

To all our customers

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

Cautions

Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.

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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H7N0602LD, H7N0602LS, H7N0602LM

Silicon N Channel MOS FET
High Speed Power Switching

RENESAS

ADE-208-1526C (Z)

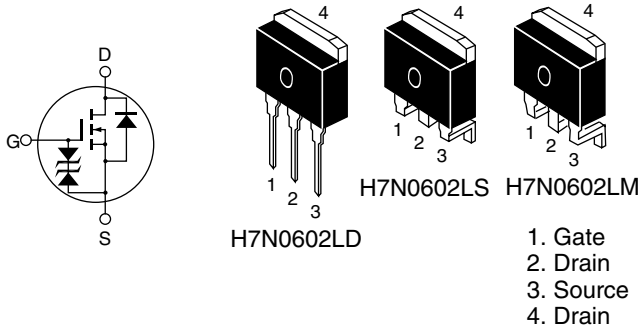
4th. Edition
May 2002

Features

- Low on-resistance
 $R_{DS(on)} = 4.1 \text{ m}\Omega$ typ.
- 4.5 V gate drive devices
- High Speed Switching

Outline

LDBPAK



Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	60	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	85	A
Drain peak current	I_D (pulse) ^{Note1}	340	A
Body-drain diode reverse drain current	I_{DR}	85	A
Avalanche current	I_{AP} ^{Note3}	65	A
Avalanche energy	E_{AR} ^{Note3}	362	mJ
Channel dissipation	Pch ^{Note2}	100	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

Notes: 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$

2. Value at Tc = 25°C

3. Value at Tch = 25°C, Rg $\geq 50 \Omega$

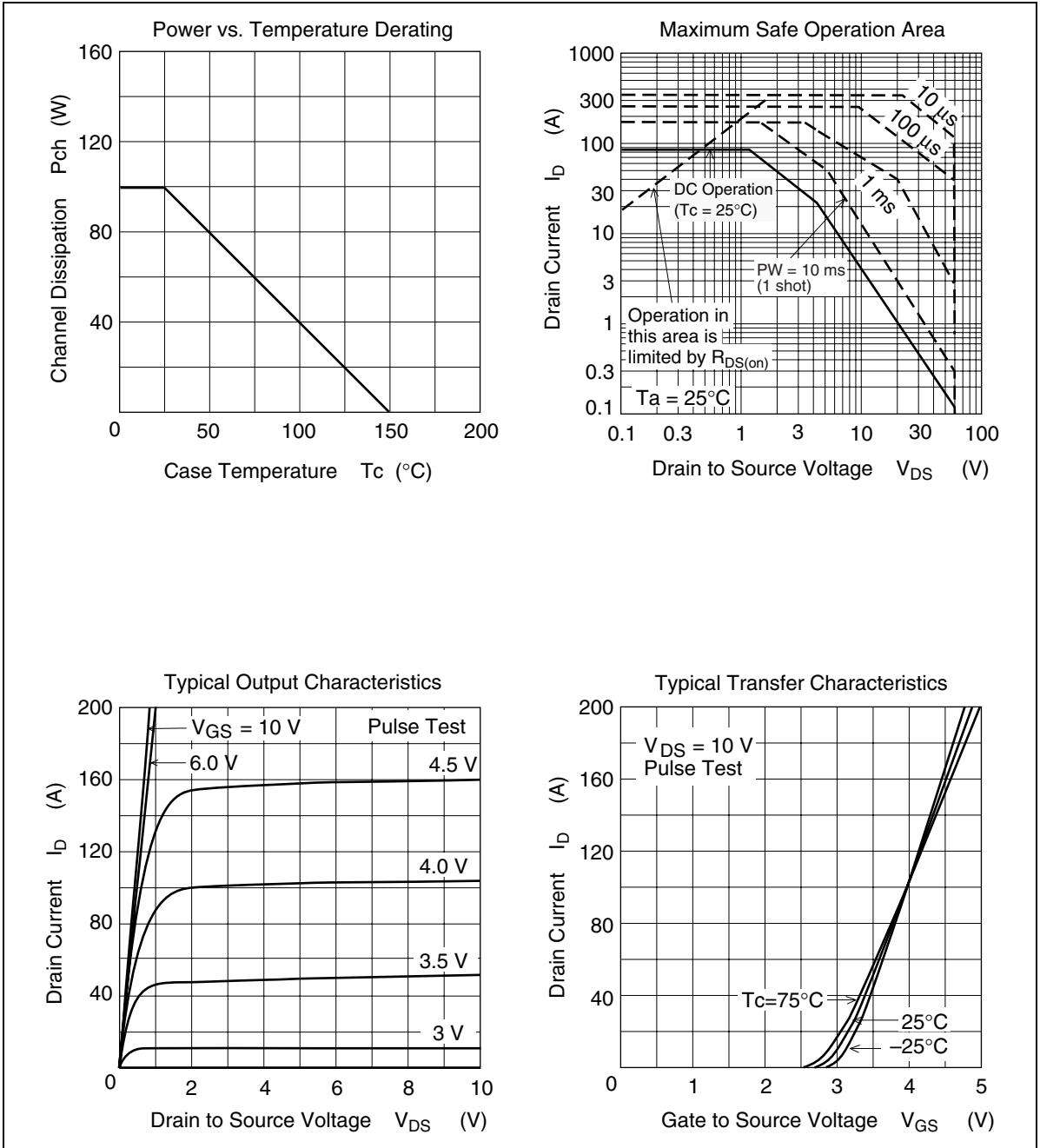
Electrical Characteristics

(Ta = 25°C)

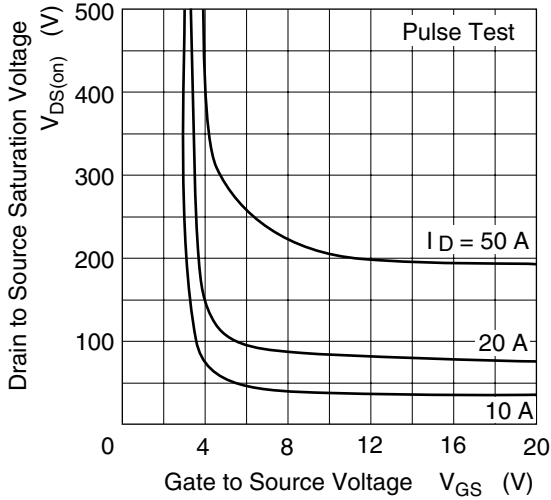
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	$I_G = \pm 100 \mu\text{A}, V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 60 \text{ V}, V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	±10	μA	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.5	—	2.5	V	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}^{\text{Note 1}}$
Forward transfer admittance	$ y_{fs} $	70	120	—	S	$I_D = 45 \text{ A}, V_{DS} = 10 \text{ V}^{\text{Note 1}}$
Static drain to source on state resistance	$R_{DS(on)}$	—	4.1	5.2	mΩ	$I_D = 45 \text{ A}, V_{GS} = 10 \text{ V}^{\text{note 1}}$
Static drain to source on state resistance	$R_{DS(on)}$	—	6.2	9.0	mΩ	$I_D = 45 \text{ A}, V_{GS} = 4.5 \text{ V}^{\text{Note 1}}$
Input capacitance	C_{iss}	—	9000	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	1000	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	470	—	pF	$f = 1 \text{ MHz}$
Total gate charge	Q_g	—	140	—	nc	$V_{DD} = 25 \text{ V}$
Gate to source charge	Q_{gs}	—	30	—	nc	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	30	—	nc	$I_D = 85 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	55	—	ns	$V_{GS} = 10 \text{ V}$
Rise time	t_r	—	290	—	ns	$I_D = 45 \text{ A}$
Turn-off delay time	$t_{d(off)}$	—	140	—	ns	$R_L = 0.67 \Omega$
Fall time	t_f	—	50	—	ns	$R_g = 4.7 \Omega$
Body-drain diode forward voltage	V_{DF}	—	0.95	—	V	$I_F = 85 \text{ A}, V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	45	—	ns	$I_F = 85 \text{ A}, V_{GS} = 0$ $diF/dt = 100 \text{ A}/\mu\text{s}$

Notes: 1. Pulse test

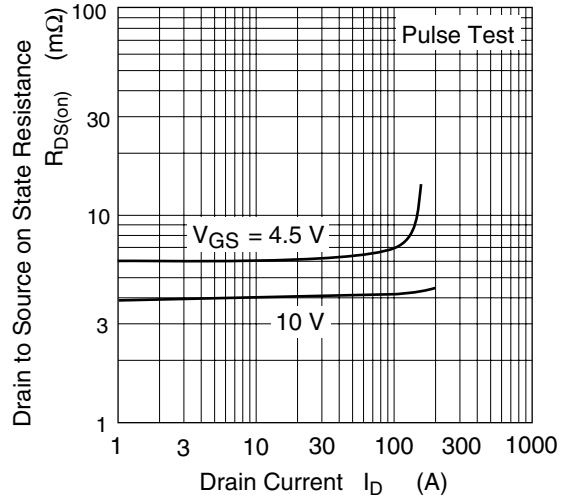
Main Characteristics



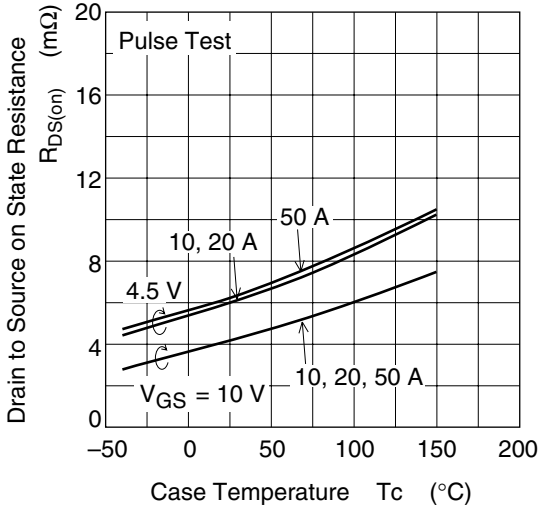
Drain to Source Saturation Voltage vs. Gate to Source Voltage



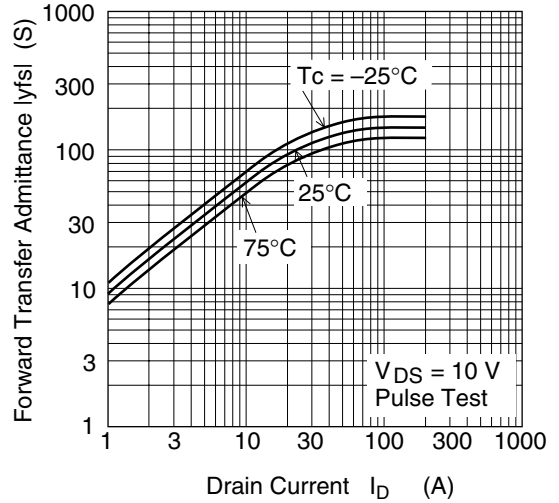
Static Drain to Source on State Resistance vs. Drain Current



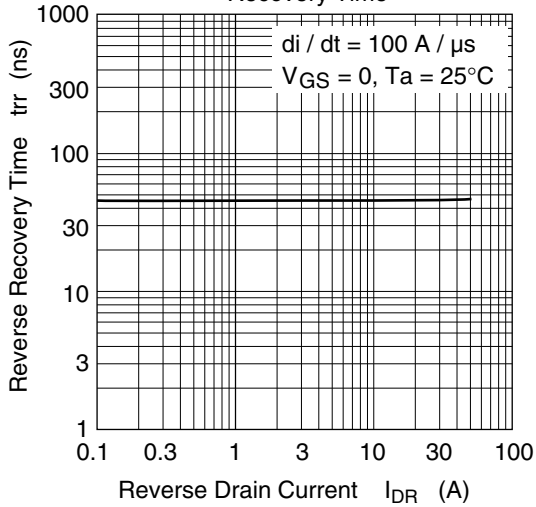
Static Drain to Source on State Resistance vs. Temperature



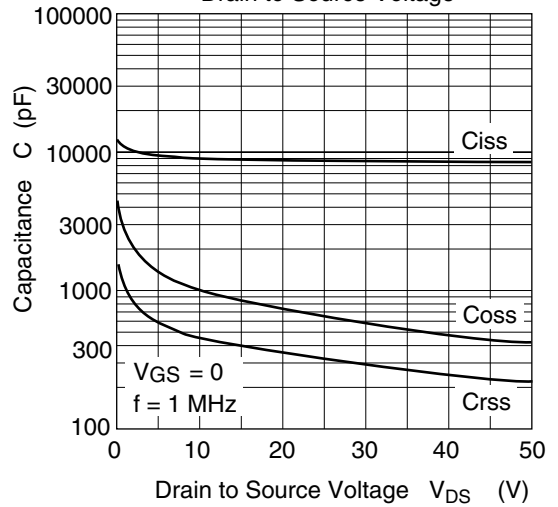
Forward Transfer Admittance vs. Drain Current



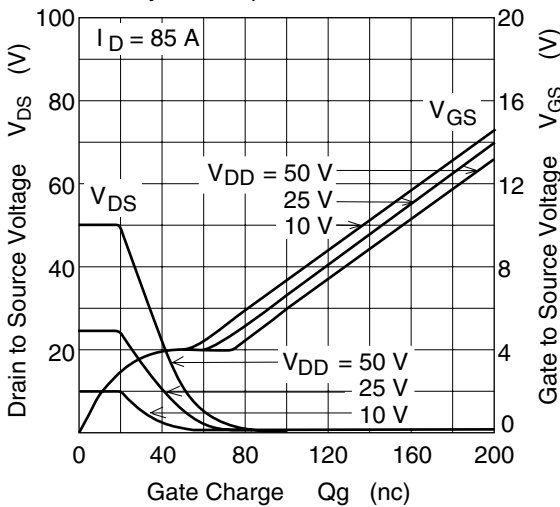
Body-Drain Diode Reverse Recovery Time



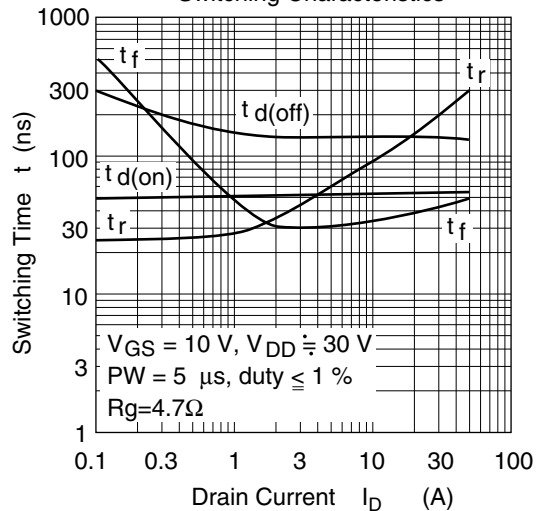
Typical Capacitance vs. Drain to Source Voltage

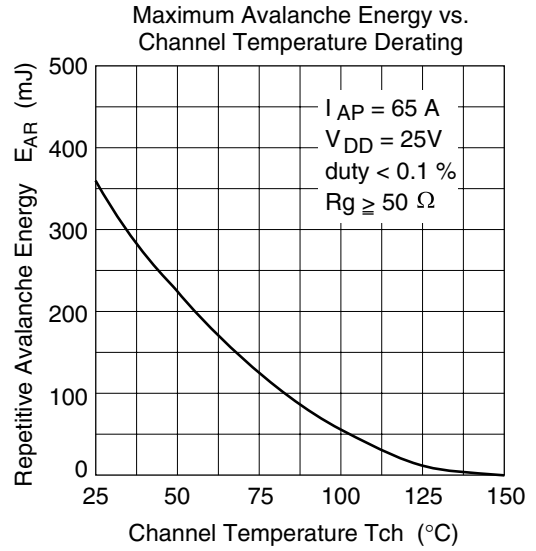
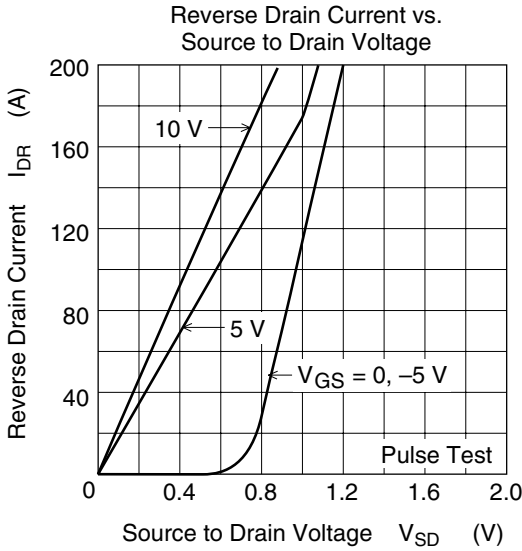


Dynamic Input Characteristics

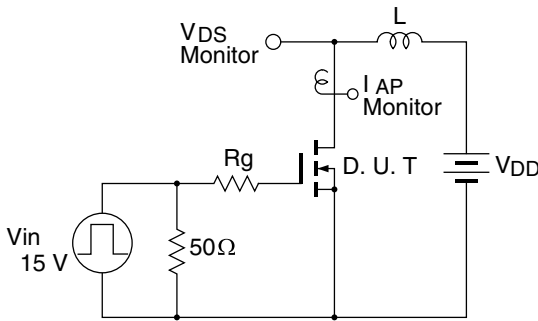


Switching Characteristics



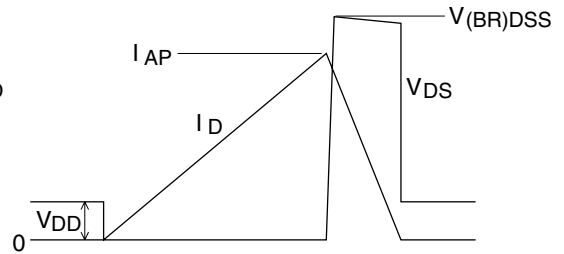


Avalanche Test Circuit

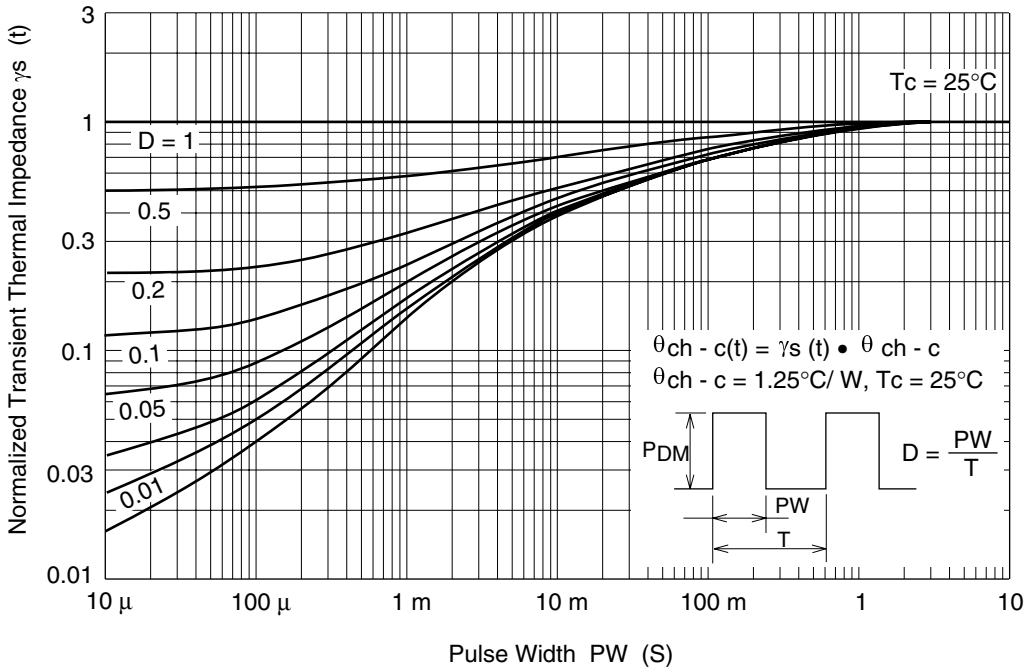


Avalanche Waveform

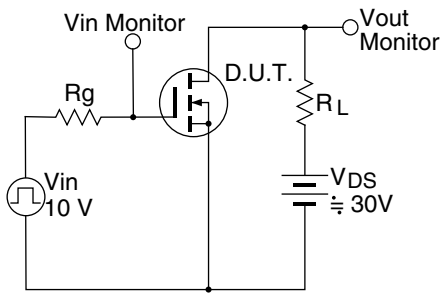
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



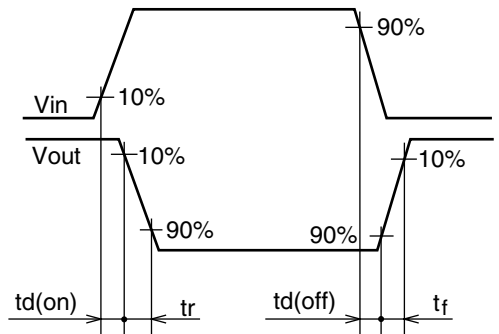
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

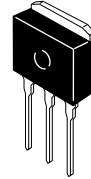
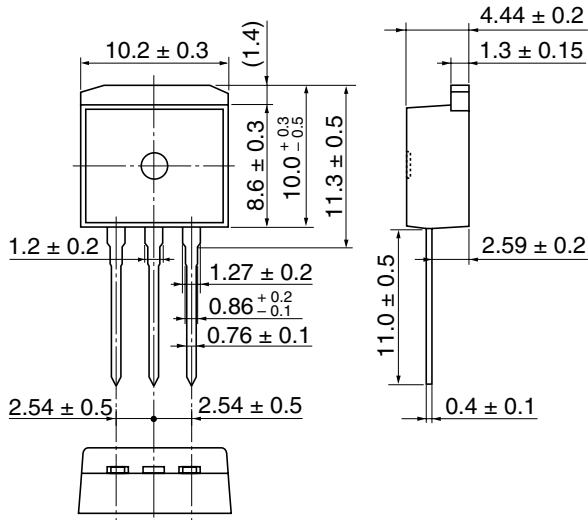


Waveform



Package Dimensions

As of January, 2002
Unit: mm

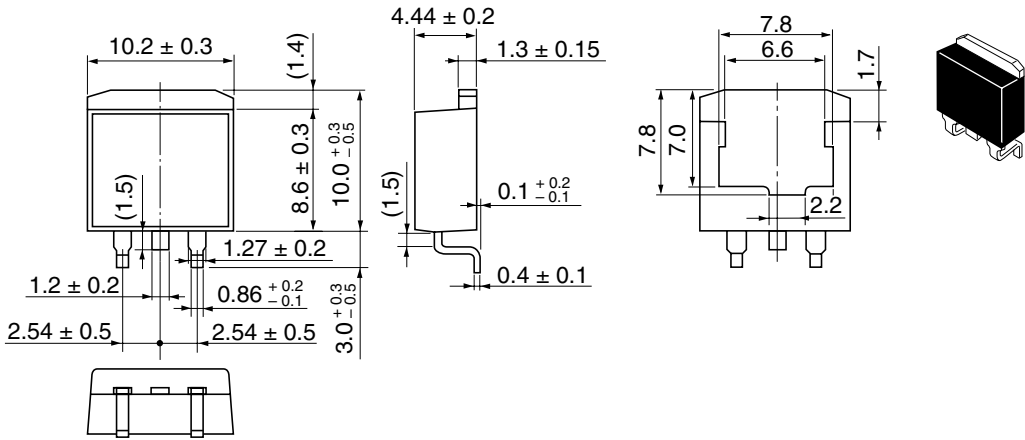


Hitachi Code	LDPAK (L)
JEDEC	—
JEITA	—
Mass (reference value)	1.4 g

H7N0602LD, H7N0602LS, H7N0602LM

As of January, 2002

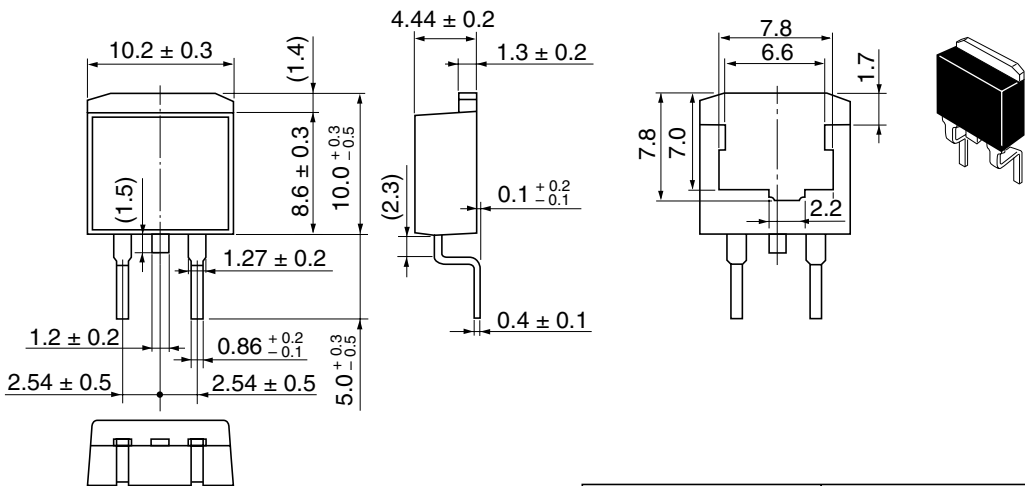
Unit: mm



Hitachi Code	LDPAK (S)-(1)
JEDEC	—
JEITA	—
Mass (reference value)	1.3 g

As of January, 2002

Unit: mm



Hitachi Code	LDPAK (S)-(2)
JEDEC	—
JEITA	—
Mass (reference value)	1.35 g

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Sales Offices

HITACHI

Hitachi, Ltd.

Semiconductor & Integrated Circuits
 Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
 Tel: (03) 3270-2111 Fax: (03) 3270-5109

URL <http://www.hitachisemiconductor.com/>

For further information write to:

Hitachi Semiconductor
 (America) Inc.
 179 East Tasman Drive
 San Jose, CA 95134
 Tel: <1> (408) 433-1990
 Fax: <1> (408) 433-0223

Hitachi Europe Ltd.
 Electronic Components Group
 Whitebrook Park
 Lower Cookham Road
 Maidenhead
 Berkshire SL6 8YA, United Kingdom
 Tel: <44> (1628) 585000
 Fax: <44> (1628) 585200

Hitachi Europe GmbH
 Electronic Components Group
 Dornacher Straße 3
 D-85622 Feldkirchen
 Postfach 201, D-85619 Feldkirchen
 Germany
 Tel: <49> (89) 9 9180-0
 Fax: <49> (89) 9 29 30 00

Hitachi Asia Ltd.
 Hitachi Tower
 16 Collyer Quay #20-00
 Singapore 049318
 Tel: <65>-6538-6533/6538-8577
 Fax: <65>-6538-6933/6538-3877
 URL: <http://semiconductor.hitachi.com.sg>

Hitachi Asia Ltd.
 (Taipei Branch Office)
 4/F, No. 167, Tun Hwa North Road
 Hung-Kuo Building
 Taipei (105), Taiwan
 Tel: <886>-(2)-2718-3666
 Fax: <886>-(2)-2718-8180
 Telex: 23222 HAS-TP
 URL: <http://www.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.
 Group III (Electronic Components)
 7/F., North Tower
 World Finance Centre,
 Harbour City, Canton Road
 Tsim Sha Tsui, Kowloon Hong Kong
 Tel: <852>-2735-9218
 Fax: <852>-2730-0281
 URL: <http://semiconductor.hitachi.com.hk>

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