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# 2SK1159, 2SK1160

Silicon N-Channel MOS FET

# HITACHI

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## Application

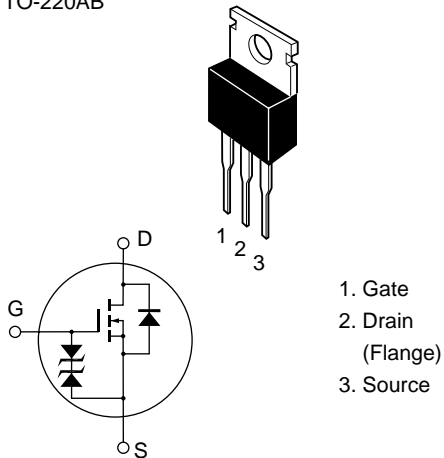
High speed power switching

## Features

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

## Outline

TO-220AB



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## 2SK1159, 2SK1160

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

Item		Symbol	Ratings	Unit
Drain to source voltage	2SK1159	$V_{DSS}$	450	V
	2SK1160		500	
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		$Pch^{*2}$	60	W
Channel temperature		Tch	150	°C
Storage temperature		Tstg	-55 to +150	°C

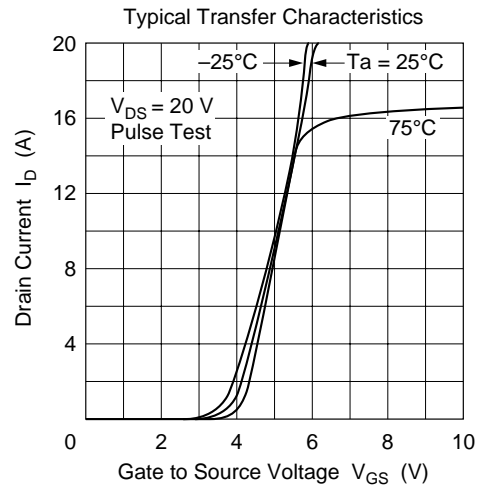
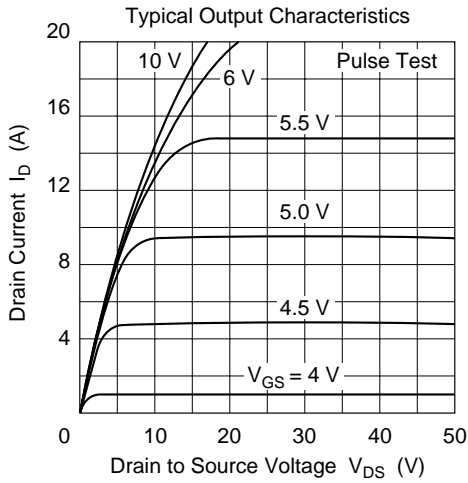
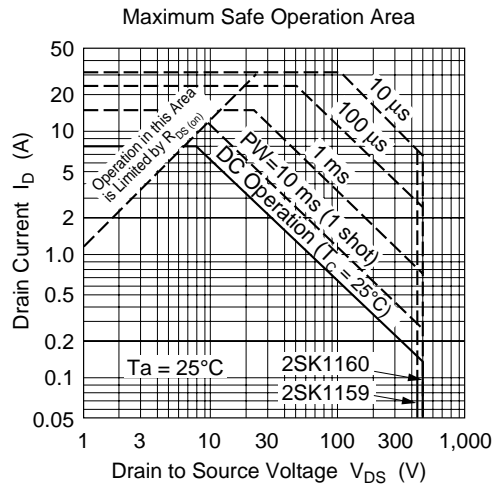
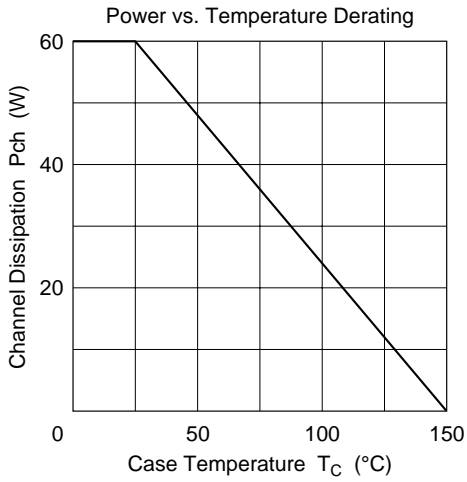
Notes: 1. PW 10 μs, duty cycle 1%

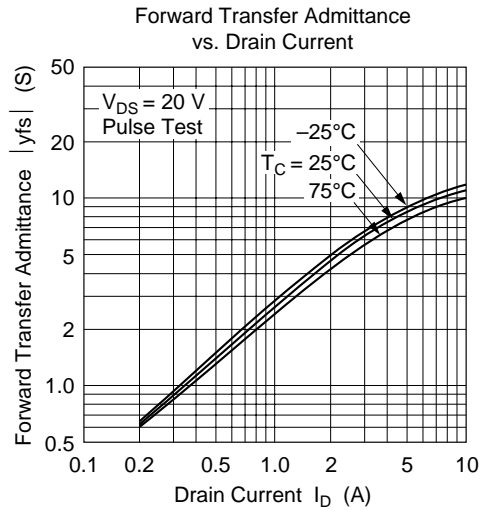
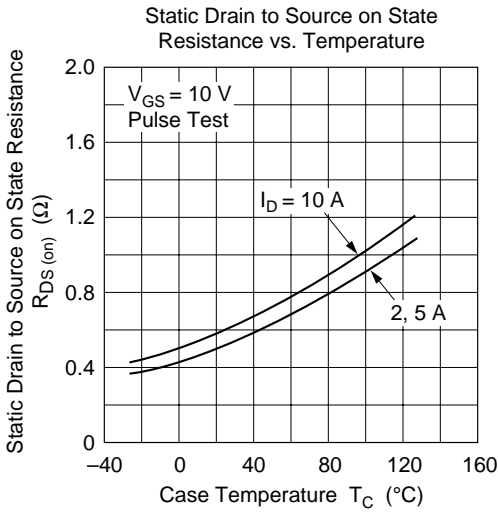
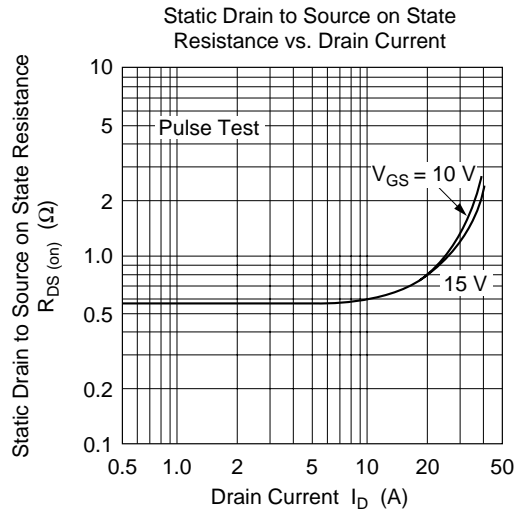
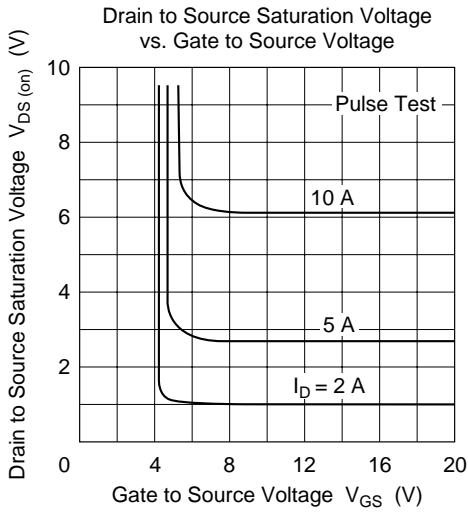
2. Value at T<sub>c</sub> = 25°C

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

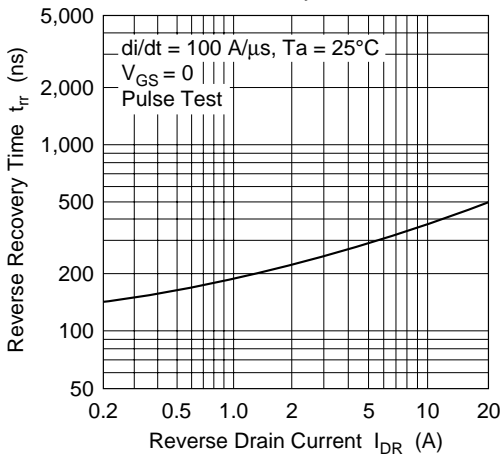
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	2SK1159 $V_{(BR)DSS}$ 2SK1160	450 500	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±30	—	—	V	$I_G = \pm 100 \text{ } \mu\text{A}$ , $V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	±10	μA	$V_{GS} = \pm 25 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	2SK1159 $I_{DSS}$ 2SK1160	—	—	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	2SK1159 $R_{DS(on)}$ 2SK1160	—	0.55 0.60	0.7 0.8		$I_D = 4 \text{ A}$ , $V_{GS} = 10 \text{ V}^{*1}$
Forward transfer admittance	yfs	4.5	7.5	—	S	$I_D = 4 \text{ A}$ , $V_{DS} = 10 \text{ V}^{*1}$
Input capacitance	Ciss	—	1150	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ ,
Output capacitance	Coss	—	340	—	pF	f = 1 MHz
Reverse transfer capacitance	Crss	—	55	—	pF	
Turn-on delay time	$t_{d(on)}$	—	17	—	ns	$I_D = 4 \text{ A}$ , $V_{GS} = 10 \text{ V}$ ,
Rise time	$t_r$	—	55	—	ns	$R_L = 7.5$
Turn-off delay time	$t_{d(off)}$	—	100	—	ns	
Fall time	$t_f$	—	45	—	ns	
Body to drain diode forward voltage	$V_{DF}$	—	0.9	—	V	$I_F = 8 \text{ A}$ , $V_{GS} = 0$
Body to drain diode forward voltage	$t_{rr}$	—	350	—	ns	$I_F = 8 \text{ A}$ , $V_{GS} = 0$ , $di_F/dt = 100 \text{ A}/\mu\text{s}$

Note: 1. Pulse test

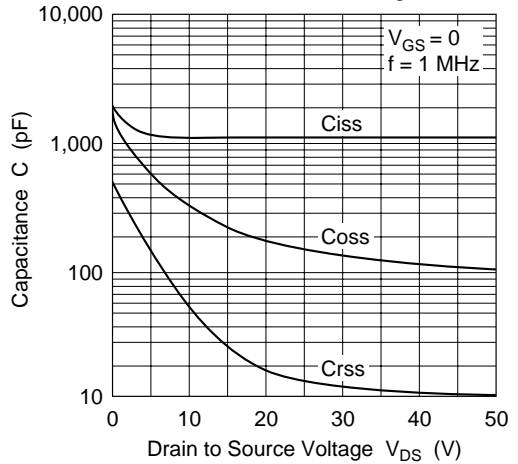




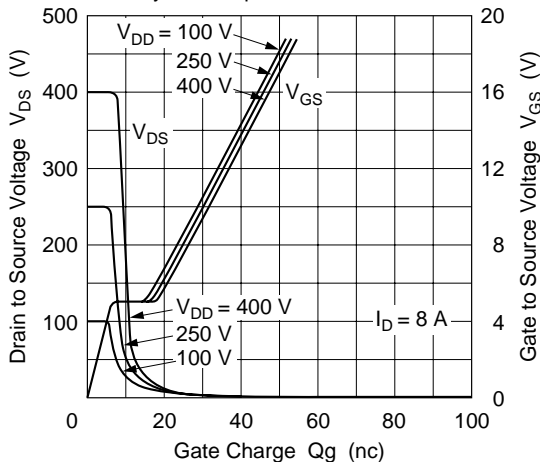
Body to Drain Diode Reverse Recovery Time



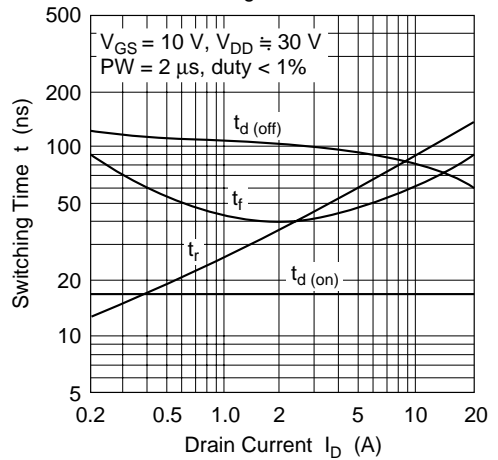
Typical Capacitance vs. Drain to Source Voltage

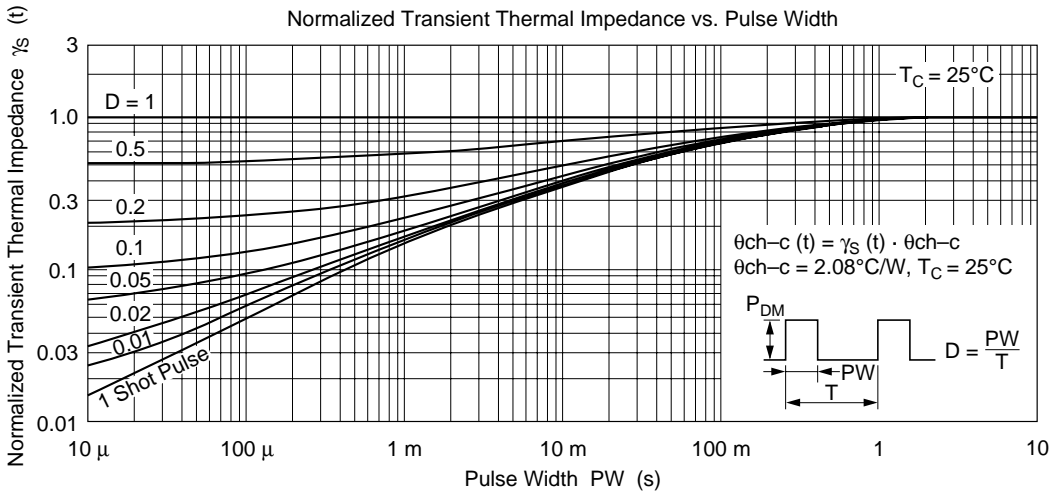
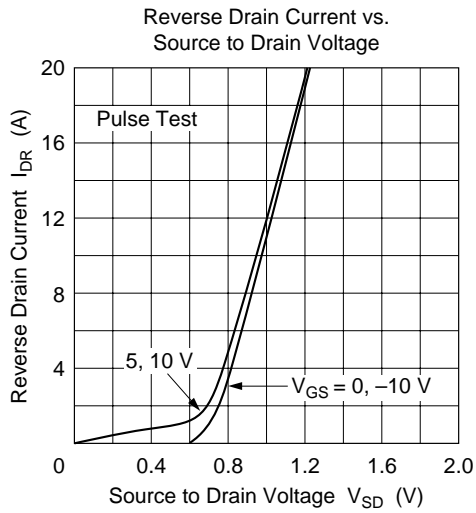


Dynamic Input Characteristics

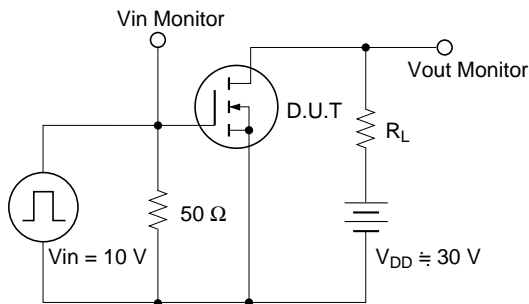


Switching Characteristics

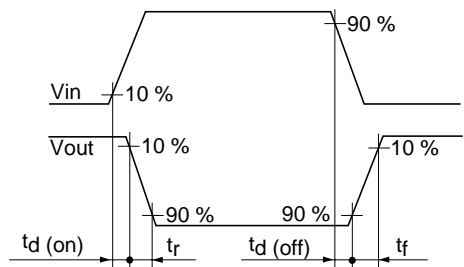




Switching Time Test Circuit



Waveforms



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