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# 2SK1304

Silicon N-Channel MOS FET

# HITACHI

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## Application

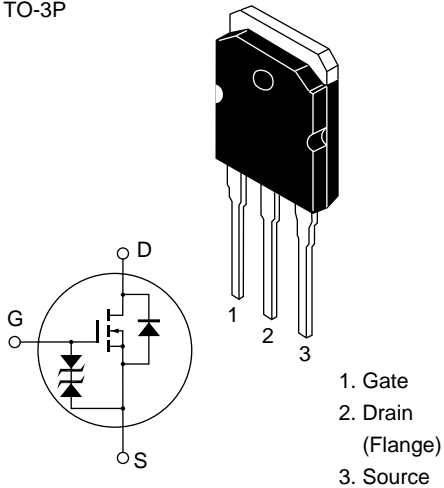
High speed power switching

## Features

- Low on-resistance
- High speed switching
- Low drive current
- 4 V gate drive device
  - Can be driven from 5 V source
- Suitable for motor drive, DC-DC converter, power switch and solenoid drive

## Outline

TO-3P



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## 2SK1304

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

Item	Symbol	Ratings	Unit
Drain to source voltage	V <sub>DSS</sub>	100	V
Gate to source voltage	V <sub>GSS</sub>	±20	V
Drain current	I <sub>D</sub>	40	A
Drain peak current	I <sub>D(pulse)</sub> <sup>*1</sup>	160	A
Body to drain diode reverse drain current	I <sub>DR</sub>	40	A
Channel dissipation	Pch <sup>*2</sup>	100	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

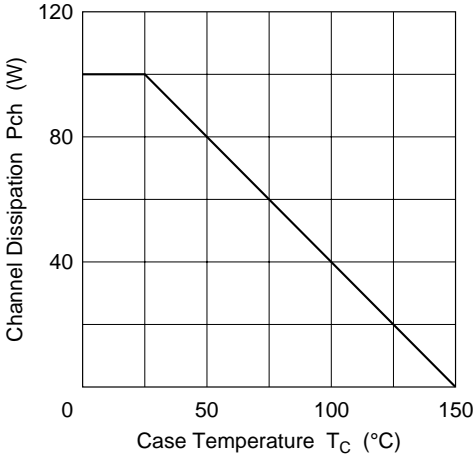
Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%  
2. Value at T<sub>c</sub> = 25°C

## Electrical Characteristics (Ta = 25°C)

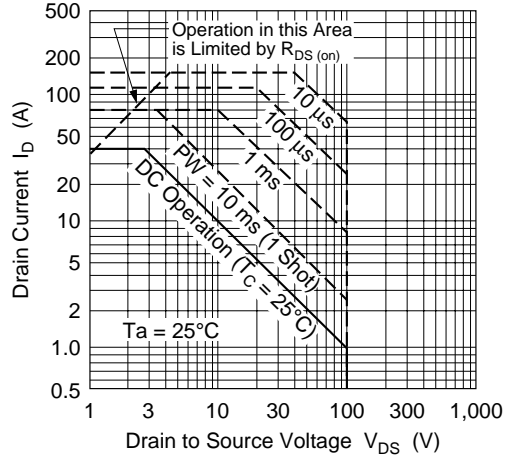
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	100	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 20$	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$ , $V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 16 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	250	$\mu\text{A}$	$V_{DS} = 80 \text{ V}$ , $V_{GS} = 0$
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	$R_{DS(on)}$	—	0.025	0.03	$\Omega$	$I_D = 20 \text{ A}$ , $V_{GS} = 10 \text{ V}^{*1}$
		—	0.03	0.04	$\Omega$	$I_D = 20 \text{ A}$ , $V_{GS} = 4 \text{ V}^{*1}$
Forward transfer admittance	$ y_{fs} $	22	35	—	S	$I_D = 20 \text{ A}$ , $V_{DS} = 10 \text{ V}^{*1}$
Input capacitance	$C_{iss}$	—	3500	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ ,
Output capacitance	$C_{oss}$	—	1400	—	pF	$f = 1 \text{ MHz}$
Reverse transfer capacitance	$C_{rss}$	—	340	—	pF	
Turn-on delay time	$t_{d(on)}$	—	25	—	ns	$I_D = 20 \text{ A}$ , $V_{GS} = 10 \text{ V}$ ,
Rise time	$t_r$	—	170	—	ns	$R_L = 1.5 \text{ }\Omega$
Turn-off delay time	$t_{d(off)}$	—	730	—	ns	
Fall time	$t_f$	—	300	—	ns	
Body to drain diode forward voltage	$V_{DF}$	—	1.2	—	V	$I_F = 40 \text{ A}$ , $V_{GS} = 0$
Body to drain diode reverse recovery time	$t_{rr}$	—	300	—	ns	$I_F = 40 \text{ A}$ , $V_{GS} = 0$ , $di_F/dt = 50 \text{ A}/\mu\text{s}$

Note: 1. Pulse test

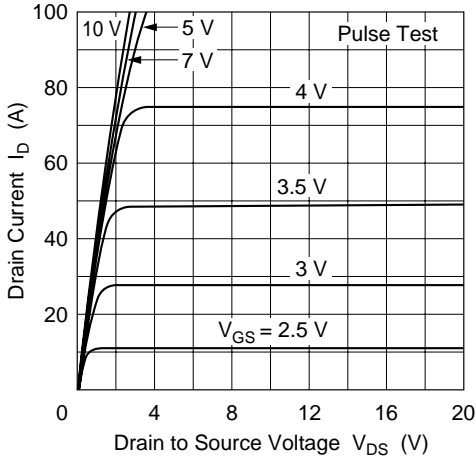
Power vs. Temperature Derating



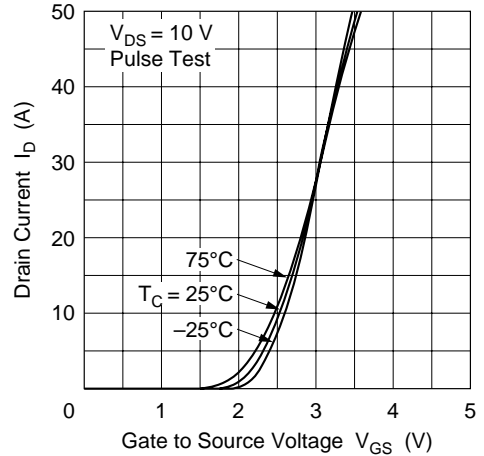
Maximum Safe Operation Area

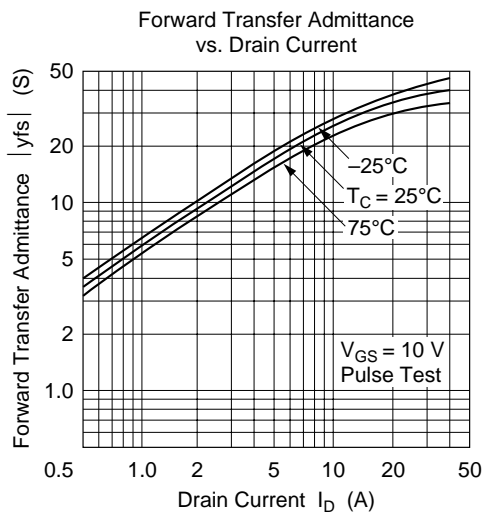
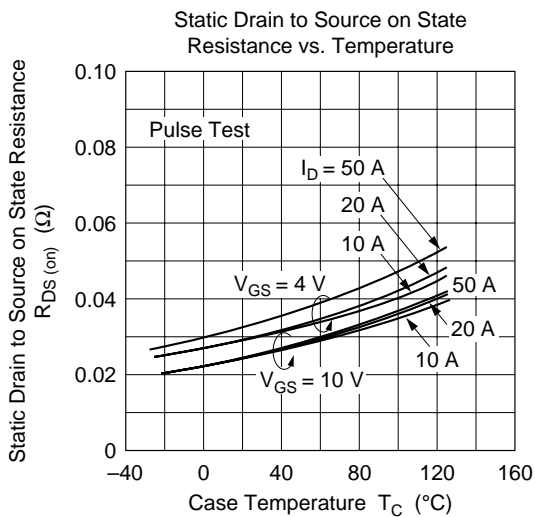
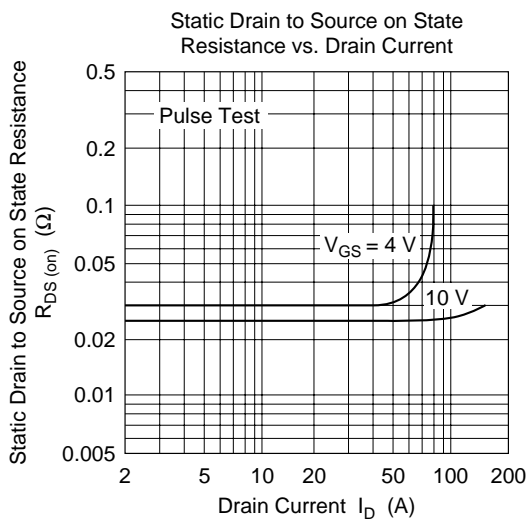
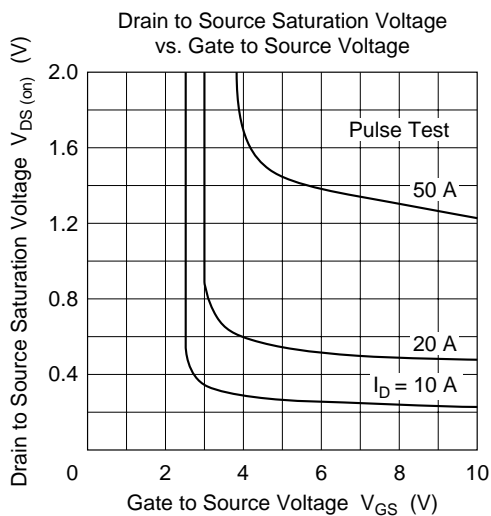


Typical Output Characteristics

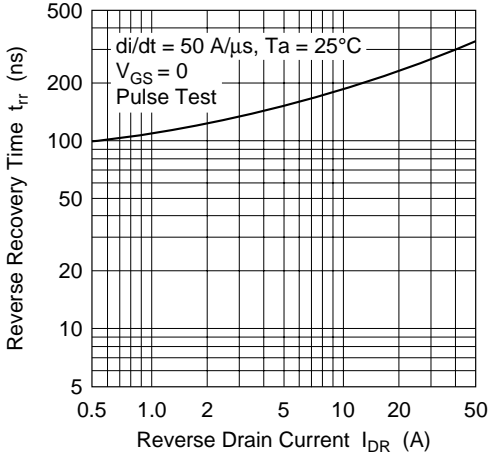


Typical Transfer Characteristics

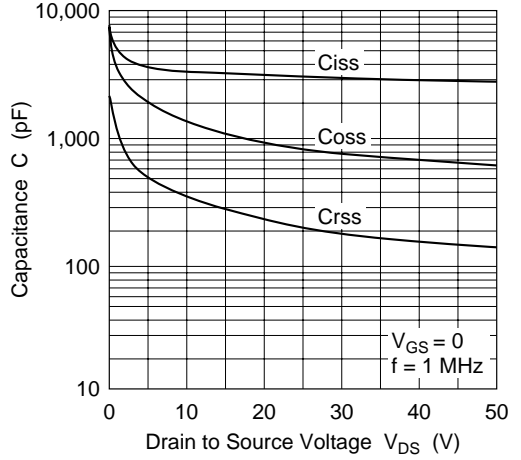




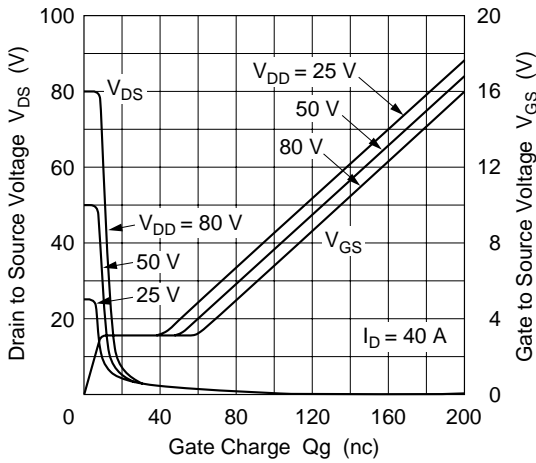
Body to Drain Diode Reverse Recovery Time



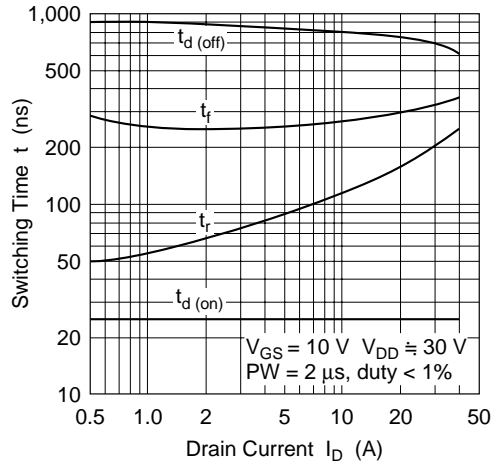
Typical Capacitance vs. Drain to Source Voltage

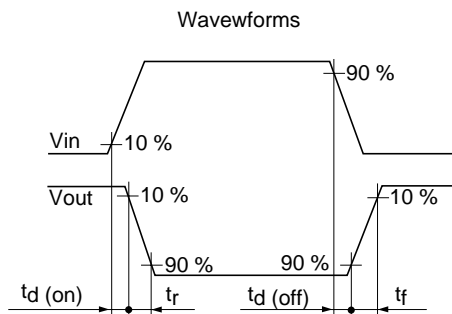
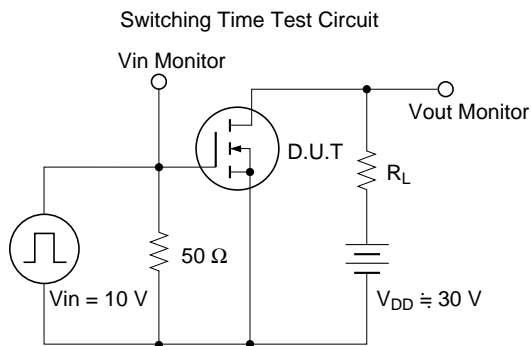
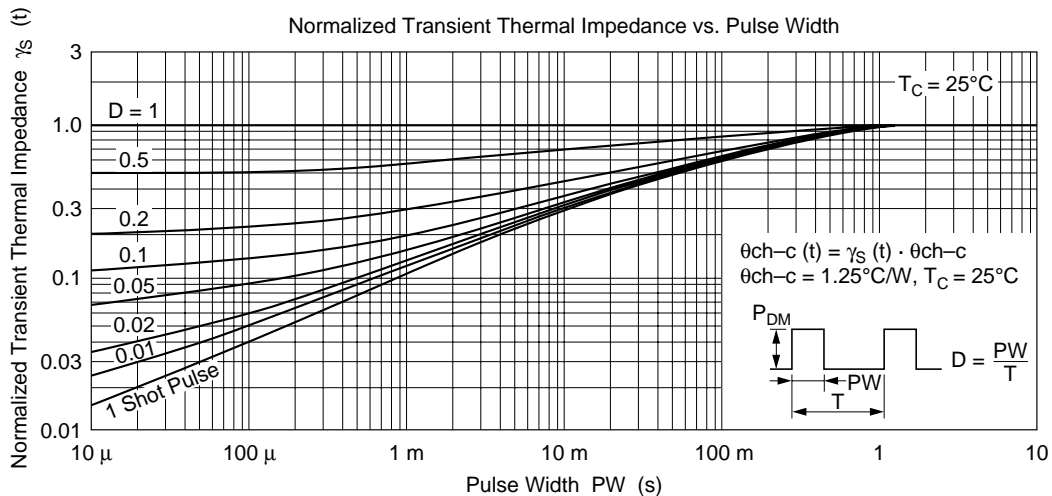
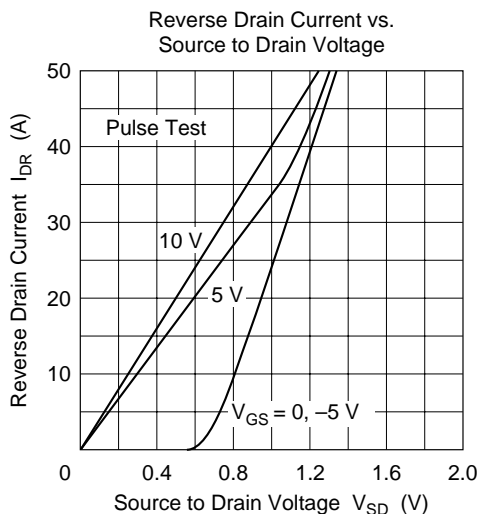


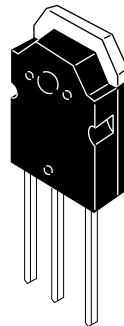
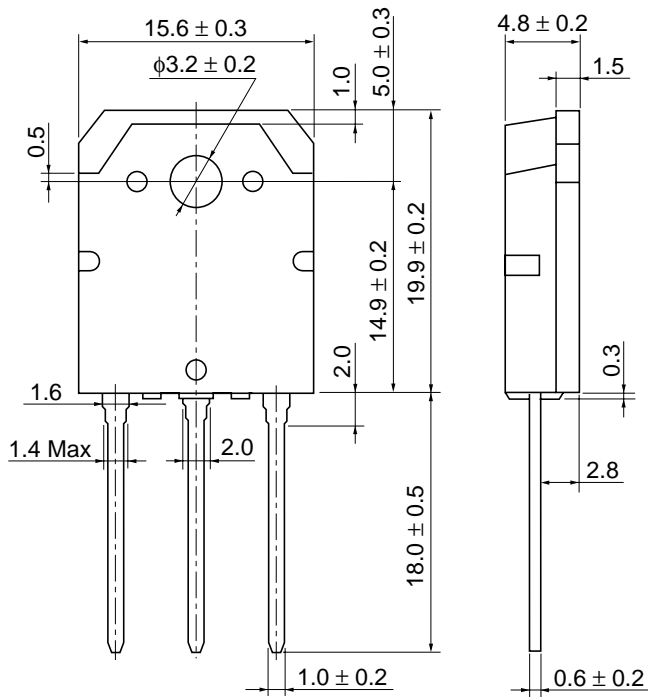
Dynamic Input Characteristics



Switching Characteristics







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



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