

# 2SK1933

Silicon N-Channel MOS FET

# HITACHI

## Application

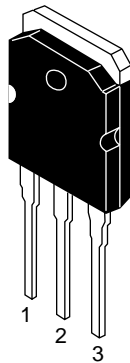
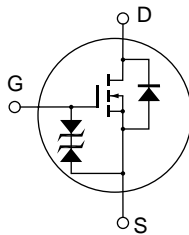
High speed power switching

## Features

- Low on-resistance
- High speed switching
- No secondary breakdown
- Suitable for Switching regulator

## Outline

TO-3P



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

**Absolute Maximum Ratings** ( $T_a = 25^\circ\text{C}$ )

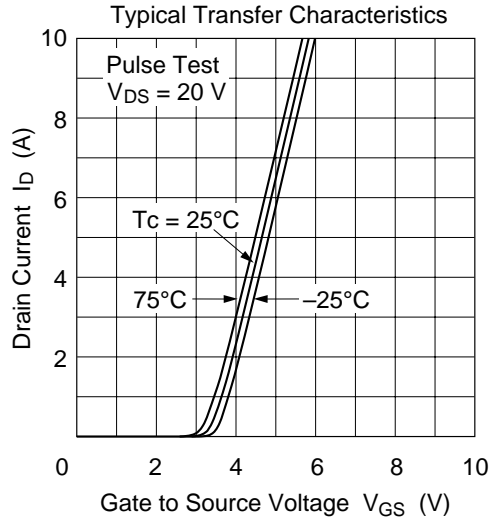
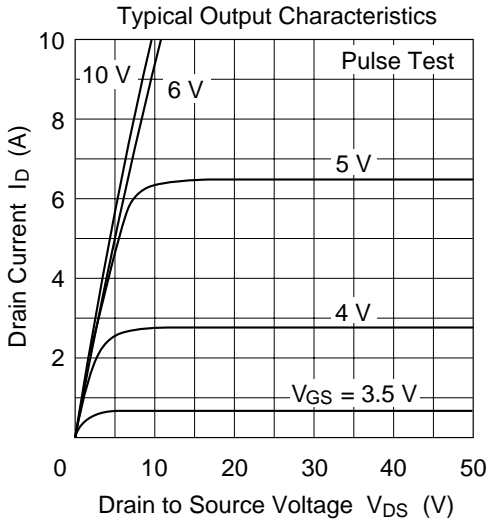
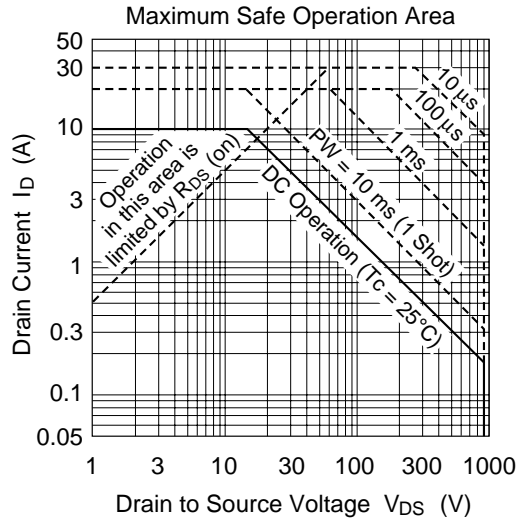
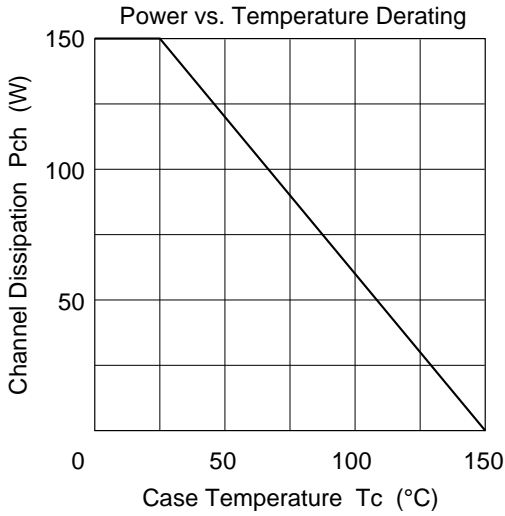
<b>Item</b>	<b>Symbol</b>	<b>Ratings</b>	<b>Unit</b>
Drain to source voltage	$V_{\text{DSS}}$	900	V
Gate to source voltage	$V_{\text{GSS}}$	$\pm 30$	V
Drain current	$I_{\text{D}}$	10	A
Drain peak current	$I_{\text{D(pulse)}}^{*1}$	30	A
Body to drain diode reverse drain current	$I_{\text{DR}}$	10	A
Channel dissipation	$\text{Pch}^{*2}$	150	W
Channel temperature	$T_{\text{ch}}$	150	$^\circ\text{C}$
Storage temperature	$T_{\text{stg}}$	-55 to +150	$^\circ\text{C}$

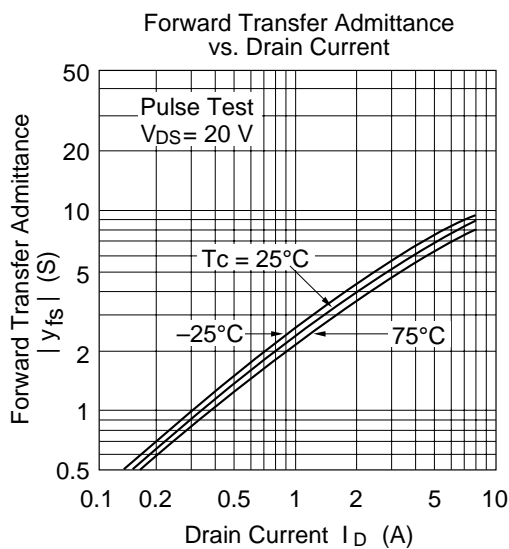
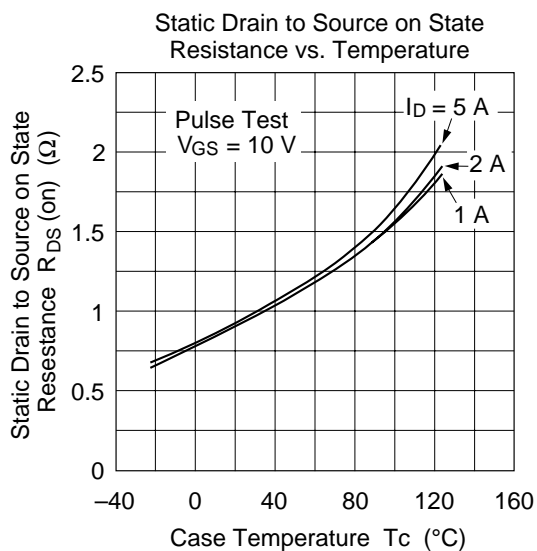
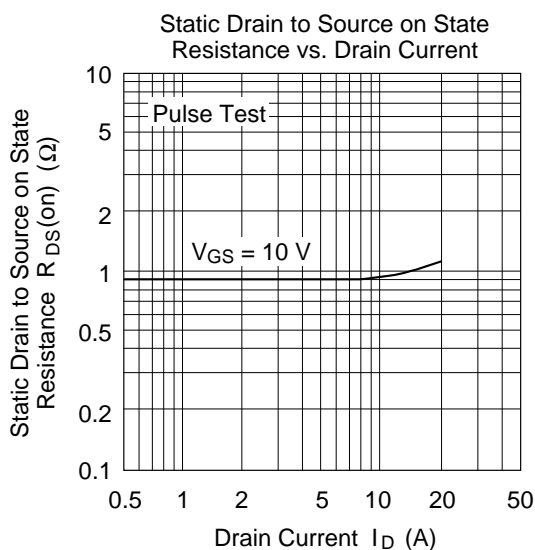
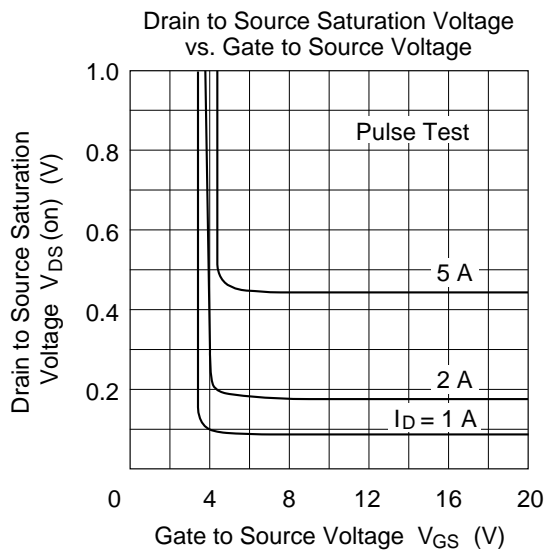
Notes 1.  $\text{PW} \leq 10 \mu\text{s}$ , duty cycle  $\leq 1\%$   
2. Value at  $T_c = 25^\circ\text{C}$

## Electrical Characteristics (Ta = 25°C)

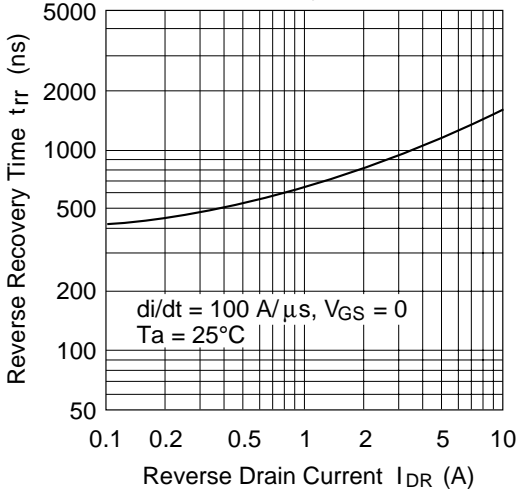
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	900	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 30$	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}, V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	250	$\mu\text{A}$	$V_{DS} = 720 \text{ V}, V_{GS} = 0$
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	$R_{DS(on)}$	—	0.9	1.2	$\Omega$	$I_D = 5 \text{ A}$ $V_{GS} = 10 \text{ V}^{*1}$
Forward transfer admittance	$ y_{fs} $	4.5	7	—	S	$I_D = 5 \text{ A}$ $V_{DS} = 20 \text{ V}^{*1}$
Input capacitance	$C_{iss}$	—	2620	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	$C_{oss}$	—	830	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	320	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	30	—	ns	$I_D = 5 \text{ A}$
Rise time	$t_r$	—	140	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	285	—	ns	$R_L = 6 \text{ }\Omega$
Fall time	$t_f$	—	170	—	ns	
Body to drain diode forward voltage	$V_{DF}$	—	0.9	—	V	$I_F = 10 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time	$t_{rr}$	—	1600	—	ns	$I_F = 10 \text{ A}, V_{GS} = 0,$ $di_F / dt = 100 \text{ A} / \mu\text{s}$

Note 1. Pulse Test

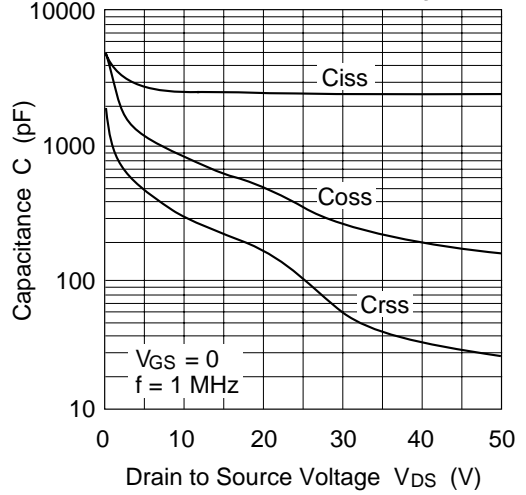




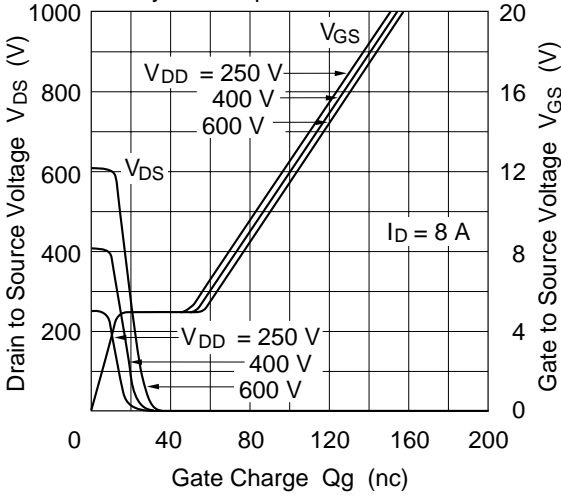
Body to Drain Diode Reverse Recovery Time



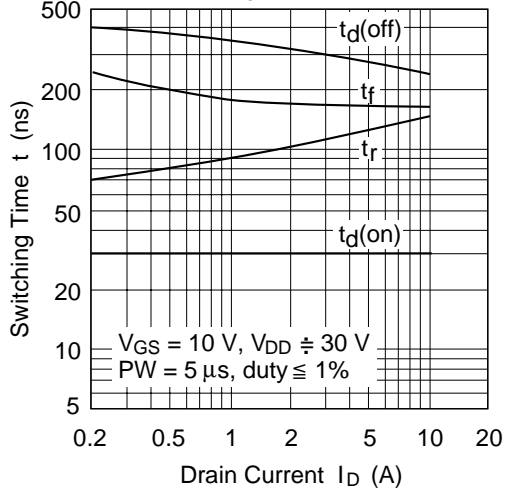
Typical Capacitance vs. Drain to Source Voltage

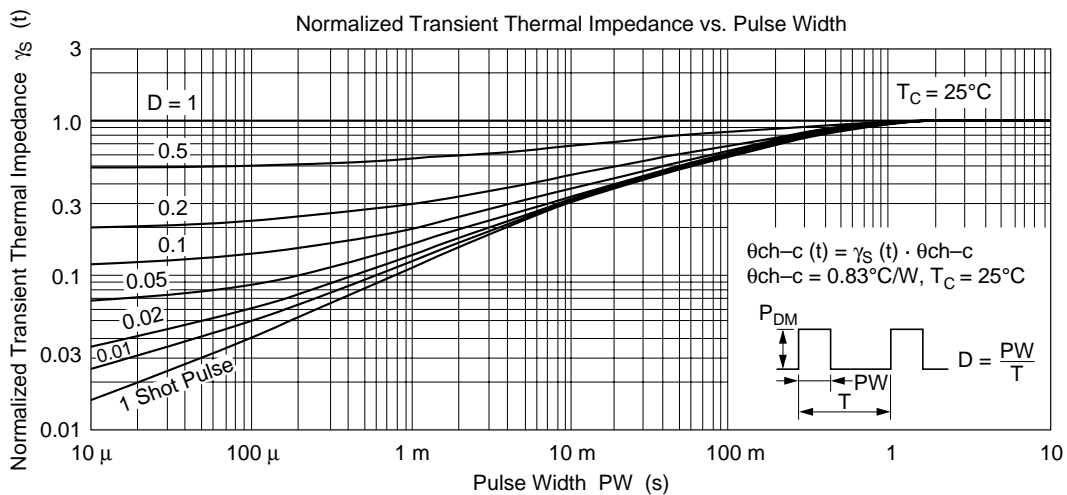
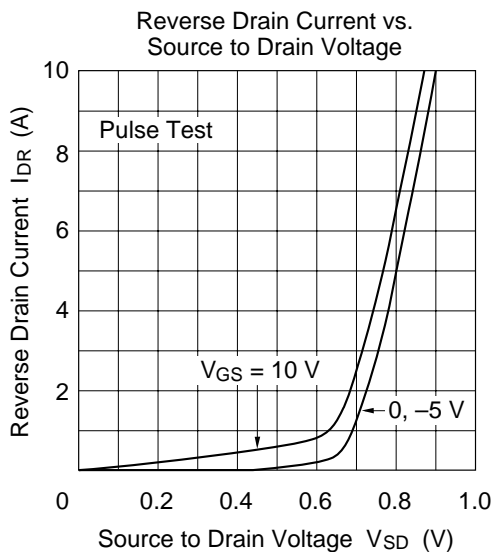


Dynamic Input Characteristics

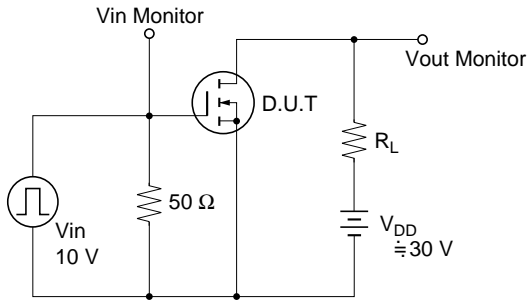


Switching Characteristics

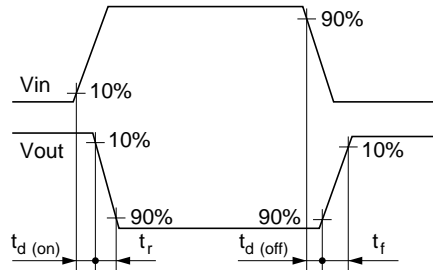




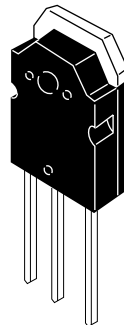
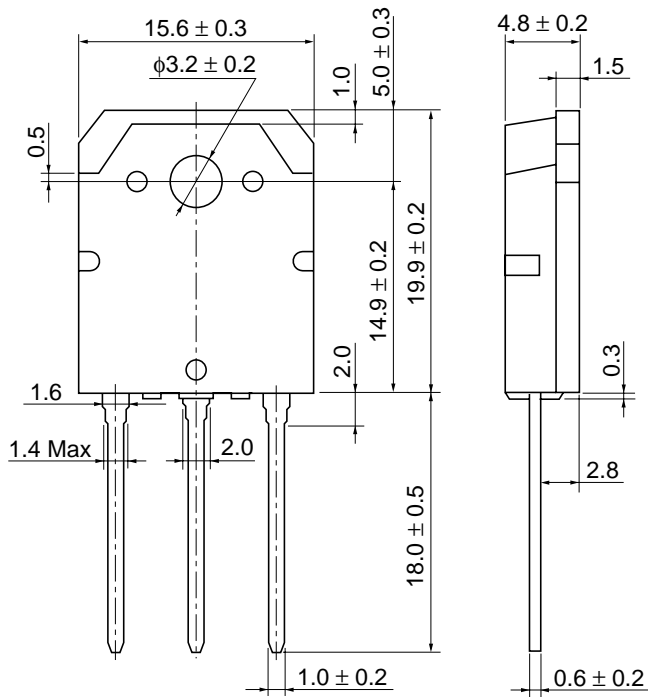
Switching Time Test Circuit



Waveforms







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

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