

# HAT2285WP

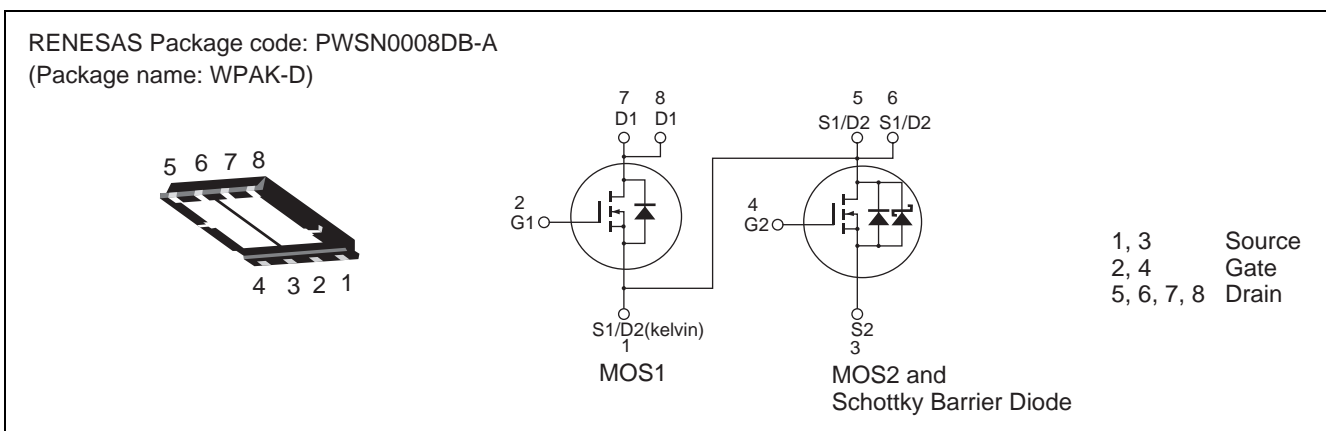
## Silicon N Channel Power MOS FET with Schottky Barrier Diode High Speed Power Switching

REJ03G1371-0310  
Rev.3.10  
May 13, 2010

### 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 <sub>DSS</sub>	30	30	V
Gate to source voltage	V <sub>GSS</sub>	±20	±12	V
Drain current	I <sub>D</sub>	14	22	A
Drain peak current	I <sub>D(pulse)</sub> <sup>Note1</sup>	56	88	A
Reverse drain current	I <sub>DR</sub>	14	22	A
Channel dissipation	P <sub>ch</sub> <sup>Note2</sup>	8	15	W
Channel temperature	T <sub>ch</sub>	150	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	-55 to +150	°C

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1 %

2. Tc = 25°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 & Schottky Barrier Diode

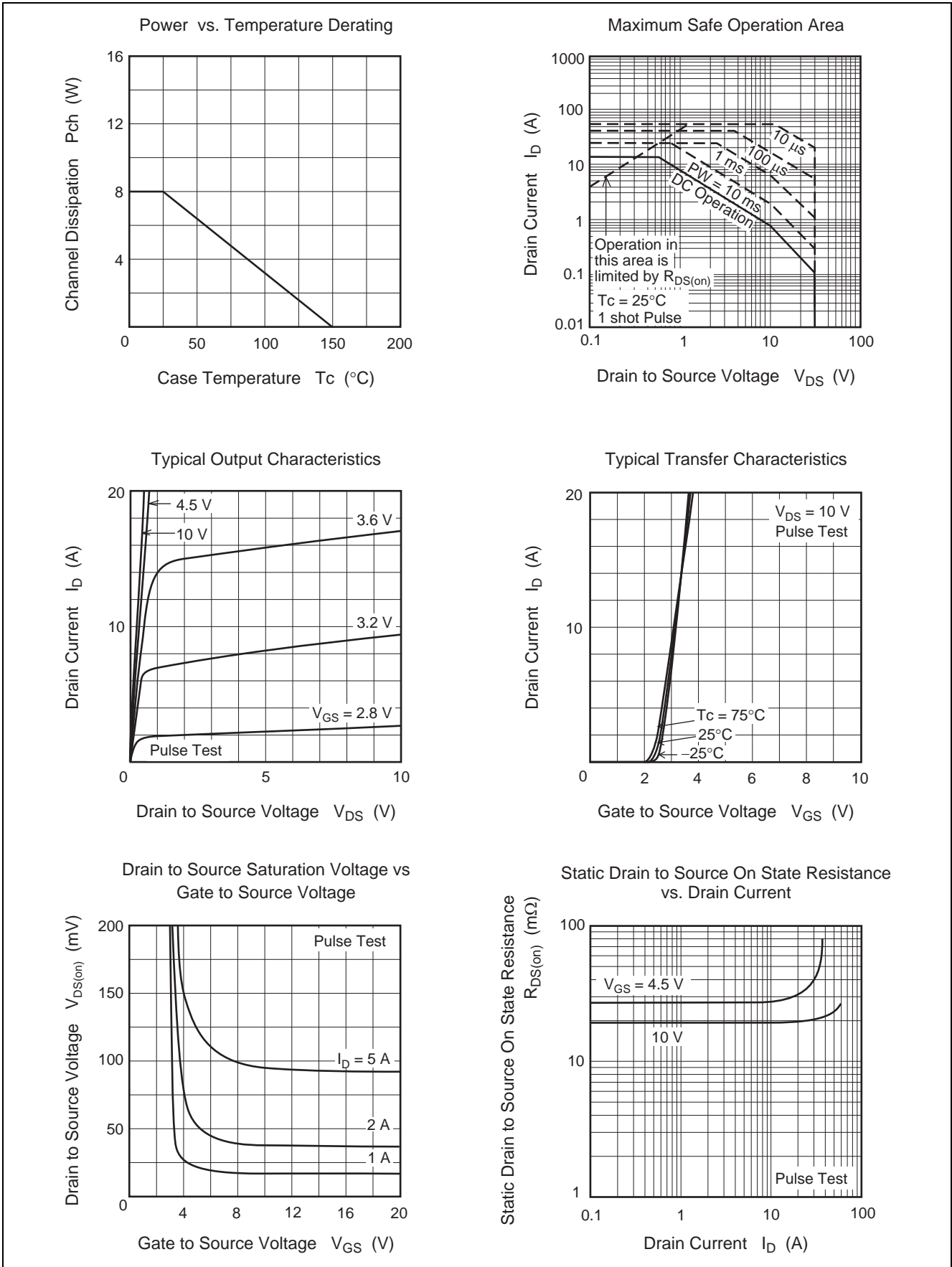
(Ta = 25°C)

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	$\text{mA}$	$V_{DS} = 30 \text{ V}, V_{GS} = 0$
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	$I_F = 22 \text{ A}, V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

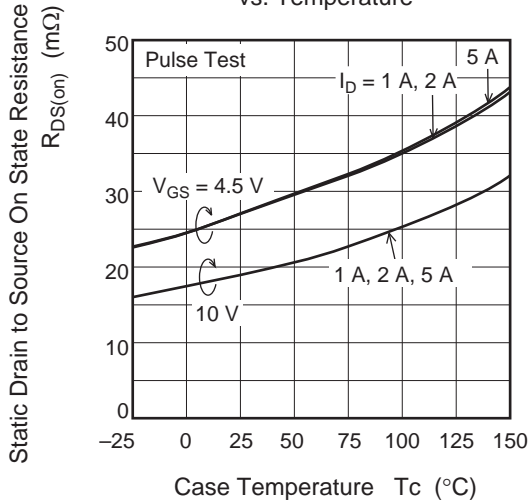
Notes: 3. Pulse test

# Electrical Characteristics

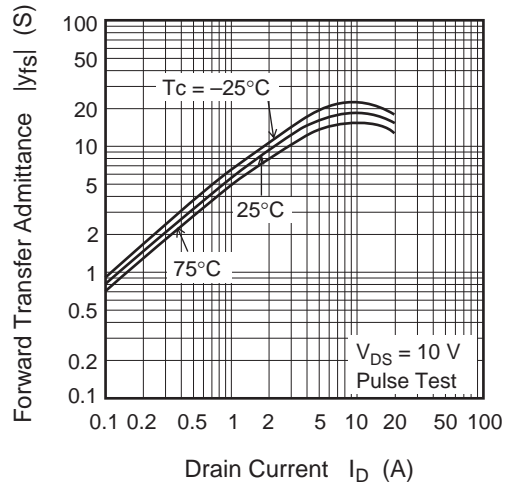
• MOS1



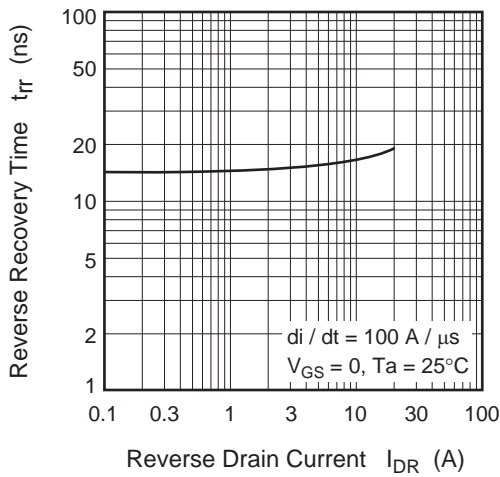
Static Drain to Source On State Resistance vs. Temperature



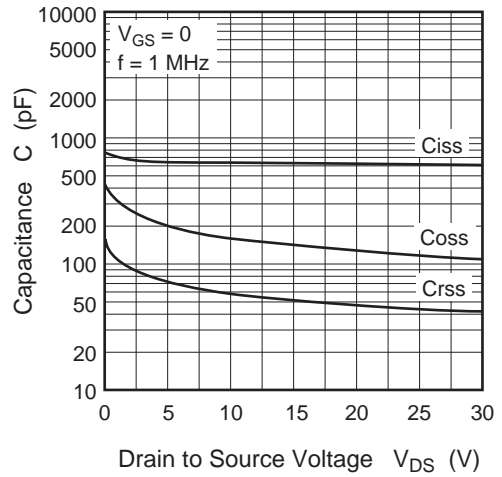
Forward Transfer Admittance vs. Drain Current



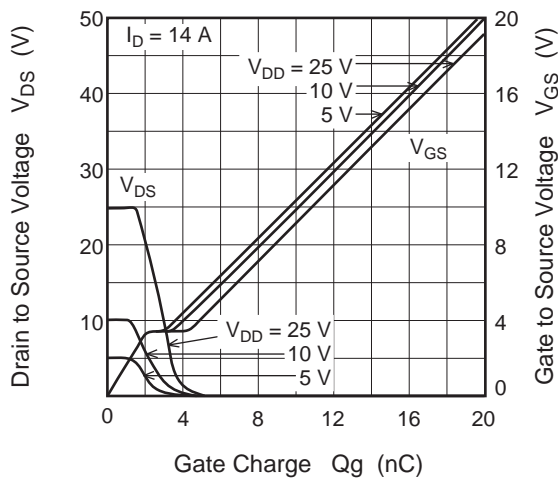
Body-Drain Diode Reverse Recovery Time



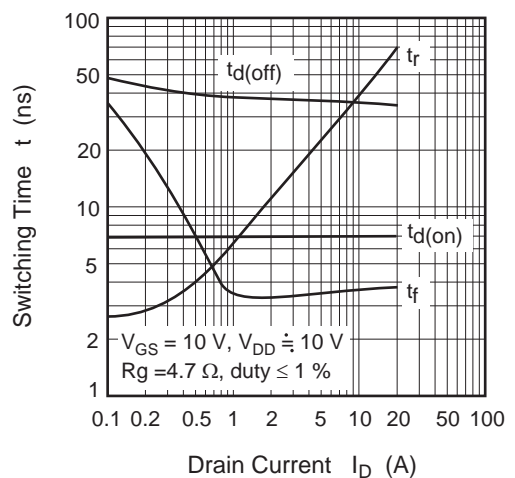
Typical Capacitance vs. Drain to Source Voltage



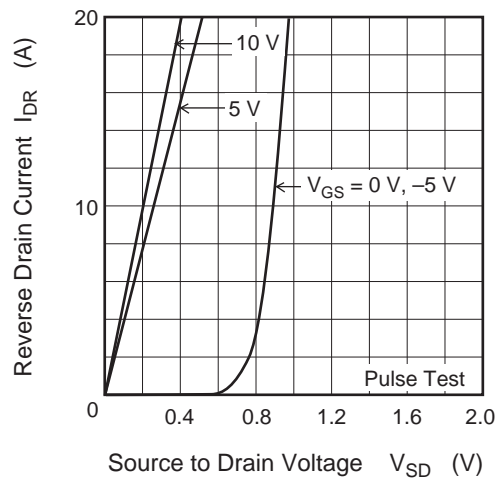
Dynamic Input Characteristics



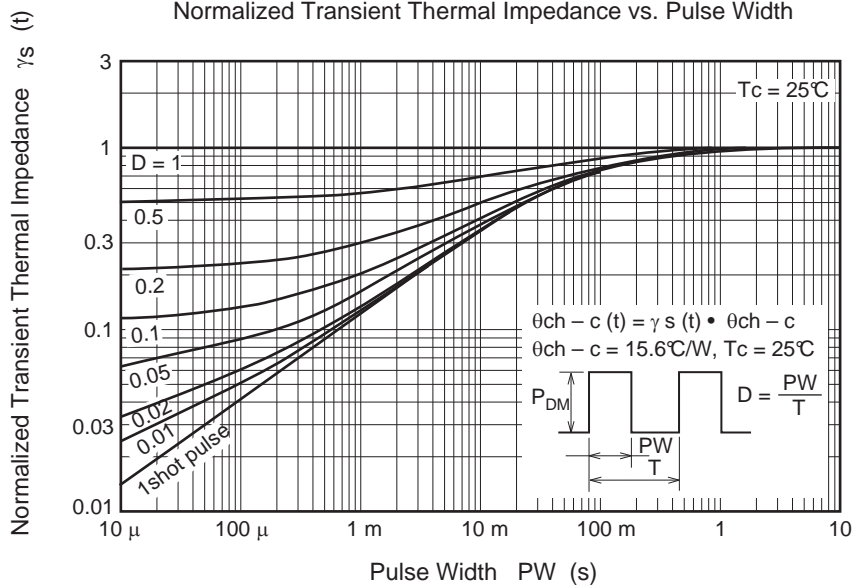
Switching Characteristics



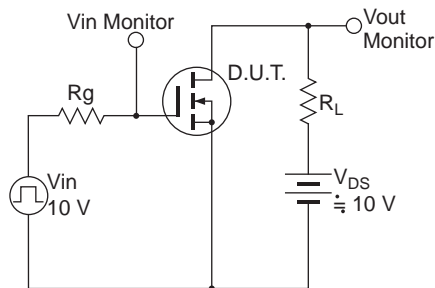
Reverse Drain Current vs. Source to Drain Voltage



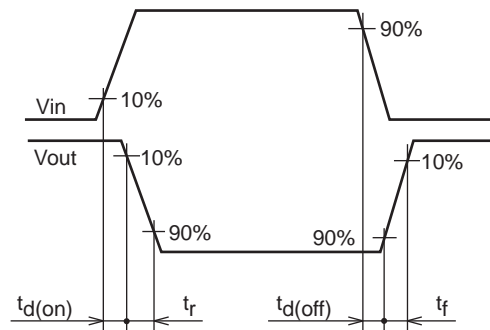
Normalized Transient Thermal Impedance vs. Pulse Width



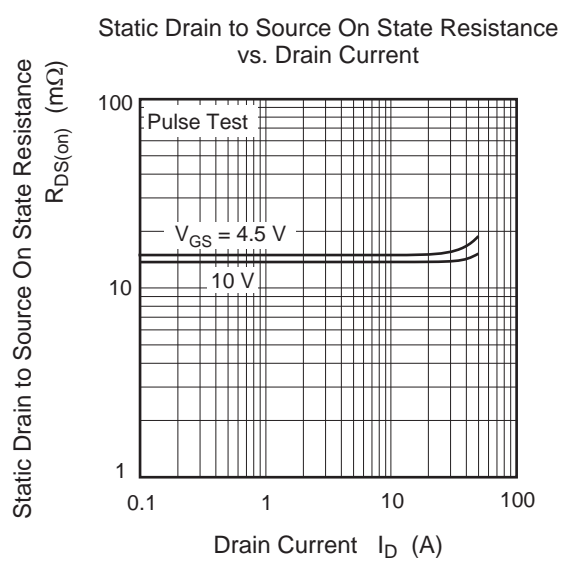
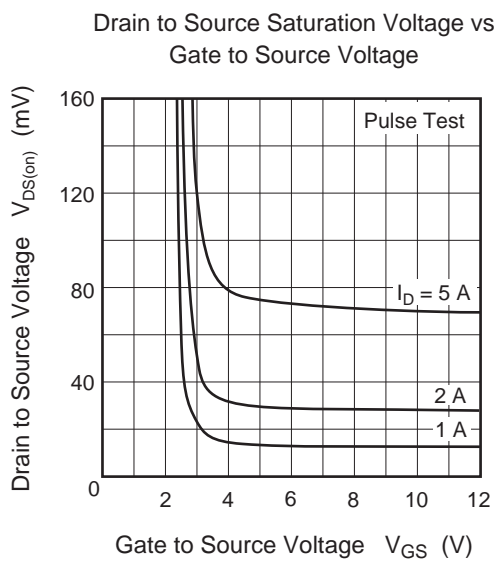
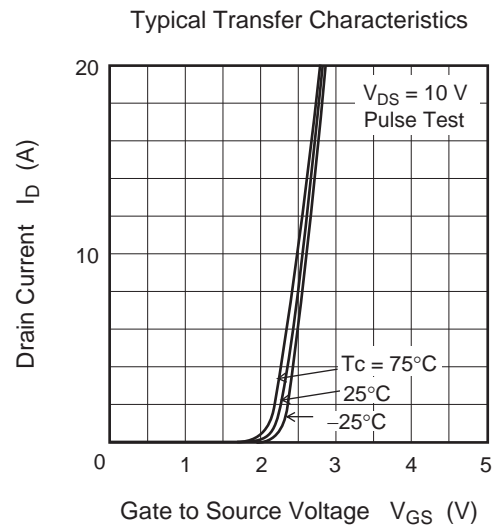
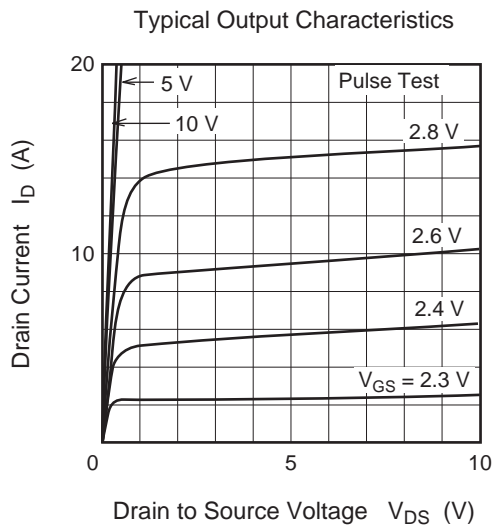
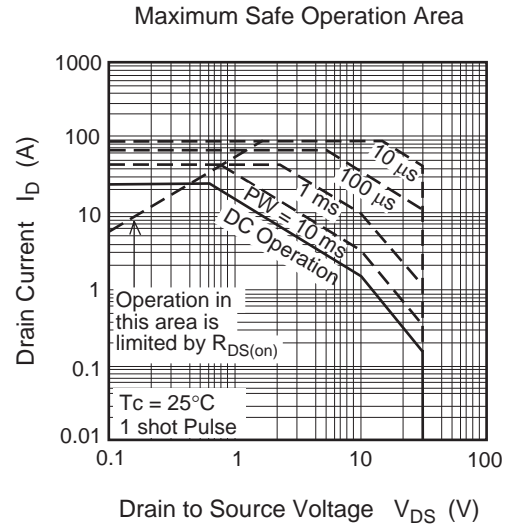
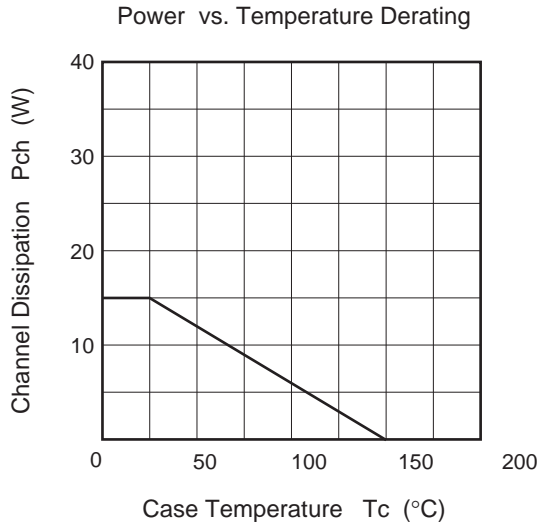
Switching Time Test Circuit



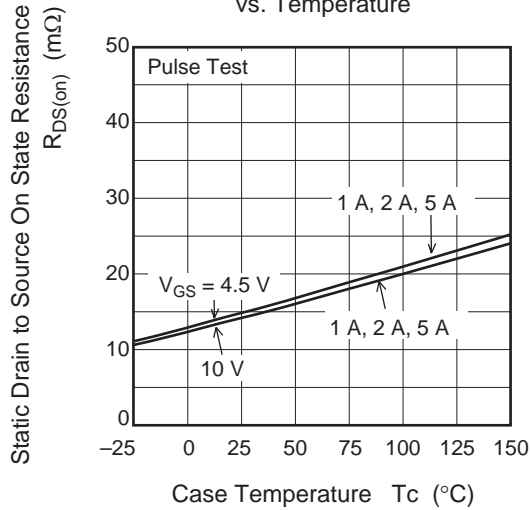
Switching Time Waveform



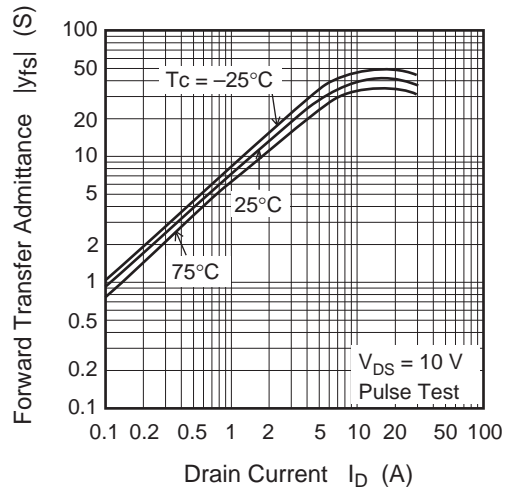
• MOS2 & Schottky Barrier Diode



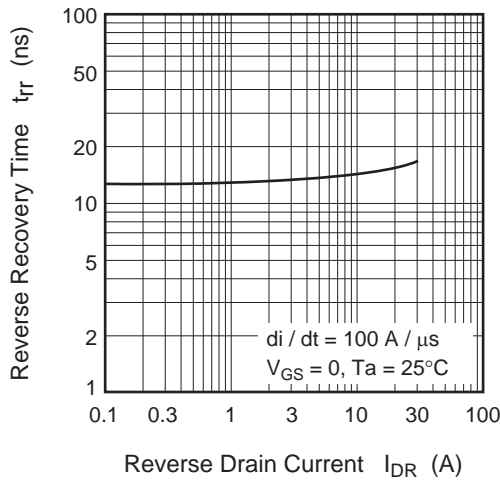
Static Drain to Source On State Resistance vs. Temperature



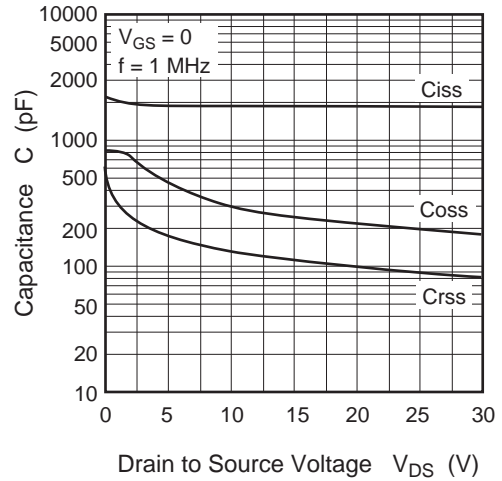
Forward Transfer Admittance vs. Drain Current



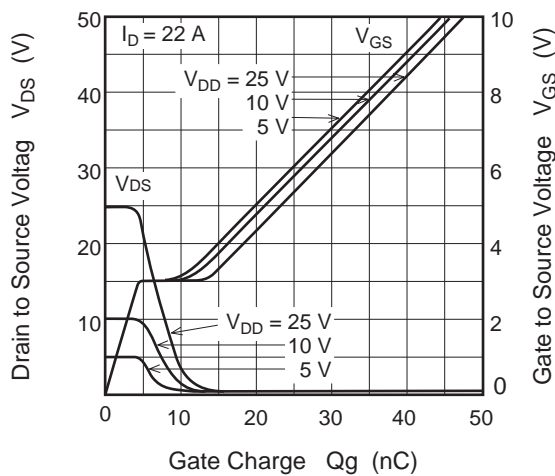
Body-Drain Diode Reverse Recovery Time



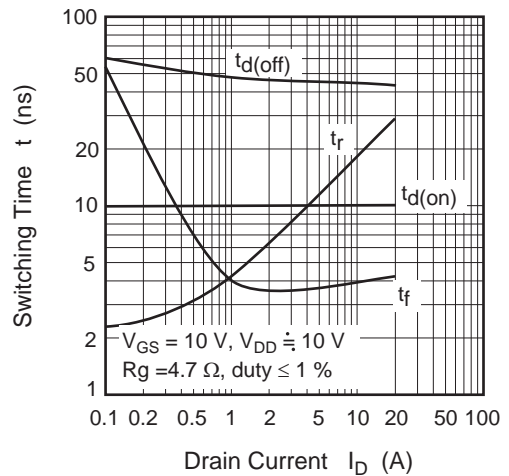
Typical Capacitance vs. Drain to Source Voltage



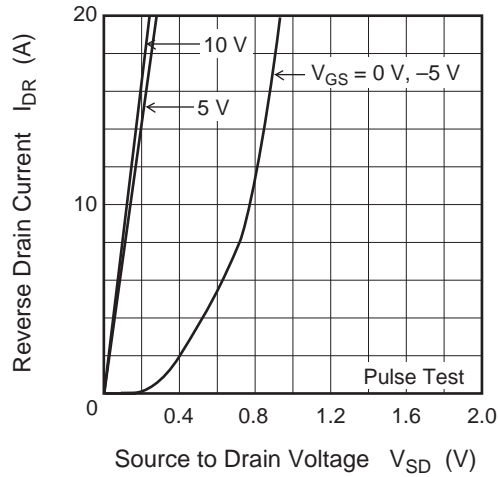
Dynamic Input Characteristics



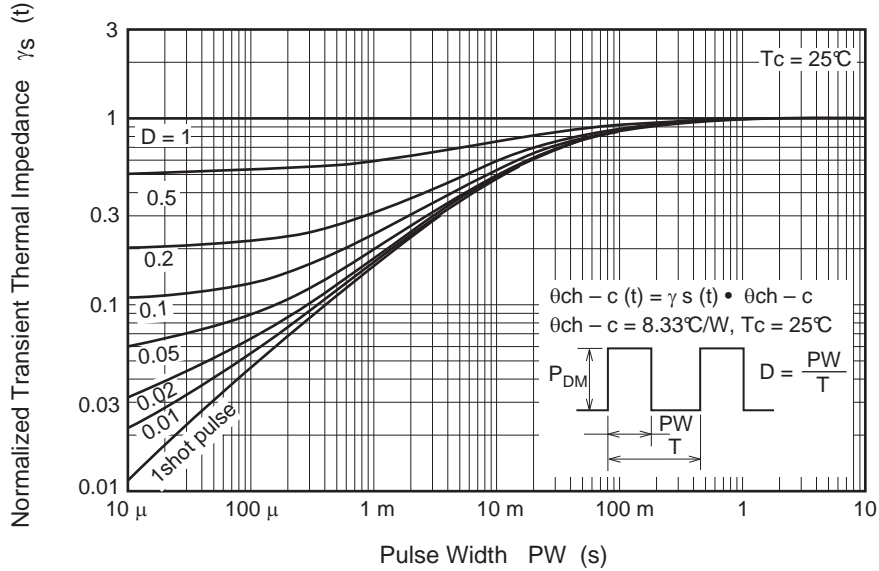
Switching Characteristics



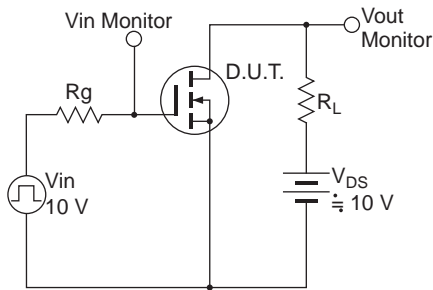
Reverse Drain Current vs. Source to Drain Voltage



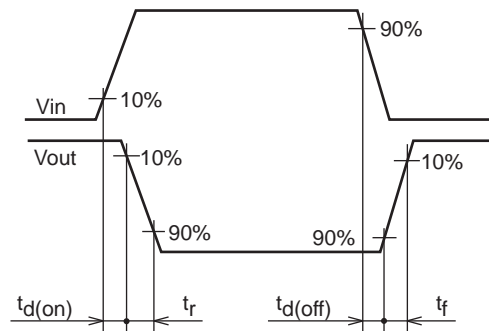
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

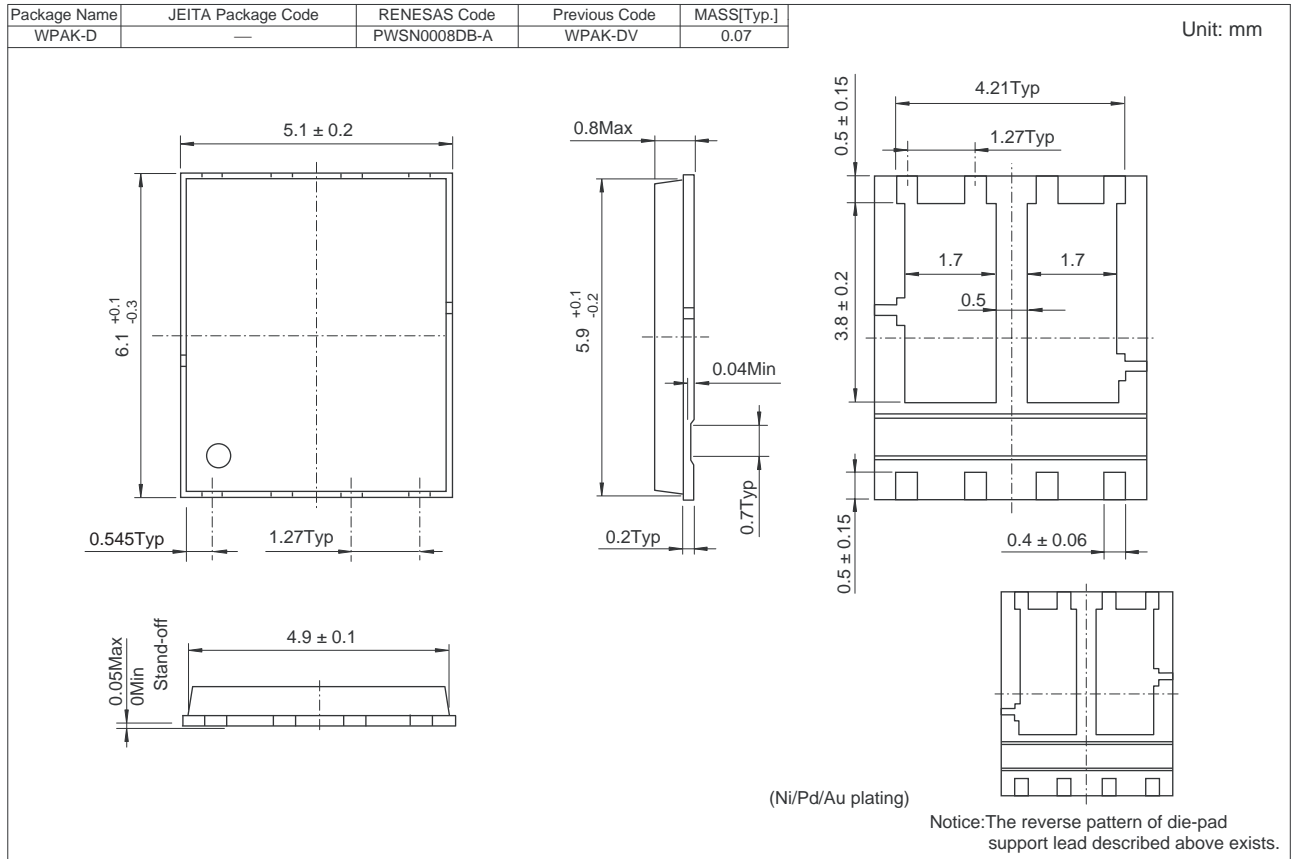


Switching Time Waveform





### Package Dimensions



### Ordering Information

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

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