

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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# 2SK2788

## Silicon N Channel MOS FET High Speed Power Switching

# RENESAS

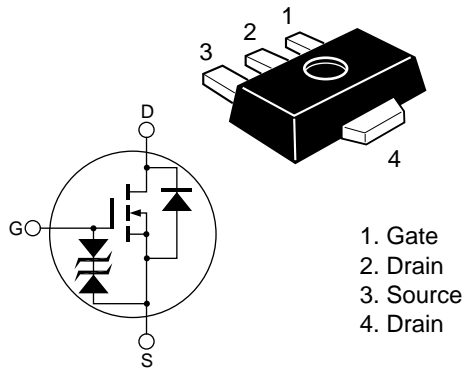
ADE-208-538 (Z)  
1st. Edition  
Jun 1997

### Features

- Low on-resistance  
 $R_{DS(on)} = 0.12\Omega$  typ ( $V_{GS} = 10\text{ V}$ ,  $I_D = 1\text{ A}$ )
- Low drive current
- High speed switching
- 4V gate drive devices.

### Outline

UPAK



**Absolute Maximum Ratings** ( $T_a = 25^\circ\text{C}$ )

<b>Item</b>	<b>Symbol</b>	<b>Ratings</b>	<b>Unit</b>
Drain to source voltage	$V_{DSS}$	60	V
Gate to source voltage	$V_{GSS}$	$\pm 20$	V
Drain current	$I_D$	2	A
Drain peak current	$I_{D(pulse)}^{*1}$	4	A
Body to drain diode reverse drain current	$I_{DR}$	2	A
Channel dissipation	$P_{ch}^{*2}$	1	W
Channel temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

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

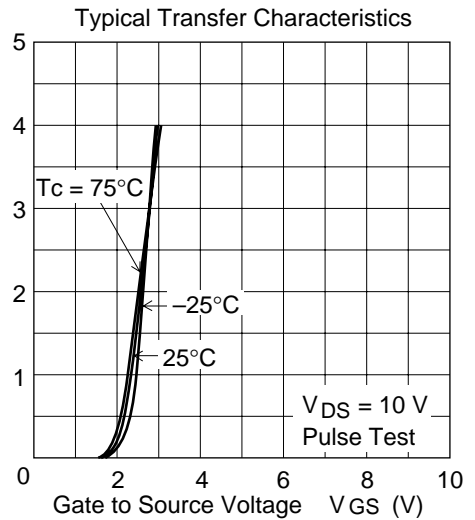
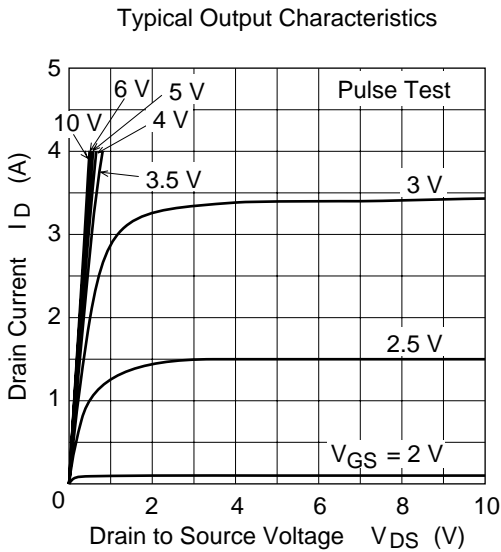
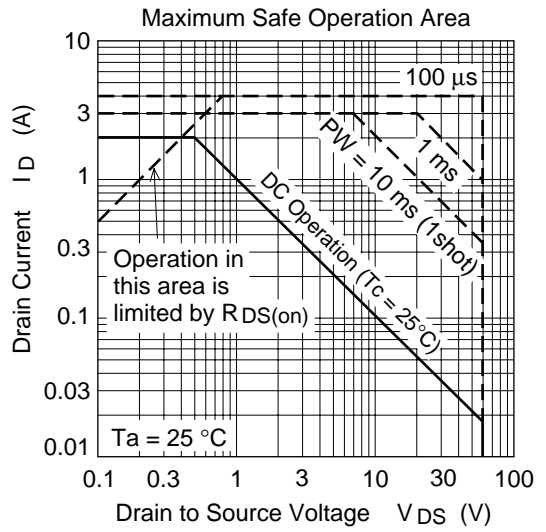
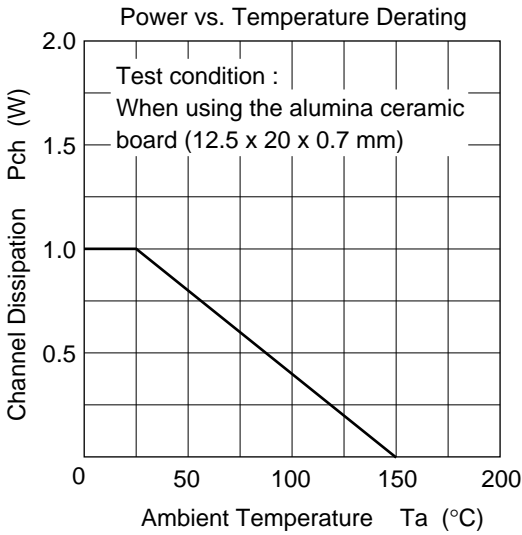
2. When using the alumina ceramic board (12.5 x 20 x 0.7 mm)

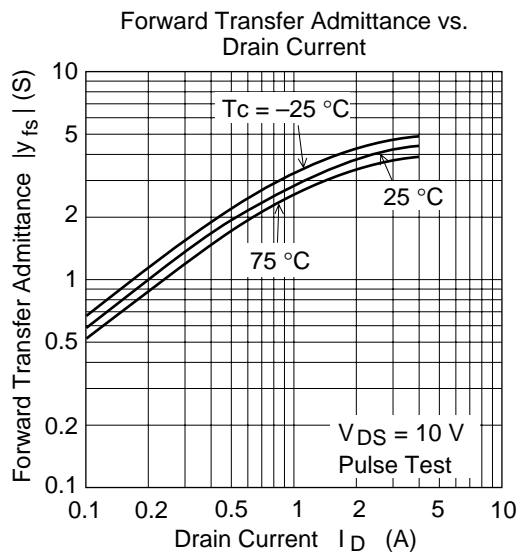
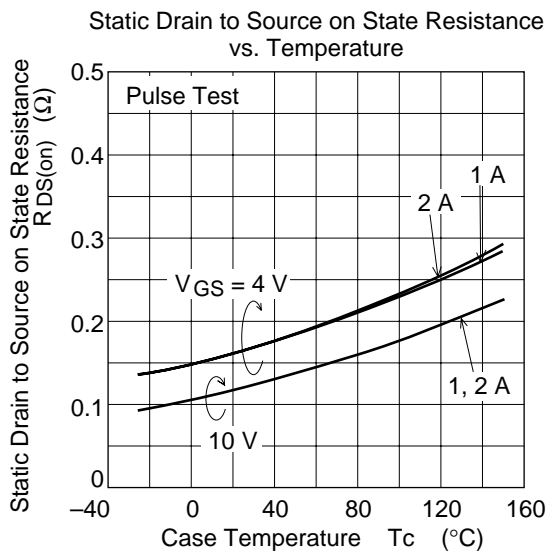
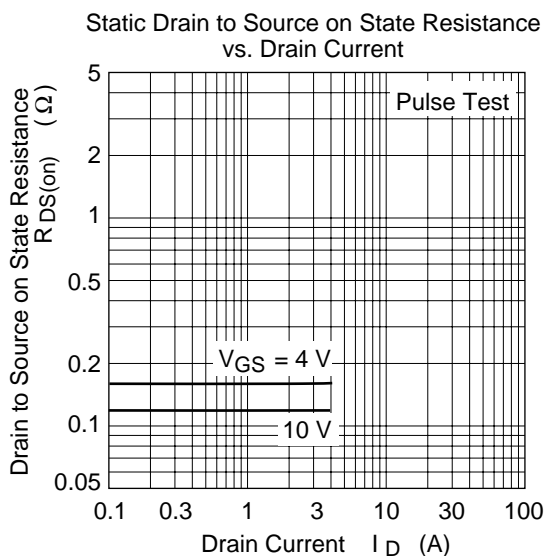
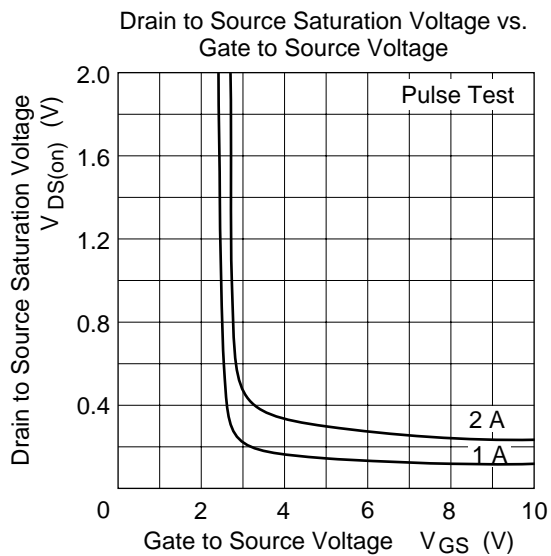
## Electrical Characteristics (Ta = 25°C)

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	$V_{(BR)GSS}$	$\pm 20$	—	—	V	$I_G = \pm 100\mu\text{A}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	10	$\mu\text{A}$	$V_{DS} = 60\text{V}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 16\text{V}$ , $V_{DS} = 0$
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	$R_{DS(on)}$	—	0.12	0.16	$\Omega$	$I_D = 1\text{A}$ , $V_{GS} = 10\text{V}^{*1}$
	$R_{DS(on)}$	—	0.16	0.25	$\Omega$	$I_D = 1\text{A}$ , $V_{GS} = 4\text{V}^{*1}$
Forward transfer admittance	$ y_{fs} $	1.6	2.8	—	S	$I_D = 1\text{A}$ , $V_{DS} = 10\text{V}^{*1}$
Input capacitance	$C_{iss}$	—	180	—	pF	$V_{DS} = 10\text{V}$
Output capacitance	$C_{oss}$	—	90	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	30	—	pF	$f = 1\text{MHz}$
Turn-on delay time	$t_{d(on)}$	—	9	—	ns	$V_{GS} = 10\text{V}$ , $I_D = 1\text{A}$
Rise time	$t_r$	—	15	—	ns	$R_L = 30\Omega$
Turn-off delay time	$t_{d(off)}$	—	40	—	ns	
Fall time	$t_f$	—	35	—	ns	
Body to drain diode forward voltage	$V_{DF}$	—	0.9	—	V	$I_D = 2\text{A}$ , $V_{GS} = 0$
Body to drain diode reverse recovery time	$t_{rr}$	—	35	—	ns	$I_F = 2\text{A}$ , $V_{GS} = 0$ $di_F/dt = 50\text{A}/\mu\text{s}$

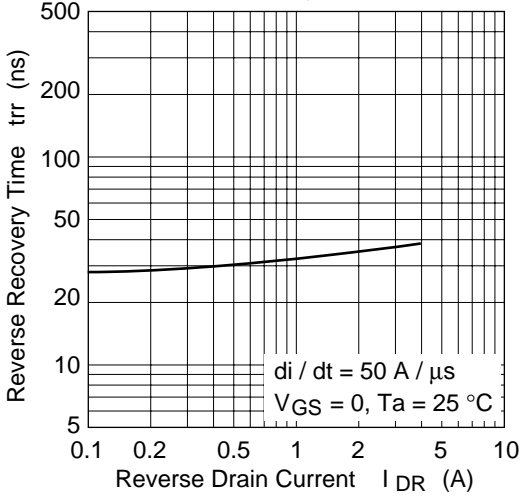
Notes: 1. Pulse test  
2. Marking is "VY"

Main Characteristics

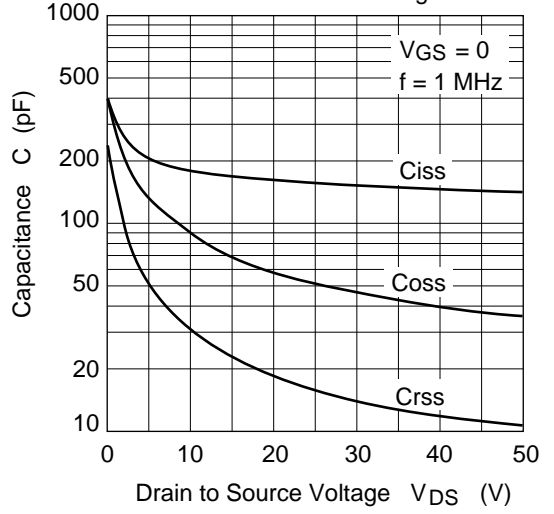




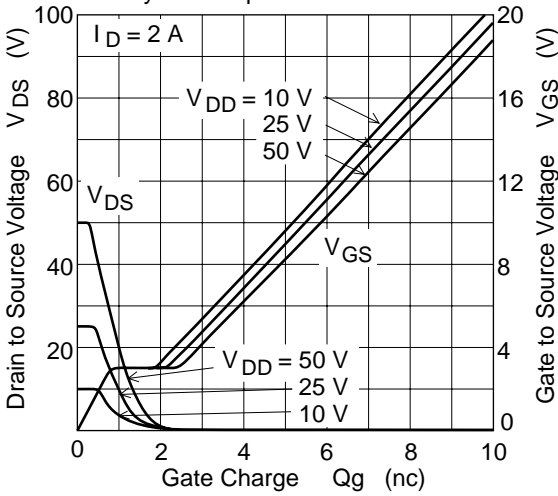
Body to Drain Diode Reverse Recovery Time



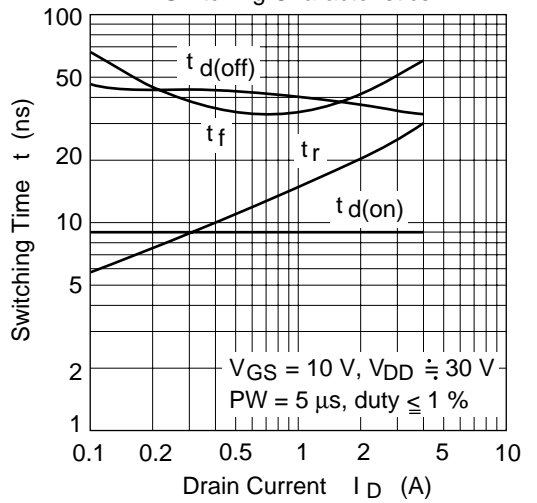
Typical Capacitance vs. Drain to Source Voltage



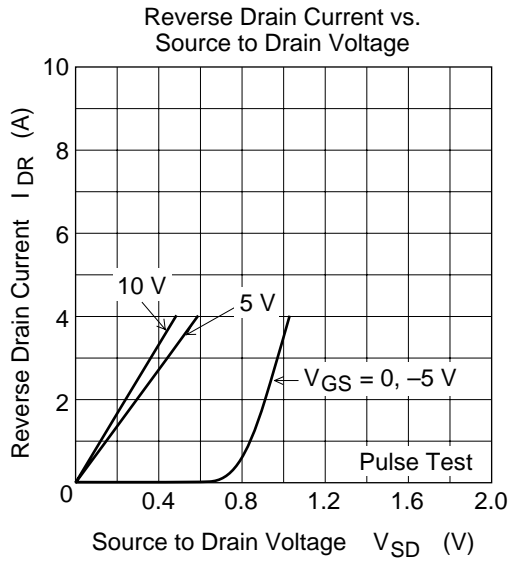
Dynamic Input Characteristics



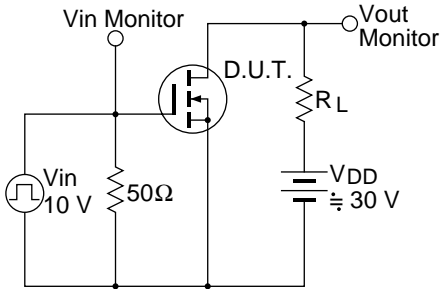
Switching Characteristics



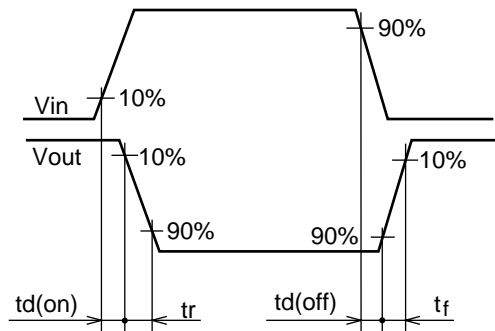




Switching Time Test Circuit



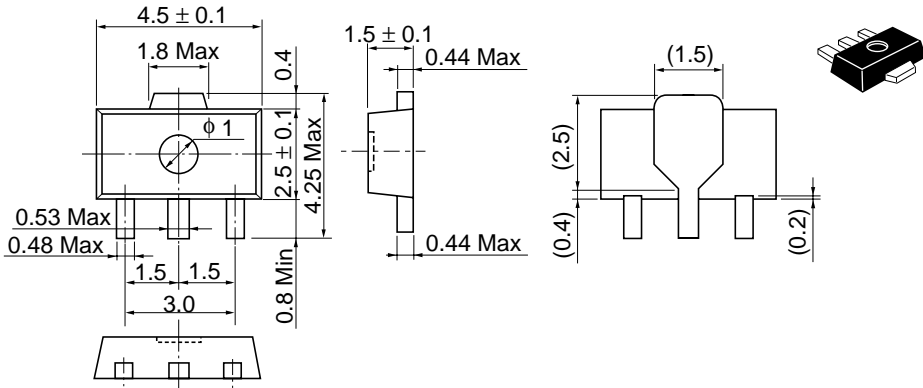
Waveform



Package Dimensions

As of January, 2001

Unit: mm



Hitachi Code	UPAK
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.050 g

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