RS3E075AT

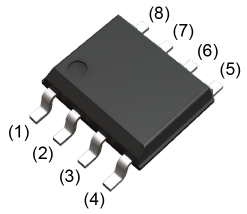
Pch -30V -7.5A Middle Power MOSFET

Datasheet

V_{DSS}	-30V
$R_{DS(on)}$(Max.)	23.5mΩ
I_D	±7.5A
P_D	2.0W

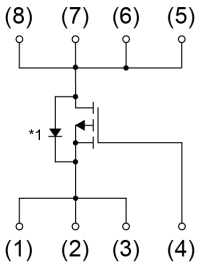
●Outline

SOP8



●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) Small Surface Mount Package (SOP8).
3) Pb-free lead plating ; RoHS compliant.

●Application

Switching

●Packaging specifications

Type	Packing	Embossed Tape
	Reel size (mm)	330
	Tape width (mm)	12
	Basic ordering unit (pcs)	2500
	Taping code	TB
	Marking	RS3E075AT

●Absolute maximum ratings (T_a = 25°C)

Parameter	Symbol	Value	Unit
Drain - Source voltage	V_{DSS}	-30	V
Continuous drain current	I_D *1	±7.5	A
Pulsed drain current	$I_{D,pulse}$ *2	±30	A
Gate - Source voltage	V_{GSS}	±20	V
Avalanche energy, single pulse	E_{AS} *3	4.2	mJ
Avalanche current	I_{AS} *3	-7.5	A
Power dissipation	P_D *4	2.0	W
Junction temperature	T_j	150	℃
Range of storage temperature	T_{stg}	-55 to +150	℃

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●Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - ambient	R_{thJA} *4	-	62.5	-	℃/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℃	-	-22	-	mV/℃
Zero gate voltage drain current	I_{DSS}	V_{DS} = -30V, 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} = -10, I_D = -1mA	-1.0	-	-2.5	V
Gate threshold voltage temperature coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_j}$	I_D = -1mA referenced to 25℃	-	2.9	-	mV/℃
Static drain - source on - state resistance	$R_{DS(on)}$ *5	V_{GS} = -10V, I_D = -7.5A	-	18.0	23.5	mΩ
		V_{GS} = -4.5V, I_D = -7.5A	-	24.0	31.0	
Transconductance	g_{fs} *5	V_{DS} = -5V, I_D = -7.5A	7.5	-	-	S

*1 Limited only by maximum temperature allowed.

*2 Pw ≤ 10μs, Duty cycle ≤ 1%

*3 L ≃ 100μH, V_{DD} = -15V, R_G = 25Ω, STARTING T_{ch} = 25℃ Fig.3-1,3-2

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

*5 Pulsed

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●Electrical characteristics (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{iss}	V_{GS} = 0V	-	1250	-	pF
Output capacitance	C_{oss}	V_{DS} = -15V	-	220	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	170	-	
Turn - on delay time	$t_{d(on)}$ *5	V_{DD} ≃ -15V, V_{GS} = -10V	-	10	-	ns
Rise time	t_r *5	I_D = -3.75A	-	20	-	
Turn - off delay time	$t_{d(off)}$ *5	R_L = 4Ω	-	80	-	
Fall time	t_f *5	R_G = 10Ω	-	60	-	

●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 = -7.5A	V_{GS} = -10V	-	25	-	nC
			V_{GS} = -4.5V	-	12.8	-	
Gate - Source charge	Q_{gs} *5			-	4.5	-	
Gate - Drain charge	Q_{gd} *5			-	4.7	-	

●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 *1	T_a = 25℃	-	-	-1.67	A
Body diode pulse current	I_{SP} *2		-	-	-30	
Forward voltage	V_{SD} *5	V_{GS} = 0V, I_S = -1.67A	-	-	-1.2	V

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●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

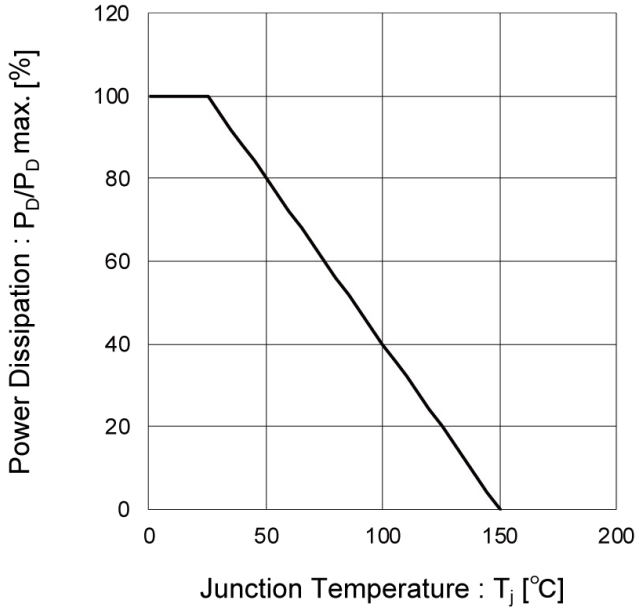


Fig.2 Maximum Safe Operating Area

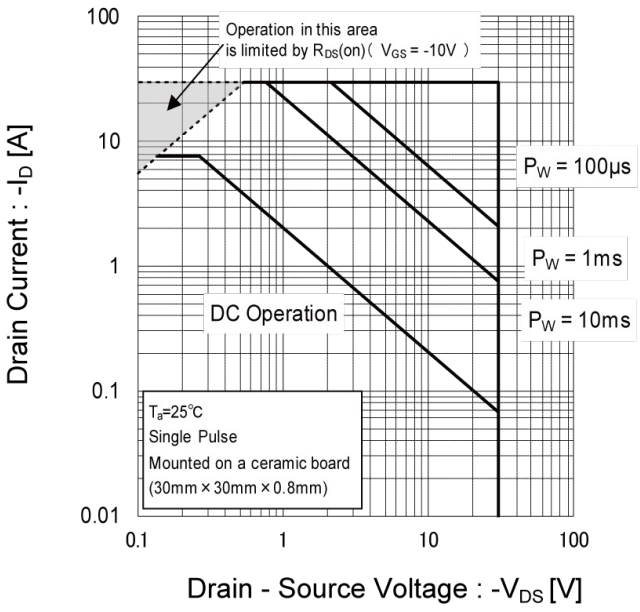


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width

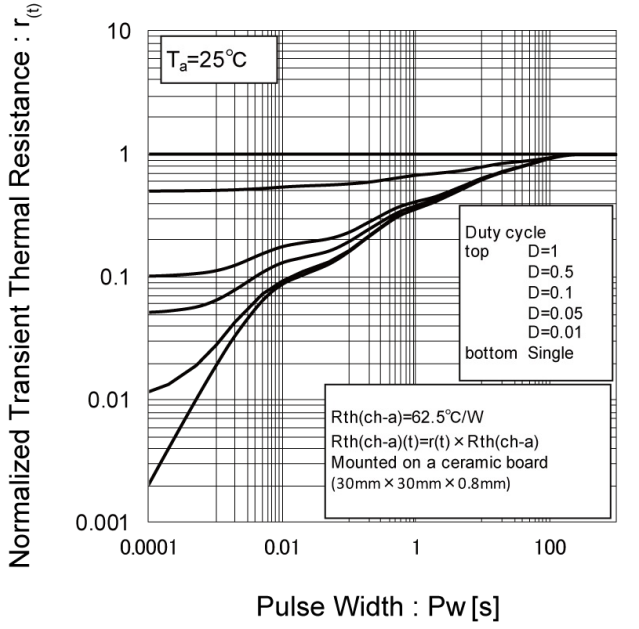
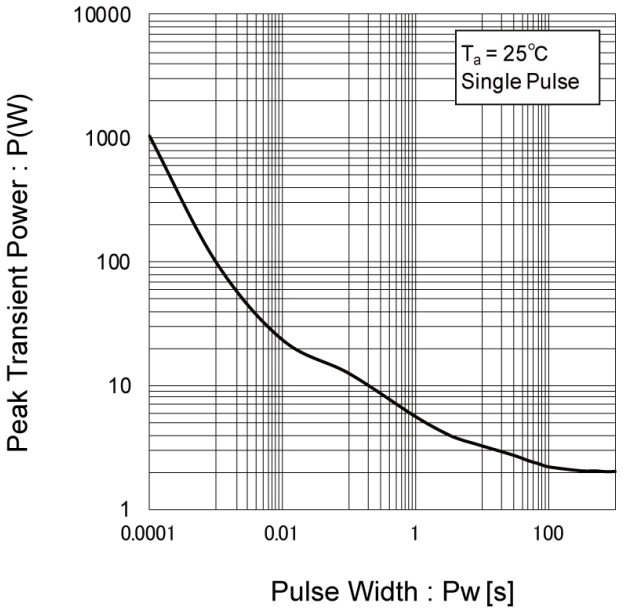


Fig.4 Single Pulse Maximum Power dissipation



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●Electrical characteristic curves

Fig.5 Typical Output Characteristics(I)

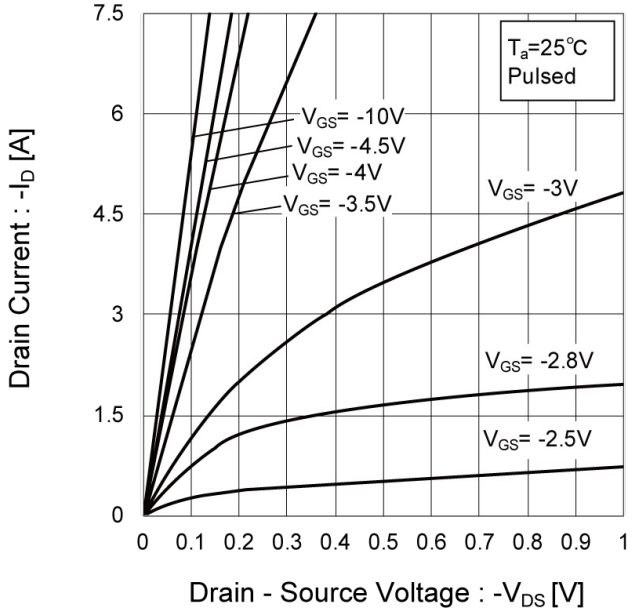


Fig.6 Typical Output Characteristics(II)

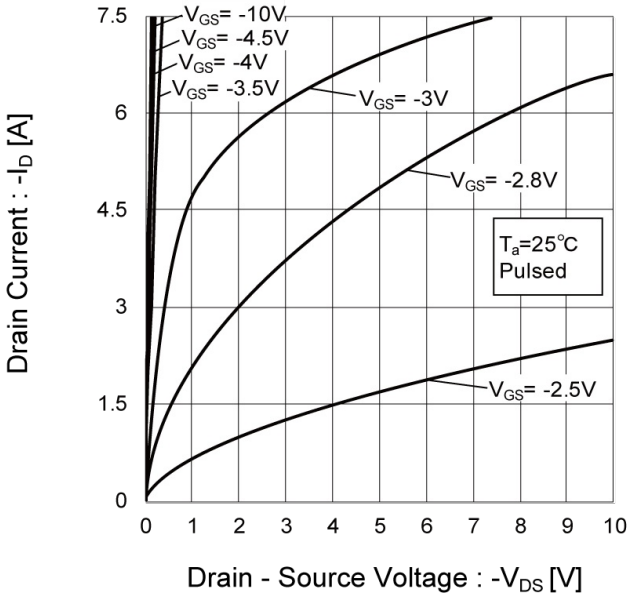
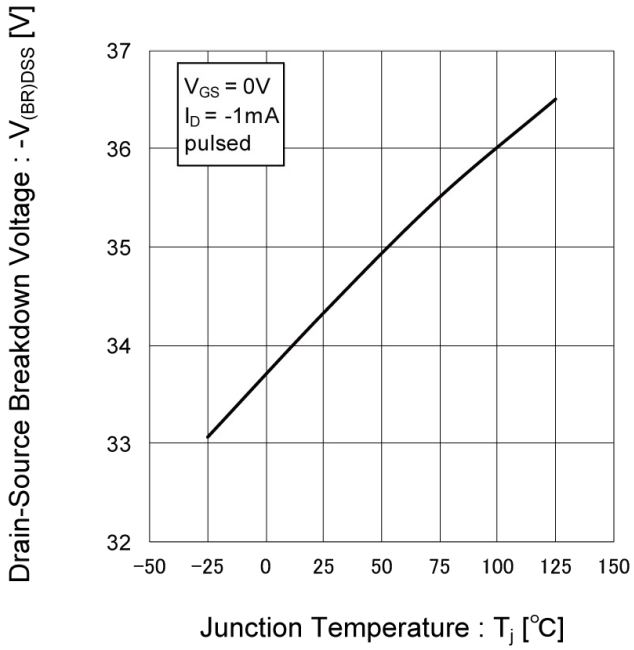


Fig.7 Breakdown Voltage vs. Junction Temperature



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●Electrical characteristic curves

Fig.8 Typical Transfer Characteristics

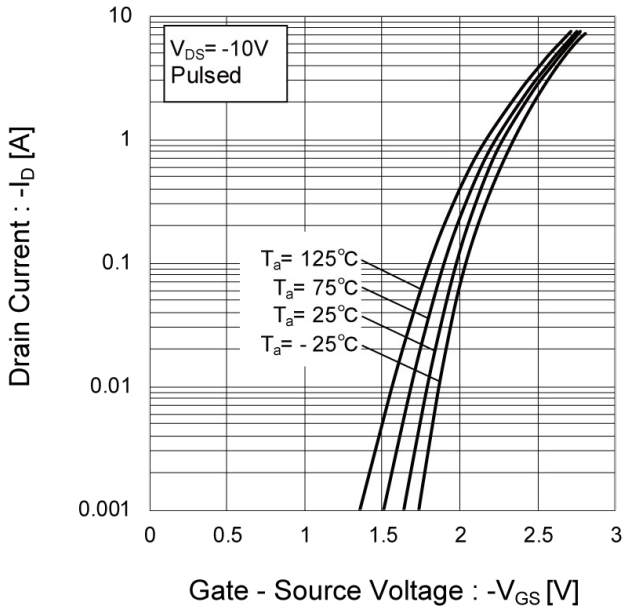


Fig.9 Gate Threshold Voltage vs. Junction Temperature

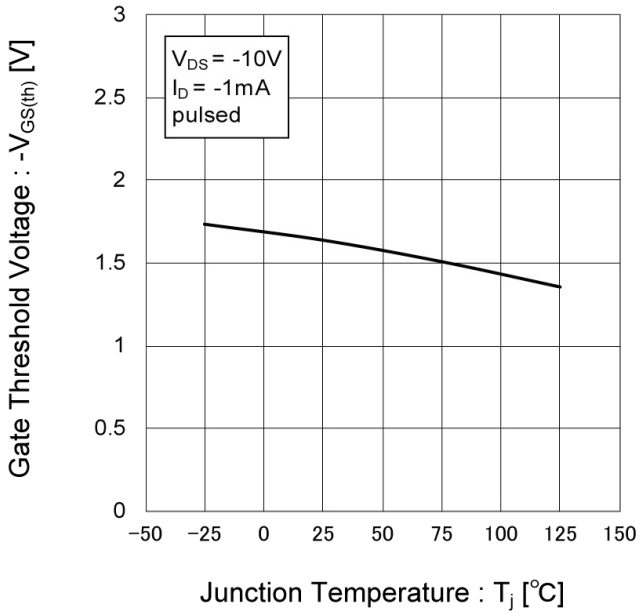
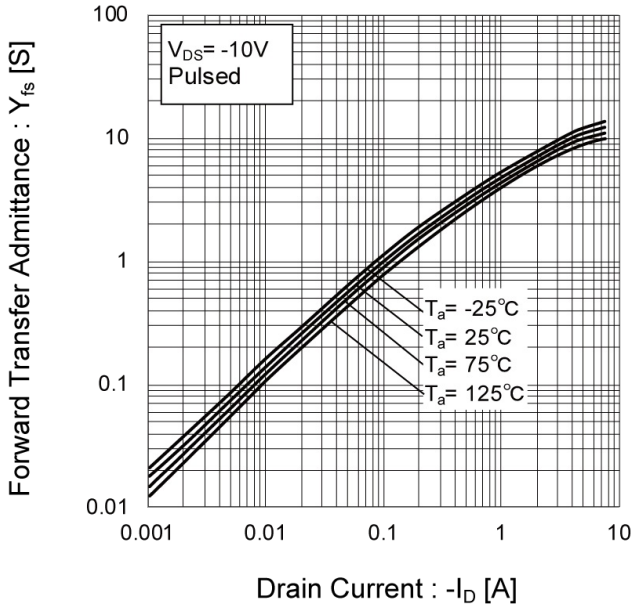


Fig.10 Transconductance vs. Drain Current



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●Electrical characteristic curves

Fig.11 Drain Current Derating Curve

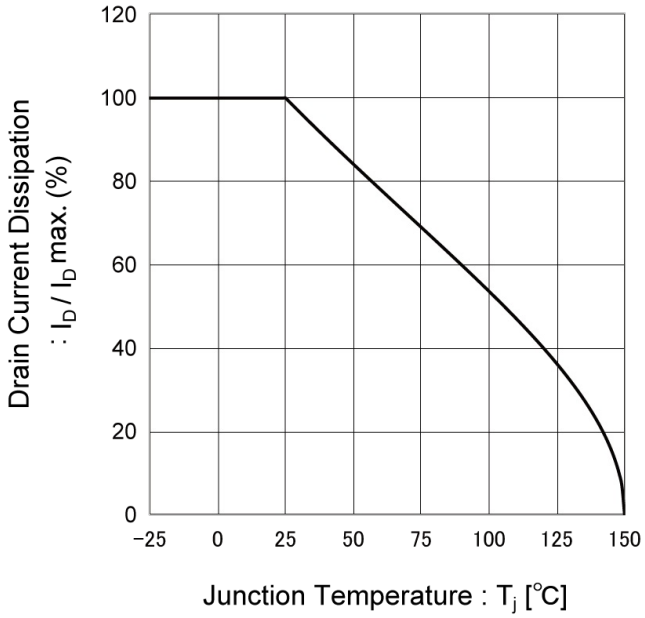


Fig.12 Static Drain - Source On - State Resistance vs. Gate Source Voltage

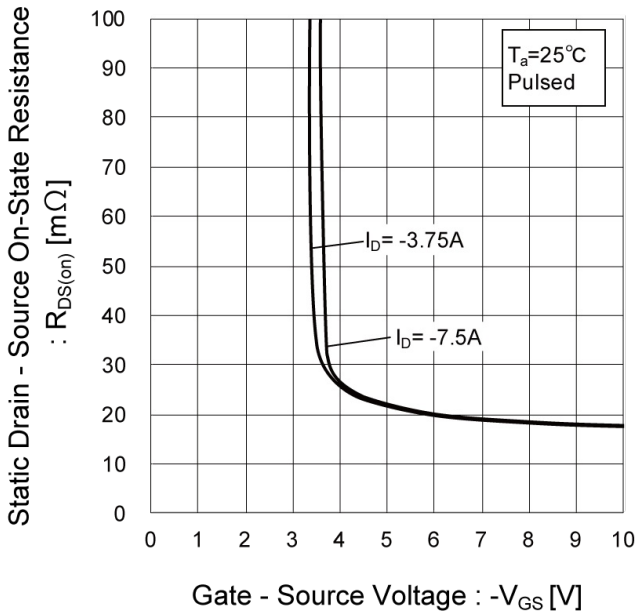
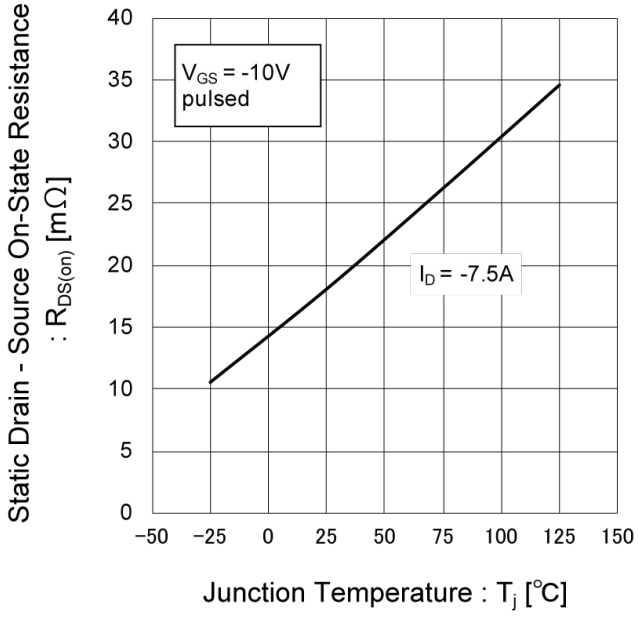


Fig.13 Static Drain - Source On - State Resistance vs. Junction Temperature



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●Electrical characteristic curves

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

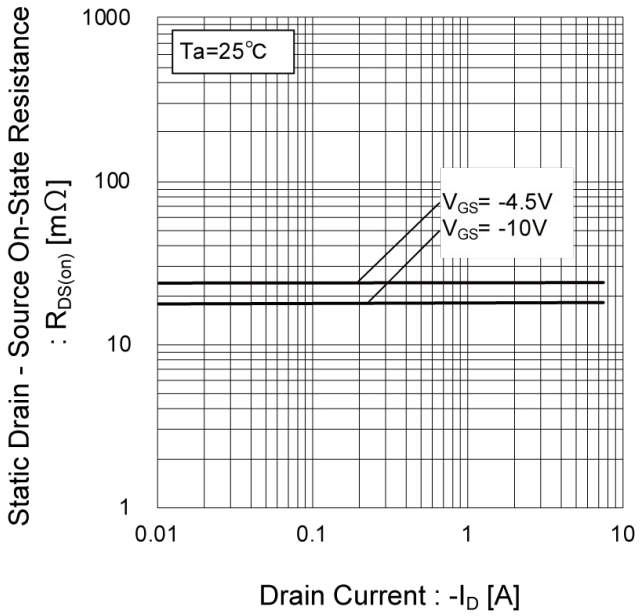


Fig.15 Static Drain - Source On - State Resistance vs. Drain Current(II)

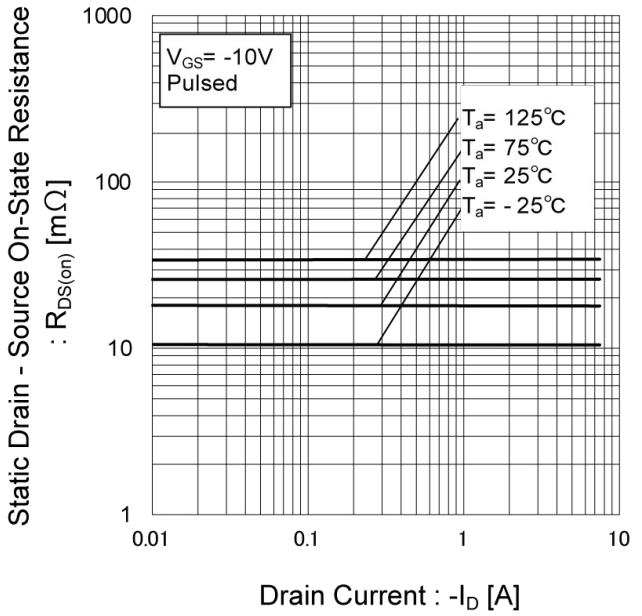
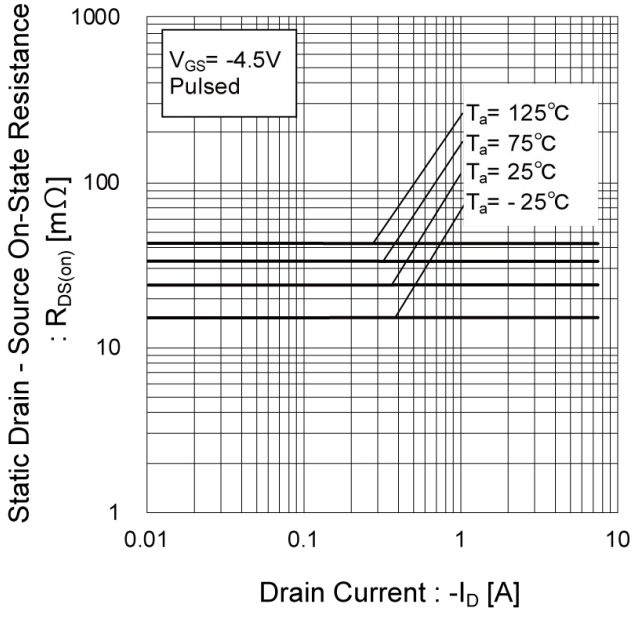


Fig.16 Static Drain - Source On - State Resistance vs. Drain Current(III)



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●Electrical characteristic curves

Fig.17 Typical Capacitance vs. Drain - Source Voltage

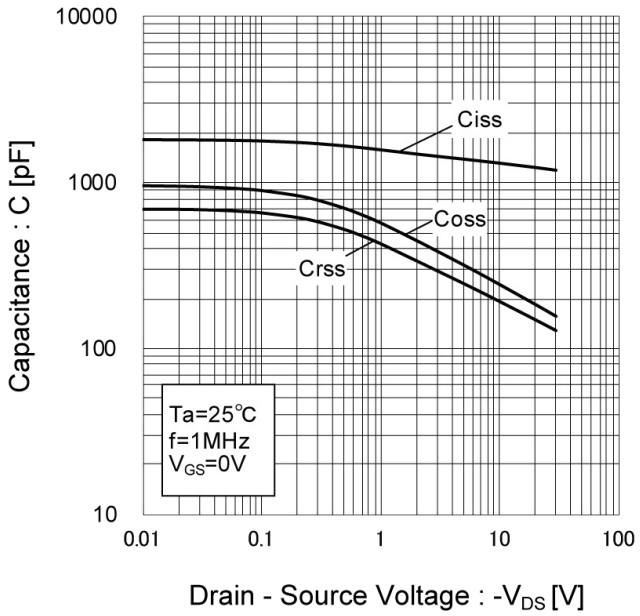


Fig.18 Switching Characteristics

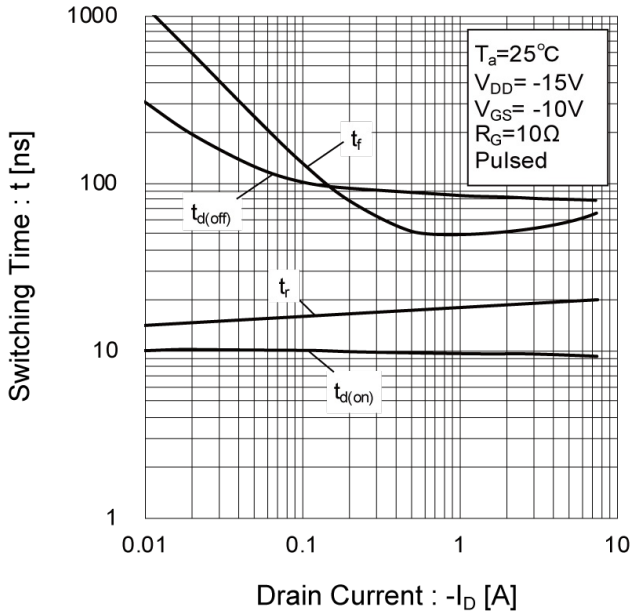


Fig.19 Dynamic Input Characteristics

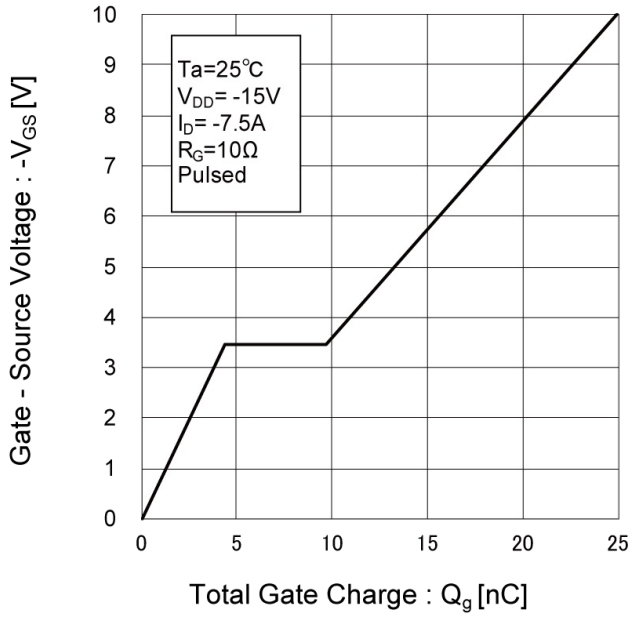
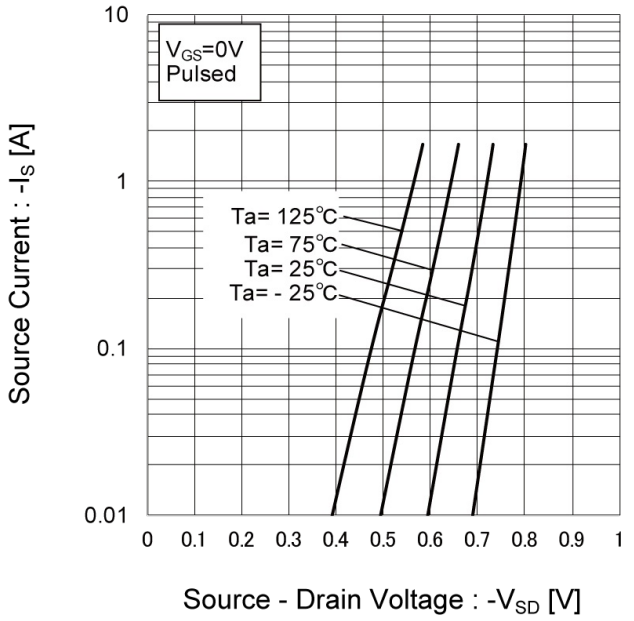


Fig.20 Source Current vs. Source Drain Voltage



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●Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

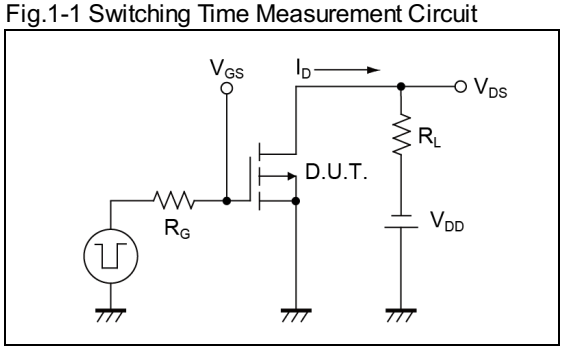


Fig.1-2 Switching Waveforms

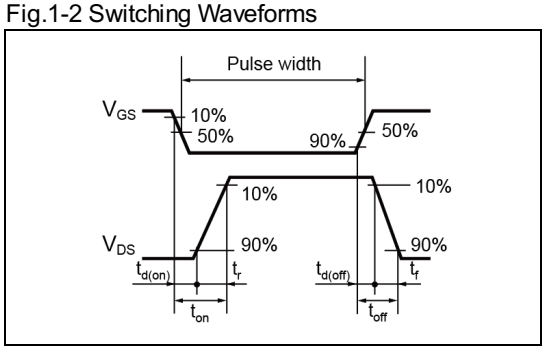


Fig.2-1 Gate Charge Measurement Circuit

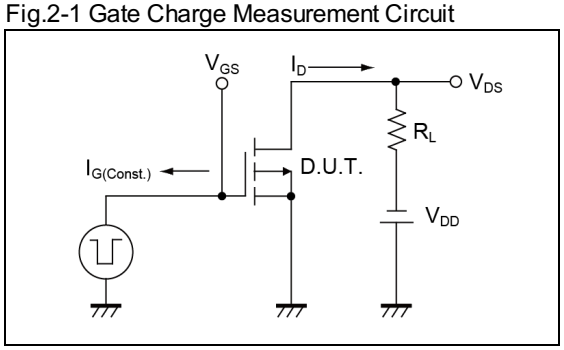


Fig.2-2 Gate Charge Waveform

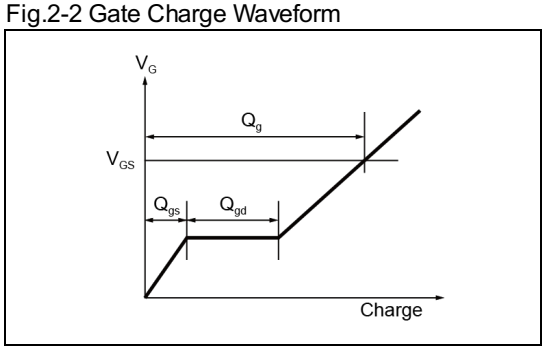


Fig.3-1 AVALANCHE MEASUREMENT CIRCUIT

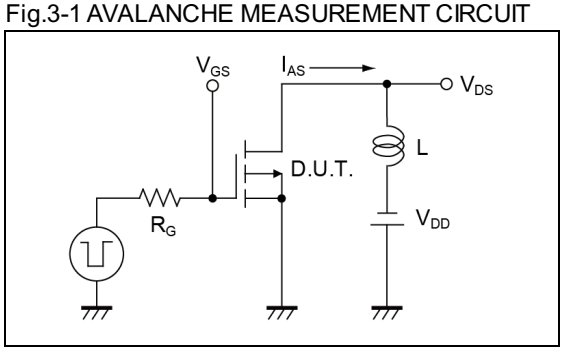
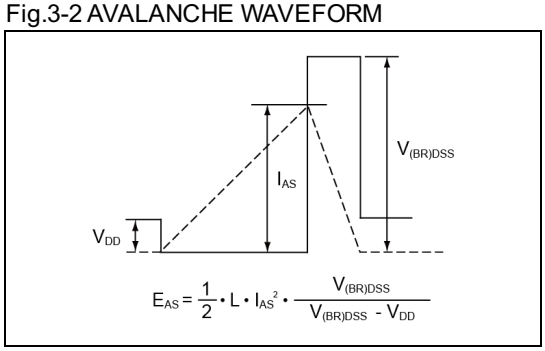


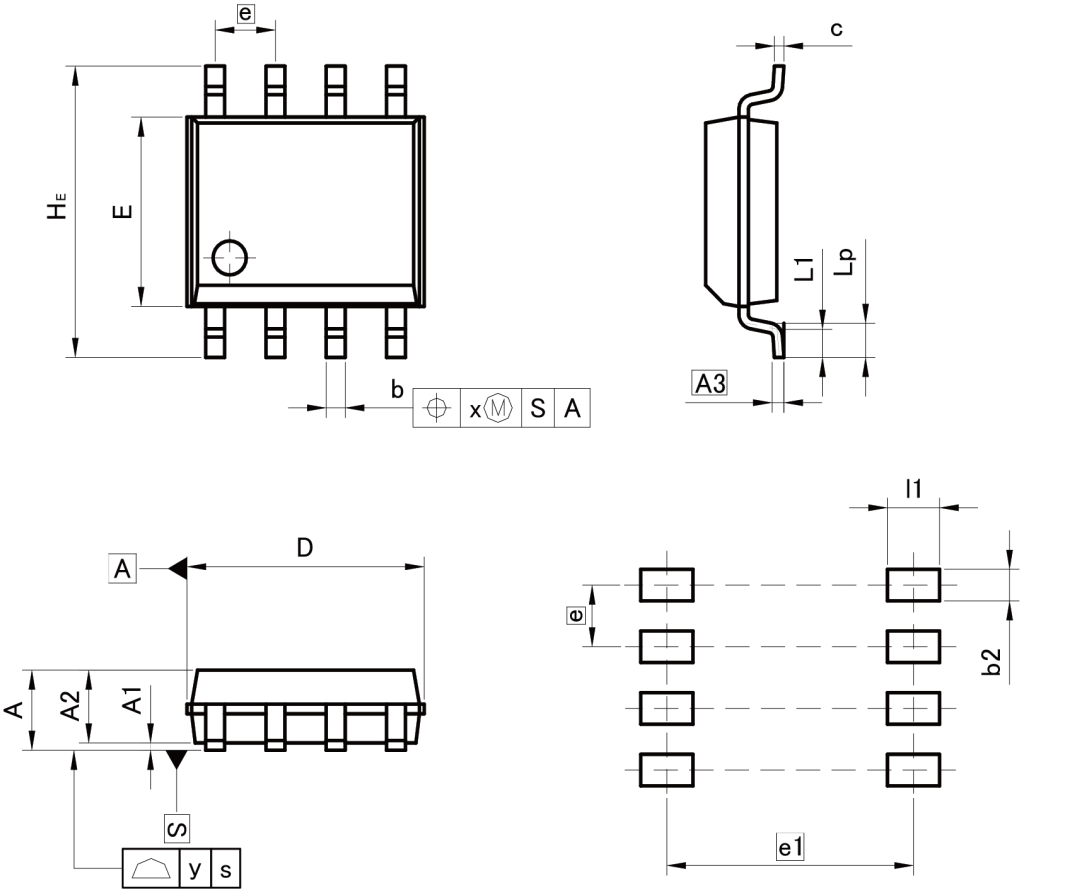
Fig.3-2 AVALANCHE WAVEFORM



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●Dimensions

SOP8



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

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	1.75	–	0.069
A1	0.15		0.006	
A2	1.40	1.60	0.055	0.063
A3	0.25		0.010	
b	0.30	0.50	0.012	0.020
c	0.10	0.30	0.004	0.012
D	4.80	5.20	0.189	0.205
E	3.75	4.05	0.148	0.159
e	1.27		0.050	
HE	5.70	6.30	0.224	0.248
L1	0.50	0.70	0.020	0.028
Lp	0.65	0.85	0.026	0.033
x	0.15		0.006	
y	0.10		0.004	

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	–	0.65	–	0.026
e1	5.15		0.203	
l1	–	1.15	–	0.045

Dimension in mm/inches

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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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