
2SK1169, 2SK1170

Silicon N-Channel MOS FET

HITACHI

Application

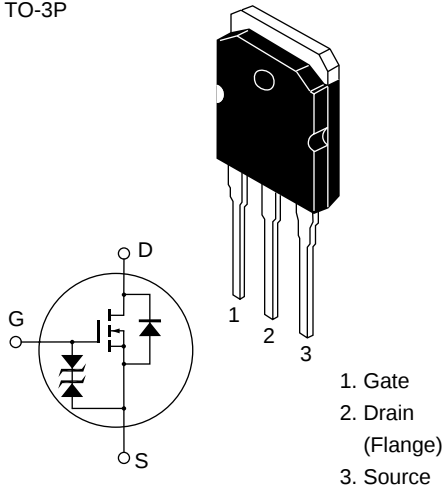
High speed power switching

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)

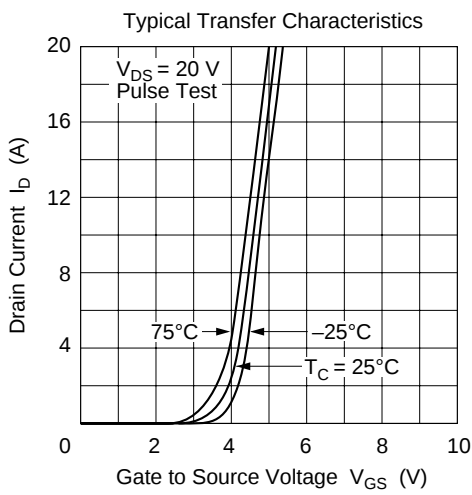
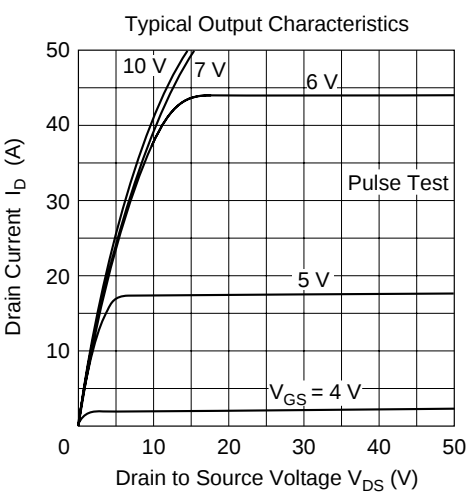
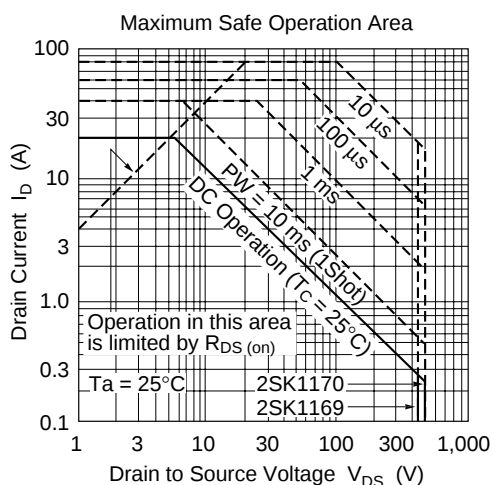
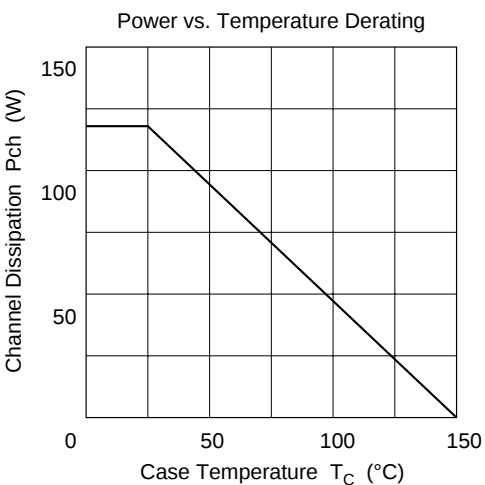
Item		Symbol	Ratings	Unit
Drain to source voltage	2SK1169	V_{DSS}	450	V
	2SK1170		500	
Gate to source voltage		V_{GSS}	±30	V
Drain current		I_D	20	A
Drain peak current		$I_{D(pulse)}^{*1}$	80	A
Body to drain diode reverse drain current		I_{DR}	20	A
Channel dissipation		P_{ch}^{*2}	120	W
Channel temperature		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 $T_c = 25^\circ C$

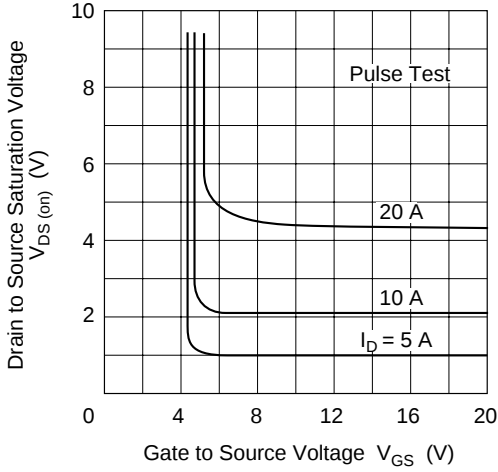
Electrical Characteristics (Ta = 25°C)

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	$V_{(BR)GSS}$	± 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	2SK1169 I_{DSS} 2SK1170	—	—	250	μA	$V_{DS} = 360 \text{ V}$, $V_{GS} = 0$ $V_{DS} = 400 \text{ V}$, $V_{GS} = 0$
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	Ω	$I_D = 10 \text{ A}$, $V_{GS} = 10 \text{ V}^{*1}$
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	$R_L = 3 \Omega$
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	$I_F = 20 \text{ A}$, $V_{GS} = 0$, $di_F/dt = 100 \text{ A}/\mu\text{s}$

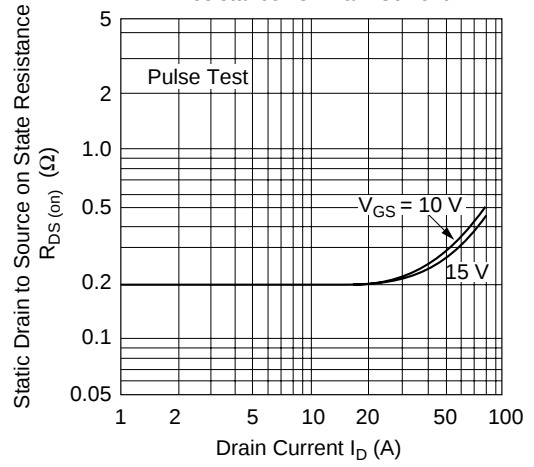
Note: 1. Pulse test



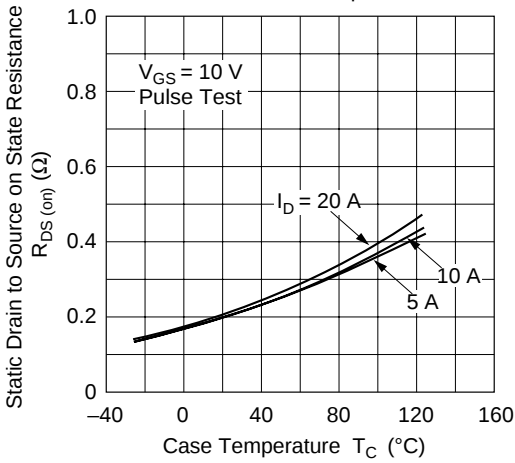
Drain to Source Saturation Voltage
vs. Gate to Source Voltage



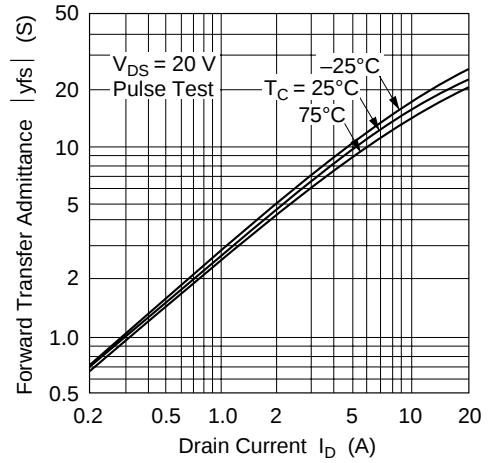
Static Drain to Source on State
Resistance vs. Drain Current



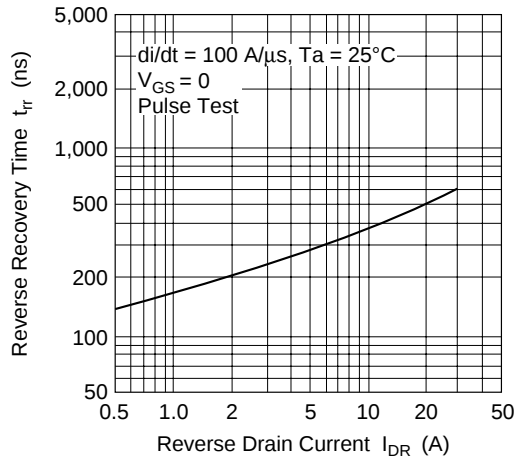
Static Drain to Source on State
Resistance vs. Temperature



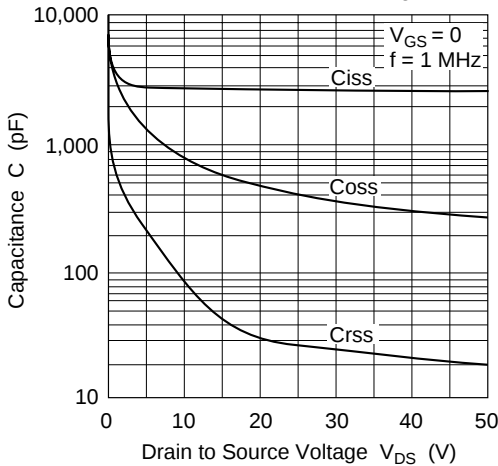
Forward Transfer Admittance
vs. Drain Current



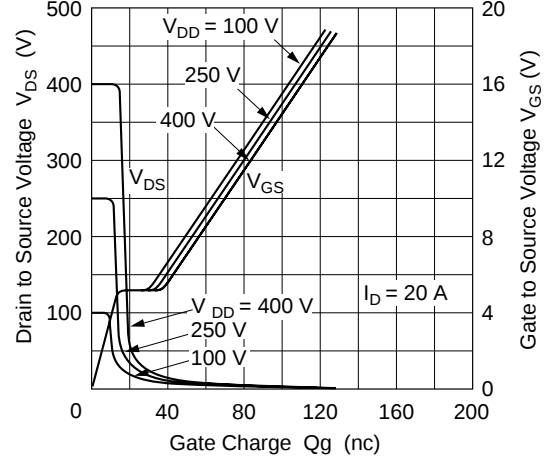
Body to Drain Diode Reverse Recovery Time



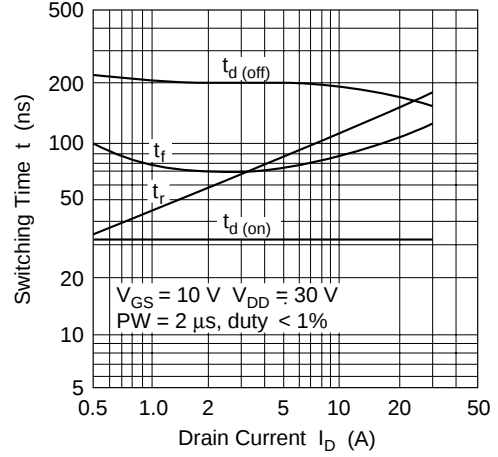
Typical Capacitance vs. Drain to Source Voltage

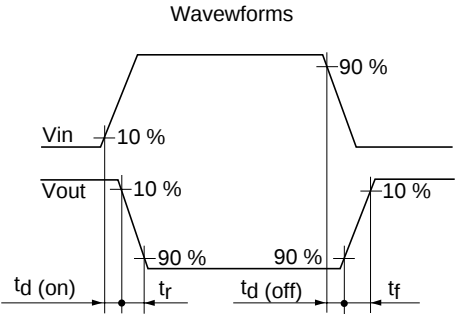
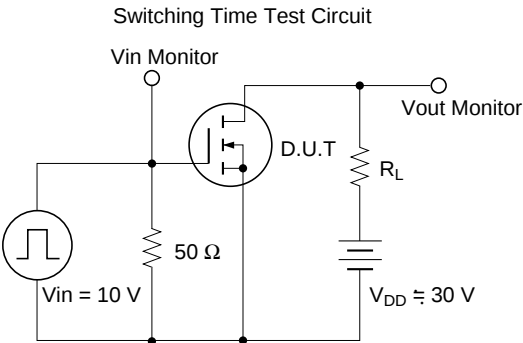
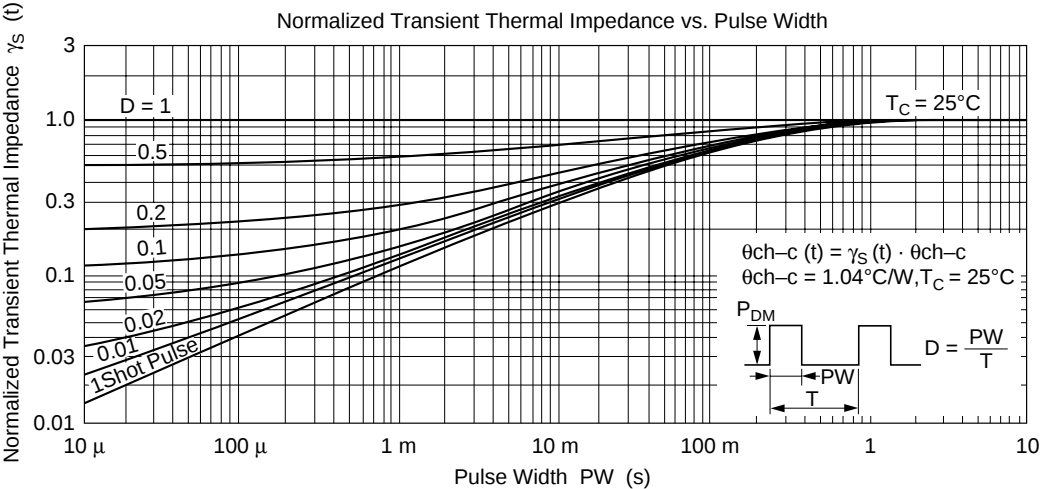
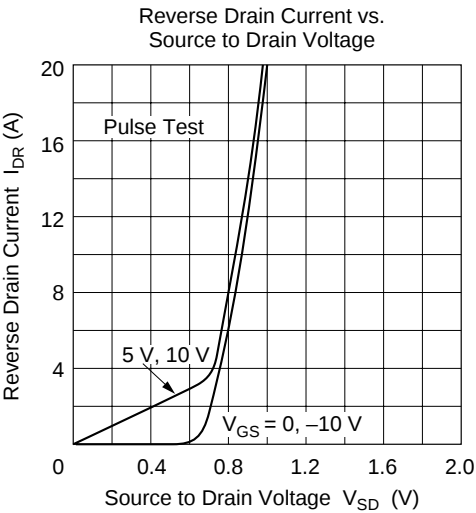


Dynamic Input Characteristics

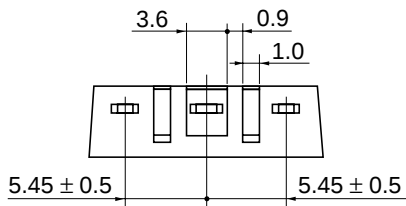
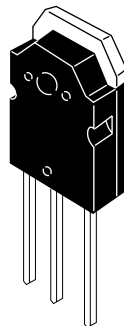
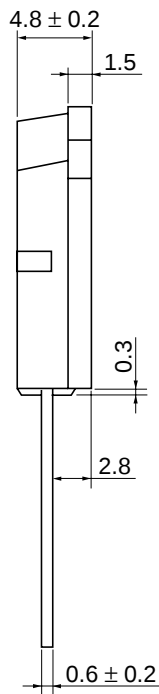
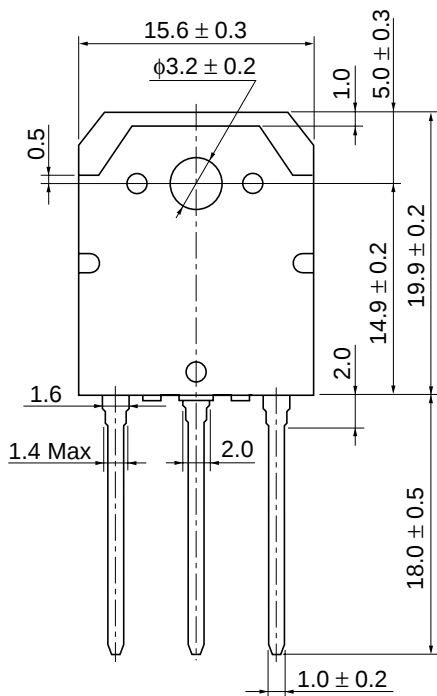


Switching Characteristics





Unit: mm



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

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