

- ◆ N-Channel Power MOS FET
- ◆ DMOS Structure
- ◆ Low On-State Resistance :  $0.03\Omega$  (max)
- ◆ Ultra High-Speed Switching
- ◆ SOP - 8 Package

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

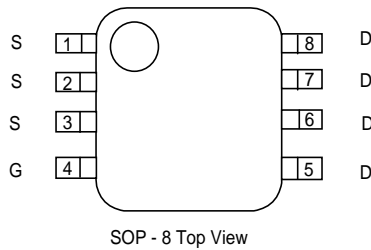
### ■ General Description

The XP131A1330SR 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** :  $R_{ds(on)} = 0.03\Omega$  (  $V_{gs} = 4.5V$  )  
 $R_{ds(on)} = 0.04\Omega$  (  $V_{gs} = 2.5V$  )  
 $R_{ds(on)} = 0.07\Omega$  (  $V_{gs} = 1.5V$  )
- Ultra high-speed switching**
- Operational Voltage** : 1.5V
- High density mounting** : SOP - 8

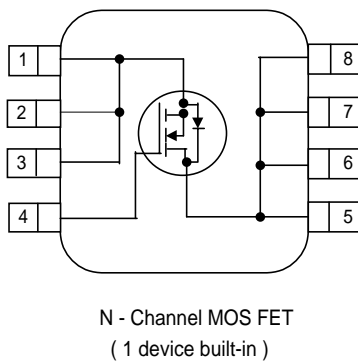
### ■ Pin Configuration



### ■ Pin Assignment

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

### ■ Equivalent Circuit



### ■ Absolute Maximum Ratings

PARAMETER	SYMBOL	RATINGS	UNITS
Drain - Source Voltage	$V_{dss}$	20	V
Gate - Source Voltage	$V_{gss}$	$\pm 8$	V
Drain Current (DC)	$I_d$	8	A
Drain Current (Pulse)	$I_{dp}$	30	A
Reverse Drain Current	$I_{dr}$	8	A
Continuous Channel Power Dissipation (note)	$P_d$	2.5	W
Channel Temperature	$T_{ch}$	150	$^{\circ}C$
Storage Temperature	$T_{stg}$	-55 to 150	$^{\circ}C$

$T_a=25^{\circ}C$

( 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 = 4A , Vgs = 4.5V		0.025	0.03	Ω
		Id = 4A , Vgs = 2.5V		0.03	0.04	Ω
		Id = 4A , Vgs = 1.5V		0.045	0.07	Ω
Forward Transfer Admittance ( note )	Yfs	Id = 4A , Vds = 10V		22		S
Body Drain Diode Forward Voltage	Vf	If = 8A , 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 = 1 MHz		950		pF
Output Capacitance	Coss			430		pF
Feedback Capacitance	Crss			180		pF

#### Switching characteristics

Ta=25°C

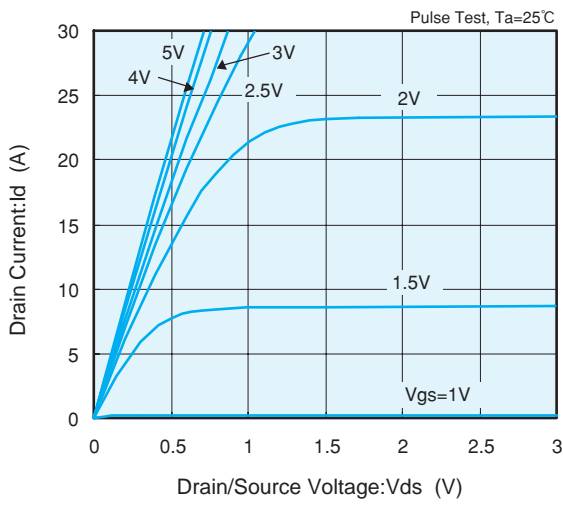
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Turn-on Delay Time	td ( on )	Vgs = 5V , Id = 4A Vdd = 10V		15		ns
Rise Time	tr			20		ns
Turn-off Delay Time	td ( off )			80		ns
Fall Time	tf			15		ns

#### Thermal characteristics

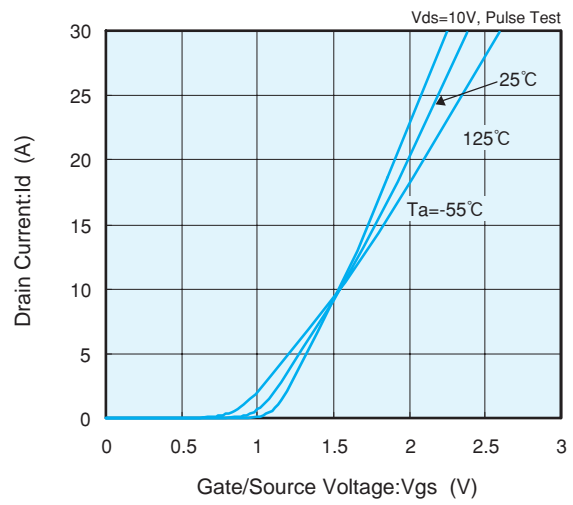
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Thermal Resistance ( channel - surroundings )	Rth ( ch - a )	Implement on a glass epoxy resin PCB		50		°C / W

## Electrical Characteristics

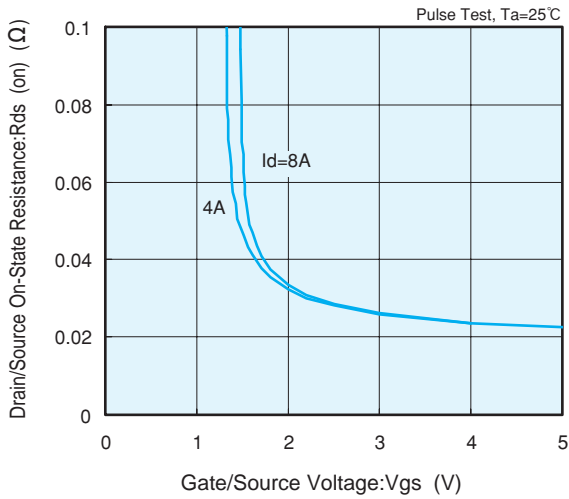
Drain Current vs. Drain/Source Voltage



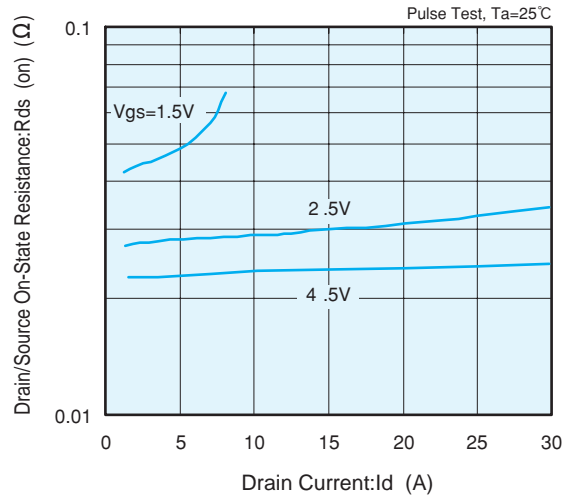
Drain Current vs. Gate/Source Voltage



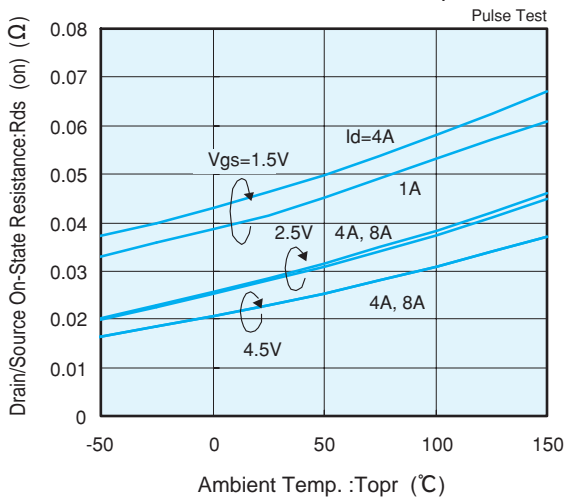
Drain/Source On-State Resistance vs. Gate/Source Voltage



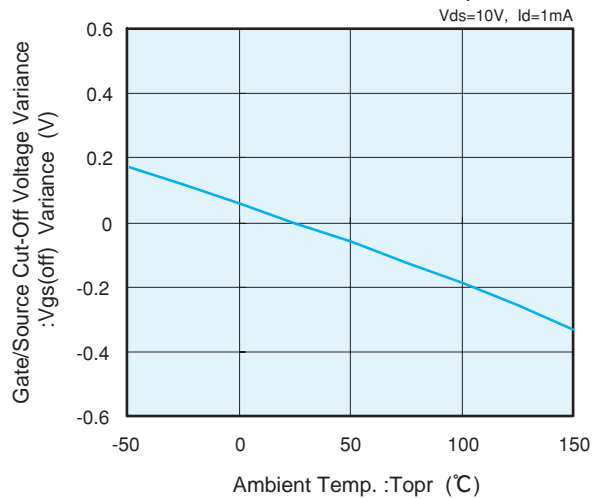
Drain/Source On-State Resistance vs. Drain Current



Drain/Source On-State Resistance vs. Ambient Temperature

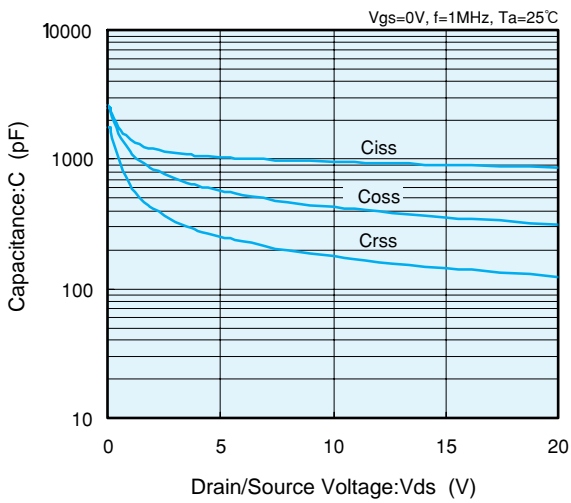


Gate/Source Cut-Off Voltage Variance vs. Ambient Temperature

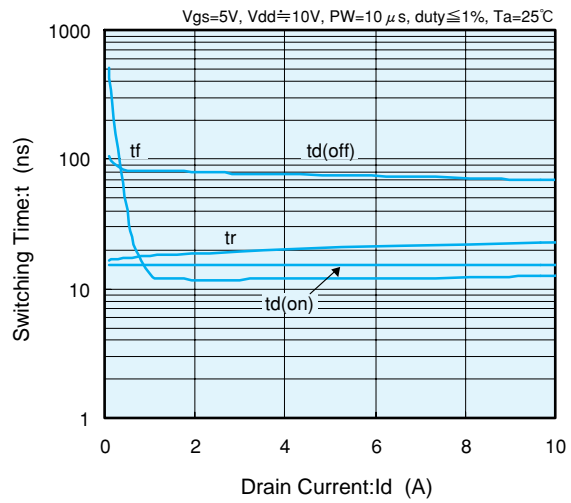


### Electrical Characteristics

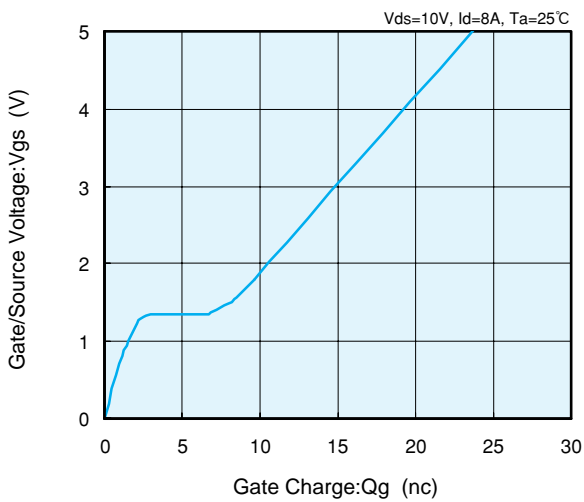
Drain/Source Voltage vs. Capacitance



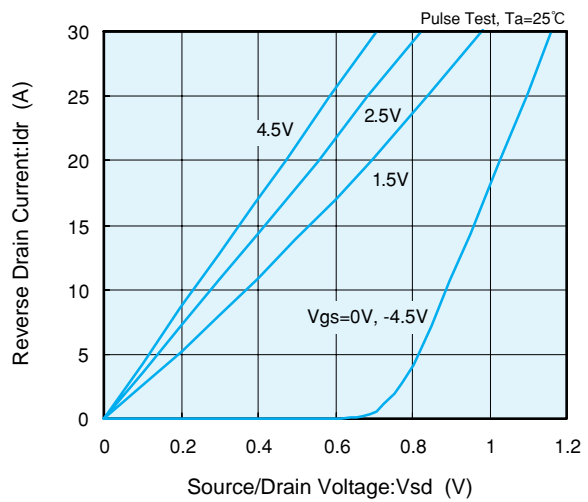
Switching Time vs. Drain Current



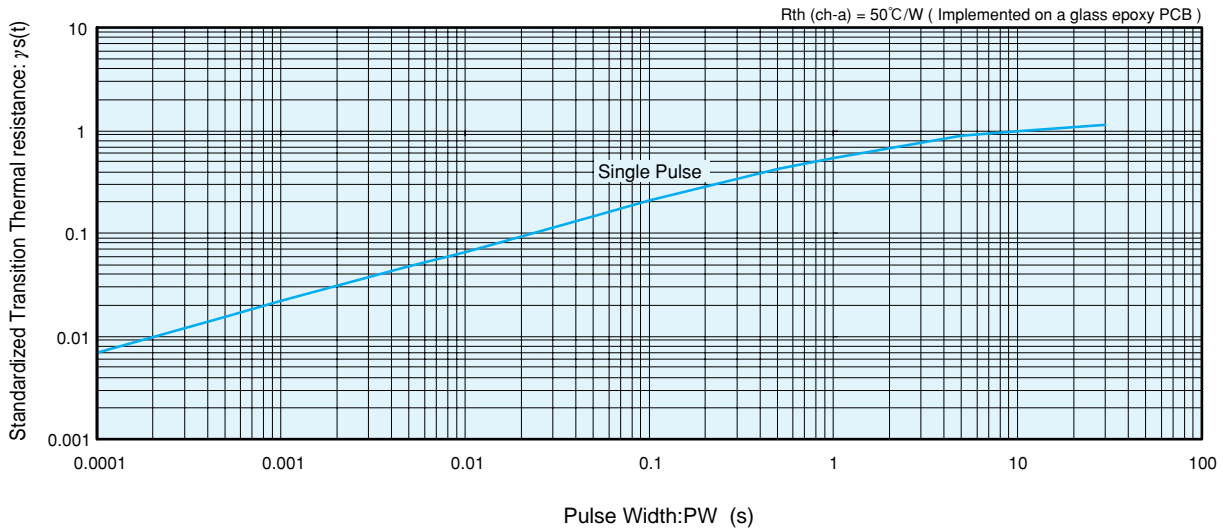
Gate/Source Voltage vs. Gate Charge



Reverse Drain Current vs. Source/Drain Voltage



Standardized Transition Thermal Resistance vs. Pulse Width



7