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April 1st, 2010
Renesas Electronics Corporation

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

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HAT2170H

Silicon N Channel MOS FET Power Switching

REJ03G0121-0500
Rev.5.00
Sep 26, 2005

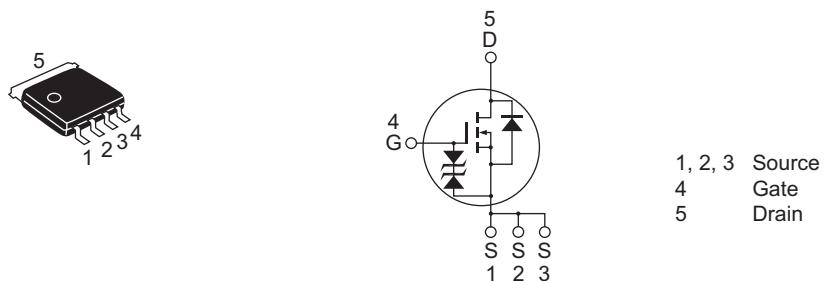
Features

- High speed switching
- Capable of 7 V gate drive
- Low drive current
- High density mounting
- Low on-resistance

$R_{DS(on)} = 3.3 \text{ m}\Omega \text{ typ. (at } V_{GS} = 10 \text{ V)}$

Outline

RENESAS Package code: PTZZ0005DA-A)
(Package name: LFPAK)



Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	40	V
Gate to source voltage	V_{GSS}	± 20	V
Drain current	I_D	45	A
Drain peak current	$I_{D(\text{pulse})}$ ^{Note1}	180	A
Body-drain diode reverse drain current	I_{DR}	45	A
Avalanche current	I_{AP} ^{Note2}	30	A
Avalanche energy	E_{AR} ^{Note2}	72	mJ
Channel dissipation	P_{ch} ^{Note3}	30	W
Channel to Case Thermal Resistance	θ_{ch-C}	4.17	°C/W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%

2. Value at $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50 \Omega$

3. $T_c = 25^\circ\text{C}$

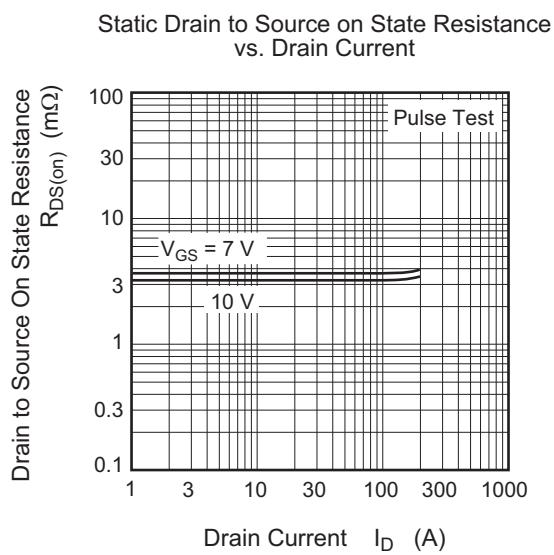
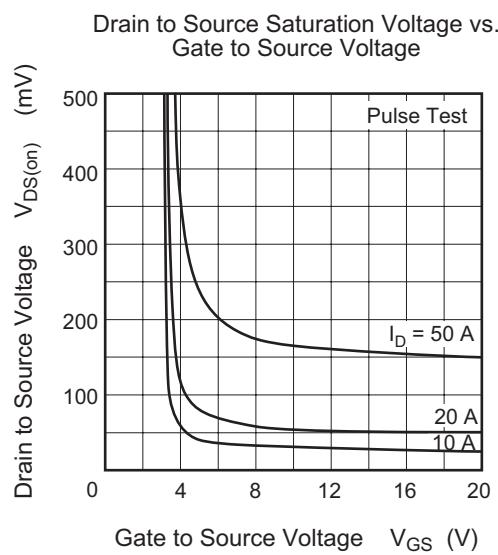
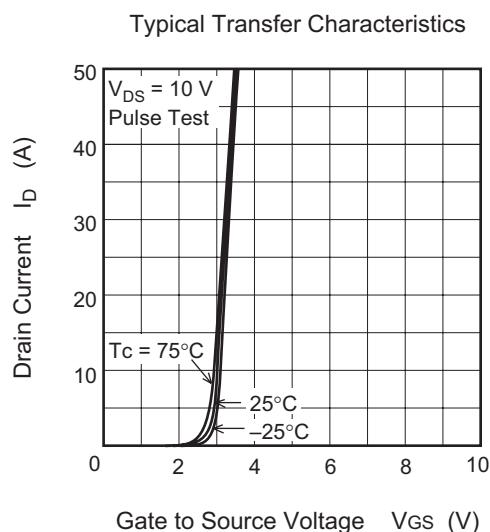
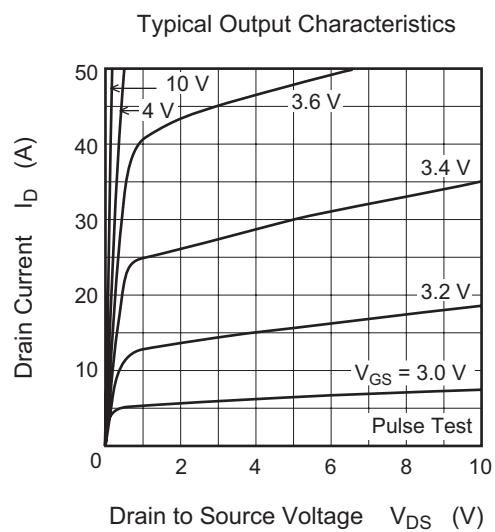
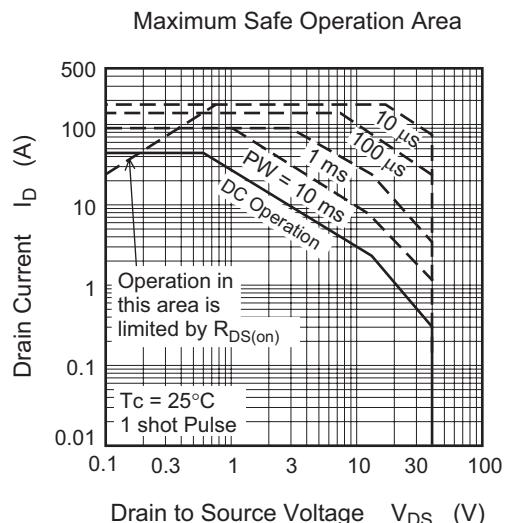
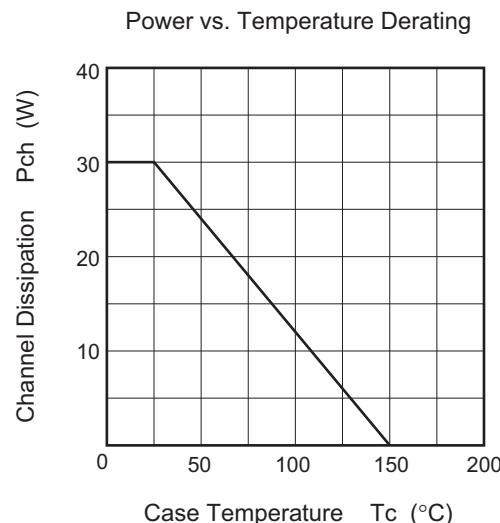
Electrical Characteristics

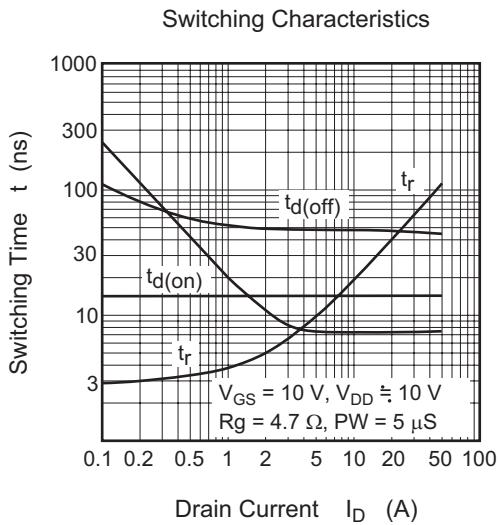
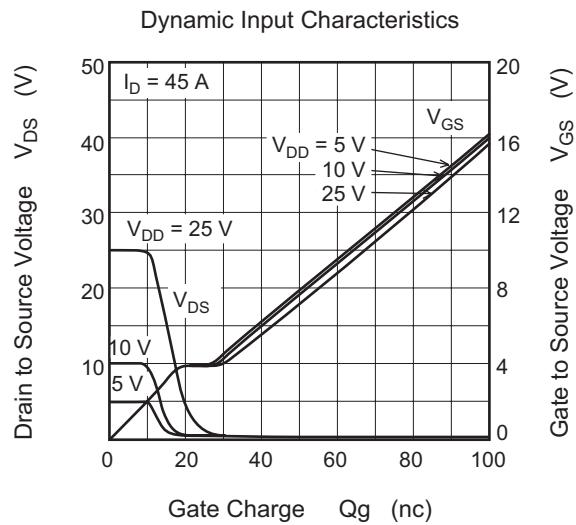
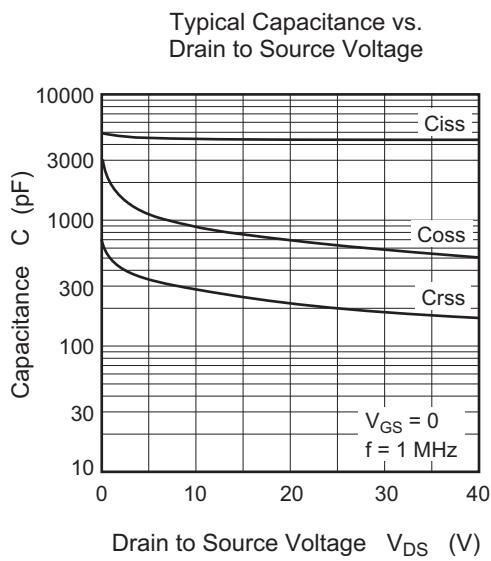
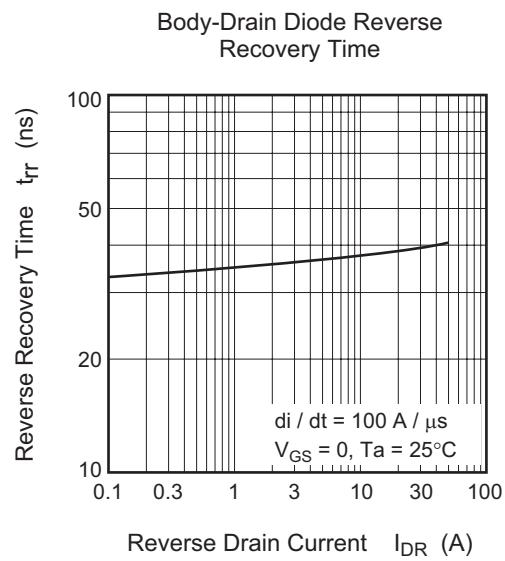
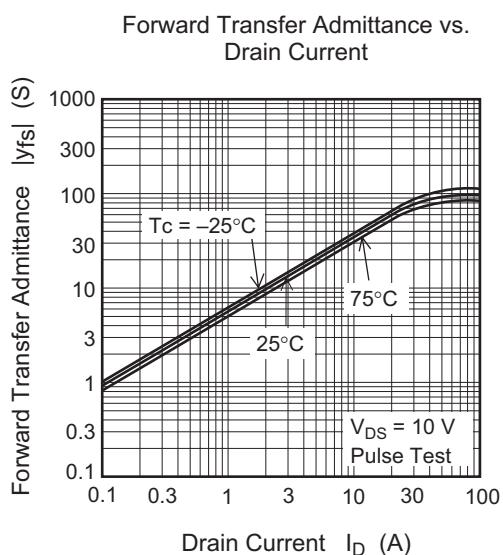
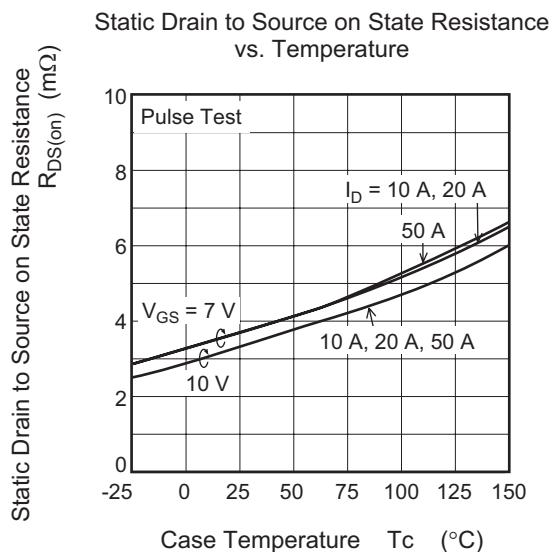
(Ta = 25°C)

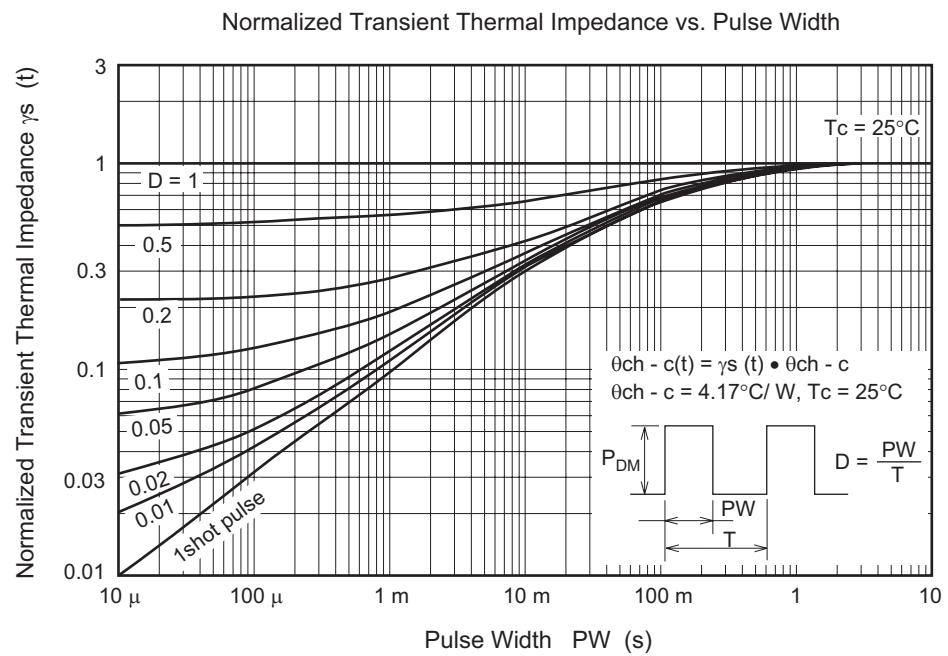
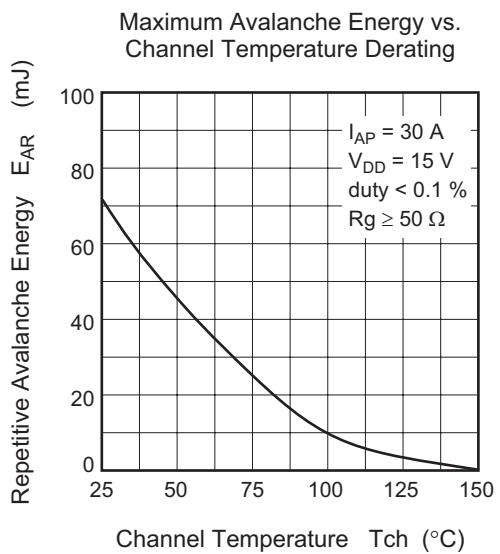
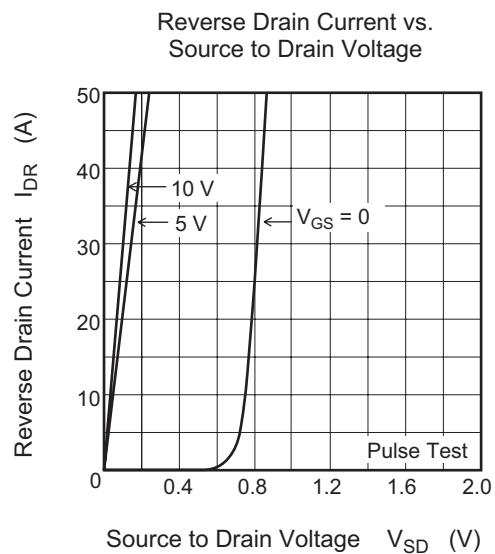
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V _{(BR)DSS}	40	—	—	V	I _D = 10 mA, V _{GS} = 0
Gate to source breakdown voltage	V _{(BR)GSS}	±20	—	—	V	I _G = ±100 μA, V _{DS} = 0
Gate to source leak current	I _{GSS}	—	—	±10	μA	V _{GS} = ±16 V, V _{DS} = 0
Zero gate voltage drain current	I _{DSS}	—	—	1	μA	V _{DS} = 40 V, V _{GS} = 0
Gate to source cutoff voltage	V _{GS(off)}	1.5	—	3.0	V	V _{DS} = 10 V, I _D = 1 mA
Static drain to source on state resistance	R _{DS(on)}	—	3.3	4.2	mΩ	I _D = 22.5 A, V _{GS} = 10 V ^{Note4}
	R _{DS(on)}	—	3.7	5.0	mΩ	I _D = 22.5 A, V _{GS} = 7 V ^{Note4}
Forward transfer admittance	y _{fs}	39	65	—	S	I _D = 22.5 A, V _{DS} = 10 V ^{Note4}
Input capacitance	C _{iss}	—	4650	—	pF	V _{DS} = 10 V, V _{GS} = 0, f = 1 MHz
Output capacitance	C _{oss}	—	900	—	pF	
Reverse transfer capacitance	C _{rss}	—	285	—	pF	
Gate Resistance	R _g	—	0.5	—	Ω	
Total gate charge	Q _g	—	62	—	nC	V _{DD} = 10 V, V _{GS} = 10 V, I _D = 45 A
Gate to source charge	Q _{gs}	—	18	—	nC	
Gate to drain charge	Q _{gd}	—	7.0	—	nC	
Turn-on delay time	t _{d(on)}	—	15	—	ns	V _{GS} = 10 V, I _D = 22.5 A, V _{DD} ≈ 10 V, R _L = 0.44 Ω, R _g = 4.7 Ω
Rise time	t _r	—	43	—	ns	
Turn-off delay time	t _{d(off)}	—	44	—	ns	
Fall time	t _f	—	7.1	—	ns	
Body-drain diode forward voltage	V _{DF}	—	0.84	1.1	V	I _F = 45 A, V _{GS} = 0 ^{Note4}
Body-drain diode reverse recovery time	t _{rr}	—	40	—	ns	I _F = 45 A, V _{GS} = 0, di _F /dt = 100 A/μs

Notes: 4. Pulse test

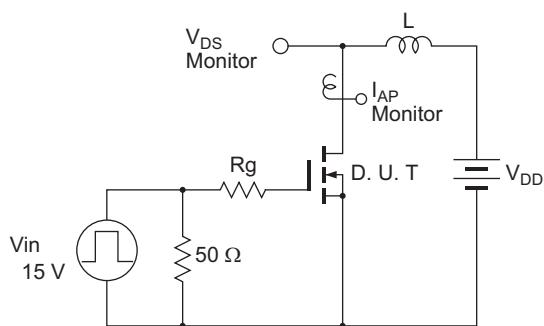
Main Characteristics



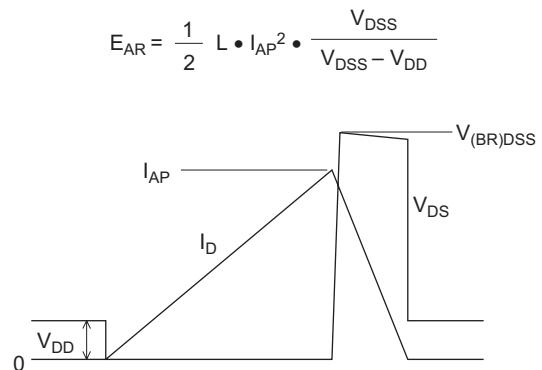


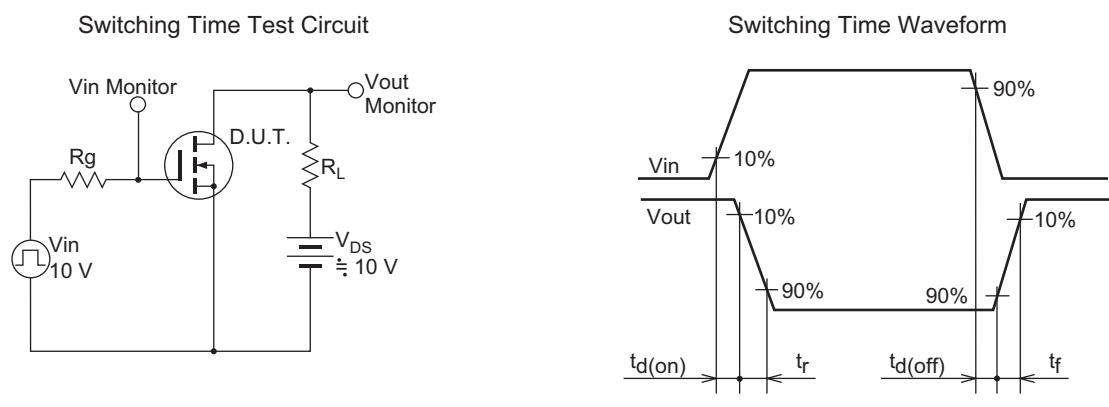


Avalanche Test Circuit



Avalanche Waveform





Package Dimensions

JEITA Package Code SC-100	RENESAS Code PTZZ005DA-A	Package Name LFPAK	MASS(Typ.) 0.080g	Unit: mm

(Ni/Pd/Au plating)

Ordering Information

Part Name	Quantity	Shipping Container
HAT2170H-EL-E	2500 pcs.	Emboss Taping

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