

- ◆ N-Channel Power MOS FET
- ◆ DMOS Structure
- ◆ Low On-State Resistance: **0.05Ω MAX**
- ◆ Ultra High-Speed Switching
- ◆ SOP-8 Package

### Applications

- Notebook PCs
- Cellular and portable phones
- On-board power supplies
- Li-ion battery systems

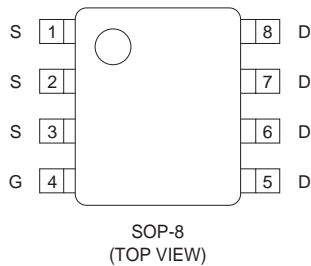
### General Description

The XP131A0150SR is a N-Channel Power MOS FET with low on-state resistance and ultra high-speed switching characteristics. Because high-speed switching is possible, the IC can be efficiently set thereby saving energy. The small SOP-8 package makes high density mounting possible.

### Features

**Low on-state resistance:**  $R_{ds(on)}=0.035\Omega(V_{gs}=10V)$   
 $R_{ds(on)}=0.050\Omega(V_{gs}=4.5V)$   
**Ultra high-speed switching**  
**Operational Voltage:** 4.5V  
**High density mounting:** SOP-8

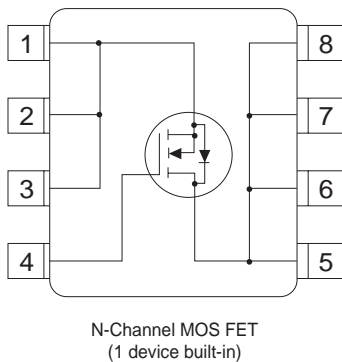
### Pin Configuration



### Pin Assignment

PIN NUMBER	PIN NAME	FUNCTION
1~3	S	Source
4	G	Gate
5~8	D	Drain

### Equivalent Circuit



### Absolute Maximum Ratings

$T_a=25^\circ\text{C}$

PARAMETER	SYMBOL	RATINGS	UNITS
Drain-Source Voltage	$V_{dss}$	30	V
Gate-Source Voltage	$V_{gss}$	$\pm 20$	V
Drain Current (DC)	$I_d$	7	A
Drain Current (Pulse)	$I_{dp}$	20	A
Reverse Drain Current	$I_{dr}$	7	A
Continuous Channel Power Dissipation (note)	$P_d$	2.5	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55~150	$^\circ\text{C}$

Note: When implemented on a glass epoxy PCB

### Electrical Characteristics

#### DC characteristics

Ta=25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Drain Cut-off Current	Idss	Vds=30V, Vgs=0V			10	μA
Gate-Source Leakage Current	Igss	Vgs=±20V, Vds=0V			±10	μA
Gate-Source Cut-off Voltage	Vgs(off)	Id=1mA, Vds=10V	1.0		2.5	V
Drain-Source On-state Resistance (note)	Rds(on)	Id=4A, Vgs=10V		0.028	0.035	Ω
		Id=4A, Vgs=4.5V		0.042	0.05	Ω
Forward Transfer Admittance (note)	Yfs	Id=4A, Vds=10V		10		S
Body Drain Diode Forward Voltage	Vf	If=7A, Vgs=0V		0.85	1.1	V

Note: Effective during pulse test.

#### Dynamic characteristics

Ta=25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Capacitance	Ciss	Vds=10V, Vgs=0V f=1MHz		720		pF
Output Capacitance	Coss			450		pF
Feedback Capacitance	Crss			180		pF

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#### Switching characteristics

Ta=25°C

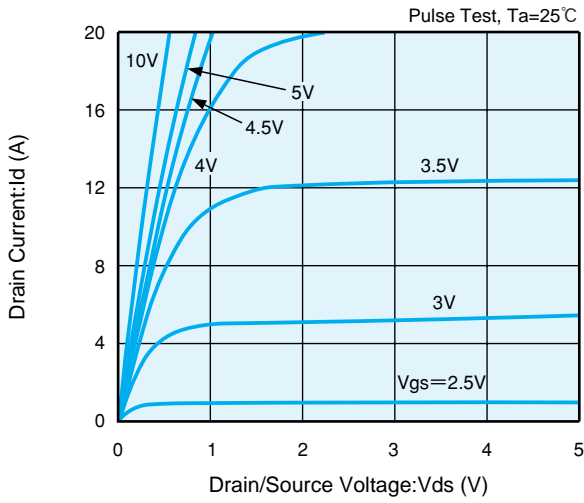
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	
Turn-on Delay Time	td (on)	Vgs=5V, Id=4A Vdd=10V		25		ns	
Rise Time	tr			20		ns	
Turn-off Delay Time	td (off)				35		ns
Fall Time	tf				20		ns

#### Thermal characteristics

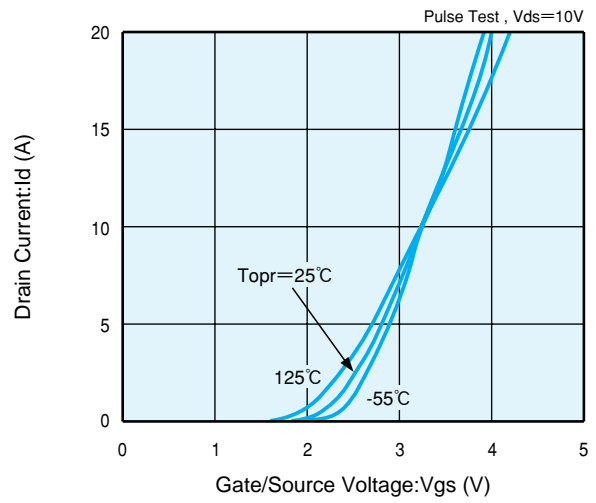
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Thermal Resistance (channel-surroundings)	Rth (ch-a)	Implement on a glass epoxy resin PCB		50		°C/W

## XP131A0150SR Characteristics

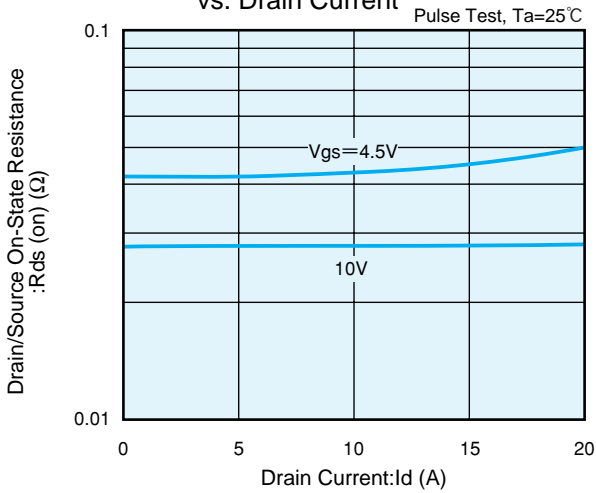
Drain Current vs. Drain /Source Voltage



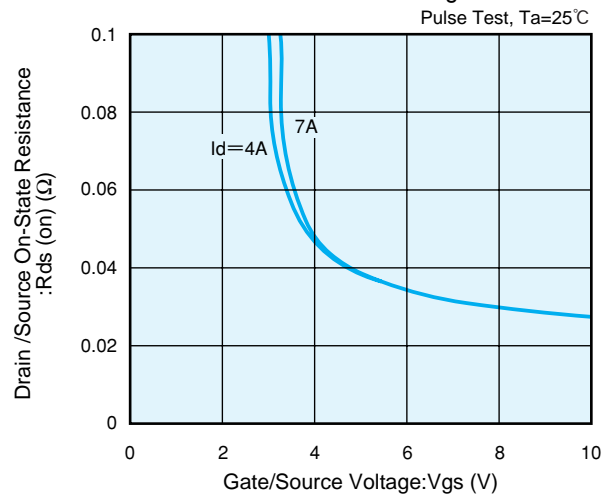
Drain Current vs. Gate/Source Voltage



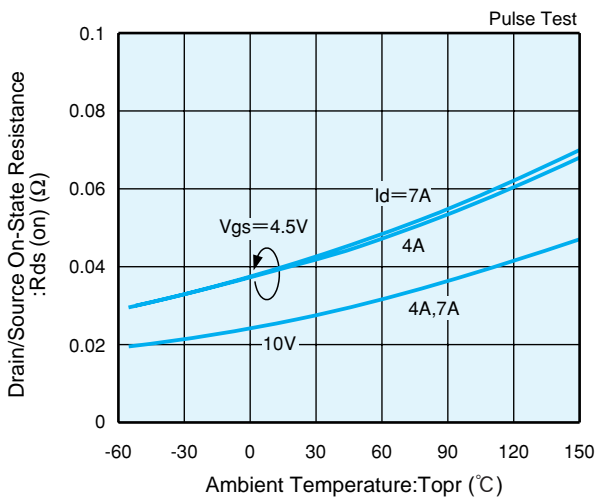
Drain/Source On-State Resistance vs. Drain Current



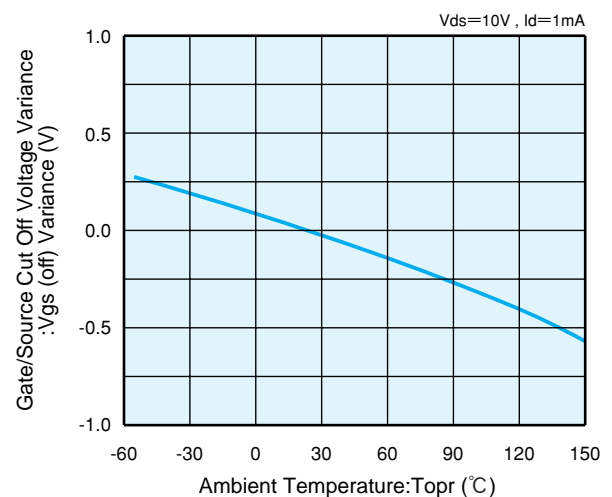
Drain/Source On-State Resistance vs. Gate/Source Voltage



Drain/Source On-State Resistance vs. Ambient Temp.



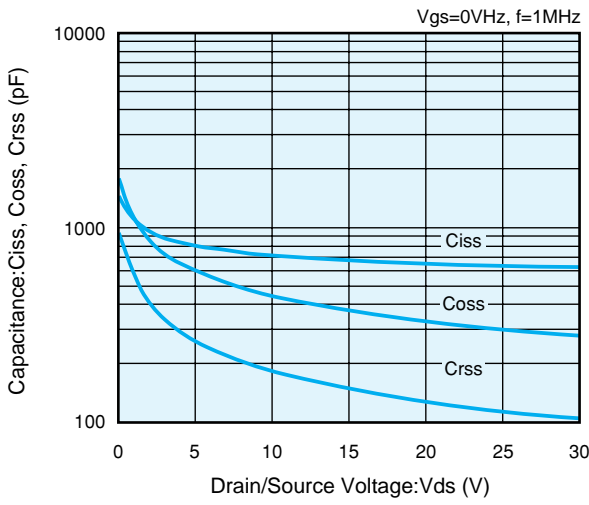
Gate/Source Cut Off Voltage Variance vs. Ambient Temp.



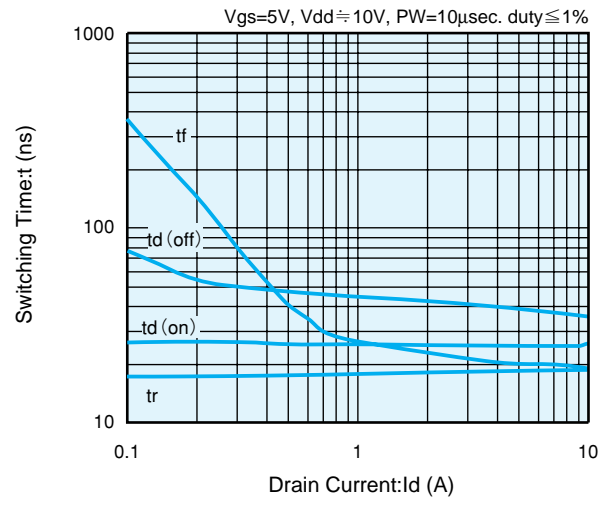
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### Electrical Characteristics

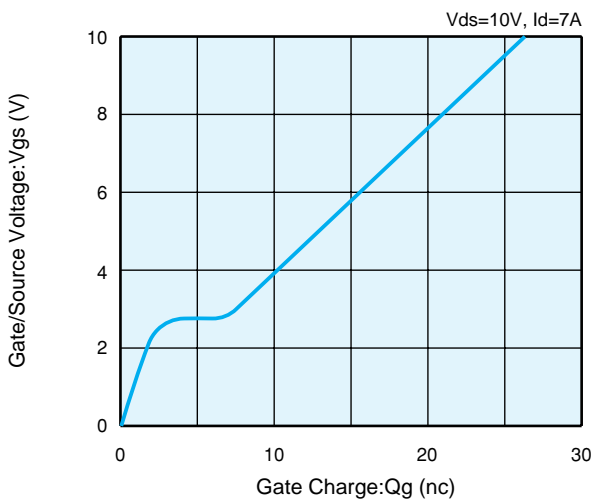
Drain/Source Voltage vs. Capacitance



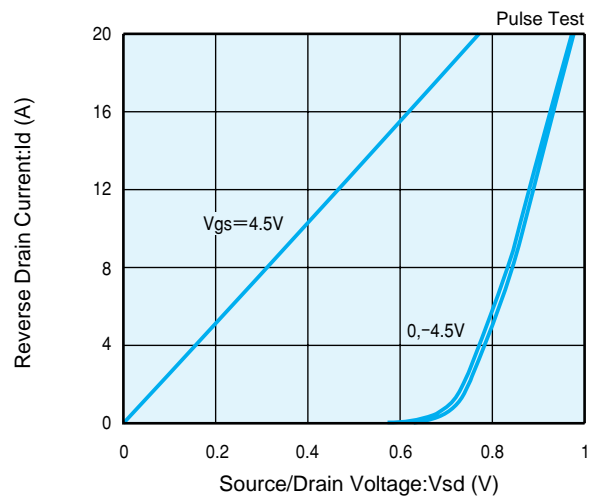
Switching Time vs. Drain Current



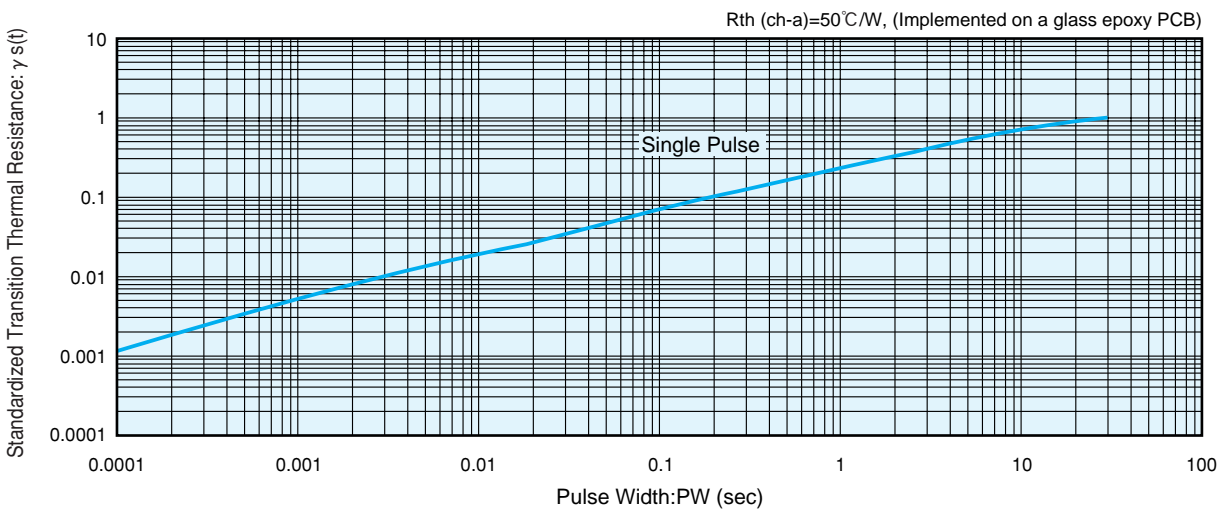
Gate/Source Voltage vs. Gate Charge



Reverse Drain Current vs. Source/Drain Voltage



Standardized Transition Thermal Resistance vs. Pulse Width



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