To all our customers

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Keep safety first in your circuit designs!

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   Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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HAT2096H

Silicon N Channel Power MOS FET
Power Switching

ADE-208-1431B (Z)

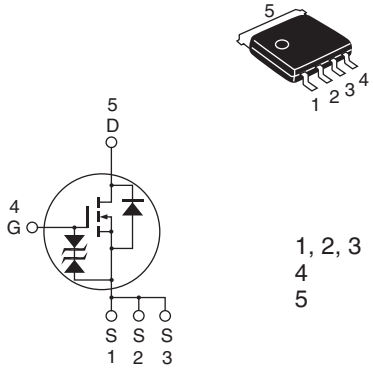
3rd. Edition
Aug. 2002

Features

- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
  $R_{DS(on)}$ = 4.2 mΩ typ. (at V_{GS} = 10 V)

Outline

LFPAK



1, 2, 3	Source
4	Gate
5	Drain

Absolute Maximum Ratings

(Ta = 25°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	40	A
Drain peak current	$I_{D(pulse)}$ Note1	160	A
Body-drain diode reverse drain current	I_{DR}	40	A
Channel dissipation	Pch Note2	20	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to + 150	°C

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%
2. Tc = 25°C

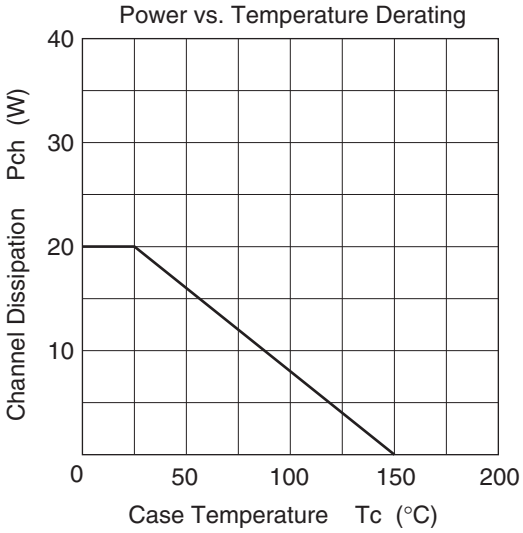
Electrical Characteristics

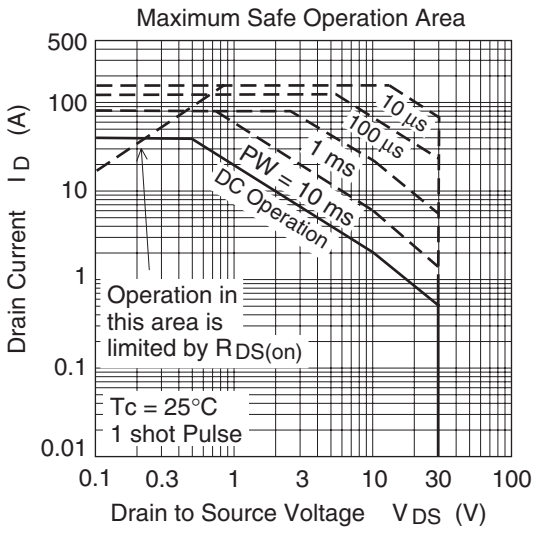
(Ta = 25°C)

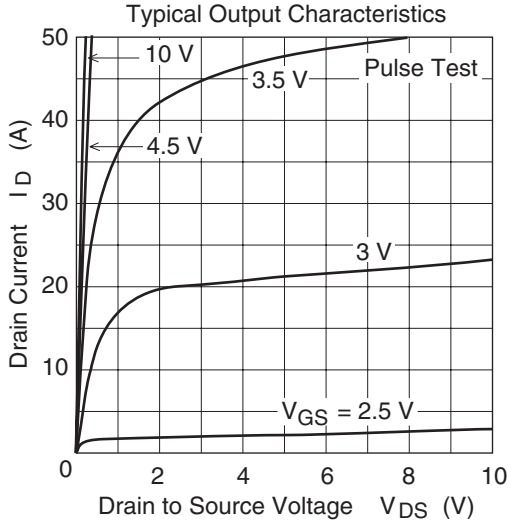
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	I_G = ±100 µA, V_{DS} = 0
Gate to source leak current	I_{GSS}	—	—	± 10	µA	V_{GS} = ±16 V, V_{DS} = 0
Zero gate voltege 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	$R_{DS(on)}$	—	4.2	5.3	mΩ	I_D = 20 A, V_{GS} = 10 V [Note3]
	$R_{DS(on)}$	—	7.0	10	mΩ	I_D = 20 A, V_{GS} = 4.5 V [Note3]
Forward transfer admittance	$\|y_{fs}\|$	30	50	—	S	I_D = 20 A, V_{DS} = 10 V [Note3]
Input capacitance	Ciss	—	2200	—	pF	V_{DS} = 10 V
Output capacitance	Coss	—	600	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	330	—	pF	f = 1 MHz
Total gate charge	Qg	—	40	—	nc	V_{DD} = 10 V
Gate to source charge	Qgs	—	7	—	nc	V_{GS} = 10 V
Gate to drain charge	Qgd	—	8	—	nc	I_D = 40 A
Turn-on delay time	$t_{d(on)}$	—	20	—	ns	V_{GS} = 10 V, I_D = 20 A
Rise time	t_r	—	49	—	ns	V_{DD} ≅ 10 V
Turn-off delay time	$t_{d(off)}$	—	62	—	ns	R_L = 0.5 Ω
Fall time	t_f	—	15	—	ns	Rg = 4.7 Ω
Body–drain diode forward voltage	V_{DF}	—	0.85	1.11	V	IF = 40 A, V_{GS} = 0 [Note3]
Body–drain diode reverse recovery time	t_{rr}	—	60	—	ns	IF = 40 A, V_{GS} = 0 diF/ dt = 50 A/ µs

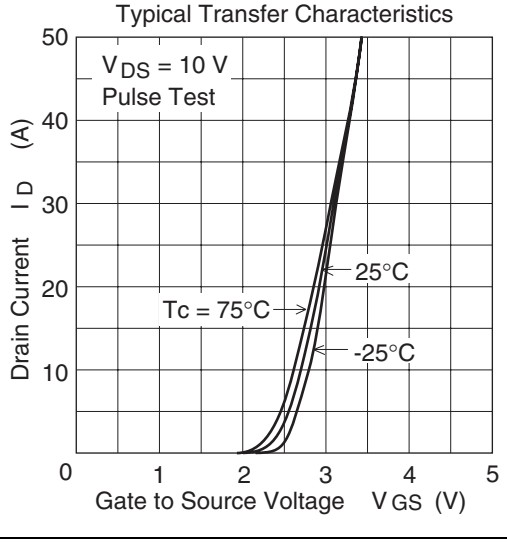
Notes: 3. Pulse test

Main Characteristics

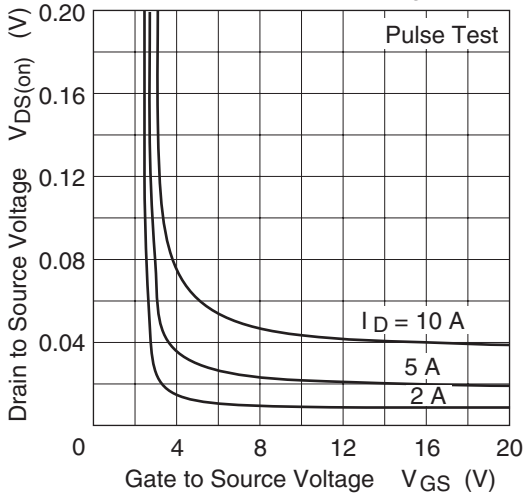




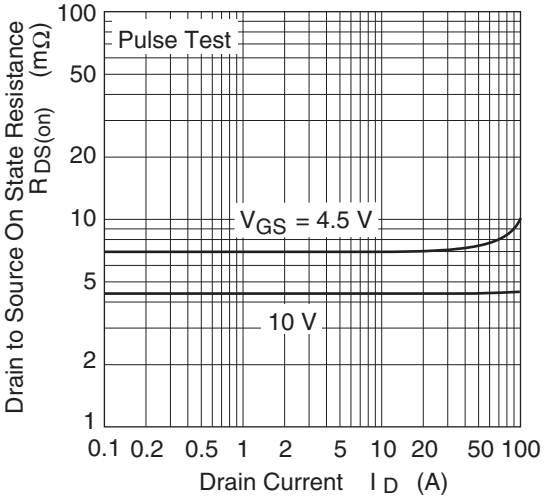




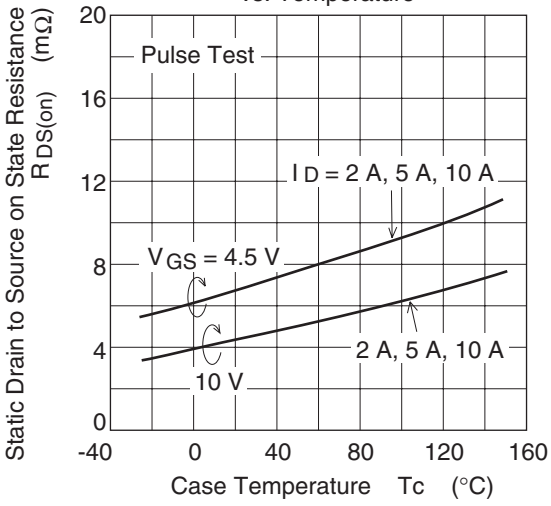
Drain to Source Saturation Voltage vs. Gate to Source Voltage



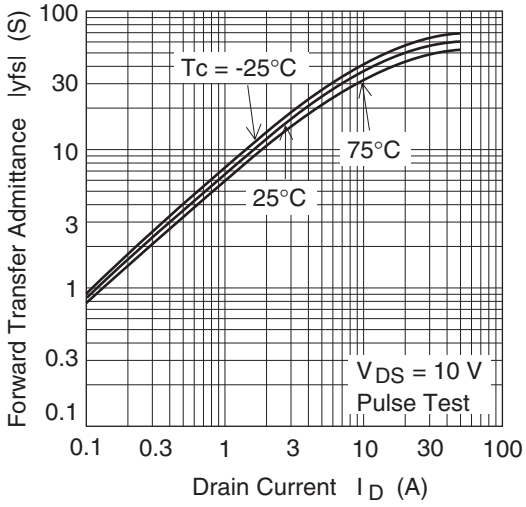
Static Drain to Source on State Resistance vs. Drain Current



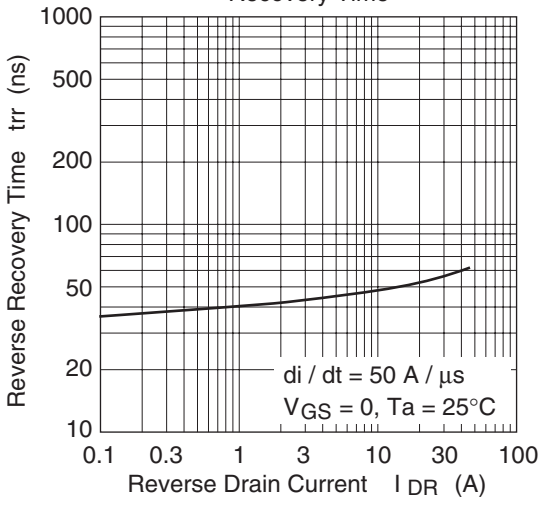
Static Drain to Source on State Resistance vs. Temperature



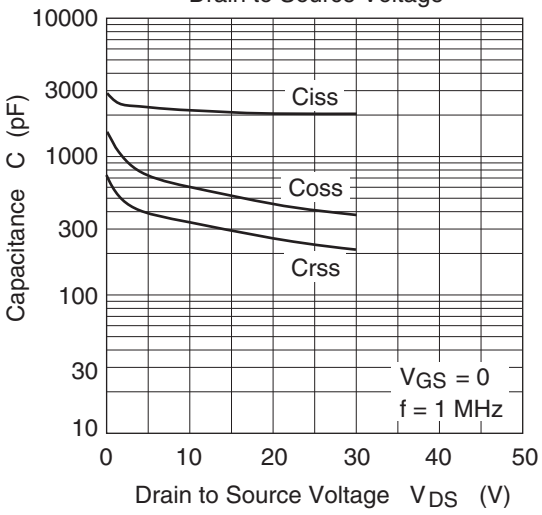
Forward Transfer Admittance vs. Drain Current



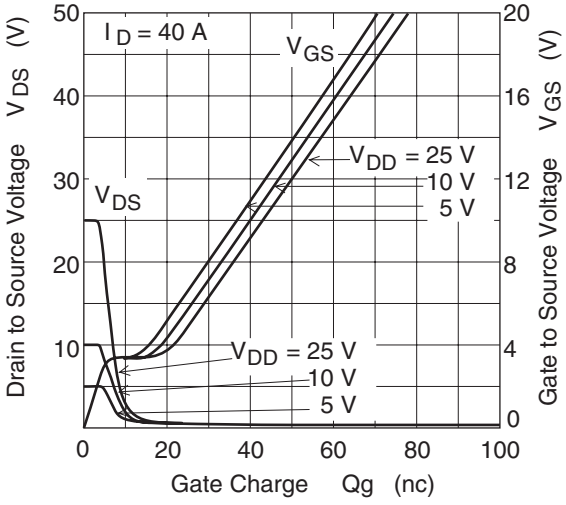
Body-Drain Diode Reverse Recovery Time



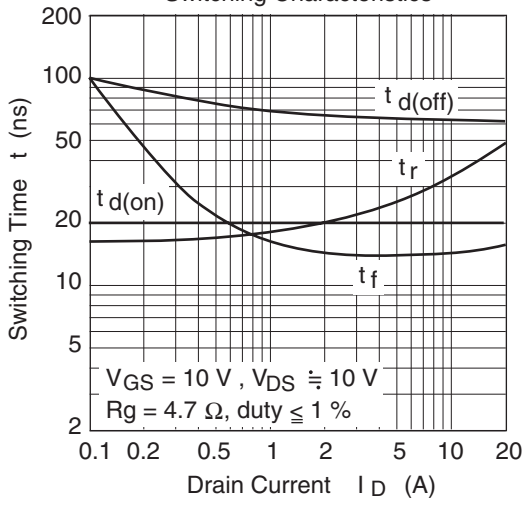
Typical Capacitance vs. Drain to Source Voltage



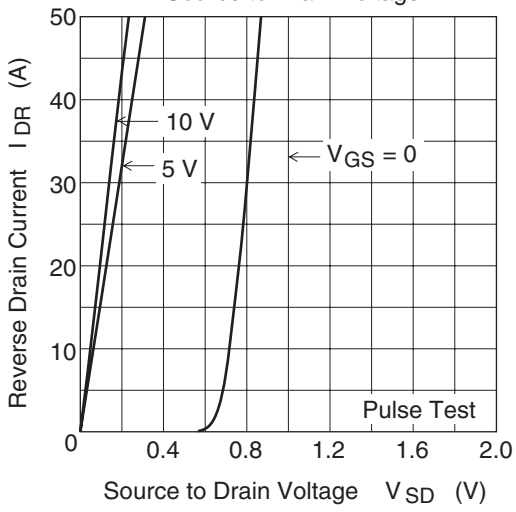
Dynamic Input Characteristics



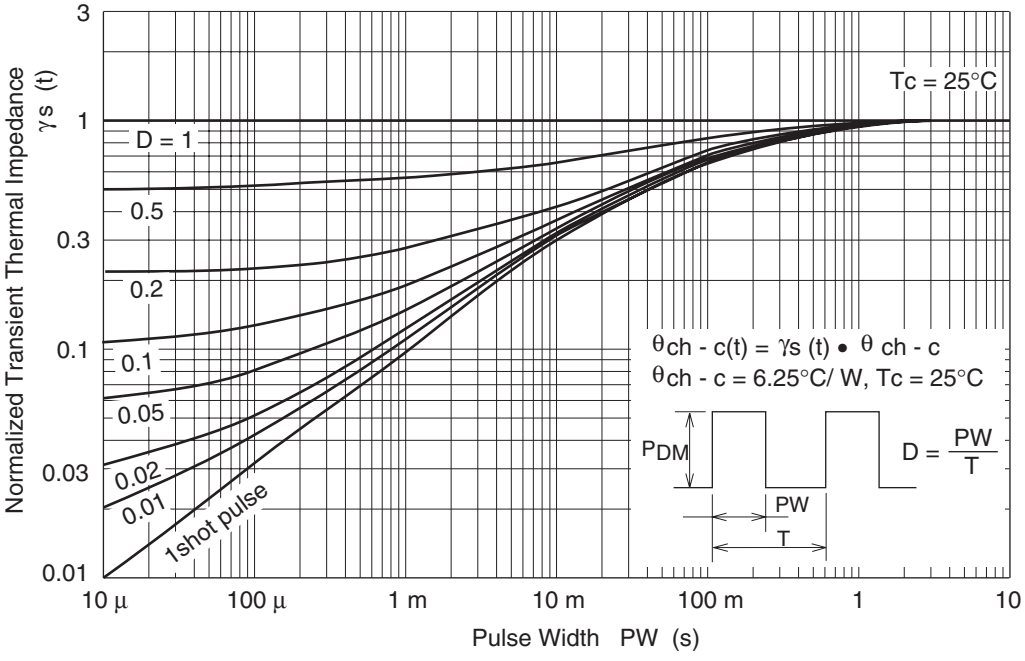
Switching Characteristics



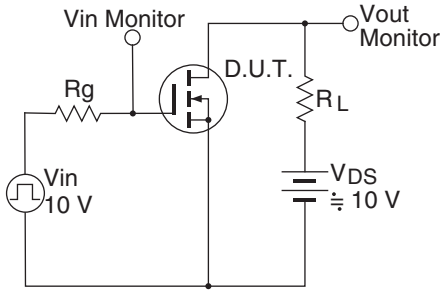
Reverse Drain Current vs.
Source to Drain Voltage



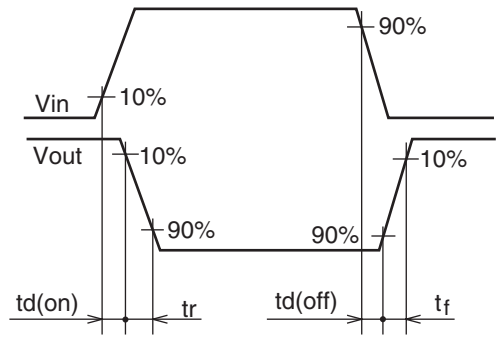
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



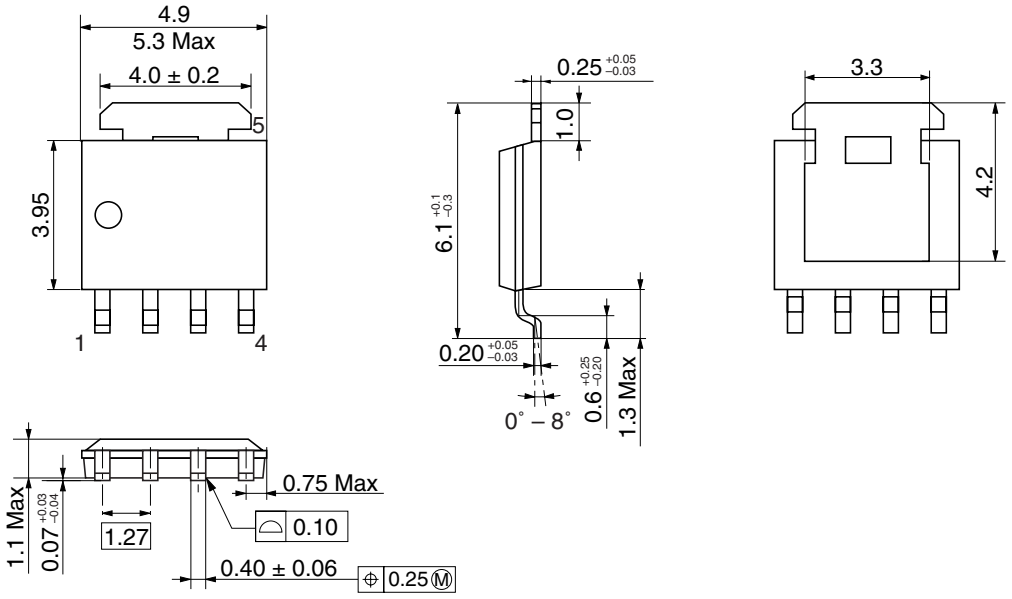
Switching Time Waveform



Package Dimensions

As of January, 2002

Unit: mm



Hitachi Code	LFPAK
JEDEC	—
JEITA	—
Mass (reference value)	0.080 g

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