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

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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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2SK1838(L), 2SK1838(S)

Silicon N-Channel MOS FET

RENESAS

ADE-208-1327 (Z)
1st. Edition
Mar. 2001

Application

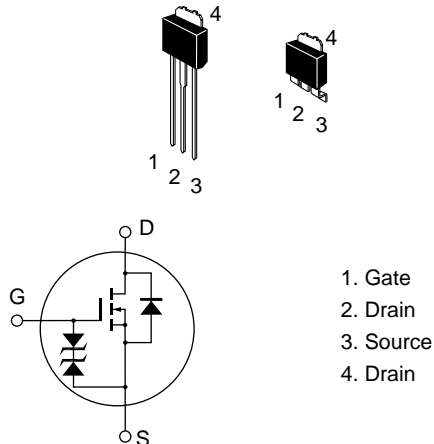
High speed power switching

Features

- Low on-resistance
- High speed switching
- Low drive current
- No secondary breakdown
- Suitable for switching regulator, DC-DC converter

Outline

DPAK-1



2SK1838(L), 2SK1838(S)

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	250	V
Gate to source voltage	V_{GSS}	±30	V
Drain current	I_D	1	A
Drain peak current	$I_{D(pulse)}^{*1}$	2	A
Body to drain diode reverse drain current	I_{DR}	1	A
Channel dissipation	Pch*2	10	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

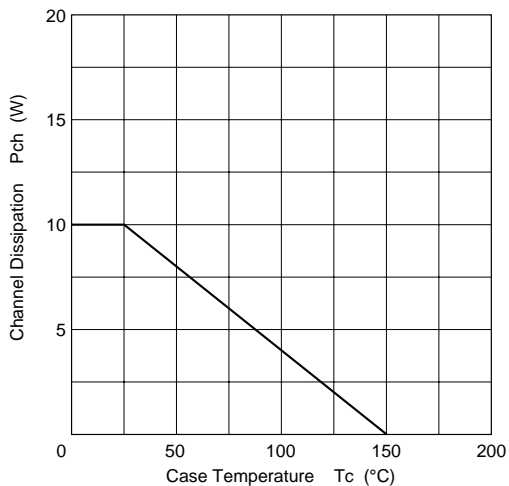
Notes 1. PW 10 μs, duty cycle 1 %
2. Value at Tc = 25 °C

Electrical Characteristics (Ta = 25°C)

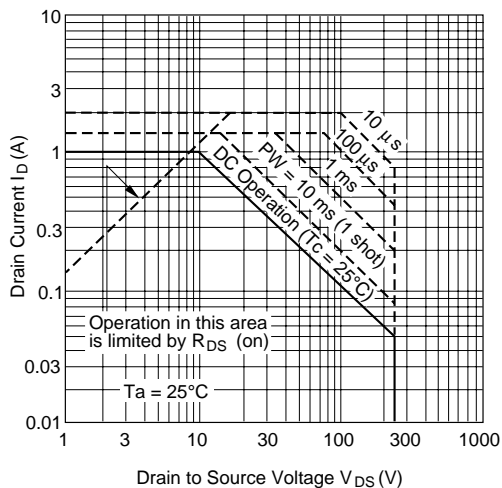
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	250	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±30	—	—	V	$I_G = \pm 100 \text{ } \mu\text{A}, V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	±10	μA	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	100	μA	$V_{DS} = 200 \text{ V}, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	3.0	V	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$
Forward transfer admittance	$ y_{fs} $	0.3	0.5	—	S	$V_{DS} = 10 \text{ V}, I_D = 0.5 \text{ A}^{*1}$
Static drain to source on state resistance	$R_{DS(on)}$	—	5.5	8.0		$I_D = 0.5 \text{ A}, V_{GS} = 10 \text{ V}^{*1}$
Input capacitance	Ciss	—	60	—	pF	$V_{DS} = 10 \text{ V}, V_{GS} = 0,$
Output capacitance	Coss	—	30	—	pF	$f = 1 \text{ MHz}$
Reverse transfer capacitance	Crss	—	5	—	pF	
Turn-on delay time	$t_{d(on)}$	—	5	—	ns	$V_{GS} = 10 \text{ V}, I_D = 0.5 \text{ A},$
Rise time	t_r	—	6	—	ns	$R_L = 60$
Turn-off delay time	$t_{d(off)}$	—	10	—	ns	
Fall time	t_f	—	4.5	—	ns	
Body to drain diode forward voltage	V_{DF}	—	0.96	—	V	$I_F = 1 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	160	—	ns	$I_F = 7 \text{ A}, V_{GS} = 0,$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Note 1. Pulse test

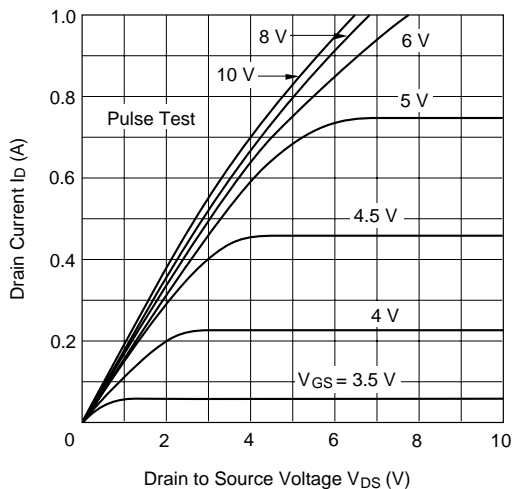
Power vs. Temperature Derating



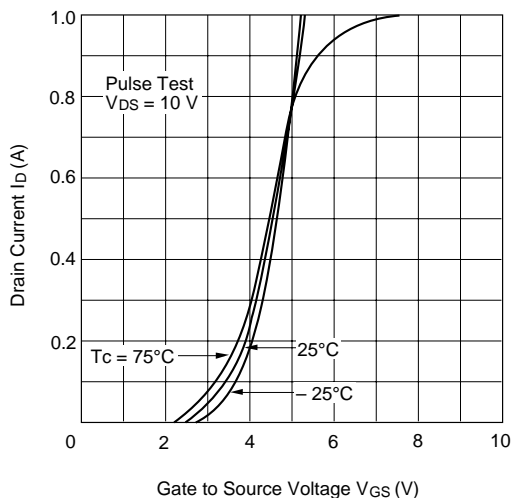
Maximum Safe Operation Area



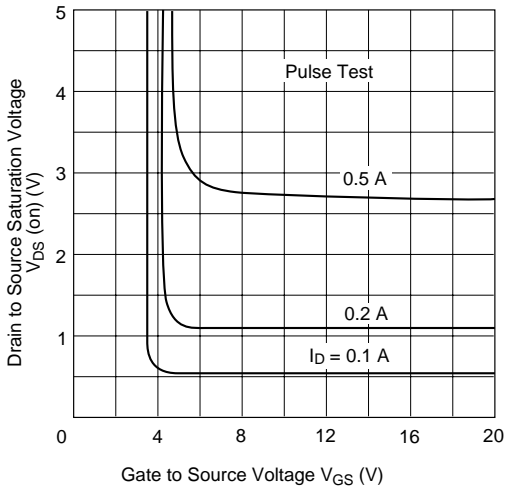
Typical Output Characteristics



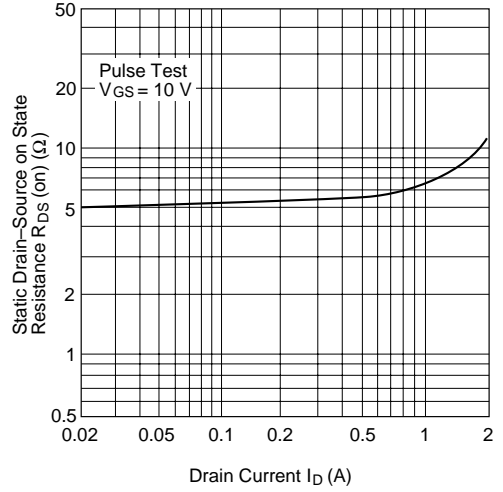
Typical Transfer Characteristics



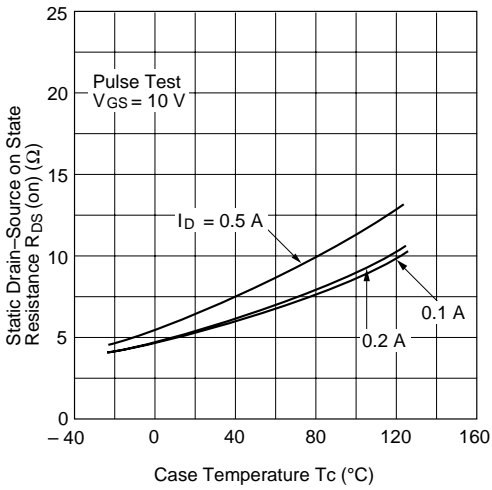
Drain to Source Saturation Voltage vs. Gate to Source Voltage



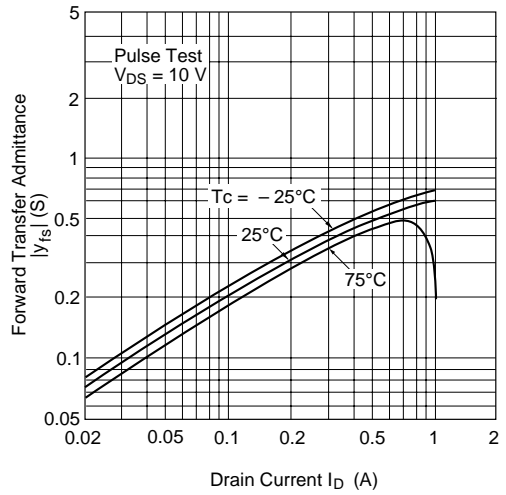
Static Drain to Source on State Resistance vs. Drain Current



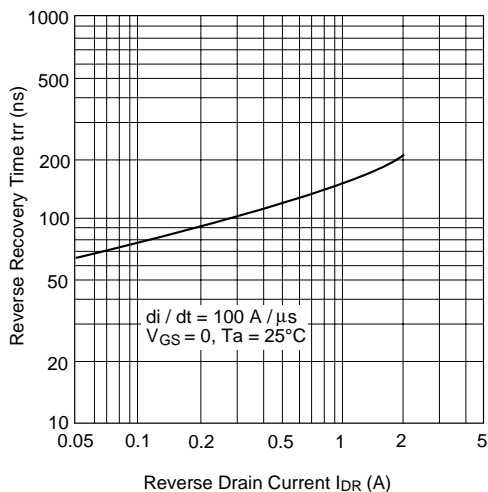
Static Drain to Source on State Resistance vs. Temperature



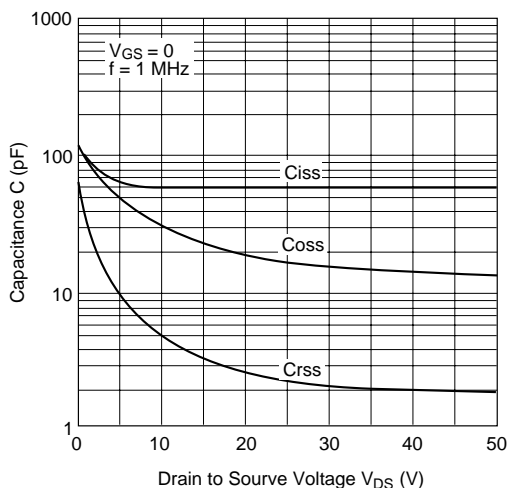
Forward Transfer Admittance vs. Drain Current



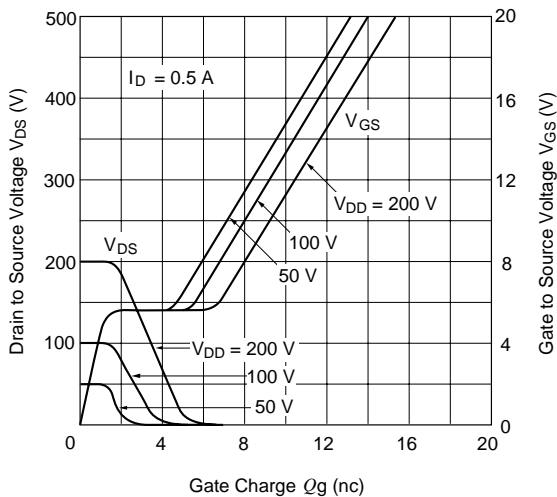
Body to Drain Diode Reverse Recovery Time



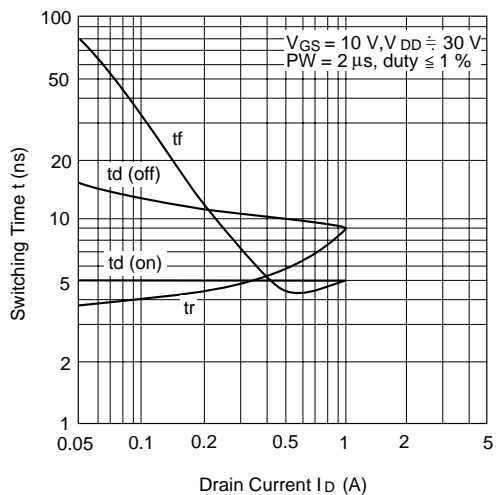
Typical Capacitance vs. Drain to Source Voltage



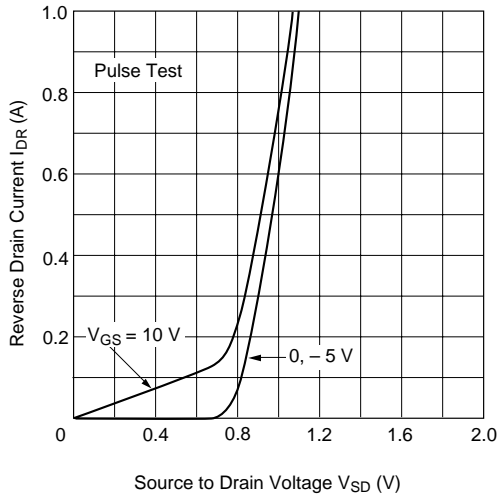
Dynamic Input Characteristics



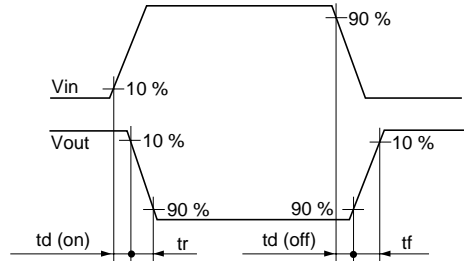
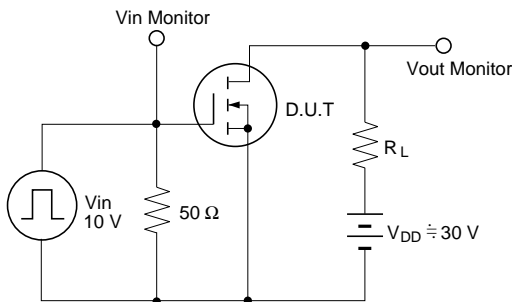
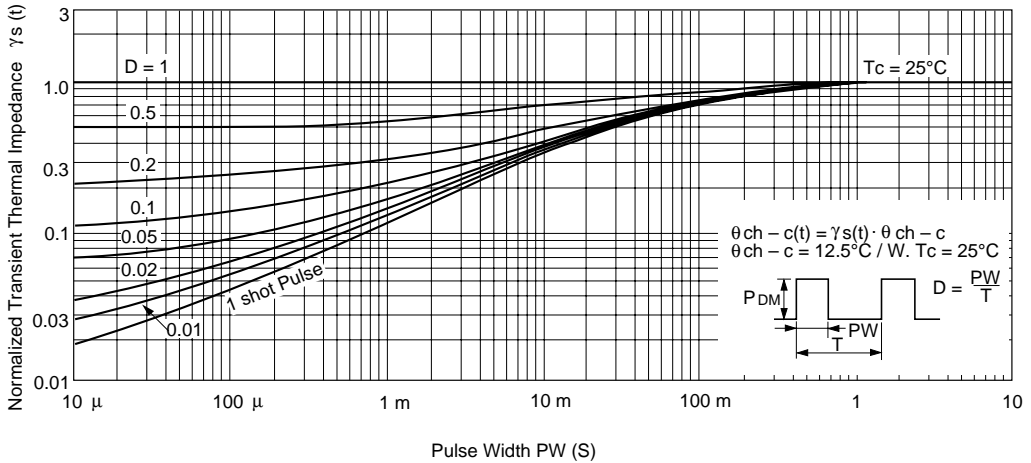
Switching Characteristics



Reverse Drain Current vs. Source to Drain Voltage

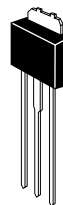
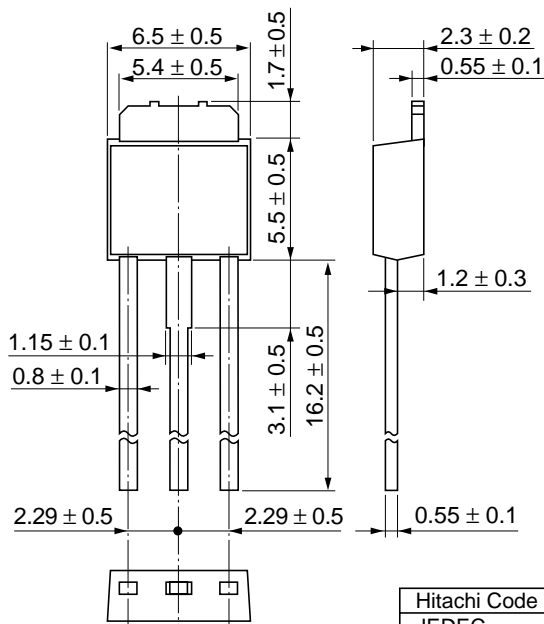


Normalized Transient Thermal Impedance vs. Pulse Width



Package Dimensions

As of January, 2001
Unit: mm

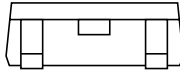
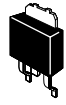
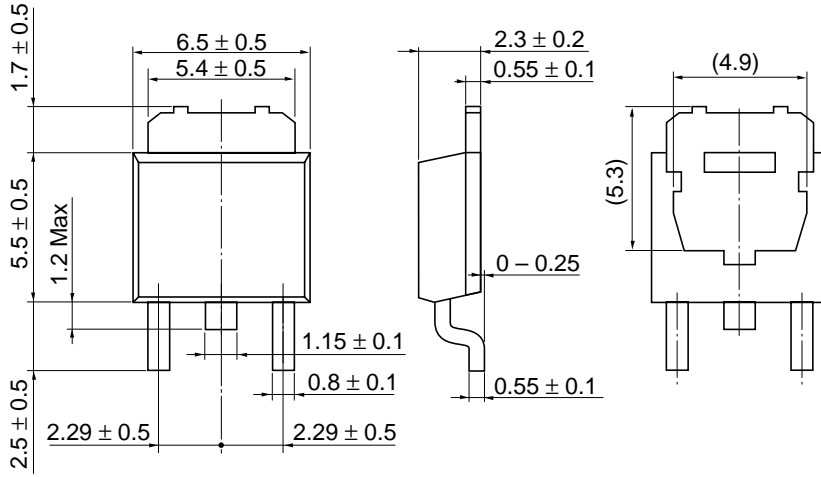


Hitachi Code	DPAK (L)-(1)
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.42 g

2SK1838(L), 2SK1838(S)

As of January, 2001

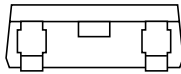
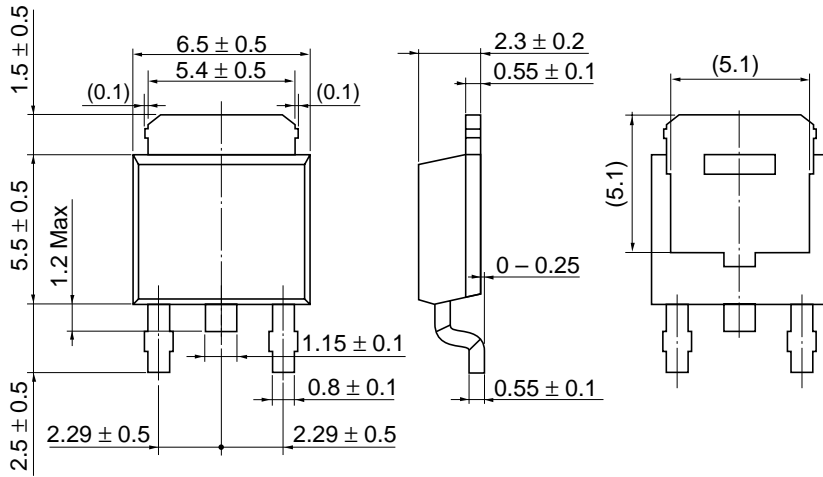
Unit: mm



Hitachi Code	DPAK (S)-(1),(2)
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.28 g

As of January, 2001

Unit: mm



Hitachi Code	DPAK (S)-(3)
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.28 g

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