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

Cautions

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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2SK1400, 2SK1400A

Silicon N-Channel MOS FET

RENESAS

ADE-208-1280 (Z)
1st. Edition
Mar. 2001

Application

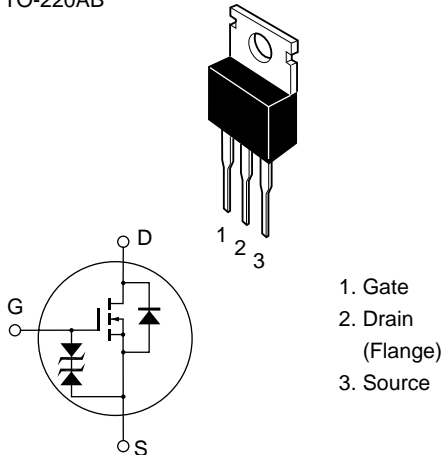
High speed power switching

Features

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

Outline

TO-220AB



1. Gate
2. Drain
(Flange)
3. Source

2SK1400, 2SK1400A

Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	Ratings	Unit
Drain to source voltage	2SK1400	V_{DSS}	300	V
	2SK1400A		350	
Gate to source voltage		V_{GSS}	±30	V
Drain current		I_D	7	A
Drain peak current		$I_{D(pulse)}^{*1}$	28	A
Body to drain diode reverse drain current		I_{DR}	7	A
Channel dissipation		Pch^{*2}	50	W
Channel temperature		Tch	150	°C
Storage temperature		Tstg	-55 to +150	°C

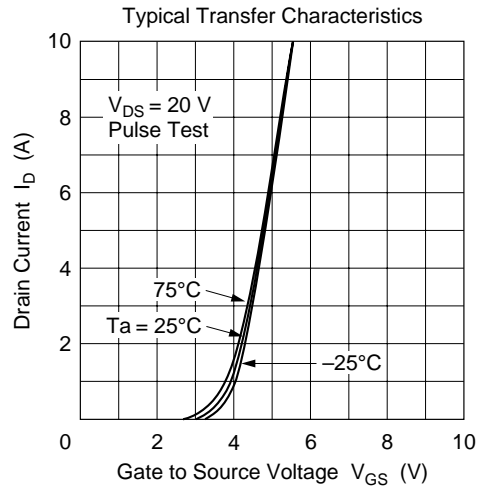
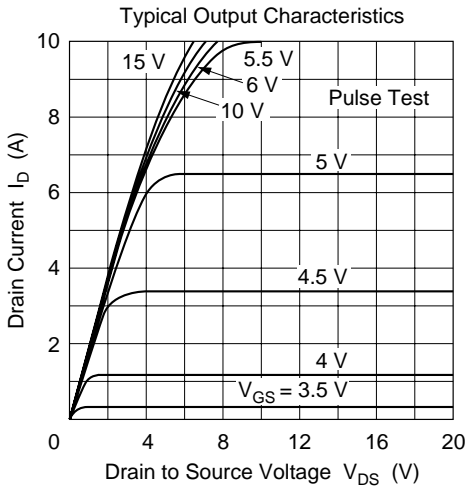
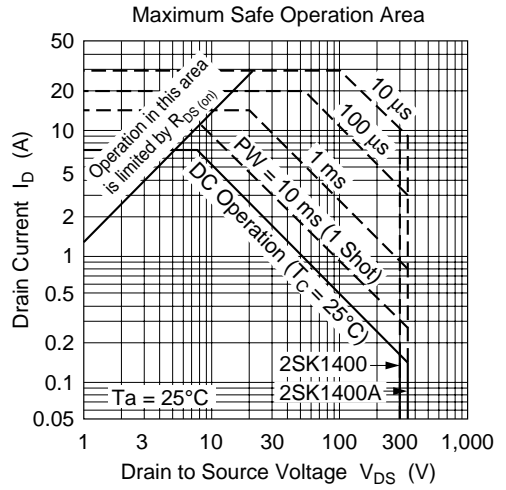
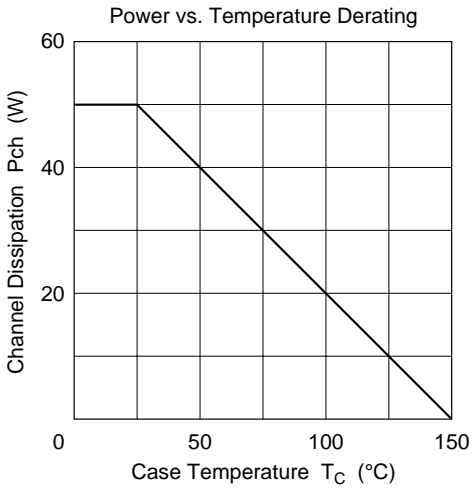
Notes: 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$

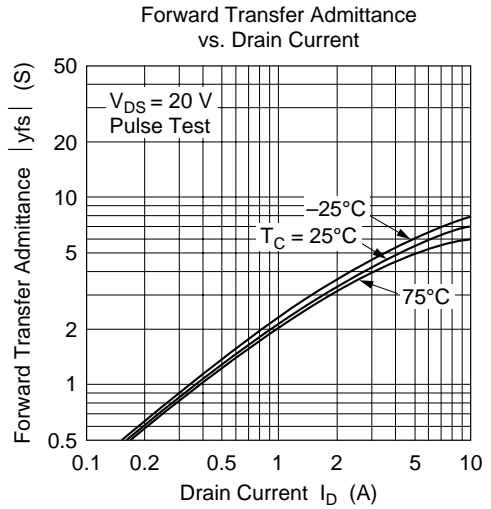
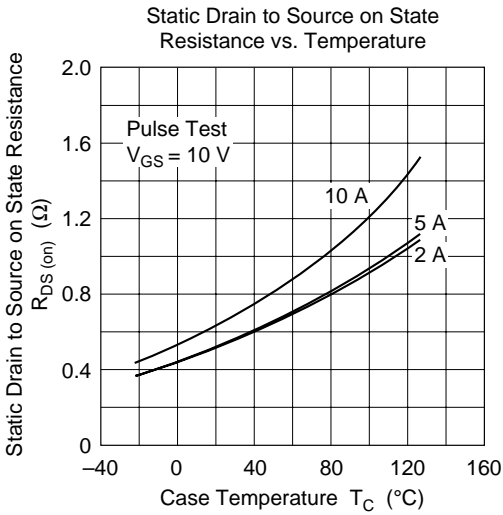
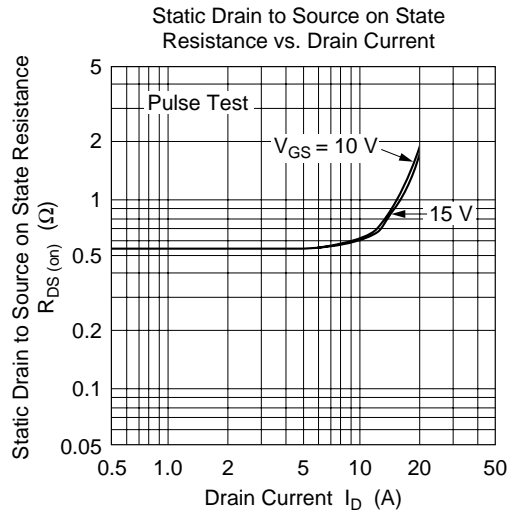
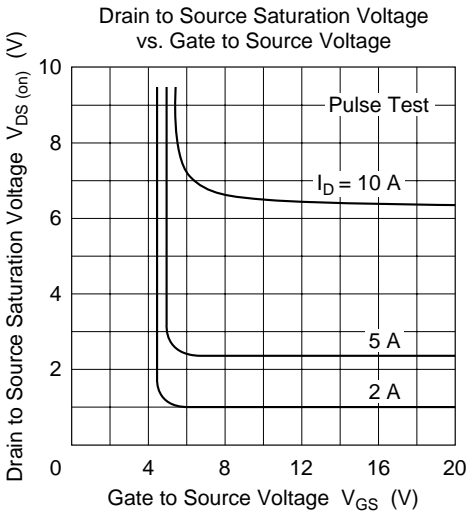
2. Value at $T_C = 25^\circ C$

Electrical Characteristics (Ta = 25°C)

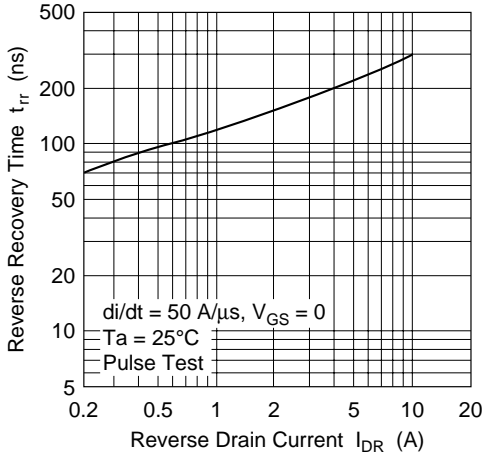
Item		Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	K1400 K1400A	$V_{(BR)DSS}$	300 350	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage		$V_{(BR)GSS}$	± 30	—	—	V	$I_G = \pm 100 \mu\text{A}$, $V_{DS} = 0$
Gate to source leak current		I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 25 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	K1400 K1400A	I_{DSS}	—	—	250	μA	$V_{DS} = 240 \text{ V}$, $V_{GS} = 0$ $V_{DS} = 280 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage		$V_{GS(off)}$	2.0	—	3.0	V	$I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$
Static drain to source on state resistance	K1400 K1400A	$R_{DS(on)}$	—	0.50 0.60	0.70 0.80	Ω	$I_D = 4 \text{ A}$, $V_{GS} = 10 \text{ V}^{*1}$
Forward transfer admittance		$ y_{fs} $	3.0	5.0	—	S	$I_D = 4 \text{ A}$, $V_{DS} = 10 \text{ V}^{*1}$
Input capacitance		C_{iss}	—	635	—	pF	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0$,
Output capacitance		C_{oss}	—	230	—	pF	$f = 1 \text{ MHz}$
Reverse transfer capacitance		C_{rss}	—	40	—	pF	
Turn-on delay time		$t_{d(on)}$	—	10	—	ns	$I_D = 4 \text{ A}$, $V_{GS} = 10 \text{ V}$,
Rise time		t_r	—	50	—	ns	$R_L = 7.5 \Omega$
Turn-off delay time		$t_{d(off)}$	—	60	—	ns	
Fall time		t_f	—	40	—	ns	
Body to drain diode forward voltage		V_{DF}	—	1.0	—	V	$I_F = 7 \text{ A}$, $V_{GS} = 0$
Body to drain diode reverse recovery time		t_{rr}	—	240	—	ns	$I_F = 7 \text{ A}$, $V_{GS} = 0$, $di_F/dt = 100 \text{ A}/\mu\text{s}$

Note: 1. Pulse test

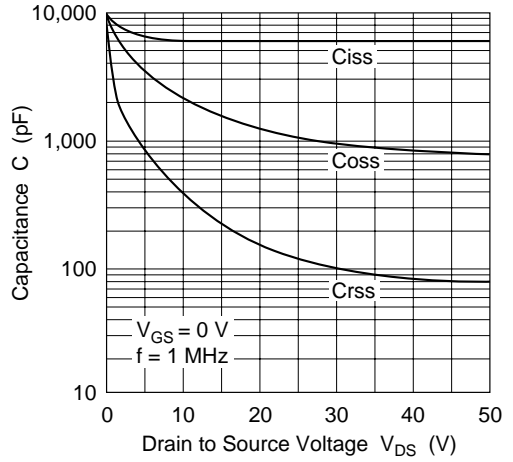




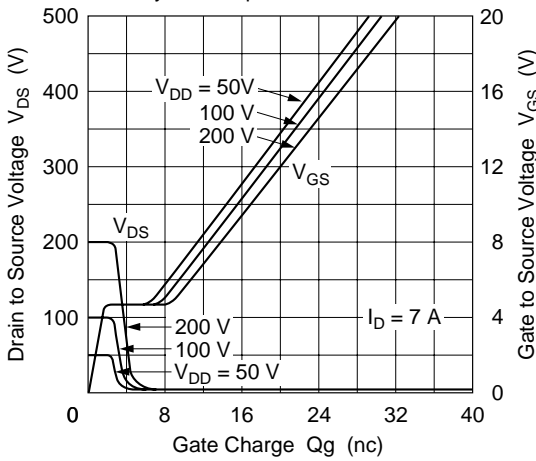
Body to Drain Diode Reverse Recovery Time



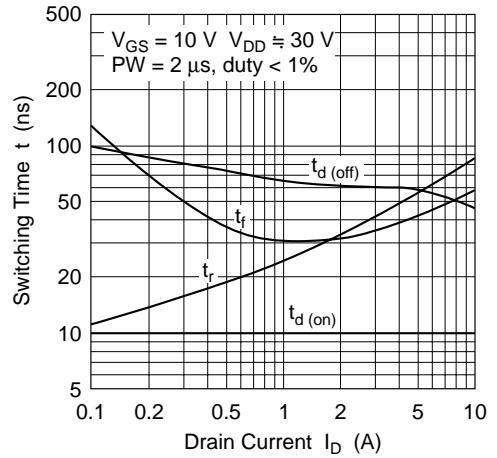
Static Drain-Source on State Resistance vs. Drain Current

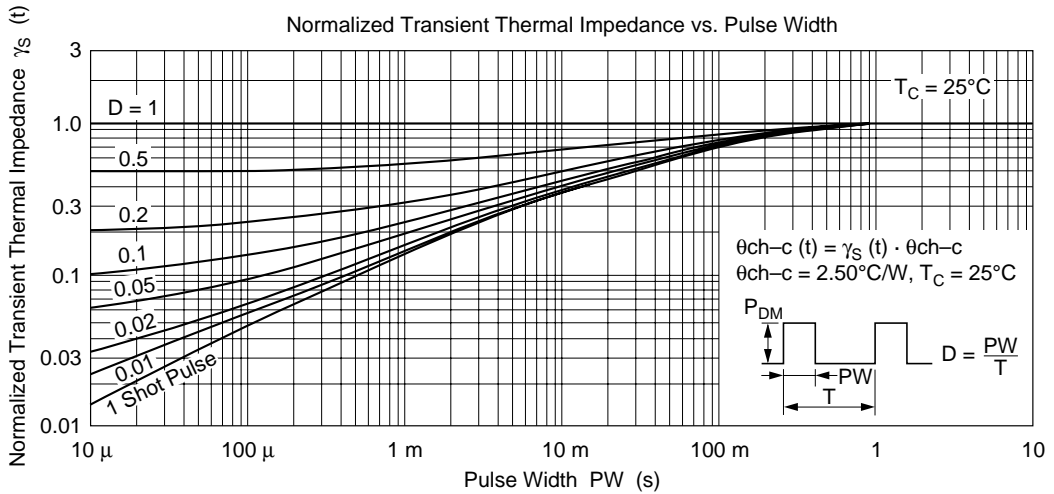
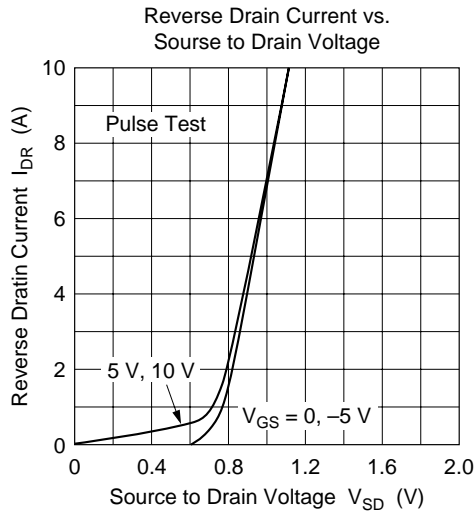


Dynamic Input Characteristics

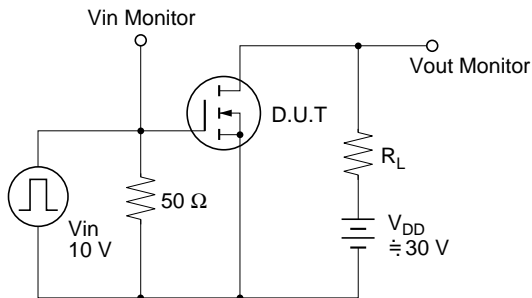


Switching Characteristics

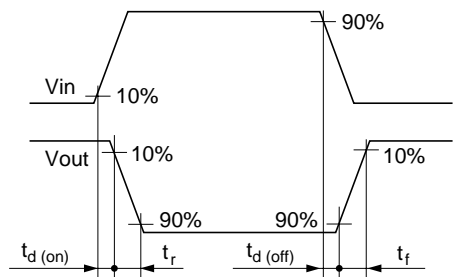




Switching Time Test Circuit



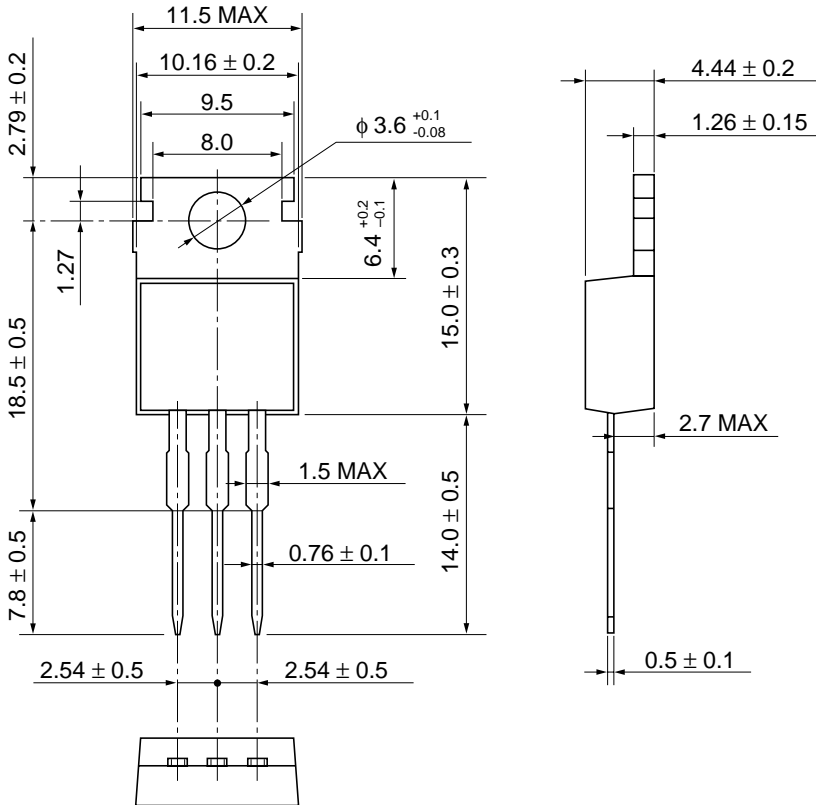
Waveforms



Package Dimensions

As of January, 2001

Unit: mm



Hitachi Code	TO-220AB
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	1.8 g

Cautions

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