



HAT2099H

Silicon N Channel Power MOS FET
Power Switching

REJ03G1187-0500
(Previous: ADE-208-1432C)

Rev.5.00

Sep 07, 2005

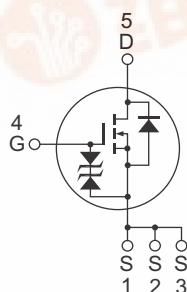
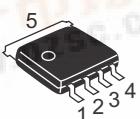
Features

- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance

$R_{DS(on)} = 2.9 \text{ m}\Omega \text{ typ. (at } V_{GS} = 10 \text{ V)}$

Outline

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



1, 2, 3 Source
4 Gate
5 Drain

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V _{DSS}	30	V
Gate to source voltage	V _{GSS}	±20	V
Drain current	I _D	50	A
Drain peak current	I _D (pulse) ^{Note 1}	200	A
Body-drain diode reverse drain current	I _{DR}	50	A
Avalanche current	I _{AP} ^{Note 3}	5	A
Avalanche energy	E _{AR} ^{Note 3}	2.5	mJ
Channel dissipation	P _{ch} ^{Note 2}	30	W
Channel temperature	T _{ch}	150	°C
Storage temperature	T _{stg}	-55 to +150	°C

Notes: 1. PW ≤ 10 µs, duty cycle ≤ 1%

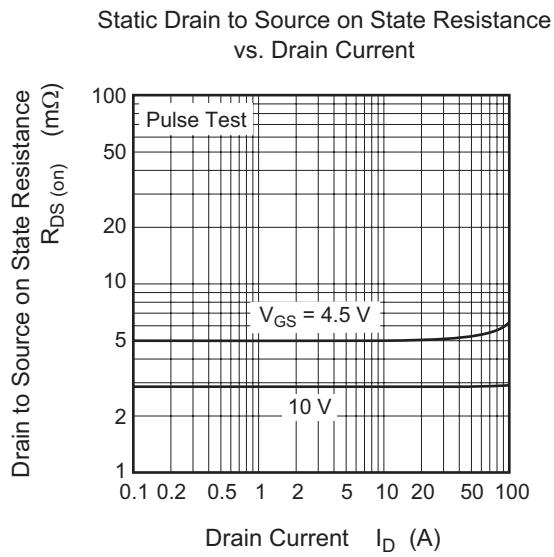
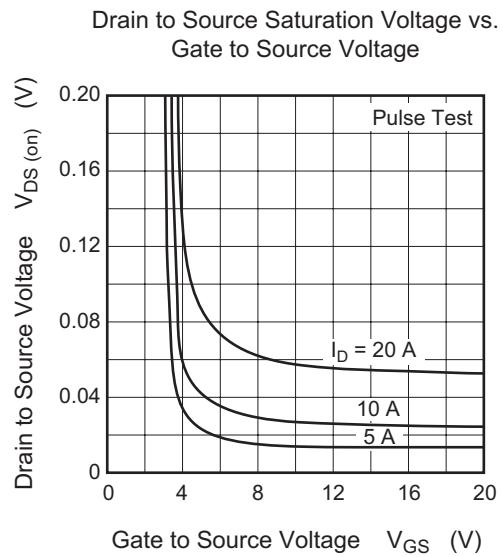
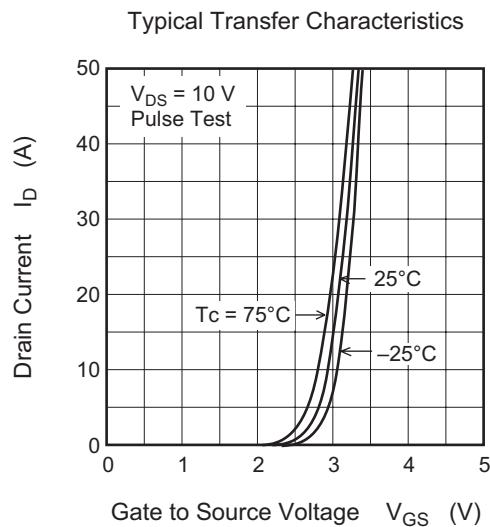
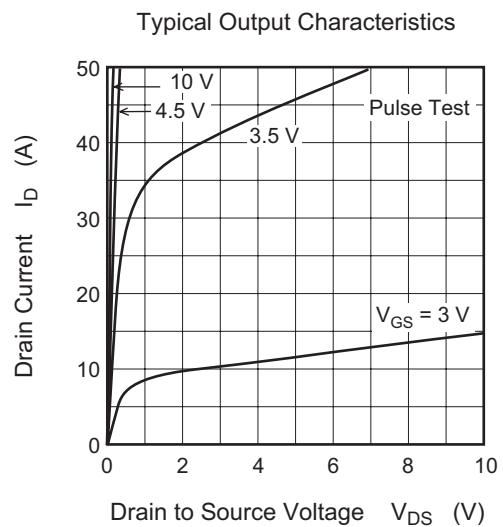
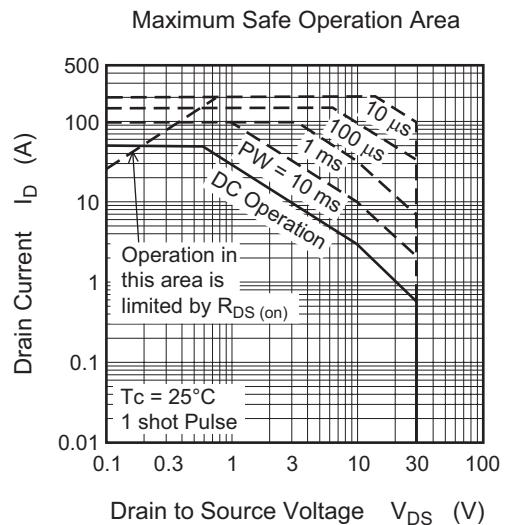
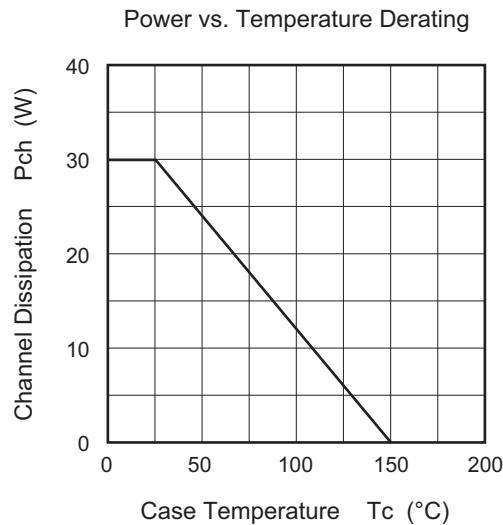
2. T_c = 25 °C3. Value at T_{ch} = 25°C, R_g ≥ 50 Ω**Electrical Characteristics**

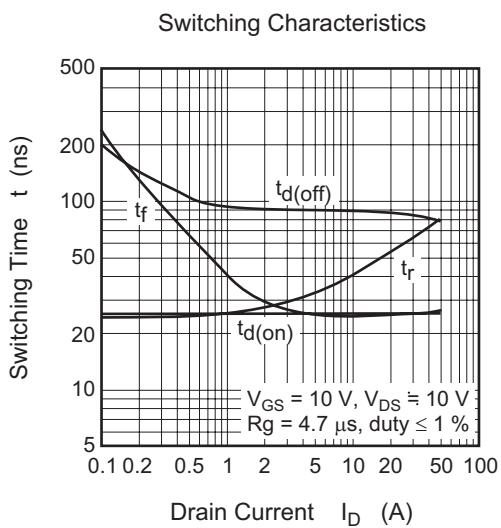
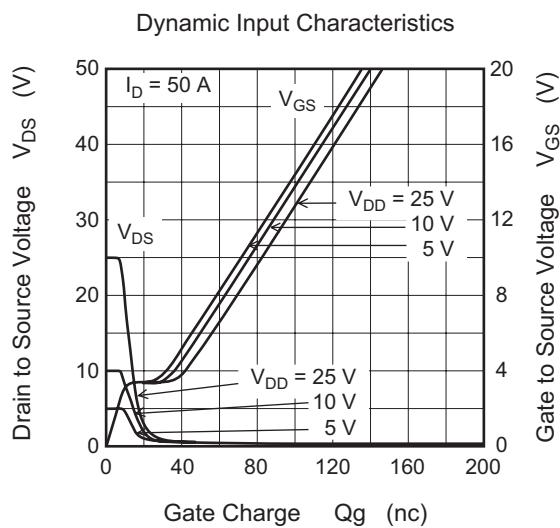
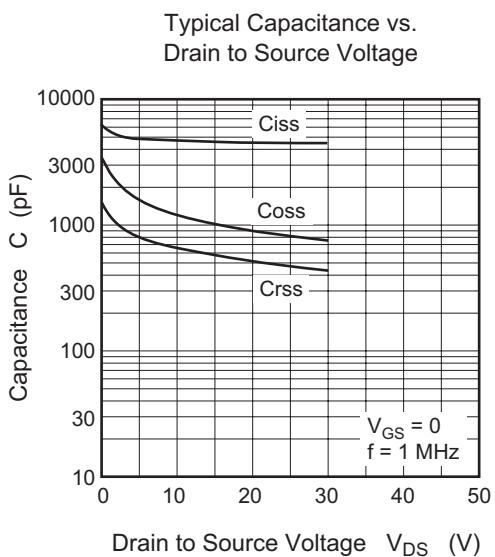
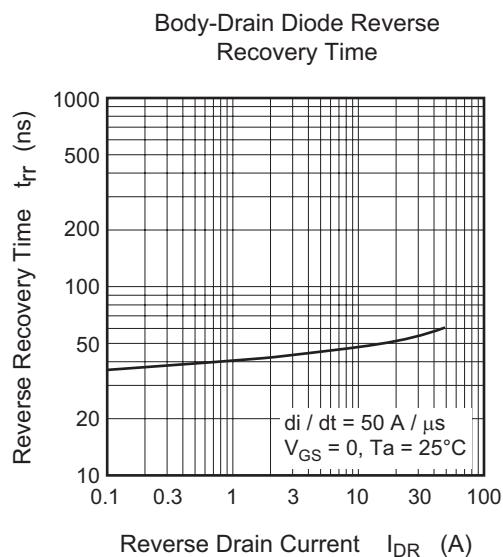
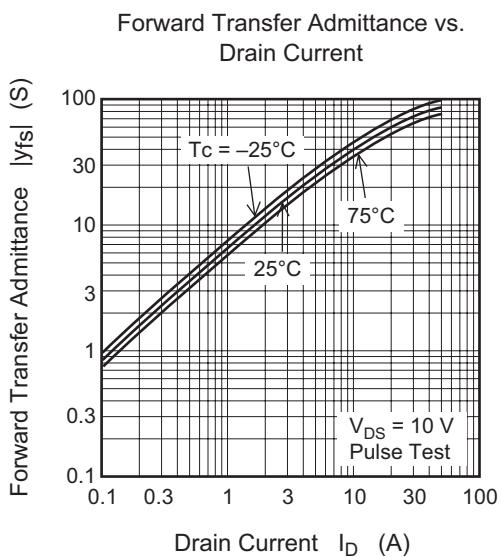
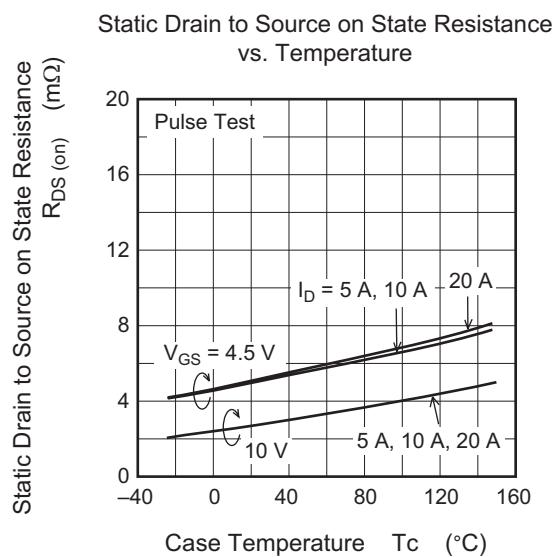
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V _{(BR) DSS}	30	—	—	V	I _D = 10 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} = 30 V, V _{GS} = 0
Gate to source cutoff voltage	V _{GS (off)}	1.0	—	2.5	V	V _{DS} = 10 V, I _D = 1 mA
Static drain to source on state resistance	R _{DS (on)}	—	2.9	3.7	mΩ	I _D = 25 A, V _{GS} = 10 V ^{Note 4}
	R _{DS (on)}	—	5.0	7.3	mΩ	I _D = 25 A, V _{GS} = 4.5 V ^{Note 4}
Forward transfer admittance	y _{fs}	39	65	—	S	I _D = 25 A, V _{DS} = 10 V ^{Note 4}
Input capacitance	C _{iss}	—	4750	—	pF	V _{DS} = 10 V V _{GS} = 0 f = 1 MHz
Output capacitance	C _{oss}	—	1180	—	pF	
Reverse transfer capacitance	C _{rss}	—	650	—	pF	
Total gate charge	Q _g	—	75	—	nC	V _{DD} = 10 V V _{GS} = 10 V I _D = 50 A
Gate to source charge	Q _{gs}	—	16	—	nC	
Gate to drain charge	Q _{gd}	—	14	—	nC	
Turn-on delay time	t _{d (on)}	—	26	—	ns	V _{GS} = 10 V, I _D = 25 A V _{DD} ≈ 10 V R _L = 0.4 Ω R _g = 4.7 Ω
Rise time	t _r	—	60	—	ns	
Turn-off delay time	t _{d (off)}	—	85	—	ns	
Fall time	t _f	—	26	—	ns	
Body-drain diode forward voltage	V _{DF}	—	0.85	0.98	V	I _F = 50 A, V _{GS} = 0 ^{Note 4}
Body-drain diode reverse recovery time	t _{rr}	—	60	—	ns	I _F = 50 A, V _{GS} = 0 di _F /dt = 50 A/µs

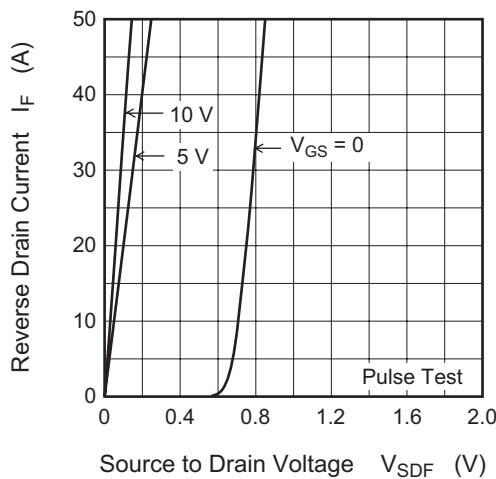
Note: 4. Pulse test

Main Characteristics

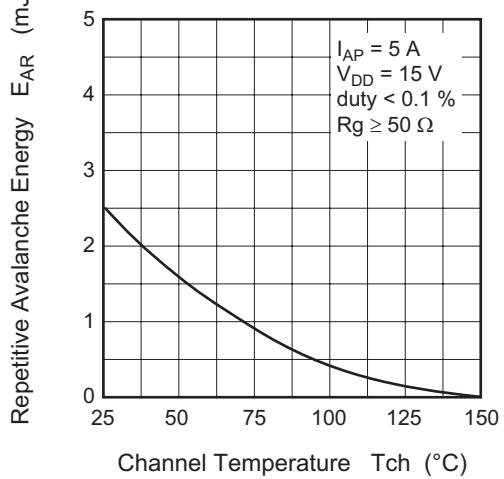




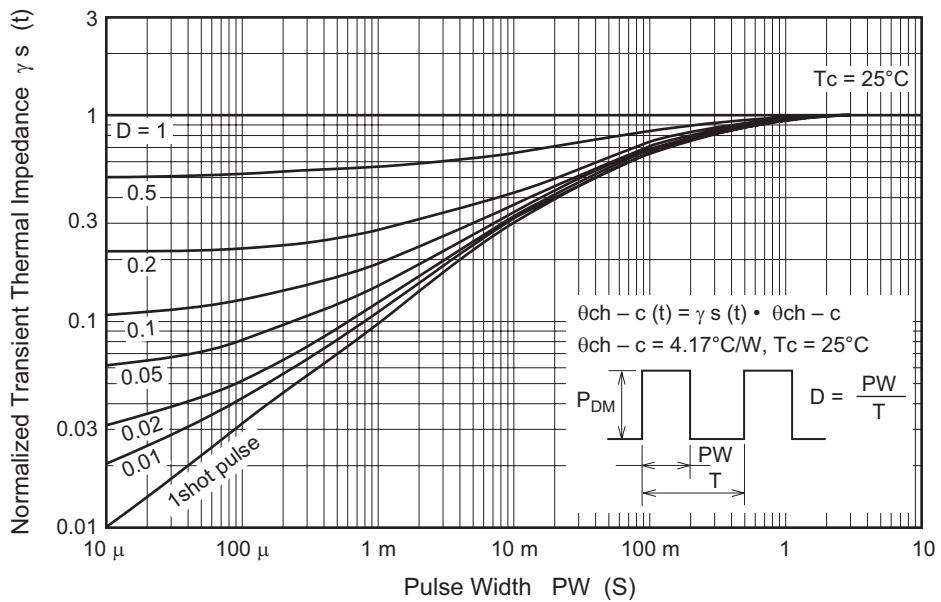
Reverse Drain Current vs.
Source to Drain Voltage



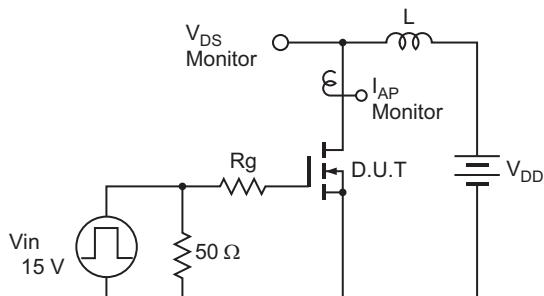
Maximum Avalanche Energy vs.
Channel Temperature Derating



Normalized Transient Thermal Impedance vs. Pulse Width

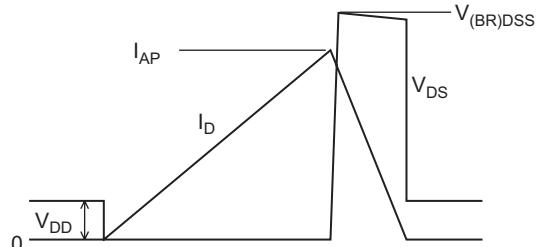


Avalanche Test Circuit

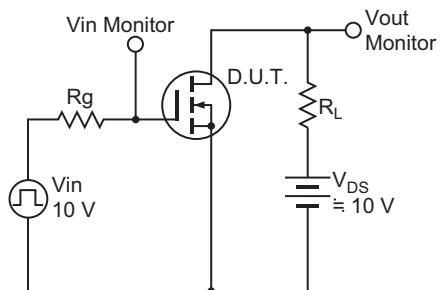


Avalanche Waveform

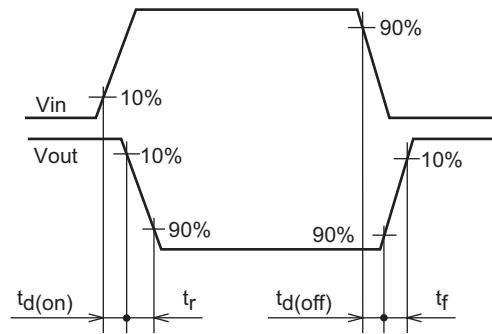
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Switching Time Test Circuit

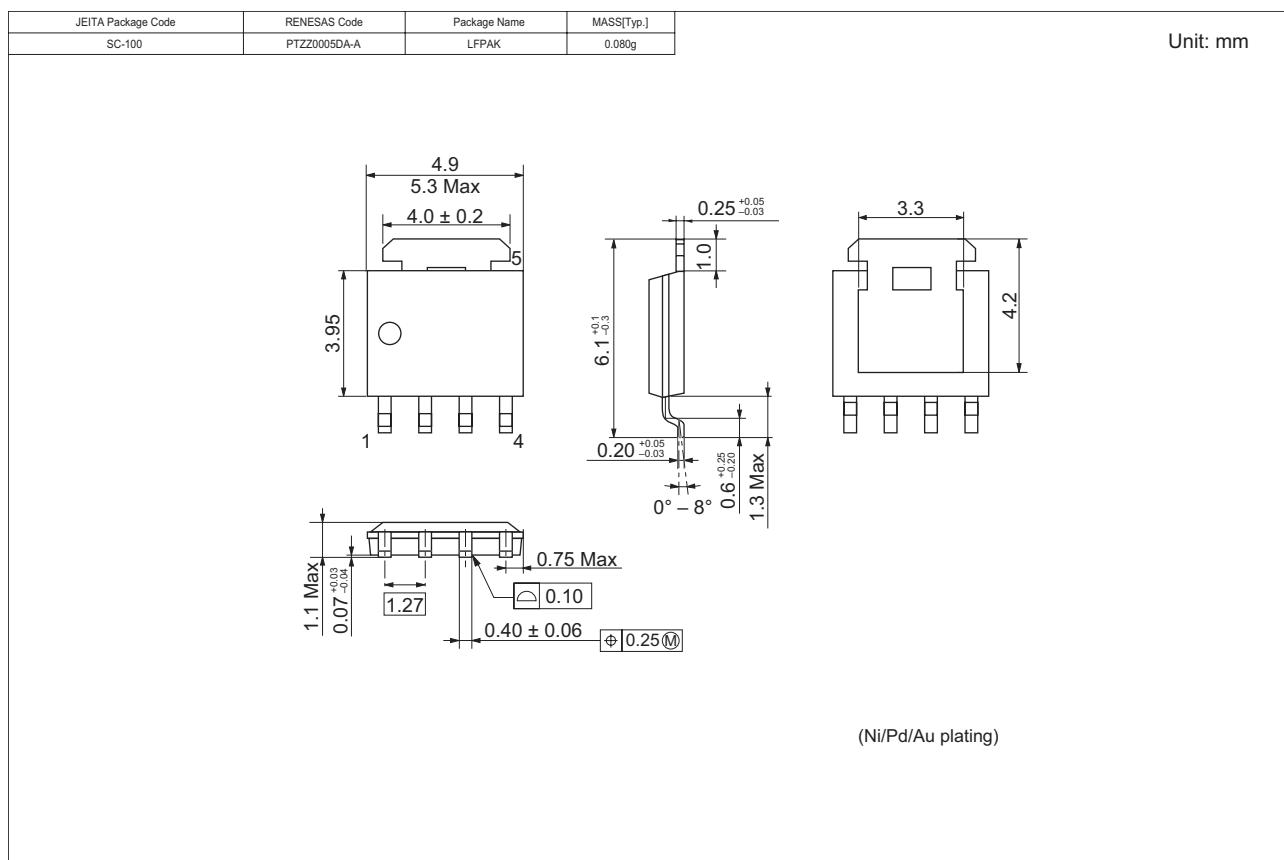


Switching Time Waveform



HAT2099H

Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAT2099H-EL-E	2500 pcs	Taping

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