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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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HAT2168N

Silicon N Channel Power MOS FET Power Switching

REJ03G1682-0200

Rev.2.00

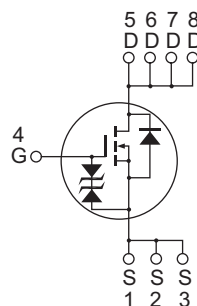
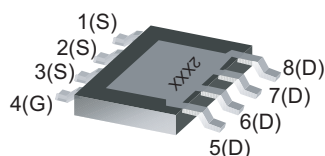
May 27, 2008

Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
 $R_{DS(on)} = 6.3 \text{ m}\Omega$ typ. (at $V_{GS} = 10 \text{ V}$)
- Power Supply for Server and Telecom (Indoor use)

Outline

RENESAS Package code: PTSP0008DC-A
(Package name: LFPAK-i)



1, 2, 3 Source
4 Gate
5, 6, 7, 8 Drain

Absolute Maximum Ratings

($T_a = 25^\circ\text{C}$)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	30	V
Gate to source voltage	V_{GSS}	± 20	V
Drain current	I_D	30	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	120	A
Body-drain diode reverse drain current	I_{DR}	30	A
Avalanche current	I_{AP} ^{Note 2}	15	A
Avalanche energy	E_{AR} ^{Note 2}	22	mJ
Channel dissipation	P_{ch} ^{Note 3}	15	W
Channel to case thermal resistance	θ_{ch-C}	8.33	$^\circ\text{C/W}$
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	- 55 to + 150	$^\circ\text{C}$

- Notes: 1. $PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$
 2. Value at $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50 \Omega$
 3. $T_c = 25^\circ\text{C}$

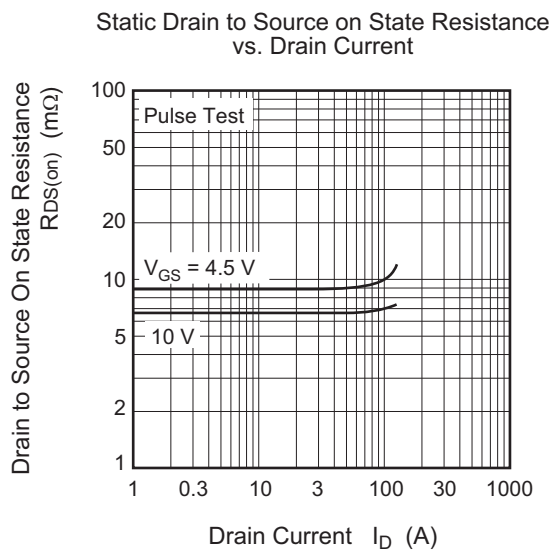
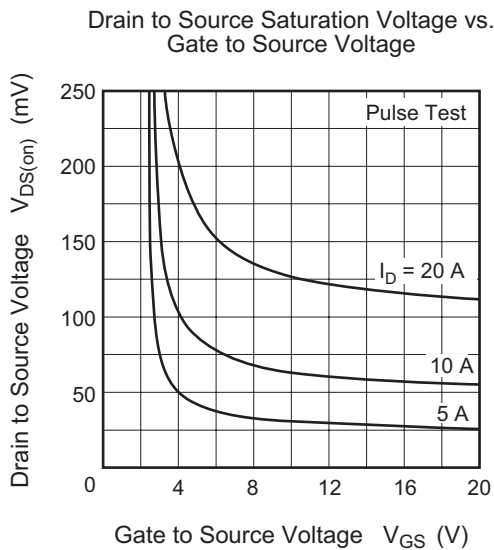
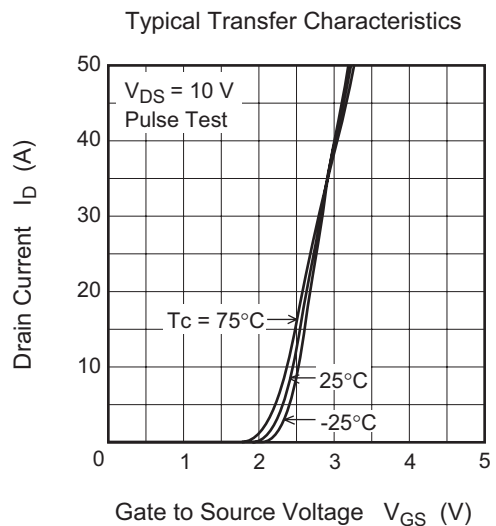
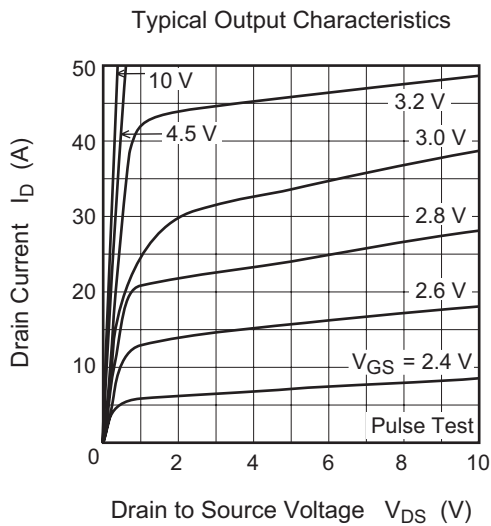
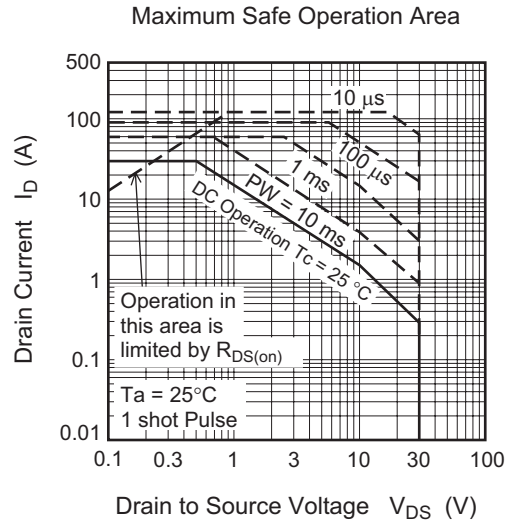
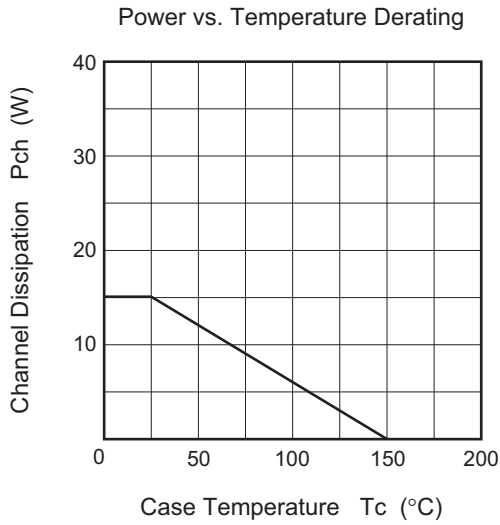
Electrical Characteristics

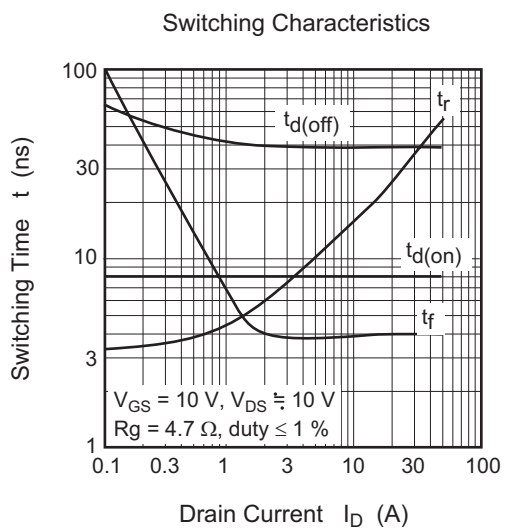
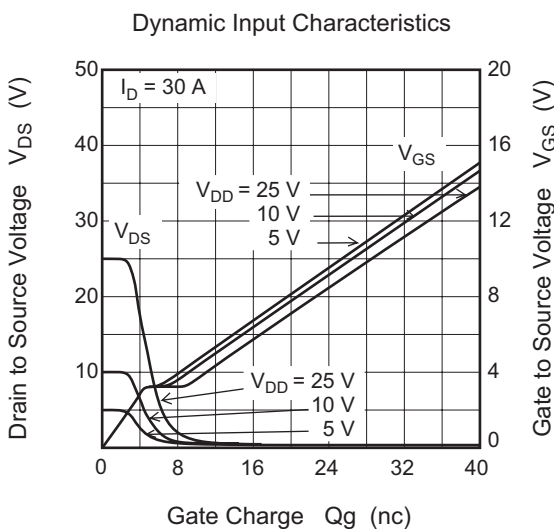
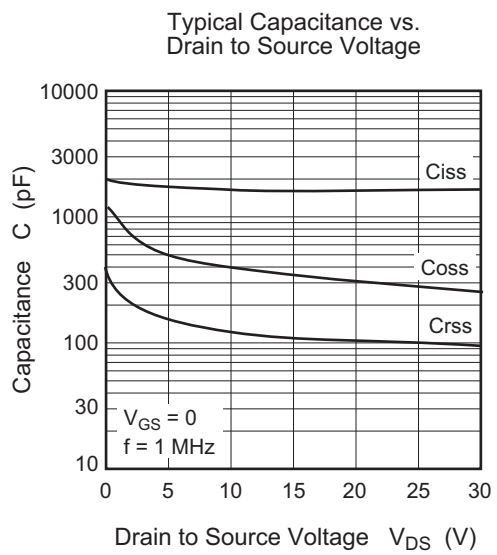
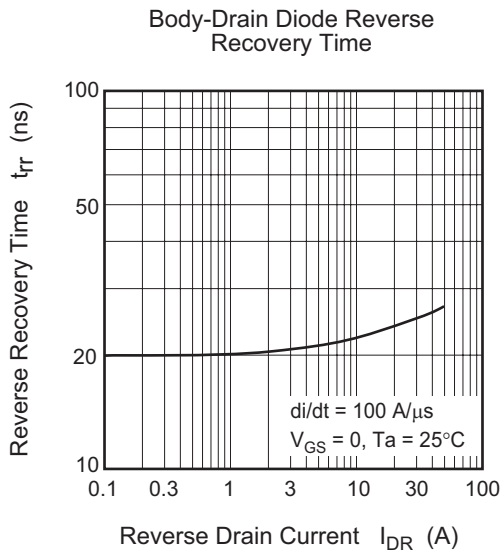
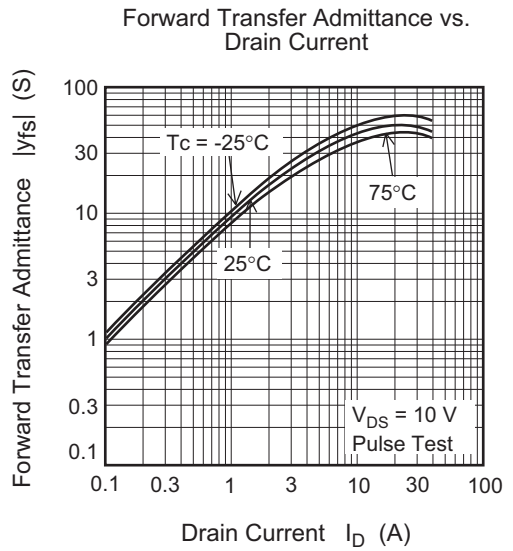
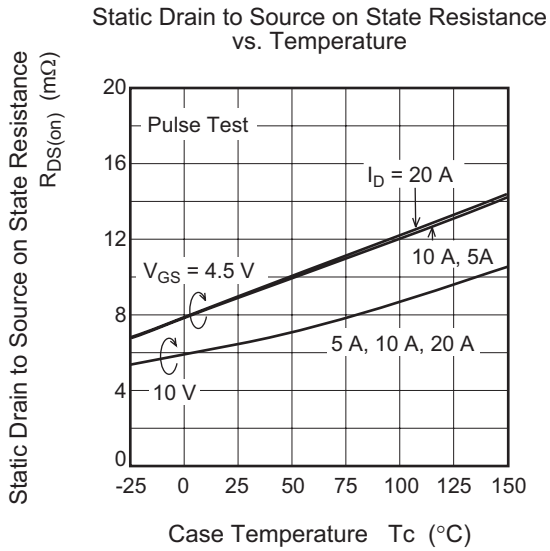
(Ta = 25°C)

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 breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$
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	$R_{DS(on)}$	—	6.3	8.2	$\text{m}\Omega$	$I_D = 15 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	9.1	13.8	$\text{m}\Omega$	$I_D = 15 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	30	50	—	S	$I_D = 15 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	1730	—	pF	$V_{DS} = 10 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	400	—	pF	
Reverse transfer capacitance	C_{rss}	—	130	—	pF	
Gate Resistance	R_g	—	0.55	—	Ω	
Total gate charge	Q_g	—	11	—	nc	$V_{DD} = 10 \text{ V}$ $V_{GS} = 4.5 \text{ V}$ $I_D = 30 \text{ A}$
Gate to source charge	Q_{gs}	—	5	—	nc	
Gate to drain charge	Q_{gd}	—	2.4	—	nc	
Turn-on delay time	$t_{d(on)}$	—	8	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 15 \text{ A}$
Rise time	t_r	—	20	—	ns	$V_{DD} \cong 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	40	—	ns	$R_L = 0.67 \text{ }\Omega$
Fall time	t_f	—	4	—	ns	$R_g = 4.7 \text{ }\Omega$
Body-drain diode forward voltage	V_{DF}	—	0.85	1.10	V	$I_F = 30 \text{ A}$, $V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	25	—	ns	$I_F = 30 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

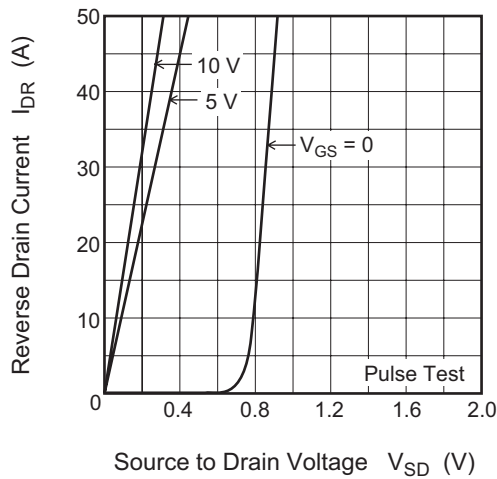
Notes: 4. Pulse test

Main Characteristics

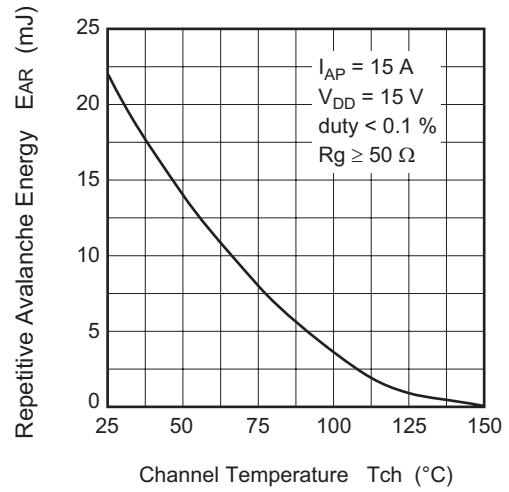




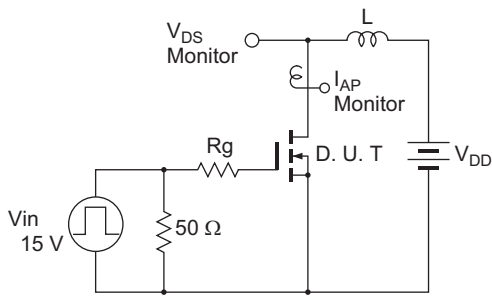
Reverse Drain Current vs. Source to Drain Voltage



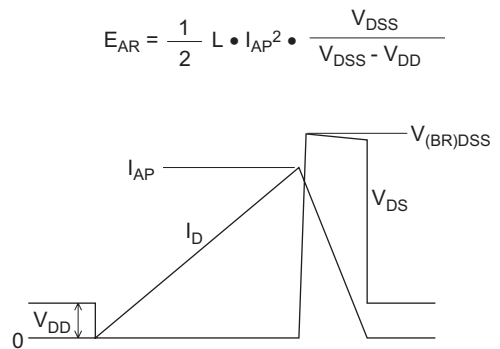
Maximum Avalanche Energy vs. Channel Temperature Derating



Avalanche Test Circuit

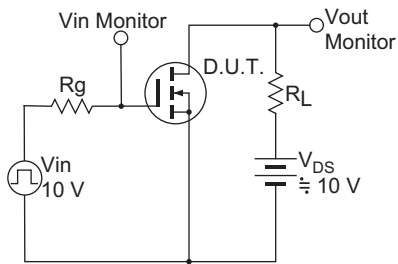


Avalanche Waveform

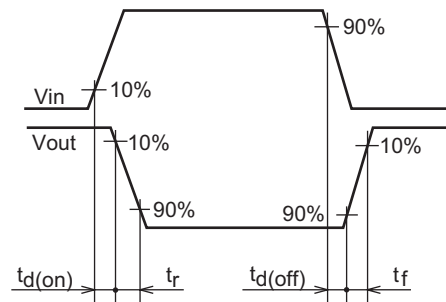


$$E_{AR} = \frac{1}{2} L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$

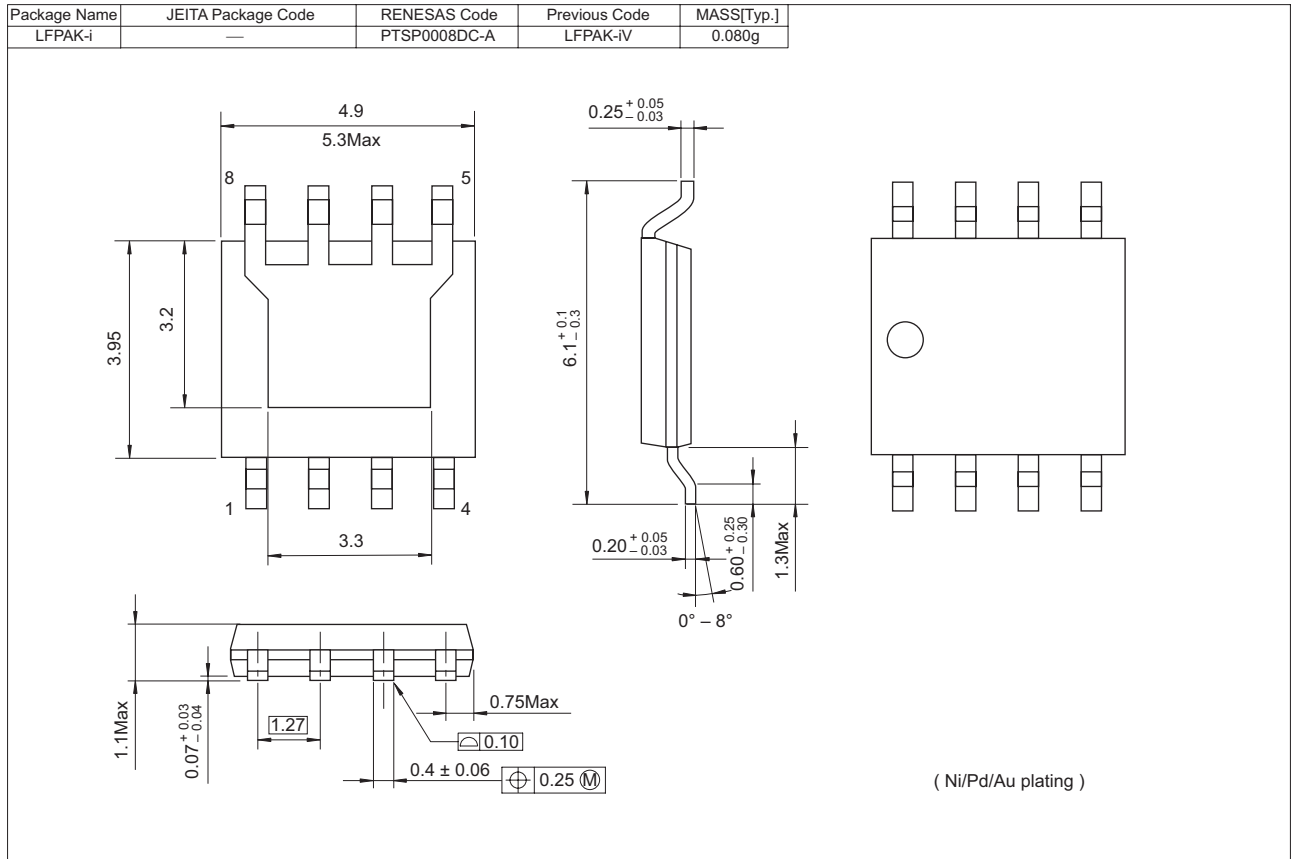
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

Part No.	Quantity	Shipping Container
HAT2168N-EL-E	2500 pcs	Taping

Notes:

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