QH8KA2

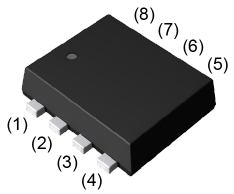
30V Nch+Nch Power MOSFET

Datasheet

V_{DSS}	30V
$R_{DS(on)}$(Max.)	35mΩ
I_D	±4.5A
P_D	1.5W

●Outline

TSMT8

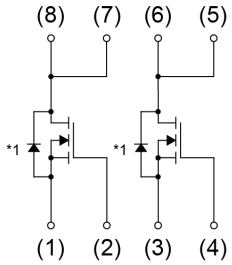


●Features

1) Low on - resistance.
2) Small Surface Mount Package (TSMT8).
3) Pb-free lead plating ; RoHS compliant.
4) Halogen Free.

●Inner circuit

(1) Tr1 Source
(2) Tr1 Gate
(3) Tr2 Source
(4) Tr2 Gate
(5) Tr2 Drain
(6) Tr2 Drain
(7) Tr1 Drain
(8) Tr1 Drain
*1 Body Diode



●Packaging specifications

Type	Packing	Embossed Tape
	Reel size (mm)	180
	Tape width (mm)	8
	Basic ordering unit (pcs)	3000
	Taping code	TR
	Marking	KA2

●Application

Switching

Motor Drive

●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	±4.5	A
Pulsed drain current	$I_{D,\,pulse}$ *1	±12	A
Gate - Source voltage	V_{GSS}	±20	V
Avalanche energy, single pulse	E_{AS} *2	1.5	mJ
Avalanche current	I_{AS} *2	4.5	A
Power dissipation	P_D *3	1.5	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	-	83.3	-	

●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 25℃	-	21	-	mV/℃
Zero gate voltage drain current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	-	-	1	μA
Gate - Source leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, 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℃	-	-3	-	mV/℃
Static drain - source on - state resistance	$R_{DS(on)}$ *4	V_{GS} = 10V, I_D = 4.5A	-	25	35	mΩ
		V_{GS} = 4.5V, I_D = 4.5A	-	40	56	
Transconductance	g_{fs} *4	V_{DS} = 5V, I_D = 4.5A	1.4	-	-	S

*1 Pw ≦ 10μs, Duty cycle ≦ 1%

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

*3 MOUNTED ON A CERAMIC 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	-	365	-	pF
Output capacitance	C_{oss}	V_{DS} = 10V	-	62	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	50	-	
Turn - on delay time	$t_{d(on)}$ *4	V_{DD} ≃ 15V, V_{GS} = 10V	-	7.2	-	ns
Rise time	t_r *4	I_D = 2.2A	-	8.0	-	
Turn - off delay time	$t_{d(off)}$ *4	R_L = 6.8Ω	-	12.0	-	
Fall time	t_f *4	R_G = 10Ω	-	5.7	-	

●**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 = 4.5A	V_{GS} = 10V	-	8.4	-	nC
			V_{GS} = 4.5V	-	4.7	-	
Gate - Source charge	Q_{gs} *4			-	1.7	-	
Gate - Drain charge	Q_{gd} *4			-	1.6	-	

●**Body diode electrical 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	T_a = 25°C	-	-	1.0	A
Body diode pulse current	I_{SP} *1		-	-	12	
Forward voltage	V_{SD} *4	V_{GS} = 0V, I_S = 1.0A	-	-	1.2	V
Reverse recovery time	t_{rr} *4	I_S = 4.5A, V_{GS} = 0V di/dt = 100A/μs	-	14.1	-	ns
Reverse recovery charge	Q_{rr} *4		-	4.7	-	nC

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

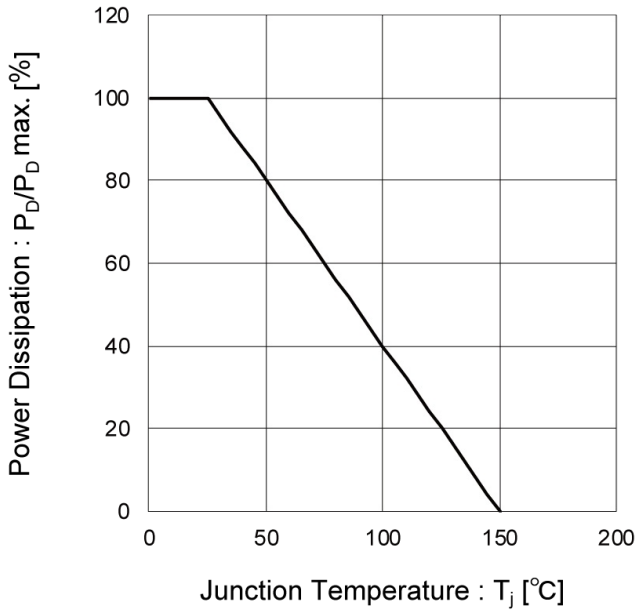


Fig.2 Maximum Safe Operating Area

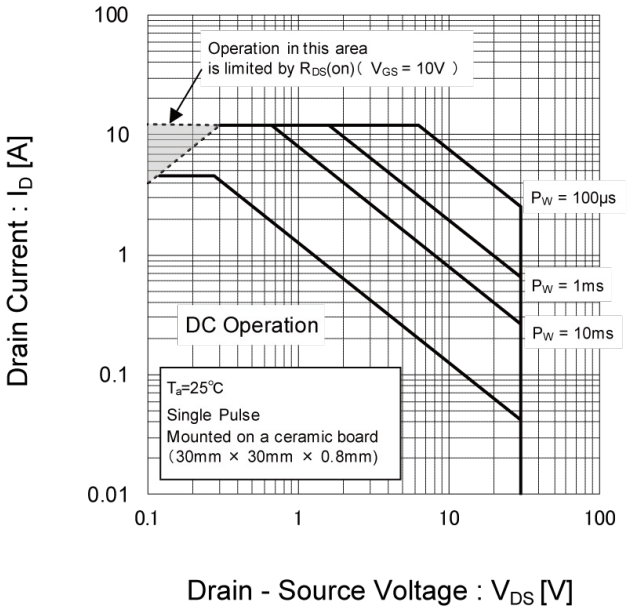


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width

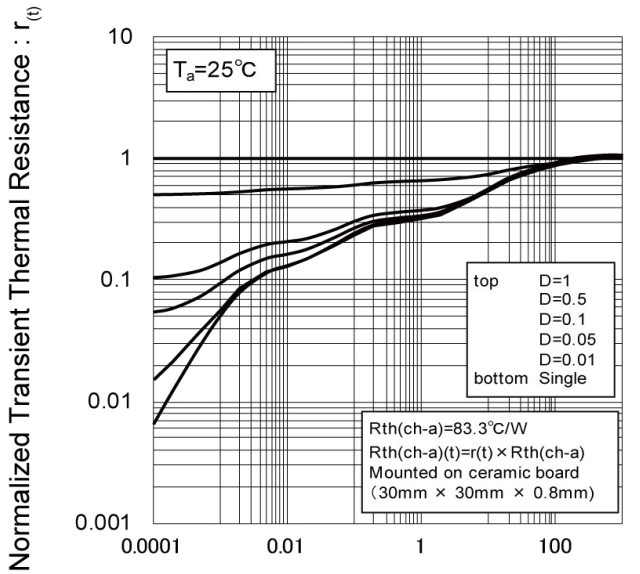
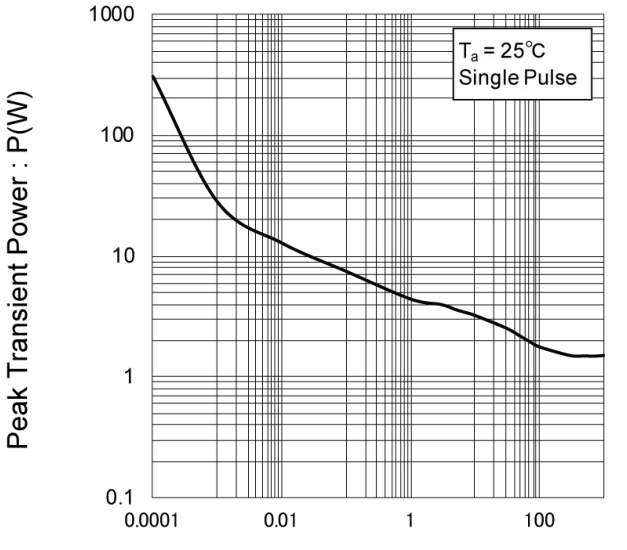


Fig.4 Single Pulse Maximum Power dissipation



●Electrical characteristic curves

Fig.5 Typical Output Characteristics(I)

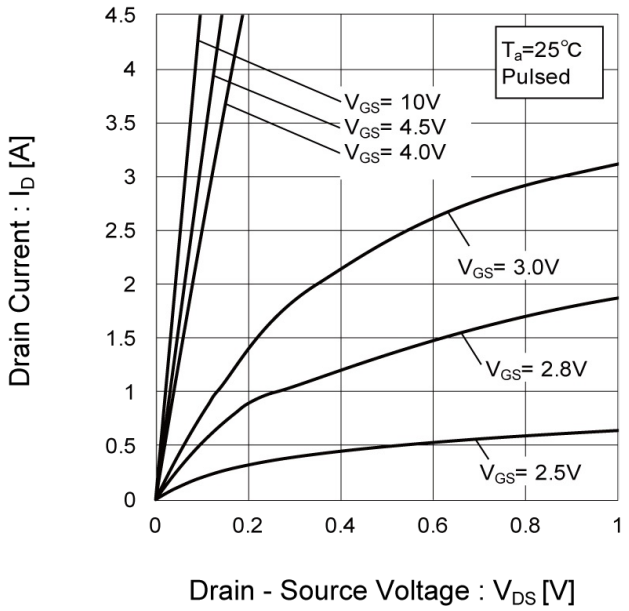


Fig.6 Typical Output Characteristics(II)

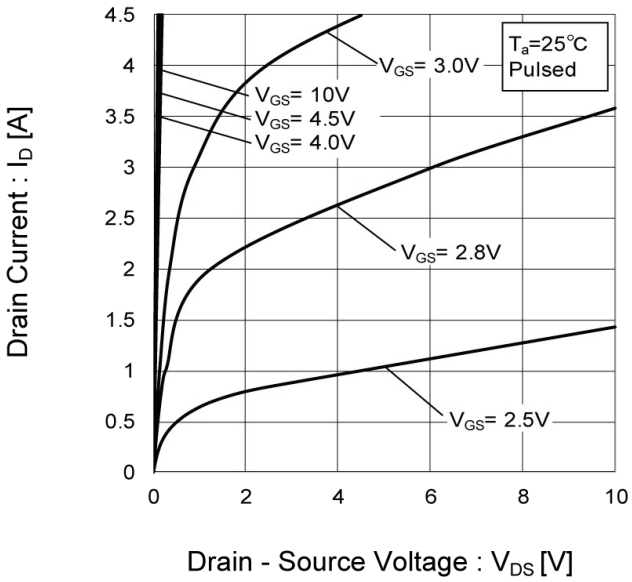
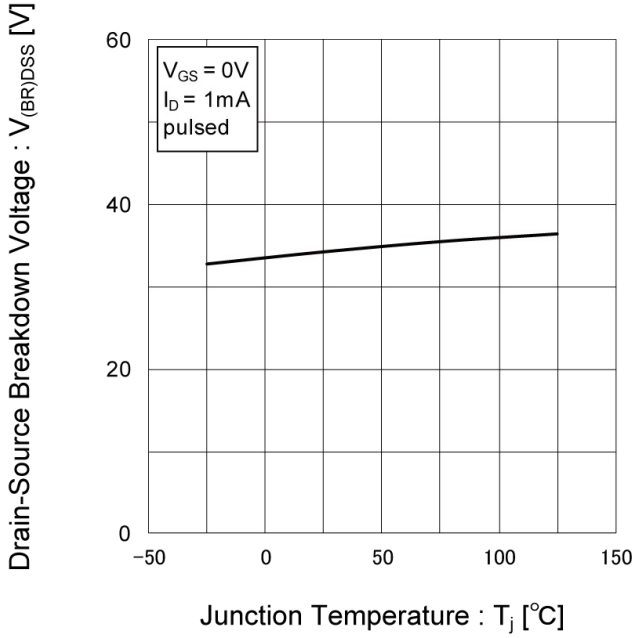


Fig.7 Breakdown Voltage vs. Junction Temperature



●Electrical characteristic curves

Fig.8 Typical Transfer Characteristics

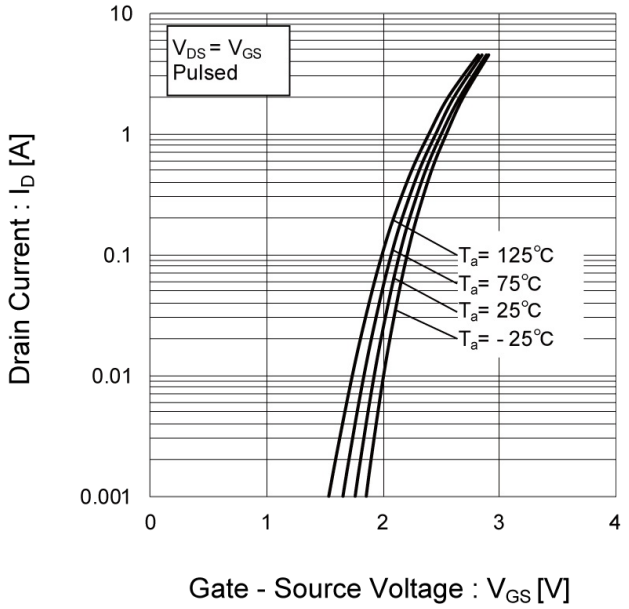


Fig.9 Gate Threshold Voltage vs. Junction Temperature

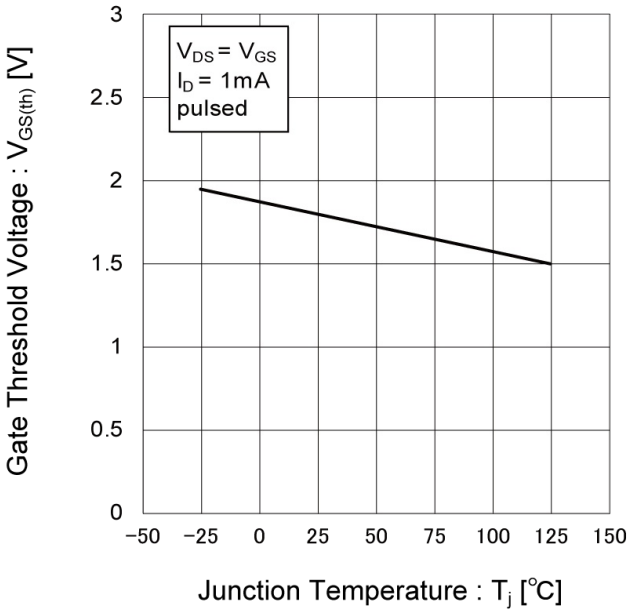
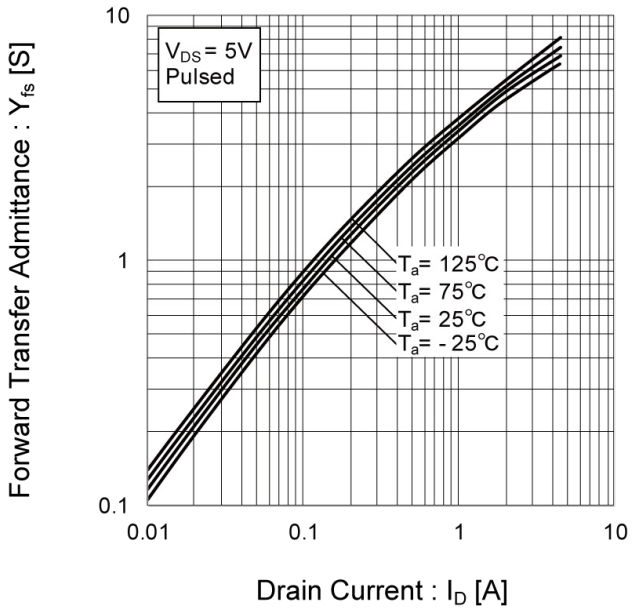


Fig.10 Tranceconductance vs. Drain Current



●Electrical characteristic curves

Fig.11 Drain Current Derating Curve

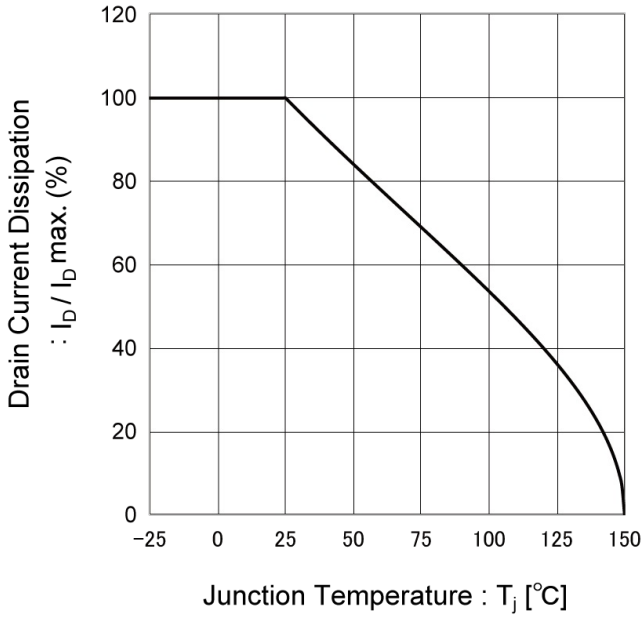


Fig.12 Static Drain - Source On - State Resistance vs. Gate Source Voltage

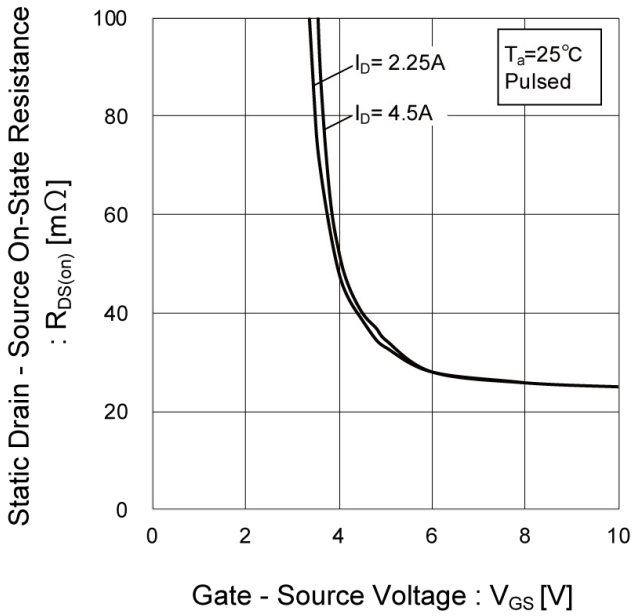
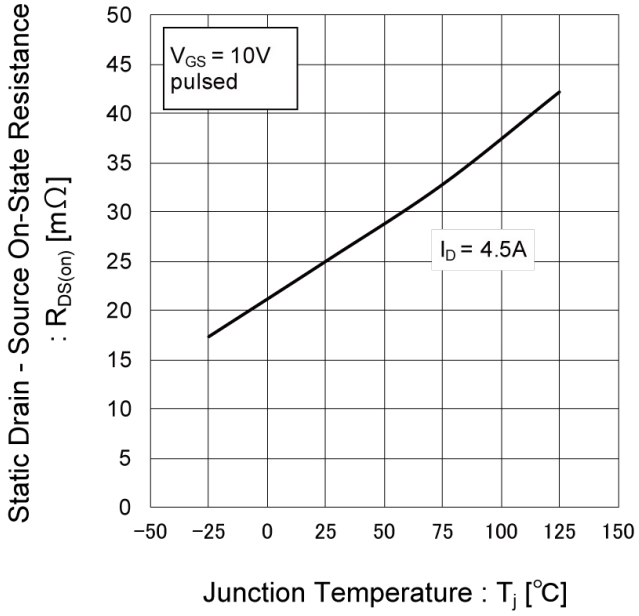


Fig.13 Static Drain - Source On - State Resistance vs. Junction Temperature



●Electrical characteristic curves

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

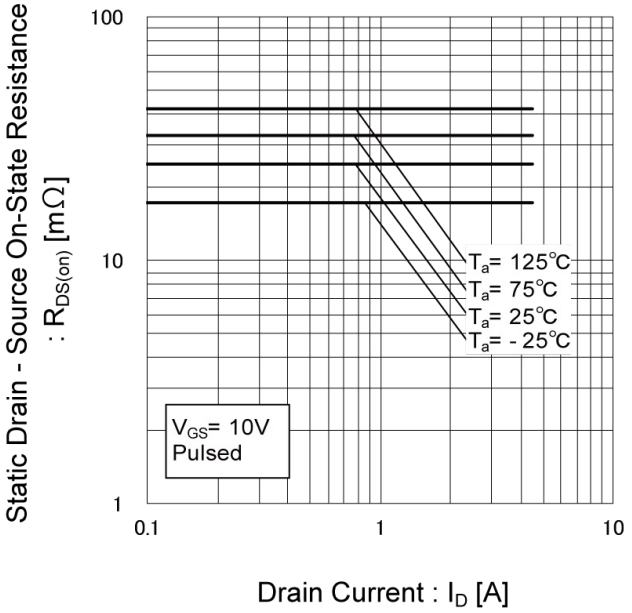


Fig.15 Static Drain - Source On - State Resistance vs. Drain Current(II)

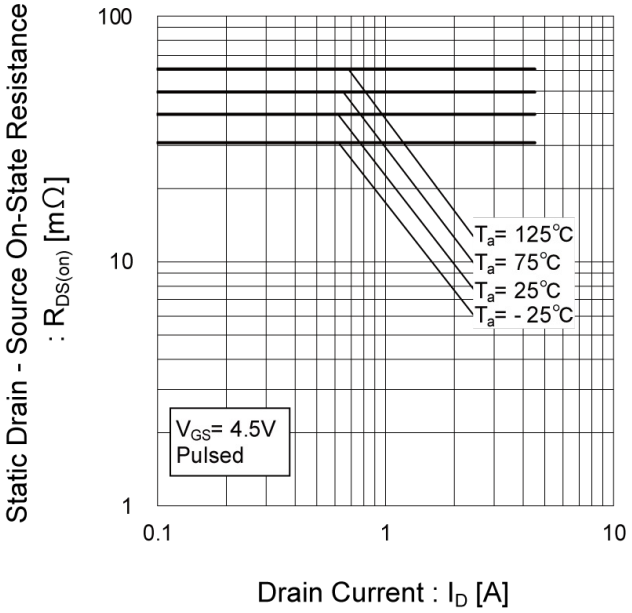
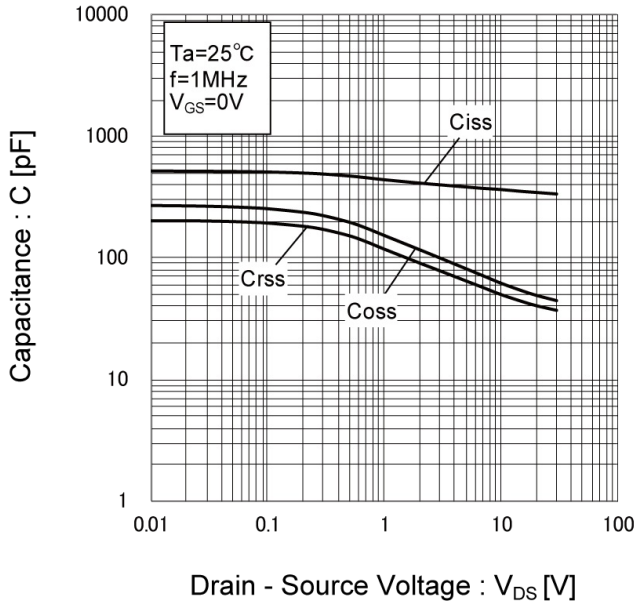


Fig.16 Typical Capacitance vs. Drain - Source Voltage



●Electrical characteristic curves

Fig.17 Switching Characteristics

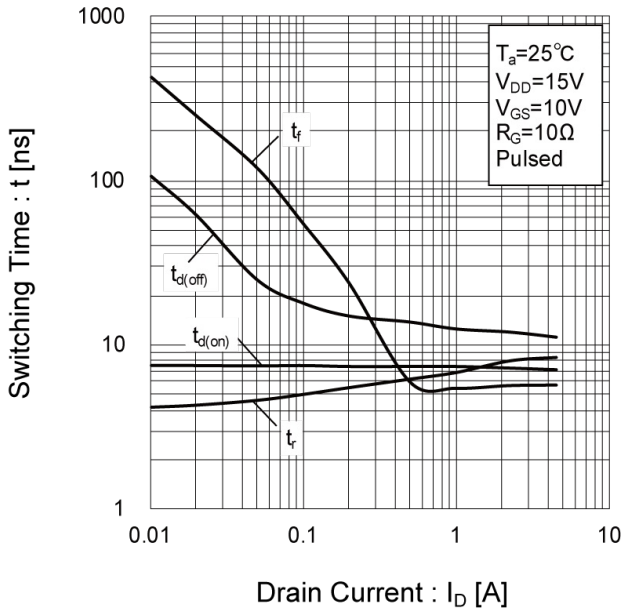


Fig.18 Dynamic Input Characteristics

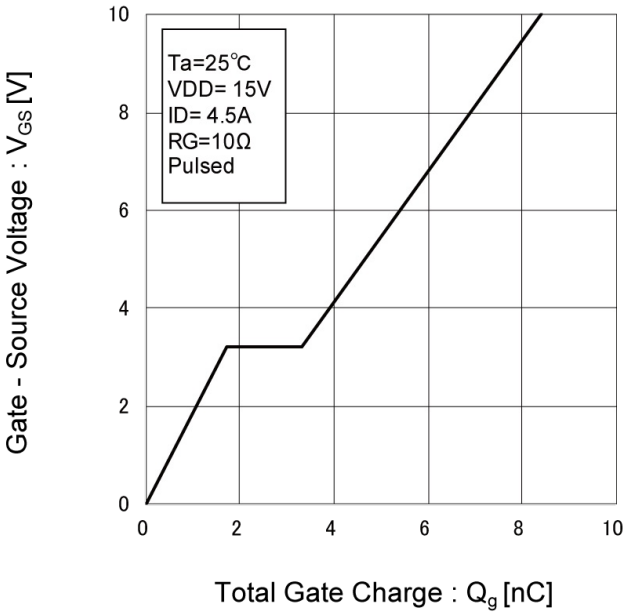
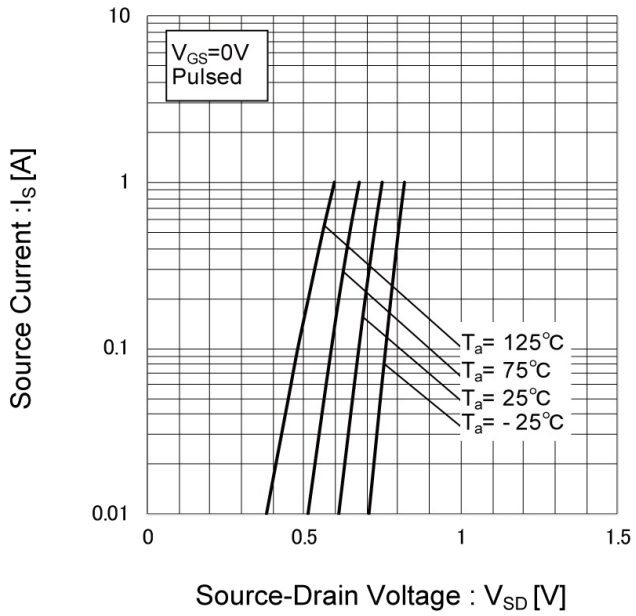


Fig.19 Source Current vs. Source Drain Voltage



●Measurement circuits <It is the same for the Tr1 and Tr2>

Fig.1-1 Switching Time Measurement Circuit

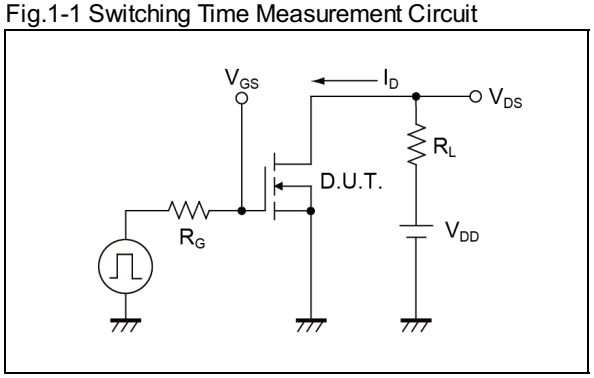


Fig.1-2 Switching Waveforms

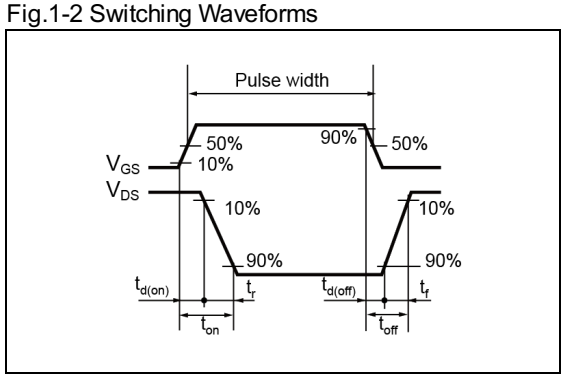


Fig.2-1 Gate Charge Measurement Circuit

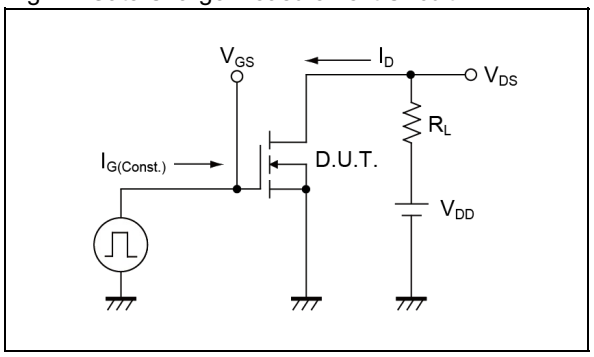


Fig.2-2 Gate Charge Waveform

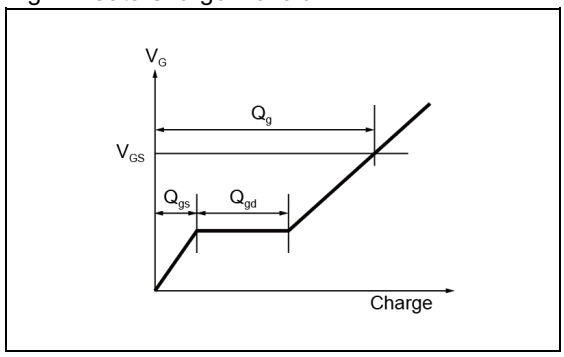


Fig.3-1 Avalanche Measurement Circuit

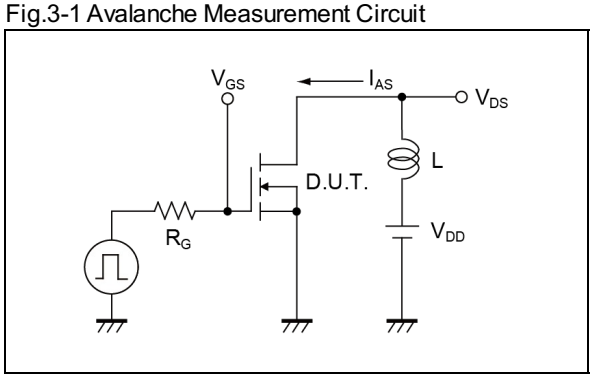
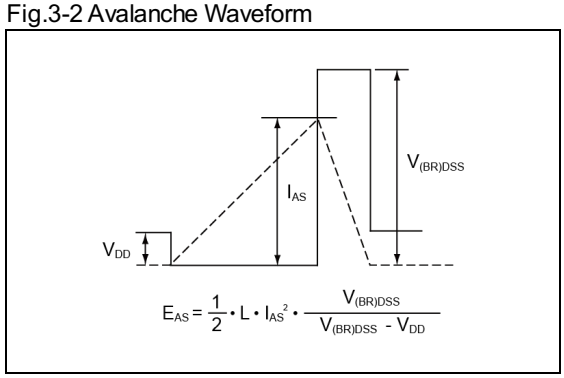
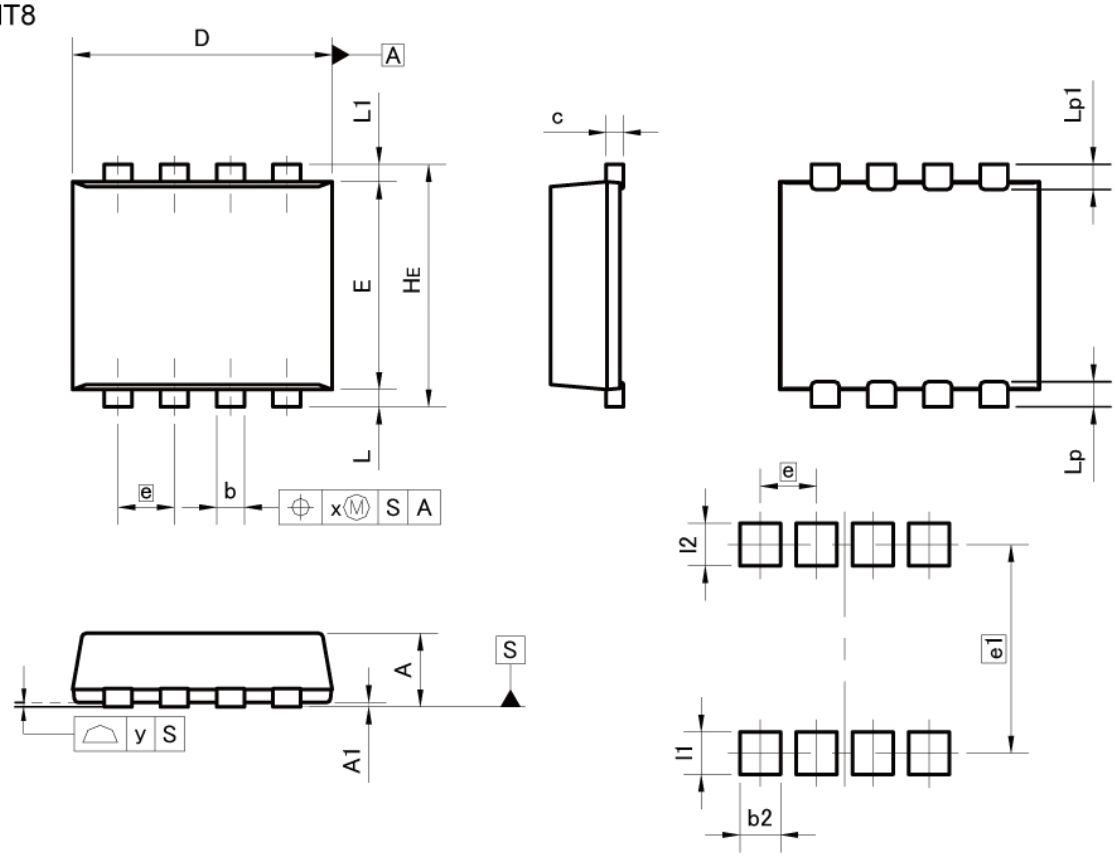


Fig.3-2 Avalanche Waveform



●Dimensions

TSMT8



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

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.75	0.85	0.030	0.033
A1	0.00	0.05	0.000	0.002
b	0.27	0.37	0.011	0.015
c	0.12	0.22	0.005	0.009
D	2.90	3.10	0.114	0.122
E	2.30	2.50	0.091	0.098
e	0.65		0.026	
HE	2.70	2.90	0.106	0.114
L	0.10	0.30	0.004	0.012
L1	0.10	0.30	0.004	0.012
Lp	0.19	0.39	0.007	0.015
Lp1	0.19	0.39	0.007	0.015
x	–	0.10	–	0.004
y	–	0.10	–	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	–	0.47	–	0.019
e1	2.41		0.095	
l1	–	0.49	–	0.019
l2	–	0.49	–	0.019

Dimension in mm/inches

Notes

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QH8KA2 - Web Page

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Distribution Inventory

Part Number	QH8KA2
Package	TSMT8
Unit Quantity	3000
Minimum Package Quantity	3000
Packing Type	Taping
Constitution Materials List	inquiry
RoHS	Yes