

To all our customers

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

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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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# 2SK1403, 2SK1403A

Silicon N-Channel MOS FET

**RENESAS**

ADE-208-1283 (Z)  
1st. Edition  
Mar. 2001

## Application

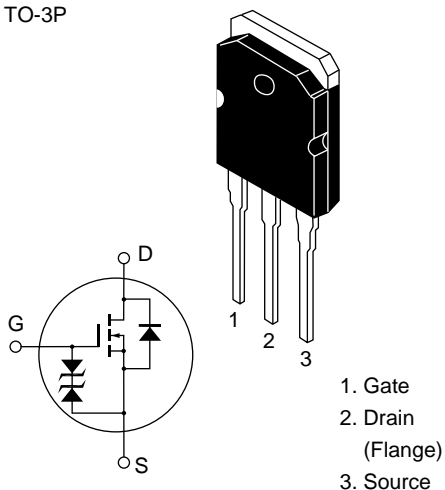
High speed power switching

## Features

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

## Outline

TO-3P



## 2SK1403, 2SK1403A

### Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	Ratings	Unit
Drain to source voltage	2SK1403	$V_{DSS}$	600	V
	2SK1403A		650	
Gate to source voltage		$V_{GSS}$	±30	V
Drain current		$I_D$	8	A
Drain peak current		$I_{D(pulse)}^{*1}$	32	A
Body to drain diode reverse drain current		$I_{DR}$	8	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  $\leq 1\%$

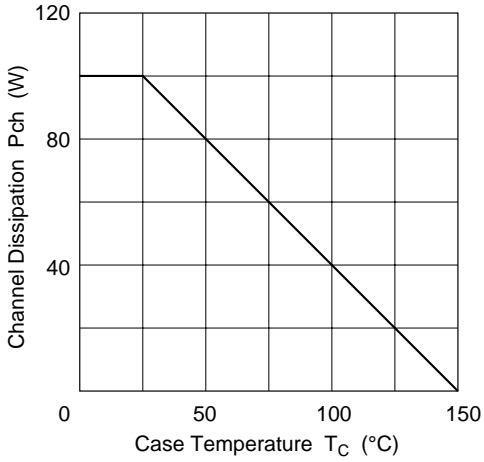
2. Value at  $T_C = 25^\circ C$

## Electrical Characteristics (Ta = 25°C)

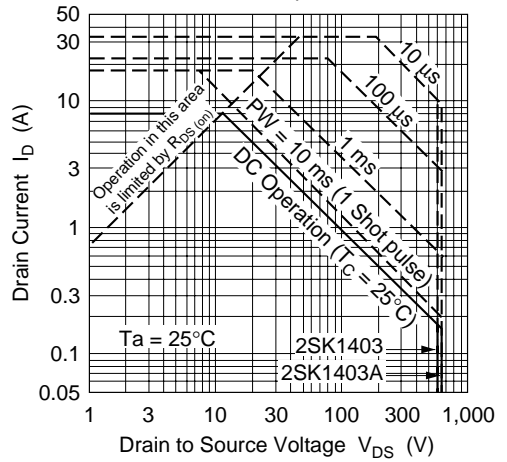
Item		Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	K1403 K1403A	$V_{(BR)DSS}$	600 650	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage		$V_{(BR)GSS}$	$\pm 30$	—	—	V	$I_G = \pm 100 \mu\text{A}$ , $V_{DS} = 0$
Gate to source leak current		$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 25 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	K1403 K1403A	$I_{DSS}$	—	—	250	$\mu\text{A}$	$V_{DS} = 500 \text{ V}$ , $V_{GS} = 0$ $V_{DS} = 550 \text{ V}$ , $V_{GS} = 0$
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	K1403 K1403A	$R_{DS(on)}$	—	0.9 1.0	1.3 1.4	$\Omega$	$I_D = 4 \text{ A}$ , $V_{GS} = 10 \text{ V}^{*1}$
Forward transfer admittance		$ y_{fs} $	4.0	6.5	—	S	$I_D = 4 \text{ A}$ , $V_{DS} = 10 \text{ V}^{*1}$
Input capacitance		$C_{iss}$	—	1180	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ ,
Output capacitance		$C_{oss}$	—	265	—	pF	$f = 1 \text{ MHz}$
Reverse transfer capacitance		$C_{rss}$	—	50	—	pF	
Turn-on delay time		$t_{d(on)}$	—	15	—	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		$t_{d(off)}$	—	105	—	ns	
Fall time		$t_f$	—	45	—	ns	
Body to drain diode forward voltage		$V_{DF}$	—	0.95	—	V	$I_F = 8 \text{ A}$ , $V_{GS} = 0$
Body to drain diode reverse recovery time		$t_{rr}$	—	420	—	ns	$I_F = 8 \text{ A}$ , $V_{GS} = 0$ , $di_F/dt = 100 \text{ A}/\mu\text{s}$

Note: 1. Pulse test

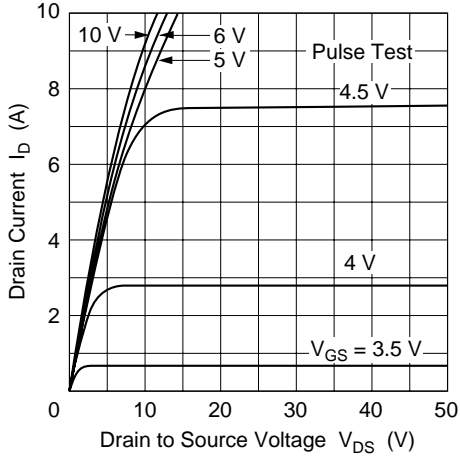
Power vs. Temperature Derating



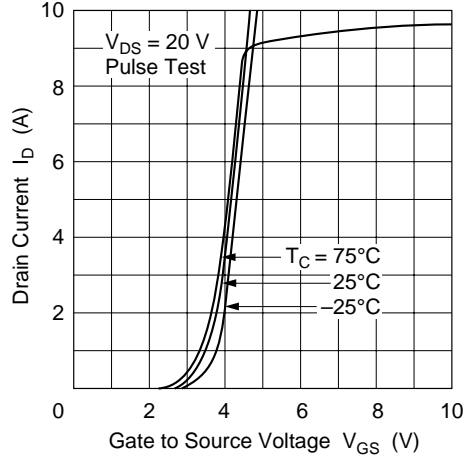
Maximum Safe Operation Area

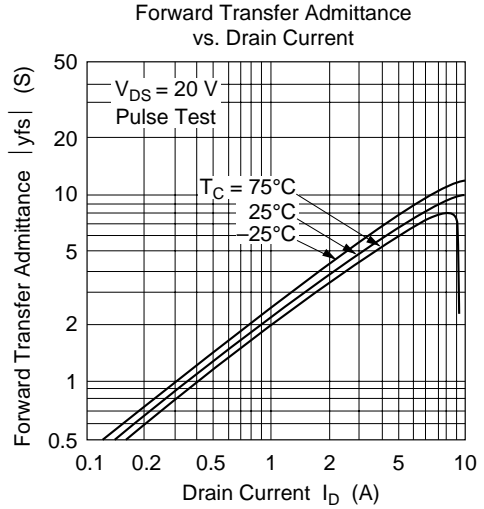
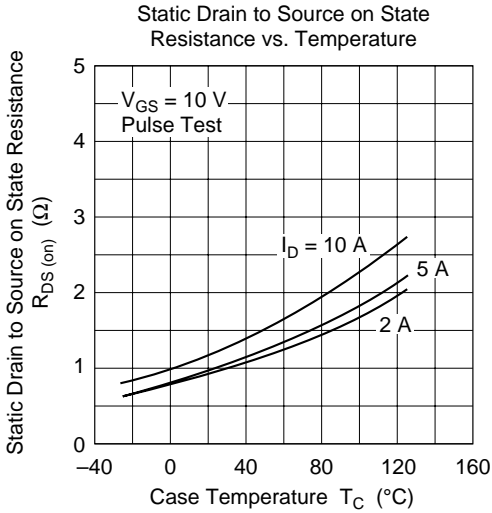
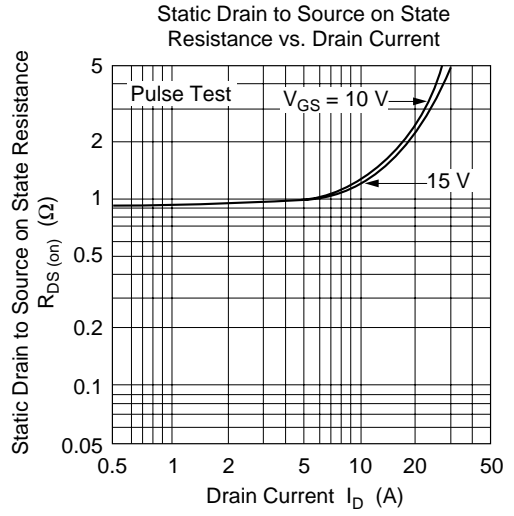
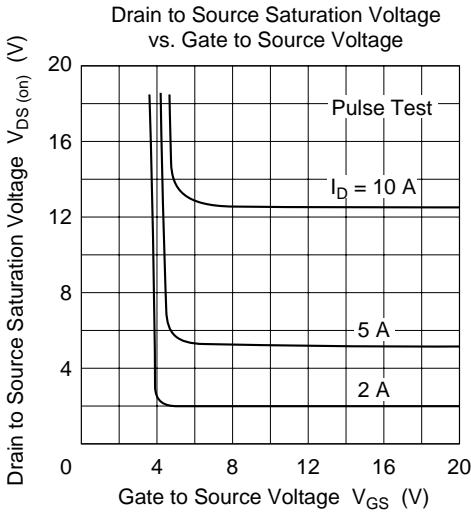


Typical Output Characteristics

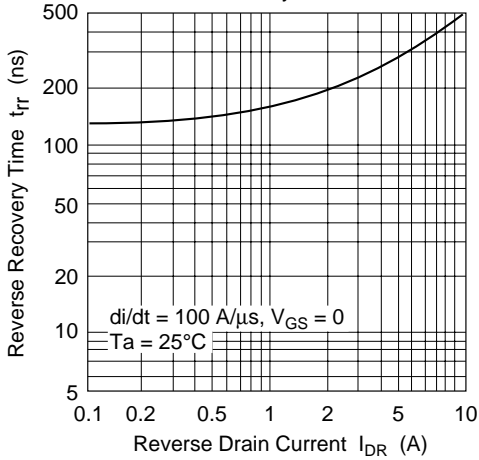


Typical Transfer Characteristics

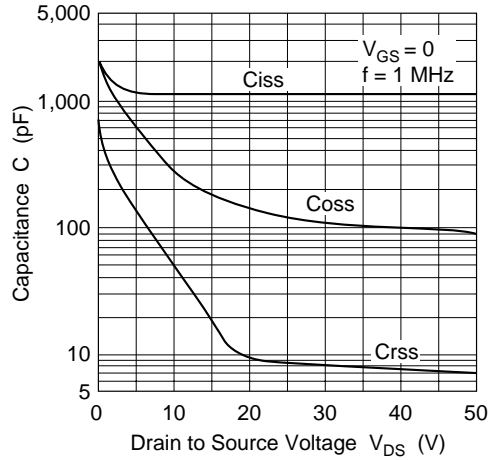




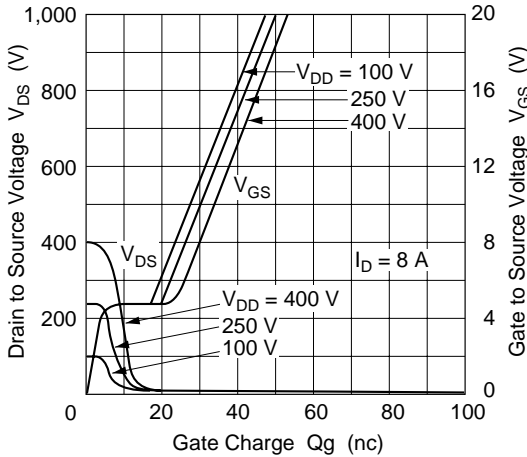
Body to Drain Diode Reverse Recovery Time



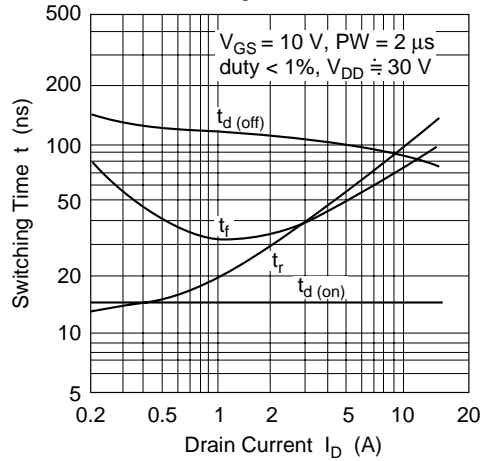
Typical Capacitance vs. Drain to Source Voltage

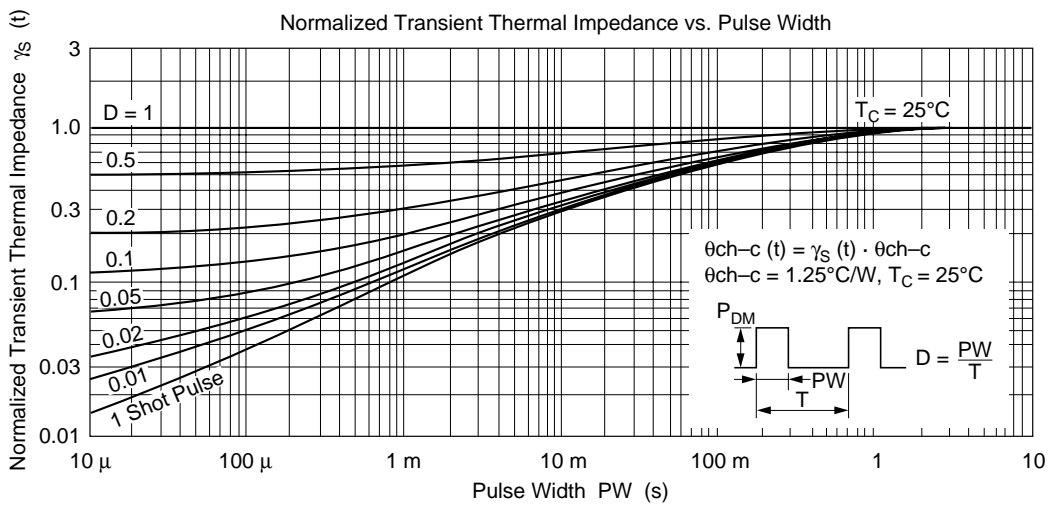
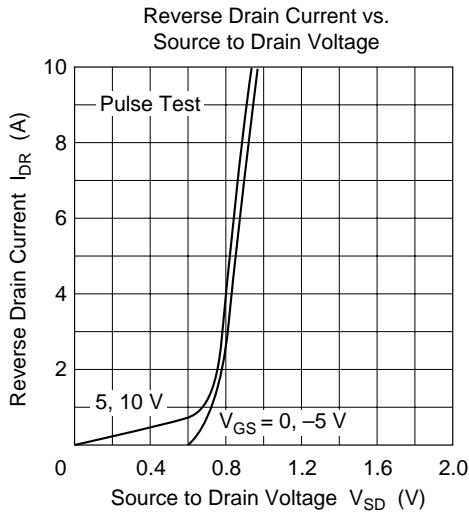


Dynamic Input Characteristics

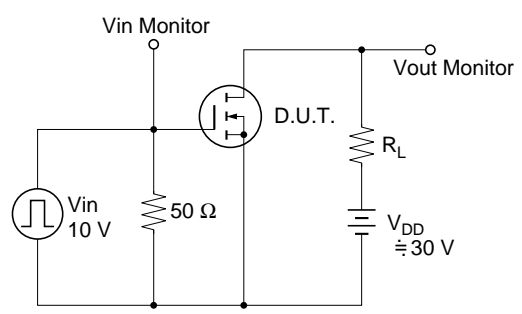


Switching Characteristics

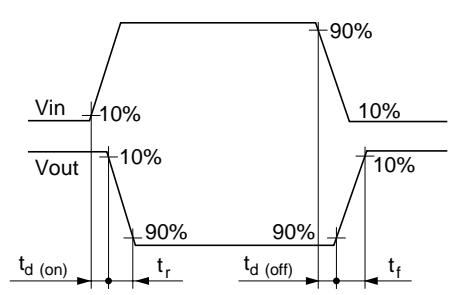




Switching Time Test Circuit



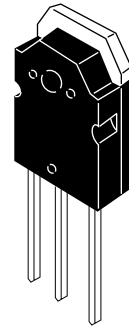
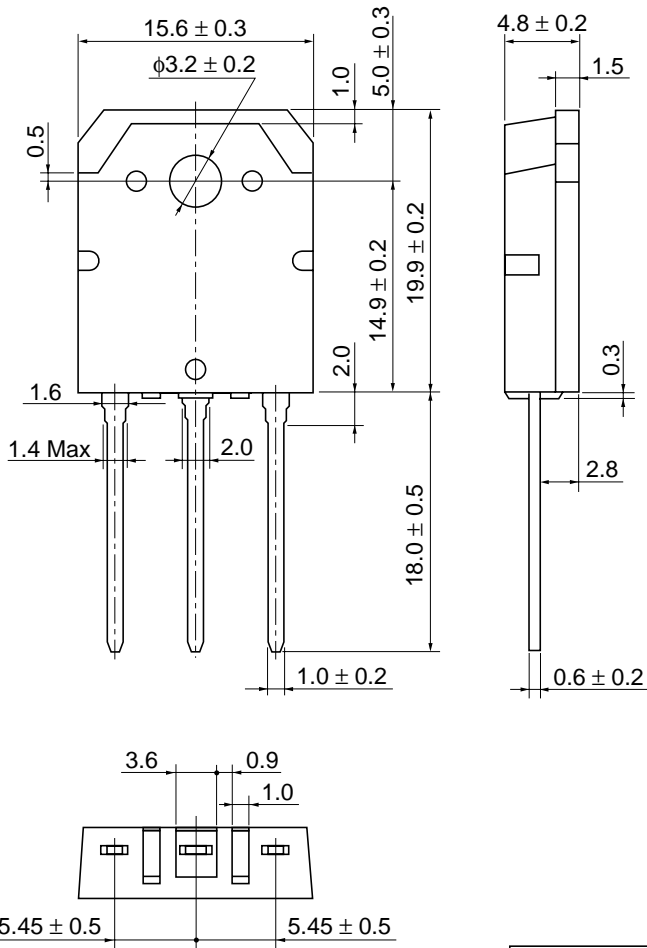
Waveforms



## 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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