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# 2SK1169, 2SK1170

Silicon N-Channel MOS FET

# HITACHI

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## Application

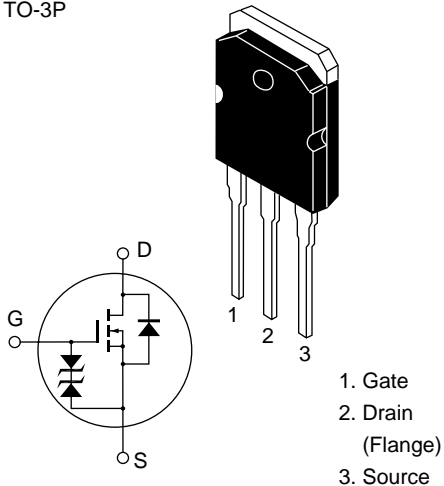
High speed power switching

## Features

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

## Outline

TO-3P



## 2SK1169, 2SK1170

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

Item		Symbol	Rated	Unit
Drain to source voltage	2SK1169	$V_{DSS}$	450	V
	2SK1170		500	
Gate to source voltage		$V_{GSS}$	±30	V
Drain current		$I_D$	20	A
Drain peak current		$I_{D(pulse)}^{*1}$	80	A
Body to drain diode reverse drain current		$I_{DR}$	20	A
Channel dissipation		$P_{ch}^{*2}$	120	W
Channel temperature		$T_{ch}$	150	°C
Storage temperature		$T_{stg}$	-55 to +150	°C

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

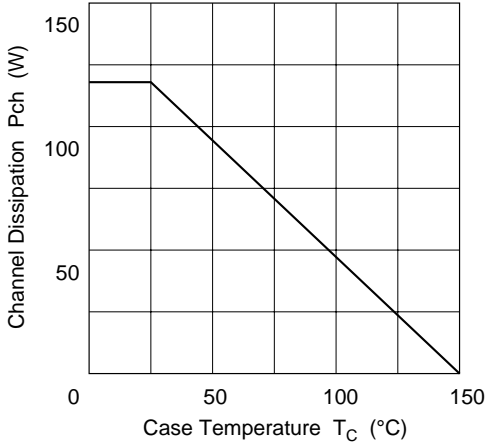
2. Value at  $T_c = 25^\circ C$

**Electrical Characteristics (Ta = 25°C)**

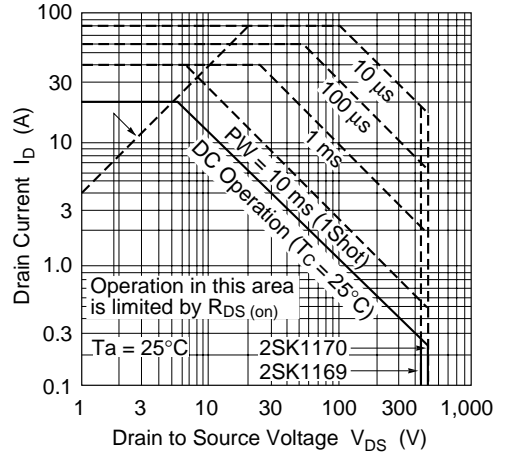
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	2SK1169 $V_{(BR)DSS}$ 2SK1170	450 500	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 30$	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}, V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	2SK1169 $I_{DSS}$ 2SK1170	—	—	250	$\mu\text{A}$	$V_{DS} = 360 \text{ V}, V_{GS} = 0$ $V_{DS} = 400 \text{ V}, V_{GS} = 0$
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	2SK1169 $R_{DS(on)}$ 2SK1170	— —	0.20 0.22	0.25 0.27	$\Omega$	$I_D = 10 \text{ A}, V_{GS} = 10 \text{ V}^{*1}$
Forward transfer admittance	$ y_{fs} $	10	16	—	S	$I_D = 10 \text{ A}, V_{DS} = 10 \text{ V}^{*1}$
Input capacitance	$C_{iss}$	—	2800	—	pF	$V_{DS} = 10 \text{ V}, V_{GS} = 0,$
Output capacitance	$C_{oss}$	—	780	—	pF	$f = 1 \text{ MHz}$
Reverse transfer capacitance	$C_{rss}$	—	90	—	pF	
Turn-on delay time	$t_{d(on)}$	—	32	—	ns	$I_D = 10 \text{ A}, V_{GS} = 10 \text{ V},$
Rise time	$t_r$	—	115	—	ns	$R_L = 3 \text{ }\Omega$
Turn-off delay time	$t_{d(off)}$	—	200	—	ns	
Fall time	$t_f$	—	90	—	ns	
Body to drain diode forward voltage	$V_{DF}$	—	1.0	—	V	$I_F = 20 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time	$t_{rr}$	—	500	—	ns	$I_F = 20 \text{ A}, V_{GS} = 0,$ $di_p/dt = 100 \text{ A}/\mu\text{s}$

Note: 1. Pulse test

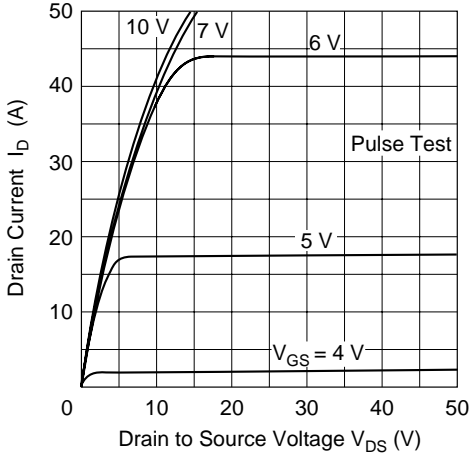
Power vs. Temperature Derating



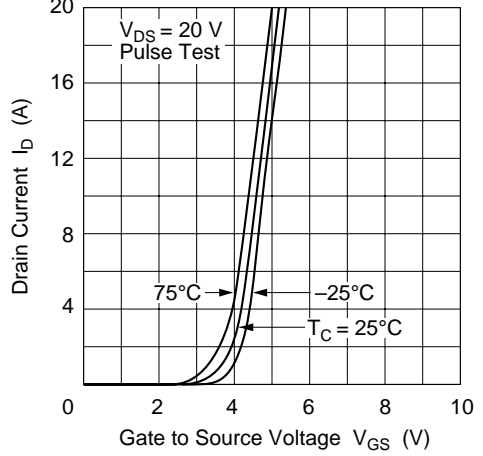
Maximum Safe Operation Area



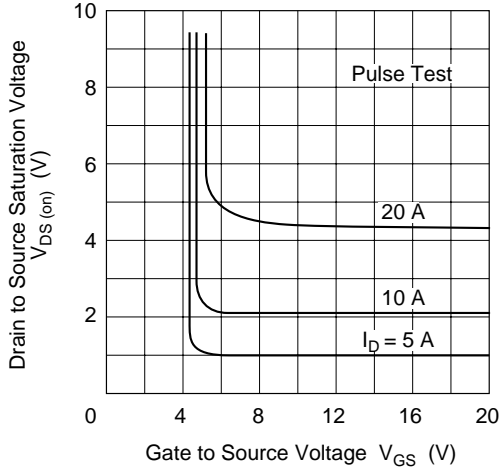
Typical Output Characteristics



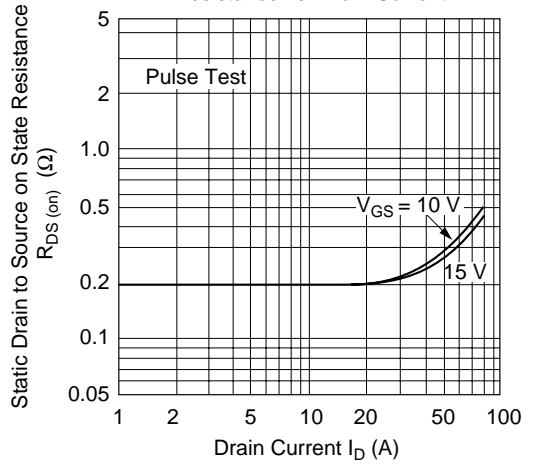
Typical Transfer Characteristics



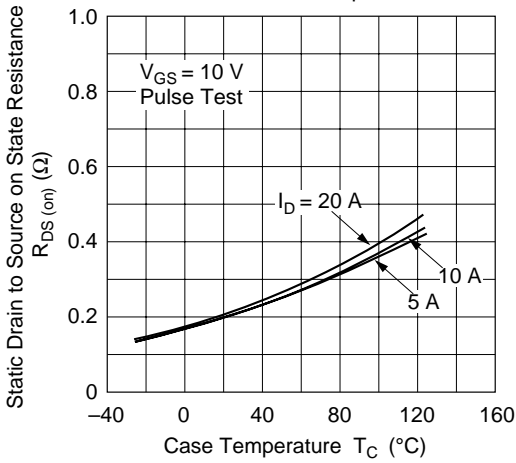
Drain to Source Saturation Voltage vs. Gate to Source Voltage



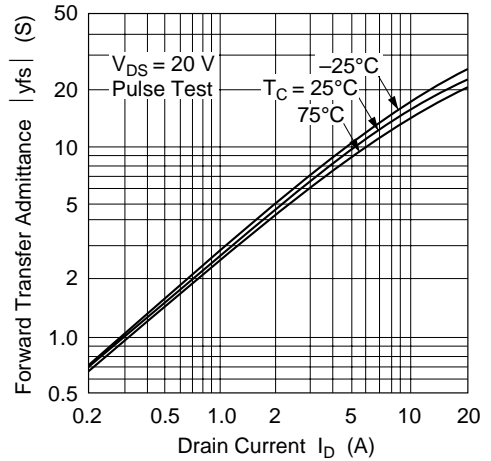
Static Drain to Source on State Resistance vs. Drain Current



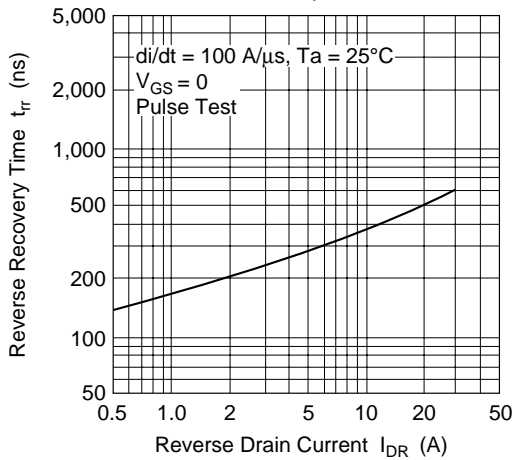
Static Drain to Source on State Resistance vs. Temperature



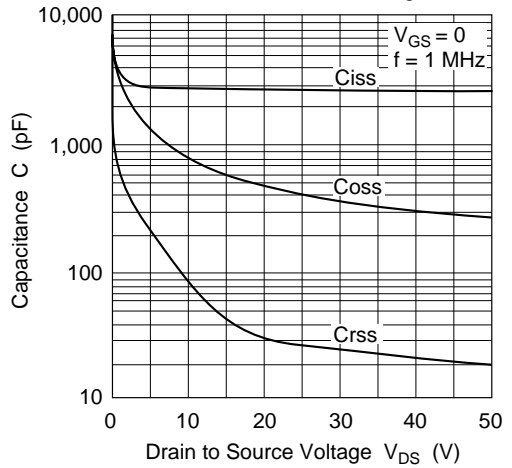
Forward Transfer Admittance vs. Drain Current



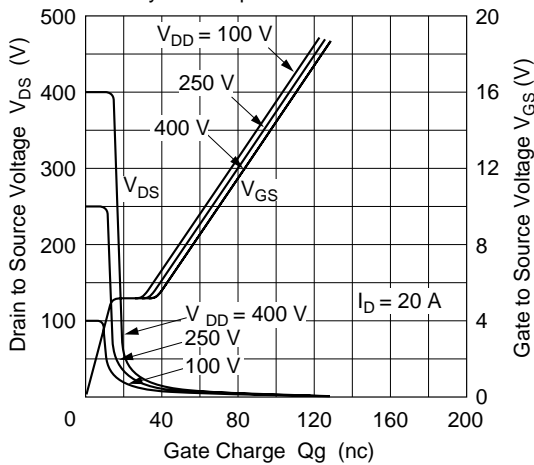
Body to Drain Diode Reverse Recovery Time



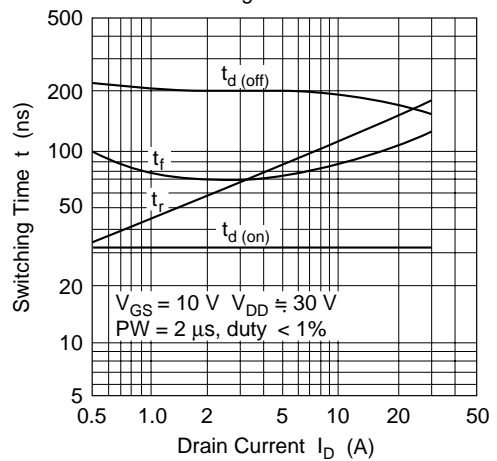
Typical Capacitance vs. Drain to Source Voltage

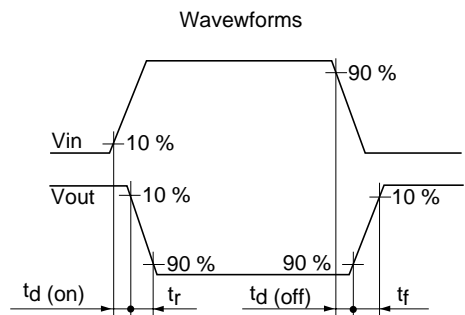
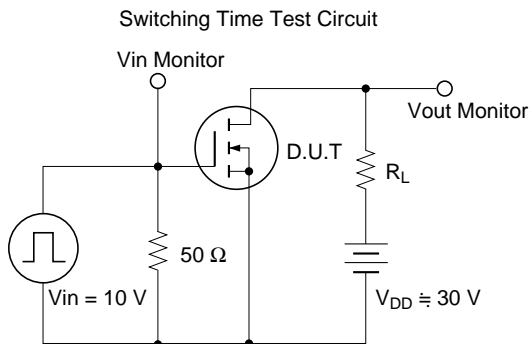
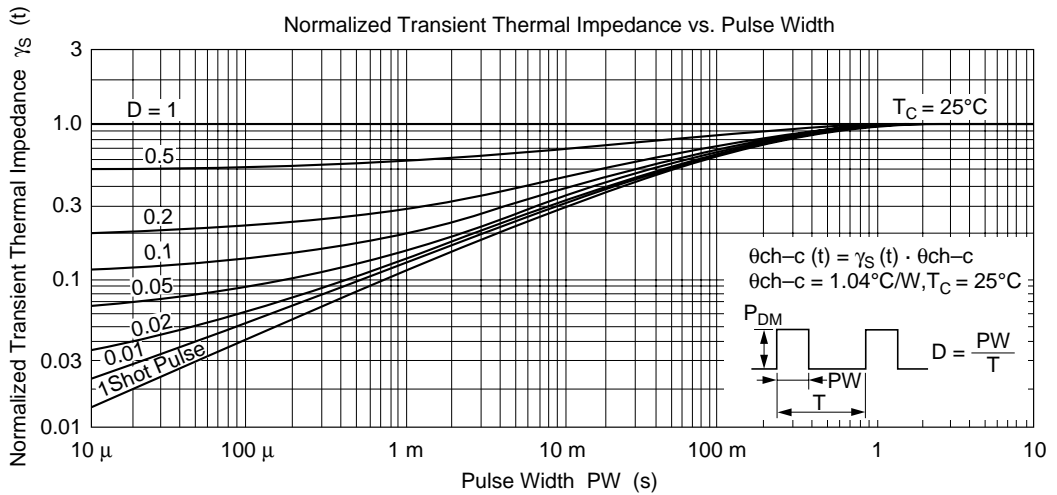
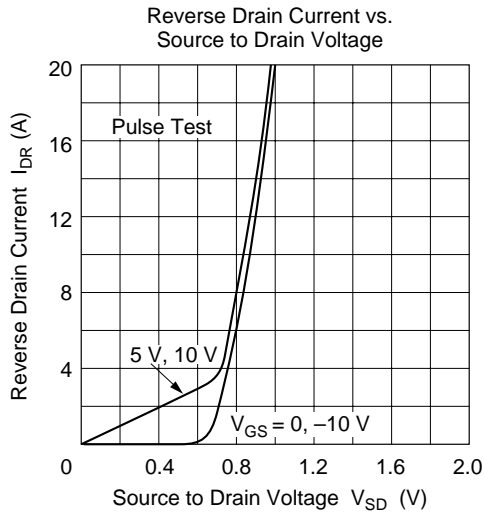


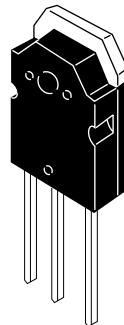
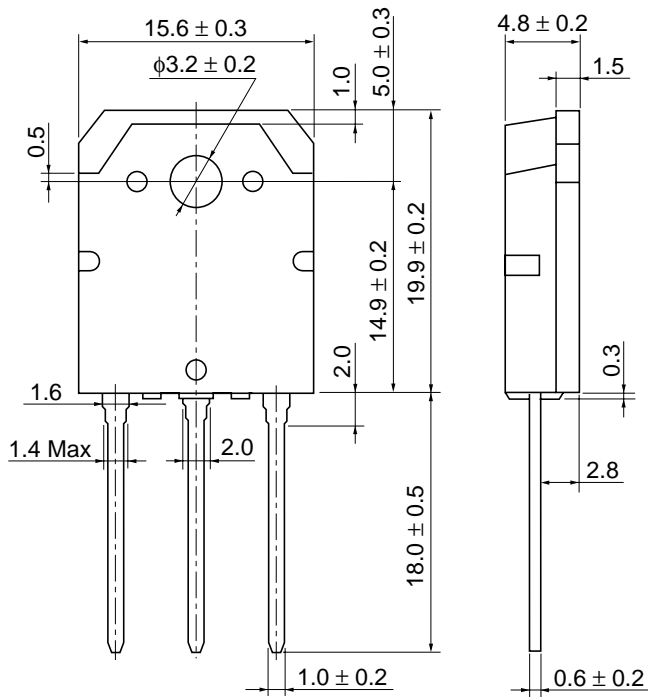
Dynamic Input Characteristics



Switching Characteristics







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



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