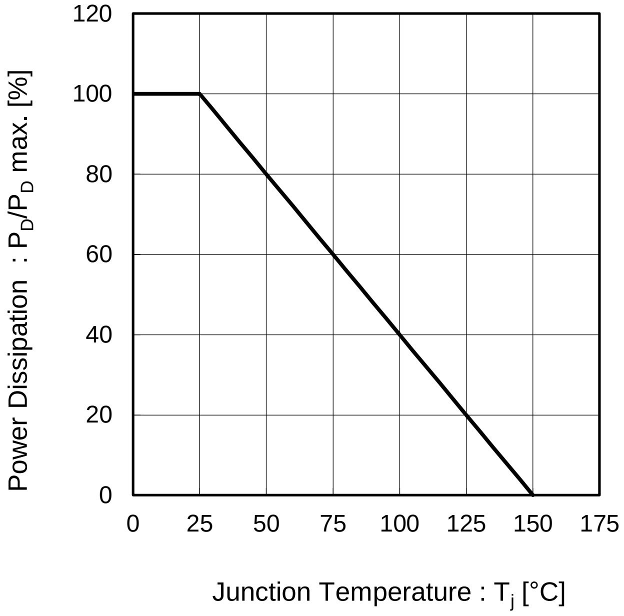


Fig.2 Maximum Safe Operating Area

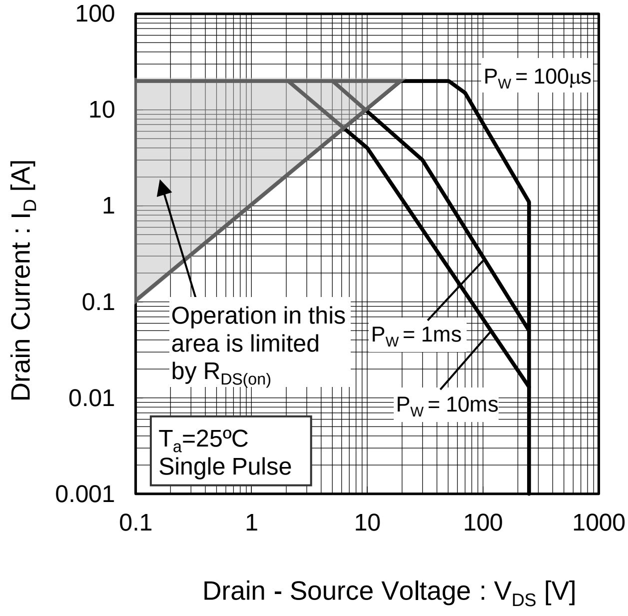
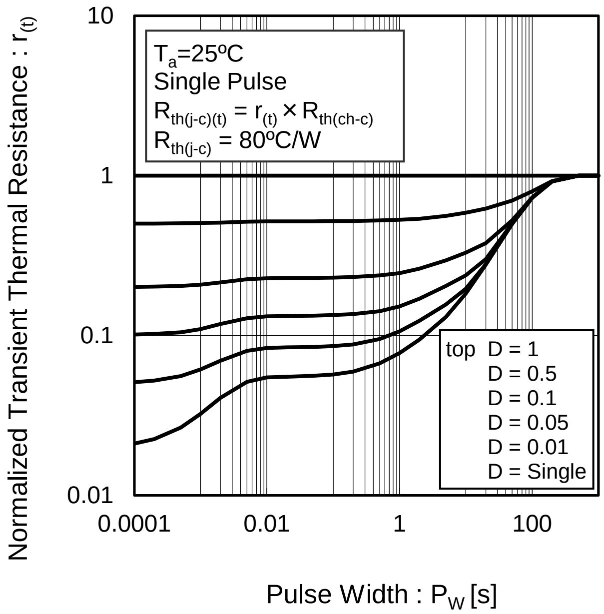


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width



●Electrical characteristic curves

Fig.4 Avalanche Current vs Inductive Load

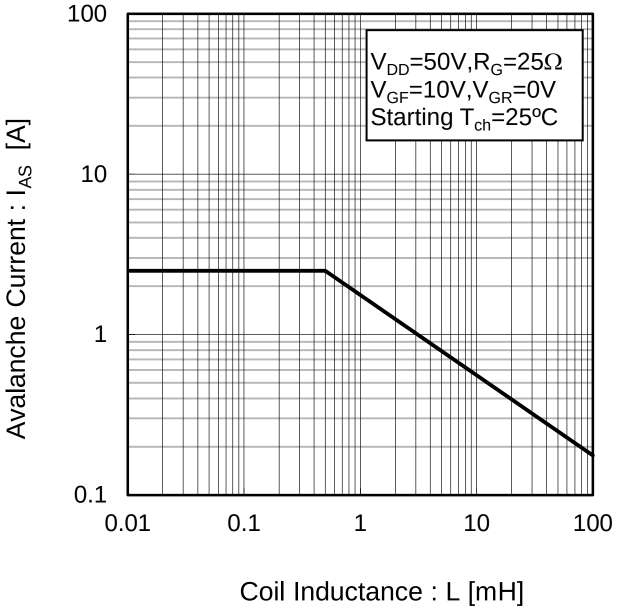


Fig.5 Avalanche Energy Derating Curve vs Junction Temperature

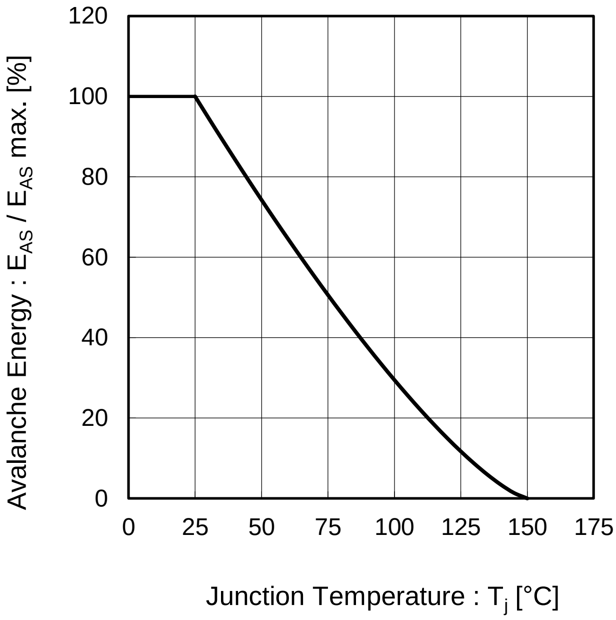


Fig.6 Typical Output Characteristics(I)

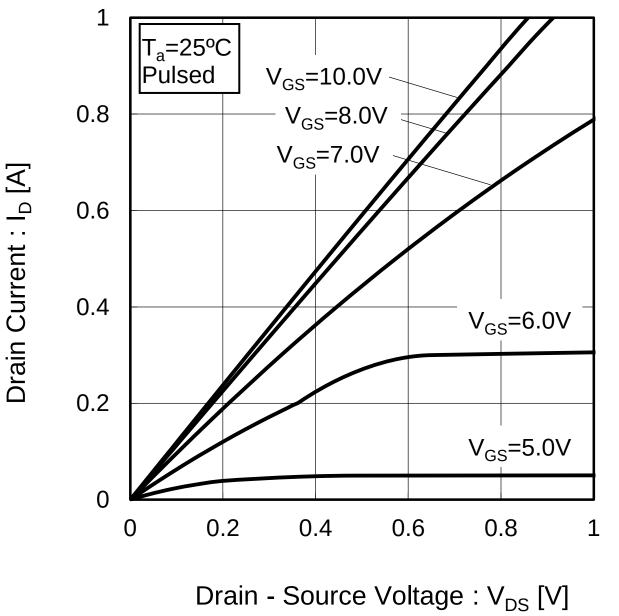
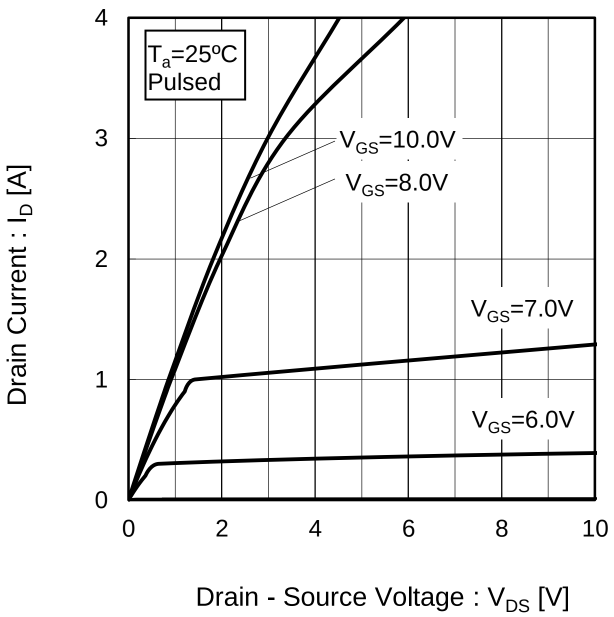


Fig.7 Typical Output Characteristics(II)



●Electrical characteristic curves

Fig.8 Breakdown Voltage vs. Junction Temperature

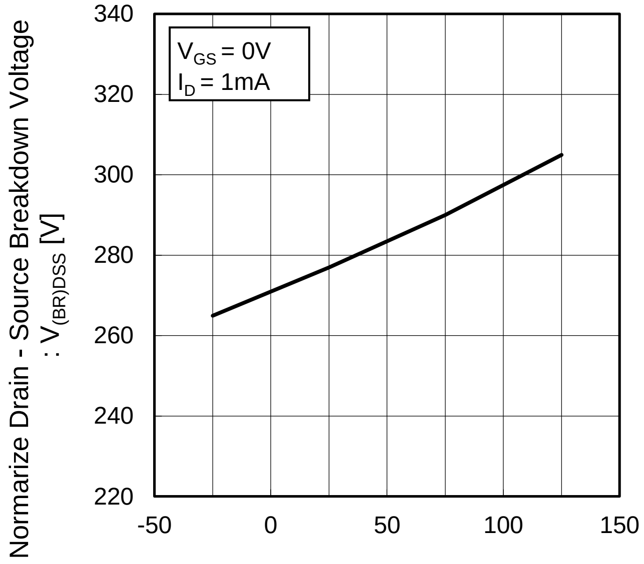


Fig.9 Typical Transfer Characteristics

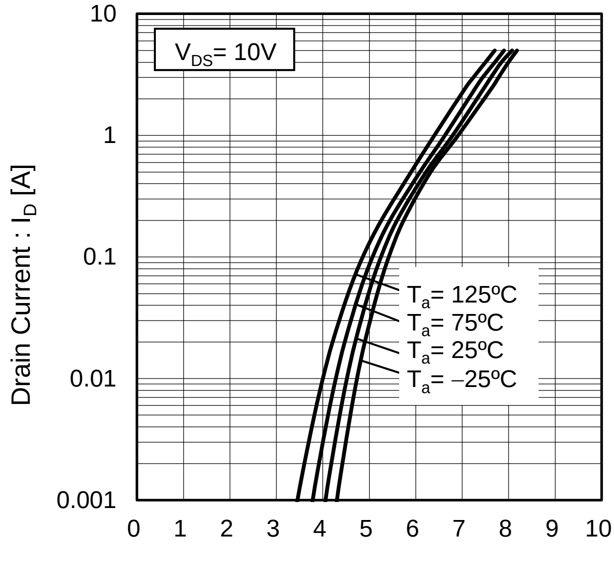


Fig.10 Gate Threshold Voltage vs. Junction Temperature

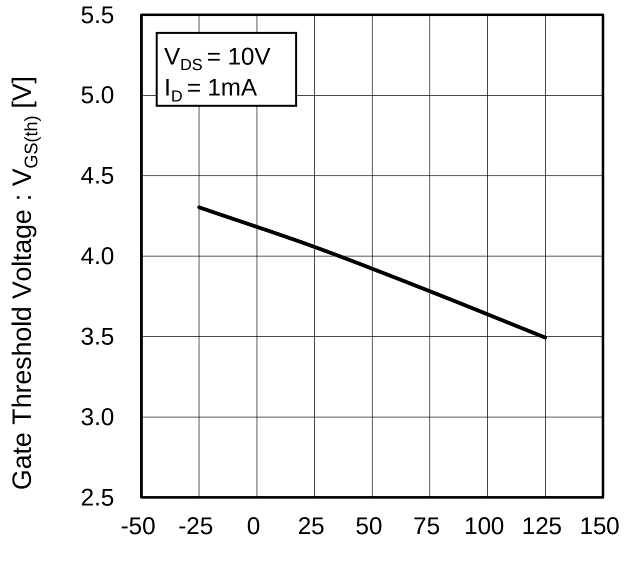
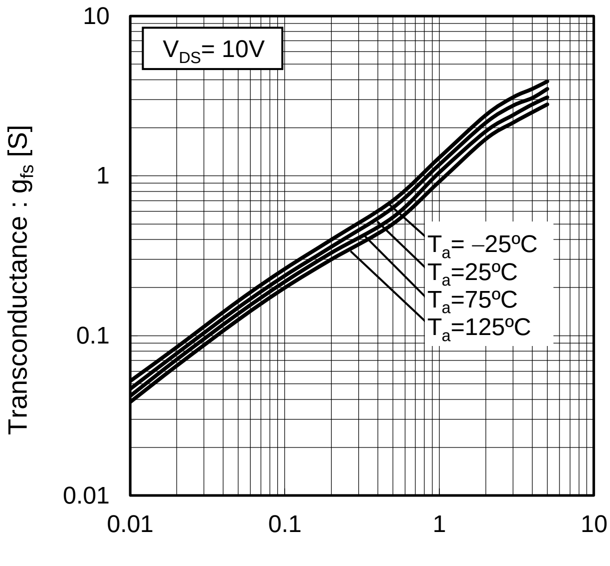


Fig.11 Transconductance vs. Drain Current



●Electrical characteristic curves

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

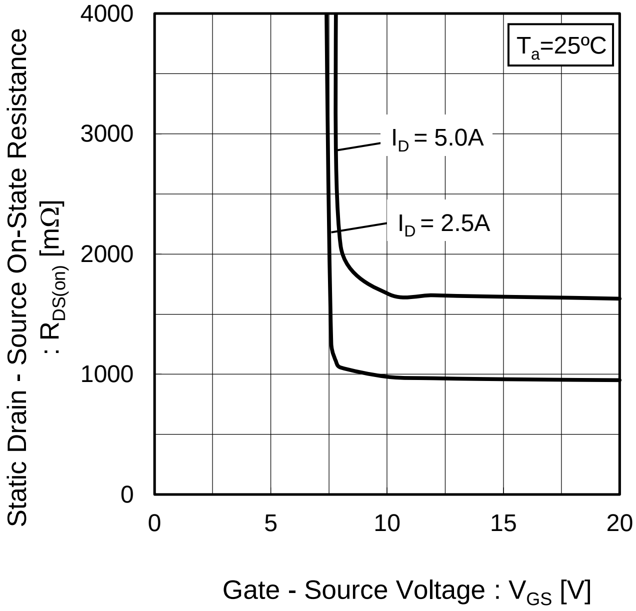


Fig.13 Static Drain - Source On - State Resistance vs. Drain Current(I)

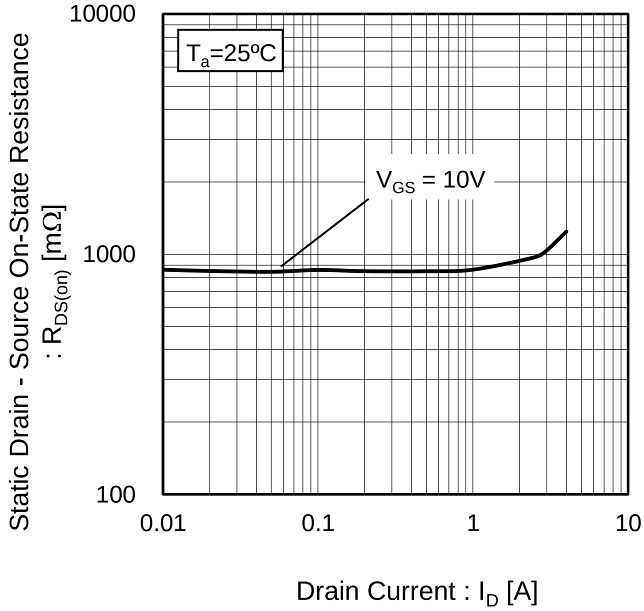
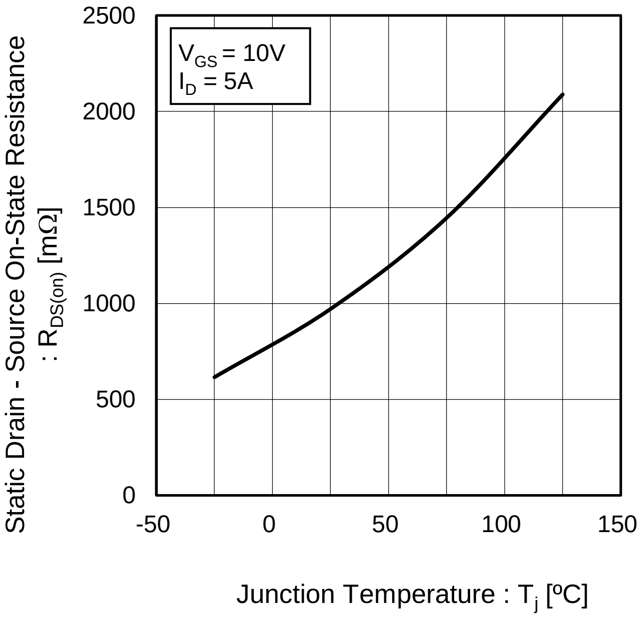


Fig.14 Static Drain - Source On - State Resistance vs. Junction Temperature



●Electrical characteristic curves

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

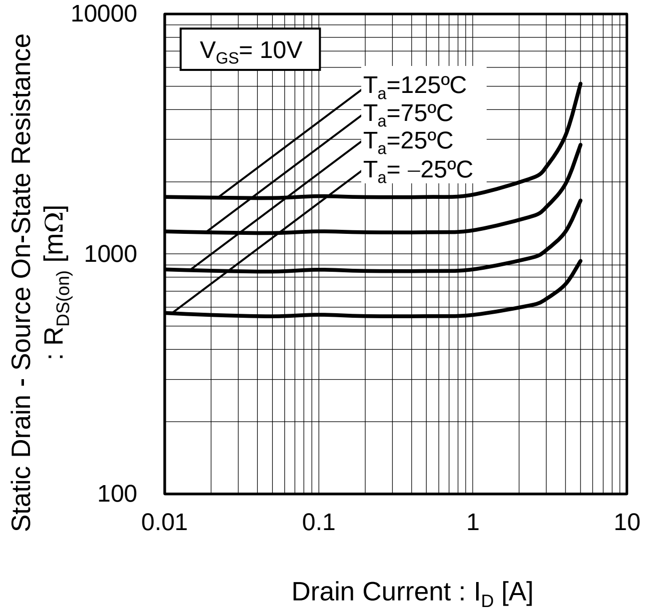
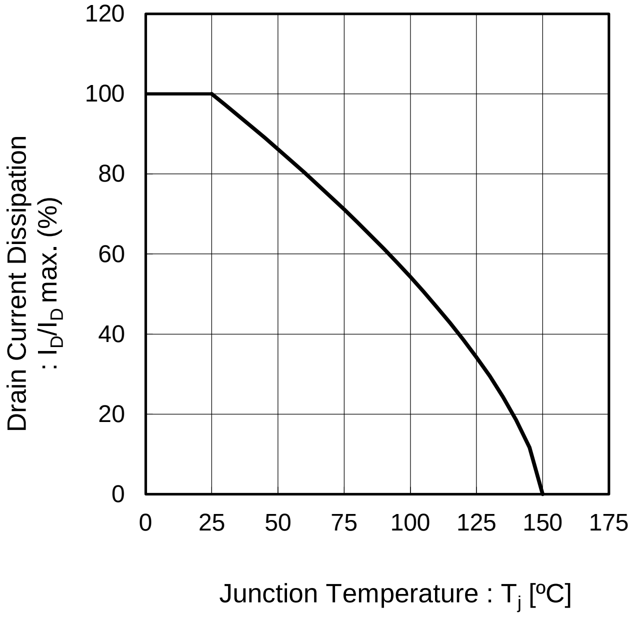


Fig.16 Drain Current Derating Curve



●Electrical characteristic curves

Fig.17 Typical Capacitance vs. Drain - Source Voltage

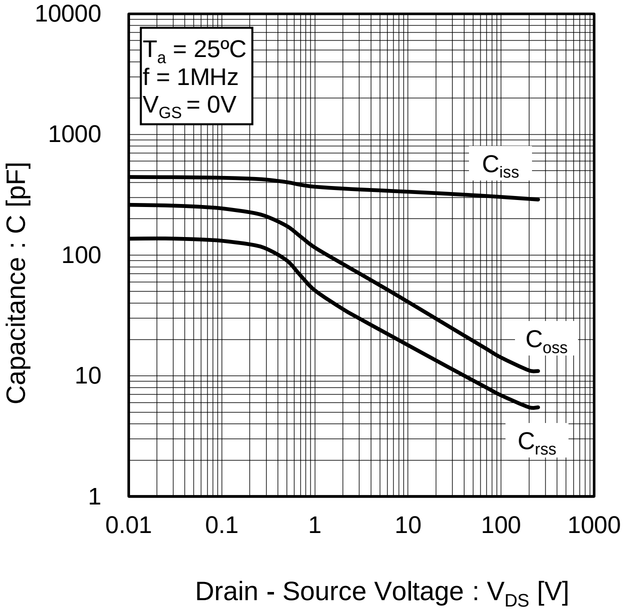


Fig.18 Switching Characteristics

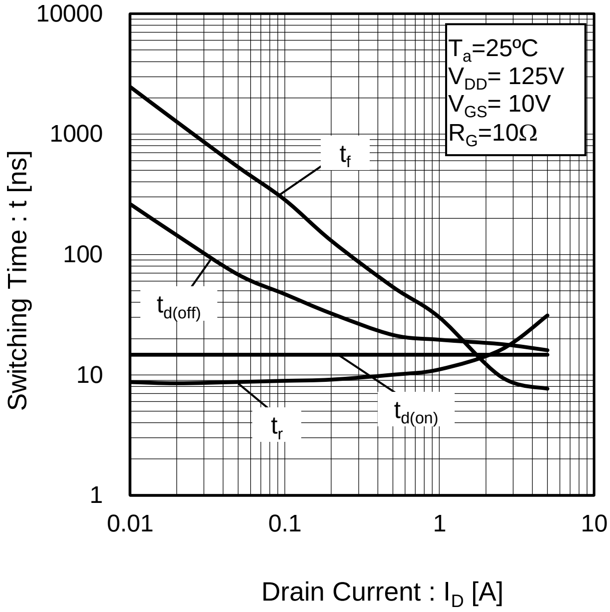
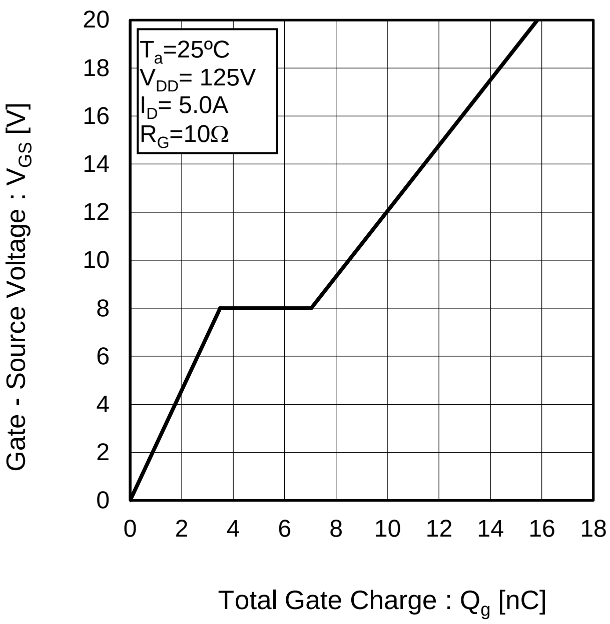


Fig.19 Dynamic Input Characteristics



●Electrical characteristic curves

Fig.20 Source Current
vs. Source - Drain Voltage

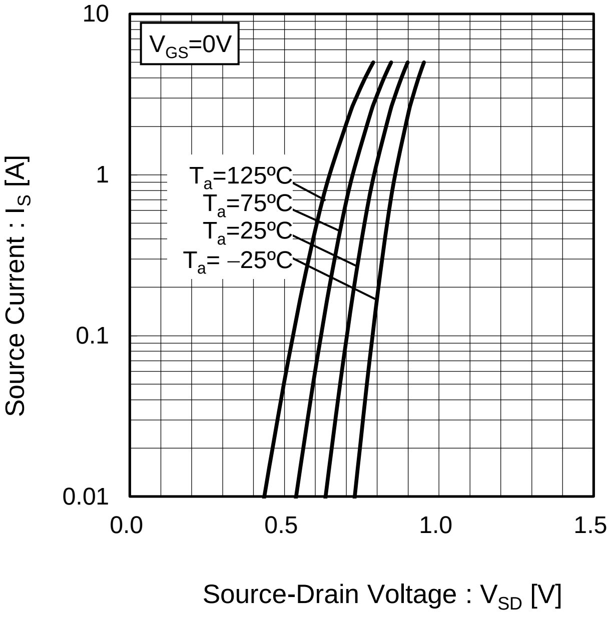
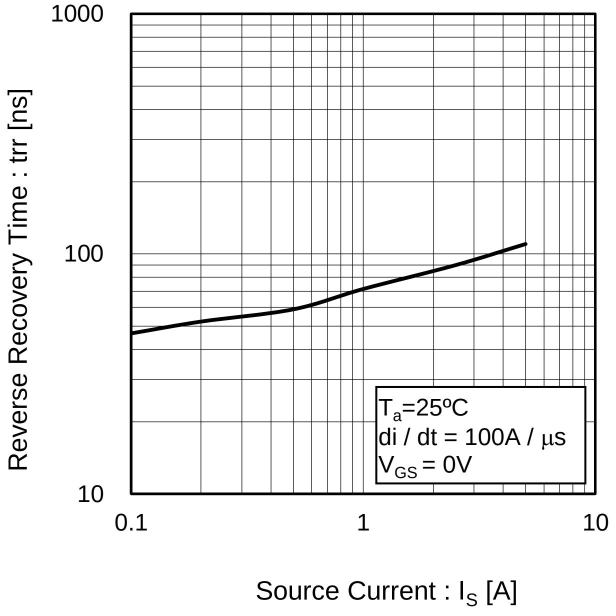


Fig21 Reverse Recovery Time
vs.Source Current



●Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

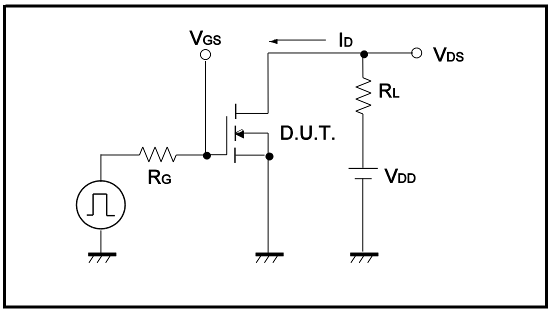


Fig.1-2 Switching Waveforms

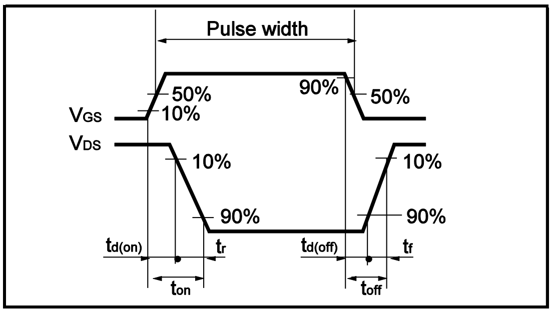


Fig.2-1 Gate Charge Measurement Circuit

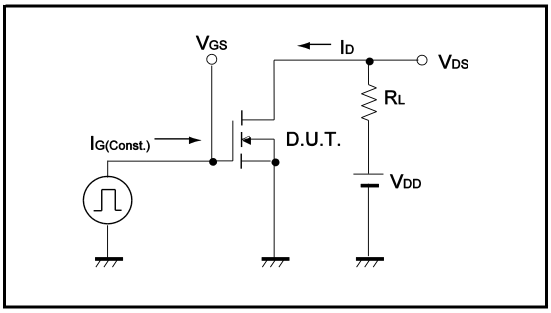


Fig.2-2 Gate Charge Waveform

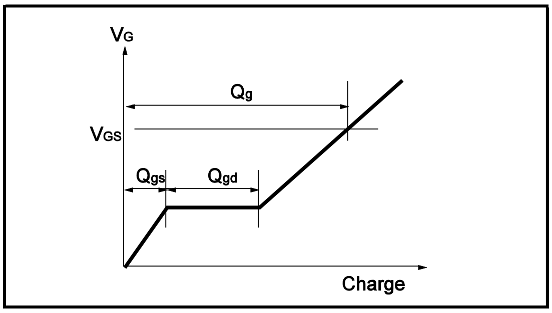


Fig.3-1 Avalanche Measurement Circuit

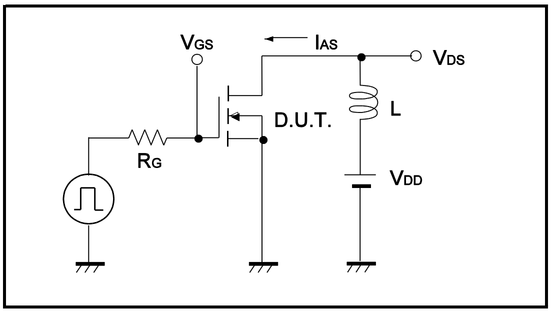
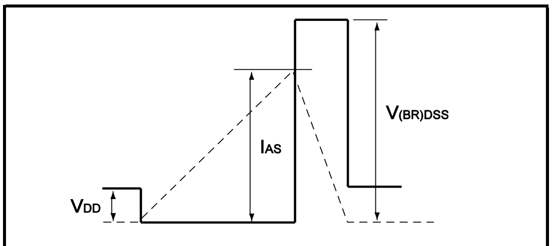


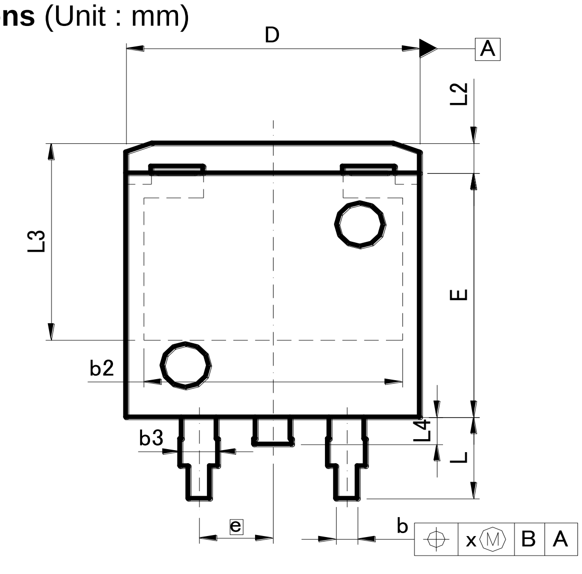
Fig.3-2 Avalanche Waveform

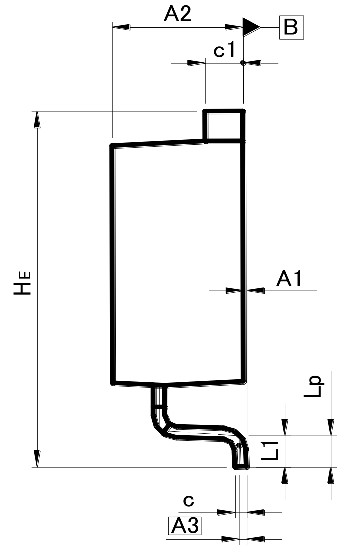


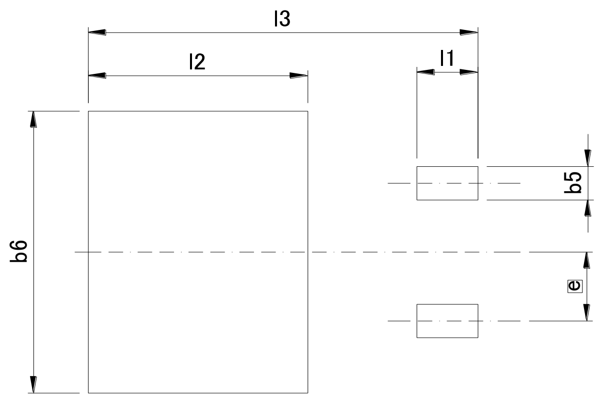
$$E_{AS} = \frac{1}{2} \cdot L \cdot I_{AS}^2 \cdot \frac{V_{(BR)DSS}}{V_{(BR)DSS} - V_{DD}}$$

●**Dimensions** (Unit : mm)

LPTS







Patterm of terminal position areas

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A1	0.00	0.30	0	0.012
A2	4.30	4.70	0.169	0.185
A3	0.25		0.01	
b	0.68	0.98	0.027	0.039
b2	8.90		0.35	
b3	1.14	1.44	0.045	0.057
c	0.30	0.60	0.012	0.024
c1	1.10	1.50	0.043	0.059
D	9.80	10.40	0.386	0.409
E	8.80	9.20	0.346	0.362
e	2.54		0.10	
HE	12.80	13.40	0.504	0.528
L	2.70	3.30	0.106	0.13
L1	0.90	1.50	0.035	0.059
L2	1.10		0.043	
L3	7.25		0.285	
L4	1.00		0.039	
Lp	0.90	1.50	0.035	0.059
x	−	0.25	−	0.01

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b5	−	1.23	−	0.049
b6	−	10.40	−	0.409
l1	−	2.10	−	0.083
l2	−	7.55	−	0.297
l3	−	13.40	−	0.528

Dimension in mm/inches

Notes

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ROHM SEMICONDUCTOR

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Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

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- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

Как с нами связаться

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