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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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2SK2553(L), 2SK2553(S)

Silicon N Channel MOS FET
High Speed Power Switching

RENESAS

ADE-208-357H (Z)
9th. Edition
Feb. 1999

Application

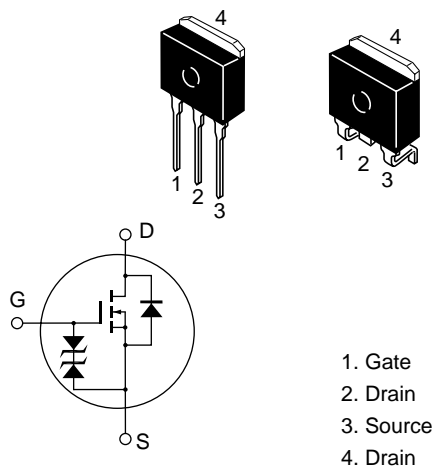
High speed power switching

Features

- Low on-resistance
- $R_{DS(on)} = 7 \text{ m}\Omega$ typ.
- High speed switching
- 4 V gate drive device can be driven from 5 V source

Outline

LDDPAK



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	50	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	200	A
Body to drain diode reverse drain current	I_{DR}	50	A
Avalanche current	I_{AP} ^{Note 3}	45	A
Avalanche energy	E_{AR} ^{Note 3}	174	mJ
Channel dissipation	P_{ch} ^{Note 2}	75	W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

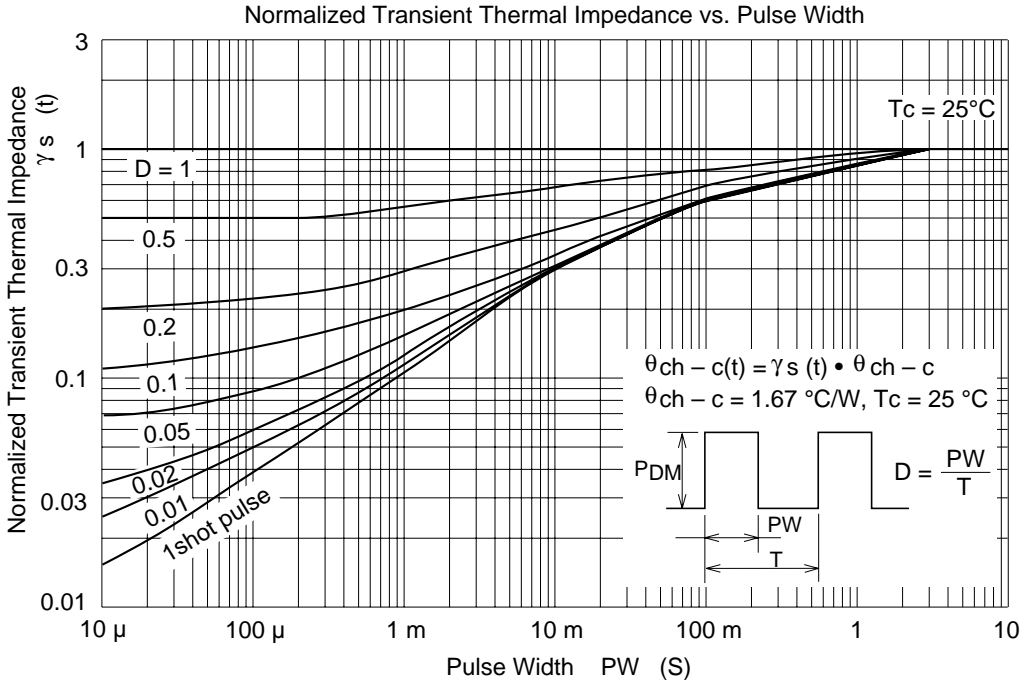
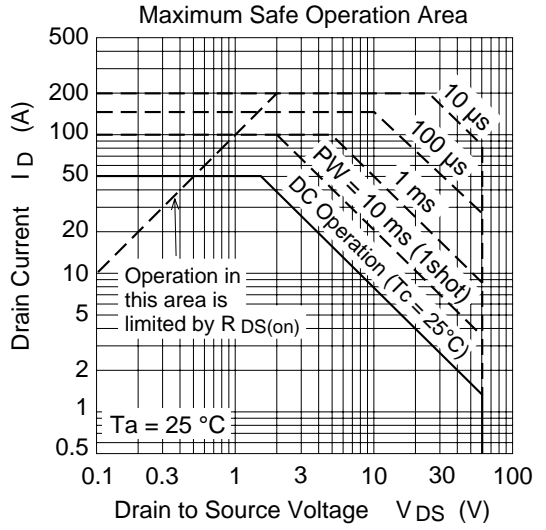
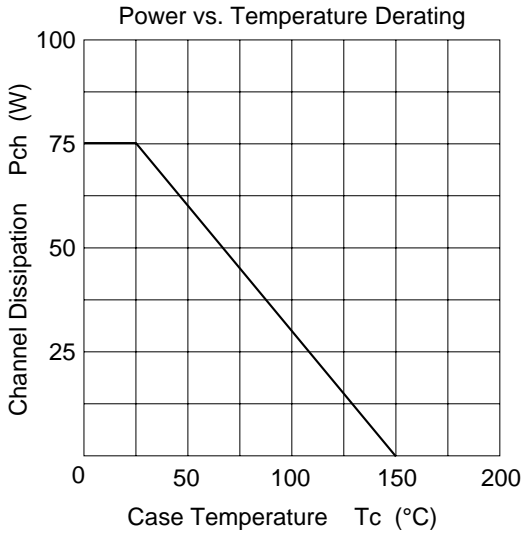
- Notes
1. PW 10 μs, duty cycle 1 %
 2. Value at Tc = 25°C
 3. Value at Tch = 25°C, Rg 50 Ω

Electrical Characteristics (Ta = 25°C)

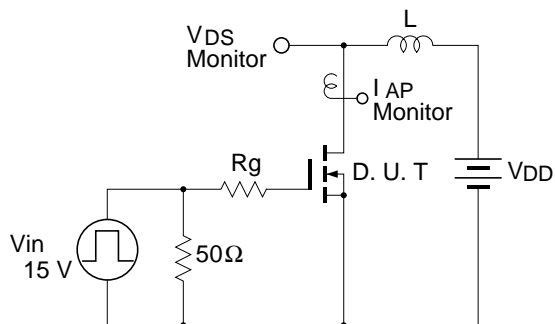
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 60 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.0	V	$I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	7	10	m	$I_D = 25 \text{ A}$ $V_{GS} = 10 \text{ V}$ Note 1
		—	10	16	m	$I_D = 25 \text{ A}$ $V_{GS} = 4 \text{ V}$ Note 1
Forward transfer admittance	$ y_{fs} $	35	55	—	S	$I_D = 25 \text{ A}$ $V_{DS} = 10 \text{ V}$ Note 1
Input capacitance	C_{iss}	—	3550	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	1760	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	500	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	35	—	ns	$I_D = 25 \text{ A}$
Rise time	t_r	—	230	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	470	—	ns	$R_L = 1.2$
Fall time	t_f	—	360	—	ns	
Body to drain diode forward voltage	V_{DF}	—	0.85	—	V	$I_F = 50 \text{ A}$, $V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	135	—	ns	$I_F = 50 \text{ A}$, $V_{GS} = 0$ $di_F / dt = 50 \text{ A} / \mu\text{s}$

Note 1. Pulse Test

See characteristic curves of 2SK2529.

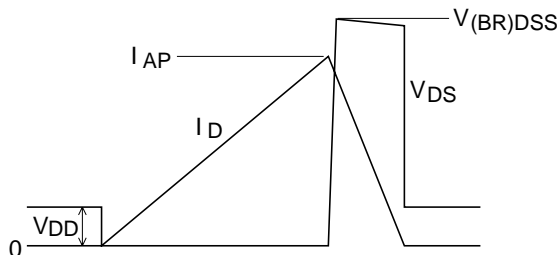


Avalanche Test Circuit

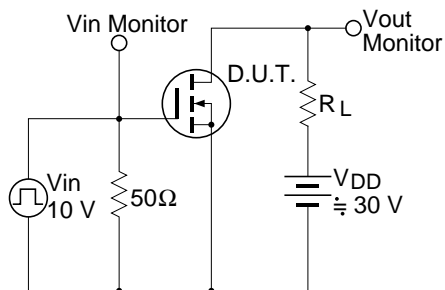


Avalanche Waveform

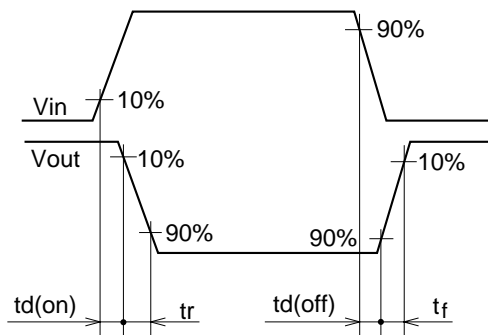
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Switching Time Test Circuit

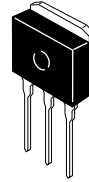
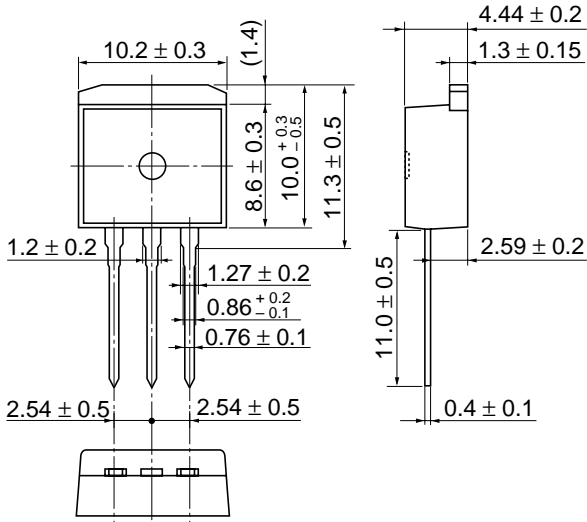


Waveform



Package Dimensions

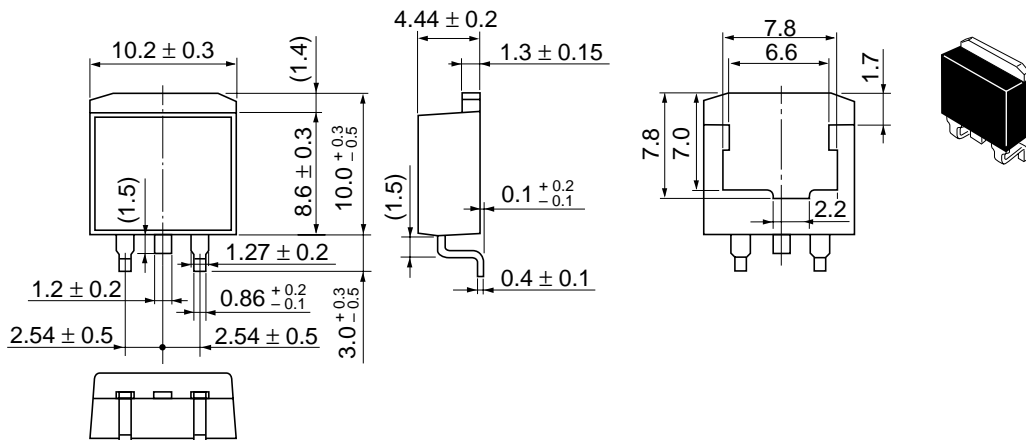
As of January, 2001
Unit: mm



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

As of January, 2001

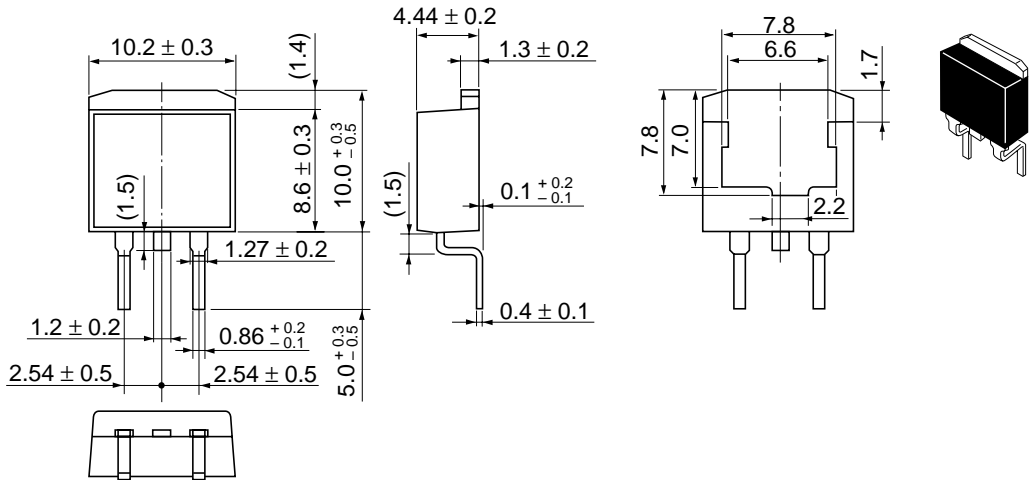
Unit: mm



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

As of January, 2001

Unit: mm



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

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