

- ◆ N-Channel Power MOS FET
- ◆ DMOS Structure
- ◆ Low On-State Resistance : 0.012Ω (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 XP131A1715SR 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

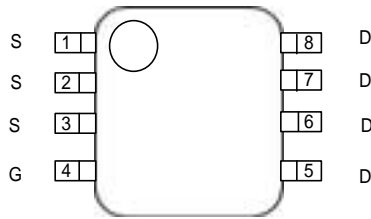
**Low on-state resistance** :  $R_{ds(on)} = 0.012\Omega$  ( $V_{gs} = 4.5V$ )  
 $R_{ds(on)} = 0.015\Omega$  ( $V_{gs} = 2.5V$ )  
 $R_{ds(on)} = 0.025\Omega$  ( $V_{gs} = 1.5V$ )

**Ultra high-speed switching**

**Operational Voltage** : 1.5V

**High density mounting** : SOP - 8

### ■ Pin Configuration

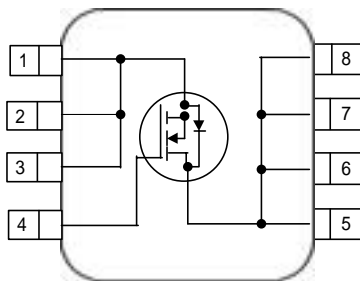


SOP - 8 Top View

### ■ Pin Assignment

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

### ■ Equivalent Circuit



N - Channel MOS FET  
( 1 device built-in )

### ■ Absolute Maximum Ratings

Ta=25°C			
PARAMETER	SYMBOL	RATINGS	UNITS
Drain - Source Voltage	V <sub>dss</sub>	20	V
Gate - Source Voltage	V <sub>gss</sub>	± 8	V
Drain Current (DC)	I <sub>d</sub>	10	A
Drain Current (Pulse)	I <sub>dp</sub>	40	A
Reverse Drain Current	I <sub>dr</sub>	10	A
Continuous Channel Power Dissipation (note)	P <sub>d</sub>	2.5	W
Channel Temperature	T <sub>ch</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55 to 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 = 20 , Vgs = 0V			10	μA
Gate-Source Leakage Current	Igss	Vgs = ± 8 , 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		0.009	0.012	Ω
		Id = 5A , Vgs = 2.5V		0.011	0.015	Ω
		Id = 5A , Vgs = 1.5V		0.017	0.025	Ω
Forward Transfer Admittance (note)	Yfs	Id = 5A , Vds = 10V		34		S
Body Drain Diode Forward Voltage	Vf	If = 10A , Vgs = 0V		0.8	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 = 1 MHz		2000		pF
Output Capacitance	Coss			1000		pF
Feedback Capacitance	Crss			450		pF

#### Switching characteristics

Ta=25°C

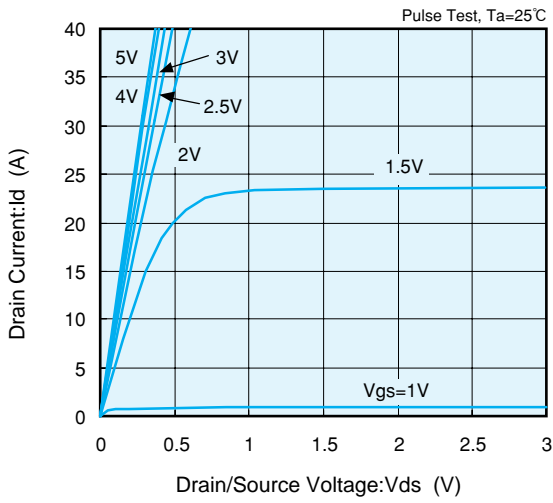
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Turn-on Delay Time	td (on)	Vgs = 5V , Id = 5A Vdd = 10V		15		ns
Rise Time	tr			25		ns
Turn-off Delay Time	td (off)				95	ns
Fall Time	tf				15	ns

#### Thermal characteristics

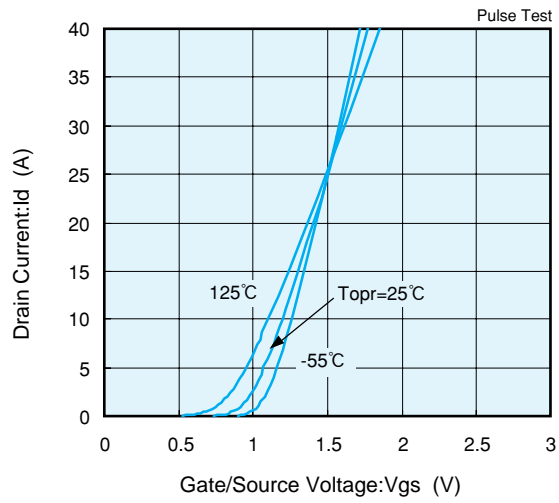
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Thermal Resistance (channel - surroundings)	Rth (ch - a)	Implement on a glass epoxy resin PCB		50		°C / W

## Electrical Characteristics

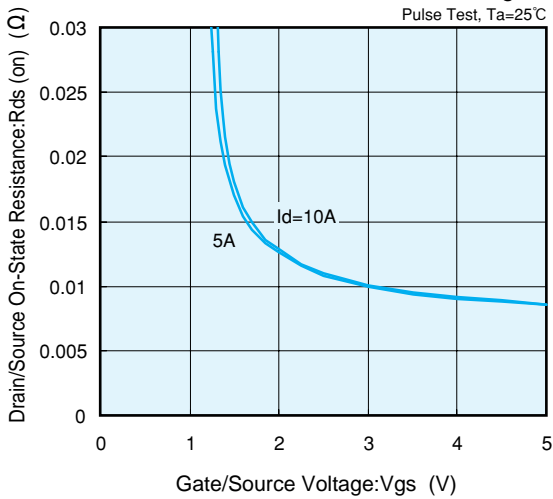
Drain Current vs. Drain/Source Voltage



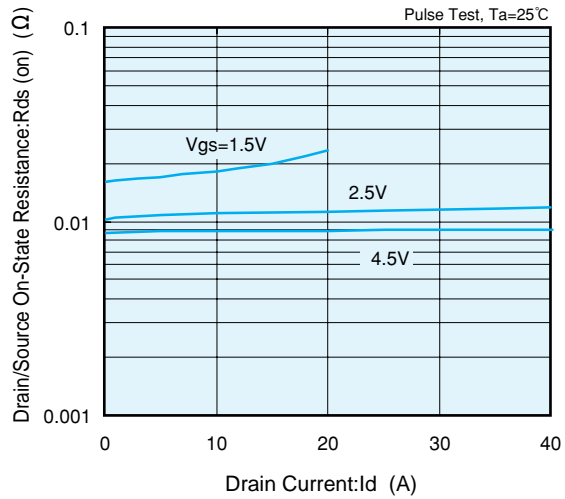
Drain Current vs. Gate/Source Voltage



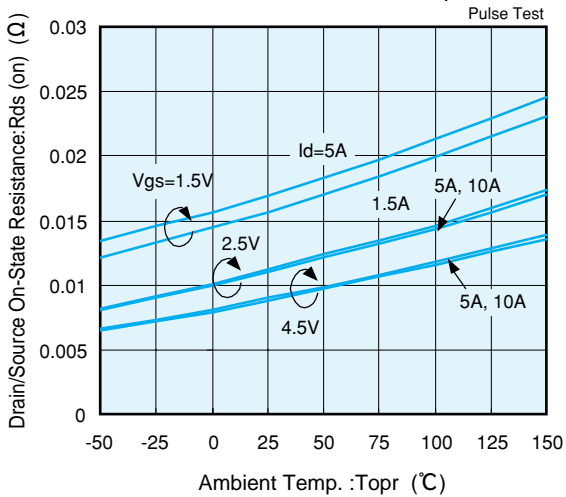
Drain/Source On-State Resistance vs. Gate/Source Voltage



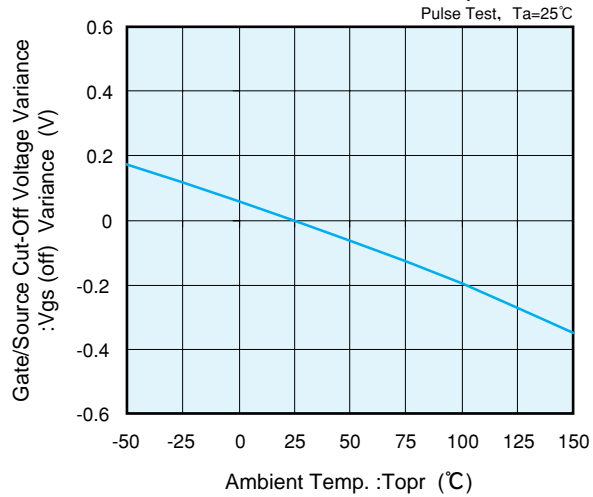
Drain/Source On-State Resistance vs. Drain Current



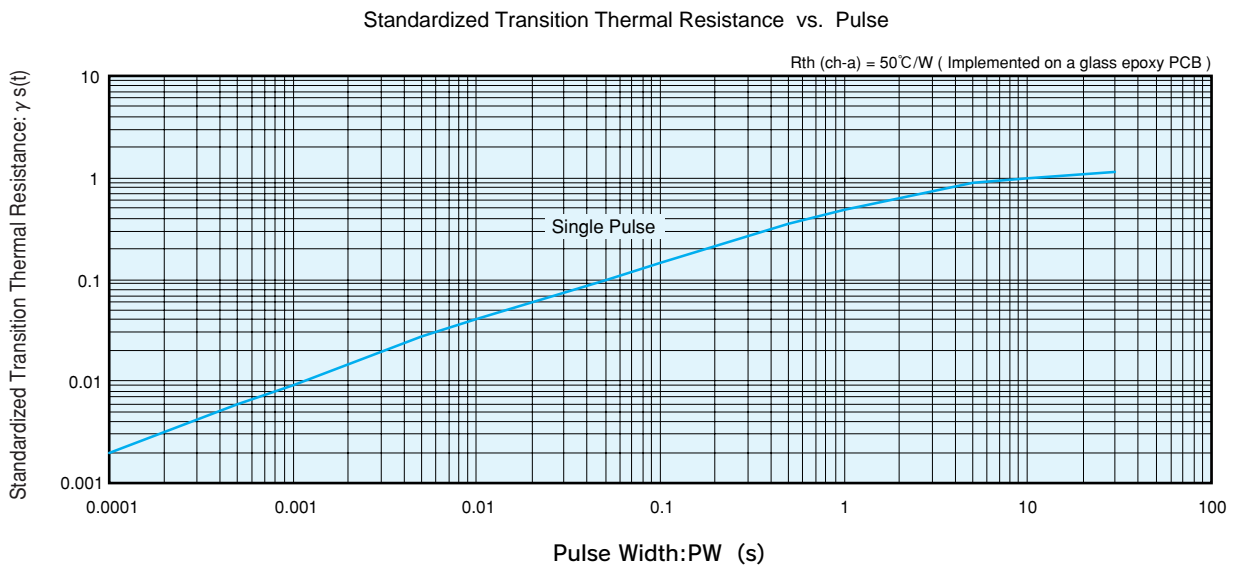
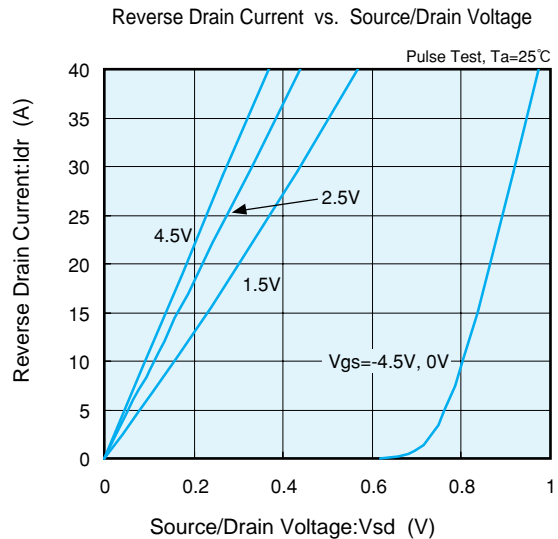
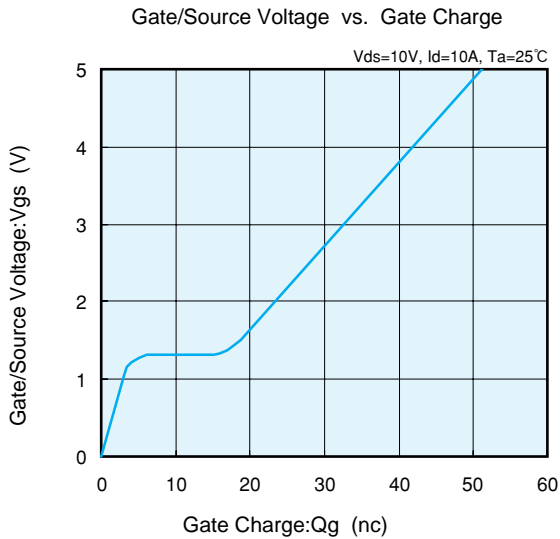
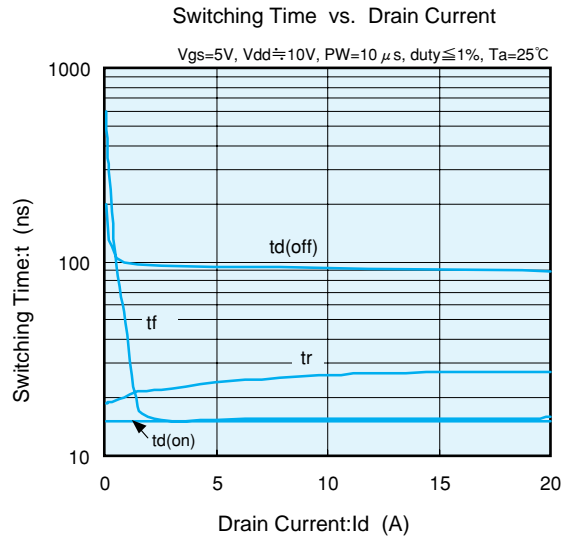
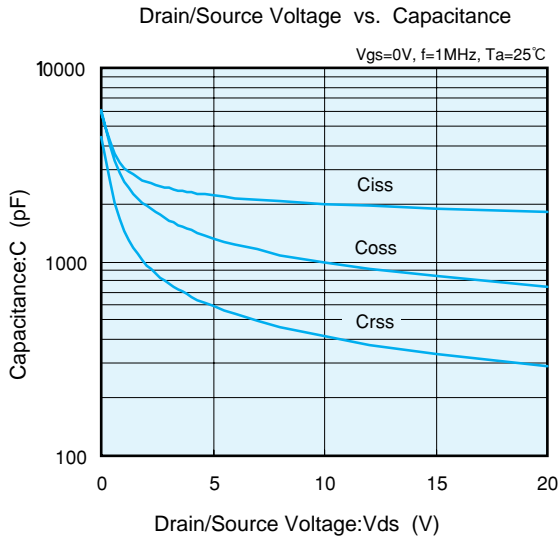
Drain/Source On-State Resistance vs. Ambient Temperature



Gate/Source Cut-Off Voltage Variance vs. Ambient Temperature



### Electrical Characteristics



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