To all our customers

Regarding the change of names mentioned in the document, such as Hitachi Electric and Hitachi XX, to Renesas Technology Corp.

The semiconductor operations of Mitsubishi Electric and Hitachi were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.) Accordingly, although Hitachi, Hitachi, Ltd., Hitachi Semiconductors, and other Hitachi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Renesas Technology Home Page: http://www.renesas.com

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

RENESAS
Renesas Technology Corp.

H7N0602LD, H7N0602LS, H7N0602LM

Silicon N Channel MOS FET
High Speed Power Switching

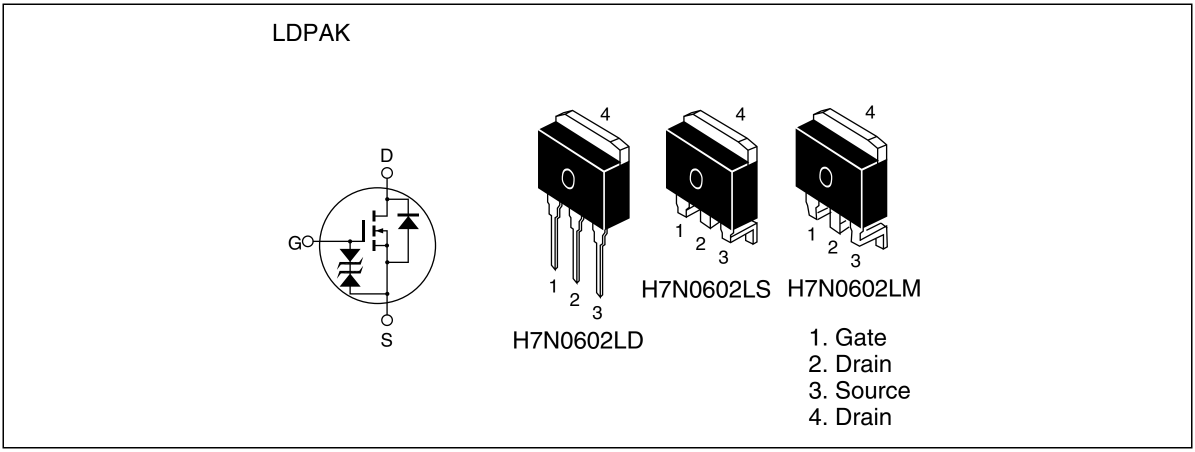
ADE-208-1526C (Z)

4th. Edition
May 2002

Features

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

Outline



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 ≤ 10 µs, duty cycle ≤ 1%
2. Value at Tc = 25°C
3. Value at Tch = 25°C, Rg ≥ 50 Ω

Electrical Characteristics

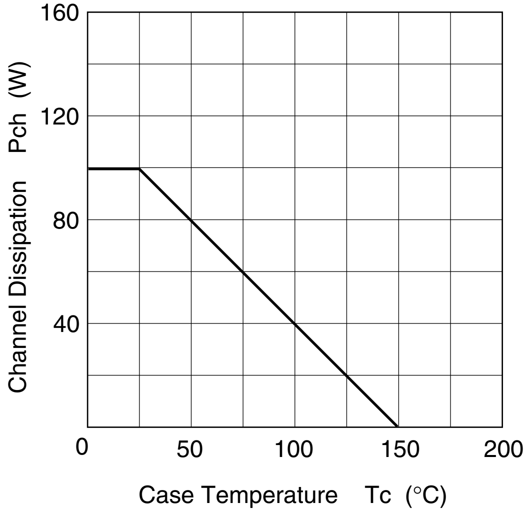
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	I_G = ±100 µA, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	10	µA	V_{DS} = 60 V, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±10	µA	V_{GS} = ±16 V, V_{DS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	1.5	—	2.5	V	V_{DS} = 10 V, I_D = 1 mA Note1
Forward transfer admittance	$\|y_{fs}\|$	70	120	—	S	I_D = 45 A, V_{DS} = 10 V Note1
Static drain to source on state resistance	$R_{DS(on)}$	—	4.1	5.2	mΩ	I_D = 45 A, V_{GS}= 10 V note1
Static drain to source on state resistance	$R_{DS(on)}$	—	6.2	9.0	mΩ	I_D = 45 A, V_{GS}=4.5 V Note1
Input capacitance	Ciss	—	9000	—	pF	V_{DS} = 10 V
Output capacitance	Coss	—	1000	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	470	—	pF	f = 1 MHz
Total gate charge	Qg	—	140	—	nc	V_{DD} = 25 V
Gate to source charge	Qgs	—	30	—	nc	V_{GS} = 10 V
Gate to drain charge	Qgd	—	30	—	nc	I_D = 85 A
Turn-on delay time	td(on)	—	55	—	ns	V_{GS} = 10 V
Rise time	tr	—	290	—	ns	I_D= 45 A
Turn-off delay time	td(off)	—	140	—	ns	R_L = 0.67 Ω
Fall time	tf	—	50	—	ns	R_g = 4.7 Ω
Body–drain diode forward voltage	V_{DF}	—	0.95	—	V	I_F = 85 A, V_{GS} = 0
Body–drain diode reverse recovery time	trr	—	45	—	ns	I_F = 85 A, V_{GS} = 0 diF/dt = 100 A/µs

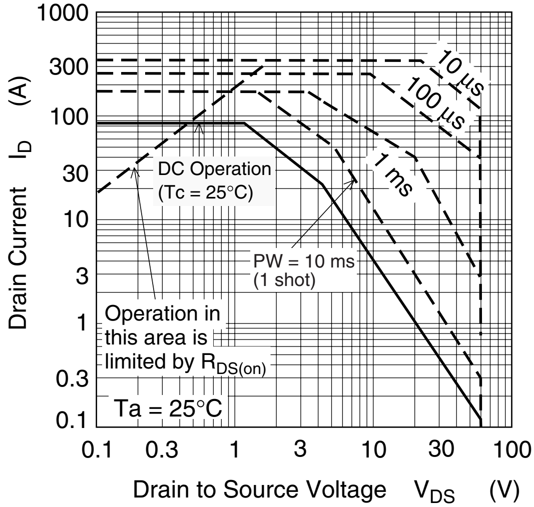
Notes: 1. Pulse test

Main Characteristics

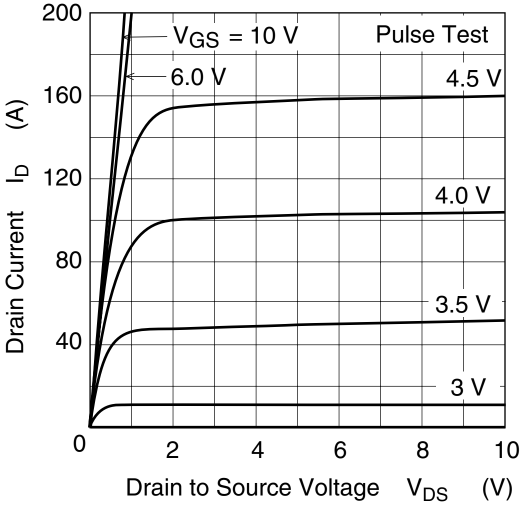
Power vs. Temperature Derating



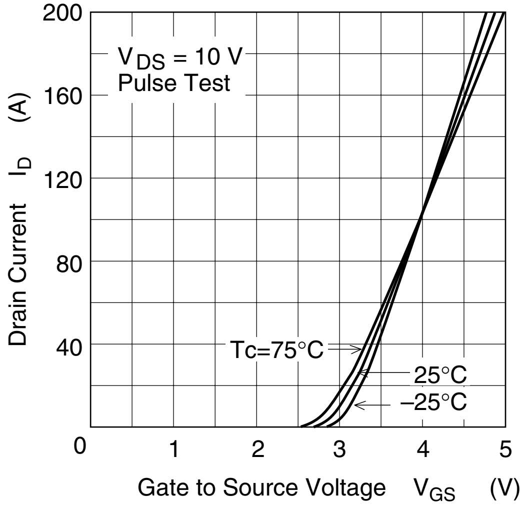
Maximum Safe Operation Area



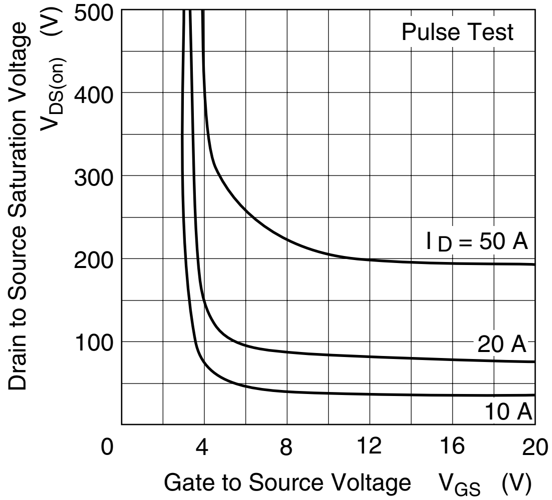
Typical Output Characteristics



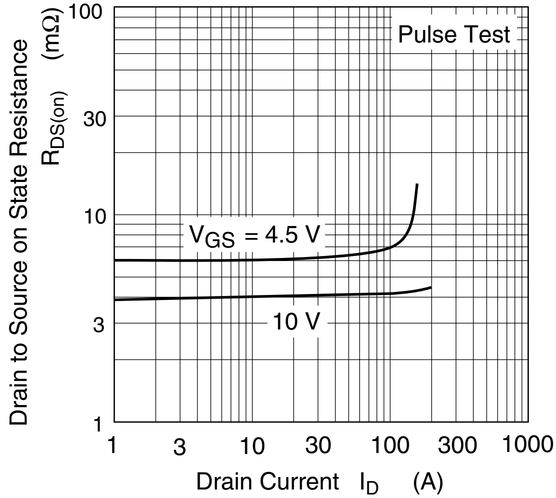
Typical Transfer Characteristics



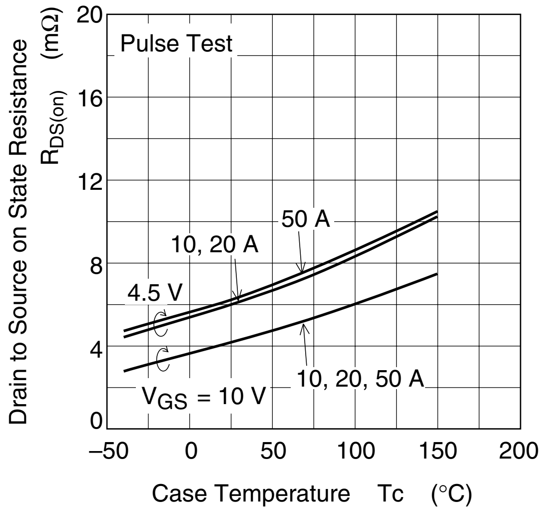
Drain to Source Saturation Voltage vs. Gate to Source Voltage



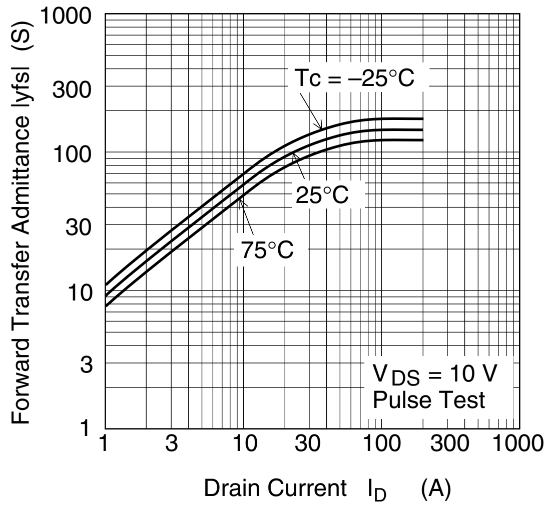
Static Drain to Source on State Resistance vs. Drain Current



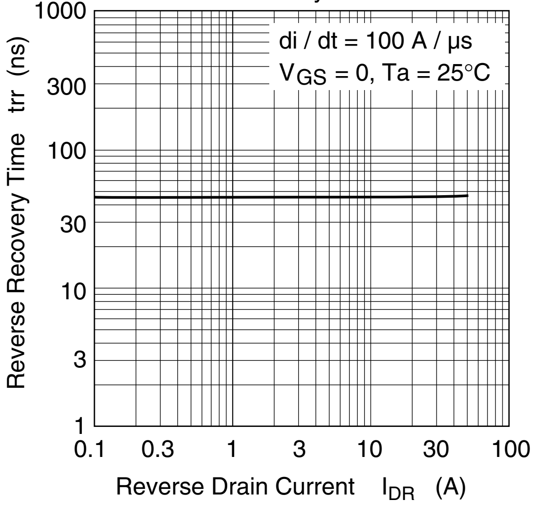
Static Drain to Source on State Resistance vs. Temperature



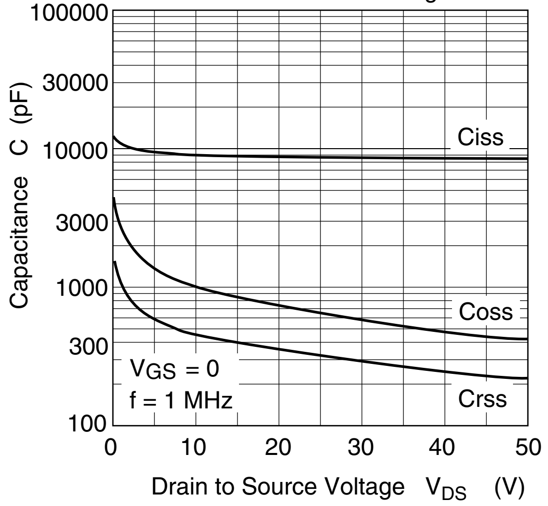
Forward Transfer Admittance vs. Drain Current



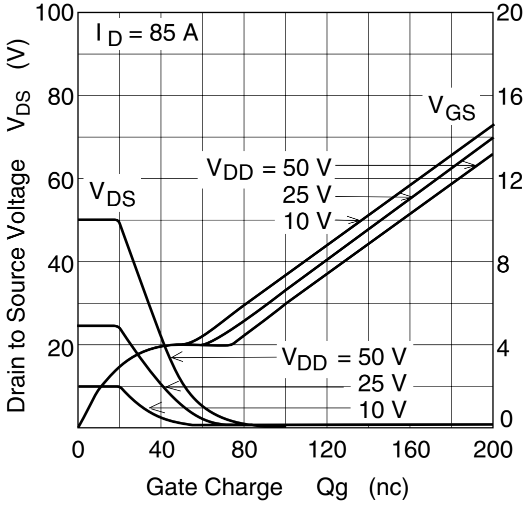
Body-Drain Diode Reverse Recovery Time



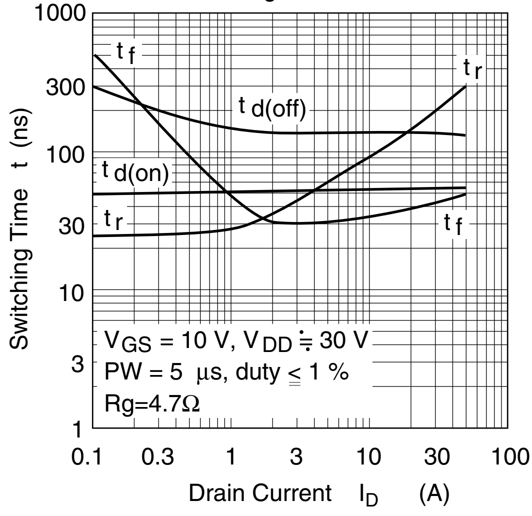
Typical Capacitance vs. Drain to Source Voltage

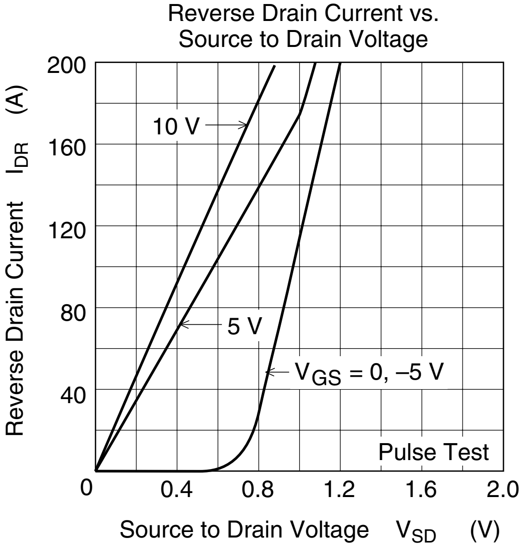


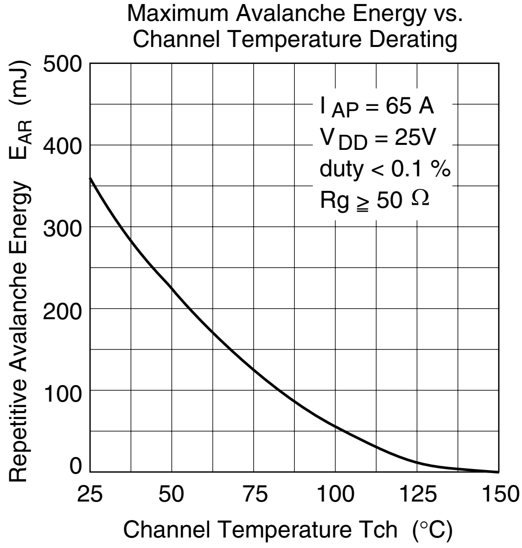
Dynamic Input Characteristics

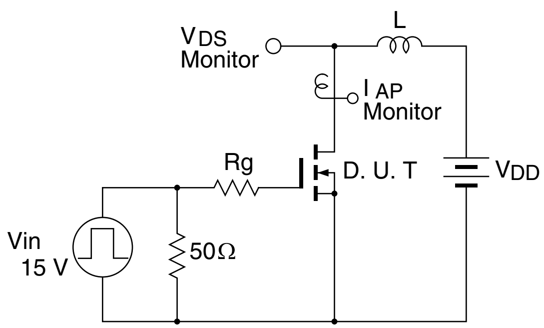


Switching Characteristics



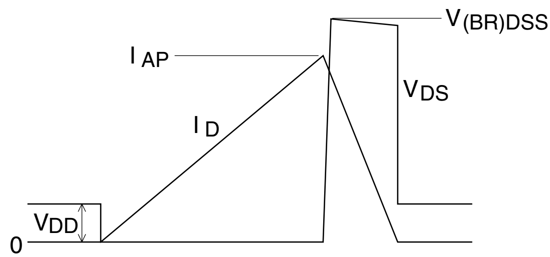




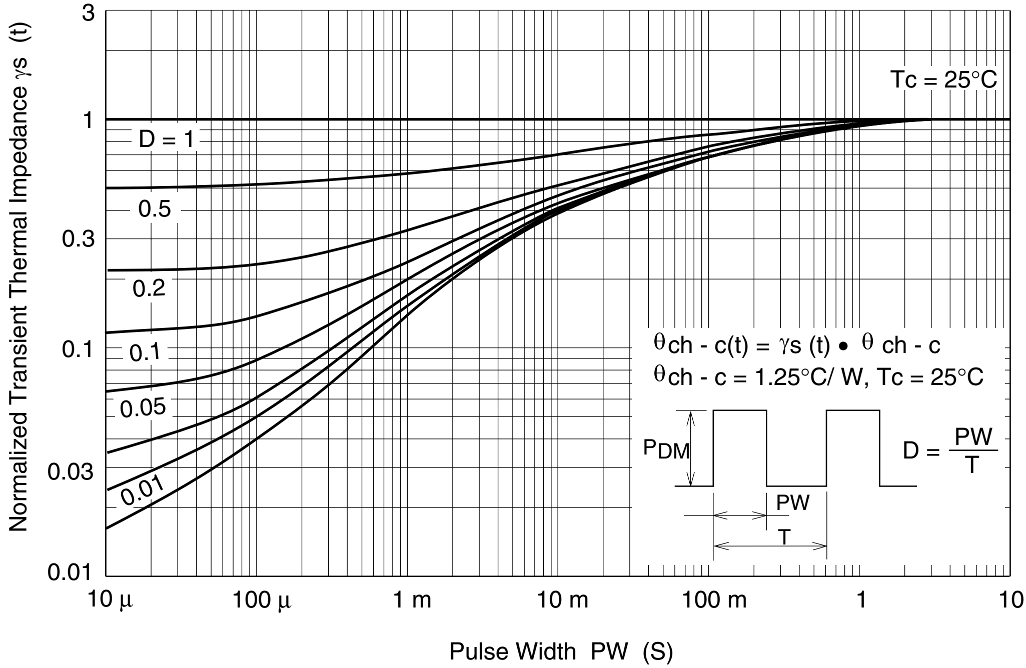


Avalanche Waveform

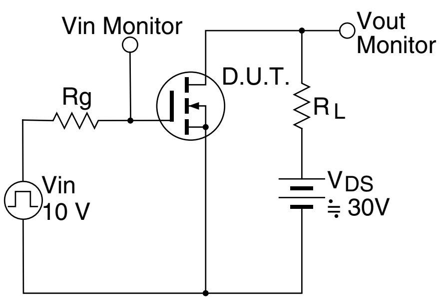
$$E_{AR} = \frac{1}{2} \bullet L \bullet I_{AP}^2 \bullet \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



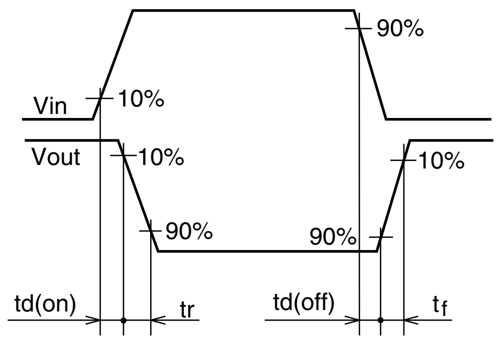
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

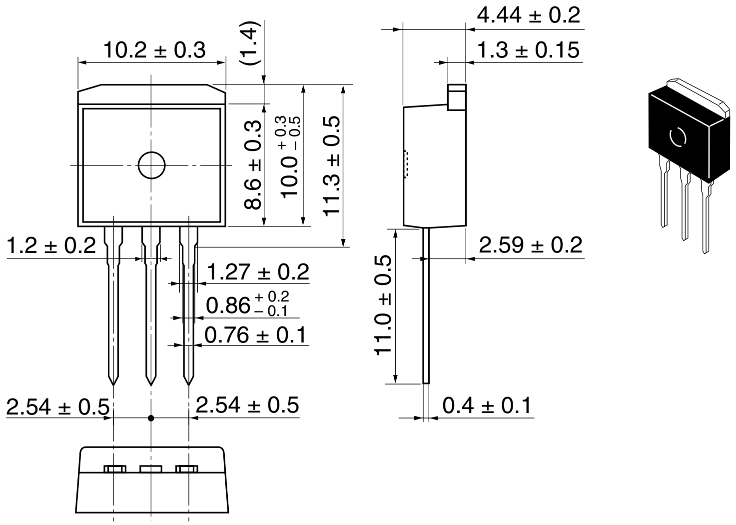


Waveform



Package Dimensions

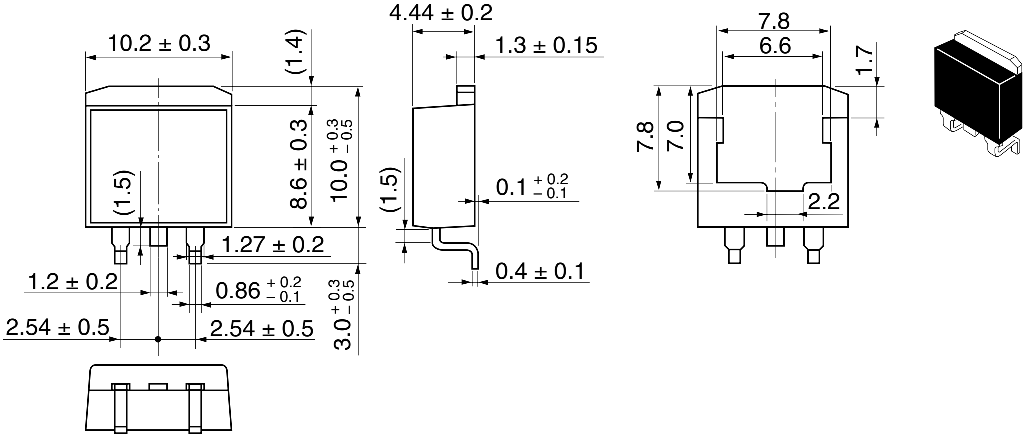
As of January, 2002
Unit: mm



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

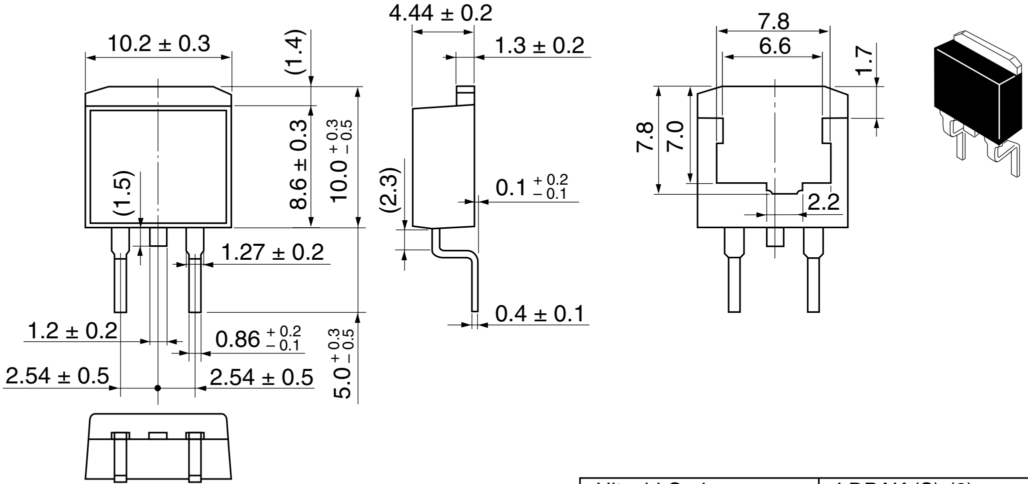
RENESAS

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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