

- ◆ N-Channel Power MOS FET
- ◆ DMOS Structure
- ◆ Low On-State Resistance: **0.016Ω 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 XP131A0616SR 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

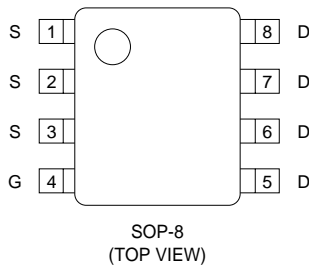
**Low on-state resistance:**  $R_{ds(on)}=0.016\Omega(V_{gs}=4.5V)$   
 $R_{ds(on)}=0.022\Omega(V_{gs}=2.5V)$   
 $R_{ds(on)}=0.045\Omega(V_{gs}=1.5V)$

**Ultra high-speed switching**

**Operational Voltage:** 1.5V

**High density mounting:** SOP-8

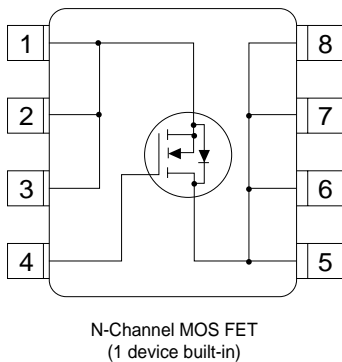
### Pin Configuration



### Pin Assignment

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

### Equivalent Circuit



### Absolute Maximum Ratings

Ta=25°C

PARAMETER	SYMBOL	RATINGS	UNITS
Drain-Source Voltage	Vdss	20	V
Gate-Source Voltage	Vgss	±8	V
Drain Current (DC)	Id	10	A
Drain Current (Pulse)	Idp	30	A
Reverse Drain Current	Idr	10	A
Continuous Channel Power Dissipation (note)	Pd	2.5	W
Channel Temperature	Tch	150	°C
Storage Temperature	Tstg	-55~150	°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=20V, Vgs=0V			10	μA
Gate-Source Leakage Current	Igss	Vgs=±8V, Vds=0V			±1	μA
Gate-Source Cut-off Voltage	Vgs(off)	Id=1mA, Vds=10V	0.5		1.2	V
Drain-Source On-state Resistance (note)	Rds(on)	Id=5A, Vgs=4.5V		0.012	0.016	Ω
		Id=5A, Vgs=2.5V		0.016	0.022	Ω
		Id=1.5A, Vgs=1.5V		0.028	0.045	Ω
Forward Transfer Admittance (note)	Yfs	Id=5A, Vds=10V		28		S
Body Drain Diode Forward Voltage	Vf	If=10A, 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		2100		pF
Output Capacitance	Coss			1000		pF
Feedback Capacitance	Crss			400		pF

7

#### Switching characteristics

Ta=25°C

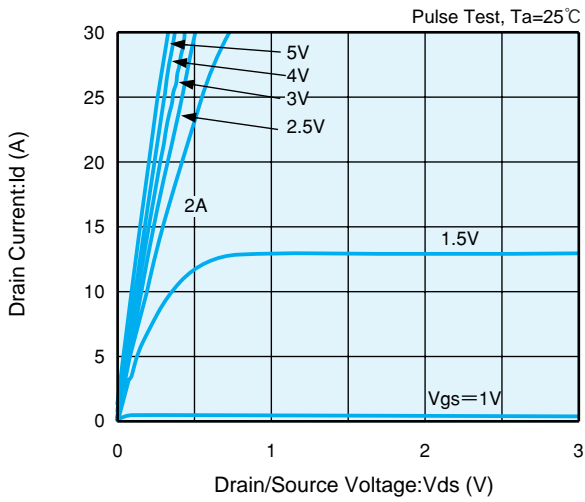
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Turn-on Delay Time	td (on)	Vgs=5V, Id=5A Vdd=10V		15		ns
Rise Time	tr			100		ns
Turn-off Delay Time	td (off)			100		ns
Fall Time	tf			20		ns

#### Thermal characteristics

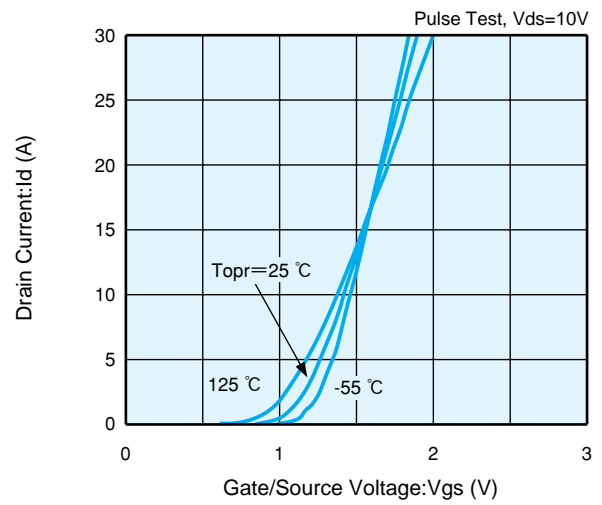
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Thermal Resistance (channel-surroundings)	Rth (ch-a)	Implement on a glass epoxy resin PCB		50		°C/W

## Electrical Characteristics

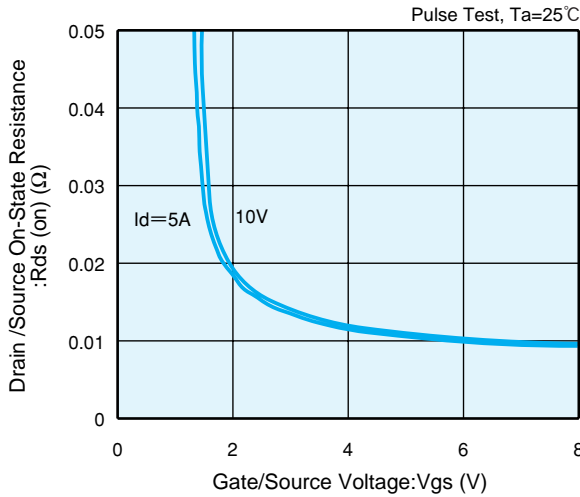
Drain Current vs. Drain /Source Voltage



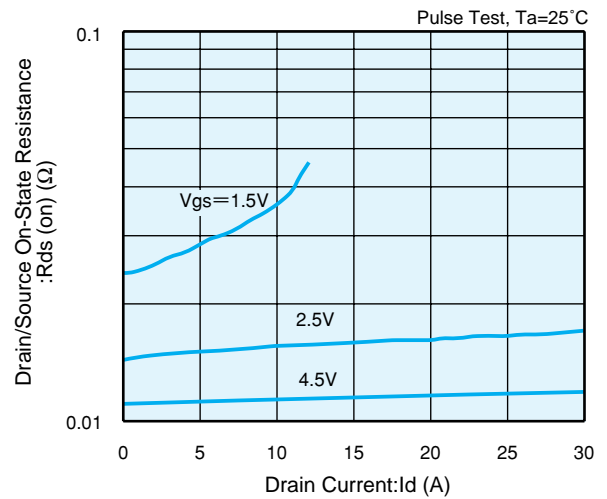
Drain Current vs. Gate/Source Voltage



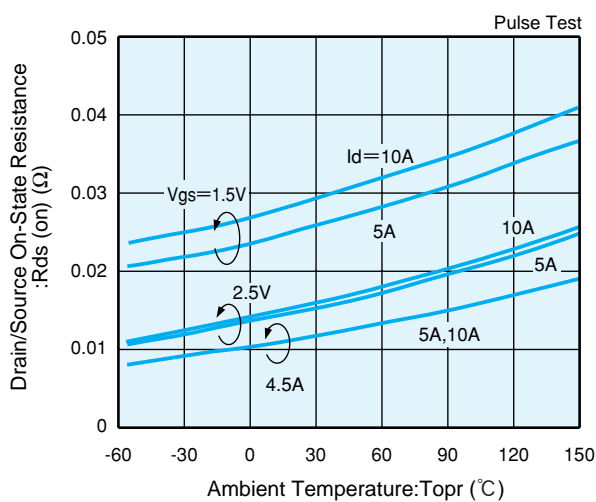
Drain/Source On-State Resistance vs. Gate/Source Voltage



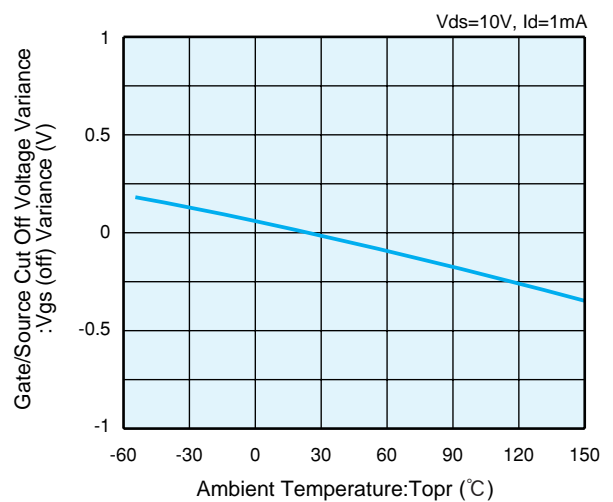
Drain/Source On-State Resistance vs. Drain Current



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

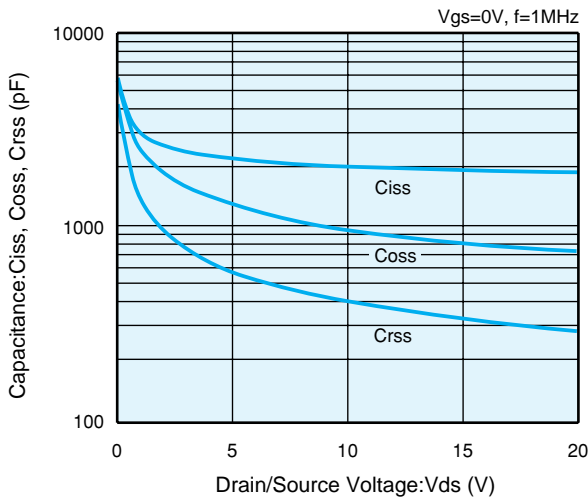


Gate/Source Cut Off Voltage Variance vs. Ambient Temp.

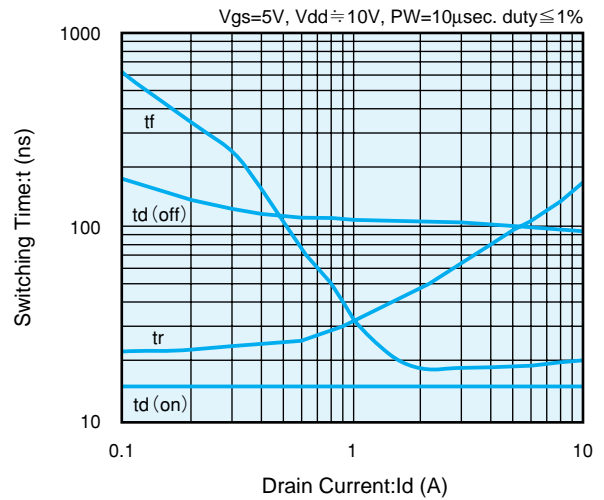


### Electrical Characteristics

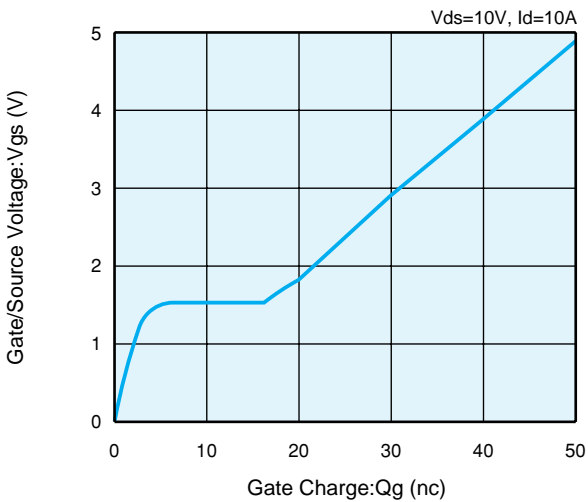
Drain/Source Voltage vs. Capacitance



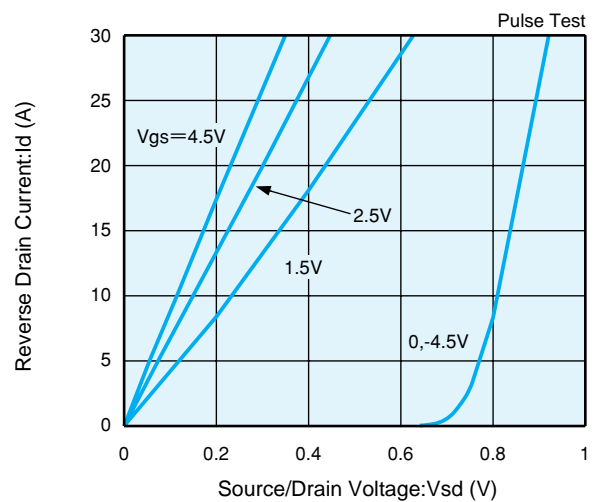
Switching Time vs. Drain Current



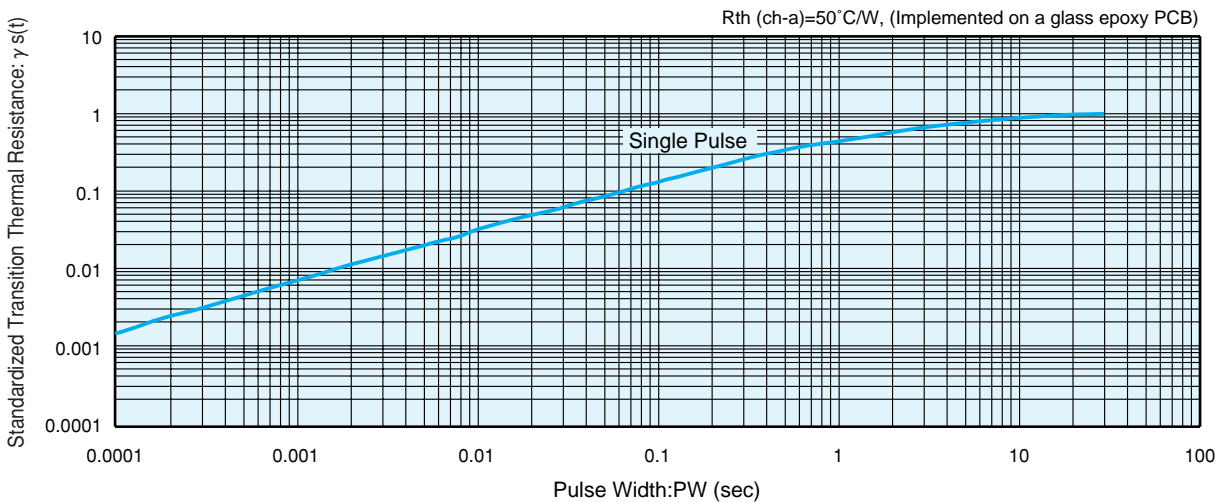
Gate/Source Voltage vs. Gate Charge



Reverse Drain Current vs. Source/Drain Voltage



Standardized Transition Thermal Resistance vs. Pulse Width



7