

## Power MOSFET

### ■ GENERAL DESCRIPTION

The XP131A1617SR is an N-channel Power MOSFET 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.

### ■ APPLICATIONS

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

### ■ FEATURES

**Low On-State Resistance:**  $R_{ds(on)}=0.014\ \Omega$  ( $V_{gs}=4.5V$ )  
 $R_{ds(on)}=0.019\ \Omega$  ( $V_{gs}=2.5V$ )

**Ultra High-Speed Switching**

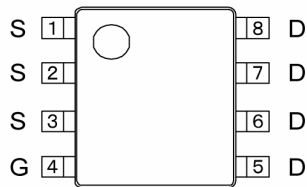
**Driving Voltage** : 2.5V

**N-Channel Power MOSFET**

**DMOS Structure**

**Package** : SOP-8

### ■ PIN CONFIGURATION

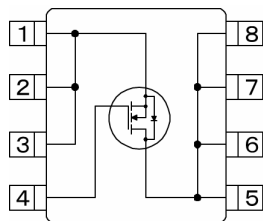


SOP-8  
(TOP VIEW)

### ■ PIN ASSIGNMENT

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

### ■ EQUIVALENT CIRCUIT



N-channel MOSFET  
( 1 device built-in )

### ■ ABSOLUTE MAXIMUM RATINGS

$T_a = 25^\circ C$

PARAMETER	SYMBOL	RATINGS	UNITS
Drain-Source Voltage	$V_{dss}$	20	V
Gate-Source Voltage	$V_{gss}$	$\pm 12$	V
Drain Current (DC)	$I_d$	10	A
Drain Current (Pulse)	$I_{dp}$	40	A
Reverse Drain Current	$I_{dr}$	10	A
Channel Power Dissipation *	$P_d$	2.5	W
Channel Temperature	$T_{ch}$	150	$^\circ C$
Storage Temperature Range	$T_{stg}$	-55~150	$^\circ C$

\* 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 Leak Current	Igss	Vgs=±12V, Vds=0V	-	-	±1	μA
Gate-Source Cut-Off Voltage	Vgs(off)	Id=1mA, Vds=10V	0.7	-	1.4	V
Drain-Source On-State Resistance *	Rds(on)	Id=5A, Vgs=4.5V	-	0.010	0.014	Ω
		Id=5A, Vgs=2.5V	-	0.013	0.019	Ω
Forward Transfer Admittance *	Yfs	Id=5A, Vds=10V	-	32	-	S
Body Drain Diode Forward Voltage	Vf	If=10A, Vgs=0V	-	0.8	1.1	V

\* 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	-	1650	-	pF
Output Capacitance	Coss		-	1000	-	pF
Feedback Capacitance	Crss		-	450	-	pF

### Switching Characteristics

Ta = 25°C

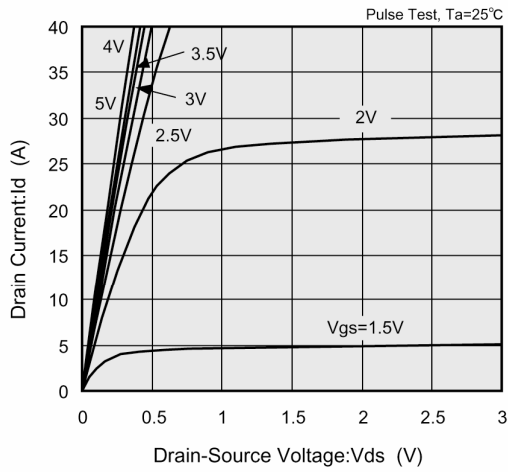
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-On Delay Time	td (on)	Vgs=5V, Id=5A Vdd=10V	-	15	-	ns
Rise Time	tr		-	25	-	ns
Turn-Off Delay Time	td (off)		-	65	-	ns
Fall Time	tf		-	15	-	ns

### Thermal Characteristics

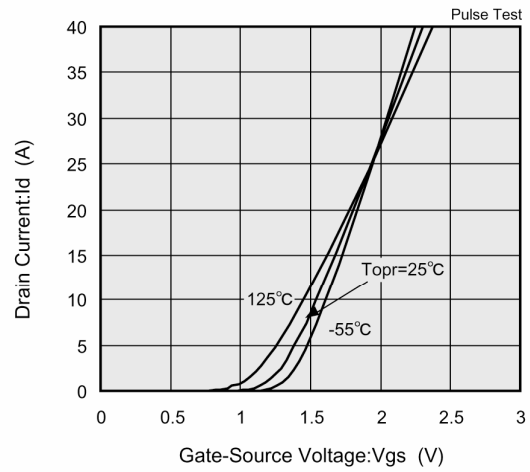
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal Resistance (Channel-Ambience)	Rth (ch-a)	Implement on a glass epoxy resin PCB	-	50	-	°C/W

## TYPICAL PERFORMANCE CHARACTERISTICS

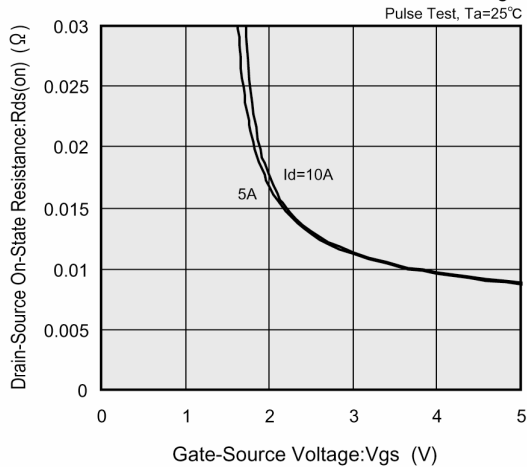
(1) Drain Current vs. Drain-Source Voltage



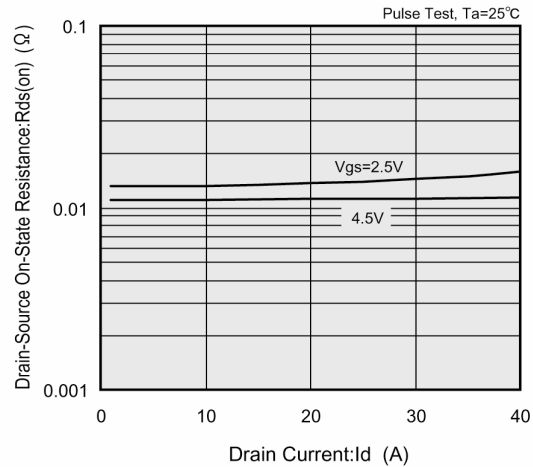
(2) Drain Current vs. Gate-Source Voltage



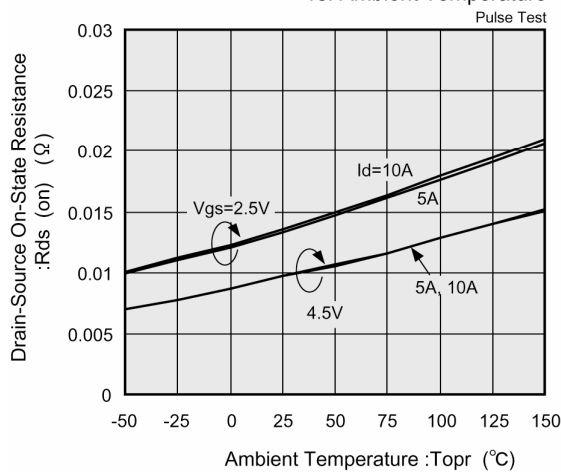
(3) Drain-Source On-State Resistance vs. Gate-Source Voltage



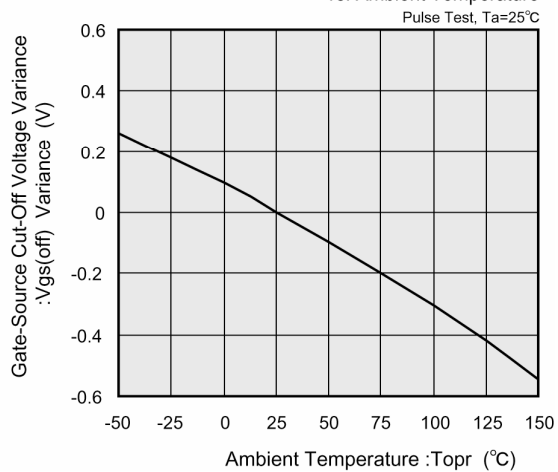
(4) Drain-Source On-State Resistance vs. Drain Current



(5) Drain-Source On-State Resistance vs. Ambient Temperature

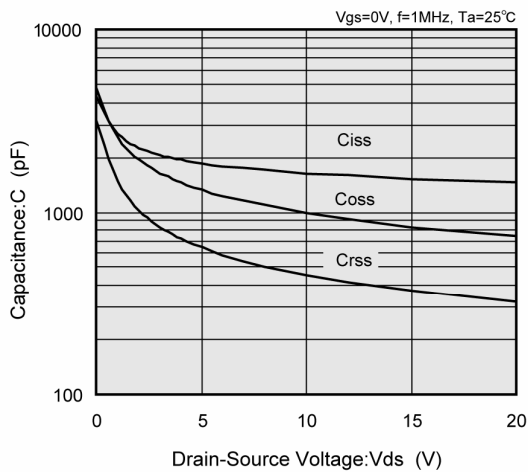


(6) Gate-Source Cut-Off Voltage Variance vs. Ambient Temperature

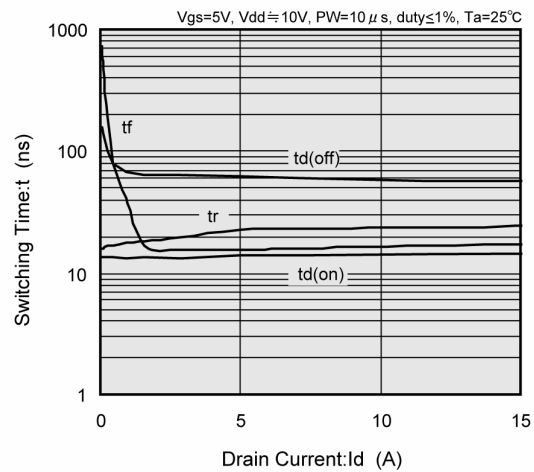


## TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

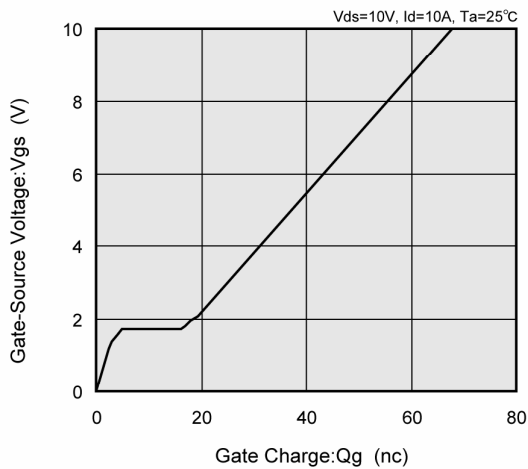
(7) Capacitance vs. Drain-Source Voltage



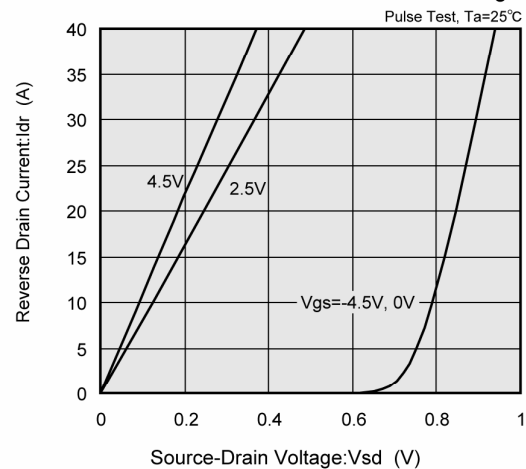
(8) Switching Time vs. Drain Current



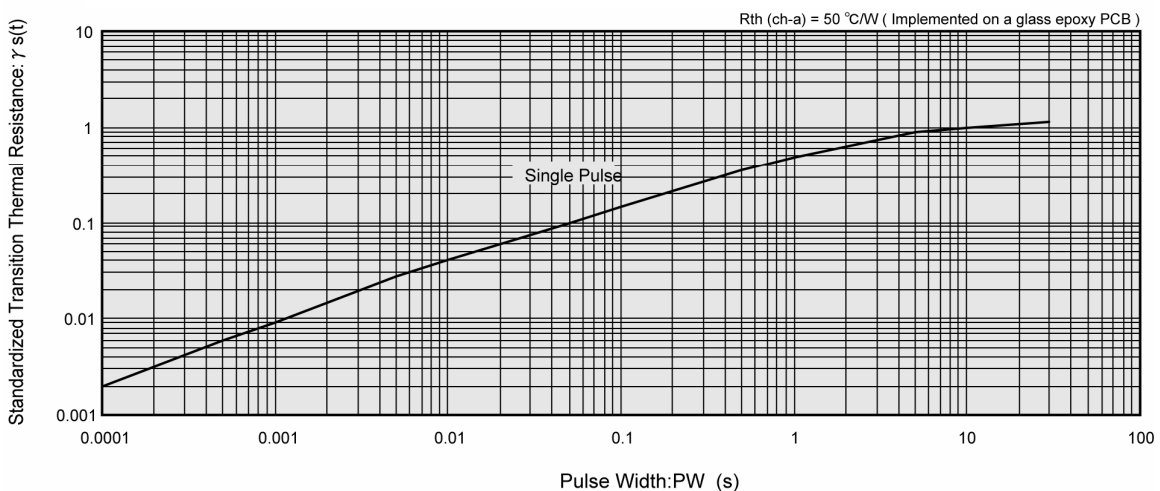
(9) Gate-Source Voltage vs. Gate Charge



(10) Reverse Drain Current vs. Source-Drain Voltage



(11) Standardized transition Thermal Resistance vs. Pulse Width



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