

# HAT2285WP

Silicon N Channel Power MOS FET with Schottky Barrier Diode  
High Speed Power Switching

REJ03G1371-0300

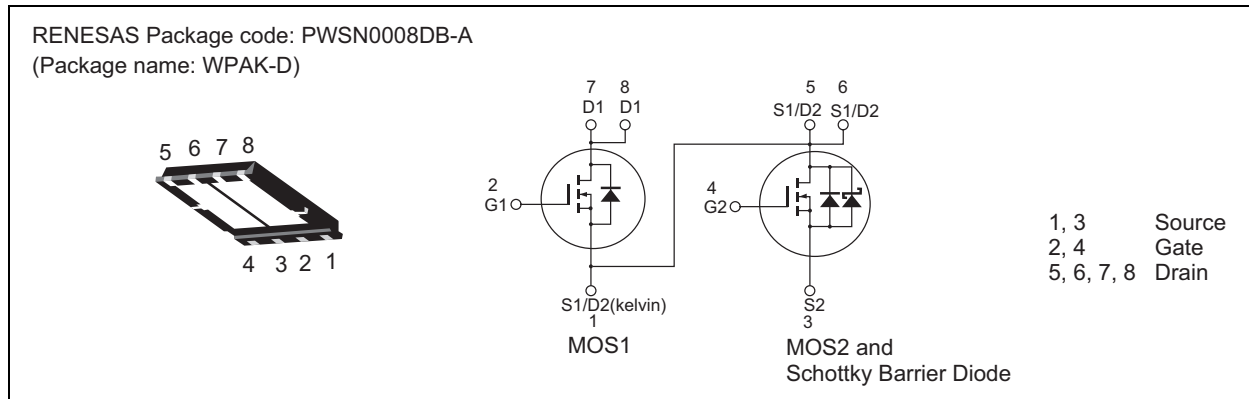
Rev.3.00

Apr 05, 2006

## Features

- Low on-resistance
- Capable of 4.5 V gate drive
- High density mounting
- Built-in Schottky Barrier Diode

## Outline



## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings		Unit
		MOS1	MOS2 & SBD	
Drain to source voltage	$V_{DSS}$	30	30	V
Gate to source voltage	$V_{GSS}$	$\pm 20$	$\pm 12$	V
Drain current	$I_D$	14	22	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	56	88	A
Reverse drain current	$I_{DR}$	14	22	A
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	8	15	W
Channel temperature	Tch	150	150	°C
Storage temperature	Tstg	-55 to +150	-55 to +150	°C

Notes: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$

2.  $T_c = 25^\circ C$

## Electrical Characteristics

## • MOS1

(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	19	24	$\text{m}\Omega$	$I_D = 7 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note3</sup>
	$R_{DS(on)}$	—	27	40	$\text{m}\Omega$	$I_D = 7 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	10	18	—	S	$I_D = 7 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	630	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ , $f = 1\text{MHz}$
Output capacitance	$C_{oss}$	—	155	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	57	—	pF	
Total gate charge	$Q_g$	—	4.6	—	nC	$V_{DD} = 10 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ , $I_D = 14 \text{ A}$
Gate to source charge	$Q_{gs}$	—	2.2	—	nC	
Gate to drain charge	$Q_{gd}$	—	1.2	—	nC	
Turn-on delay time	$t_{d(on)}$	—	7	—	ns	$V_{GS} = 10 \text{ V}$ , $I_D = 7 \text{ A}$ , $V_{DD} \cong 10 \text{ V}$ , $R_L = 1.42 \Omega$ , $R_g = 4.7 \Omega$
Rise time	$t_r$	—	30	—	ns	
Turn-off delay time	$t_{d(off)}$	—	35	—	ns	
Fall time	$t_f$	—	3.6	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	0.91	1.19	V	$I_F = 14 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	18	—	ns	$I_F = 14 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Notes: 3. Pulse test

## • MOS2 &amp; Schottky Barrier Diode

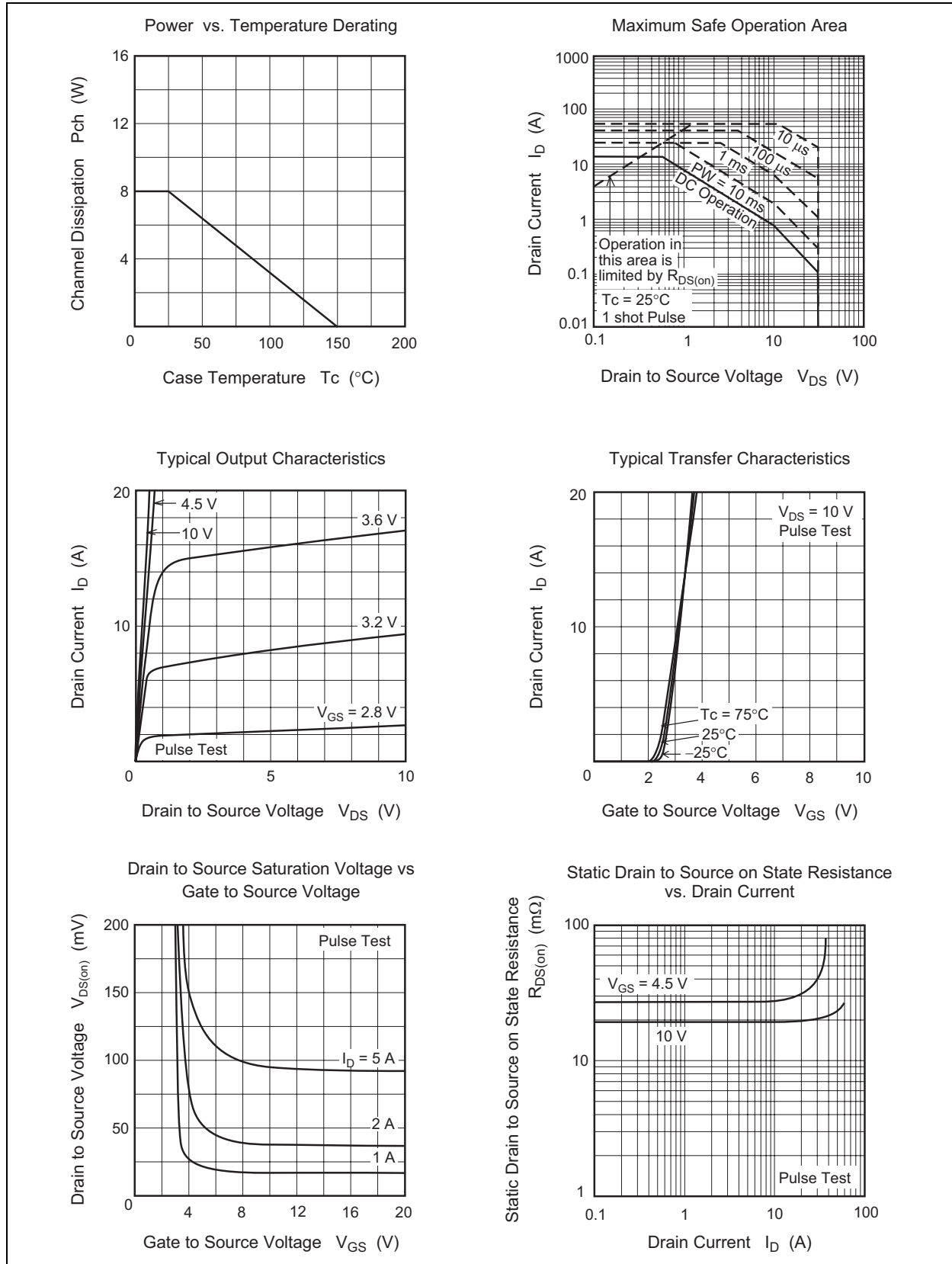
(Ta = 25°C)

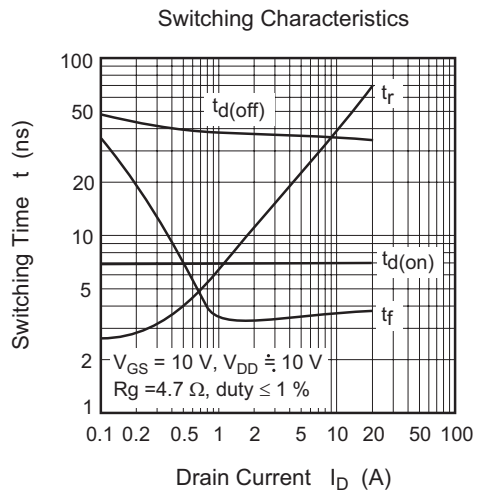
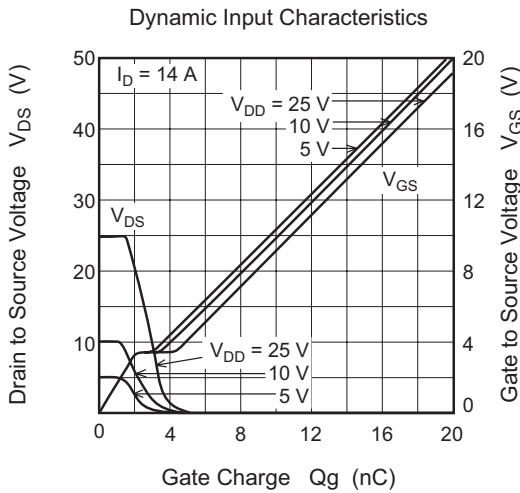
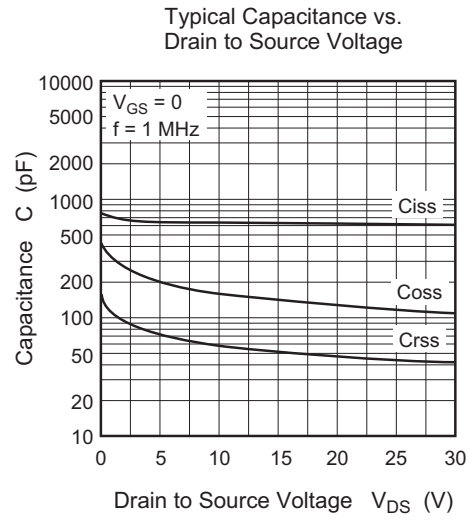
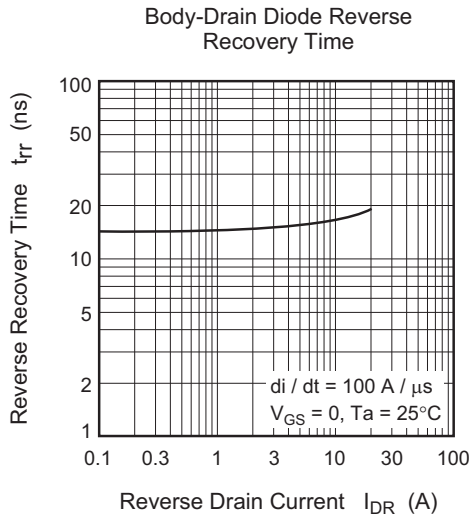
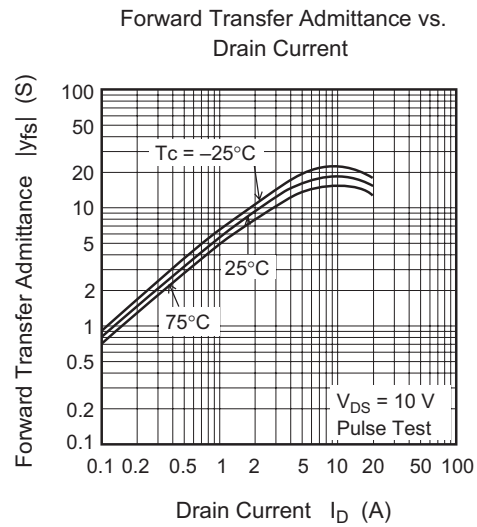
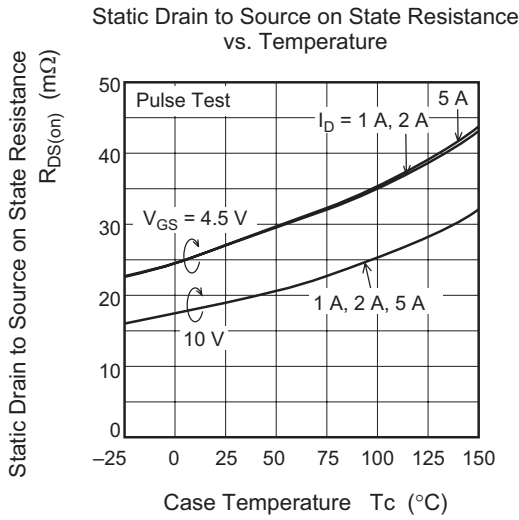
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 12 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	m A	$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.4	—	2.5	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	14	18	$\text{m}\Omega$	$I_D = 11 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note3</sup>
	$R_{DS(on)}$	—	15	23	$\text{m}\Omega$	$I_D = 11 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	24	40	—	S	$I_D = 11 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	1930	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ , $f = 1\text{MHz}$
Output capacitance	$C_{oss}$	—	300	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	130	—	pF	
Total gate charge	$Q_g$	—	18	—	nC	$V_{DD} = 10 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ , $I_D = 22 \text{ A}$
Gate to source charge	$Q_{gs}$	—	5.8	—	nC	
Gate to drain charge	$Q_{gd}$	—	4.5	—	nC	
Turn-on delay time	$t_{d(on)}$	—	10	—	ns	$V_{GS} = 10 \text{ V}$ , $I_D = 11 \text{ A}$ , $V_{DD} \cong 10 \text{ V}$ , $R_L = 0.91 \Omega$ , $R_g = 4.7 \Omega$
Rise time	$t_r$	—	20	—	ns	
Turn-off delay time	$t_{d(off)}$	—	45	—	ns	
Fall time	$t_f$	—	4.0	—	ns	
Schottky Barrier diode forward voltage	$V_F$	—	0.5	—	V	$I_F = 3.5 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	16	—	ns	$I_F = 22 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Notes: 3. Pulse test

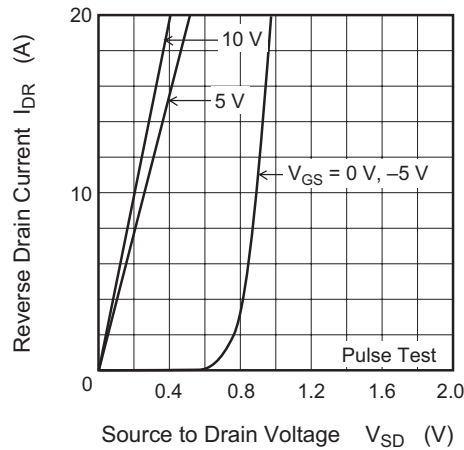
## Electrical Characteristics

• MOS1

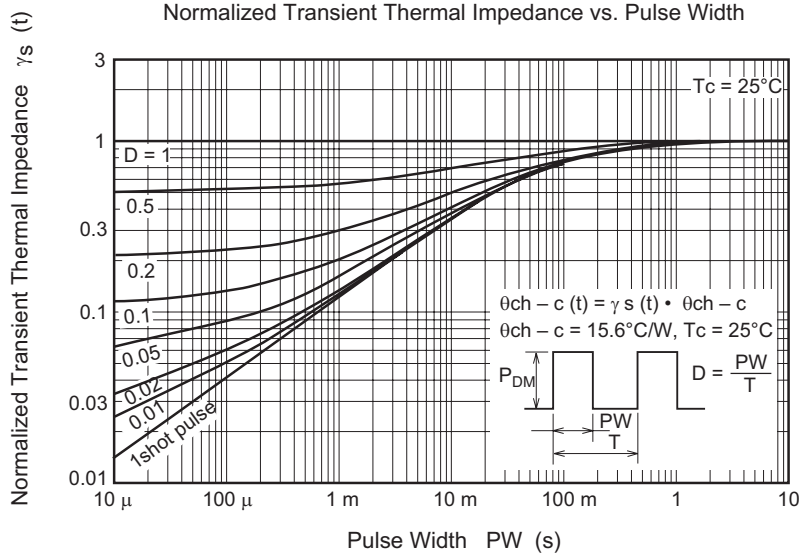




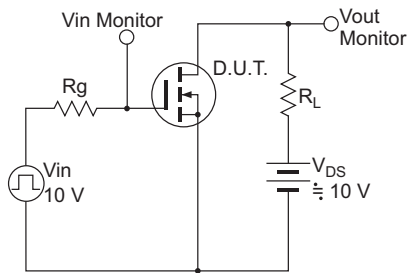
Reverse Drain Current vs. Source to Drain Voltage



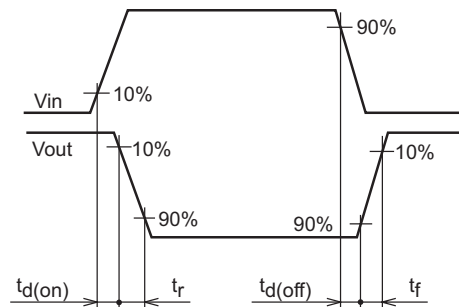
Normalized Transient Thermal Impedance vs. Pulse Width



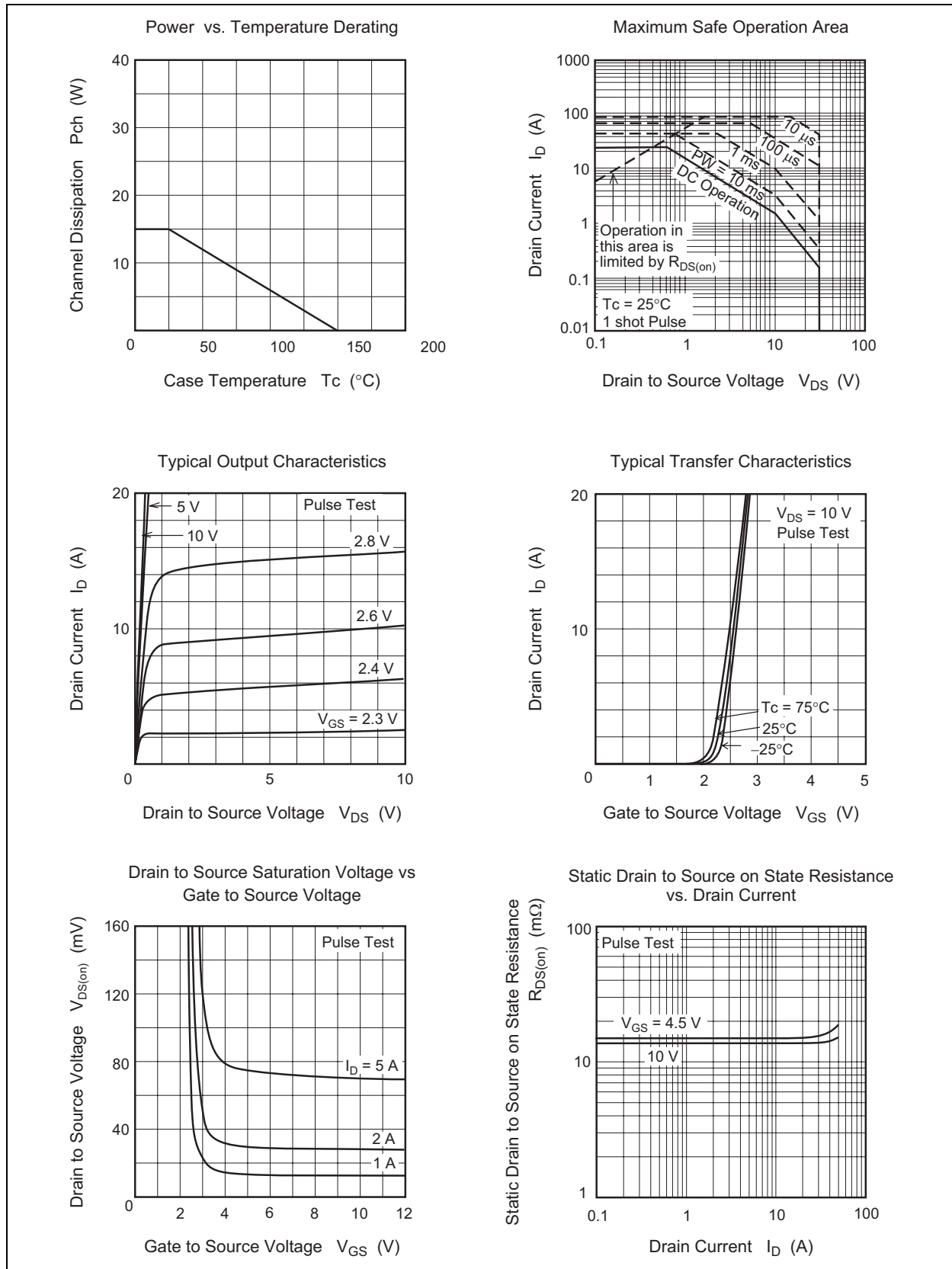
Switching Time Test Circuit

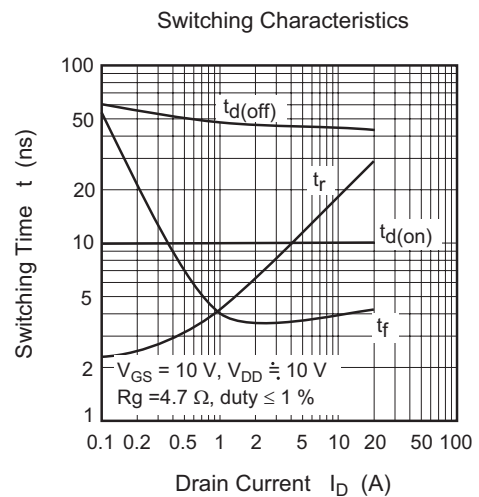
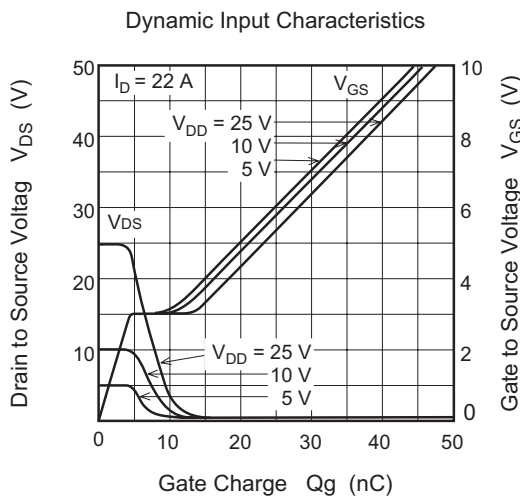
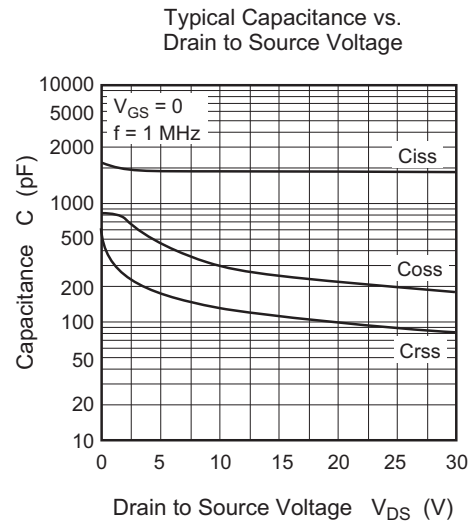
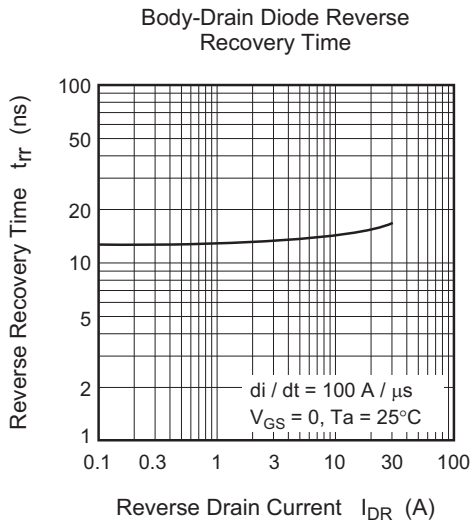
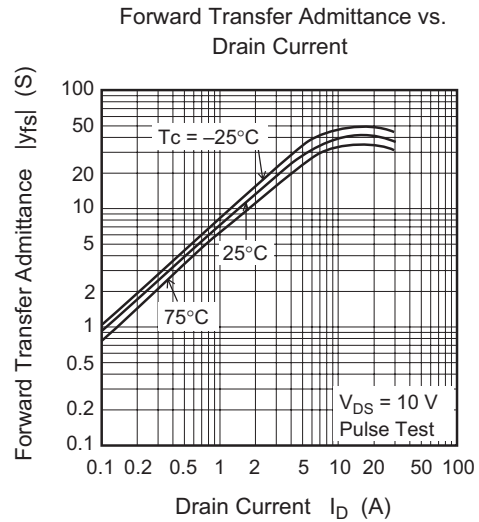
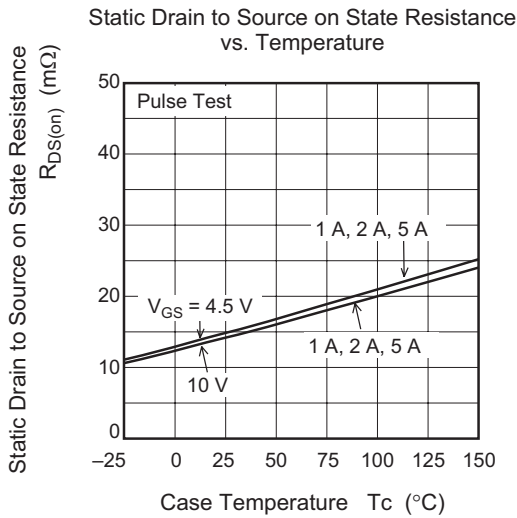


Switching Time Waveform

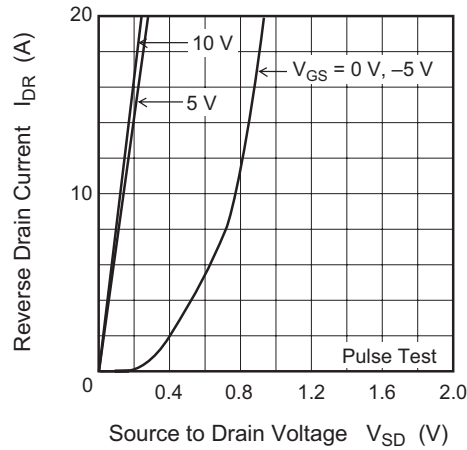


• MOS2 & Schottky Barrier Diode

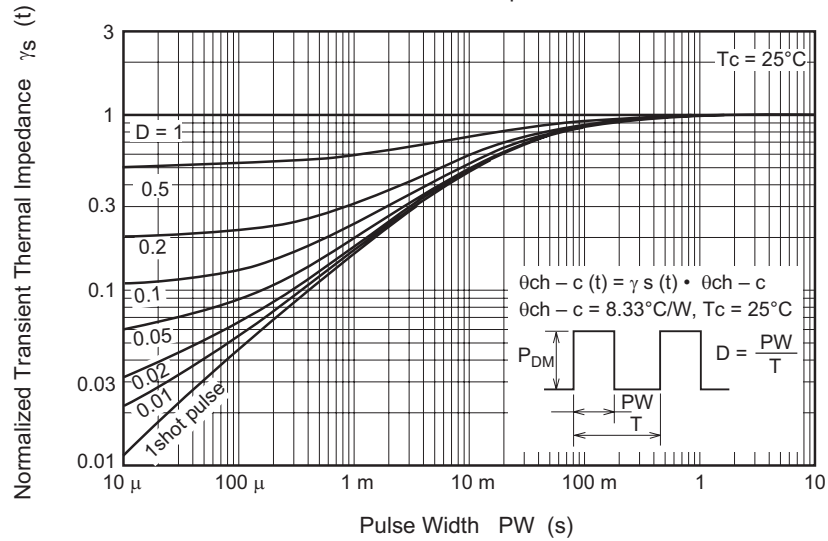




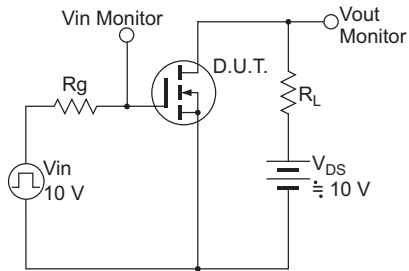
Reverse Drain Current vs. Source to Drain Voltage



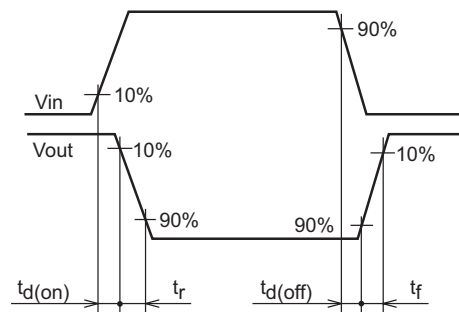
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

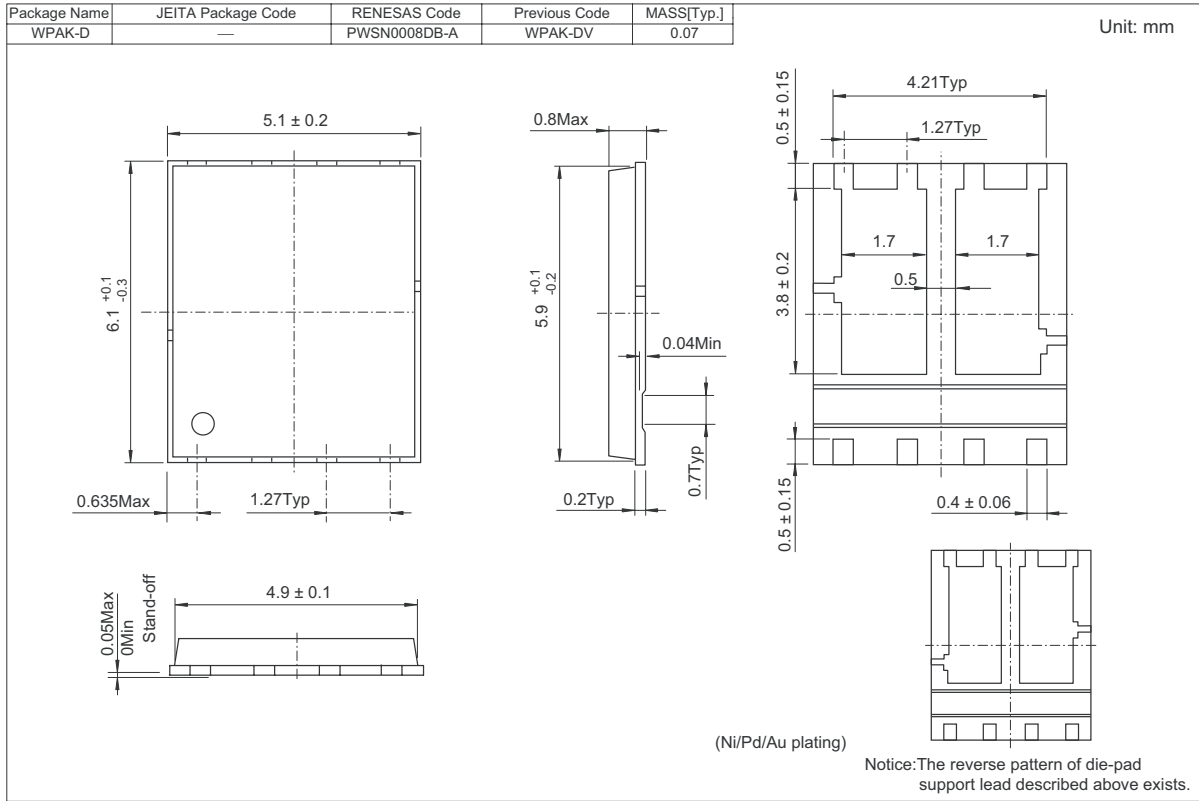


Switching Time Waveform





### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
HAT2285WP-EL-E	2500 pcs	Taping

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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