

Power MOSFET

■ GENERAL DESCRIPTION

The XP131A1520SR 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.

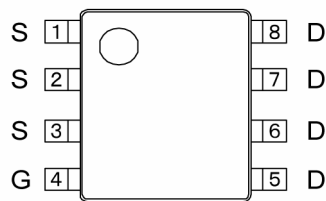
■ APPLICATIONS

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

■ FEATURES

- Low On-State Resistance** : $R_{ds(on)}=0.015(V_{gs}=10V)$
: $R_{ds(on)}=0.02\Omega(V_{gs}=4.5V)$
- Ultra High-Speed Switching**
- Driving Voltage** : 4.5V
- N-Channel Power MOSFET**
- DMOS Structure**
- Package** : SOP-8

■ PIN CONFIGURATION

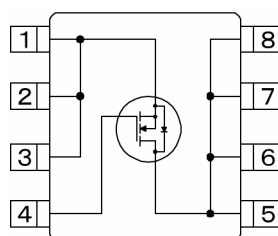


SOP-8
(TOP VIEW)

■ 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

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

PARAMETER	SYMBOL	RATINGS	UNITS
Drain-Source Voltage	V_{dss}	30	V
Gate-Source Voltage	V_{gss}	± 20	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	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55~150	$^\circ\text{C}$

* 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	I _{dss}	V _{ds} =30V, V _{gs} =0V	-	-	10	μA
Gate-Source Leak Current	I _{gss}	V _{gs} =±20V, V _{ds} =0V	-	-	±1	μA
Gate-Source Cut-Off Voltage	V _{gs(off)}	I _d =1mA, V _{ds} =10V	1.0	-	2.5	V
Drain-Source On-State Resistance *	R _{ds(on)}	I _d =5A, V _{gs} =10V	-	0.012	0.015	Ω
		I _d =5A, V _{gs} =4.5V	-	0.016	0.020	Ω
Forward Transfer Admittance *	Y _{fs}	I _d =5A, V _{ds} =10V	-	20	-	S
Body Drain Diode Forward Voltage	V _f	I _f =10A, V _{gs} =0V	-	0.8	1.1	V

* Effective during pulse test.

Dynamic Characteristics

Ta = 25°C

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Capacitance	C _{iss}	V _{ds} =10V, V _{gs} =0V f=1MHz	-	1370	-	pF
Output Capacitance	C _{oss}		-	740	-	pF
Feedback Capacitance	C _{rss}		-	280	-	pF

Switching Characteristics

Ta = 25°C

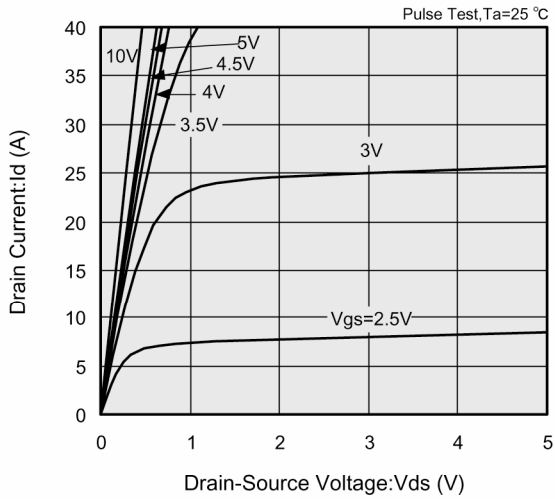
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-On Delay Time	t _{d (on)}	V _{gs} =5V, I _d =5A V _{dd} =10V	-	20	-	ns
Rise Time	t _r		-	25	-	ns
Turn-Off Delay Time	t _{d (off)}		-	40	-	ns
Fall Time	t _f		-	20	-	ns

Thermal Characteristics

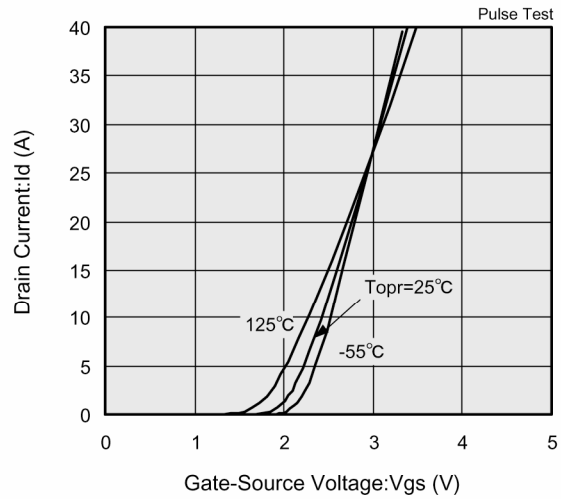
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal Resistance (Channel-Ambience)	R _{th (ch-a)}	Implement on a glass epoxy resin PCB	-	50	-	°C/W

TYPICAL PERFORMANCE CHARACTERISTICS

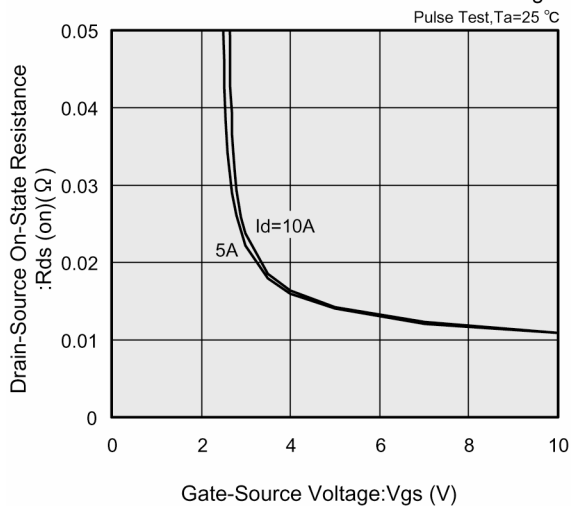
(1) Drain Current vs. Drain-Source Voltage



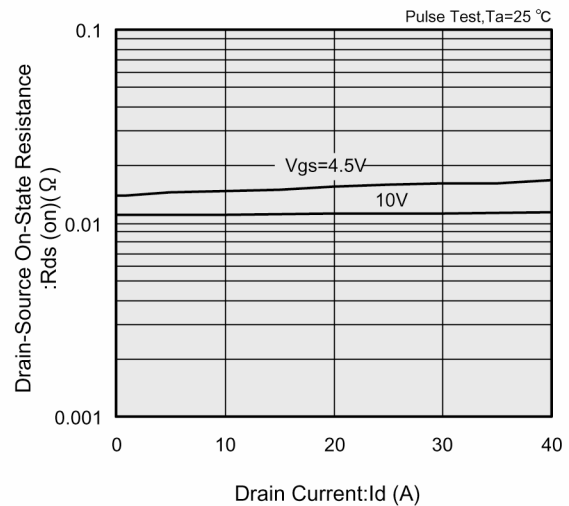
(2) Drain Current vs. Gate-Source Voltage



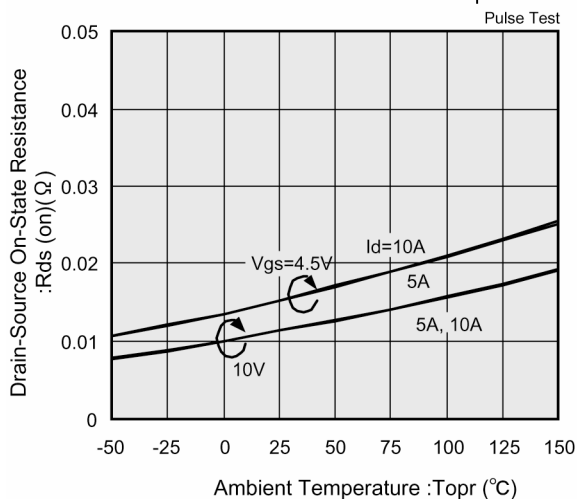
(3) Drain-Source On-State Resistance vs. Gate-Source Voltage



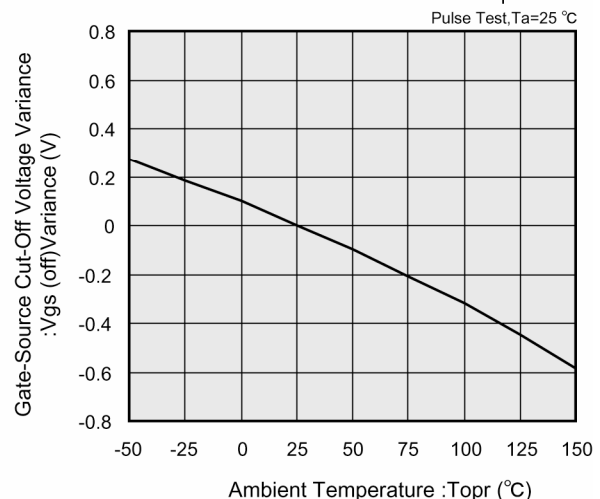
(4) Drain-Source On-State Resistance vs. Drain Current



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

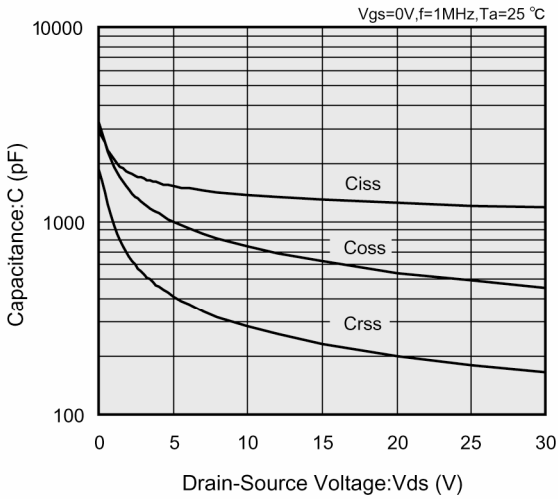


(6) Gate-Source Cut-Off Voltage Variance vs. Ambient Temperature

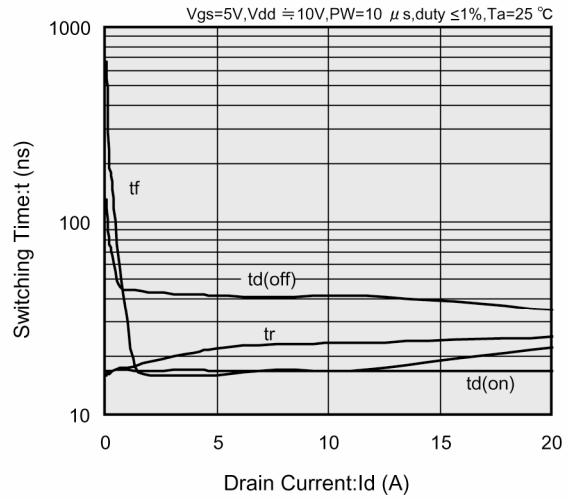


TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

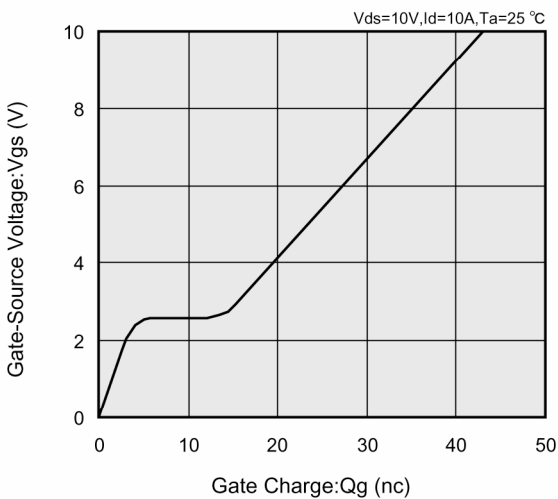
(7) Capacitance vs. Drain-Source Voltage



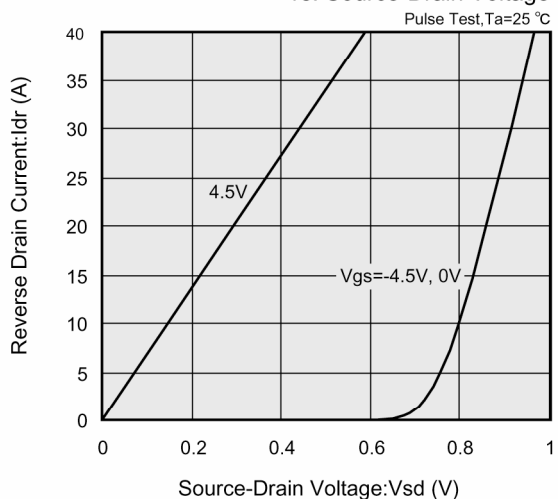
(8) Switching Time vs. Drain Current



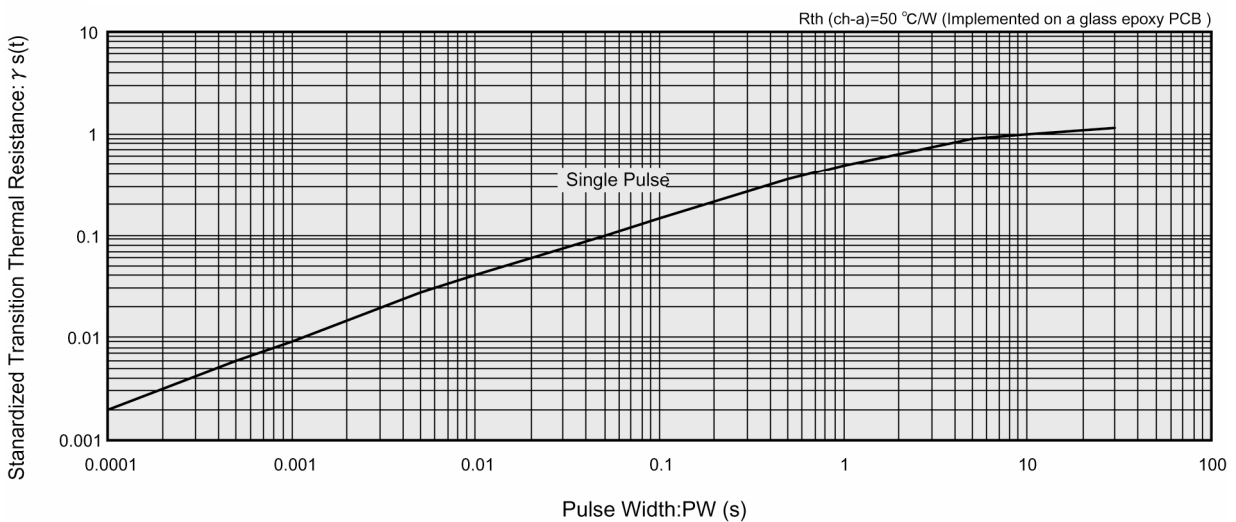
(9) Gate-Source Voltage vs. Gate Charge



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



(11) Standardized transition Thermal Resistance vs. Pulse Width



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