

HAT2285WP

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

REJ03G1371-0300

Rev.3.00

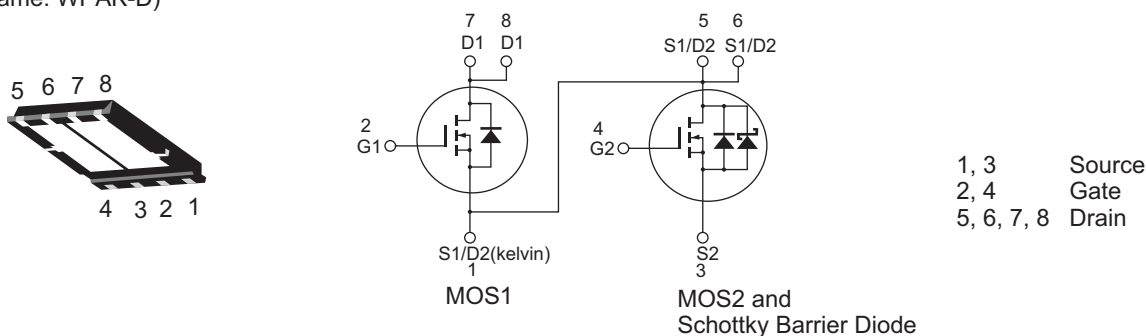
Apr 05, 2006

Features

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

Outline

RENESAS Package code: PWSN0008DB-A
(Package name: WPAK-D)



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}	±20	±12	V
Drain current	I_D	14	22	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	56	88	A
Reverse drain current	I_{DR}	14	22	A
Channel dissipation	P_{ch} ^{Note2}	8	15	W
Channel temperature	T_{ch}	150	150	°C
Storage temperature	T_{stg}	-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}	—	—	± 0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 30 \text{ V}$, $V_{GS} = 0$
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	$\text{m}\Omega$	$I_D = 7 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note3}
	$R_{DS(on)}$	—	27	40	$\text{m}\Omega$	$I_D = 7 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note3}
Forward transfer admittance	$ y_{fs} $	10	18	—	S	$I_D = 7 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note3}
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	$I_F = 14 \text{ A}$, $V_{GS} = 0$ ^{Note3}
Body-drain diode forward voltage	V_{DF}	—	0.91	1.19	V	
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

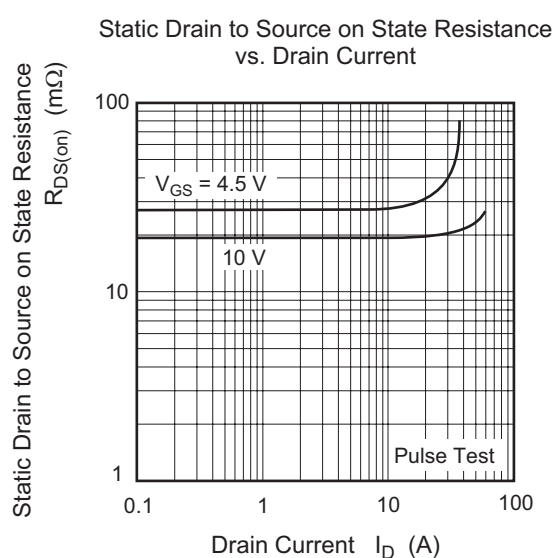
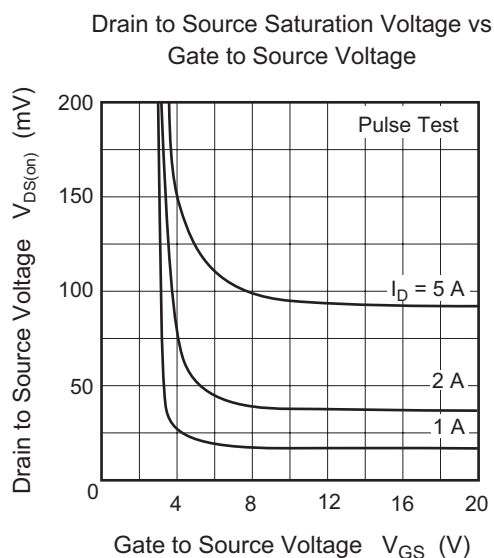
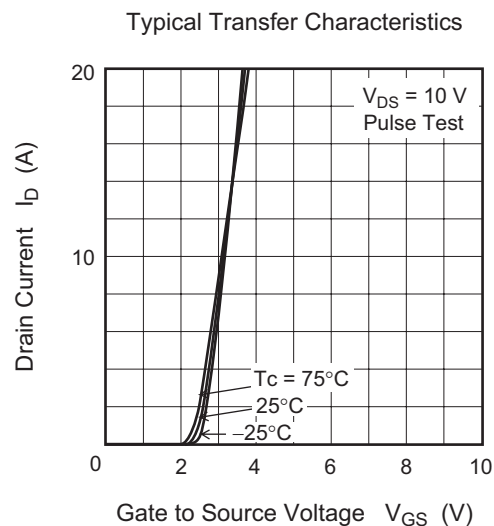
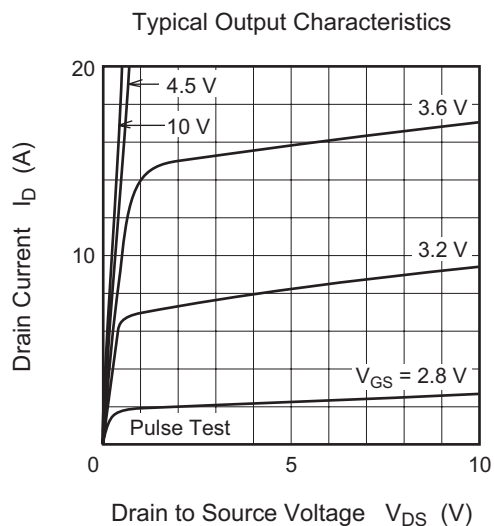
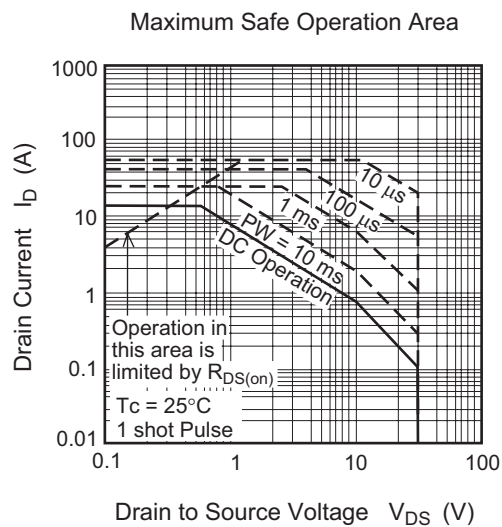
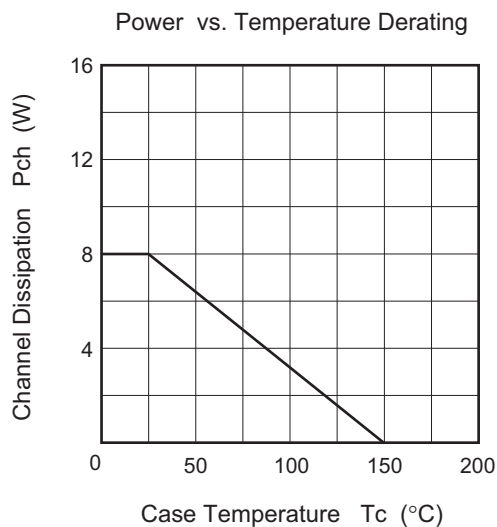
(Ta = 25°C)

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}	—	—	± 0.1	μA	$V_{GS} = \pm 12 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	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	$\text{m}\Omega$	$I_D = 11 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note3}
	$R_{DS(on)}$	—	15	23	$\text{m}\Omega$	$I_D = 11 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note3}
Forward transfer admittance	$ y_{fs} $	24	40	—	S	$I_D = 11 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note3}
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	$I_F = 3.5 \text{ A}$, $V_{GS} = 0$ ^{Note3}
Schottky Barrier diode forward voltage	V_F	—	0.5	—	V	
Body-drain diode reverse recovery time	t_{rr}	—	16	—	ns	$I_F = 22 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

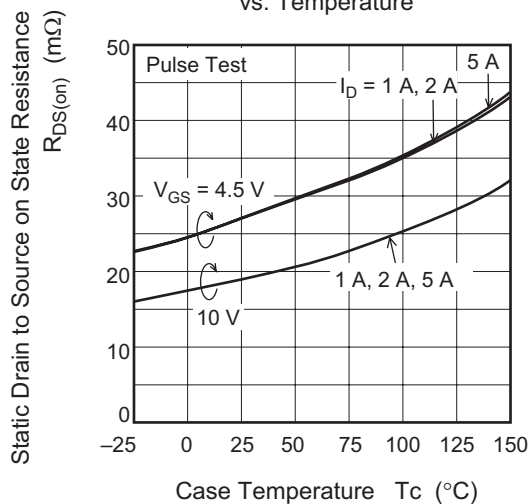
Notes: 3. Pulse test

Electrical Characteristics

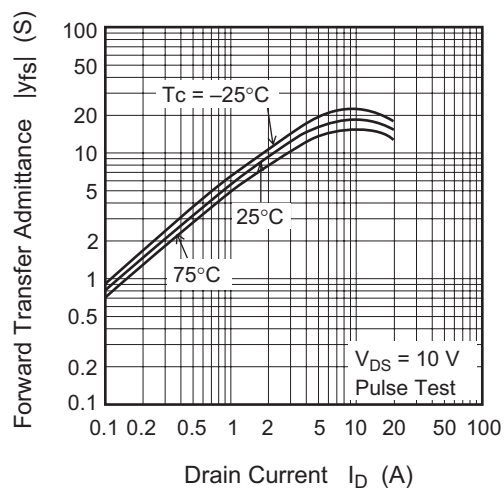
• MOS1



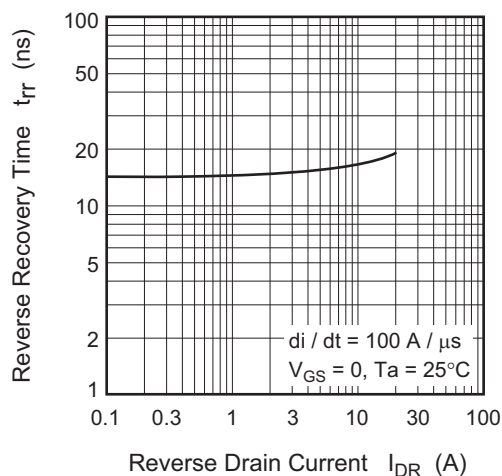
Static Drain to Source on State Resistance vs. Temperature



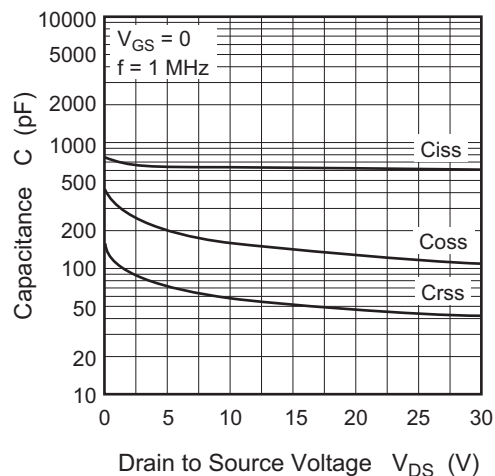
Forward Transfer Admittance vs. Drain Current



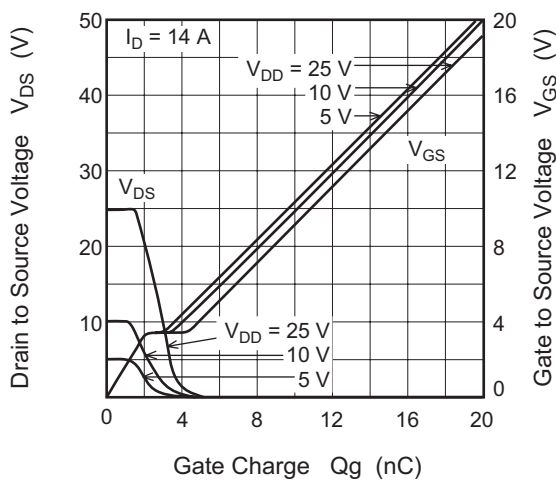
Body-Drain Diode Reverse Recovery Time



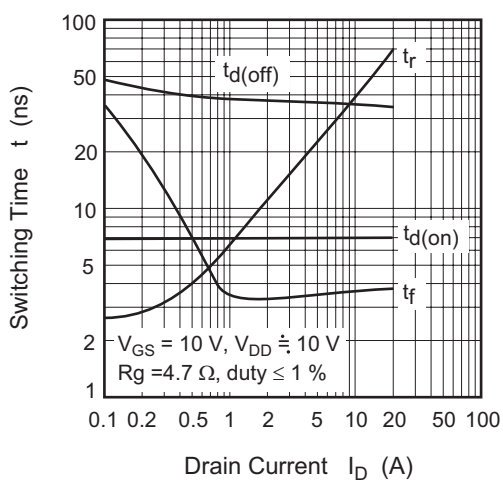
Typical Capacitance vs. Drain to Source Voltage

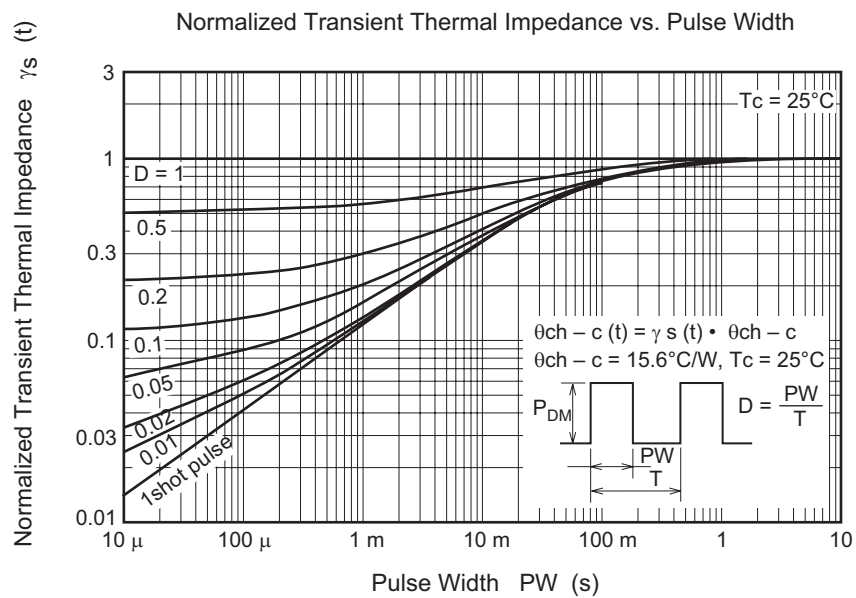
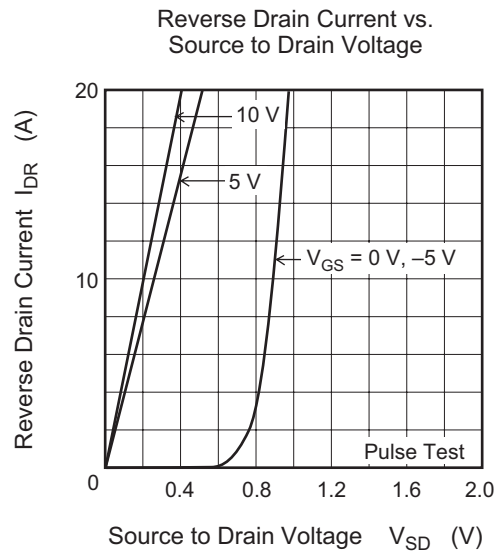


Dynamic Input Characteristics

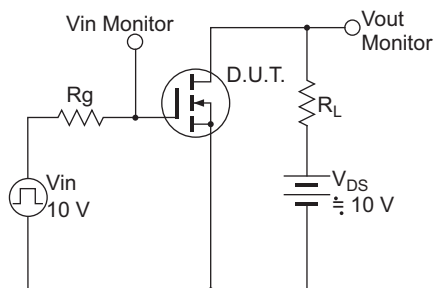


Switching Characteristics

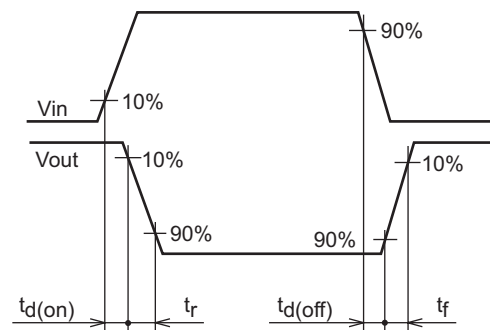




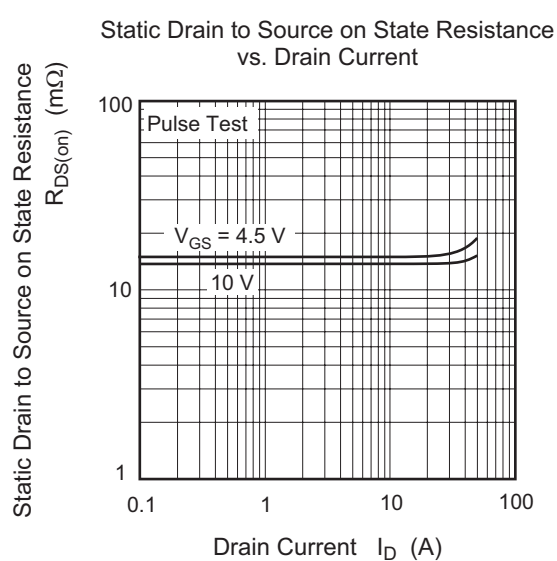
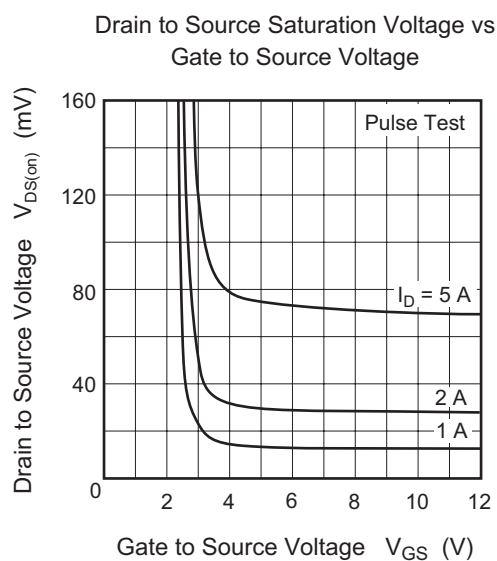
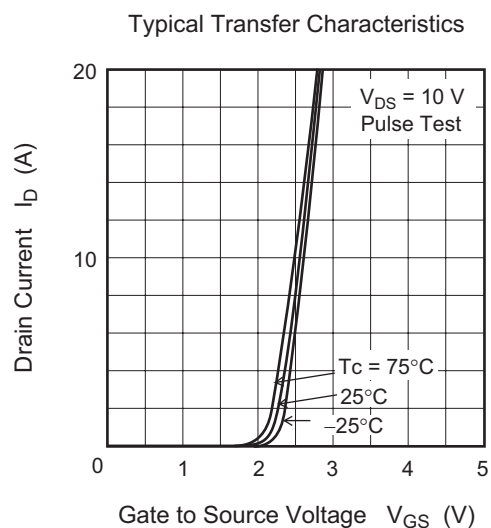
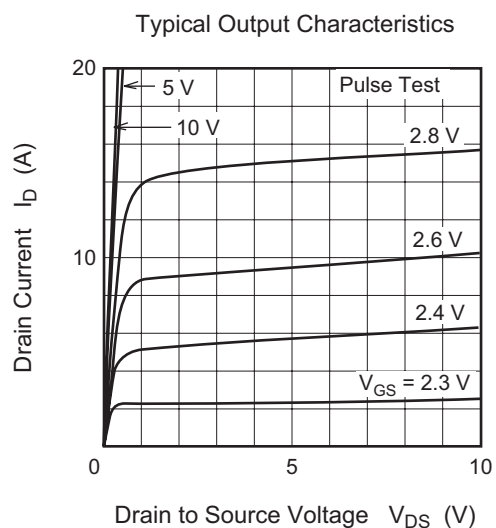
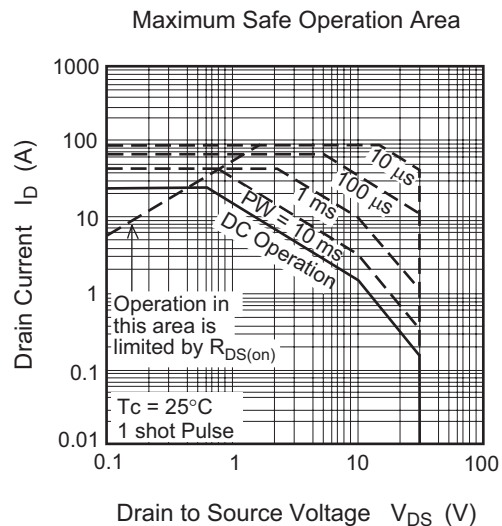
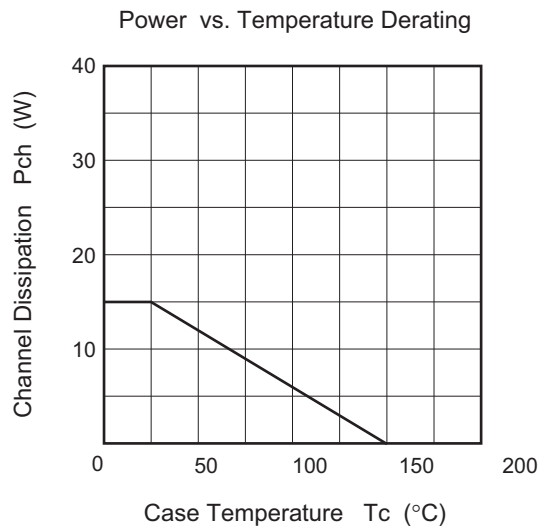
Switching Time Test Circuit



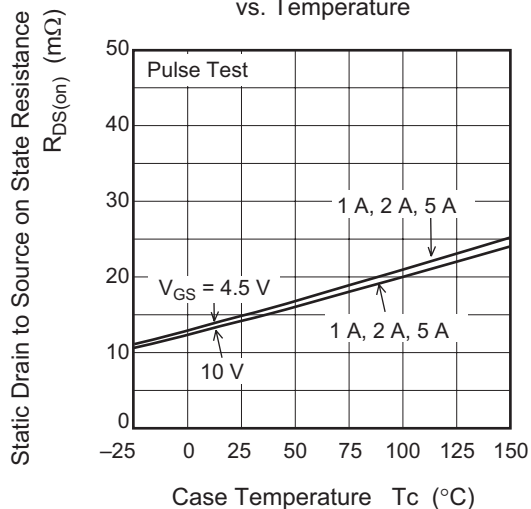
Switching Time Waveform



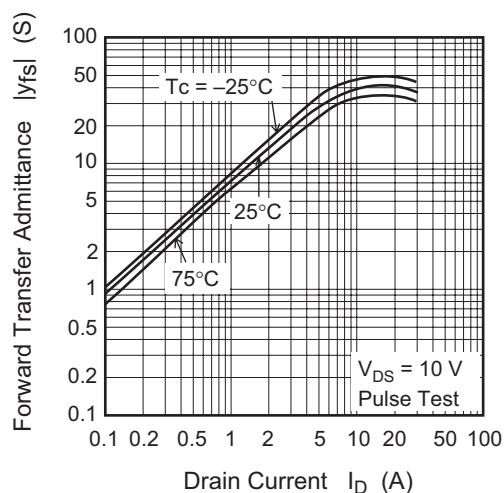
MOS2 & Schottky Barrier Diode



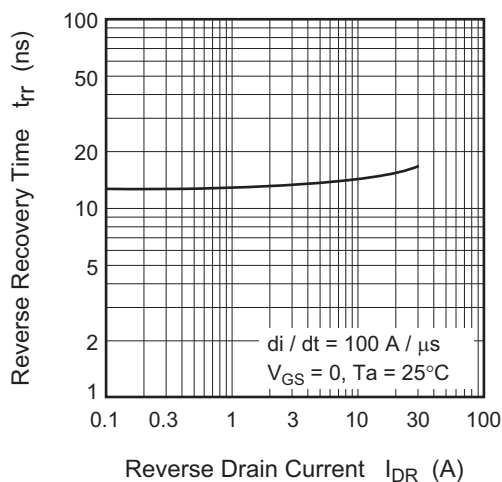
Static Drain to Source on State Resistance vs. Temperature



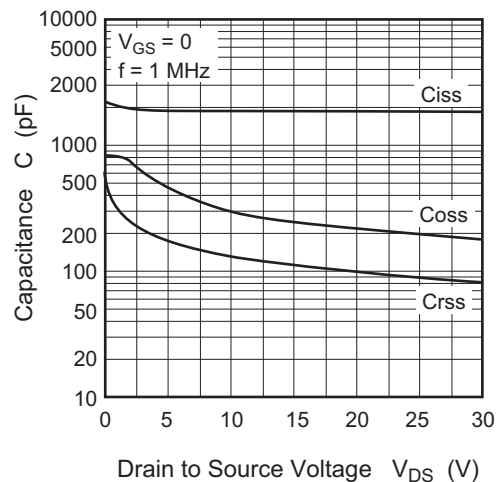
Forward Transfer Admittance vs. Drain Current



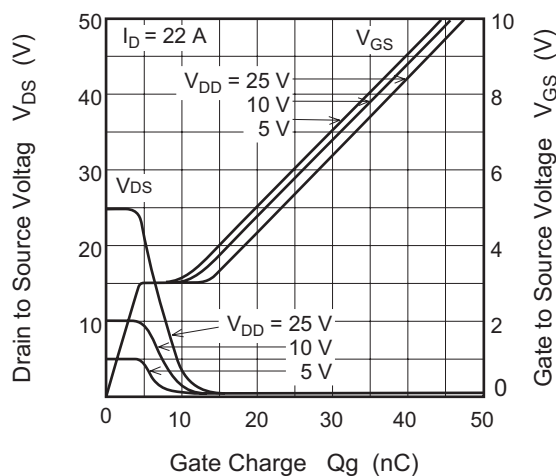
Body-Drain Diode Reverse Recovery Time



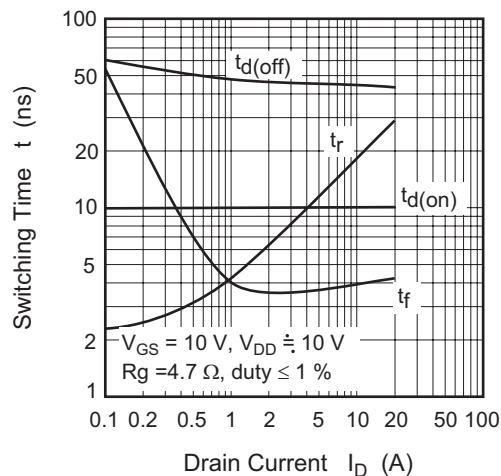
Typical Capacitance vs. Drain to Source Voltage

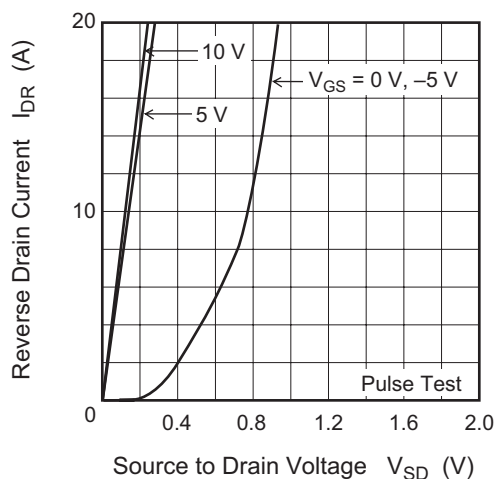


Dynamic Input Characteristics

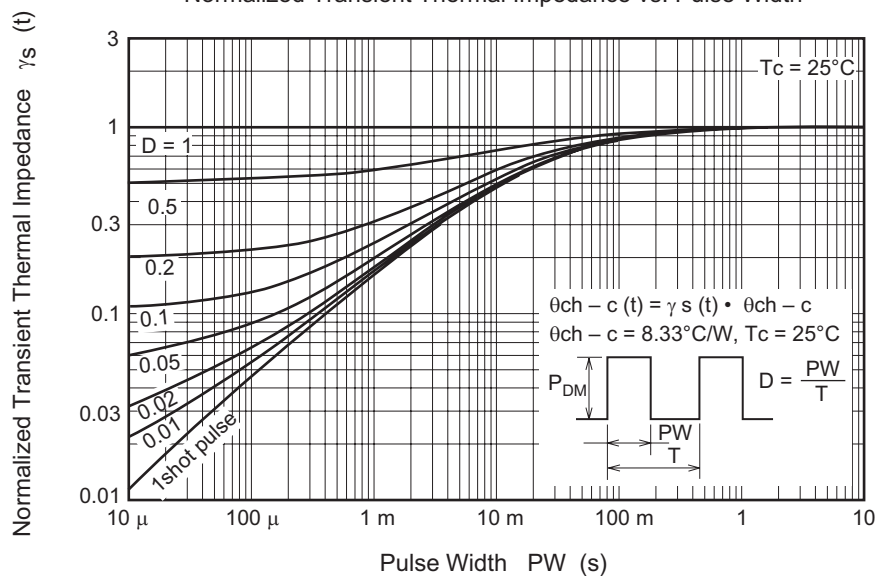


Switching Characteristics

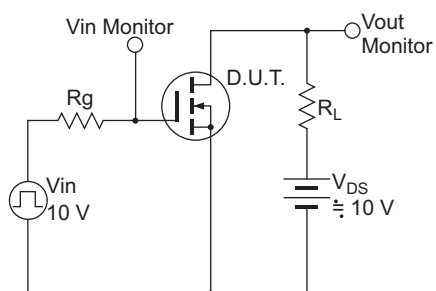


Reverse Drain Current vs.
Source to Drain Voltage

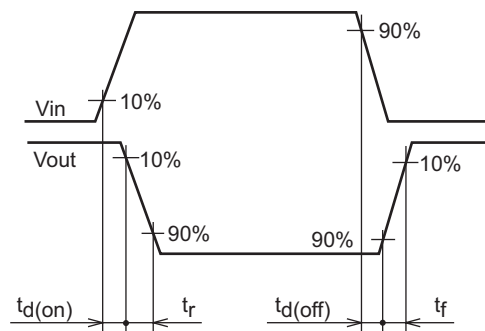
Normalized Transient Thermal Impedance vs. Pulse Width



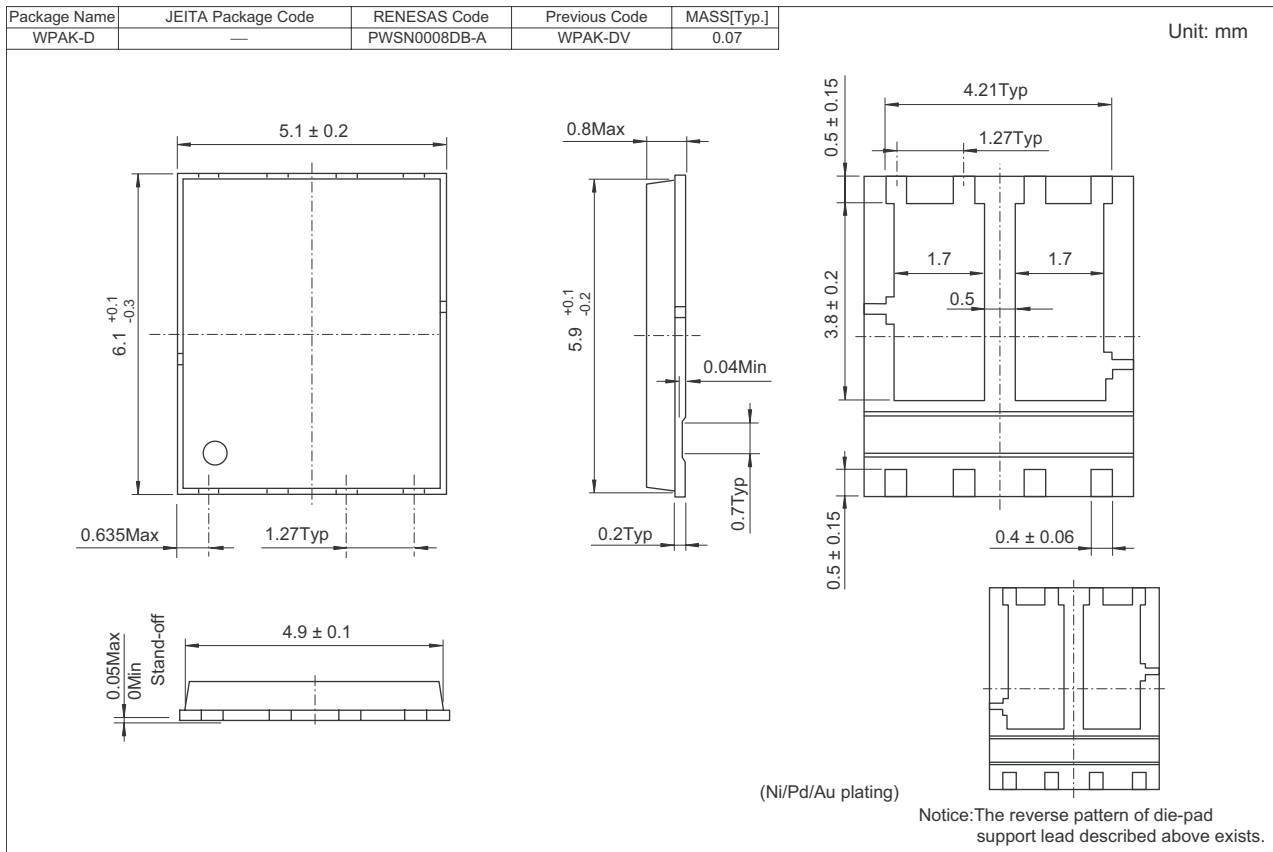
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

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

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