HP8KA1

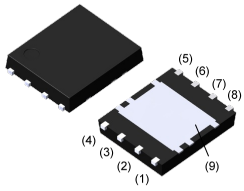
30V Nch+Nch Power MOSFET

Datasheet

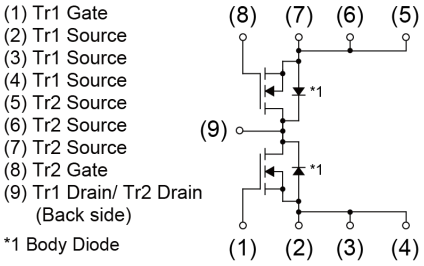
V_{DSS}	30V
$R_{DS(on)}$(Max.)	5.0mΩ
I_D	14A
P_D	3W

●Outline

HSOP8



●Inner circuit



●Features

1) Low on - resistance.
2) Pb-free lead plating ; RoHS compliant.
3) Halogen Free.

●Application

Load Switch

LiB charging and discharging switch

●Packaging specifications

Type	Packing	Embossed Tape
	Reel size (mm)	330
	Tape width (mm)	12
	Basic ordering unit (pcs)	2500
	Taping code	TB
	Marking	HP8KA1

●Absolute maximum ratings (T_a = 25°C) <It is the same ratings for the Tr1 and Tr2>

Parameter	Symbol	Value	Unit
Drain - Source voltage	V_{DSS}	30	V
Continuous drain current	I_D*1	14	A
Pulsed drain current	$I_{D,pulse}$*2	28	A
Gate - Source voltage	V_{GSS}	±20	V
Power dissipation	P_D*3	3	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} *3	-	41	-	℃/W

●Electrical characteristics (T_a = 25°C) <It is the same characteristics for the Tr1 and Tr2>

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	-	21	-	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} = 10V, I_D = 10mA	1.0	-	2.5	V
Gate threshold voltage temperature coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_j}$	I_D = 1mA referenced to	-	-3	-	mV/℃
Static drain - source on - state resistance	$R_{DS(on)}$ *4	V_{GS} = 10V, I_D = 14A	-	3.5	5.0	mΩ
		V_{GS} = 4.5V, I_D = 14A	-	5.0	7.0	
Transconductance	g_{fs} *4	V_{DS} = 5V, I_D = 14A	14	-	-	S

*1 Limited only by maximum temperature allowed.

*2 Pw ≤ 10μs, Duty cycle ≤ 1%

*3 Mounted on 40mm×40mm Cu BOARD

*4 Pulsed

●**Electrical characteristics** (T_a = 25°C) <It is the same characteristics for the Tr1 and Tr2>

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{iss}	V_{GS} = 0V	-	2550	-	pF
Output capacitance	C_{oss}	V_{DS} = 15V	-	330	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	270	-	
Turn - on delay time	$t_{d(on)}$ *4	V_{DD} ≃ 15V, V_{GS} = 10V	-	25	-	ns
Rise time	t_r *4	I_D = 7A	-	30	-	
Turn - off delay time	$t_{d(off)}$ *4	R_L = 2.1Ω	-	85	-	
Fall time	t_f *4	R_G = 10Ω	-	40	-	

●**Gate charge characteristics** (T_a = 25°C) <It is the same characteristics for the Tr1 and Tr2>

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Total gate charge	Q_g *4	V_{DD} ≃ 15V, I_D = 14A V_{GS} = 4.5V	-	24	-	nC
Gate - Source charge	Q_{gs} *4		-	7.5	-	
Gate - Drain charge	Q_{gd} *4		-	9.0	-	

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

<It is the same characteristics for the Tr1 and Tr2>

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Body diode continuous forward current	I_S *1	T_a = 25°C	-	-	2.5	A
Body diode pulse current	I_{SP} *2		-	-	28	
Forward voltage	V_{SD} *4	V_{GS} = 0V, I_S = 2.5A	-	-	1.2	V

● **Electrical characteristics curves** <It is the same characteristics for the Tr1 and Tr2>

Fig.1 Power Dissipation Derating Curve

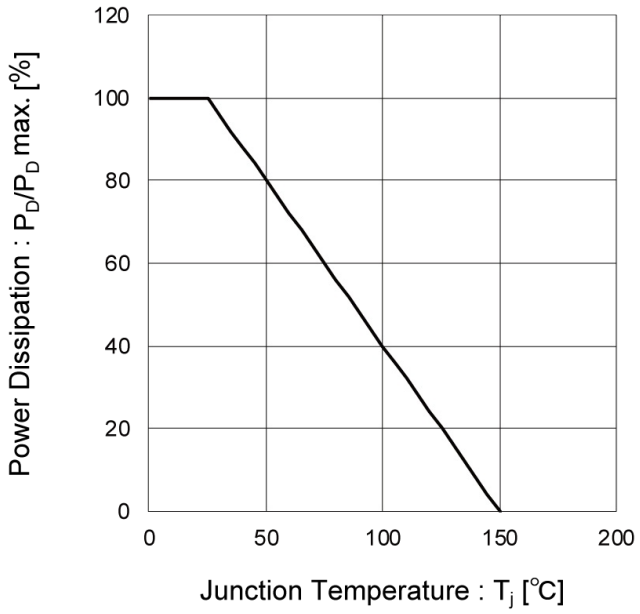


Fig.2 Maximum Safe Operating Area

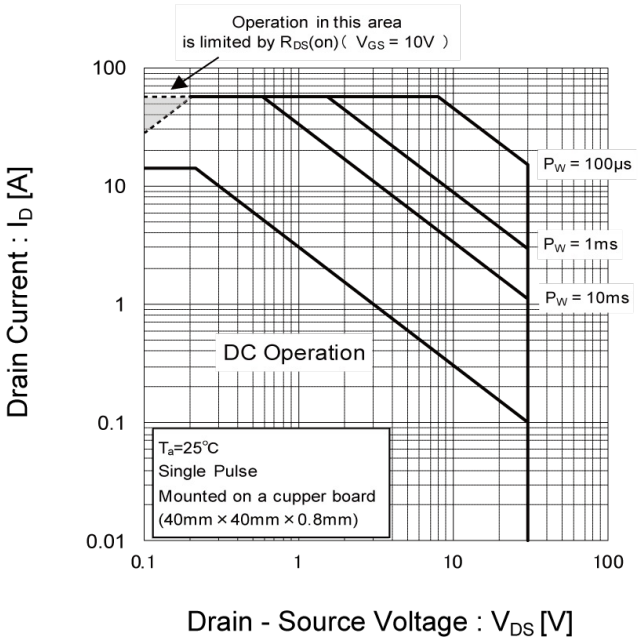


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width

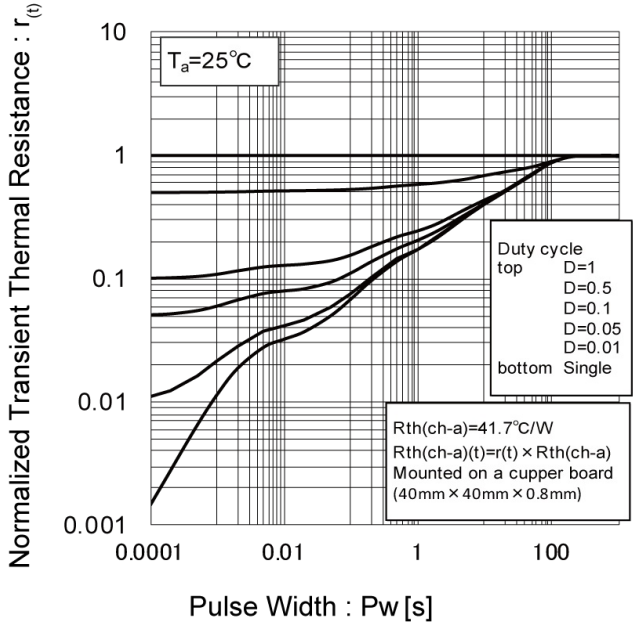
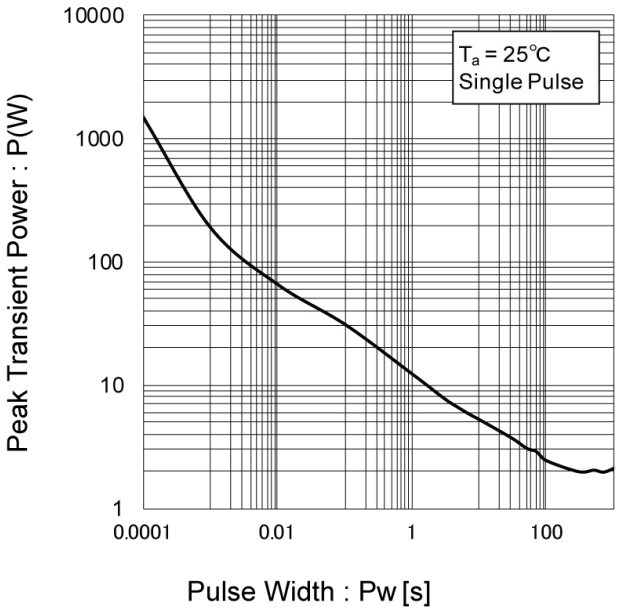


Fig.4 Single Pulse Maximum Power dissipation



●**Electrical characteristics curves** <It is the same characteristics for the Tr1 and Tr2>

Fig.5 Typical Output Characteristics(I)

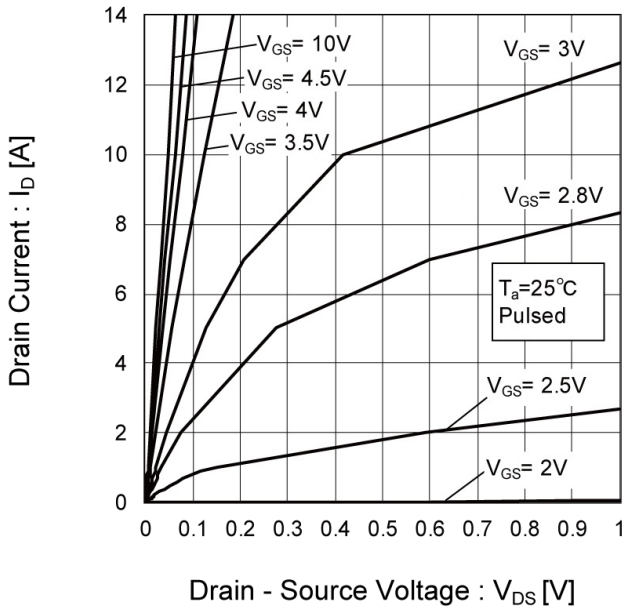


Fig.6 Typical Output Characteristics(II)

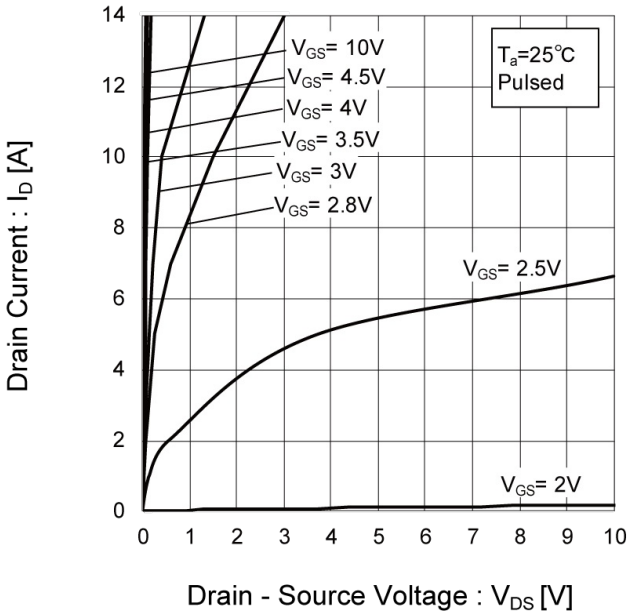
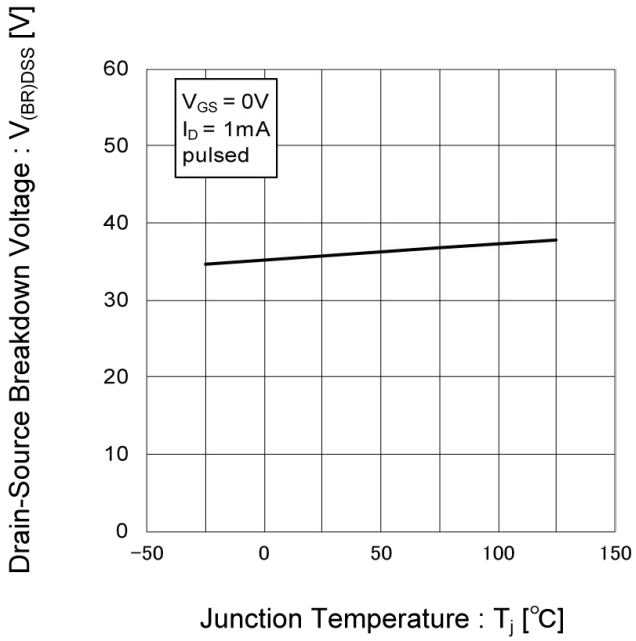


Fig.7 Breakdown Voltage vs. Junction Temperature



●**Electrical characteristics curves** <It is the same characteristics for the Tr1 and Tr2>

Fig.8 Typical Transfer Characteristics

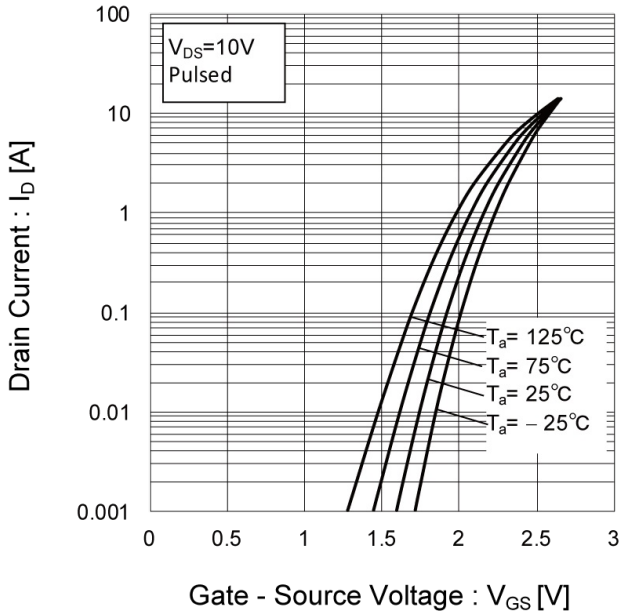


Fig.9 Gate Threshold Voltage vs. Junction Temperature

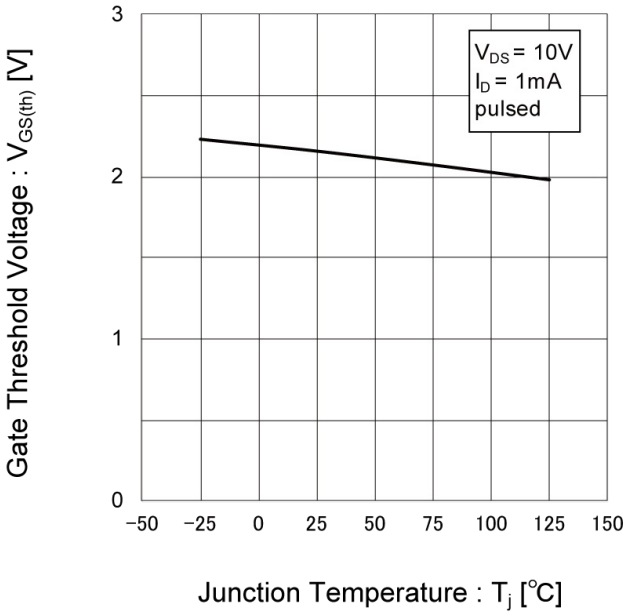
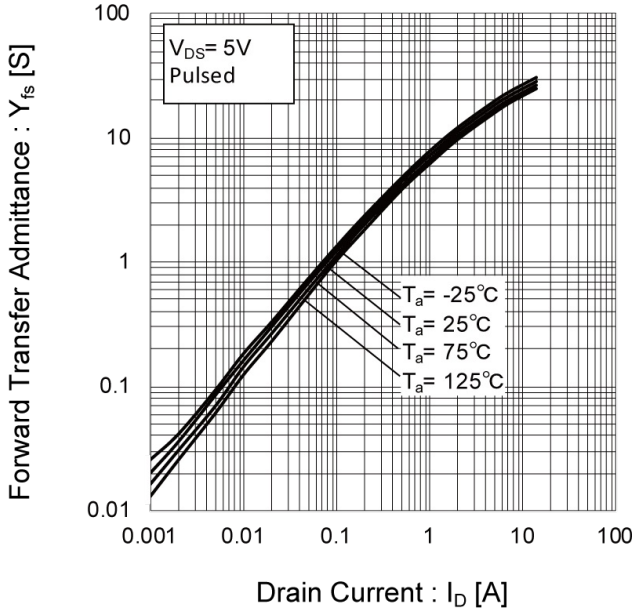


Fig.10 Tranceconductance vs. Drain Current



● **Electrical characteristics curves** <It is the same characteristics for the Tr1 and Tr2>

Fig.11 Drain Current Derating Curve

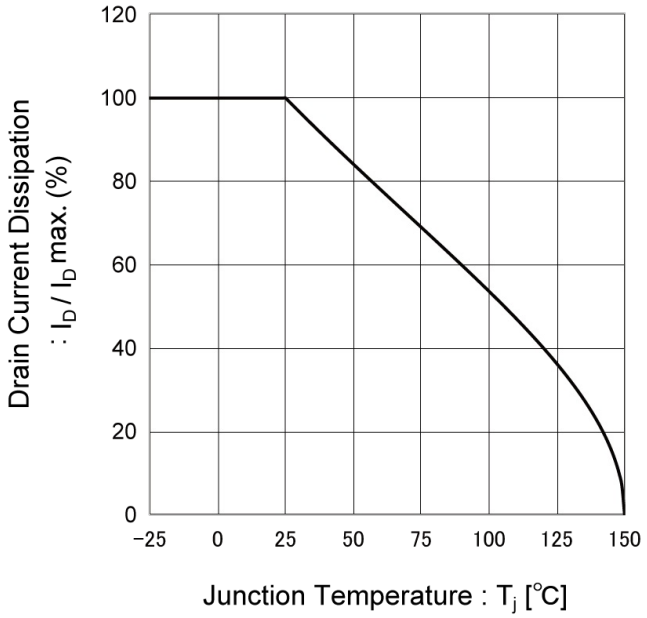


Fig.12 Static Drain - Source On - State Resistance vs. Gate Source Voltage

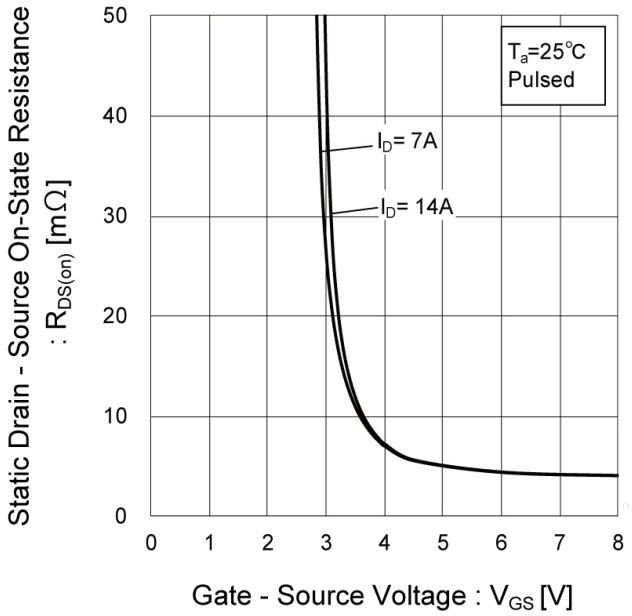
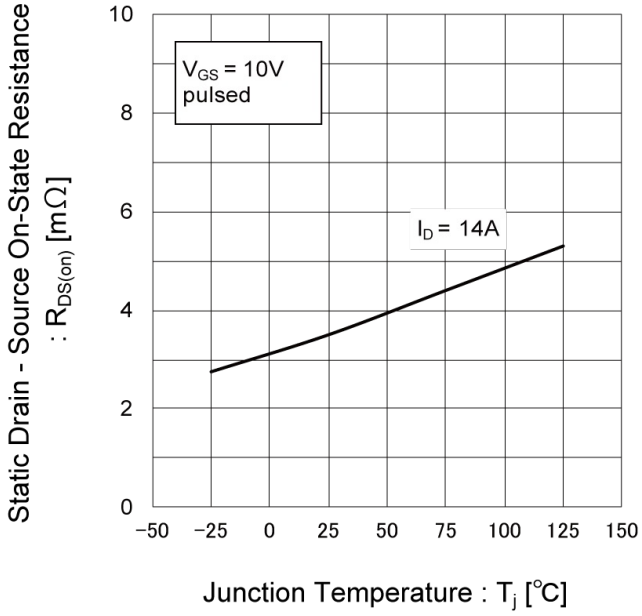


Fig.13 Static Drain - Source On - State Resistance vs. Junction Temperature



●**Electrical characteristics curves** <It is the same characteristics for the Tr1 and Tr2>

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

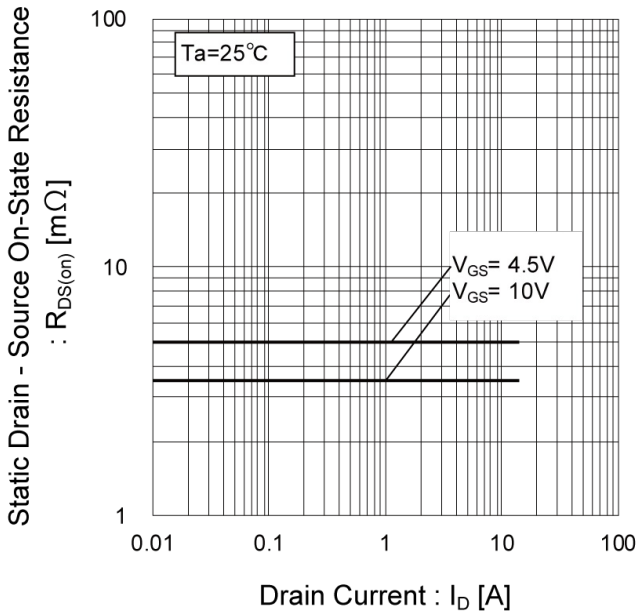


Fig.15 Static Drain - Source On - State Resistance vs. Drain Current(II)

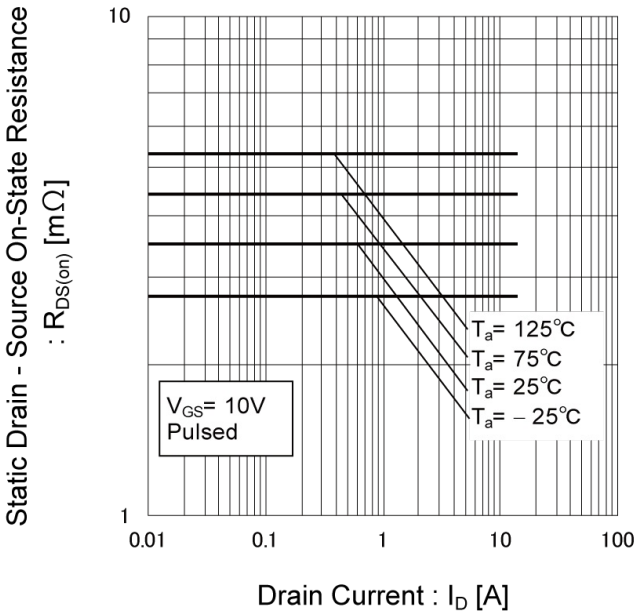
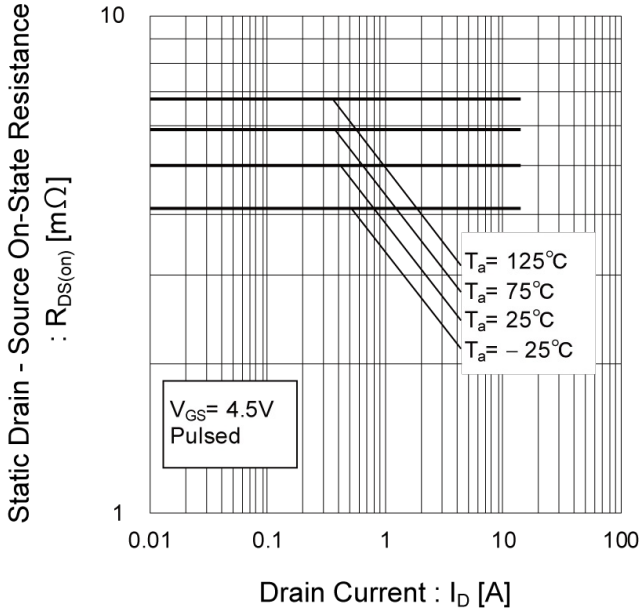


Fig.16 Static Drain - Source On - State Resistance vs. Drain Current(III)



●**Electrical characteristics curves** <It is the same characteristics for the Tr1 and Tr2>

Fig.17 Typical Capacitance vs. Drain - Source Voltage

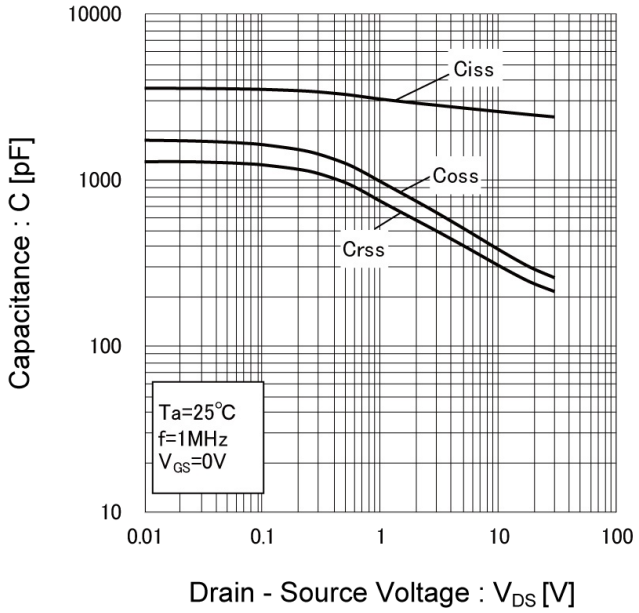


Fig.18 Switching Characteristics

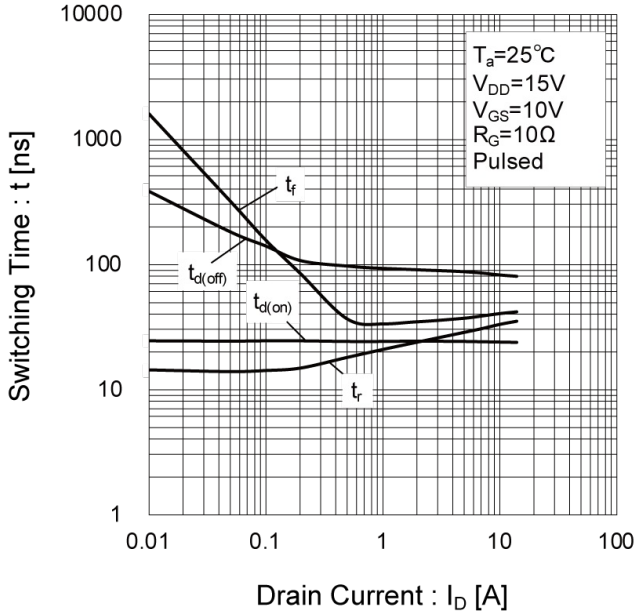


Fig.19 Dynamic Input Characteristics

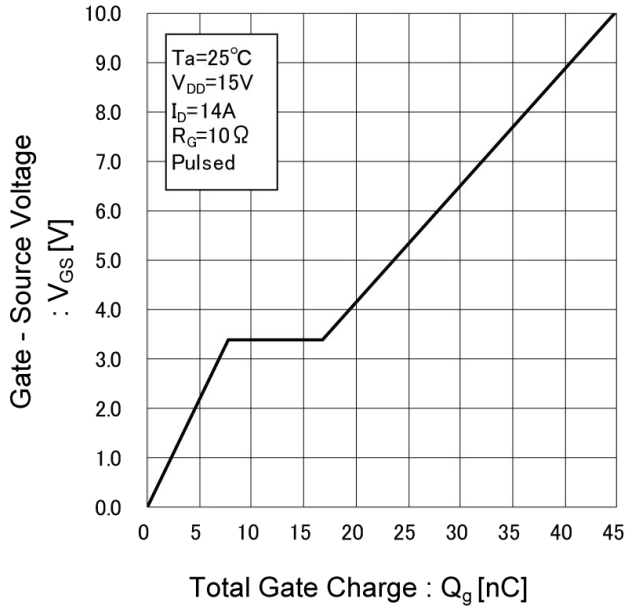
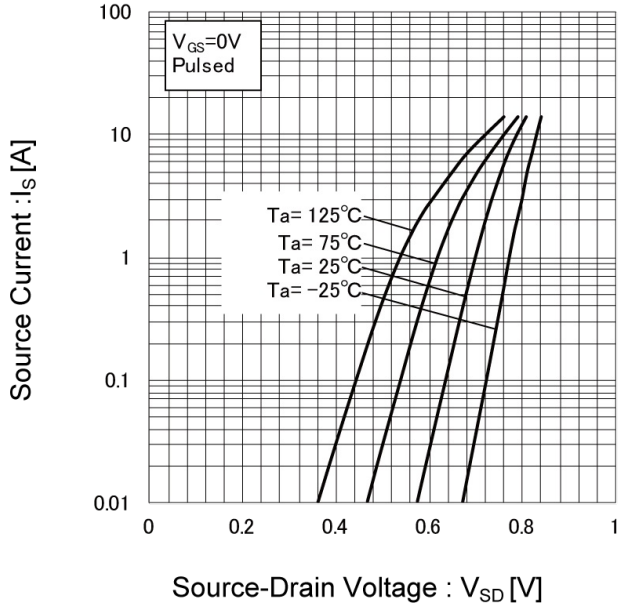


Fig.20 Source Current vs. Source Drain Voltage



●Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

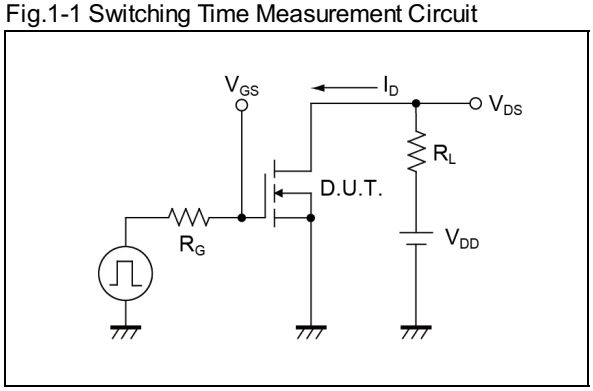


Fig.1-2 Switching Waveforms

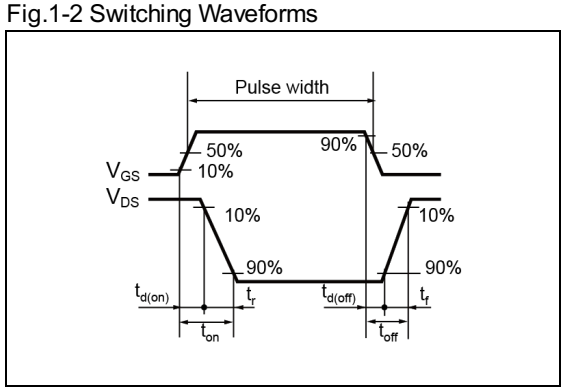


Fig.2-1 Gate Charge Measurement Circuit

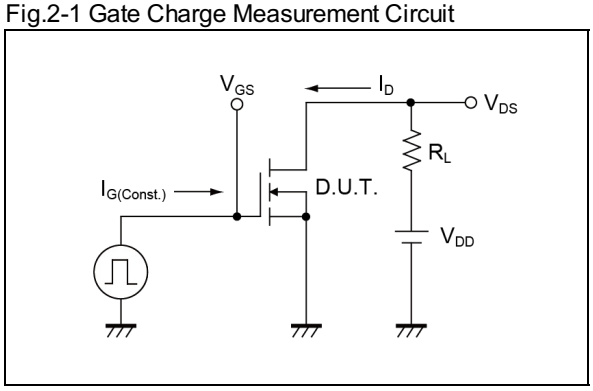
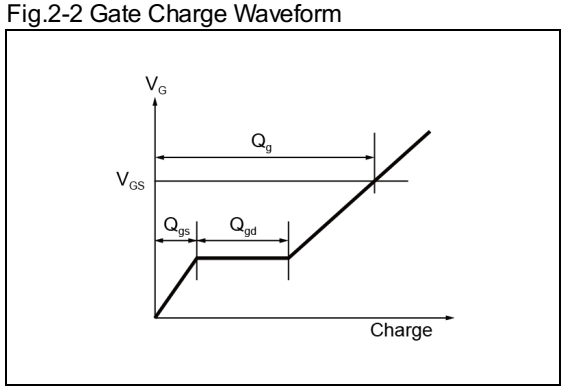
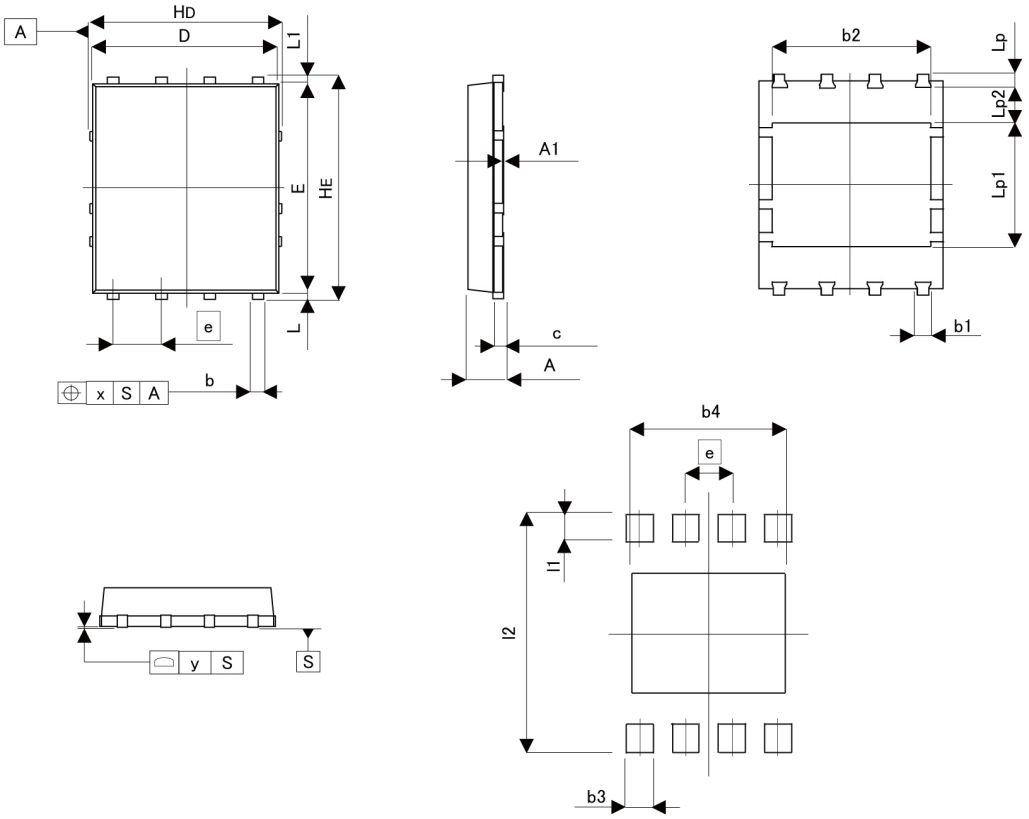


Fig.2-2 Gate Charge Waveform



●Dimensions

HSOP8 (Drain common)



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

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.10	0.035	0.043
A1	0.00	0.05	0.000	0.002
b	0.24	0.42	0.009	0.017
b1	0.22	0.52	0.009	0.020
b2	4.00	4.40	0.157	0.173
c	0.20	0.30	0.008	0.012
D	4.80	5.00	0.189	0.197
E	5.60	5.80	0.220	0.228
e	1.27		0.050	
HD	4.90	5.10	0.193	0.201
HE	5.90	6.10	0.232	0.240
L	0.07	0.25	0.003	0.010
L1	0.07	0.25	0.003	0.010
Lp	0.27	0.47	0.011	0.019
Lp1	3.12	3.52	0.123	0.139
Lp2	0.97		0.038	
x	-	0.10	-	0.004
y	-	0.10	-	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b3	-	0.62	-	0.024
b4	-	4.40	-	0.173
l1	-	0.57	-	0.022
l2	-	6.10	-	0.240

Dimension in mm/inches

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