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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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2SK1401, 2SK1401A

Silicon N-Channel MOS FET

RENESAS

ADE-208-1281 (Z)
1st. Edition
Mar. 2001

Application

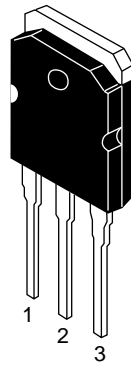
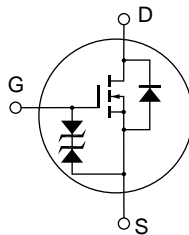
High speed power switching

Features

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

Outline

TO-3P



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

2SK1401, 2SK1401A

Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	Ratings	Unit
Drain to source voltage	2SK1401	V_{DSS}	300	V
	2SK1401A		350	
Gate to source voltage		V_{GSS}	±30	V
Drain current		I_D	15	A
Drain peak current		$I_{D(pulse)}^{*1}$	60	A
Body to drain diode reverse drain current		I_{DR}	15	A
Channel dissipation		Pch^{*2}	100	W
Channel temperature		Tch	150	°C
Storage temperature		Tstg	-55 to +150	°C

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

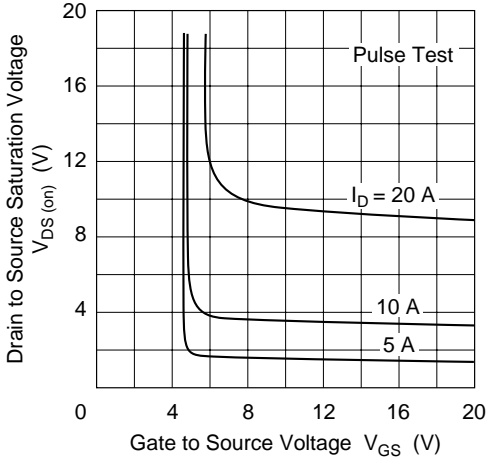
2. Value at $T_C = 25^\circ C$

Electrical Characteristics (Ta = 25°C)

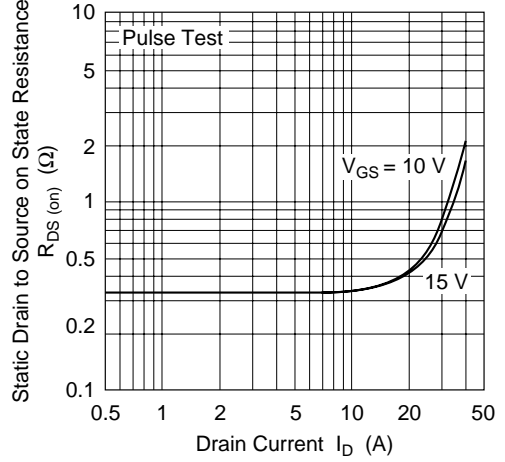
Item		Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	K1401	$V_{(BR)DSS}$	300	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
	K1401A		350	—	—		
Gate to source breakdown voltage		$V_{(BR)GSS}$	± 30	—	—	V	$I_G = \pm 100 \mu\text{A}, V_{DS} = 0$
Gate to source leak current		I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	K1401	I_{DSS}	—	—	250	μA	$V_{DS} = 240 \text{ V}, V_{GS} = 0$
	K1401A						$V_{DS} = 280 \text{ V}, V_{GS} = 0$
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	K1401	$R_{DS(on)}$	—	0.25	0.35	Ω	$I_D = 8 \text{ A}, V_{GS} = 10 \text{ V}^{*1}$
	K1401A		—	0.30	0.40		
Forward transfer admittance		$ y_{fs} $	6	9.5	—	S	$I_D = 8 \text{ A}, V_{DS} = 10 \text{ V}^{*1}$
Input capacitance		C_{iss}	—	1250	—	pF	$V_{DS} = 10 \text{ V}, V_{GS} = 0,$
Output capacitance		C_{oss}	—	420	—	pF	$f = 1 \text{ MHz}$
Reverse transfer capacitance		C_{rss}	—	70	—	pF	
Turn-on delay time		$t_{d(on)}$	—	15	—	ns	$I_D = 8 \text{ A}, V_{GS} = 10 \text{ V},$
Rise time		t_r	—	80	—	ns	$R_L = 3.75 \Omega$
Turn-off delay time		$t_{d(off)}$	—	100	—	ns	
Fall time		t_f	—	55	—	ns	
Body to drain diode forward voltage		V_{DF}	—	1.05	—	V	$I_F = 15 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time		t_{rr}	—	370	—	ns	$I_F = 15 \text{ A}, V_{GS} = 0,$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Note: 1. Pulse test

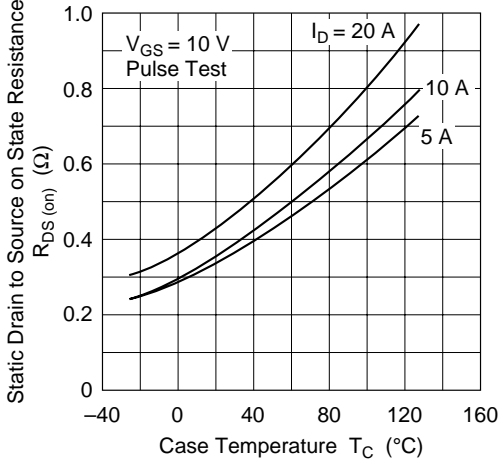
Drain to Source Saturation Voltage vs. Gate to Source Voltage



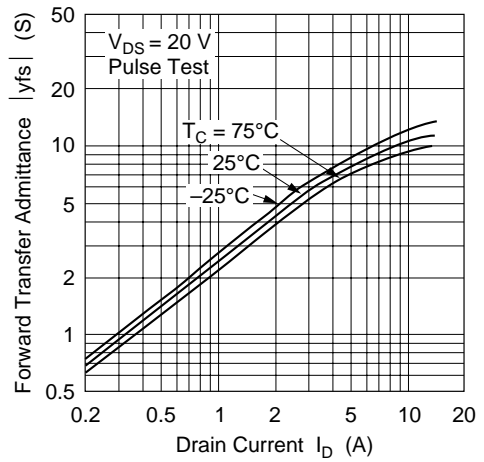
Static Drain to Source on State Resistance vs. Drain Current



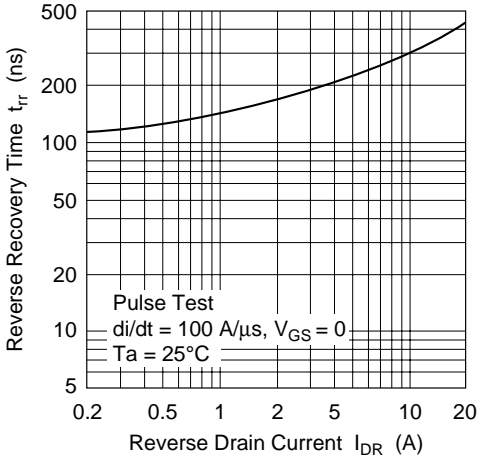
Static Drain to Source on State Resistance vs. Temperature



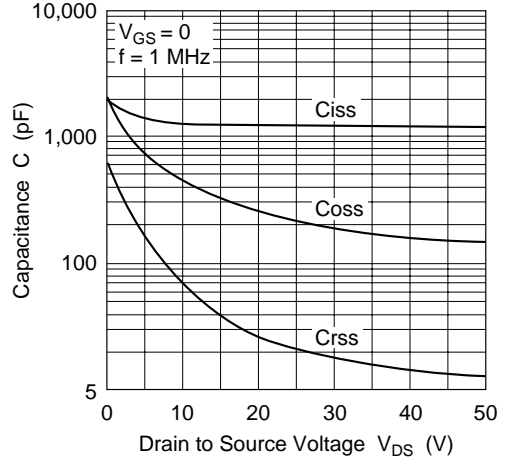
Forward Transfer Admittance vs. Drain Current



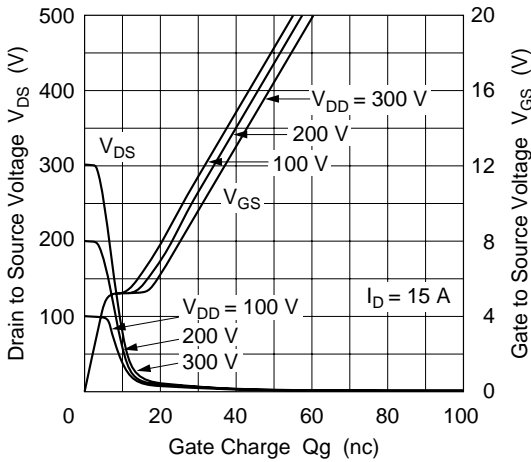
Body to Drain Diode Reverse Recovery Time



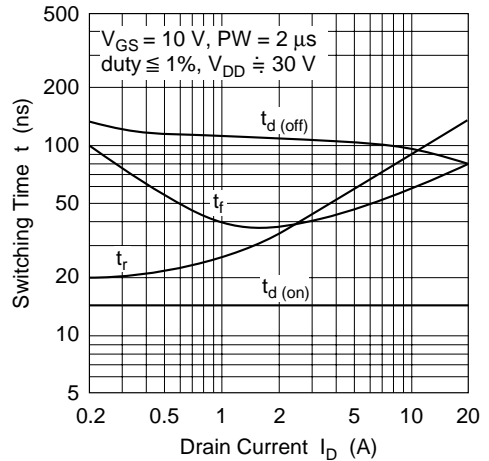
Typical Capacitance vs. Drain to Source Voltage

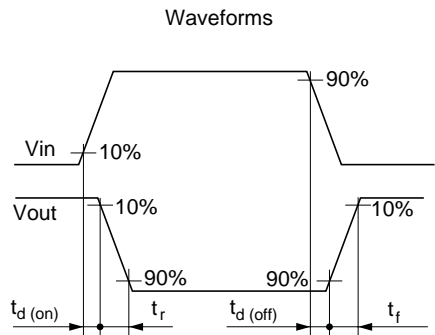
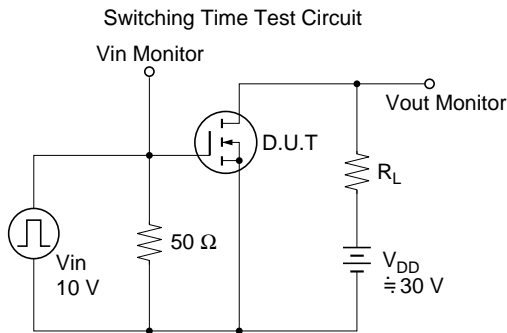
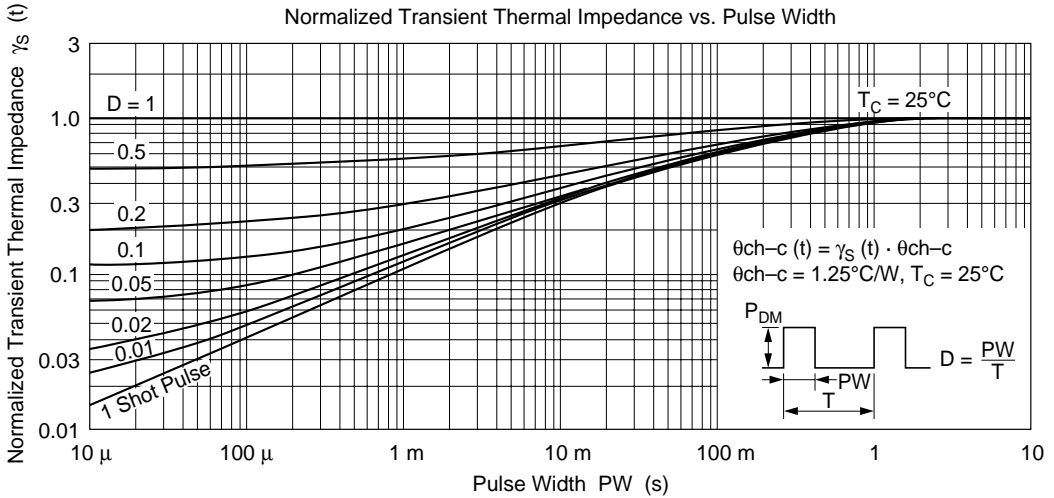
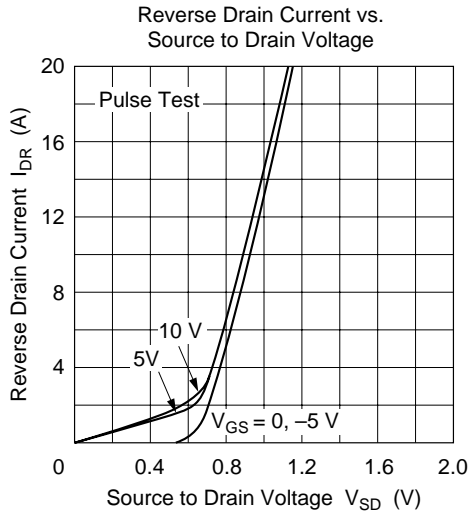


Dynamic Input Characteristics

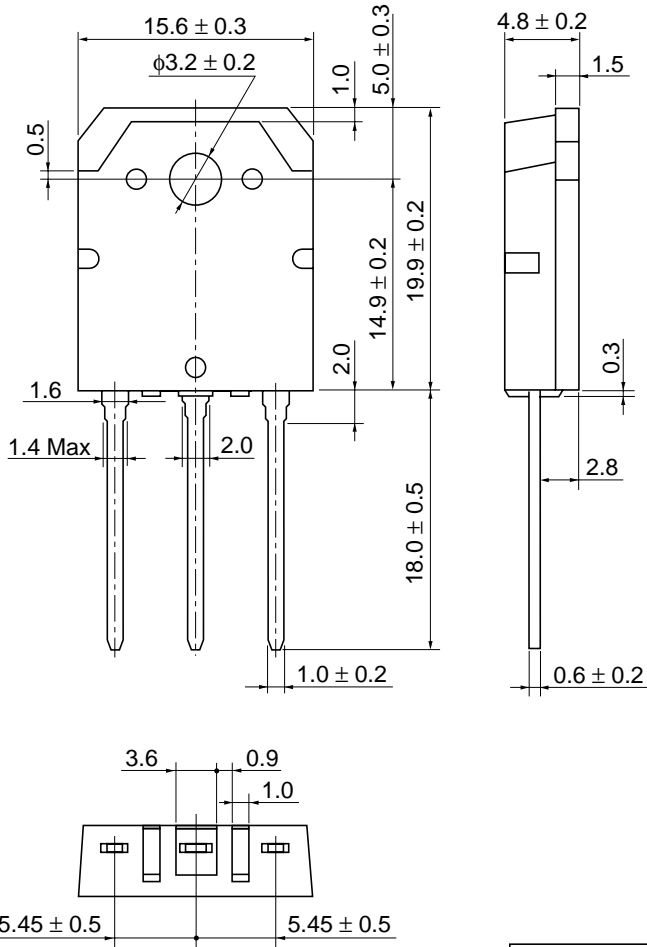


Switching Characteristics

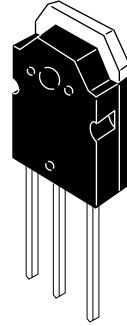




Package Dimensions



As of January, 2001
Unit: mm



Hitachi Code	TO-3P
JEDEC	—
EIAJ	Conforms
Mass (reference value)	5.0 g

Cautions

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